2021 EDITION

STANDARD TREATMENT GUIDELINES AND ESSENTIAL MEDICINES LIST

Of Common Medical Conditions in the Kingdom of Eswatini

SIVINQABA

MINISTRY OF HEALTH

ADULT

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Copies may be obtained from the:
Ministry of Health
Directorate: Health Services
Tel: +268 2404 5554
Fax: +268 2404 2092
Email: infohealth@gov.sz
Website: http://www.gov.sz

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FOREWORD

The Ministry of Health is pleased to present the second edition of the integrated standard treatment guidelines (STGs) and essential medicines list (EML) for common medical conditions in the Kingdom of Eswatini. The purpose of the guidelines is to standardise and improve cost-effective management of common diseases to enhance quality and efficiency in service delivery. Development of these guidelines were based on principles of scientific evidence, cost-effectiveness, and prioritisation of conditions to maximise health benefits with limited resources and is in line with the World Health Organisation (WHO) model list of Essential Medicines 21st edition of 2019.

The health system still faces multiple challenges that include a high burden of infectious diseases, that remain major causes of morbidity and mortality, such as; HIV, tuberculosis, Pneumonia and malnutrition. Furthermore, non-communicable disease conditions such as diabetes, hypertension, heart disease, and mental disorders exert more pressure on the already constrained health resources. These standard treatment guidelines will facilitate effective diagnosis and management of these conditions across all levels of care by presenting updated, practical, and useful information on the diagnosis and management of these common conditions. The essential medicines list also provides a rational basis for efficient procurement and supply of medicines as per the Essential Health Care package (EHCP) for specified levels. This is to ensure continuous availability of safe, efficacious, quality medicines and health supplies to emaSwati and also ensure the rational use of these medicines.

These guidelines were developed collaboratively involving wide consultations with relevant stakeholders and interested parties in the public, private not for profit, private for profit health sectors and academia. Lessons learnt from the development of the maiden editions of the Eswatini treatment guidelines were taken into consideration. These include enhancing content for secondary care, providing linkages to other programme guidelines, involvement of all health professional and development of an electronic application. These guidelines are therefore recommended for use at all heath facilities and at pre-service training institutions and will be distributed widely to all health care workers.

To promote continued appropriate use of medicines, health products and technologies in line with the Extended National Health Sector Strategic Plan II 2019-2023, these guidelines will be reviewed on a regular basis.

Finally, I would like to express my gratitude to the Directorate in the Ministry of Health; the STG/EML technical working group and the efforts of all those who worked on these guidelines. Special mention and gratitude go to the World Health Organisation and the Global Health Supply Chain- Procurement and Supply Management Project funded by the USAID, for providing sustained technical and financial support for the development of these important documents.

Honourable Senator Lizzy Nkosi
Minister of Health

PREFACE

Standard treatment guidelines provide evidence-based, practical, and implementable guidance to heath care workers to ensure cost-effective and affordable treatment of priority health conditions to optimise use of limited resources and provide a basis for formulation of an essential medicines list.

These guidelines have been reviewed and updated from August 2019 to December 2020 involving extensive consultations with public health programmes staff, medical experts, academics and health workers of all cadres. The treatments described in this standard treatment guidelines are therefore nationally recognised standard treatments, and in many cases, are derived from the appropriate Public Health programmes updated guidelines, World Health Organisation, and other international diseases guidelines.

As per the previous version, section A of the document contains the STG, and efforts have been made to have the conditions commonly encountered in Eswatini classified according to systems and written in simple, clear language. Each section consists of a short definition, common symptoms and signs of the disease or condition and then management (pharmacological and non-pharmacological).

Section B is the EML derived from recommendations from the STG. The medicines are clearly listed according to the Anatomical Therapeutic Chemical (ATC) classification system recommended by WHO. These guidelines are intended to be used as a guide and cannot replace clinical judgement in individual cases given the dynamic developments in clinical medicine. The Ministry of Health and all stakeholders involved in the development of the second edition (STG/EML) in the Kingdom of Eswatini believe that these guidelines will provide much needed guidance for improving quality of care at health facilities.

Dr. Simon M. Zwane
Principal Secretary

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Advisory and Leadership

Dr. Simon Zwane, Principal Secretary, Ministry of Health
Dr. Vusi Magagula, Director of Health Services
Ms. Fortunate Bhembe, Deputy Director Pharmaceutical Services
Dr. Velephi Okello, Deputy Director, Clinical Services
Ms. Rejoice Nkambule, Deputy Director, Public Health
Dr. Khosie Mthethwa, WHO
Mr. Timothy Rosche, Country Director, GHSC-PSM

STG/EML Task Team

Dr. Lomangisi Diana Dlamini, Anaesthesiologist, Mbabane Government Hospital
Ms. Thuli Magagula, Assistant Director Pharmaceutical Services, Essential Medicines
Dr. Precious Waweru, Physician Mbabane Government Hospital
Dr. Debra Vambe, Technical Advisor, National TB Control Programme
Dr. Nondumiso Ncube, Treatment Optimisation Focal Person, Eswatini National AIDS Programme
Mr. Siphesihle Gama, Senior Pharmacist Mbabane Government Hospital
Ms. Anita Hettema, CHAI Senior Programme Manager
Mr. Derrick Khumalo, Principal Laboratory Technologist, Mbabane Government Hospital
Mr. Denis Okidi Ladwar, Senior Technical Director, GHSC-PSM
Mr. Sebenta Menon, Dean of Faculty of Health Sciences, EMCU
Mr Yazanani Mthunzi, Pharmacist, Sound Health Pharmacy
Mr. Willie Siduna, Senior Regional Logistics Officer, GHSC-PSM
Ms. Lindiwe Malaza, Family Planning/Condom Programme Coordinator, SRH
Mr. Sakhile Dube, Pharmacist Raleigh Fitkin Memorial Hospital
Ms. Philile Zulu, Principal Pharmacist, Manzini Region
Ms. Sifundo Zwane, Principal Pharmacist, Hhohho Region
Dr. Nomthandazo Lukhele, WHO
Ms. Thobekile Cindzi, CHAI

Consultants and External Review

Professor Chiratidzo Ndlovu, Specialist Physician & Nephrologist, University of Zimbabwe Faculty of Medicine
Mrs. Ropafadzo Hove, Director of Pharmaceutical Services, Ministry of Health and Child Welfare, Zimbabwe
Mr. Forward Mudzimu, Procurement and Supply Manager, Ministry of Health and Child Welfare Zimbabwe.

Technical Assistance and Support

CHAI
GHSC-PSM
ICAP
WHO

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Contributors

Dr. Elly Agaba
Dr. Pawelos Beshah
Dr. Ignace Bigilimane
Dr. Paul Chilwesa
Ms. Lindiwe Mdluli-Dlamini
Dr. Thandiwe A.L. Dlamini
Dr. Siphesihle Happiness Dlamini
Ms. Siphiwesihle Dlamini
Dr. Ndumiso Dlamini
Ms. Sijabulile Dlamini
Dr. Ntokozo C. Dube
Mr. Sakhile Dube
Dr. Jayson Earnshaw
Ms. Ntombi Ginindza
Dr. Michael Ggayi
Dr. Takudzwanashe Gwitima
Ms. Tisho Hadzebe
Dr. Eunice Haumba
Dr. Cynthia Iradukunda
Ms. Pia Kirk
Mr. Abiy Korsa
Ms. Thea Litschka-Koen
Ms. Thandi Kunene
Dr. Rudo Kuwengwa
Ms. Felicity Lukhele
Dr. Jean Pierre Lukoji
Ms. Thelma Mabuza
Ms. Ntombikayise Madlopha
Ms. Gugulethu Madonsela
Ms. Busisiwe Mamba
Ms. Harriet Mamba
Dr. Malven Masango
Ms. Nobuhle Mthethwa
Dr. Dumsile Mabundza
Dr. Sikhumbuzo Masina
Ms. Zinhle Matsebula
Ms. Sindi Matse
Mr. Mpumelelo Mavimbela
Dr. Sibusiso Mkhize
Mrs. Bongisiwe Mosekoa
Ms. Nozipho Motsa
Dr. Simangele Mthethwa-Hleta
Ms Sibongile Mthethwa
Dr. Bismarck Mupundu
Mr. Noel Munzabwa
Dr. Violet David Mwanjali
Mr. Mgcineni Ndlangamandla
Ms. Purity Ndzimandze
Dr. Charity Newton
Dr. Erastor Ngonyani
Ms. Fikile Ngwenya
Dr. David Polepole
Dr. Jonathan Pons
Dr. Eunice Ruhinda
Dr. Grace Ruhinda
Mr. Vusi R. Shabangu
Dr. Nontobeko Simelane
Dr. Tholakele Zwane

HOW TO USE THIS BOOK

Following is a general overview of what this book contains and how to find it.

Sections of the Book

The Standard Treatment Guidelines (STG) and Essential Medicines List (EML) of common medical conditions in the Kingdom of Swaziland is divided into two sections:

- Section A: The STG component
- Section B: The EML component

How to Use the Standard Treatment Guidelines

The STG content in Section A is divided into 20 chapters that cover specific diseases by systems or conditions.

For example, in Chapter 1, "Cardiovascular System," you will find "1.1 Hypertension," and "1.4 Congestive Cardiac Failure."

Where applicable, each condition or disorder follows this format—

- Name of disease or condition
- Definition (World Health Organisation [WHO] standard case definitions if possible) followed by a short description, introduction, or explanation
- Causes (including duration and risk factors)
- Symptoms and signs (indicating the danger signs)
- Special investigations
- Management
  - Indicating nonpharmacological and pharmacological management
  - Differentiating treatment according to level of facility
  - Indicating when to refer
  - Advising according to age group
  - Mentioning side effects of certain medicines
  - Including important notes and precaution measures (see Caution notes)

- Health promotion, education, counselling, and follow-up (including dietary advice, follow-up dates, adherence checks, surveillance and contact tracing, rehabilitation advice, and complications, if applicable).

All the acronyms in the document can be found in the acronyms section. The description of the **codes** of medicines listed in the treatment guidelines **(ABCS)** and priority of the product **(VEN)** are described in the section below.

You will note that acronyms and abbreviations are not defined in the text of sections A and B. Please refer to the comprehensive list of acronyms in the frontmatter.

How to Use the Essential Medicines List

The EML content in Section B is divided according to the international Anatomical Therapeutic Chemical (ATC) classification system. Medicines are divided into groups according to the organ or system on which they act and their chemical, pharmacological, and therapeutic properties. The specific ATC codes, however, are not included because they are of no practical use for health workers. The medicines are listed according to their generic names.

Explanation of columns in the EML:

- **Column 1: Medicine.** This column contains the generic name of the medicine.
- **Column 2: Strength.** This column contains the different strengths of the preparations in the list. Combination strengths are illustrated by a + sign (e.g., rifampicin + isoniazid (150 mg + 75 mg) tablet.
- **Column 3: Dosage form.** This column describes the dosage form in which the medicines are available.
- **Column 4: Level of use.** This column describes at which level of care the medicine can be ordered and prescribed.
  - A—Indicates medicines that are distributed to all health care facilities as part of primary health care services. Both doctors and nurses can prescribe medicines from this class.
  - B—Indicates medicines that are distributed to health centres and hospitals. The prescribing of these medicines is restricted to medical doctors only. Medicines in this category can be initiated at level B and distributed to level A.
  - C—Indicates medicines that are distributed to hospitals only.
    Medicines in this class can only be prescribed by medical doctors working in hospitals, following appropriate microbial or diagnostic test results.
  - S—Indicates medicines that are distributed on demand by specialist doctors.
  - Asterisk (*)—Indicates medicines that are distributed by (vertical) national programmes (e.g., tuberculosis, mental health, family planning, Expanded Programme on ImmuniSation [EPI], and malaria control).

- **Column 5: VEN.** The VEN classification (used here as vital, essential, nonessential) describes the various medicines according to the importance of their therapeutic effect. It serves as a guide to prioritise medicine ordering in cases where budgets are insufficient to keep all EML medicines in stock.
  - V—These medicines are considered vital and should be in stock at the respective level at all times. These medicines are mostly used for life-threatening conditions and/or used for treatment that should not be stopped.
  - E—These medicines are essential for the health services. If at all possible, they should be available at the health facilities. They include medicine that are effective against less-severe but widespread illnesses
  - N—These medicines are nonessential. If they are not available for prescribing, however, no serious negative impact on the population's health is expected. In times of budgetary constraints, these medicines are of lowest priority

Feedback and Requests for Changes Comments on and requests for changes to the STG or EML should be discussed in institutional Pharmacy Therapeutic Committees and forwarded with recommendations to the Pharmaceutical Services Department at the Ministry of Health. Proposals for changes must be submitted using the appropriate form (refer to Annex 2 of this document). It is important that sufficient evidence be submitted (preferably controlled clinical trials) to support any changes.

Major changes from the previous version

This section will give an overview of the major changes in this latest edition of the STG/EML to make practitioners aware of the guideline recommendations that need to be considered in patient care, medicine management or supply issues. Drawing from the Essential Medicines List, facilities should come up with their locally adapted medicines formularies to ensure they order the medicines they use. Pharmacy and Therapeutic Committees should guide in selection of medicines for use at the facility as well as adherence to the treatment guidelines.

This edition has the same format and layout, categorisation of conditions as the last edition. For convenience and ease of reference, pharmacological management has been tabulated. In cases of major changes in treatment protocols, the STG/EML Task Team will send out the appropriate guidance.

Notable highlights in this edition are:

Introduction of the Paediatric Standard Treatment Guideline

To ensure effective management of paediatric patients, a separate guideline has been developed and stakeholders are encouraged to provide feedback on how the guidelines can be further improved.

Addition of new chapters

Three new chapters namely Anaesthesia, Oncology and COVID-19 have been added to the document.

Asthma Treatment

A stepwise approach to asthma management is recommended, with focus on the daily use of inhaled corticosteroids. The use of **oral** salbutamol has been stopped and practitioners should ensure that patients adhere to treatment and know how to use their inhalers.

ART Guidelines (use latest ART guidelines)

The use of Nevirapine based products has been stopped except in Prevention of Mother to Child Transmission, newborn babies and neonates. The use of Dolutegravir in paediatrics has been introduced. Practitioners should refer to the latest ART guidelines for any updates.

ABC	-	Airway, Breathing, Circulation
ABG	-	Arterial Blood Gas
ACE	-	Angiotensin Converting Enzyme
ACEI	-	Angiotensin Converting Enzyme Inhibitor
ACLS	-	Advanced Cardiac Life Support
ACR	-	Albumin to creatinine ratio
ADHD	-	Attention Deficit Hyperactivity Disorder
AED	-	Anti-Epileptic Drugs
AHA	-	Alpha Hydroxy Acid, American Heart Association
AIDP	-	Acute Inflammatory Demyelinating Polyneuropathy
AIDS	-	Acquired Immuno Deficiency Syndrome
AKI	-	Acute Kidney Injury
ANC	-	Antenatal Care
ANCA	-	Antineutrophil Cytoplasmic Antibodies
ANF/RF	-	Acute renal failure/ Rheumatoid Factor
APH	-	Antepartum Hemorrhage -
ARB	-	Angiotensin Receptor Blocker
ARDS	-	Adult Respiratory Distress Syndrome
ART	-	Antiretroviral Therapy
ASHP	-	American Society of Hospital Pharmacists
ASOT	-	Antistreptolysin-O test
AST	-	Aspartate aminotransferase
ATC	-	Anatomical Therapeutic Chemical
ATLS	-	Advanced Trauma Life Support
AV	-	Atrioventricular
AVN	-	Avascular Necrosis
AVPU	-	Alert, Voice, Pain, Unresponsive
AZT	-	Azidothymidine
BAD	-	Bipolar Affective Disorder
BBT	-	Basal Body Temperature
BD	-	Buerger Disease / Behavoral Disorder
BID	-	“bis in die” - Two times a day
BMAT	-	Bone Marrow Aspiration & Trephine
BMI	-	Body Mass Index
BP	-	Blood Pressure
BPFS	-	Biochemical Progression Free Survival
BTL	-	Bilateral Tubal Ligation
CAPD	-	Continuous Ambulatory Peritoneal Dialysis
CBC	-	Complete Blood Count
CBE	-	Clinical Breast Exam

CBS	-	Corticobasal Syndrome
CCB	-	Calcium Channel Blocker
CCF	-	Congestive Cardiac Failure
CEA	-	Carcinoembryonic Antigen A
CGA	-	Comprehensive Geriatric Assessment
CI	-	Coitus Interruptus
CIDP	-	Chronic Inflammatory Demyelinating Polyneuropathy
CINV	-	Chemotherapy-induced Nausea and Vomiting
CKD	-	Chronic Kidney Disease
CKMB	-	Creatine Kinase-MB
CLAT	-	Common Law Admission Test
CMP	-	Comprehensive Metabolic Panel, Calcium Magnesium Phosphate
CNS	-	Central Nervous System
CO_2	-	Carbon Dioxide
COC	-	Combine Oral Contraceptive
CR	-	Complete Remisssion
CrCL	-	Creatinine Clearance Test
CPR	-	Cardiopulmonary Resuscitation
CR	-	Controlled Release
CRP	-	C Reactive Protein
CRPC	-	Castration Resistance Prostate Cancer
CSF	-	Cerebral Spinal Fluid
CSF FTA abs	-	Cerebrospinal Fluid Fluorescent Treponemal Antibodies
CSS	-	Cancer Specific Survival
CT or CAT	-	Computerised Axial Tomography
CTG	-	Cardiotocography
CTZ	-	Chemoreceptor Trigger Zone
CVA	-	Cerebrovascular Accident
CVP	-	Central Venous Pressure
CVS	-	Cardiovascular system; Chorionic Villus Sampling
CXR	-	Chest X-Ray
DBS	-	Dried Blood Spot
DBP	-	Diastolic Blood Pressure
DHAP	-	Dihydroxyacetone Phosphate
DIC	-	Disseminated Intravascular Coagulopathy
DIFF	-	Differential
DKA	-	Diabetic ketoacidosis
DLBCL	-	Diffuse large B-cell lymphoma
DM	-	Diabetes Mellitus
DMARDs	-	Disease-modifying antirheumatic drugs
DMPA	-	Diffuse Large B-cell Lymphoma
DNA	-	Deoxyribonucleic Acid
DNA PCR	-	Deoxyribonucleic Acid Polymerase Chain Reaction
DPN	-	Dermatosis Papulosa Nigra
DPP	-	Diabetes Prevention Programme
DPT	-	Diphtheria Tetanus Pertussis

DSD	-	Differentiated Service Delivery
DSM	-	Diagnostic and Statistical Manual of Mental Disorders
DST	-	Drug Sensitivity Testing
DT	-	Diphtheria, Tetanus
DTG	-	Dolutegravir
DVT	-	Deep Vein Thrombosis
DW	-	Dextrose in Water
DWI	-	Diffusion Weighted Imaging
EBRT	-	External Beam Radiation Therapy
EBV	-	Epstein Barr Virus
EC	-	Emergency Contraceptive
ECE	-	Extracapsular Extension
ECG	-	Electrocardiogram
ECOG	-	Eastern Cooperative Oncology Group
EDLIZ	-	Essential Drug List In Zimbabwe
EEG	-	Electroencephalogram
EFV	-	Efavirenz
EFW	-	Estimated Fetal Weight
EHCP	-	Essential Health Care Package
EIB	-	Exercise-Induced Bronchoconstriction
EM	-	Electron Microscopy
EMA	-	Epithelial Membrane Antigen
EML	-	Essential Medicines List
ENT	-	Ear, Nose, and Throat
EPO	-	Erythropoeitin
ER	-	Estrogen Receptor
ERNA	-	Equilibrium Radionuclide Angiocardiography
ES	-	Epidural Steroids
ESAS	-	Erythropoiesis-stimulating agents
ESH/ESC	-	Erythropoiesis-stimulating agents / Embryonic Stem Cell
ESR	-	Estimated Sedimentation Rate
FBC	-	Full Blood Count
FB	-	Foreign Body
FBC	-	Full Blood Count
FDA	-	Food and Drug Administration
FDC	-	Fixed Dose Combination
FDR	-	First Dose Reaction
FEV	-	Forced Expiratory Volume
FFP	-	Fresh Frozen Plasma
FISH	-	Fluorescence in situ hybridisation
FIX	-	Fixed arm support
FLACC	-	Face, Legs, Activity, Cry, Consolability
FNA	-	Fine Needle Aspirate
FNAC	-	Fine Needle Aspiration Cytology
FP	-	Family Planning
FPG	-	Fasting Plasma Glucose
FQ	-	Fluoroquinolone
FSGS	-	Focal segmental glomerulosclerosis
G6PD	-	Glucose-6-Phosphate Dehydrogenase

GAD	-	Generalised Anxiety Disorder
GCS	-	Glasgow Coma Scale
G-CSF	-	Granulocyte Colony Stimulating Factor
GFR	-	Glomerular Filtration Rate
GIT	-	Gastrointestinal tract
GS	-	Gleason Score
GP	-	General Practitioner
GRF	-	Glomerular filtration rate
GSH	-	Gamma-glutamylcysteine Synthetase
GTN	-	Glyceryl Trinitrate
HAART	-	Highly Active Antiretroviral Therapy
HB	-	Haemoglobin
HbS	-	Haemoglobin S, Sickle-cell Hemoglobin
HBS Ag	-	Hepatitis B surface antigen
HbSS	-	Hank's Balanced Salt Solution
HC	-	Health Centre
HCTZ	-	Hydrochlorothiazide
HER2	-	Human Epidermal Growth Factor 2
HHS	-	Hyperosmolar Hyperglycemic State
HHV	-	Human Herpes Virus;
HIV	-	Human Immuno-Deficiency Virus
HIVDR	-	HIV Drug Resistance
HIVST	-	HIV Self-Test
HMGCoA	-	3-hydroxy-3-methyl-glutaryl-CoA reductase (rate-controlling enzyme)
HPV	-	Human Papillomavirus
HSG	-	Hysterosalpingography
HSPC	-	Hormone Sensitive Prostate Cancer
HSV	-	Herpes Simplex Virus
HTC	-	HIV Testing and counselling
HTN	-	Hypertension
IASP	-	International Association for the Study of Pain
ICE	-	Patients' ideas, concerns, and expectations
ICS	-	Inhaled corticosteroids
ICU	-	Intensive Care Unit
IDDM	-	Insulin dependent diabetes mellitus
IDF	-	International Diabetes Federation
IFE	-	Immunofixation electrophoresis
IGEV	-	Ifosfamide, Gemcitabine, and Vinorelbine
IHC	-	Immunohistochemistry
IM	-	Intramuscular
INH	-	Isonicotinic acid hydrazide
INR	-	International normalised ratio
IRIS	-	Immune reconstitution inflammatory syndrome
ITP	-	Idiopathic Thrombocytopenia
IU	-	International unit
IUCD	-	Intra Uterine Contraceptive Device
IV	-	Intravenous
IVI	-	Intravenous injection

JVP	-	Jugular Venous Pressure
KCL	-	Kilocalories, Potassium Chloride
KDIGO	-	Kidney Disease: Improving Global Outcomes
KFT	-	Kidney Function Test
KS	-	Kaposi Sarcoma
LABA	-	Long-acting beta-agonist
LAM	-	Lactational Amenorrhea Method
LDH	-	Lactate Dehydrogenase
LDL	-	Low-density lipoprotein
LEEP	-	Loop Electrosurgical Excision Procedure
LFT	-	Liver Function Test
LGE	-	Linear Gingival Erythema
LOC	-	Loss of consciousness
LOGMAR	-	Logarithm of Minimal Angle of Resolution
LTRA	-	Leukotriene Receptor Antagonists
MAC	-	Monitored Anaesthesia Care
MAM	-	Moderate Acute Malnutrition
MAP	-	Mean arterial pressure
MAV	-	Mitral valve prolapse
MCH	-	Mean corpuscular haemoglobin
MCPJ	-	Metacarpophalangeal Joint
MCS	-	Microscopy, culture, and sensitivity
MCV	-	Mean Corpuscular Volume
MDD	-	Major Depressive Disorder
MDR-TB	-	Multidrug Resistant TB
MDT	-	Multi-disciplinary Team
MEC	-	Medical Eligibility Criteria
MEN	-	Multiple endocrine neoplasia
MGIT	-	Mycobacteria Growth Indicator Tube
MI	-	Myocardial Infarction
MIU	-	Minor Injuries Unit
MLH	-	Macaque Luteinising Hormone
MO	-	Monocytes
MRC	-	Medical Reserve Corps.
MRI	-	Magnetic Resonance Imaging
MSE	-	Mental status examination
MSH	-	Melanocyte-Stimulating hormone
MTB/RIF	-	Mycobacterium Tuberculosis; Rifampicin (RIF) resistance
MTPJ	-	Metatarsophalangeal joint
MU	-	Million Units
MUAC	-	Mid-Upper Arm Circumference
MVA	-	Monovalent antivenom
MWL	-	Maximum Weight Limit

NCD	-	Non-communicable disease
NET	-	Neuroendocrine tumour
NF	-	Necrotising Fasciitis
NFPM	-	Natural Family Planning Methods
NG	-	Nasogastric
NGT	-	Naso-Gastric Tube
NHL	-	Non-Hodgkins Lymphoma
NI	-	Noise Index
NNRTI	-	Non-Nucleoside Reverse Transcriptase Inhibitor
NP	-	Necrotising Periodontis
NPH	-	Neutral Protamine Hagedorn [insulin]
NPO	-	Nothing by mouth
NRTIs	-	Nucleoside reverse transcriptase inhibitors
NSAID	-	Nonsteroidal anti-inflammatory drug
NSTEMI	-	Non-ST segment elevation myocardial infarction
NUP	-	Necrotising ulcerative periodontitis
NVP	-	Nevirapine
NYHA	-	New York Heart Association
OAC	-	Oral anticoagulant
OH	-	Obstructive Hydrocephalus.
ORS	-	Oral rehydration solution
OTP	-	Opioid Treatment Programme
PAV	-	Proportional assist ventilation
PCA	-	Patient Controlled Analgesia
PCI	-	Percutaneous Coronary Intervention
PCR	-	Polymerase chain reaction
PDPH	-	Post-dural puncture headache
PDR	-	Proliferative Diabetic Retinopathy
PE	-	Physical exam, pulmonary embolism
PEB	-	Post Extraction Bleeding
PEF	-	Peak expiratory Flow
PEFR	-	Peak expiratory flow rate
PEP	-	Post Exposure Prophylaxis
PET	-	Positron Emission Tomography
PIC	-	Post-intensive care syndrome
PID	-	Pelvic Inflammatory Disease
PMI	-	Point of Maximum Impulse
PMS	-	Pre Menstrual syndrome
PMTCT	-	Prevention of mother to child transmission
PNES	-	Psychogenic Non-epileptic Seizures
PO	-	Per os (by mouth)
POP	-	Progestogen only Pill
PPD	-	Purified Protein Derivative
PPE	-	Personal protective equipment
PPG	-	Post Pandral Glucose
PPH	-	Primary Pulmonary Hypertension

PR	-	Progesterone Receptor
PRBCs	-	Packed red blood cells
PrEP	-	Pre-exposure prophylaxis
PRN	-	As needed, whenever necessary
PROM	-	Premature rupture of membranes
PS	-	Performance Status
PSA	-	Prostate Specific Antigen
PT	-	Prothrombin Time
PTB	-	Pulmonary Tuberculosis
PTH	-	Parathyroid hormone
PTT	-	Partial Thromboplastin Time
PVA	-	Polyvalent Antivenom
PVRV	-	Purified Vero cell Rabies Vaccine
QID	-	Four times per day
QT	-	Qualification Test
RAS	-	Recurrent Aphthous Stomatitis
RCC	-	Red blood cell/count
RDT	-	Rapid diagnostic test
RIG	-	Rabbies Immunoglobulin
ROP	-	Retinopathy of Prematurity
RPR	-	Rapid Plasma Reagin
RR	-	Respiratory Rate
RSV	-	Respiratory Syncytial Virus
RUTF	-	Ready to use Therapeutic food
RV	-	Rabbies Vaccine
SABA	-	Short-acting beta-agonists
SAIMR	-	South African Institute of Medical Research
SAM	-	Systolic anterior motion
SAVP	-	Simultaneous Atrioventricular Pacing
SBP	-	Spontaneous Bacterial Peritonitis; Systolic Blood Pressure
SC	-	Subcutaneous
SC	-	Spinal Cord
SCC	-	Squamous cell cancer
SDH	-	Subdural hematoma
SIADH	-	Syndrome of inappropriate antidiuretic hormone
SIRS	-	Systemic inflammatory response syndrome
SJS	-	Stevens-Johnson syndrome
SLE	-	Systematic lupus erythematosus
SNRI	-	Serotonin and norepinephrine reuptake inhibitors
SR	-	Sustained release
SRE	-	Schedule of Recent Events
SS	-	Subserosal Sjogren's Syndrome
SSRI	-	Selective serotonin reuptake inhibitors
STAT	-	Immediately or instantly
STEMI	-	Segment elevation myocardial infarction
STG	-	Standard Treatment Guidelines
STIs	-	Sexually transmitted infection
TB	-	Tuberculosis
TBSA	-	Total body surface area

TCA	-	Tricyclic antidepressant
TEN	-	Toxic epidermal necrolysis
TIA	-	Transient Ischemic Attack
TID	-	Three times per day
TLS	-	Tumour Lysis Syndrome
TMJ	-	Temporo-Mandibular Joint
TOD	-	Target Organ Damage
TPF	-	Taxotere-Platinol-fluorouracil
TPHA	-	Treponema Pallidum Hemagglutination assay
TPT	-	TB Preventative Therapy
TRUS	-	Transrectal Ultrasound
TTCV	-	Tetanus Toxoid Containing Vaccine
TT	-	Tetanus toxoid
U&E	-	Urea and electrolytes
UA	-	Urine Analysis; also Uric Acid
UE	-	Upper Extremity (usually preceded by R or L)
UEA	-	Ung Emulcificans aquosum
UEC	-	Urea, electrolytes and creatinine
UFH	-	Unfractionated Heparin
ULN	-	Upper Limit of Normal
URT	-	Upper respiratory Tract
VA	-	Visual Acuity
VBG	-	Venous Blood Gas
VDRL	-	Venereal Disease research Laboratory
VERO	-	Verda reno, (green kidney)
VIA	-	Visual Inspection with Acetic Acid
VL	-	Viral load
VM	-	Venous malformation
VTE	-	Venous Thrombo Embolism
VWF	-	Von Willebrand Factor
WBC	-	White blood cells
WC	-	White cells
WCC	-	White Cell Count
WHO	-	World Health Organisation
WHZ	-	Weight-for-height z-score
WOA	-	Wide Open Airway
XDR-TB	-	Extensively drug resistant TB

CHAPTER 1

CARDIO-VASCULAR CONDITIONS

1.1 Hypertension

In Adults

- Three successive raised systolic readings ≥140 mmHg or diastolic ≥ 90 mmHg, using appropriate cuff size and procedure.
- (In children SBP/DBP >95th percentile for age, sex and height – see Pediatric Guidelines).
- Levels of adult hypertension are defined in *Table 1.1*.
- Patients are treated according to level of BP, cardiovascular risk factors, and the presence of compelling indications (*See Table 1.2*).
- Patients with Grade 3 hypertension should be treated according to severity outline (see the management of severe hypertension in this chapter, *Table 1.1)*.

Causes:

- In adults 90% is primary or essential hypertension (interplay between genetic predisposition and environmental factors) and about 10% is secondary.
- Usually secondary in young children (renal, renovascular, coarctation of the aorta, or endocrine including diabetes). See Pediatric Guidelines.

Table 1.1 Levels of Hypertension in Adults (Adapted from South African Guidelines 2014)

Stage	Systolic BP mmHg	Diastolic BP mmHg
Normal	<120	<80
Optimal	120-129	80-84
High normal	130-139	85-89
Grade 1	140-159	90-99
Grade 2	160-179	100-109
Grade 3	≥180	≥110
Isolated systolic	≥140	<90

Risk factors

- Family history, chronic kidney disease, diabetes mellitus, obesity, smoking (cigarettes/illicit drugs), look out for secondary hypertension causes.

Symptoms and signs

- Often asymptomatic. May have headache, blurred vision, epistaxis, chest pain, shortness of breath, palpitations.

Table 1.2 Major risk factors, target organ damage and complications. Adapted from the ESH/ESC guidelines

Major Risk Factor	Target Organ Damage	Complications
• Levels of SBP and DBP • Smoking • Dyslipidaemia o Total cholesterol >5.1mmol/l, **or** o LDL >3mmol/l, **or** o HDL in men <1 mmol/l and in women <1.2mmol/l • Diabetes mellitus • Age o Men >55y o Women >65y • Waist circumference o Men ≥102 cm and Women ≥ 88 cm • If Chinese or South Asian o Men >90cm and Women >80 cm	• Left ventricular hypertrophy: ECG o Sokolow-Lyons:>35mm o R in aVL>11mm o Cornel>2440mm/ms • Microalbuminuria: albumin creatinine ratio 3-30mg/mmol preferably spot morning urine with eGFR >60ml/min	• Coronary heart disease • Heart failure • Chronic kidney disease o Macroalbuminuria >30mg/mmol, **or** o eGFR <60ml/minute • Stroke or Transient ischaemic attack • Peripheral arterial/vascular disease • Advanced retinopathy with Hemorrhages OR exudates OR papilloedema

Nonpharmacological management

- Lifestyle modification is required. Low salt diet (<5g salt or <1tspn per day = <2g Sodium per day), low saturated fat diet, low sugar diet, limit alcohol, increase fruit and vegetables (see Nutrition section), no smoking, 30 minutes aerobic exercise at least x5 days/week, BMI 18.5-24.9.

Pharmacological management principles in Adults: BP medication for SBP ≥140mmHg or DBP ≥90mmHg is started as follows:

- **If < 3 risk factors, no TOD, and no complications and SBP remains** ≥140 mmHg or DBP remains ≥90 mmHg despite lifestyle modification for 3-6 months after diagnosis, then start one first line antihypertensive medication. Refer for Specialist review if <40y.
- **If ≥ 3 risk factors, diabetes, TOD, or complications and SBP** ≥140 mmHg or DBP is ≥90 mmHg with SBP and DBP <160/100mmHg, start one first line antihypertensive medication and lifestyle modification and review in 4-6 weeks. Refer for Specialist review.
- **If Grade 2 hypertension (BP≥160/100mmHg)**: start 2 first line anti-hypertensive medications same day, lifestyle recommendations and review in 4-6weeks.
- **Grade 3 hypertension:** treatment should be started on the same day according to the presence of symptoms and signs of rapidly progressing TOD (see section on 'The management of severe hypertension").
- First line medication include - 1. Calcium channel blocker, 2. Thiazide diuretic (or thiazide –like diuretic), and 3. Angiotensin converting enzyme inhibitor or angiotensin receptor blocker.
- If chronic kidney disease and diabetes mellitus prefer angiotensin converting enzyme inhibitor (or angiotensin receptor blocker if contraindication).
- In patients without complications or added cardiovascular risk factors – start with thiazide diuretics or calcium channel blocker.

- A non-selective Beta blocker is not recommended as first line (unless compelling indication by specialist).
- Do not combine ACE inhibitors and ARBs as this can precipitate acute kidney injury and hyperkalaemia.
- If GFR <45ml/minute prefer furosemide as diuretic over thiazide (taken bd 6 hours apart).
- Start medication at low dose and titrate up.
- Consider contra-indications/possible interactions with other medication the patient is on.

Ancillary medication

- Aspirin
  - Do not routinely prescribe aspirin to hypertensive patients unless patients have or are at high risk for cardiovascular disease (such as those with type 2 diabetes, coronary artery disease, transient ischaemic attack, stroke, or peripheral vascular disease).
  - Before prescribing aspirin, ensure BP is < 160/100mmHg to avoid intracerebral hemorrhage and ensure there are no other contra-indications to aspirin use.

- Statins
  - If diabetic nephropathy with albuminuria/proteinuria and no contra-indications to protect against increased cardiovascular risk, coronary artery disease, peripheral vascular disease, previous transient ischaemic attack, previous ischaemic stroke.
  - Atorvastatin preferred over simvastatin locally as less drug interactions with HAART.

Basic Investigations

- At first clinic visit - weight, height (for BMI), waist circumference, urine analysis for albuminuria and exclude pregnancy, glucose, ECG for TOD, chest x-ray for TOD, abdominal ultrasound scan, blood for - kidney function with electrolytes (suspect hyperaldosteronism if potassium is low), lipogram, FBC, uric acid.
- At each clinic review check weight, height (for BMI), waist circumference, glucose.
- Annual referral to Ophthalmologist for fundoscopy.
- Annual blood tests for kidney function and electrolytes, lipids (more regularly if abnormal and refer to Specialist).

Criteria for Specialist Referral

- Children
- Young onset hypertension aged less than 40 years
- Associated kidney disease
- Associated diabetes
- Associated target organ damage other than kidney disease – neurological, cardiac, vascular, eyes/ retinal
- Resistant hypertension
- Severe hypertension
- All women who have had hypertension in pregnancy, pre-eclampsia or eclampsia because they are at high risk of chronic hypertension and kidney failure.

What to do on follow-up clinic visits (monthly until goal is reached then 3 monthly)

- Review of medication:
  - o Ask patient to attend clinic with all medication packets.
  - o Ask about drug side effects.
  - o Check for compliance and barriers to compliance.
  - o Look for possible drug interactions with other medication being used.
- Assess BP control (aim <140/90mmHg for all adults except >80y where goal is SBP 140-150mmHg). If not at goal optimise doses or add another antihypertensive medication at starting dose.

Thiazide diuretic

	Medicine	Adult dose	Frequency	Duration	Codes
	Hydrochlorothiazide po	12.5 – 25mg *(max 25mg)*	Once a day	Long Term	A V

Class side effects include diabetes, dyslipidemia, hyperuricemea, hypokalemia. Contraindicated in gout.

Calcium Channel Blockers

	Medicine	Adult dose	Frequency	Duration	Codes
	Nifedipine slow release po	10 - 40mg	1-2 times a day	Long Term	B V
or	Amlodipine po	5 - 10mg	Once a day	Long Term	B E

Common side-effects for calcium channel blockers include aortic stenosis, hypertrophic obstructive cardiomyopathy, liver failure. May cause ankle swelling and gynaecomastia.

ACE Inhibitors

	Medicine	Adult dose	Frequency	Duration	Codes
	Enalapril	5 - 40mg	Once a day	Long Term	B V
or	Lisinopril	5 - 40mg	Once a day	Long Term	B E

Contraindicated in renal artery stenosis and angioedema. Monitor renal function and potassium levels. There is risk of developing angioedema and development of cough. If cough develops, use Irbesartan.

	Medicine	Adult dose	Frequency	Duration	Codes
	Irbesartan	75 - 300mg	Once a day	Long Term	B V

Use with caution in patients with ACE inhibitor induced angioedema. Contraindicated in renal artery stenosis, angioedema and renal artery hyperkalaemia.

Step 2: Second line therapy

Choice is dependant on compelling indications and risk factors. Maximise doses of individual medicines first then combine any two medicines from the first line agents.

Step 3: Third line therapy

Maximise doses of individual medicines. Use second line medicines and add any of the third line agents one at a time according to compelling indicators and risk factors.

Spironolactone an aldosterone antagonist is contraindicated in renal failure. Side effects include renal failure, Parkinson's disease, haemolytic anaemia and depression.

Medication considered for Second or Third line Therapy

	Medicine	Adult dose	Frequency	Duration	Codes
	Atenolol	25-100mg	1-2 times a day	Long Term	B V
	Methyldopa	250-500mg	3-4 times a day	Long Term	B V
	Doxazosin	4-16mg	Once daily	Long Term	C V
	Spironolactone	25-50 mg	Once daily	Long Term	B E
	Minoxidil	2.5-40mg	1-3 times a day	Upon review	C E
	Hydralazine	50-300mg	Every six hours	Upon review	C E

- **Examination** - Blood pressure control, BMI, waist circumference, investigations (Repeat any abnormal tests, annual tests per protocol), specialist referral if any problems.
- **Reinforce lifestyle measures** - Eexercise, no smoking, low salt, low sugar, high intake of fruit and vegetables.

Spironolactone an aldosterone antagonist is contraindicated in renal failure. Side effects include renal failure, Parkinson's disease, haemolytic anaemia and depression.

Beta blockers, such as atenolol and carvedilol are contra-indicated in asthma, chronic obstructive pulmonary disease, heart block, pregnancy (atenolol). Their side effects include peripheral vascular disease, bradycardia, glucose intolerance, metabolic syndrome.

Alpha blockers (eg doxazosin, prazosin, terazosin) are contraindicated for use in liver impairment and the elderly. They may cause severe hypotension, tachycardia and arrhythmias.

Hydralazine, a vasodilator is contraindicated in aortic stenosis, hypertrophic obstructive cardiomyopathy, tachycardia, systemic lupus erythematosus and to be used with caution in mitral stenosis, angina, renal impairment, liver impairment and porphyria.

Minoxidil, a vasodilator may precipitate heart failure if used as monotherapy without beta blocker and diuretic due to reactive water retention and tachycardia. Other side effects are hirsutism and pericarditis (pericarditis risk is increased in renal failure patients).

Centrally acting anti-hypertensive (e.g. methyldopa) may cause drowsiness, hepatitis, systemic lupus erythematosus and are to be used with caution in liver disease, phaeochromocytoma and porphyria.

Hypertensive emergencies:

- **Approach to severe hypertension without stroke**
  - Severe hypertension (Stage 3: systolic BP ≥ 180mmHg or diastolic BP ≥110mmHg or above the 95th percentile in children). Note can occur at lower BPs in pregnancy and in children.
  - History and examination to exclude rapidly progressive target organ damage.
  - Aim BP reduction by no more than 15-20% in the first 24 hours to avoid precipitating a stroke or other organ hypo-perfusion.
- **Asymptomatic severe hypertension** – absence of rapidly progressive target organ damage (repeat BP after patient has rested for one hour and treat if remains raised).
- **Medication combinations**

For non-chronic kidney disease patients.

	Medicine	Adult dose	Frequency	Duration	Codes
	Nifedipine slow release po	10 - 40mg	1-2 times a day	Long Term	B V
or	Amlodipine po	5 – 10mg	Once a day	Long Term	B E
plus	Hydrochlorothiazide	25mg	Once a day	Long Term	A V
In chronic kidney disease give:					
	Furosemide po	40-120mg	Once daily for water retention	Long Term	B V
plus	Nifedipine slow release po	10 - 40mg	1-2 times a day	Long Term	B V
or	Amlodipine po	5 – 10mg	Once a day	Long Term	B E

- Re-check blood pressure within 1 hour.
- If safely reduced with no symptoms, patient to be booked follow up within one week and sent home on oral dual therapy (calcium channel blocker and diuretic).
- Investigations to be as for first visit with search for secondary cause of hypertension.
- If BP no better – patient to be monitored in the hospital for safe BP lowering and investigations.

- **Hypertensive urgency** –non-immediately life-threatening target organ damage (for example, presence of headache and shortness of breath)
  - Admit for safe BP lowering and baseline investigations.
  - Treatment should be commenced with 2 oral agents with an aim to lower the DBP to 100 mmHg, slowly over 48 - 72 hours.

Medication combinations

	Medicine	Adult dose	Frequency	Duration	Codes
	Nifedipine slow release po	10 - 40mg	1-2 times a day	Long Term	B V
or	Amlodipine po	5 – 10mg	Once a day	Long Term	B E
plus	Hydrochlorothiazide	25mg	Once a day	Long Term	A V

If there is kidney impairment or pulmonary congestion give:

	Medicine	Adult dose	Frequency	Duration	Codes
	Furosemide po	80 - 160mg	1-2 times a day, at least 6 hours apart	Long Term	B V

Can also lower BP with:

	Medicine	Adult dose	Frequency	Duration	Codes
	Atenolol po	50mg	1-2 times a day	Long Term	B V
or	Enalapril po	5-10mg	Once a day	Long Term	B E

as second agent if no contraindications.

- **Hypertensive emergency** – acute BP rise with ongoing target organ damage in the eyes, brain, heart kidney and vessels.
  - Start IV antihypertensive medication such as labetalol (see Table for doses and contraindications). Change to oral once patient is stable.
  - ***Refer*** to tertiary hospital for close monitoring and controlled BP lowering.

- Lower BP to safe level (DBP 100mmHg) progressively over 8 hours and by 25% from baseline in the first 24 hours.

- **Approach to severe hypertension in stroke** (Oral treatment may be given unless patient is unable to swallow, when intravenous anti-hypertensive medication with a minimal effect on cerebral blood vessels is used (e.g. labetalol).
  - Blood pressure is raised in many patients with acute stroke and usually drops during the first days after stroke, even without specific medical treatment.
  - Blood flow in the critical ischaemic penumbra of the brain tissue that is potentially salvageable following stroke is passively dependant on the mean arterial pressure. In this setting, cerebral auto-regulation is impaired, and rapid BP reduction may result in an ischaemic stroke extension.
  - Avoid and treat hypotension in the setting of acute stroke.
- There are levels for ischaemic and haemorrhagic stroke however, above which cautious blood pressure lowering is recommended.
- **Intracerebral hemorrhage**
  - Aim to lower SBP <140mmHg to reduce hematoma formation (INTERACT trial) and urgent referral to Neurosurgery and ICU where more intensive BP reduction can be done under close monitoring.
- **Ischaemic stroke**
  - Current consensus in ischaemic stroke, BP should be observed for at least 1 - 2 hours.
  - Only a persistently elevated DBP >120 mmHg or SBP >220 mmHg should be treated, with caution and an initial 15% reduction in mean arterial pressure.

Intravenous antihypertensive medication

Medicine	Adult dose	Frequency	Duration	Codes
Labetalol	2.5-5mg. Every 15minutes to a maximum of 200mg in 24 hours. Infuse if equipment is available.			C V
Dihydralazine	2.5mg iv. Slowly repeat after 20-30 minutes to a maximum of 10mg in an hour. Infuse if equipment is available.			B V
Glyceryl Trinitrate	5-10mcg/min infusion. BP should be lowered in 2 to 5 minutes.			C E
Furosemide	40-80mg iv. Max dose of 500mg in renal failure			B V
Magnesium Sulphate	Loading dose of 4 g intravenous over 5-10 min, immediately followed by 10 g intramuscularly (5g into each buttock).			C V

1.2 Acute rheumatic fever

Rheumatic fever is a disease or condition in which the body develops antibodies against its own tissues. It generally follows a streptococcal throat or upper respiratory tract infection, especially between the ages 3 and 15, but it can occur in patients up to 30 years old. It is a systemic disease that primarily affects the heart and joints, and is characterised and is characterised by the presence of the following:

Symptoms and signs

- Heart murmur, fever, flitting (migratory) joint pain, possible previous sore throat or skin infection, erythema marginatum (reddish rash at the extremities), chorea (involuntary movement of limbs and face), subcutaneous nodules, anorexia.

Diagnosis

- Evidence of group A beta haemolytic streptococcal infection + 2 major modified Jones criteria or 1 major + 2 minor.

Pharmacological management

Adults

	Medicine	Adult dose	Frequency	Duration	Codes
	PhenoxymethyLpenicillin po	500mg	Twice daily	7-10 days	A V
or	Benzathine penicillin IM	1.2 Mu	At once		A V
and	Acetylsalicylic Acid po	25mg/kg	Four times a day	Until fever subsides	A E
For penicillin allergy	Erythromycn po	250mg	Four times a day	7-10 days	A V
For severe Carditis add:	Prednisolone	1-2mg/kg	Once a day	3 weeks	B V

Acute rheumatic fever prophylaxis in adults

Treat all patients with confirmed rheumatic fever and no rheumatic valvular disease until the age of 35.

	Medicine	Adult dose	Frequency	Duration	Codes
	Benzathine penicillin IM	1.2MU	Every three weeks	Until the age of 35	A V
or	PhenoxymethyLpenicillin po	250mg	Twice a day	Until the age of 35	A V
For penicillin allergy	Erythromycin po	500mg	Twice a day	Until the age of 35	A V

Pharmacological management in children

	Medicine	Adult dose	Frequency	Duration	Codes
	Phenoxymethylpenicillin	125-250mg	Four times a day	7-10 days	A V
and	Acetylsalicylic Acid po	1-2mg/kg	Four times a day	Until fever subsides	A E
For severe Carditis add:	Prednisolone	1-2mg/kg	Once a day	For 14 days, then reduce gradually over 7 days	B V

Caution: Acetylsalicylic is Contraindicated in children <8 years, clinician should weigh benefits and risks of Reye's syndrome.

Acute rheumatic fever prophylaxis in children

	Medicine	Adult dose	Frequency	Duration	Codes
	Benzathine benzylpenicillin IM	0.6MU	Every three weeks until 21years of age. Give adult dose for children over 30kg		A V
or	Phenoxymethylpenicillin po	125-250mg	Twice daily	until 21 years of age	A V
In penicillin allergy	Erythromycin 500mg po	125-250mg	Twice daily	until 21 years of age	A V

1.3 Valvular heart disease

Damage to heart valves commonly caused by rheumatic fever and occasionally by other causes; congenital heart defects; ischaemic heart disease.

Common valvular heart diseases include;

- Aortic stenosis, mitral valve stenosis, mitral regurgitation, aortic regurgitation, mitral valve prolapse.

Symptoms and signs

- Asymptomatic, features of congestive cardiac failure (see Table 1.6), heart murmurs.

Nonpharmacological management

- Low salt diet (<5g/day = <2g sodium/day), advise all patients with a heart murmur to inform health care providers of the presence of the heart murmur whenever reporting medical or dental treatment.

Refer all patients with heart murmurs to Tertiary level for assessment.

Pharmacological management

Refer for specialist treatment. Antibiotic prophylaxis before Dental procedures.

1.4 Congestive Cardiac Failure

A chronic and progressive condition which is characterised by a clinical syndrome resulting from the inadequacy of the heart to supply oxygen rich blood to the body. It may be due to inherited or acquired abnormalities of the cardiac structures and/or function.

Symptoms and signs

- Symptoms: progressive swelling of the extremities (ankles, pretibial region, sacral area), dyspnoea (shortness of breath) first exertion and later at rest, orthopnoea (shortness of breath while lying down causing a person to have to sleep propped up in bed or sitting in the chair), paroxysmal nocturnal dyspnoea (sudden shortness of breath at night when lying down), persistent productive cough (frothy), fatigue, nocturia.
- Signs - *See Table 1.6*
- Severity is assessed based on the New York Heart Association classification (NYHA) as follows:
  - *Class 1:* ordinary physical activities do not cause undue dyspnoea.
  - *Class 2:* comfortable at rest, dyspnea on ordinary physical activities
  - *Class 3:* less than ordinary activity causing dyspnoea which is limiting
  - Class 4: dyspnoea at rest, all activity causes discomfort.

Table 1.6 Signs of Congestive Cardiac Failure

Right Heart Failure	Left Heart Failure	Global CCF
Raised jugular vein pressure (JVP)	Pulmonary crackles (rales or crepitations)	Combination of signs from both left and right heart failure
Rapid pulse (tachycardia)	Cyanosis	Cachexia
Pitting peripheral oedema	Heart gallop	
Enlarged and tender liver	Displaced point of maximal impulse (PMI)	
Positive abdominojugular reflux	Pleural effusion	
Ascites	Murmur of mitral and tricusbid regurgitation	
	Wheezing	

Diagnosis

Diagnosis is clinical and based on signs and symptoms of heart failure, however they are neither sensitive nor specific, as well as special investigations.

- Resting 12 lead ECG: to assess cardiac rhythm and underlying conditions such as LVH, prior myocardial infarction, etc.
- Chest X-ray: can demonstrate cardiomegaly, pleural effusion, Kerley B lines, pulmonary oedema.
- Echocardiogram/Doppler: to assess left ventricular function, size of cardiac chambers, valvular disorders, etc. (Secondary or Tertiary level).

Nonpharmacological management

- Lifestyle modification:

  Low salt diet (<5g salt/day=<2g sodium/day), fluid restriction, routine modest physical activities such as walking as tolerated should be encouraged in those with NYHA I-III, no smoking, no excess alcohol.

- Pre-referral treatment

  Oxygen with aim to maintain oxygen saturation greater than 90% on pulse oximeter, Semi-Fowler's position (Nurse sitting upright).

Pharmacological management

- ***Refer*** all cases to Tertiary Centre.

Hospital management

Step 1.

- Give an ACE inhibitor

Medicine	Adult dose	Frequency	Duration	Codes
Enalapril; OR	5 - 20mg	Twice a day	Long Term	B V
Lisinopril	5-40mg	Once a day	Long Term	B E
If ACE inhibitors induce cough or angioedema, use ARBs				
Irbesartan; Plus	75 - 300mg	Once a day	Long Term	B V
Furosemide	20-40mg	1-2 times a day and titrate 1-2 times a day and titrate carefully upward		B E

Step 2. (Step 1 + selective Beta B blocker as below). Refer for specialist management

- Add selective beta blocker: B-blockers (e.g. carvedilol) decrease mortality in heart failure. with caution: '

start low and go slow'.

Medicine	Adult dose	Frequency	Duration	Codes
Carvedilol po	3.125mg (increase to 25-50mg/12hr). Dose to be increased after two weeks of therapy.	Twice a day	Long Term	B E

Step3. (Step 2 + aldosterone antagonist). Patient should be under specialist management

- Add an aldosterone antagonist –

Medicine	Adult dose	Frequency	Duration	Codes
Spironolactone po	25mg	Twice a day	Long Term	B E

For those in NYHA III-IV; Ejection fraction<35% on echocardiography (B).

Caution: Spironolactone can cause life threatening hyperkalaemia: Do not use together with potassium supplements; do not use when GRF<30ml/min or serum potassium is >5mmol/l. Serum potassium should be monitored regularly when aldosterone antagonists are used concomitantly with ACE inhibitors.

Digoxin may be added or newer drugs such as ARB/Neprilysin inhibitor (valsartan/sacubitril) combination (C).

CHAPTER 2

CENTRAL NERVOUS SYSTEM

2.1 Epilepsy

Epilepsy is a condition characterised by recurrent, unprovoked seizures. Table 2.1 describes the types of epilepsy.

Types of Epilepsy

<table>
<tr><th colspan="4">Partial</th></tr>
<tr><th colspan="2">Simple Partial</th><th colspan="2">Complex Partial</th></tr>
<tr><td colspan="2">Seizure on one side of the body with no loss of consciousness</td><td colspan="2">Partial seizure associated with a loss of consciousness</td></tr>
<tr><td colspan="4">Generalised</td></tr>
<tr><td>Generalised Tonic-Clonic</td><td>Tonic</td><td>Myoclonic</td><td>Absence</td></tr>
<tr><td>• Loss of consciousness preceded by—
• A brief stiff phase, which is followed by—
• Jerking of all the limbs</td><td>One or more limbs become stiff without jerking</td><td>Brief, usually generalised, jerks with retained awareness</td><td>• Occurs in childhood
• Sudden cessation of activity followed by a blank stare
• Usually no muscle twitching
• Some children will smack their lips</td></tr>
</table>

Diagnosis

- Diagnosis of seizure is mainly based on history and clinical examination. To be diagnosed with epilepsy, an individual must have had two or more seizures in the last 12 months. It is important to take into consideration common differential diagnoses such as syncope and PNES (psychogenic non-epileptic seizures).
- Supplementary assessment should include a physical assessment, including complete neurological examination, random blood glucose level, electrolytes (i.e., sodium, calcium, magnesium), and renal and liver functions. Important studies to be considered include an EEG and a neuroimaging exam (e.g., CT scan or MRI).

Non-pharmacological management

- Emphasise the need for family and community support; assign a treatment supporter.
- Instruct the patient to keep a seizure diary to record the date, time, and most importantly, the description of the seizures.
- Inform the patient that alcohol, illicit drugs, and herbal or traditional medicines can cause or worsen seizures.
- Advise patient with epilepsy against doing any of the following: Driving of a vehicle if he or she has not been certified to be seizure-free, swimming alone, working at heights, ingesting alcohol and other psychoactive substances, operating machinery, cooking by open fire alone.

Pharmacological management Acute Phase

- Termination of seizures; if the person is convulsing;
  - o Consider ABC in management of emergency cases

Summary of Termination of seizures

Medicine		Dose	Frequency	Duration	Codes
	Diazepam IV	Initial dose; 10mg slowly no faster than 2mg/minute Max. 20mg	Stat dose	Immediate	B V
	Administer/prescribe another dose of 5-10mg if the patient is still fitting after 10-15minutes of the first dose.				
or	Lorazepam IV	Initial dose; 4mg slowly no faster than 2mg/minute Max. 10mg	Stat dose	Immediate	B E
	Inject another dose of 2-4mg if the patient is still fitting after 10-15minutes of the first dose.				
plus or	PhenobarbitalIV	Initial dose; 200-400mg at a rate of 2mg/minute diluted in 200mls of sodium chloride 0.9% Max. 400mg	Stat dose	Immediate	B V
or	Phenytoin IV	Initial dose; 250-500mg diluted in sodium chloride 0.9% administered not faster than 50 mg/minute Max. 500 mg	Stat dose	Immediate	B V

Generally the patient should receive a benzodiazepine (Diazepam or Lorazepam) PLUS an anti-convulsant (Phenytoin/Phenobarbital).

- ***Refer*** the patient for possible management of status epilepticus if fits continues after fifteen minutes of receiving the second dose of benzodiazepines.

Principles of managing epilepsy

General pharmacological management guidelines include the following:

- Begin with monotherapy at lowest dosage range.
- If seizures are not controlled, increase the dose gradually to upper limit of dosage range or until side effects appears.
- If seizures are poorly controlled, change to a different medicine, gradually reducing the dose of the initial agent while simultaneously introducing the new one.
- Try three single medicines before resorting to a medicine combination, which is helpful in only a minority of cases.
- Regular compliance is the key to successful seizure control and counseling the patient is the most critical factor in compliance. Do not increase the dose of anti convulsant medication if adherence is not good or there were less than three epilepsy episodes in a month.
- Similar efficacy rates of most anticonvulsants drugs (AEDs) mean adverse effect profile is often the determining factor in medicine selection.
- The most common adverse effects are dose-dependent and reversible.

Summary of Pharmacological Management of Epilepsy

Type of Seizure	Type of Seizure Treatment
Generalised tonic–clonic, simple partial, and complex partial seizures	**Carbamazepine, phenobarbital, phenytoin, Levetiracetam, Lamotrigine and sodium valproate CR are** widely used in the treatment of these conditions.
Absence seizures	**Both ethosuximide, Lamotrigine and sodium valproate CR** are widely used in the treatment of absence seizures and are usually well tolerated.
Tonic seizures, atonic seizures, and atypical absence seizures	**Phenobarbital, Lamotrigine** used for tonic seizures and **sodium valproate CR** for atonic seizures and atypical absence seizures.
Myoclonic seizures	**Levetiracetam, Sodium valproate CR** is widely used and most effective for juvenile myoclonic seizures.

Long term management of epilepsy

Medicine		Dose	Frequency	Duration	Max dose	Codes
1st Line						
	Phenytoin po	Initial dose; 150-300mg	Once to three times	Long term	600mg/day	A E
	Increase the dose gradually at an interval of 7-14 days by 30-100mg increments until fits are controlled or max dose is reached.					
or	Carbamazepine CR po	Initial dose; 200mg	Once to three times	Long term	1.6g/day	B V
	Increase the dose gradually at an interval of 7-14 days by 200mg increments until fits are controlled or max dose is reached.					
or	Carbamazepine po	Initial dose; 200mg	Once to three times	Long term	1.6g/day	B V
	Increase the dose gradually at an interval of 7-14 days by 200mg increments until fits are controlled or max dose is reached.					
or	Phenobarbital po	Initial dose; 30-60mg	Bedtime	Long term	180mg/day	A V
	Increase the dose gradually at an interval of 7-14 days by 30mg increments until fits are controlled or max dose is reached.					
2nd Line						
or	Sodium Valproate CR po	Initial dose; 300-500mg daily for 2 weeks	Once to three times	Long term	2.5g/day	B E
	Increase the dose gradually at an interval of 7-14 days by 300-500mg increments until fits are controlled or max dose is reached.					
or	Lamotrigine po	Initial dose 25-50mg daily for 2 weeks	Once to three times	Long term	400mg/day	B E
	Increase the dose gradually at an interval of 7-14 days by 25-50mg increments until fits are controlled or max dose is reached.					
or	Levetiracetam po	Initial dose; 250mg	Once to three times	Long term	300mg/day	C E
	Increase the dose gradually at an interval of 7-14 days by 250mg increments until fits are controlled or max dose is reached.					

NB: Sodium valproate and Lamotrigine are first line in patients on HAART (see notes on epilepsy and HIV)

Interactions:

- Avoid use in HAART, Isoniazide may increase reactive intermediates causing hepatotoxicity, Oral contraceptives— reduced efficacy, other anticonvulsants—often lowers plasma concentration of Sodium valproate CR and phenytoin (may raise phenytoin level).
- Avoid carbamazepine (plain and CR), phenytoin and phenobarbital to patients who are on HAART as it inhibits PIs and NNRTIs.
- Sodium Valproate CR may act as a hepatic enzyme inhibitor, increases Zidovudine serum levels. Monitor closely for signs of toxicity. Does not reduce efficacy of oral contraceptive pill.

Adjuvant Therapy for management of epilepsy

- For poorly responding epilepsy as an add on medication

Medicine		Dose	Frequency	Duration	Codes
	Clonazepam po	Initial dose; 0.5-1mg Max. 20mg/day	Once to thrice a day	Short term	C E
	Increase the dose gradually by 0.5mg at an interval of 3-7 days if the patient still presents				

Psychotic Symptoms and Epilepsy

- Prescribe anticonvulsant(s) concurrently with a low dose of antipsychotics as below:
- If psychosis persists increase the dose of an anticonvulsant as almost all anti-psychotics are epileptogenic and may worsen seizures.

Medicine		Dose	Frequency	Duration	Codes
	Haloperidol po	Initial dose; 1.5mg Max. 1.5mg/day	Bedtime	Short to long term	B E
or	Risperidone po	Initial dose; 1-2mg Max. 3mg/day	Bedtime	Short to long term	B E

Note:

- Refer patient(s) to a Medical Practitioner for initial evaluation to assess for etiology of epilepsy and initiation of anticonvulsant medications.
- When patients are started on anticonvulsant medicines and HAART or anti-TB therapy, they should be reviewed by a Medical Practitioner because of potential problems with drug interactions.
- Patients on HAART who are taking phenytoin, phenobarbital and/or carbamazepine should be switched to Lamotrigine, Levetiracetam or Sodium valproate CR to avoid potential drug-drug interactions.
- Carbamazepine CR is mostly preferred as it is less sedative. Preferably prescribe it if the client requires high dose.
- Prescribe Carbamazepine (plain and CR) concurrently with folic acid 5 mg daily, because it inhibits folate metabolism.
- Lamotrigine has high risk of inducing Steven Johnson Syndrome, cautious while prescribing it and it is better prescribed by a Medical Practitioner.
- Use phenobarbital with caution in diabetes, asthma, hyperthyroidism, elderly patients, debilitated patients, children, hepatic impairment, renal impairment, respiratory, depression, pregnancy and breastfeeding.
- Check serum plasma levels of anticonvulsants every 6 to 12 months for monitoring purposes.

- Check serum concentration levels of anticonvulsants if seizures are not controlled despite of good adherence and high dose before changing to another anti-convulsant.
- Sodium valproate causes weight gain as a side effect, avoid in obese clients and weight conscious individuals.
- Avoid Carbamazepine, phenytoin and Phenobarbital to patients who are using HAART because these can reduce serum concentration of non-nucleoside reverse transcriptase inhibitors and protease inhibitors.
- Do not prescribe chlorpromazine to clients with epilepsy because it lowers seizure threshold more compared to other antipsychotics hence may induce more epilepsy attacks.

Epilepsy secondary to neurocysticercosis

	Medicine	Dose	Frequency	Duration	Codes
	Albendazole	400mg (15mg/kg/day in 2-3 divided doses)	2 to 3 times a day	for 14-21 days	A V
plus	Prednisolone	20-60mg in the morning reducing gradually by 5-10mg every 7 days		for 14-21 days.	B V

Stopping anti-convulsant medications

- Consult a Physician/Neurologist/Psychiatrist
- Treatment can be stopped only after 2 to 3 years of being seizure free with no risk of relapse.
- The majority of epilepsy patients may require long-term maintenance dose of anticonvulsant.

Special conditions

- Neonates and children; (Refer to Neonatal Seizures.)
  - o Avoid using phenobarbital because it can cause behavioural and cognitive dysfunctions.
  - o As children grow, their medication should be titrated up. Weigh child, and refer for review by MO at least every 6 months.

Pregnancy

If possible, women should have their epilepsy treatment reviewed before becoming pregnant. The following supplements should be taken during pregnancy:

	Medicine	Dose	Frequency	Duration	Codes
	Folic acid po	5mg	Once a day	for the duration of the pregnancy	A E
and	Phytomenadione (Vitamin K) po	10mg	Once a day	in last month of pregnancy	A V
Give baby	Phytomenadione(VitaminK) im	1mg	At birth		A V

2.2 Status Epilepticus

A generalised convulsion lasting 5 minutes or longer, or repeated tonic-clonic convulsion occurring over 5 minutes. It is a medical emergency that carries a high mortality rate.

Diagnosis

- Diagnosis is based on history.

Caution: If a patient is diagnosed with status epilepticus, start management before any laboratory tests.

Non-pharmacological management

Start ABC

- **Airway**—secure airway; may need to intubate the patient
- **Breathing**—give oxygen
- **Circulation**—assess pulse and blood pressure, establish IV access, fluid resuscitation
- Check blood sugar level, and if RBS < 2 mmol/L, give glucose (50 mL of 50% dextrose , and then follow guidelines for hypoglycaemia (see Medical Emergencies Chapter))

Pharmacological management

Seizures should be stopped promptly as prolonged seizures can cause permanent brain damage. Aim for definitive control within 60 minutes of onset.

Initial treatment

	Medicine	Dose	Frequency	Duration	Codes
	Diazepam iv	10 mg slowly no faster than 2mg/minute repeat after 5-10minutes if necessary up to a maximum of 20mg.			B V
or	Lorazepam iv/im	4mg im/iv, repeat after 5-10 minutes if necessary; Max 8mg/12 hours.			B E
or	Midazolam im/iv	10mg, repeat after 5-10 minutes if necessary			B E
plus	Phenytoin iv	20 mg/kg diluted in sodium chloride 0.9% administered not faster than 50 mg/minute preferably with cardiac monitoring. If arrhythmias occur, interrupt the infusion temporarily and reintroduce slowly			B E

If seizures continue after 30 minutes, intubate and ventilate patient then prescribe;

	Medicine	Dose	Frequency	Duration	Codes
	Thiopental iv	4 mg/kg, followed by 50 mg bolus every 2–3 minutes to control seizures. Maintenance dose: 1–5 mg/kg/hour. Beware of hypotension. Once seizures controlled for 24 hours, wean off by decreasing the dose by 1 mg/kg every 12 hours.			B E
or	Propofol iv	3mg/kg/dose as a bolus. Maintenance dose: 30–100 mcg/kg/minute.			B E

Higher initial maintenance doses of phenytoin may be needed in patients who have had sodium thiopental. Doses should be guided by daily therapeutic drug monitoring until phenytoin levels have stabilised after sodium thiopentone has been weaned off.

Maintenance Therapy after managing status epilepticus;

- If seizures are controlled prescribe oral anticonvulsants, refer above on **Long term management of epilepsy**
- First maintenance dose should be no more than 12 hours after the loading dose.

If patient shows any sign of alcohol abuse give:

	Medicine	Dose	Frequency	Duration	Codes
	Vitamin B1(thiamine) iv	100mg	Once a day	Long term	A N

If pregnant, consider eclampsia, and treat with magnesium sulphate (B) (Obstetrics & Gynaeology). Treat any underlying reversible causes.

	Medicine	Dose	Frequency	Duration	Codes
	Lamotrigine po	25mg daily for 2 weeks. Increase gradually by 50-100mg every 7-14days to a maximum of 400mg a day in 2 divided doses if response is poor.			B E
or	Sodium valproate po	200–300 mg 12 hourly after food Increase, as required, every 2 weeks to a maximum dose of 1200 mg 12 hourly. If attacks continue inccrease the dose by 200-300 mg/24hours i.e. 300mg po mane and 600mg po nocte OR 300 mg po mane and 500 mg po nocte for 14 days, If poor response after 14 days increase the dose gradually by 200-300 mg/24hours at 3 – 7 days intervals until control is achieved or as tolerated by the patient in 2-3 divided doses. Maximum: 2.5 g daily in divided doses. Usual maintenance dose: 1–2 g daily (20–30 mg/kg)			B E
or	Levetiracetam po	Initial dose 250 mg po 12 hourly for 7-14 days If the patient continues to experience epilepsy attacks increase the dose by 250 mg i.e. 500 mg po at bedtime (nocte) and 250 mg mane for 14 days, if poor response after 14 days increase the dose gradually by 250 mg increments at 5 – 7 days interval until control is achieved, or as tolerated by the patient up to a maximum dose of 3000 mg/day in 2 divided doses.			A V

Epilepsy with TB and/or HIV
When patients are started on Anti-epileptic medicines and ART or anti-TB therapy, they should be reviewed by an MO because of potential problems with drug interactions.

Sodium valproate/Lamotrigine/ Levetiracetam is the first line for individuals on HAART or TB treatment.

Notes
Patients on ART who are taking phenytoin, phenobarbital and carbamazepine should be switched to lamotrigine or valproate to avoid potential drug-drug interactions due to the enzyme inducing effects of these antiepileptic medicines.

Sodium valproate is the preferred choice if patient is on HAART.
Cautions - Liver toxicity, potentially fatal (especially in children <2 yrs), blood or hepatic disorders (measure LFTs + CBC before starting therapy), pancreatitis, SLE, avoid abrupt withdrawal, renal impairment, pregnancy (spina bifida occurs in 1–2% of exposures 17–30 days after fertilisation), breastfeeding.

Interactions - May act as a hepatic enzyme inhibitor, increases Zidovudine serum levels. Monitor closely for signs of toxicity. Other antiepileptics—raises plasma concentrations of active metabolite of carbamazepine, phenobarbitone, and phenytoin (may also lower phenytoin). Does not reduce efficacy of oral contraceptive pill.

Side effects - Common—nausea, vomiting, diarrhoea, and constipation. CNS effects (dose-related) include fatigue, sedation, and ataxia.

Uncommon—skin rashes, hair loss, blood and liver disorders, and pancreatitis. Inform patients how to recognise (i.e., watch for fever, sore throat, rash, mouth ulcers, bruising or bleeding, abdominal pain).

Lamotrigine can be used as add on therapy to valproate. The metabolism of lamotrigine is induced by lopinavir/ritonavir and atazanavir/ritonavir. The dose of lamotrigine may need to be increased when patients are switched to a lopinavir/ritonavir- or atazanavir/ritonavir containing regimen.

2.3 Cerebrovascular Syndromes

2.3.1 Stroke

General measures

- Optimise hydration and nutrition; insert nasogastric tube if patient cannot swallow.
- Take precautions to ensure an open airway if patient is unconscious.
- Full history and careful cardiac examination: Ischaemic stroke in young adults (< 45 years of age) may be due to:
  - o Atherosclerosis
  - o **Embolic:** e.g. rheumatic heart disease, atrial fibrillation, cardiomyopathy, previous myocardial infarction, and, very rarely, patent foramen ovale
  - o Investigate ECG/CXR, and echocardiography
  - o **Vessel wall disease:** e.g. syphilis HIV infection, collagen-vascular diseases, or related to acute or chronic meningitis, and other rarer disorders such as sarcoidosis and Wegener's granulomatosis, and extracranial arterial dissection.
  - o Investigate as dictated by clinical presentation, but at least syphilis and HIV serology, urine dipstix (haematuria and/or proteinuria), and ANF/RF. ANCA, and cerebral angiography or carotid Doppler may be indicated. Although the finding of a carotid bruit in a symptomatic patient should lead to further investigation, its absence does not exclude significant carotid stenosis.
  - o **Hypercoagulable States:** e.g. antiphospholipid antibody syndrome, thrombotic thrombocytopenic purpura. Useful screening investigations are FBC and, in women, PTT/Anti-phospholipid Ab. Testing for thrombophilias and their management should only be done in consultation with an expert.
- Physiotherapy/occupational/psychological/social worker and good nursing care
- Do an ECG to out an acute coronary event or atrial fibrillation as precipitants
- Do RPR (serology to exclude meningovascular syphilis)
- Check lipid profile if there are clinical features to suggest dyslipidaemia
- Although the finding of a carotid bruit in a symptomatic patient should lead to further investigation, its absence does not exclude significant carotid stenosis.

Pharmacotherapy management

Measures for secondary prevention may not be appropriate for patients with severe disability.
All patients not on anticoagulation:

	Medicine	Dose	Frequency	Duration	Codes
	Acetylsalicylic acid	150mg	Once a day with food	Long term	A E

For patients with a thrombotic stroke for secondary prevention, irrespective of the LDL level, treat with HMGCoA reductase inhibitors.

	Medicine	Dose	Frequency	Duration	Codes
	Atorvastatin po	20mg	At night	Long term	B E

For DVT prophylaxis, low dose subcutaneous heparin

	Medicine	Dose	Frequency	Duration	Codes
	Heparin sc	5 000 units	Twice a day	Review	C V
or	Enoxaparin sc	40mg	Once a day	Review	S E

In patients with cardioembolic strokes (e.g. atrial fibrillation) start anticoagulation with warfarin 7 days after an index event provided there is no haemorrhage on CT scan.

Bridging anticoagulation with heparin, or earlier initiation of warfarin, is not recommended because, although it reduces ischaemic stroke recurrence, it causes an equivalent increase in symptomatic intracranial haemorrhage.

Treat secondary pulmonary and urinary tract infections appropriately.

Blood pressure management:
A transient increase in BP is common after an acute stroke. Do not actively lower a BP of less than 220/120 mmHg in the first few days after stroke as this may be associated with an increased risk of death. In patients presenting with stroke and BP > 220/120 mmHg lower BP to about 180/110 in the first 24 hours. If BP > 220/120 mm Hg, give a long-acting calcium channel blocker and if adequate fluid intake can be ensured give a thiazide diuretic.

	Medicine	Dose	Frequency	Duration	Codes
	Amlodipine po	5mg	Once a day	Review	B E
or	Hydrochlorothiazide po	25-50mg	Once a day	Review	B V

Good long-term BP control is important for patients whose BP remains elevated after the first few days

Referral: To a facility with a CT scan.

- Patients with atypical clinical presentation.
- Selected patients with suspected ischaemic stroke who may benefit from thrombolysis with tissue plasminogen activator if initiated within 3 hours of onset of symptoms.
- Patients with suspected posterior cerebral fossa haemorrhage who may require surgical decompression.
- If there is a history suggestive of subarachnoid haemorrhage or if there is neck stiffness.

2.3.2 Transient Ischaemic Attack (TIA)

A transient ischaemic attack is an episode of the brain, spinal cord, or retinal ischaemia causing focal neurological dysfunction usually for less than one hour. Risk of subsequent stroke is highest in the week after a TIA.

Consider hypoglycemia, epilepsy and migraine as alternative causes for the symptoms.

The ABCD2 scoring system:

ABCD2 items (score: 0-7)		Points
A	Age: ≥60 years	1
B	Blood pressure: ≥140/90mm Hg	1
C	Clinical features: • Unilateral weakness or • Speech impairment without weakness	 2 1
D	Duration of symptoms: • ≥60 minutes or • 10-59 minutes	 2 1
D	Diabates: (on medication/insulin)	1

ABCD2 score of ≥4 is regarded as high risk and warrants urgent investigation and management as the risk of stroke within the next week is ≥4%.

Pharmacological therapy
In cardioembolic disease,

	Medicine	Dose	Frequency	Duration	Codes
	Warfarin po	5mg	Once a day	Long term	A E

INR should be done after 48 hours, then every 1 to 2 days until within the therapeutic range of 2 to 3 Adjust dose to keep INR within therapeutic range.

For other patients,

	Medicine	Dose	Frequency	Duration	Codes
	Acetylsalicylic Acid po	150mg	Once a day with food	Long term	A E
plus	Simvastation po	10mg	At night	Long term	B E
or	Atorvastatin po	20mg	At night	Long term	B E

In addition, manage hypertension.

2.3.3 Subarachnoid Haemorrhage

- Bleeding into the subarachnoid space, most commonly due to the rupture of a vascular aneurysm.
- Patients frequently present with an acute onset of severe headache and may have additional neurological symptoms and signs
- Diagnosis is confirmed preferably by neurological imaging and, when this is not available, urgently by lumbar puncture, demonstrating xanthochromia.

General measures:
Maintain normal hydration and electrolyte status and control blood pressure.

Pharmacological therapy:
Analgesia if level of consciousness is not impaired. Avoid NSAIDs.

	Medicine	Dose	Frequency	Duration	Codes
	Paracetamol po	1g	Every 4-6 hours max dose 4g in 24 hours	5 days	A E

If no response,

	Medicine	Dose	Frequency	Duration	Codes
	Morphine IV	10mg	At once		B V

In patients with grades 1 to 3 impairment of consciousness level while waiting for transfer to neurosurgical facility and in consultation with neurosurgeon,

	Medicine	Dose	Frequency	Duration	Codes
	Nimodipine po	60mg	Every 4 hours	21 days	S E

Refer All patients with minimal impairment of consciousness level for angiography and appropriate neurosurgical management. Patients initially deemed unsuitable for further investigation, may be referred at a later stage, should their condition improve.

2.4 Infectious and Parasitic Conditions

2.4.1 Meningitis

Meningitis due to *Neisseria Meningitidis* and *Haemophilus Influenzae* Type B are notifiable diseases.

Diagnosis

- Lumbar puncture for chemistry and bacteriology or fungal investigation should be done in all cases, if safe.
- CT brain needs to be done before lumbar puncture in patients with focal neurological signs e.g. Hemiplegia, visual field defects, new seizures, papilloedema and reduced level of consciousness.
- In cases where lumbar puncture is delayed or cannot be done (e.g. uncontrolled significant bleeding tendency), commence empiric antibiotic therapy after taking samples for blood cultures. Attempt the lumbar puncture later, if possible.

General measures:

- Observe patient closely with regular monitoring of vital signs and neurological state.
- Pay close attention to nutritional and hydration status.
- Nurse patients in a quiet, semi-dark surrounding
- In uncomplicated bacterial meningitis, repeated lumbar punctures are of no benefit
- Prompt initiation of antibiotic therapy is associated with improved outcomes.

Pharmacological management

All patients require sufficient analgesia

	Medicine	Dose	Frequency	Duration	Codes
	Paracetamol po	1g	Every 4-6 hours max dose 4g in 24 hours	when needed	A E
and/or	ibuprofen po	400mg	three times a day with meals	when needed	A E

In cases of severe pain add,

	Medicine	Dose	Frequency	Duration	Codes
	Morphine im/iv	10mg	At once	When needed	B V

Adjust dose accordingly for individuals and monitor for response and toxicity.

Antibiotic therapy Empiric therapy for bacterial meningitis, until sensitivity results are available:

	Medicine	Dose	Frequency	Duration	Codes
	Ceftriaxone im/iv	2mg	Twice a day	10-14 days	B V

Adjunctive corticosteroids have not been demonstrated to be of value.
Meningococcal meningitis for confirmed meningococcal disease only,

	Medicine	Dose	Frequency	Duration	Codes
	Benzylpenicillin (penicillin G) im/iv	2.5MU	Every 4-6 hours	7 days	A V

Eradicate nasopharyngeal carriage with a single dose of ciprofloxacin 500 mg after completing course of benzylpenicillin (see below). This is not required if the patient was treated with ceftriaxone for ≥ 24 hours.

Prophylaxis of contacts: Only for close household contacts. Only healthcare workers who resuscitate patients before they received appropriate treatment should receive prophylaxis.

	Medicine	Dose	Frequency	Duration	Codes
	Ciprofloxacin 500mg	500mg	At once		A V

Pneumococcal meningitis- This organism may be associated with other respiratory disease or CSF leaks.
If sensitive to penicillin:

	Medicine	Dose	Frequency	Duration	Codes
	Benzylpenicillin (penicillin G) im/iv	2.5MU	Every 4-6 hours	10 days	A V

If resistant to penicillin,

	Medicine	Dose	Frequency	Duration	Codes
	Ceftriaxone im/iv	2mg	Twice a day	10-14 days	B V

Haemophilus influenzae:

	Medicine	Dose	Frequency	Duration	Codes
	Ceftriaxone im/iv	2g	Twice a day	10 days	B V

Severe penicillin allergy:

	Medicine	Dose	Frequency	Duration	Codes
	Vancomycin iv	Loading dose of 30mg/kg followed by 20mg/kg twice daily			S E
and	Rifampicin	600mg	Twice daily	5 days	B V

For guidance on prescribing and monitoring of vancomycin consult a microbiologist or an infectious diseases specialist.

Tuberculous meningitis:
CSF findings are extremely variable. Generally, lymphocytes predominate, however, polymorphs may initially predominate in about a third of patients. Protein is usually >1g/L, glucose is usually low.

In cases where the differential diagnosis between bacterial and tuberculous meningitis is in doubt, lumbar puncture should be repeated 2-3 days later while still on ceftriaxone.

If the aetiology is bacterial, considerable improvement in CSF findings may be expected, but with untreated tuberculous meningitis the cell counts, and protein levels will be the same or higher; and the glucose level will be the same or lower.

Standard combination tuberculosis therapy according to National protocol. Please see HIV/TB Section: Tuberculosis, Pulmonary. Duration of therapy: 9 months.

	Medicine	Dose	Frequency	Duration	Codes
	Dexamethasone iv	12mg	Twice daily	2 weeks	B V
followed by	Prednisolone po	1-2mg/kg	Once daily in the morning after food for 2 weeks, taper dose for the next 6 weeks		B V
if Dexamethasone iv is not available	Prednisolone po	1-2mg/kg	Once daily in the morning after food for 4 weeks, taper dose for the next 6 weeks		B V

Cryptococcal meningitis: This is an infection due to fungus *(Cryptococcus neoformans)* and mainly affects patients with advanced immunosuppression (HIV or non HIV related), manifesting mainly with a severe headache (usually rather chronic) secondary to raised intracranial pressure. HIV infected patients (see section on treatment of Cryptococcal meningitis in HIV management guidelines). In HIV infection the aim is to suppress the infection until immune restoration occurs with antiretroviral therapy. In HIV-uninfected patients, for example oncology patients, the aim is to cure the infection.

General Measures
Therapeutic lumber puncture is indicated to lower pressure in symptomatic patients and should be done with pressure monitoring via afluid manometer - remove sufficient CSF to lower pressure to 50% of the measured elevated pressure but not less than 20cm of H_2O. Normal CSF pressure values 10-18 cm H_2O (8 -15mm Hg) with patient in a lateral position and 20 - 30cm of H_2O 16 - 24mm Hg) with the patient in sitting position.

Induction therapy:

	Medicine	Dose	Frequency	Duration	Codes
	Amphotericin B iv	1mg/kg	Once daily	2 weeks	B V
	Amphotericin B (liposomal)	3-5mg/kg	Once daily	2 weeks	B V
and	Fluconazole po	1200mg	Once daily	2 weeks	B V

Ensure adequate hydration to minimise nephrotoxicity. In patients with neurological complications or persistent positive culture: Consider lengthening the induction phase of therapy to 4-6weeks in consultation with a specialist.

If no neurological complications and follow up CSF culture at 2 weeks is negative (India ink or Cryptococus Latex Agglutination Test (CLAT) may still be positive).

Consolidation phase

	Medicine	Dose	Frequency	Duration	Codes
	Fluconazole po im/iv	400mg	Once daily	4 weeks	B V

Maintenance therapy

	Medicine	Dose	Frequency	Duration	Codes
	Fluconazole po im/iv	200mg	Once daily	Dependent on CD4 count achieved during maintenance therap	B V

Secondary prophylaxis

	Medicine	Dose	Frequency	Duration	Codes
	Fluconazole po im/iv	800mg	Once daily	8 weeks	B V

Consult with a specialist for longer duration.
Follow all patients closely for relapses. Therapeutic lumbar puncture: This should be considered as the intracranial pressure is often elevated with a communicating hydrocephalus.

2.4.2 Viral Meningoencephalitis

Patients present with headache, neck stiffness, and encephalitic symptoms which may include fever, personality or behavioural changes, hallucinations and seizures. Lumbar puncture typically shows mildly elevated protein, normal glucose and mildly raised cells (< 500), mainly lymphocytes (early on polymorphs may predominate). Most cases do not require specific therapy, other than analgesia. Empiric antibiotic therapy should be initiated until diagnosis is confirmed.

Pharmacological management:

	Medicine	Dose	Frequency	Duration	Codes
	Paracetamol po	1g	Every 4-6hours Max 4g in 24hours	when needed	A E
or	Ibuprofen po	400mg	three times a day with meals	when needed	A E

For severe pain:

	Medicine	Dose	Frequency	Duration	Codes
	Morphine im/iv	10mg	At once		B V

Herpes simplex encephalitis
Clinical features are fever, change in behaviour and seizures, which may be either focal or generalised. Evidence of mucocutaneous involvement is usually not present. Lumbar puncture shows the above features of viral meningoencephalitis, but in this condition may be additionally haemorrhagic in nature. A medial temporal focus on EEG or MRI/CT neuro-imaging is strongly supportive of the diagnosis, and positive HSV PCR test on CSF is diagnostic.

Start therapy as early as possible, i.e. before results are available. A negative herpes PCR usually excludes the diagnosis unless the specimen was taken within 72 hours of onset of symptoms, when false negatives have been described.

	Medicine	Dose	Frequency	Duration	Codes
	Acyclovir iv	10mg/kg	Three times a day	21 days	C E

Treat seizures appropriately with phenytoin/carbamazepine. See section Epilepsy 2.1 All suspected cases of herpes encephalitis should be discussed with a specialist.

Referral

- For neuro-imaging: patients not responding or worsening in condition, i.e. decrease in consciousness and cranial nerve palsies, despite appropriate therapy
- This is especially urgent in patients with tuberculous meningitis, who may develop hydrocephalus and require an urgent shunting procedure
- Patients with shunts.

2.4.3 Meningovascular Syphilis

Lumbar puncture typically shows lymphocytosis with mildly elevated protein and low/normal glucose. Serum syphilis serology: a negative TPHA excludes the diagnosis; RPR may be negative. CSF syphilis serology: VDRL in CSF is often of low titre, and may be negative; a negative CSF FTA-abs excludes the diagnosis of neurosyphilis.

Pharmacological therapy:

	Medicine	Dose	Frequency	Duration	Codes
	Benzylpenicillin (penicillin G) im/iv	2.5MU	Every 4-6 hours	10-14 days	A V

Severe penicillin allergy: ***Refer*** for consideration of desensitisation and subsequent treatment with benzylpenicillin at a referral centre.

2.4.4 Brain Abscess (needs urgent neurosurgical referral)

Patient may present with focal neurological signs and signs of infection. Neurological signs may not always be prominent. Neuro-imaging usually confirms diagnosis. Patients may have concomitant infection of ears, paranasal sinuses or lower respiratory tract.

Pharmacological therapy:
Empiric antibiotic therapy

	Medicine	Dose	Frequency	Duration	Codes
	Ceftriaxone im/iv	2g	twice a day	4 - 6 weeks or until resolved	B V
and	Metronidazole po	400mg	Three times a day	4 - 6 weeks or until resolved	A V
or	Metronidazole iv	500mg	Three times a day	4 - 6 weeks or until resolved	B V

Adjust according to antimicrobial sensitivity after surgical drainage.

2.4.5 Neurocysticercosis

Patients may present with seizures and/or focal neurological deficit. Typical cystic lesions are seen on neuro-imaging. Old calcified lesions are inactive and do not require treatment.

General Measures
Health education. Surgery for treatable ventricular blockage or spinal or intraocular cysts.

Pharmacological management:
For active or viable cysts only.

	Medicine	Dose	Frequency	Duration	Codes
	Albendazole po	10mg/kg	Above 60 kg: 400 mg. po twice a day, below 60 kg: 7.5 mg/kg twice daily to a maximum of 800 mg daily.	8 days	A V
and	Prednisolone po	60mg	Daily in the morning after food	8 days	B V

Anticonvulsants, if required.

2.5 Headache and facial Pain Syndromes

2.5.1 Migraine

Episodic headache, usually focal in nature, which may occur with or without an aura. It is usually accompanied by nausea and/or vomiting. Several variants of migraine also occur.

- General Measures: Reassure patient that this is a benign condition. Attempt to identify any precipitating factors or food allergies from the history (although this is usually unrewarding), and try to avoid stressors which trigger the condition.

Pharmacological management:
For acute treatment initiate therapy during the migraine attack or at the onset of the headache using analgesics.

	Medicine	Dose	Frequency	Duration	Codes
	Paracetamol po	1g	Every 4-6hours max 4g in 24hours	when needed	A E
and/or	Ibuprofen po	400mg	three times a day with meals	when needed	A E

If severe and not responding to therapy above,

	Medicine	Dose	Frequency	Duration	Codes
	Morphine im/iv	10mg	At once		B V

Adjust dose accordingly for individual dosing and monitoring for response and toxicity.

For nausea

	Medicine	Dose	Frequency	Duration	Codes
	Metoclopramide im/po	10mg	Three times	When necessary	B E

Prophylaxis: Regular, daily, prophylactic therapy is advised if attacks are frequent, i.e. more than 2–3 per month; severe, causing a significant amount of disability and if they are long lasting. Also consider prophylaxis for patients who tolerate therapy for acute attacks poorly.

	Medicine	Dose	Frequency	Duration	Codes
	Amitriptyline po	10-25mg	at night	review in 2 months	B V
		more than 75-150mg single bedtime dose is seldom required			
or	Carbamazepine po	100mg	Twice daily	when needed	B V
		Increase every two weeks to a maximum of 400mg 12hourly			

Note: Only about half of patients will respond to one of these agents and this response may take 1– 2 months to occur.

2.5.2 Cluster Headache

- Repetitive episodes of excruciating headache typically of short duration (up to 2 hours) in clusters for weeks to months at a time. Typically the headache is of sudden onset, unilateral during the specific cluster, and quickly reaches a climax. Associated redness of the eye with lacrimation and rhinorrhoea occurs.

Pharmacological therapy
Oxygen inhalation may abort some episodes and analgesics are ineffective. To induce rapid remission in patients with episodic cluster headache give:

	Medicine	Dose	Frequency	Duration	Codes
	Prednisolone po	40mg	Daily in the morning with food	5-10 days	B V
or	Verapamil po	40-80mg	Twice daily	review	C E

Referral: Inadequate response to treatment to neurologist.

2.5.3 Trigeminal Neuralgia

Severe, very short lived stabs of facial pain in the sensory trigeminal distribution. It is important in the diagnostic workup to exclude intracranial mass lesions, which may impinge on the trigeminal nerve.

Pharmacological management

	Medicine	Dose	Frequency	Duration	Codes
	Carbamazepine Controlled Release po	200mg	Twice daily	Review	B V
		Increase slowly to a maximum of 1 200mg daily. Reduce dose to maintenance dose of 400–800 mg daily after exacerbation.			

Referral: Neuro-imaging, if not available locally.

- Poor response to single drug therapy.

2.5.4 Tension Headache

Headache over the back of the head, but sometimes over the entire head, described as a tight band around the head, usually worse in the afternoon.

Pharmacological management
Consider use of relaxation techniques. The importance of this diagnosis is the exclusion of other, more sinister conditions. Exclude analgesia overuse headache.

	Medicine	Dose	Frequency	Duration	Codes
	Amitriptyline po	10-75mg	at night	review	B V

Referral:
- Atypical pain, suggestive of alternate diagnosis.
- Poor response to therapy.

2.5.5 Idiopathic Intracranial Hypertension (Pseudotumor Cerebri)

Patients present with symptoms (chronic headache and sometimes eventual visual loss due to persistent papilloedema) and signs (papilloedema) of raised intracranial pressure in the absence of any structural intracranial abnormality or abnormal CSF composition.

- Diagnosis All patients should have neuro-imaging (CT scan)
  - o If this is normal, i.e. the absence of structural lesions or hydrocephalus, perform a lumbar puncture
- Diagnosis is confirmed by the presence of raised CSF pressure > 20 cm H20.

General Measures
- Not all patients require definitive treatment. Regular monitoring of visual fields is crucial
- Weight loss
- Repeated lumbar punctures
- Consider surgery if there is progression of visual defects, despite medical therapy, visual loss at onset or severe papilloedema
- Stop medicines known to be associated with benign intracranial hypertension (e.g. doxycycline, amiodarone, levodopa, corticosteroids).

Pharmacological therapy
All patients need to be discussed with a specialist. For visual involvement, persistent headaches, or severe papilloedema.

	Medicine	Dose	Frequency	Duration	Codes
	Acetazolamide po	1g-2g	Once daily	Review	B E
or	Furosemide po	40mg	Once daily	Review	B E

Referral:

- For neuro-imaging, if not available locally
- Visual symptoms or deterioration of visual fields for opthalmology evaluation
- Patients not responding to therapy or in need of surgical management.

2.6 Dementia

- Progressive loss of cognitive function, usually of insidious onset. Initial presentation may be with mild personality or memory changes, before more pronounced defects become evident.
- Investigate patients for treatable (reversible) systemic, neurological and psychiatric illnesses

General measures

- Appropriate care and support, according to the level of impairment. Ambulatory care is preferred to hospitalisation, if feasible. Family counselling and support.

Pharmacological management:

Management of dementia is mainly symptomatic

To control restless patients, give:

	Medicine	Dose	Frequency	Duration	Codes
	Haloperidol po	0.5-1mg	Three times a day	Review every 6 weeks	B E

Common reversible causes of Dementia include:

- Thyroid disease (hypothyrodism)
- Vitamin B12 deficiency
- Thiamine deficiency (Wernicke's encephalopathy)
- Pellagra
- Alcohol
- Hepatic encephalopathy
- Normal - pressure hydrocephalus
- Sub-dural haematoma
- Benign brain tumours
- Chronic meningitis
- Brain Abscess or Cyst

For pellagra:

	Medicine	Dose	Frequency	Duration	Codes
	Nicotinamide po	100mg	Three times a day	Review in 2 weeks	A E

Thiamine deficiency (refer all patients with neurological symptoms):

	Medicine	Dose	Frequency	Duration	Codes
	Vitamin B1 po	500mg	Twice daily	Three days	A N
then	Nicotinamide po	100mg	Three times a day	Three days review	A N

Prophylaxis in patients at risk (alcoholism, malnutrition):

	Medicine	Dose	Frequency	Duration	Codes
	Vitamin B1 po	100mg	Three times a day	14 days	A N

Treat other commonly associated nutritional deficiencies:

	Medicine	Dose	Frequency	Duration	Codes
	Vitamin B complex po	2 tablets	Three times a day	Review	A E

2.7 Movement Disorders

Abnormalities of movement/initiation of movement, divided into those with reduction of movement (hypokinesia or bradykinesia), or those with excessive movements (hyperkinesia).

2.7.1 Parkinsonism

Parkinsonism is a syndrome characterised by tremor, rigidity, bradykinesia and postural disturbances. Parkisonsim can be classified into Idiopathic Parkinson's disease or Atypical Parkinson's Disease/ Parkinson's Plus syndromes e.g. Drug-induced, vascular parkinsonism.

The objective of treatment is to minimise disabling symptoms, prevent complications and avoid serious drug-induced side effects and improve quality of life.

General Measures
General supportive therapy and advice about lifestyle modification, physiotherapy and occupational therapy.

Pharmacological management

Note: Set therapeutic targets so that the patient is functioning as well as possible.
Idiopathic Parkinson's disease: Bradykinesia, rigidity and postural disturbance:

	Medicine	Dose	Frequency	Duration	Codes
	Carbidopa/levodopa po	25/100mg -half a tablet	Three times daily	Long term	B E
		Increase to 25/250mg three times daily in consultation with specialist if there is no control			

Drug-induced parkinsonism - Anticholinergics have a very small role in this setting and should be used with caution.

Tremor only - Consider anticholinergic agent

	Medicine	Dose	Frequency	Duration	Codes
	Orphenadrine po	50mg	Three times daily, increase gradually to a maximum of 400mg daily. Usual dose is 150-250mg.	Review	B E

Acute dystonic reaction: Usually follows administration of dopamine-antagonistic drug, e.g. metoclopramide and phenothiazines. Treat with anticholinergic.

	Medicine	Dose	Frequency	Duration	Codes
	Biperiden iv	2mg	Once	Repeat when necessary	B E
or	Promethazine im	25-50mg 25 mg in the elderly	Once	Review	A V

Referral
No improvement or poor control with treatment.
Increasing on/off phenomenon.
Dyskinesias.

2.7.2 Essential Tremor

Also known as Benign tremor, familial tremor, and idiopathic tremor, is a condition characterised by involuntary rhythmic contractions and relaxations (oscillations or twitching movements) of certain muscle groups in one or more body parts of unknown cause.

General Measures
Exclude and manage alternate causes, such as drugs, thyrotoxicosis, hyperadrenergic states and psychiatric disorders.

Occasionally a patient may present with essential tremor and an additional neurological condition, which may make the diagnosis difficult.

Pharmacological management:

	Medicine	Dose	Frequency	Duration	Codes
	Propranolol po	20-80mg	1-3 times daily	Review as necessary	B V

Monitor BP.

2.7.3 Chorea

Involuntary random, irregular movements
Primary – Huntington's chorea, benign hereditary chorea and others;
Secondary – due to Sydenham's chorea, vascular pathology, metabolic, endocrine and infective conditions, amongst others.

Pharmacological management: To be prescribed by a specialist only.

	Medicine	Dose	Frequency	Duration	Codes
	Haloperidol po	0.5-5mg	2-3 times a day	Review every 6 weeks	B E

2.8 Peripheral Neuropathies

Diseases that affect the the peripheral nerves, either motor or sensory. Important subgroups for differential diagnosis are predominately motor, painful peripheral neuropathies and mononeuritis multiplex.

Mononeuritis multiplex is a painful, asymmetrical, asynchronous sensory and motor peripheral neuropathy involving isolated damage to at least 2 separate nerve areas that can be in random areas of the body.

Common causes of Peripheral Neuropathies

- Medicines and chemicals (Lead, phenytoin, metronidazole, amiodarone, hydralazine, vincristine, isoniazid, organic solvents, sulphonamides, nitrofurantoin, carbon monoxide, organo phosphate).
- Alcohol (with or without Thiamine deficiency)
- Metabolic (diabetes, hypoglycemia, uraemia)
- Infection (HIV, leprosy, lyme, diptheria, syphilis) or post infectious (GBS)
- Tumour (paraneoplastic phenomenon – lung, lymphoma, myeloma)
- B 12 & other vitamin deficiency states, as well as pyridoxine excess
- Idiopathic and infiltrative (e.g. amyloidosis)
- Toxins (botulism, ciguatera, Tetrodotoxin, Saxitoxin, tick paralysis)
- Connective tissue and congenital diseases
- Hypothyroidism

Pharmacological management

Most cases respond to management of the underlying disease process or removal of the aetiological agent.

2.8.1 Neuropathic pain

For neuropathic pain (i.e. pain due to a disease or injury of the central or peripheral nervous system) and herpes zoster neuropathy.

	Medicine	Dose	Frequency	Duration	Codes
	Amitriptyline po	25-75mg	At night	Review	B V
and/or	Carbamazepine po	200mg -1.2g	Daily in divided doses	Review	B V

Note: Carbamazepine interacts with ARVs.

2.8.2 Isoniazid–induced polyneuropathy

	Medicine	Dose	Frequency	Duration	Codes
	Pyridoxine (vitamin B6) po	75mg Followed by 25-50mg daily	Daily	3 weeks long term	A E

2.8.3 Bells palsy

Prevention of corneal ulceration is important. In patients presenting within 72 hours of onset of symptoms of a Bells palsy who are HIV uninfected and have no evidence of local herpes zoster or suppurative otitis media, corticosteroids improve the probability of facial recovery at 3 months (83% vs. 63.6%), although even without treatment over 80% will recover by 9 months. The addition of aciclovir is not of proven benefit.

	Medicine	Dose	Frequency	Duration	Codes
	Prednisolone po	50mg	Daily in the morning with food	10 days	B V

Peripheral Neuropathy indication for referral

- Electrophysiological studies may be needed in the diagnostic assessment, although many common causes do not warrant specialist investigations, e.g. polyneuropathies due to diabetes mellitus, HIV, drugs, and alcohol. These cases may initially be managed locally, with referral of non-responding or atypical cases.
- Gullain-Barré Syndrome: referral criteria are progressive, extensive paralysis with impending respiratory failure, bulbar palsy and swallowing problems, and aspiration, as well as for diagnostic confirmation.

2.9 Acute Myelopathy

Patients present with a sudden onset of paraparesis, with associated sensory loss, i.e. a sensory level may be found. Incontinence and autonomic instability may be present. Note: Do not perform a lumbar puncture, until obstructive lesions of the spinal cord have been excluded clinically or radiologically.
Refer all patients for urgent imaging.

	Medicine	Dose	Frequency	Duration	Codes
	Pyridostigmine, po	60mg	Five times daily	Review monthly	B V

2.10 Multiple Sclerosis

A demyelinating disease of the central nervous system, characterised by episodes of unifocal or multifocal neurological dysfunction. Diagnosis is confirmed by imaging. The CSF may show oligo clonal bands and raised IgG index. Recovery between acute flares of illness is common, although a general stepwise deterioration from baseline is usually found. Consult with neurologist for diagnosis and treatment.

Refer all patients to neurologist.

2.11 Myasthenia Gravis

Consider this in patients with new onset weakness and fatiguability. Particularly involving the eyes and the swallowing muscles. Diagnosis of myasthenia gravis is upon detectable presence of antibodies to the acetylcholine receptor (ACR) or mucscle-specific tyrosine kinase (MuSK).

Pharmacological management
Discuss both diagnosis and treatment with a specialist.

	Medicine	Dose	Frequency	Duration	Codes
	Dexamethasome IV	4mg	Every six hours	48 days	B V

Corticosteroids and azathioprine should only be used in consultation with a specialist.

2.12 Oedema, Cerebral

Swelling of brain parenchymal tissue, due to vasogenic, cytotoxic and osmotic causes. Only the vasogenic causes, such as brain tumors and inflammation, respond to corticosteroids.

2.12.1 Brain Oedema due to tumors and Inflammation

General measures
Supportive management. See section on Stroke.

Pharmacological management
Treat the underlying cause. This is especially important with brain oedema associated with systemic conditions, such as electrolyte disturbances and organ failure. Patients with primary brain tumours or brain metastases should be considered for specific treatment of the tumour, which includes surgery and/or radiotherapy.

Discontinue if no response has occurred after 48 hours. Taper dose according to response and duration of therapy.

CHAPTER 3

DENTAL AND ORAL CONDITIONS

3.1 Bacterial infections

3.1.1 Dental Caries

Caries are caused by the metabolism of sugar in dental plaque by *Streptococcus mutans and Lactobacillus acidophilus,* resulting in the production of acid and subsequent demineralisation of the protective enamel layer and subsequent formation of tooth cavities.

Diagnostic criteria
Clinical exam will show cavity in tooth, or darkened area underlying the enamel.
Intraoral radiographs will show area of radiolucency within tooth.

Pharmacological Treatment
Consider analgesics and antibiotics depending on clinical presentation, in which case;

	Medicine	Dose	Frequency	Duration	Codes
	Paracetamol po	500mg - 1g	Three times a day	5 Days	A E
	Ibuprofen po	200mg-1.2g	Three times a day	5 Days	A E

Children: Mechanical removal of decayed tooth structure and restoration of tooth integrity. Endodontic therapy or extraction of tooth is indicated when the pulp is infected. Consider antibiotics depending on clinical presentation, in which case penicillin-group or clindamycin for 7–10 days is generally effective.

Follow-up: Patients with dental caries should be seen by a dentist regularly following treatment of all active caries to monitor for new or recurrent lesions. High risk patients and those with rampant caries should be prescribed sodium fluoride gel 5,000 parts-per-million which can be applied by toothbrush or in soft custom-fabricated dental trays.

3.1.2 Periapical Abscess

Is a complication of inflammation of the dental pulp or periodontal pocket. The condition may be acute and diffuse, chronic with fistula or localised and circumscribed. It is located in the apical aspect of the supporting bone.

Diagnostic Criteria
Swelling of gingiva around the affected tooth
Draining fistula in gingiva overlying the root apex
Non-pharmacological Treatment Non-pharmacological Treatment

- ***Refer*** patient to endodontist or dental officer for root canal therapy or extraction.

Pharmacological Treatment
Use suitable analgesic therapy depending on severity of pain and add on appropriate antibiotic therapy.

	Medicine	Dose	Frequency	Duration	Codes
For mild pain	Paracetamol po	500mg - 1g	Three times a day	5 Days	A E
Moderate pain	Ibuprofen po	200-400mg	Three times a day	5 Days	A E
Severe pain	Diclofenac po	50mg	Three times a day	5 Days	B E
Plus	Paracetamol+codeine (500/80mg)	1-2 tablets	Three times a day	5 Days	B N

Antibiotic therapy

In adults

	Medicine	Dose	Frequency	Duration	Codes
	Amoxycillin po	500mg	Three times a day	7 Days	A V
In penicillin allergy	Erythromycin po	500mg	Four times a day	10 Days	A V
Plus	Metronidazole po	400mg	Three times a day	7 Days	A V

In Children

	Medicine	Dose	Frequency	Duration	Codes
	Amoxycillin po	20mg/kg	Three times a day	5 Days	A V
In penicillin allergy	Azithromycin po	10mg/kg day 1 and then 5mg/kg for 4 days			A V
Plus	Metronidazole po	50mg/kg	Three times a day	5 Days	A V

3.1.3 Dental Abscess

Acute lesion characterised by localisation of pus in the structures that surround the teeth.

Diagnostic Criteria
- An offending tooth

Non-pharmacological Treatment
Decompression through incision and drainage, and irrigation with 3% hydrogen peroxide followed by normal saline (irrigation and dressing is repeated daily).

Supportive therapy carried out depending on the level of debilitation (most patients need rehydration and detoxification using IV Normal saline 0.9% or IV Ringers Lactate).

Pharmacological Treatment
Admit patient for IV antibiotics

	Medicine	Dose	Frequency	Duration	Codes
	Benzylpenicillin IV	2MU	Four times a day	5 Days	A V
or	Ceftriaxone IM/IV	1g-2g	Once daily	5 Days	B V
Plus	Metronidazole IV	500mg	Three times a day	5 Days	B V

Paediatric Management

	Medicine	Dose	Frequency	Duration	Codes
	Benzylpenicillin IV	50000 units/kg/dose	Four times a day	5 Days	A V
or	Ceftriaxone IM/IV	50mg/kg/dose	Once daily	5 Days	B V
Plus	Metronidazole IV	7.5mg/kg/dose	Three times a day	5 Days	B V

Criteria for Referral to Dental/Maxillofacial Surgeon

Rapidly progressive infection
Difficulty in breathing
Difficulty swallowing
Fascia space involvement
Elevated body temperature (greater than 39°C)
Severe jaw trismus/failure to open the mouth (less than 10mm)
Toxic appearance
Compromised host defences

3.1.4 Ludwig's Angina

Is progression of unmanaged dental abscess, involving the sublingual, submandibular, submental, and parapharyngeal fascial spaces bilaterally. This serious, life threatening condition will often be preceded by a tooth ache progressing to a dental abscess.

Non-Pharmacological Treatment
Secure airway – tracheostomy
Set up an IV line- fluid management
Incision and drainage (even in absence of pus) to relieve the pressure and allow irrigation
Remove cause, if it's a tooth- extract offending tooth
Supportive care includes high protein diet and fluids for rehydration and detoxification

Pharmacological Treatment
Admit patient for IV antibiotics

	Medicine	Dose	Frequency	Duration	Codes
	Benzylpenicillin IV	2MU	Four times a day	5 Days	A V
or	Ceftriaxone IM/IV	1000-2000mg	Once daily	5 Days	B V
Plus	Metronidazole IV	500mg	Three times a day	5 Days	B V

For this condition and other life-threatening oral conditions consultation of available specialists (especially oral and maxillofacial surgeons) should go parallel with life saving measures.

3.1.5 Cervical Necrotising Fasciitis

Cervical necrotising fasciitis (NF) is an aggressive polymicrobial infection of the subcutaneous tissues in the head and neck. It is a rare but rapidly progressive and potentially life-threatening infection of the soft tissue, involving subcutaneous tissue and deep fascial layer. It may affect any part of the body, but the extremities, abdominal wall, and perineum are most commonly affected, are now referred to by the generic term "necrotising soft tissue infections.

Treatment

Surgical Debridement
Surgery is the primary treatment for necrotising fasciitis. Intensive medical and surgical care are crucial for treatment. A high index of suspicion is warranted for patients with type 2 diabetes or those taking immunosuppressive medications.

Dressings
Following each debridement of the necrotic tissue, daily antibiotic dressings are recommended. Silver sulfadiazine (Silvadene) remains the most popular antimicrobial cream. If the patient is allergic to sulfa, alternative agents include Polysporin, Bacitracin, and Bactroban. Mafenide is an alternate agent that penetrates eschar more effectively than silver sulfadiazine.

3.1.7 Osteomyelitis of the Jaw

Inflammatory process affecting the medullary portion of the jaw bone and extending to the periosteum of the affected area. Infection is first established in the bone, resulting in pus formation medullary cavity, compromising blood supply. The resulting ischaemia, combined with the infection, leads to bone necrosis. Three principal types of clinical courses of acute osteomyelitis can be distinguished:

- Acute suppurative
- Subacute suppurative
- Clinically silent with or without suppuration.
- Acute Suppurative Osteomyelitis

Signs and Symptoms

- Intense pain, tenderness, fever, painful or painless swelling, purulent discharge, intraoral discharge, skin fistula, trismus, hypoesthesia of the inferior dental nerve, and pathologic fractures.

Non-supurative

- Recurrent pain, swelling, limited mouth opening, absence of suppuration, periostitis, regional lymphadenopathy and reduced inferior alveolar sensation.

Diagnosis

- Culture and sensitivity
- Imaging techniques
- Conventional radiographs, CT scans, PET/CT scans
- MRI, Ultrasound imaging
- Bone scintigraphy
- Histologic analysis

Generalised constitutional symptoms—The patient experiences a general malaise caused by high intermittent fever with temperatures reaching up to 39–40°C, often accompanied by regional lymphadenopathy. Deep seated boring, continuous intense pain in the affected area Intermittent paresthesia or anesthesia of the lower lip (Vincent's symptom), indicating involvement of the inferior alveolar nerve Facial cellulitis Trismus—Local swelling and edema due to abscess formation causing limitation of jaw function Teeth become sensitive to percussion Foetid odour—caused by anaerobic pyogenic bacteria often is present In cases of a sub-acute or silent course, with or without suppuration, the clinical presentation is by definition less impressive. This can make an early diagnosis increasingly difficult, and in many instances these cases are not detected until they have become secondary chronic.

3.1.8 Chronic Osteomyelitis

Chronic inflammatory disorder of the cortical and cancellous bone of unknown etiology. Minimal pain and tenderness. The deep and intense pain frequently observed in the acute stage is replaced by a duller pain. Painful swelling caused by local oedema and abscess formation in the acute stage when it is subsided is followed by a harder palpable tenderness caused by periosteal reaction.

Signs and symptoms

- Non-healing bone
- Induration of soft tissues
- Intraoral or extra-oral draining fistulae
- Thickened or wooden character of bone
- Enlargement of mandible
- Pathological fractures may occur
- Sterile abscess
- Teeth become loose and sensitive to palpation and percussion.

Non-pharmacological management

- Complete bed rest
- Supportive therapy
- Nutritional support.
- Rehydration

Pharmacological Management

In adults

	Medicine	Dose	Frequency	Duration	Codes
	Clindamycin IV	150mg	Three times a day	14 Days	B V
or	Ceftriaxone IM/IV	1g	Twice a day	14 Days	B V
plus	Metronidazole IV	500mg	Three times a day	14 Days	B V
plus	Prednisolone po	10mg	Once daily	10 Days	B V
or	Ibuprofen	400mg	Three times a day	5 Days	A V

In Children

	Medicine	Dose	Frequency	Duration	Codes
	Amoxycillin/clavulanate po	20mg/kg	Three times a day	5 Days	B E
or	Meropenem IV	500mg	Twice a day	5 Days	S E
plus	Metronidazole IV	250mg	Three times a day	5 Days	B V
plus	Ibuprofen	200mg	Three times a day	5 Days	A V

NB: the recommended duration varies from 2 weeks to 6 weeks, typically beginning with intravenous antibiotics followed by a variable period of oral antibiotics.

Surgical Management

- Debridement of affected tissue, decortication with or without bone grafting, sequestrectomy and saucerisation.

Investigations
Bacterial culture or sensitivity testing Radiograph
Till at least 30–60% destruction of mineralised portion of bone takes place—this destruction is not visible on radiograph. Acute osteomyelitis—not visible on radiograph Chronic osteomyelitis—moth eaten appearance.

CT scan More accurate as compared to radiograph.

MRI
More accurate as compared to CT scan.

Bone marrow changes and soft tissue changes are seen more accurately in MRI when compared to a CT scan Scintigraphy/bone scanning/radionuclide scanning Measures physiological changes in bone.

Conservative management

Complete bed rest Supportive therapy

– Nutritional support: – High protein diet – High caloric diet – Adequate multivitamins.

Rehydration
Hydration orally administration of IV fluids.
Blood transfusion control of pain

Antibiotic therapy
Systemic antibiotics - Penicillin

Antibiotic of choice for osteomyelitis of jaw
- Metronidazole, Ciprofloxacin, Clindamycin, etc.

Note: Use antibiotics for 2–4 months.

Local antibiotics
- Gentamicicn + polymethylmethacrylate delivery system – non resorbable - Gentamicin + collagen sponge – resorbable - Recent introduction of oxazoledinone— non synthetic antibiotic which has a strong action against gram positive pathogens - Tigecycline—first commercially available new class of antimicrobial agent. It is a glycycline derivative of tetracycline and can de administered parenterally and has bacteriostatic action, useful for antibiotic resistant organism.

Closed wound irrigation – suction:
To achieve the desired effect locally it may be required to give very high doses of antibiotic systematically which on other hand will produce unwanted side effects – To overcome this problem, local application of the antibiotic may be effective

Antibiotic impregnated beads: – PMMA (Polymethyl methacrylate) beads impregnated with antibiotics may be placed into the disease bone.

Hyperbaric oxygentherapy

Surgical Management
extraction of offending tooth, incision and drainage, sequestrectomy, saucerisation, decortication, resection and reconstruction

Refer patient to maxillofacial surgeon for management

3.2 Periodontal Conditions

3.2.1 Gingivitis

Inflammation of the gingiva commonly caused by plaque in patients with poor oral hygiene

Diagnostic Criteria

Erythematous gingiva
Differential diagnosis
- Linear gingival erythema (Gingival Candidiasis)
- HIV related. Diagnosis of candidiasis can be accomplished based on culture, smear, and biopsy. Nonresponse to standard therapy is suggestive. Confirm HIV status. Some cases are associated with oral candidiasis.

Non-pharmacological Treatment
- Encourage proper oral hygiene and technique (brushing twice daily, use of dental floss, tongue cleaning on the dorsal part).

3.2.2 Periodontitis
Progression of gingivitis that affects the periodontium (tooth support structures). Inflammation spreads to the periodontal ligaments, the root surface, and the alveolar bone. Condition is common in the diabetic, HIV infected, those with hepatic and renal disease, pregnant, and heavily smoking patients.

Diagnostic Criteria

- Erythematous, oedematous gingiva
- Easily bleeding gingiva
- Periodontal pocket
- Loose/mobile teeth
- Bad breath
- Gingival recession
- Bone resorption/pockets around teeth evident on X-ray (panorex or intra-oral x-rays)
- Patients may describe "itchy gums

Non-pharmacological Treatment

- Instruct proper oral hygiene
- Refer to dental practitioner for scaling and root planning. Frequency of visits at dentist's discretion but at least every three months until condition resolved

Pharmacological Treatment

Only as adjunct to scaling and root planning

	Medicine	Dose	Frequency	Duration	Codes
	Hydrogen peroxide 3% mouthwash	gargle four times daily for at least five days			A V
or	Chlorhexidine digluconate 0.2%	gargle 15ml twice daily for at least 7 days and no more than 14 days			A E
plus	Metronidazole po	250mg	Three times a day	8 Days	A V
plus	Amoxycillin po	500mg	Three times a day	8 Days	B E
or	Doxycycline po	200mg	Three times a day	10 Days	A V

3.2.3 Necrotising Gingivitis (NG)

Formally known as acute necrotising gingivitis. It is a severe form of gingivitis and is characterised by rapid onset of necrotic and ulcerated papillary and marginal gingiva covered by a yellowish-white or grey colored slough or "pseudomembrane", blunting of papillae, spontaneous bleeding, sharp and intense pain, bleeding on probing and fetid breath.

Non pharmacological management

- Cleaning and debridement of affected areas with plaque control is the treatment of choice. The patient should be seen at least every other day or daily for the first week. Debridement of affected areas is repeated at each visit along with precise plaque control methods. Patient should avoid using tobacco, alcohol etc.

Pharmacological treatment

- Antimicrobial mouth rinses such as chlorhexidine gluconate 0.12% must be prescribed.
- Systemic antibiotics (like amoxicillin or metronidasole) can be prescribed for patients with moderate to severe tissue destruction, localised lymphadenopathy or systemic or both. If required, prophylactic antifungal medication must be considered

In children

	Medicine	Dose	Frequency	Duration	Codes
	Hydrogen peroxide 3% mouthwash	Gargle four times daily for at least five days			A V
or	Chlorhexidine digluconate 0.2%	Gargle 15ml twice daily for at least 7 days and no more than 14 days			A E
plus	Metronidazole po	10mg/kg	Three times a day	5 Days	A V
plus	Amoxycillin po	10mg/kg	Three times a day	5 Days	B E

In adults

	Medicine	Dose	Frequency	Duration	Codes
	Chlorhexidine digluconate 0.2%	gargle 15ml twice daily for at least 7 days and no more than 14 days			A E
plus	Metronidazole po	400mg	Three times a day	5 Days	A V
plus	Amoxycillin po	500mg	Three times a day	5 Days	B E

It is important to manage underlying systemic conditions

3.2.4 Primary Herpetic Gingivostomatitis

Is a common pediatric infection caused in 90% of cases by HSV 1. It is usually seen before 6 years of age. Mostly asymptomatic. Highly contagious.

Symptoms and signs

- Pain and swelling, drooling, difficulty in swallowing, fever, blisters on the tongue, cheeks, gums, lips and roof of mouth. After blisters pod, ulcers form.

Diagnosis

- Based on clinical presentation.
- Erythematous gingivae, mucosal hemorrhages, clusters of small erupted vesicles throughout the mouth.

Non pharmacological management

- Avoid contact with infected people
- Usually clears up on its own within 2- weeks

Pharmacological treatment

	Medicine	Dose	Frequency	Duration	Codes
	Acyclovir po	400mg	Four times a day	7 Days	A E
and	Paracetamol po	500-1g	Three times a day	5 Days	A E

Give oral fluids for dehydration

3.2.5 Necrotising Periodontitis (NP)

Is a necrotising, ulcerative, rapidly progressive form of periodontitis mainly seen in individuals with HIV/AIDS.

Diagnosis

- Intense pain, interproximal gingival necrosis, and craters in soft tissues. Spontaneous bleeding and joint pain are often complained by the patients. Destruction of the periodontium and bone.

Non pharmacological management

- Patient's oral hygiene maintenance and necessary periodontal therapies are done in periodic appointments in the acute and healing stages.

Pharmacological management

	Medicine	Dose	Frequency	Duration	Codes
	Metronidazole po	400mg	Three times a day	5 Days	A V
plus	Amoxycillin po	500mg	Three times a day	5 Days	A V
or	Amoxycillin/clavulanate	500/125mg	Three times a day	5 Days	B E

Simultaneous administration of an antifungal agent should be considered as systemic antibiotics increase the patient's risk for candidiasis.

Thereafter refer to maxillo-facial surgeon for further management.

3.3 Odontogenic and non-odontogenic orofacial infections

3.3.1 Pericoronitis

Soft tissue inflammation of the operculum covering the crowns of erupting teeth. Occurs more commonly in association with the mandibular third molar (wisdom tooth) but can occur with any tooth.

Diagnostic Criteria

- Discomfort in swallowing and chewing
- Dull to severe pain in jaw
- Inflamed operculum over erupting or unerupted tooth
- Patients may report pain in opposing jaw, or pain radiating to middle ear and area around eye (referred pain)
- Pus discharge beneath the flap
- Fetid breath
- Trismus
- Regional lymphadenopathy

Non-Pharmacological Treatment

- Localised scaling
- Operculectomy under local anesthesia
- Extraction of the third molar associated with the condition
- Grinding or extraction of the opposing tooth

Pharmacological Treatment

In children

	Medicine	Dose	Frequency	Duration	Codes
	Hydrogen peroxide 3% mouthwash	Gargle four times daily for at least five days			A V
or	Chlorhexidine digluconate 0.2%	Gargle 15ml twice daily for at least 7 days and no more than 14 days			A E
plus	Metronidazole po	10mg/kg	Three times a day	5 days	A V
plus	Amoxycillin po	10mg/kg	Three times a day	5 days	A V

In Adults

	Medicine	Dose	Frequency	Duration	Codes
	Chlorhexidine digluconate 0.2%	Gargle 15ml twice daily for at least 7 days and no more than 14 days			A E
plus	Metronidazole po	400mg	Three times a day	5 days	A V
plus	Amoxycillin po	500mg	Three times a day	5 days	A V

3.3.2 Parotitis

- Is the inflammation of the parotid gland. It can be acute, chronic, or chronic with acute exacerbations. Believed to be due to retrograde infection from the oral cavity. Acute bacterial parotitis occurs mainly in neonates and in elderly or debilitated persons with systemic illness or after surgery. It is characterised by painful acute swelling of the parotid gland, commonly on one side. Bilateral cases are usually associated with neonatal cases.

Signs and Symptoms – high fever, chills and marked systemic toxicity

Diagnostic criteria

- Extraoral examination demonstrates visible fullness of the gland, often with erythema of the overlying skin and outward displacement of the ear.
- Palpation of the gland elicits discomfort, and intraoral examination may show swelling and erythema in the region of the duct orifice.
- Purulent discharge may be visible as well.

Diagnostic tests: Culture and sensitivity of purulent discharge, especially if nonresponsive to antibiotics. CT may be ordered to evaluate for the presence of salivary calcifications or abscess.

Treatment

Adequate hydration **Non- pharmacological**

- Adequate hydration

- Manual compression of gland to facilitate drainage of purulence via Stenson's duct in conjunction with sialagogues and hydration.

Pharmacological Management

Parotitis associated with dental infections

	Medicine	Dose	Frequency	Duration	Codes
	Ceftriaxone IM/IV	1g	Twice daily	5 Days	B V
plus	Metronidazole IV	500mg	Three times a day	5 Days	B V
In history of recurrent MRSA infections	Vancomycin	1g	Twice daily	7-10 Days	S E

3.4 Fungal Infections

The vast majority of oral fungal infections are caused by *Candida albicans*, which is considered a component of the normal oral flora. Deep fungal infections are in comparison exceedingly rare and are generally only encountered in immunocompromised individuals.

3.4.1 Oral Candidiasis

This is a fungal infection of the oral mucosa commonly referred to as thrush. It is seen most commonly in the malnourished, the severely ill, neonates, immunocompromised patients (HIV-AIDS patients or patients on long term oral corticosteroid use), and patients on long term oral antibiotics.

Diagnostic criteria

- Generalised patchy white to yellow spots or plaques that have a "cottage cheese" like appearance, referred to as *pseudomembranous candidiasis.* These can be easily wiped away with gauze leaving an erythematous base with minimal bleeding. Much less frequently, candidiasis can present with a purely erythematous macular lesion, and is termed e*rythematous candidiasis*.
- Very rarely, candidiasis can present as a white plaque that does not rub away and looks clinically identical to leukoplakia, this is referred to as *hyperplastic candidiasis.* As the hyperplastic form cannot be distinguished clinically from leukoplakia, an incisional biopsy is required for diagnosis.

Pharmacological Treatment

	Medicine	Dose	Frequency	Duration	Codes
	Nystatin po	100 000IU	hold 1ml in the mouth for 3 minutes before swallowing 4-5 times a day	5 Days	A E
or	Miconazole 2% gel po	Rub on mucosa four to five times a day		5 Days	A E
or	Nystatin/triamcinolone acetonide	Apply a small amount to the corners of the mouth twice daily		3 Days	C E

Treatment should be confirmed for 5 days after clearance
Systemic treatment

	Medicine	Dose	Frequency	Duration	Codes
	Fluconazole po	200mg	Twice daily	7-30 Days	B V
plus	Itraconazole po	200mg	Twice daily	7 Days	C E

While oral candidiasis has several risk factors, it is prudent to investigate first and foremost for HIV and manage accordingly.

3.4.2 Denture Stomatitis

Fungal infection associated with poor denture hygiene. Predisposing factors also include malnourishment, HIV, DM, and long term steroid use.

Diagnostic

- Mild forms appear as pinpoint hyperaemic lesions on the palate.
- Moderate forms appear as diffuse erythema of palatal mucosa in denture bearing area
- The most severe form will have inflammatory papillary hyperplasia as well as areas of the mild and moderate form.

Non Pharmacological treatment

- Effective only for mild forms
- Initiate good oral hygiene habits. Patient should brush mucosa after every meal and learn to avoid wearing of dentures when sleeping.
- Period of rest with dentures kept out of mouth until lesions resolve.
- Dentures should be kept in a solution of 0.2% chlorhexidine digluconate (A), while said solution will also be used as a mouth rinse for a period lasting not longer than 14 days, until lesions resolve.

Pharmacological Treatment

	Medicine	Dose	Frequency	Duration	Codes
	Miconazole 2% gel po	Rub on mucosa four to five times a day		5 Days	A E

For moderate and severe forms. After prescribing, refer to prosthodontist or dental officer for further management.

3.5 Viral Infections

3.5.1 Herpes Labialis

Common lesion that affects the lips and perioral tissues, caused by Herpes Simplex Viruses (type 1 and type2). It appears as papulovesicular lesions which ultimately ulcerate. The condition is recurrent following a primary herpes infection (herpetic gingivostomatitis) which occurs during childhood leaving herpes simplex viruses latent in the trigeminal ganglia. The primary infection affects mainly the gingiva and palate.

Diagnosis

- A prodrome of tingling, warmth or itching at the site usually precedes the recurrence
- About 12 hours later, redness appears followed by papules and then vesicles
- These vesicles then burst, weep, dry, scab and then heal
- The length of the cycle is variable (5–12 days mean time being 7 days)
- There are no investigations required unless patient has systemic diseases

Non-Pharmacological Treatment

- Adequate hydration
- Cover lesions on the lips with Petroleum jelly and control any underlying cause

Pharmacological Treatment

Self-limiting condition but if persistent for 10 days pharmacological intervention necessary. This may also enhance resolution if started during prodromal or early stages.

For herpes labialis

	Medicine	Dose	Frequency	Duration	Codes
	Acyclovir cream	Apply four hourly		5 Days	A E

For Herpes Stomatitis

	Medicine	Dose	Frequency	Duration	Codes
	Acyclovir po	200mg	Four times a day	5 Days	A E
plus	Acyclovir cream	Apply four hourly		5 Days	A E

In immunocompromised patients

	Medicine	Dose	Frequency	Duration	Codes
	Acyclovir po	400mg	Five times a day	5 Days	A E

For oral facial lesions of herpes zoster treat with

	Medicine	Dose	Frequency	Duration	Codes
	Acyclovir po	400-800mg	Four times a day	7 Days	A E
plus	Paracetamol po	500mg-1g	Three times a day	7 Days	A E
or	Ibuprofen po	400mg	Three times a day	5 Days	A E

3.6 Post extraction complication

3.6.1 Oro- antral Communication (OAC)

Is an unnatural connection between two internal organs or tube-like communication joining an internal organ to the body surface. The extraction of maxillary posterior teeth is the most common cause of OAC (80%), because of the anatomic close relationship between the root apices of the premolar and molar teeth and the sinus floor.

Signs and symptoms

- Altered nasal resonance & nasal regurgitation of fluid. But some patients can be asymptomatic.

Perioperative Management

- Before performing any surgical procedure to repair an oroantral defect, irrigation of operating site with saline and followed by diluted saline is very much important to eliminate infection.

Operative Management

- The oroantral defects, which are smaller than 2 mm in diameter, can heal spontaneously but, the larger defects will require surgical management. An immediate closure of oroantral fistulas proves more successful and the success rate is up to 95 % whereas, the secondary closure of oroantral fistula shows low success rate, i.e., up to 67 %.

Surgical Management

- Buccal flap, palatal rotation-advancement flap, use of buccal fat pad and prosthodontics could be successful techniques to close OAC.
- Complication – Maxillary sinusitis

Refer to ENT surgeon.

3.6.2 Post extraction bleeding (PEB)

It is bleeding that continues beyond 8 to 12 hours after dental extraction. Such bleeding incidents can cause distress for patients, who might need emergency dental consultations and interventions.

Diagnostic criteria

- Begins 2-3 hours post extraction, after the vasoconstrictor effect of local anesthesia wears off
- Usually due to underlying systemic conditions such as bleeding or clotting disorders
- Not controlled by local measures and may require systemic interventions

Non-Pharmacological Treatment

- Non-surgical haemostatic measures, or styptics. These encompass an array of sealants, adhesives, absorbable agents, and combination of these.

Pharmacological Treatment

- Apply oxidised cellulose gel foam, thrombin solution, collagen fleeces, cyanoacrylate glue, acrylic or surgical splints.
- Antifibrinolytic solutions, such as tranexamic acid mouthwash fibrin glue or adhesive (resorbable gelatin sponge, collagen sponge, gauze soaked with tranexamic acid chlorhexidine bio-adhesive gel, calcium alginate, Haemocoagulase, Ankaferd Blood Stopper, green tea extract, Chitosan-based dressings and bone wax.
- Various combinations of surgical and non-surgical interventions have also been used, such as tranexamic acid mouthwash along with gelatin sponge and sutures, and fibrin glue with collagen fleece and sutures.

Systemic interventions

- Administration of fresh frozen plasma (FFP), platelets, or both. Factor replacement therapy, using recombinant or plasma-derived ant-haemophilic factor A (FVIII) or anti-haemophilic factor B or Christmas factor (FIX) in the case of haemophilia, and plasma-derived Von Willebrand factor (VWF)/ FVIII concentrates in the case of Von Willebrand disease (intranasal desmopressin intravenous synthetic vasopressin.

	Medicine	Dose	Frequency	Duration	Codes
	Tranexamic Acid po or IV	500mg	Twice a day	3 Days	C E
plus	Oral or intravenous epsilon aminocaproic acid				C E

3.6.3 Dry Socket

Also termed fibrinolytic osteitis or alveolar osteitis, is a complication of tooth exodontia. A dry socket lesion is a post-extraction socket that exhibits exposed bone that is not covered by a blood clot or healing epithelium and exists inside or around the perimeter of the socket or alveolus for days after the extraction procedure.

Diagnosis

- The bone inside the socket is exposed, but there is no exposed bone on the socket occlusal perimeter and all the exposed bone is below the projected location of the occlusal surface of the socket when the socket eventually heals.
- There may be some healing, which is exhibited by narrowing of the socket occlusal diameter by epithelial growth.
- Severe pain after 72 hours post extraction.

Non-pharmacological Management

- Irrigate out food particles or bacterial material using chlorhexidine gluconate or saline and then fill the socket with a medicated gel.
- Suture the lesion to retain the medicated gel or blood clot and create a dense suture barrier over the socket opening.

Pharmacological Treatment

	Medicine	Dose	Frequency	Duration	Codes
	Chlorhexidine digluconate 0.2%	Gargle 15ml twice daily for at least 7 days and no more than 14 days			A E
plus	Paracetamol po	500mg-1g	Three times a day	4 Days	A E
or	Ibuprofen po	400mg	Three times a day	4 Days	A E

3.6.4 Infected Socket

Post extraction complication due to infection of the socket from vertical tooth fractures. Likely due to entrapment of infectious tissue in the clot formed. More commonly seen in immunocompromised patients.

Diagnosis

- Severe painful socket after 72 hours post-extraction
- Fever
- Necrotic blood clot in the socket
- Swollen gingiva around the socket
- Sometimes there may be regional lymphadenopathy and trismus (inability to open the mouth)

Management

- As for dry socket, but antibiotic therapy becomes crucial.

Non-pharmacological

- As for dry socket. Must be repeated for a second and third day

Pharmacological Treatment

	Medicine	Dose	Frequency	Duration	Codes
	Amoxycillin po	500mg	Three times a day	5 Days	A V
In penicillin allergy	Azithromycin po	500mg	Once a day	3 Days	A E
Plus	Metronidazole po	400mg	Three times a day	5 Days	A V

Note: Early management is crucial to prevent osteomyelitis and fascial space infections.

3. 7 Immune- Mediated and Allergic Conditions

3. 7.1 Aphthous Ulcers

Aphthous or recurrent aphthous stomatitis (RAS) are painful recurrent mucous membrane ulcerations usually affecting the non-keratinised oral mucous membrane. Usually associated with patients under severe emotional or psychological stress. Several conditions and diseases can present with RAS, including deficiencies in folic acid, vitamin B12, and iron, inflammatory bowel disease celiac disease, Behcet disease, and HIV disease.

Diagnostic Criteria

- There are four distinct clinical presentations: minor, herpetiform, major and severe aphthous ulcers. By far the most common, minor aphthous ulcers are less than 5mm in diameter
- Lesions appear clinically as nonspecific shallow round or oval ulcerations covered by a grayish-white fibrin pseudo membrane that is surrounded by a sharply defined erythematous halo

Minor Aphthous Ulcers

- Most common. Small round or ovoid ulcers 2–4 mm in diameter, surrounded by an erythematous halo and some oedema. Ulcers up to 1 cm in size, shallow and generally last 10-14days
- Occurs labial and buccal mucosa, soft palate, tongue or floor of the mouth.

Symptoms and sign

- Prodromal burning or stinging sensation prior to appearance of the lesions. Scar formation does not occur with healing minor aphthous ulcers.

Pharmacological Management

	Medicine	Dose	Frequency	Duration	Codes
	Chlorhexidine digluconate 0.2%	Gargle 15ml twice daily for at least 7 days and no more than 14 days			A E

3.7.2 Herpetiform ulcers

Outbreaks of numerous, small, vesicular lesions. Vesciles may coalese into larger lesions.
Persist for 10- 14 days. Generally no scar is formed.

Non-Pharmacological Management

Rationale of treatment is to offer symptomatic treatment for pain and discomfort, especially when ulcers are causing problems with eating. Major aphthous ulcers must be referred to a periodontist or maxillo facial surgeon to mitigate the scarring.

Pharmacological Treatment
Topical treatment

	Medicine	Dose	Frequency	Duration	Codes
	5% amlexanox paste	Apply six hourly for a day			C E
or	Triamcinolone acetinide cream 0.1%	Apply twice daily		5 Days	B E
or	Chlorhexidine digluconate 0.2%	Gargle 15ml twice daily for at least 7 days and no more than 14 days		5 Days	A E
or	Dexamethasone 0.1% topical	Apply three times a day		3 days	B E
or	Silver nitrate pencil 40%				A E

Oral formulations

	Medicine	Dose	Frequency	Duration	Codes
	Montelukast 10mg po daily	10mg	At night	One month	C E
plus	Vit B12 1000mcg sublingually daily	1000mcg	Once daily	One month	B E
or	Omega 3 fatty acids	200mg	Once daily	One month	B N
If lesions persist or frequently recur:	Prednisolone oral	20mg 8 hourly for 3 days then dose tapered to prednisolone 10mg 8 hourly for 2 days then 5mg 8 hourly for other 2 days.			B V

Systemic treatment
- ***Refer*** if indicated

Differential diagnosis
- Traumatic ulcer
- These will have an obvious cause (e.g ill-fitting new denture) and will be solitary

3.7.3 Angioedema

This is a condition characterised by rapid localised swelling of the skin or mucosa and underlying connective tissue. The lips and tongue are most frequently affected; however, the floor of mouth and other areas of the face can also be involved.

Signs and symptoms
- Affected areas are characterised by painless, nonpitting edema with adjacent uninvolved tissues appearing completely normal
- Patients with upper airway symptoms, including wheezing, gasping, or voice changes, should be evaluated emergently.

Non-Pharmacological Treatment
Oral lesions are usually self-limiting and resolve within 2–3 days.

Diagnosis
- Patients should be referred to a specialist to further characterise the disorder and identify risk factors. Allergy and immunology work-up is generally indicated.
- *Biopsy:* Not required in most cases.

Pharmacological Treatment:
- **Anti-itch drugs**- antihistamines
- **Anti-inflammatory drugs** - oral corticosteroid- prednisone
- **Immunosuppressants**- if antihistamines and corticosteroids are ineffective
- ***Follow-up:*** Patients should be followed as needed to assess response to treatment

3.8 Vascular Lesions

3.8.1 Varix

Varicosities are dilated or distended veins that are seen fairly commonly in the oral cavity, most often on the ventrolateral surface of the tongue and floor of mouth. Although observed in all age groups, they are much more common in older patients.

Signs and symptoms

- Lesions are usually superficial and painless with a classic blue to purple color blanches on pressure
- Occasionally small calcifications (phleboliths) form within the varix secondary to venous stasis.
- These may be palpable as firm nodules do not need to be removed unless bothersome to the patient. Varicosities also occur on the lower lip, where excision may be indicated for cosmetic reasons or bleeding; otherwise treatment is not required.

3.8.2 Hemangioma

Hemangiomas and vascular malformations are benign lesions that can be seen in the oral cavity. Hemangiomas represent a rapid proliferation of vascular endothelium arising in infancy that tends to regress (involute) with growth of the child. These are often referred to as capillary or cavernous types depending on the histological appearance.

Diagnosis

- Generally noted within 2 weeks of postnatal life.

Present at birth

- Yes-Venous Malformations
- No-Hemangioma
- Rapid proliferation
- Yes-Hemangioma
- No-Venous Malformations

Involution

- Yes-Hemangioma
- No-Venous Malformations

Pharmacological management

	Medicine	Dose	Frequency	Duration	Codes
Topical	Triamcinolone topical or intralesional	3-5mg/kg	Twice day	Every 6 to 8 weeks	A V
Systematic	Prednisone po	2-3mg/kg/d, taper dose slowly every 2-4weeks. Discontinue when child is 11 months. Treat for 4-6 weeks if rebound growth occurs.			A E

Refer to specialist for second line therapy and surgical management.

3.8.3 Pyogenic Granuloma

This presents as a focal mass of benign reactive granulation tissue in response to local injury or irritation, such as from dental calculus or bite trauma. These lesions are seen most commonly on the gingiva near the interdental papilla and occur more frequently in women, often during pregnancy.

Signs and symptoms

- Well-defined exophytic growths that are usually bright red in color, often ulcerated, and bleed easily
- Treatment is via simple excision and removal of causal calculus, although gingival lesions tend to recur. Refer to Dentist.

3.8.4 Kaposi Sarcoma

Refer to Chapter 21

3.8.5 Other Vascular Lesions

Other vascular lesions, such as hematomas, ecchymoses, and petechiae, may occur in the oral cavity as a result of minor local trauma. Small dilated vessels, or telangiectasias, may be seen particularly following radiation therapy.

Signs and symptoms

- Lesions appear red, blue, purple, or black in color and do not blanch secondary to the presence of extravasated blood in the tissues.

Diagnosis

- Attempt to identify source of trauma. Laboratory testing and work-up for underlying bleeding disorder and or coagulopathy as indicated.

3.8.6 Premalignant Conditions

The term premalignant, or "precancerous," implies that there is a known potential for the lesion to transform into malignancy at a rate high enough to warrant pre-emptive action or close observation.

Actinic Cheilitis (Sailor's lip; Solar cheilitis).

Classically occurs on the lower lip and is directly related to long- term sun exposure.

Signs and Symptoms

- The vermilion appears atrophic and pale, with a glossy surface and loss of demarcation at the vermilion border. With progression, fissuring and ulceration can occur along with crusting or scaling'

Diagnosis

- Areas of persistent ulceration should be biopsied due to a 6–10% rate of malignant transformation.
- Treatment of malignancy is primarily surgical; however, a trial of topical chemotherapy with 5-fluorouracil (S) can be used with early lesions. Prophylactic laser ablation or vermillionectomy may be performed in cases where malignant transformation has not yet occurred.
- Close long-term follow-up is indicated, as these patients are at risk for additional cancers associated with solar damage.

Leukoplakia

- A white plaque that cannot be rubbed off or clinically identified as another named entity. It is therefore strictly a *clinical* label rather than a *histological* diagnosis.
- These lesions should be biopsied, after which a more definitive diagnosis can be assigned. Most prove to be benign (usually hyperkeratosis or chronic inflammation), however, up to 20% may exhibit histological changes consistent with dysplasia or carcinoma.

Erythroplakia

- Flat red area," and is a clinically descriptive term without specific histologic definition. Lesions frequently exhibit a bright red, velvety appearance and are usually asymptomatic.
- The incidence of severe dysplasia or carcinoma in these lesions is very high (80–90%), and biopsy is mandatory. Areas of erythroplakia may also coexist with leukoplakia in so-called "mixed" or "speckled" lesions *(erythroleukoplakia)*. Care must be taken to obtain a representative biopsy specimen

in such cases, with sampling of multiple areas within the lesion, as carcinoma may be present only focally.

3.8.7 Orofacial Pain Conditions

Orofacial pain is a common symptom that causes significant morbidity. The majority of orofacial pain disorders can be classified as odontogenic, myofascial, temporomandibular joint-related, and neuropathic.

Myofascial pain

- Pain quality
- Deep ache, can be sharp

Pain location

- Along and behind the jaw Other areas can be affected Secondary headaches common Unilateral or bilateral.

Timing/pattern

- Often painful in the morning, generally gets worse throughout the day, pain with chewing and talking.

Treatment

- Must be directed toward the specific diagnosis. Therapies for myofascial pain and arthralgia include systemic and topical NSAID therapy, soft diet, reducing parafunctional activity, splint therapy, passive stretching exercises, anxiolytics and muscle relaxants, systemic and intralesional corticosteroid therapy.
- **Follow-up:** All patients require short- and long- term follow-up.

Temporomandibular Joint (TMJ) Pain

- **Pain Quality:** Sharp
- **Pain Location:** In TMJ, Often radiates to the ear Unilateral or bilateral
- **Timing/Pattern:** Worse wit opening and closing.

Treatment

- Same as for myofascial pain above.

3.8.8 Atypical facial pain

Often in the area of a tooth, extracted tooth or previous surgical procedure. Unilateral more common but can cross the midline.

- Pain quality; Dull ache, crushing, burning
- Pain location; Poorly localised.
- Timing/Pattern; Continuous or intermittent throughout the day

Diagnosis

- None specifically. Must obtain appropriate radiographs and perform comprehensive dental evaluation when pain appears to be associated with a tooth. No Biopsy required.

Pharmacological Treatment

	Medicine	Dose	Frequency	Duration	Codes
	Amitriptyline po	10-20mg	At night	One month	B V
or	Clonazepam po	0.5-1mg	At night	One month	B E
or	Gabapentin po	300mg	At night	One month	C E

Consider topical compounded formulations.
Follow-up: Patients should be followed carefully until stable response is achieved, then seen at least twice annually.

3.8.11 Burning Mouth Syndrome

Pain quality: Burning Sensations of "coated" and "dry" also bitter or metallic taste common.
Pain location: Tongue Inner lips, Anterior hard palate, Throat can be involved Bilateral most common
Timing/Pattern: Stimulated by hot/cold and can be spontaneous.

Pharmacological Treatment

Patient education is critical.

	Medicine	Dose	Frequency	Duration	Codes
	Amitriptyline po	10-20mg	At night	Review	B V
or	Clonazepam po	0.5-1mg	At night	Review	B E
or	Gabapentin po	300mg	At night	Review	C E

Topical capsaicin therapy can be offered; however, long-term compliance is generally poor.

Follow-up: Monthly until a stable response is achieved, then twice yearly.

Trigeminal neuralgia
- **Pain quality:** Sharp, electric shock-like
- **Pain location:** May begin localised but spreads rapidly. Unilateral
- **Timing/Pattern:** Unpredictable. May be triggered by light touch or movement. Lasts seconds.

Diagnosis
- Consider brain MRI to rule- out neoplasm or systemic disease such as multiple sclerosis, especially in younger individuals. No Biopsy to be done.

Treatment
- ***Refer*** for specialist pharmacological and surgical treatment as may be required.

3.8.12 Odontogenic Pain

- **Pain quality:** Ranges from dull ache to sharp and pounding
- **Pain Location:** In location of tooth Unilateral
- **Timing/Pattern:** Stimulated by hot/cold and can be spontaneous

Treatment
- Definitive dental therapy. Refer to Dental Therapist or Dentist.

3.9 Dentition

3.9.1 Eruption of Teeth

Eruption of deciduous /primary teeth begins between 3 and 6 months post-natal. Symptoms associated with it like fever and diarrhea are normal and self-limiting unless any other causes can be established. There may be cyst-like formations overlying areas with newly erupting teeth. These eruption cysts are benign but must be referred to a dental officer for further management.

3.9.2 Baby-Bottle Caries

Caries of the teeth due to use of baby bottles, usually because of acidic drinks. Also due to poor oral hygiene. Usually affects the maxillary front four teeth. Refer such cases to dental officer who may decide to extract (if painful) or simply wait for natural exfoliation.

3.9.3 Retained Primary Teeth

Primary teeth that persist in the mouth beyond the due eruption date, until both primary and secondary tooth are visible in the mouth. The secondary tooth usually emerges palatally or lingually to the primary. At this stage tooth exfoliation is unlikely and cases must be referred to dental officer for extraction.

3.9.4 Tooth Sensitivity

Due to exposed dentine that may be due to attrition, abrasion, erosion, abfraction, or a physiological state of denudement around the cervical areas of the teeth.

Diagnostic Criteria

- Pain with thermal and/or osmotic stimuli, usually in the form of sweet or sour foods
- Sharp pain when brushing certain teeth
- There may be signs of gingivla recession and root exposure, usually with premolars and molars

Management

Non-pharmacological

- Topical fluoride therapy either with fluoride gel, or preferred sensitive toothpaste. Fluoride must be applied to affected teeth every night before bed and left on
- Refer patients with marked lesions on root surfaces to dental officer for further management

Pharmacological treatment

Appropriate analgesic therapy

	Medicine	Dose	Frequency	Duration	Codes
	Paracetamol po	500mg -1g	Three times a day	5 days	A E
or	Ibuprofen po	200-400mg	Three times a day	5 days	A E
or	Diclofenac po	50mg	Three times a day	5 days	B E

3.9.5 Edentulousness

Loss of teeth due to a variety of reasons can have profound effects on the patients psychosocial state, and nutrition. Tooth loss may be partial or complete and needs to be addressed.

A common complication of tooth loss is overeuption of the opposing tooth due to loss of occlusion. This may result in pain of the overupted tooth. Thus tooth loss must be addressed for correct nutrition,

psychological wellbeing, and to maintain proper tooth position.
Cases to be referred to dental officer for further management.

3.9.6 Ectopic Teeth

Teeth can undergo an altered pathway of eruption during the normal development of the child. The tooth may erupt adjacent to its normal position, or may erupt further afield, such as the vestibule and palate. Patient may have retained primary tooth with no sign of the secondary tooth erupting.

Refer cases to orthodontist or dental officer for further management. The tooth may mobilised into the correct position using orthodontic appliance or otherwise extracted if this is not possible.

3.9.7 Impacted Teeth

Obstruction of eruption pathway of a tooth, resulting in altered eruption state. Usually seen in mandibular third molars but can occur with any tooth.

Diagnostic Criteria

- Altered eruption position may result in funneling of food material into interproximal region, resulting in localised gingivitis and pain.
- Erupting tooth may sit in any position, from horizontal to vertical and is usually below the occlusal plane of the other teeth.

Pharmacological Management

Manage pain with appropriate analgesics

	Medicine	Dose	Frequency	Duration	Codes
	Paracetamol po	500mg - 1g	Three times a day	5 days	A E
or	Ibuprofen po	200-400mg	Three times a day	5 days	A E
or	Diclofenac po	50mg	Three times a day	5 days	B E

- ***Refer*** to Dentist or Maxillo-facial surgeon for extraction

3.9.8 Traumatic Dental Injuries

Dental trauma is an impact injury to the teeth and/or other hard and soft tissues within and around the vicinity of the mouth and oral cavity. These represent pathways for the ingress of bacteria to potentially cause pulpitis.

Injuries to dental hard tissues and pulp

- Enamel infraction
- Enamel dentine fracture
- Complicated crown fracture
- Crown root fracture

Injuries to the periodontal tissues

- Concussion
- Subluxation
- Extrusive laxation
- Lateral luxation
- Intrusive laxation
- Avulsion

Management

- Take panorex/intral oral X-rays to assess damage.
- If not available, under local anaesthetic, assess underlying bone for fractures. Assess degree of mobility of a loose tooth, or probe socket of an avulsed tooth to ensure complete tooth loss.
- Mobile teeth that are salvageable can be splint to adjacent teeth using fibre splint, orthodontic wire, or composite placed between the teeth. Thereafter refer to dental officer for further management.
- With avulsed teeth, clean socket and treat as for extracted teeth.
- Fractured aveolus requires placement of Erich Arch bars under local anaesthetic and then refer to dental officer further management.
- Fractured teeth will need immediate extirpation of the pulp.
- ***Refer*** to Dental Guidelines.

3.10 Antibiotic prophylaxis in different surgical operations in oral and maxillofacial surgery

The use of preoperative antiseptics in the oral cavity may reduce the complications caused by the surgical trauma.

Oral surgery

Operations requiring osteotomy in the oral cavity.

	Medicine	Dose	Frequency	Duration	Codes
	Chlorhexidine Digluconate 0.2%	Gargle 15ml twice daily for at least 7 days and no more than 14 days			A E
or	Betadine mouthwash	Gargle three times daily		7-10 days	A E
plus	Amoxycillin/Clavulanate po	625mg	Three times a day	5 days	B E
Or in compromised immunity	Cephazolin IM/IV	1g	Twice daily	5 days	B E

Traumatology

Includes: mandible and dentoalveolar fractures, cervicofacial pathology, orbital wall fractures, third mid and upper fractures with liquorrhoea.

	Medicine	Dose	Frequency	Duration	Codes
	Ceftriaxone IM/IV	1g	Twice daily	5 days	B V
or	Amoxycillin/Clavulanate po	625mg	Three times daily	5 days	B E

Orthognathic surgery and Periprosthetic surgery

	Medicine	Dose	Frequency	Duration	Codes
	Cephazolin IM/IV	1g	Twice daily	5 days	B E
or	Amoxycillin/Clavulanate po	625mg	Three times daily	5 days	B E

Oncological, Reconstructive and Cervical surgery

	Medicine	Dose	Frequency	Duration	Codes
	Clindamycin IV	600mg	At once		C E
or	Cephazolin IM/IV	1g	Twice daily	5 days	B E

- The dental clinician needs to understand the potential complications that can occur because of dental treatment of a medically compromised patient and when pre-treatment or post-treatment medication or emergency care is indicated
- Cardiovascular dysfunction
- Renal haemodialysis with arterio-venous fistula
- Ventriculoarterial shunts for hydrocephalus
- Vascular grafts if less than six months

For patients in high or moderate risk whenever they undergo a procedure in the oral and maxillofacial areas, the following (oral or iv) medicines must be given an hour or thirty minutes before the procedure.

Adults

	Medicine	Dose	Frequency	Duration	Codes
	Amoxycillin po	1g	Three times daily	5 days	A V
in cases of allergy use	Clindamycin po	300mg	Three times daily	5 days	C E
in immuno-compromised patients	Cephazolin IM/IV	1g	Twice daily	5 days	B E

Children

	Medicine	Dose	Frequency	Duration	Codes
	Amoxycillin po	20mg/kg	Three times daily	5 days	A V
in cases of allergy use	Clindamycin po	20mg/kg	Three times daily	5 days	C E
in immuno-compromised patients	Cephazolin IM/IV	25mg/kg	Twice daily	5 days	B E

Diabetic patient

	Medicine	Dose	Frequency	Duration	Codes
or	Amoxycillin/Clavulanate po	625mg	Three times daily	5 days	B E

CHAPTER 4

EAR, NOSE AND THROAT DISORDERS

4.1 Otitis externa

Otitis externa is the inflammation of skin of the external ear canal. It can be generalised (Diffuse) or localised (furunculosis) and Malignant with bone involvement.

Signs and symptoms
Pain and tenderness on retracting the pinna, itching, ear discharge, ear pain worsened by opening the jaws.

Differentials
Traumatic injury, Otitis media or Foreign body.

Nonpharmacological management
Advise the patient to avoid getting the ear wet, not to put objects in the ear and perform aural toilet by cleaning the ear canal to remove debris.

Diffuse otitis externa

Pharmacological management

	Medicine	Dose	Frequency	Duration	Codes
	Acetic acid 2%	3-4 drops	Four times a day	5 days	B N
plus	Chloramphenicol ear drops 0.5%	2 drops	Three times daily	14 days	B N
If no improvement	Ciprofloxacin	250mg	Twice daily	6 weeks	C V

Furunculosis

	Medicine	Dose	Frequency	Duration	Codes
	Cloxacillin	250-500mg	Four times a day	Five days	A E
in cases of penicillin allergy	Erythromycin	500mg	Four times a day	Five days	A V

If fungal infection is suspected or there is excessive debris, syringe the ear with lukewarm water to remove debris.

	Medicine	Dose	Frequency	Duration	Codes
	Clotrimazole ear drops	3 drops	Once daily	4 weeks	B V
or	Fluconazole po	200mg	Once daily	10 days	B V

Refer all cases of Malignant Otitis externa to ENT specialists or Neurosurgeons

4.2 Otitis media

4.2.1 Acute otitis media

Acute otitis media is caused by infection in the middle ear usually associated with upper respiratory infections especially in children.

Signs and symptoms
- Throbbing earache
- Fever
- Reduced hearing with or without discharge
- Loss of the light reflex
- Bulging of the ear drum

Nonpharmacological management
Advise the patient to keep the ear dry, not to instill anything in the ear and not o plug the ear with cotton wool.

Pharmacological management

Antibacterial therapy will shorten the episode, but pain control is also important.

	Medicine	Dose	Frequency	Duration	Codes
	Amoxycillin	500mg	Three times daily	10 days	A V
in penicillin allergy	Erythromycin	500mg	Four times daily	10 days	A V
plus	Paracetamol	1g	Four to six times daily when necessary.	6 weeks	A E

Refer to paediatric guidelines for management in children.

If no response to treatment after 72 hours –

Refer to Hospital or Health Centre

Recurrent otitis media –

Refer to ENT Specialist or Neurosurgeon

4.2.2 Chronic Suppurative Otitis Media
In chronic suppurative otitis media, pus drains from the ear for more than 2 weeks or the patient has a long history of on-and-off ear discharge. It is caused by multiple organism infection, which makes systemic antibiotic treatment ineffective.

Prevention
- Health Education: advise patients to keep water out the ear, e.g plug the ear with cotton while taking a shower or birth
- Do not swim if recently experienced an ear discharge
- Early diagnosis and treatment of acute otitis media
- Treat infections in adjacent area, tonsillitis, sinusitis, dental infections

Management

- Dry wiking 2-3 times daily for 2 weeks plus,

	Medicine	Dose	Frequency	Duration	Codes
	Ciprofloxacin ear drops	2-3 drops	Twice daily	Review	B E

Refer all patients for evaluation and management by an ENT specialist.

4.2.3 Otitis Media with Effusion

It's a non-suppurative otitis media commonly seen in children. It presents with no pain associated with unresolved otitis media, upper respiratory tract infections and allergy.

Signs and symptoms

- Hearing impairment, usually fluctuant in children "this child hears when they want to but sometimes ignores you"
- Presence of non-purulent fluid in the middle ear
- Buzzing noise in the head or ears
- Retracted or bulging ear drums

Non-Pharmacological Management

Chewing gums to aid opening and closure of the tube, blowing against closed nose and mouth to aid Eustation tube opening. Eliminate known predisposing factors.

Pharmacological Treatment

	Medicine	Dose	Frequency	Duration	Codes
	Chlorpheniramine po	4mg	2-3 times a day	10 days	A E
plus	Xylometazoline 0.1 nose drops	2 drops	3-4 times a day	10 days	B E
or	Ephedrine nose drops	2 drops	3-4 times a day	10 days	B E

Refer all cases to ENT specialist

4.2.4 Mastoiditis

Inflammation of the mastoid air cell system, usually a complication of Acute otitis media or chronic suppurative otitis media.

Signs and Symptoms

- Pain and tenderness over the mastoid area, swelling in the post auricular area (pina is retracted down wards and forwards), current or history of pus discharge from the adjacent ear and fever

Differential diagnosis

- Post auricular Lymphadenitis
- Post auricular abscess secondary to otitis externa

Diagnosis

- Diagnosis is mainly by clinical features elicited from history taking and thorough ontological evaluation
- Full blood counts
- High resolution CT scan temporal bone at a referral hospital

Pharmacological Management
Admit urgently and give emergency treatment

	Medicine	Dose	Frequency	Duration	Codes
	Ceftriaxone IM/IV	1-2g	Twice daily	10-14 days	B E
plus	Metronidazole IV	500mg	Three times a day	10-14 days	B V

Refer
- All cases to ENT specialist
- Mental confusion is a grave sign of intracranial spread of infection.
- Refer to ENT and/or Neurosurgeon immediately

4.3 Hearing impairment

Sudden onset of hearing impairment may be due to occlusion of the external ear canal by wax or discharge or by effusion in the middle ear. If there are signs of infection such as meningitis, consider Cryptococcal or TB meningitis and treat accordingly. Certain medicines, such as streptomycin, can lead to hearing loss as a side effect.

Nonpharmacological management
Wax is removed by gentle lavage or by syringing the ear with water at 37°C.
Caution: Ear syringing must not be done in the following conditions:
- Previous ear drum perforation
- Previous chronic discharge

Refer all cases of hearing impairment to the audiologist or ENT Specialist.

4.4 Foreign bodies in the ear

Signs and Symptoms
- Child or the peers may report the act of FB insertion
- Sensation of noise of moving object in the case of a live insect
- Reduced hearing or hearing loss
- Bleeding or discharge from the affected ear following failed attempts at removal

Management
Round smooth objects, small stones and cotton buds

- Syringe with lukewarm water at about body temperature (37oC)
- If Syringing fails, use a foreign body hook to remove. This is performed under Seddation or General anaethesia in children or sensitive adults to minimise trauma to the ear.
- For cotton buds, use Hartman's forceps to grasp and remove

Do Not use forceps to grab and remove round objects as this is likely to push them further, including rapturing the ear drum and slipping into the middle ear cavity.

Insects
- First kill it by instilling a few drops of fresh/clean cooking oil.
- Then syringe with lukewarm water.
- Large insects such as cockroaches may require removal with crocodile forceps as the legs may hook and stick along the canal walls during syringing.

Impacted seeds
- **DO NOT** syringe as these absorb water and swell further and get impacted, making it harder to remove.
- Refer immediately to ENT specialist for further management

Other Foreign bodies (such match sticks)
If there is a visible edge, grab it with crocodile forceps and remove easily

4.5 Wax in the ear

Wax in the ear is normal and comes out naturally from the ear during the physiological cleaning mechanism. However, it may accumulate and form a plug which may get impacted with time.

Signs and symptoms
- Blocked ears or reduced hearing
- Buzzing sounds
- Mild to moderate pain especially when impacted

Management
- Soften the wax by instilling 2 drops of sweet oil or sodium bicarbonate every 8 hours into the affected ear for 3-5 days. Wax may fall out on its own.
- Syringe the ear carefully with lukewarm water until it comes out.
- Stop syringing if the patient experiences pain or a sensation of spinning
- Advise the patient not poke the ears in an attempt to clean out wax as this could damage the ear drum

Do not syringe if there is:
- a history of ear discharge of Ear drum repair
- pain in the ear

4.6 Sinusitis
Inflammation of the sinuses due to allergic reactions, bacterial or viral infections resulting in poor drainage of mucus from the nose and sinuses.

4.6.1 Acute Sinusitis

Signs and symptoms
- Tenderness over the floor of the frontal sinus immediately above the inner canthus
- Referred pain to the vertex, temple or occiput
- Postnasal drainage
- Persistent coughing, throat irritation
- Hyposmia (diminished sense of smell)

Differentials

- Common cold
- Allergic Rhinitis
- Nasal polyps
- Adenoid hypertrophy

Nonpharmacological management

Irrigate the nose with normal saline. Steam inhalation may be effective in liquefying and removing secretions that are blocking the nose.

Pharmacological management

	Medicine	Dose	Frequency	Duration	Codes
	Paracetamol po	1g	4-6 times a day when necessary	5 days	A E
plus	Xylometazoline 0.1 nose drops	2 drops	3-4 times a day	5 days	B E
and/or	0.9% sodium chloride nose drops	2 drops	3-8 times a day	5 days	A E

If there are signs of bacterial infection: persistent purulent nasal discharge > 1 week, facial pain or swelling or worsening symptoms after initial improvement, start antibiotics.

	Medicine	Dose	Frequency	Duration	Codes
	Amoxycillin	500mg	Three times a day	10 days	A V
in penicillin allergy	Erythromycin	500mg	Three times a day	10 days	A V
or	Clindamycin	150-300mg	Four times a day	10 days	C E

If there is a dental focus, add metronidazole and refer to the Dentist or maxillofacial team to additional evaluation and management.

Note: Do not give antibiotics except if there's a purulent nasal discharge> 1-week, paranasal sinus tenderness, facial or periorbital swelling with or without fever

Refer to ENT specialist if

- There is suspected foreign body in the nose
- If not resolving after the above treatment
- Fever lasting longer than 48 hours
- Poor response after a week's treatment
- Presence of dental focus of infection
- Sinusitis proceeded by swelling over the forehead or periorbital swelling
- Recurrent sinusitis
- Signs of meningeal irritation or cortical cavernous thrombosis.

4.6.2 Chronic Sinusitis

Look for facial pain or headache, nasal congestion, and post-nasal drip. Offensive nasal discharge may last up to 3 months.

Refer such cases for further evaluation by ENT specialist.

4.7 Allergic Rhinitis

An abnormal reaction of the nasal mucosal tissues to certain allergens like pollen, house dust, cetain foods and certain medicines. This results in recurrent inflammation of the nasal mucosal due to the hypersensitivity.

Signs and symptoms
Blocked or stuffy nose, Watery nasal discharge, Excessive and frequent sneezing, Nasal itching and irritation, Itchy eyes, Oedematous pale pink or grey nasal mucosa, Mouth breathing and Snoring during sleep.

Nonpharmacological management
Identification and control or removal of potential allergens is helpful.

Pharmacological management
Short term symptomatic relief for adults

	Medicine	Dose	Frequency	Duration	Codes
	Chlorpheniramine po	4mg	2-3 times a day	21 days	A E

Long-term use in adults and older children

	Medicine	Dose	Frequency	Duration	Codes
	Cetirizine	10mg	Once daily	Long term	B E
plus	Fluticasone spray 100mcg/ml	2 sprays in each nostril	Once daily	Long term	B E
or	Beclomethasone 0.05% spray	2 sprays in each nostril	Once daily	Long term	B V

Refer
- Patients with chronic persistent symptoms
- Patients with severe symptoms

4.7.1 Atrophic Rhinitis

Chronic infection of the nasal mucosa associated with mucosal and turbinate atrophy due to fibrosis of the terminal blood vessels.

Signs and Symptoms
- Affects both nasal cavities, reduced or no ability to smell, foul stench not noticed by the sufferer, crusts and nose bleeds when crusts separate and fall off, sensation of obstruction, very wide nasal passages- "empty nose syndrome".

Diagnosis
- Full blood count
- HIV serology
- TPHA (Treponema Pallidum Hemagglutination Antigen)
- Obtain a swab from the nose for C&S

Pharmacological Management
Clean nasal cavities daily to remove crusts using warm saline

–PLUS–

	Medicine	Dose	Frequency	Duration	Codes
apply	Tetracycline eye ointment	apply inside nasal cavity	Up to 6 times a day	Long term	A E
plus	Amoxycillin po	1g	Three times a day	Long term	B E
In rhinoscleroma, give	Amoxycillin po	1g	Three times a day	Long term	B E

Refer to ENT specialist If the symptoms get worse within 1 week.

4.7.2 Adenoid Disease

Enlargement of inflammation of the nasopharyngeal lymphoid tissue. Common in children but also in adults with HIV/AIDS.

Signs and Symptoms

- Obstruction of the nose leading to mouth breathing, difficulty in eating, snoring, jaw deformities, reduced hearing, recurrent cough, physical and developmental retardation.

Diagnosis

- Based on thorough history taking
- Soft tissue X-ray of the neck; lateral view showing narrowing

Differentials

- Allergic rhinitis, foreign body, deviated septum, sinusitis, dental and jaw diseases

Pharmacological Management

For mild symptoms, manage conservatively with

	Medicine	Dose	Frequency	Duration	Codes
	Chlorpheniramine po	4mg	7 days	Long term	A E
plus	Fluticasone 100mcg/ml nasal spray	2 sprays in each nostril	7 days	Long term	B E
and/or	0.9% sodium chloride nose drops	2 drops	5 days	Long term	A E

- ***Refer*** to ENT specialists for moderate to severe symptoms of air way obstruction.
- ***Refer*** all cases of suspected Adenoid disease in adults to the ENT specialist.

4.7.3 Foreign Bodies in the air way

Mostly affects children less than 5 years.

Clinical features

- Sudden onset of chocking followed by stridor, cough, wheezing, hoarseness of voice if the foreign body is at the level of larynx.

May have transient symptoms and later present with complications such as pneumonia.

Management

Children

- If choking, attempt to dislodge by 3 cycles of back slaps or Heimlich's maneuver for children.
- If foreign body is visible in the mouth, grasp and remove with magils forceps.

- In case of severe respiratory distress, give oxygen and refer immediately to a hospital.

Adult
- Dislodge large foreign body e.g chunk of meat from pharynx by cycle of Heimlich maneuver (standing behind the patient with both arms around the upper abdomen, giving 5 thrusts)
- If foreign body is still suspected, refer to further management at either secondary or tertiary level

Prevention
- Avoid raw or roasted nuts or other seeds in children <2 years
- If a child has a foreign object in the mouth, leave the child alone to chew and swallow or persuade the child gently and withdraw the object. Do not force the child.

4.7.4 Foreign Body in the food passage

These include: fish or chicken bones, often lodging in the tonsils, behind the tongue, oesophagus, coins especially in children.
Disc battery is particularly dangerous and requires immediate referral.

Signs and symptoms
- Difficulty in breathing, drooling of saliva and pointing sign (patient may point to where the FB is stuck with a finger).

Differentials
- Infection in pharynx
- Trauma by foreign body
- Oropharyngeal candidiasis

Investigations
- Foreign bodies like coins may be seen on CXR done for other reasons
- X-rays (soft tissue neck X-ray oesophagus may reveal radio-opaque Foreign bodies

Management
- Depends on the type of foreign body, the location of the foreign body and the clinical status of the patient
- Negative radiographs with no symptoms, expectant management is advised
- If symptomatic but not positive X-ray findings, refer for further management
- Allow fluids diet- Do not try to dislodge or move the foreign body with solid food, this may cause spasm and impaction of the foreign body causing infection in the oesophagus
- Give IV fluids if unable to swallow or very poor intake
- If foreign body is visible in the pharynx, tonsil etc, grasp with forceps and remove it
- If patient tried to push foreign body with food, cover with broad spectrum antibiotics

	Medicine	Dose	Frequency	Duration	Codes
	Amoxycillin po	500mg	Three times a day	5 days	A V
plus	Diclofenac po	50mg	Three times a day	1-2 days	B E

Refer for further management at an ENT facility.

4.8 Tonsillitis

In most cases, tonsillitis is a viral infection and does not need antibiotics, especially if the following symptoms are present: runny nose, dry cough, or rash. Streptococcal pharyngitis or tonsillitis, however, may cause local suppurative complications such as rheumatic fever of infective endocarditis. The presence of both fever and tonsillar exudates warrant antibiotics.

Symptoms and signs
- Usually presents as a sore throat and or enlarged inflamed tonsils.
- Tender anterior cervical lymphadenopathy may be present.

Nonpharmacological management
- Advise patient to—
- Rinse the mouth using homemade salt mouthwash. Dissolve ½ teaspoon of table salt in a glass of lukewarm water; gargle for 1 minute twice daily.
- ***Caution:*** Do not give to children under 8 years because they cannot gargle.
- Ensure adequate hydration.
- Avoid getting irritants into the nose like fumes and dust.

Pharmacological management

	Medicine	Dose	Frequency	Duration	Codes
	Amoxycillin po	500mg	Three times a day	7 days	A V
or	Benzathine penicillin im	12MU	At once		A V

In cases of penicillin allergy,

	Medicine	Dose	Frequency	Duration	Codes
	Erythromycin po	500mg	Three times a day	10 days	A V
or	Azithromycin po	500mg	At once	5 days	A V
	Paracetamol	500mg-1g	Four to six times daily	when needed	A E

Refer to health centre or hospital
- Tonsillitis accompanied by—
  - Difficulty in opening the mouth.
  - Severe difficulty in breathing and muffled speech
- Suspected acute rheumatic fever
- Suspected glomerulonephritis
- Chronic or recurrent tonsillitis (i.e., three or more episodes of tonsillitis in a year)
- History of previous rheumatic fever or rheumatic heart disease
- Heart murmurs not previously diagnosed

4.9 Laryngitis

4.9.1 Acute laryngitis

An infection of the larynx, usually by viruses

Signs and symptoms
- Hoarseness of voice

- Sore throat
- Painful dry cough

Nonpharmacological management
- Advise the patient to—
- Drink plenty of water at room temperature (≥ 2 litres daily)
- Strict vocal rest

Pharmacological management
If no improvement in 3 days, then start antibiotics.

	Medicine	Dose	Frequency	Duration	Codes
	Amoxycillin po	500mg	Three times a day	7 days	A V
In penicillin allergy use	Erythromycin po	500mg	Four to six times daily	10 days	A V
or	Azithromycin po	500mg	Once daily	5 days	A V

4.9.2 Chronic Laryngitis
If the symptoms, including hoarseness, persist for more than 1 month.

Refer to an ENT specialist.

4.10 Nose bleeds (epistaxis)

Most bleeding occurs from an area anterior and inferior on the nasal septum and may be caused by local or systemic diseases or local trauma. Always look for other conditions associated with nose bleeds, especially if recurrent (e.g., hypertension, bleeding tendency).

Nonpharmacological management
- Most bleeding can be controlled by pinching the nasal wings (alae) together for 5–10 minutes. If this fails, the bleeding site must be found, and the patient must be refer to hospital.

Pharmacological management
- Pack nose with cotton or gauze soaked in Adrenaline.
- For children, give Phytomenadione (vitamin K) 2 mg IM.
- For adults, check BP and refer to hospital.

	Medicine	Dose	Frequency	Dura-tion	Codes
Give baby	Phytomenadione (VitaminK) IM	2mg	At once		A V

Refer to health centre or hospital

Patient has recurrent nose bleeds, attempts to stop the present bleed have failed and the cause of the nosebleed is undetermined.

CHAPTER 5

ENDOCRINE CONDITIONS

5.1 Diabetes mellitus

Diabetes is a metabolic syndrome characterised by persistent hyperglycemia due to defects in insulin secretion, insulin action or both.

- There are two main categories of diabetes which are Type 1 and Type 2 diabetes mellitus.
- Characteristic symptoms of diabetes include hunger, thirst, polyuria, polydipsia, blurred vision, weight loss, polyphagia and a sensation of pins and pricks in both hands and feet.
- Ketoacidosis and the non-ketotic hyperosmolar state are the more severe presentations of diabetes often leading to coma. Diabetic retinopathy, nephropathy and neuropathy are the long-term effects of diabetes.

Diagnostic Criteria for Diabetes Mellitus

In patients with typical symptoms of hyperglycemia, any one of the single tests below confirm diabetes:

- Random plasma glucose ≥ 11.1 mmol/L
- Fasting plasma glucose ≥ 7.0 mmol/L
- HBA1c ≥ 6.5 % (done at hospital level)

In patients without the typical symptoms, any one of the following tests, repeated on a separate day within a two-week period confirms diabetes:

- Fasting plasma glucose ≥ 7.0 mmol/L
- 2-hour post load glucose in OGTT ≥ 11.1 mmol/L (at hospital level)
- HBA1c ≥ 6.5%

Investigations

- Blood glucose (monthly, self-monitoring report)
- FBC
- Urine MCS
- Urea and electrolytes
- Urine protein or urine albumin (uPCR or uACR where available)
- Urine ketones
- Lipid profile initially then fasting cholesterol on subsequent visits
- Fundoscopy
- Glycosylated haemoglobin (HBA1c)

Treatment targets

- Target HBA1c < 7.0 %, Target FPG of 4.0 – 7.0 mmol/L and PPG of 5.0 – 10.0 mmol/L for the majority of patients.
- Target HBA1c < 7.5 %, Target FPG of 4.0 – 7.0 mmol/L and PPG of < 12.0 mmol/L for the elderly, high risk patients, and those with hypoglycemia unawareness.
- HBA1c < 6.5%, FPG 4.0 – 7.0 mmol/L and PPG of 4.4 – 7.8 mmol/L may be targeted for young and newly diagnosed patients.

[Where FPG is fasting plasma glucose and PPG is post-prandial (after meal) glucose]

Monitoring

- Routine blood glucose, weight and height, BP (target BP < 130/80 mmHg), foot examination, urine protein or albumin
- Annual microalbuminuria testing
- Urea and creatinine annually (more frequently if baseline KFT is abnormal).
- HBA1c every 6 months if treatment targets are achieved, if not monitor every 3 months.
- Lipid profile annually
- Eye examination annually

Nonpharmacological management:

- Advise the patient to—
  - Maintain a healthy diet (refer to Non Communicable Diseases [NCD] guidelines).
    - Regular meals
    - High-fibre diet
    - Low carbohydrate diet
    - Low-fat diet
  - Maintain an ideal BMI (18.5–25).
  - Exercise; regular, simple exercise for 30 minutes, three times a week (a snack should be taken before the exercise).
  - Do regular home glucose monitoring, where possible.

5.1.1 Type 1 Diabetes Mellitus

Type 1 DM was formerly known as insulin-dependent diabetes mellitus (IDDM) or juvenile-onset DM.

Pharmacological management

- Managed with insulin injections that are adjusted according to each patient's individual needs.
- All patients with DM Type 1 should be referred at diagnosis for the initiation and stabilisation of therapy.

Insulin

- Insulin therapy should usually begin with teaching the patient the correct technique for subcutaneous injections because self-injections are to be strongly encouraged.
- Patients should be made aware of the different appearance of different kinds of insulin
  - Soluble or regular, which is fast acting = gin clear
  - NPH or Lente, which are intermediate acting = cloudy
  - Pre-mixed insulin preparations containing both soluble and NPH insulin = cloudy
- ***Caution:*** Cloudy insulins (intermediate acting or pre-mixed) can be given only subcutaneously and should not be injected IM or IV. Only soluble or regular insulin may be given by the IM or IV route during emergency treatment.
- Patients should be made aware of the strengths of insulin and the kind of syringes to be used. To avoid confusion, 100 U/mL insulin must be administered only with 0.3 mL, 0.5 mL, or 1 mL U-100 syringes calibrated for this strength of insulin.

Insulin Regimen

- The basal bolus regimen is preferred in Type 1 diabetes and comprises pre-meal short-acting insulin (before breakfast, lunch & supper) and intermediate-acting insulin at bedtime (not later than 10 pm)
- Twice daily pre-mixed/biphasic (intermediate mixed with short-acting insulin) is an option, where ⅔ of daily dose given before breakfast and the remaining ⅓ given before supper.

Insulin dose:

- Starting daily insulin dose of 0.6 units/kg body weight (adults)
- Dose given 30 minutes before meals.
- The total daily insulin is divided into a basal insulin (comprising 40 – 50%), given with evening meal, and the other 50 – 60% being a short acting insulin (split equally and given before each meal).
- For once-daily insulin injections (long-acting), ideal time is around 2200Hrs.
- Insulin dose is adjusted as required to achieve treatment/glycemic targets

5.1.2 Type 2 Diabetes Mellitus

Type 2 DM was formerly known as non-insulin dependent DM (NIDDM).

Nonpharmacological management

See 5.1.1.

Pharmacological management

Oral Glucose Lowering Treatment

- Should be used to augment the effect of diet control and exercise, not as a replacement of these.

	Medicine	Dose	Frequency	Duration	Codes
	Metformin po	500mg	twice daily	Long term	A V
		Titrate slowly to max of 2550mg or 850mg three times daily if response is slow			

Monitor renal function and adjust dose if renal impairment is present.

Table 5.1 Renal Dosing

eGFR (or CrCl)	Metformin dose	Comments
≥ 60ml/min	Standard dose	
45 – 60 ml/min	Standard dose	Monitor KFT 3-6 monthly
30 – 45 ml/min	Maximum daily dose = 1g	Monitor KFT 3-6 monthly
< 30 ml/min	Contra-indicated	

Sulphonylureas [Glibenclamide, Glimepiride, Gliclazide]

Gliclazide is the preferred sulphonylurea especially in the elderly and those with CKD. Newly diagnosed patients should be initiated on Gliclazide over Glibenclamide.

	Medicine	Dose	Frequency	Duration	Codes
	Glibenclamide po	2.5mg	daily before breakfast	Long term	A V
		Titrate slowly according to treatment targets to maximum level of 15mg daily If daily dose ≥ 7.5 mg divide daily dose into two doses, with larger dose in the morning			

Avoid in the elderly and those with renal impairment (eGFR < 60 ml/min) and ensure kidney function monitoring is done (serum creatinine).

	Medicine	Dose	Frequency	Duration	Codes
	Gliclazide po	40-80mg	Daily with breakfast	Long term	B V
		Adjust according to response up to 160mg as a single dose. Higher doses should be divided. Max dose is 320mg.			

Insulin

Initiated when treatment targets are not achieved with oral agents. May be considered as initial therapy for patients with FPG>14mmol/L or RBG>17mmol/L.

Maintain all patients on metformin therapy after initiating insulin. Biphasic insulin is the preferred regimen for substitution therapy. Intermediate-acting insulin is an option as add on therapy.

	Medicine	Dose	Frequency	Duration	Codes
	Biphasic insulin sc	Started at 15 units daily (0.3 – 0.5 units/kg/day) with (2/3) given 30 minutes before breakfast (10 units) and (1/3) given 30 minutes before supper (5 units). Increase by 4 units weekly, added to morning dose, until glycemic targets are achieved.			B V
Optional add on therapy	Intermediate-acting insulin	Started at 0.3 units/kg (8 units) in the evening/bedtime not later than 10 pm. Increase by 2 – 4 units every 3 - 7 days to achieve the treatment targets of FPG.			B V

Diabetic emergencies

- Hypoglycemia
- Diabetic ketoacidosis (DKA)
- Hyperosmolar hyperglycemic state (HHS)

Long Term Complications

- Cardiovascular disease may include stroke, coronary artery disease and peripheral vascular disease.
- Diabetic Retinopathy
- Diabetic Nephropathy
- Diabetic Neuropathy
- Recurrent infections
- Diabetic foot

Refer

There are three levels of referral:

- Immediate, same-day referral for diabetic emergencies or acute diabetic complications as listed above
- Six-month or annual referral for assessment of progress (depending on the control of the DM and the complications)
- Automatic referral for: certain conditions
  - o Pregnancy
  - o Failure of step 2 care to control the diabetes mellitus.
  - o All type 1 diabetics

5.1.3 Hypoglycemia in Diabetes

- Characterised by a reduction in plasma glucose concentration to a level that may induce specific symptoms and signs.
- Glucose threshold level where symptoms become apparent is variable.

Diagnosis
- Blood glucose < 4 mmol/L, by glucometer and may confirm with laboratory measurements

Symptoms and signs
- Anxiety, sweating, palpitations, hunger, headaches, behavioral changes
- Sweating, tremor, tachycardia, confusion, seizures, coma

Treatment

1) **At home**: Oral sugary drinks or paste (15 – 20 g Glucose)
- 3 or 4 teaspoons of sugar or sucrose dissolved in little water.
- 175 ml of fruit juice or soft drink
- May be repeated in 10 minutes and followed with slowly digestible carbohydrate (e.g. bread) or protein (e.g. milk).

2) In hospital

	Medicine	Dose	Frequency	Duration	Codes
	50% Dextrose IV	Establish large bore IV line and give rapid IV injection of 20 – 50 ml.			B V
if glucose remains below 4.4mmol/L in 5-10 mins give	50% Dextrose IV	20-50ml	at once		B V
continue with	10% Dextrose IV	1 litre	every 6 hours	until glucose normalises	B V
If iv is not possible give	Glucagon IM	1mg	at once		B E

Provide a snack when glucose has normalised and awake and observe patient for 12 hours after stopping glucose infusion.

NB prolonged glucose infusion may be required for hypoglycemia caused by sulphonylurea.

Hyperglycemic emergencies
- Hyperglycemic emergencies, diabetic ketoacidosis (DKA) and hyperosmolar hyperglycemic state (HHS) should be suspected in patients presenting with hyperglycemia and are systemically unwell.

5.1.4 Diabetic Ketoacidosis (DKA)

DKA is characterised by:
- Uncontrolled hyperglycemia, increased anion gap metabolic acidosis and increased total body ketones

Diagnostic criteria for DKA
- Hyperglycemia > 13.9 mmol/L (prior to insulin administration)
- Acidosis: blood pH < 7.3 or serum bicarbonate < 18 mmol/L
- Ketonaemia indicated by ketones> 3 mmol/L

5.1.5 Hyperosmolar Hyperglycemic State (HHS)

HHS is a syndrome characterised by:
- Impaired consciousness from slowly developing marked hyperglycemia, hyperosmolality and severe dehydration.
- Typically affects the middle-aged and older patients

Diagnostic criteria

- Uncontrolled hyperglycemia usually > 40 mmol/L
- Blood ketones usually negative, urine ketones may be positive
- Serum osmolality is > 320 mOsm/L

Precipitating factors for DKS/HHS

- Infections, discontinuation of insulin, myocardial infarction, cerebrovascular accident and restricted water intake in the elderly.

General measures

- Secure IV access
- If unconscious protect the airway and insert an NG tube
- Monitor urine output
- Determine the precipitating cause

Investigations

- Blood tests
  - o Glucose, Urea, Creatinine, electrolytes, anion gap, FBC +differential, HBA1c
  - o Venous blood gas (VBG)
  - o Serum ketones, when available
- Urine tests
  - o Urine dipstick for nitrites, blood and proteins
  - o Urine microscopy, culture and sensitivity
- Chest X-ray
- ECG, cardiac enzymes

Treatment

IV Fluids

1) DKA

	Medicine	Dose	Frequency	Duration	Codes
or	Normal saline ringer's lactate	Average fluid deficit in adults ranges from 5 – 10 LAdminister 1 – 1.5L of fluid in 1st hour, then 250 – 500ml every hour. Fluids administered in the first 4 hours should not exceed 50ml/kg. Replace the remaining deficit in 48 hours at about 5 ml/kg/hour. Switch to 5% Dextrose once the glucose level is < 14mmol/L. Use 0.45% saline if hyperchloremic acidosis develops in recovery phase of DKA.			A V

2) HHS

	Medicine	Dose	Frequency	Duration	Codes
	Normal Insulin	Administer 1L of normal saline over an hour, if there is no cardiac compromise. Continue with 0.45% saline at 250 – 500ml/hour if the serum sodium is normal or raised. The rate of fluid administration is determined by the state of hydration and urine output Monitor the serum sodium and choose the appropriate replacement fluid.			A V

Insulin therapy for HHS

	Medicine	Dose	Frequency	Duration	Codes
	Insulin	Continuous intravenous therapy is ideally commenced in an ICU or High care setting (for adequate monitoring). Always check the serum potassium prior to insulin infusion. Initial infusion rate at 0.1 unit/kg/hour [usually 5 – 7 units/hour. An example of infusion preparation = add 50 units of short-acting, soluble insulin in 200ml normal saline; where 4ml of prepared solution = 1 unit of soluble insulin, run at 20 – 28 ml/hour, [equivalent to 5 – 7 units/hour] Where an infusion pump is available: add 50 units of soluble insulin in 50 ml of normal saline (where 1ml is equivalent to 1 unit soluble insulin) and run at 5 – 7 ml/hour. Target a drop in plasma glucose of 3 – 4 mmol/L/hr, if not achieved in 1st hour double dose of the infusion rate. o Once plasma glucose is < 14 mmol/L reduce insulin infusion rate by 1 – 2 units/hour and continue adjusting insulin dose hourly. Hourly IM or IV bolus injections of 10 units of soluble insulin per dose is the alternative where IV infusion cannot be safely administered.			B V

Switch to subcutaneous insulin:

- When the hyperglycemic emergency has resolved
- When the patient is fully conscious and eating
- When the anion gap and acidosis has resolved. [HCO3 > 18mmol/L, pH > 7.3]
- When blood glucose < 15mmol/L

Potassium Replacement given according to the table below:

Serum K level	Treatment	Codes
< 3.0 mmol/L 3.1 – 4.0 mmol/L 4.1 – 5.5 mmol/L > 5.5 mmol/L	40 mmol/L of KCL per 1 litre of IV fluid 30 mmol/L of KCL per 1 litre of IV fluid 20 mmol/L of KCL per 1 litre of IV fluid Omit KCL	B V

5.2 Goitre

A goitre is a swelling of the neck due to an enlargement of the thyroid gland. It can be benign but may occasionally be malignant.

Symptoms and signs

- Asymptomatic
- Noisy breathing
- Difficulty in breathing
- Possible fatigue, weakness
- Visible swelling at the front of the neck, which moves upwards with swallowing
- Palpable enlarged thyroid, may have many nodules

Refer all cases.

CHAPTER 6

EYE CONDITIONS

6.1 Conjunctivitis

Conjunctivitis is inflammation of the conjunctiva. Some of the causes are -

- Bacterial infections (most dangerous/ severe cause is *Neisserria Gonorrhoea*)
- Viral (usually presents with an upper respiratory infection, high fever)
- Allergic reaction (allergens)
- Chemical irritants
- Systemic infections (e.g., measles)

Table 6.1: Differential Diagnosis: Causes of conjunctivitis

Signs/ symptoms	Allergic	Acute bacterial	Viral (Pink Eye)
Definition	Inflammatory condition of the conjunctiva caused by allergens (e.g. pollen, grass) medications, cosmetics (especially eye makeup)	Inflammatory purulent condition of the conjunctiva caused by bacterial infections	Inflammatory condition of the conjunctiva caused by a virus. Commonly associated with many upper respiratory tract viral infections. highly contagious and spread by contact.
Discharge?	Mucoid	✓**Purulent**	✓**Watery/None**
Itching?	✓**Marked**	None	None
Conjuctiva	Normal/ slightly red	Redness of conjuctival angles (corners)	**Diffuse pink / red conjunctiva**
Visual acuity	Normal	Normal	Normal
Others	Tearing photophobia	Painful, gritty eyes, swollen lids	Painful eyes, photophobia, enlarged preauricular lymph nodes
One or both eyes?	Both	One or both	One or both
Recurrences	Usually	Unsual	Unsual

Note: *✓Bold lettering indicates distinguishing feature.*
Adapted and modified from EDLIZ 2015

Treatment of conjunctivitis:
Allergic Conjunctivitis:

Nonpharmacological management
Reassure and Advise patient—

- Not to rub the eyes
- To use cold compresses i.e. a clean moistened cloth over the eyes
- and wear a sun hat whenever outdoors

Pharmacological management

	Medicine	Dose	Frequency	Duration	Codes
	Antazoline + tetryzoline (0.5+0.4) mg/ml	1-2drops in each eye	four times daily	7 days	B E
and	Oxymetazoline 0.05%	1 drop in each eye	four times daily	7 days	A E
or	Sodium cromoglycate 2% eye drops	1 drop in each eye	four times daily	7 days	A N

Caution: Do not give in children younger than 2 years.

Refer

- Persons using contact lenses
- Person who is nonresponsive after 5 days of treatment
- Acute bacterial conjunctivitis
- Children < 2years of age

6.1.1 Bacterial Conjunctivitis

Non Pharmacological Management

- Educate patient on personal hygiene to prevent spread
- Educate patient on correct application of ophthalmic medication
- To wash hands thoroughly before applying ophthalmic medication
- Not to share ophthalmic medicines
- Eye swabs for Gram stain and for culture and sensitivity may be needed to tailor down treatment

Pharmacological Management

	Medicine	Dose	Frequency	Duration	Codes
	Tetracycline 1% eye ointment	Apply to the eyes	Three times daily	7 days	A E
or	Chloramphenicol 1% eye ointment	Apply to the eyes	Three times daily	7 days	A V
and	Chloramphenicol 1%eye drops	Instil 1 drop	Four times daily	5 -7 days	C E
or	Gentamicin 0.3% eye drops	Instil 1 drop	Four times daily	5 -7 days	B E
or	Ofloxacin 0.3%, eye drops	Instil 1 drop	Four times daily	5 -7 days	C V

Refer If no improvement in 3 days

6.1.2 Viral Conjunctivitis

Nonpharmacological management

- Advise patient to:
  - Use sunglasses.
  - Practice good personal hygiene. Wash hands with clean water before touching the eye and after instilling medicine.
  - Use his or her own towel.
  - Wash face and cleanse the eyes frequently with clean water.
  - Not use home remedies such as milk, urine, saliva, or other substances because they will cause secondary infection.
  - Avoid spread of infection to the other eye and to other people.
- Teach patients and caregivers how to instill eye medication (i.e., ointment or drops).
- Instruct patients not to share eye drops with others.

Pharmacological management

	Medicine	Dose	Frequency	Duration	Codes
	Oxymetazoline 0.05%	1 drop in each eye	Four times daily	7 days	A E
and (for prophylaxis)	Tetracycline eye ointment	Apply to the eye	Four times daily	7 days	A E

Caution: Steroids should not be used in viral conjuctivitis.

6.2 Vernal catarrh (spring catarrh)

Causes

- This condition occurs mainly during the spring and summer months (September to February).
- It is common in children and teenagers.
- It has not been found to be related to any particular atmospheric allergen or pollutant.
- It is now believed to be caused by the rise in temperature associated with the spring and summer seasons.

Symptom and signs

- Severe itching and a thick, white discharge
- Conjunctivae may have a brownish or milky discoloration on the exposed parts.
- In severe cases, the exposed conjunctiva is thickened with patches of silvery scales.
- Round white nodules at the edge of the cornea are often seen.
- Papillae that give the conjunctiva a cobblestone appearance are seen.

Non-pharmaceutical management

10. Re-assure the patient or parent that the condition is not serious.
11. Advise the patient to wear sunglasses when outside.

Pharmaceutical management

	Medicine	Dose	Frequency	Duration	Codes
	Sodium cromoglycate 2% eye drops	1 drop	Four times daily	6 weeks initially	A N
	If symptoms recur, this treatment must be continued for the remainder of the spring and summer season				
In severe itching	Fluorometholone 0.1% eye drops	1 drop	Three times daily	5 days	B N

6.3 Phlyctenular conjunctivitis

A circumscribed conjunctivitis accompanied by the formation of small red nodules of lymphoid tissue (phlyctenulae) on the conjunctiva.

Causes

- Immunological response (cell mediated) to Mycobacterium TB elsewhere in the body.
- Most commonly seen in children with primary TB (noncavitating type)
- Hypersensitivity
- It may also occur as a reaction to—
  - o Staphylococcal infection
  - o Seborrhoeic dermatitis

Symptoms and signs

- Presents as a small, yellow or white nodule on the limbus
- Localised inflamed blood vessels radiate away from the nodule

Nonpharmacological management

- Try to confirm the diagnosis of tuberculosis based on—
- History
- Examination

- Do not do a PPD (Mantoux) test because this condition is a hypersensitivity manifestation of primary TB, and the PPD may lead to corneal ulceration and perforation.

Pharmacological management

	Medicine	Dose	Frequency	Duration	Codes
	Sodium cromoglycate 2% eye drops	1-2 drops in each eye	Four times daily	7 days	A N
or	Hydrocortisone 1% eye drops	1-2drops in each eye	Four times daily	7 days	B E

Because phlyctenular conjunctivitis is strongly suggestive of TB refer patients to start anti-TB treatment unless there is good evidence of another cause for the phlyctenulum.
Refer all cases—
- For TB investigation
- For chest X-ray to establish whether hilar glands are enlarged

6.4 Conjunctivitis of the newborn (ophthalmia neonatorum)

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

Symptoms and signs
- The mother may complain that the baby's eyes are sticky, discharging, and oedematous.
- Mildly inflamed conjunctiva
- Purulent conjunctivitis in the newborn
- **Features that suggest gonococcal infection are—**
  - o Maternal history of a purulent vaginal discharge
  - o Onset within 4 days of birth
- **Features that suggest chlamydial infection are—**
  - o Onset after the 4th day after birth
  - o Slight watery or mildly purulent discharge

Nonpharmacological management
- Screen and treat all pregnant women at ANC for STIs.
- Clean and wipe the eyes with 0.9% sodium chloride (normal saline) (A) using a clean cloth.

Pharmacological management
Prophylaxis

	Medicine	Dose	Frequency	Duration	Codes
Routine administration	Chloramphenicol 1% eye ointment	Apply to the eyes	Three times daily	7 days	A V
or to all new-born babies	Tetracycline eye ointment	Apply to both eyes	At birth		A E

Sticky eye(s) without Purulent discharge:
Use **Compound Sodium chloride 0.9%** (A) eye wash immediately, then refer

	Medicine	Dose	Frequency	Duration	Codes
	Ceftriaxone IM	50mg/kg	Once daily	At once	B E
or	Cefotaxime	50mg/kg	Once daily	At once	B E

Given at Regional Hospital (Treatment to be initiated by Medical officer or Eye Care Professional e.g. Ophthalmic nurse) as they refer patient to a Specialist.

Refer

- Any purulent conjunctivitis in the newborn.
- Both parents of new born with purulent conjunctivitis for treatment of STIs

6.5 Trachoma

It is a chronic conjunctivitis caused by infection with Chlamydia trachomatis (a small gram negative bacterium). It is one of the commonest causes of blindness worldwide. There is chronic inflammation of the conjunctiva leading to scarring of the upper eyelid tarsal plate, entropion and in turn of eyelashes. It is a disease of poor hygiene and poverty. If not treated it will lead to blindness.

Symptoms and signs

1. In early stages—
   - Red & discharging eye (mucopurulent discharge)
   - Itching
   - Decreased vision
   - Follicles (grain-like growth) on the conjunctiva

2. In the later stages—
   - Conjuctival scarring causing the upper eyelid to turn inwards (entropion) and causing the eyelashes to scratch the cornea
   - Scarring of the cornea leading to blindness.

Differential diagnosis

Allergic conjunctivitis (chronic)

Nonpharmacological management

- Advise the patient to prevent trachoma by—
- Good personal hygiene
- Regular face washing
- Good water and sanitation
- Surgical correction of entropion
- Ensure clean infant deliveries

Pharmacological management

	Medicine	Dose	Frequency	Duration	Codes
	Tetracycline eye ointment	Apply to the eye	Twice daily	6 weeks	A E
plus	Azithromycin po	1g	At once		A V
or	Erythromycin po	500mg	Four times daily	14 days	A V

Erythromycin can be given to women of childbearing age

Refer to a specialist if there are any complications.

6.6 Eye injury

The eye is a delicate external organ easily susceptible to injuries, eye injuries include: Corneal and conjunctival foreign bodies and abrasions, burns (dry heat and chemical burns), blunt trauma (contusions), penetrating injuries to the eyeball (perforations), injuries to the eyelids, orbital injuries and cranial nerve injuries.

6.6.1 Chemical Burns "Ophthalmological Emergency"

Damage to the eye caused by contact with irritating chemical substance such as acid or alkali (e.g. household detergents, bleaching agents), snake spit , insect bite, traditional eye medicine, cement or lime cause a damage to the eye.

Presents with:

- History of patients eye(s) being in contact with any irritating chemical
- Pain
- Blurred vision
- Excessive teary & watery eye

Emergency treatment

	Medicine	Dose	Frequency	Duration	Codes
	Oxybuprocaine hydrochloride 0.4%	One drop	At once		B E

Irrigate the eye and surrounding areas thoroughly using tap water or 0.9% sodium chloride (normal saline) (A) and a 10ml syringe (without the needle) for at least 20 - 30 minutes.

*In cases of severe alkaline burn:

- Irrigation should be prolonged
- Evert upper eyelid and remove any debris or foreign bodies from the eye if present
- Perform visual acuity

	Medicine	Dose	Frequency	Duration	Codes
	Fluorescein 1% eye drops	Instill in the eyes for diagnosis of local or diffuse damage		apply once	B E

If diffuse damage is found,

	Medicine	Dose	Frequency	Duration	Codes
	Atropine 10mg/ml	1-2 drops	At once		B E
plus	Tetracycline 1% eye ointment	Apply to the eyes	At once		A E
or	Chloramphenicol 1% eye ointment	Apply to the eyes	At once		A V
and for pain	Paracetamol po	1g	3-4 times daily	When necessary	A E

Cover with eye pad, and refer to the hospital
Refer To an eye specialist within 12 hours

6.6.2 Foreign Body In The Eye

A foreign body may enter the eye and be embedded in the conjunctiva, the cornea, or deeper during every

day daily activities e.g. eyelash, dust, dirt, sand or metals (following grinding, welding or hammering). Conjunctival or eyelid foreign body may cause corneal abrasions and cause serious disturbance of vision.

Symptoms and Signs
- Foreign body sensation
- Sudden discomfort or severe pain
- Watering/ tearing eye
- Red eye
- Photophobia
- Inability to open the eye
- Poor/ blurry vision

Diagnosis
- o Take proper history
- o Check visual acuity first
- o Look on the eyeball and under the eyelids to find the foreign body

Caution: Do not use an eye pad with ecchymosis lid oedema.

Emergency treatment
Remove foreign body by using a cotton bud under local anaesthesia
—OR—
Irrigate with clean water or 0.9% sodium chloride (normal saline) (A) then refer.

	Medicine	Dose	Frequency	Duration	Codes
Stain with to reveal abrasions	Fluorescein sodium paper strips		Single use		B V
plus	Atropine 10mg/ml	1-2 drops	At once		B E
or	Chloramphenicol 1% eye ointment	Apply to the eyes	3-4 times daily		A V

Refer
1. Deep corneal foreign body
   - o Hyphaema (blood in the anterior chamber of the eye)
   - o Diffuse corneal damage
   - o Scleral and corneal laceration
   - o Lid oedema (do not use eye pad)
   - o Subconjunctival bleeding persisting for more than 24 hours
   - o Post-traumatic dilatation of the pupil
   - o Persistent corneal defect or corneal opacity

6.6.3 Corneal Abrasion & Ulcer
Corneal ulcers may be caused by an infection, a foreign body in the eye, abrasions on the surface, severely dry eye or wearing contact lenses that are left in overnight.

Presentation
- Blurring vision
- Photophobia
- Red, painful and watery eye
- White patch/es on the cornea
- Hyperemic conjuctiv

Diagnosis

- Get proper history
- Remove any foreign body if visible on cornea, conjuctiva or fornices
- Stain with fluorescein to reveal any corneal abrasions or ulcers

Pharmacological treatment

	Medicine	Dose	Frequency	Duration	Codes
	Tetracycline eye ointment	Apply to both eyes	Three times daily	3 days	A E
or	Chloramphenicol 1% eye ointment	Apply to both eyes	Three times daily	3 days	A V

Refer to eye specialist if no improvement in 3 days

Ulcers

	Medicine	Dose	Frequency	Duration	Codes
	Tetracycline eye ointment	Apply to both eyes	At once		A E
or	Chloramphenicol 1% eye ointment	Apply to both eyes	At once		A V

Apply an eye pad or patch

Refer to eye specialist

6.6.4 Blunt or Penetrating Injury

Eye injuries can be caused by high speed flying objects e.g. pieces of wood, glass, stone and other materials or by blunt objects such as sporting balls, blow from a fist, facial trauma in MVA. These injuries may include conjunctival/ corneal lacerations, haematoma, orbital fractures and penetrating open globe injuries with prolapse of eye contents.

Check for:

- Visual loss, hyphaema (blood in the eye), lacerations
- Proptosis (abnormal protrusion of eyeball)
- Perforations e.g. teardrop-shaped pupil
- Extra ocular muscle motility
- Enophthalmos (posterior displacement of eyeball)

Table 6.2

Clinical Findings	Management
Normal vision, no hyphaema, no laceration, no pain	• Observe.
Normal vision, no hyphaema, no laceration, pain	• Paracetamol 1g (adults) or 10- 15mg/kg (A) (children) po 8. hourly for 2 – 3 days. • If pain persists refer to eye specialist.
Poor vision and /or hyphaema with/without pain	• Put eye shield and refer to eye specialist immediately.
Proptosis, enophthalmos, limited Extra Ocular Motility	• ***Refer*** to eye specialist immediately.
Laceration/perforation or diffuse damage to the cornea and sclera	• Tetanus toxoid 0.5ml imi stat (A). • Systemic antibiotic stat and analgesics. • Put eye shield and refer to specialist immediately.

Clinical Findings	Management
Globe or intracocular penetration evidenced by:	
1. Poor vision, 2. Distorted pupil 3. Circumferential subconjunctival haemorrhage 4. Hyphaema with or without raised intraocular pressure	• ***Refer*** to specialist immediately.
Eyelid lacerations minor cuts not involving lid margin or tarsal conjunctiva	• Suture with nylon 5.0.
Eyelid lacerations with 1. Involvement of lid margins 2. Conjunctival tarsal plate 3. Tissue loss 4. Involvement of punctum and canaliculus	• ***Refer*** to specialist immediately.
Orbital injuries e.g intraocular FB, intraorbital FB, orbital fractures, retrobulbar hemorrhage	• Take orbital X–ray of patients. • **Tetanus 0.5 ml** imi stat (A) should be given if there is an open wound. • Give **Ceftriaxone 1g** (adults) or **50mg/kg** (children) (B) imi stat. • **Paracetamol 1g** (adults) or **10- 15mg/kg** (A) (children) PO. • Refer to eye specialist.

6.7 Glaucoma, acute and chronic

Glaucoma is the second leading cause of preventable blindness in the world. It is characterised by damage to the optic nerve and peripheral visual loss associated with raised intra ocular pressure.

Glaucoma is classified as open angle glaucoma (chronic) and angle closure glaucoma (acute). Glaucoma may be congenital, primary or secondary to other ocular conditions. It is usually bilateral, but maybe unilateral or asymmetrical. Delay in diagnosis results in irreversible damage to the optic nerve with progressive visual loss.

6.7.1 Acute Glaucoma

Symptoms and signs

- Acute onset of severe pain and redness in one eye
- Nausea and vomiting in severe cases
- A unilateral, temporal headache
- Loss of vision in affected eye
- Haloes around lights (bright rings)
- Hazy or cloudy cornea
- Shallow anterior chamber
- Fixed mid dilated pupil
- Severely elevated intraocular pressure, on palpation the eye feels hard, compared with the other eye

Note: Primary Angle Closure Glaucoma is an "Ophthalmological Emergency" Refer all patients with Acute/Congestive glaucoma to eye specialist after initial medical treatment.

Pharmacological management

	Medicine	Dose	Frequency	Duration	Codes
	Acetazolamide po	250-500mg	At once		B E
or	Glycerin as glycerol po	1ml/kg	At once		B E
plus	Timolol 0.25-0.5%	Instill 1 drop	Twice daily	2 weeks	B V

Refer immediately

Note:
- Also treat patients for associated pain and nausea/ vomiting
- Acetazolamide is a sulphur containing medicine, do not use in patients allergic to Sulphur
- Glycerol is a concentrated sugar solution, it should not be given in diabetic patients

6.7.2 Chronic Glaucoma

Symptoms and Signs
- Mostly asymptomatic
- Gradual loss of vision or loss of peripheral vision
- Optic nerve damage
- Eyeball tense on palpation
- Patients are usually over 40 years old, but with black people, it may present earlier
- First degree relatives of glaucoma patients are at increased risk.

Note 1. Primary Open Angle Glaucoma does not have symptoms in early stages, hence routine intraocular pressure checkup and fundus examinations should be done in all people of 40 years and above by a qualified eye care personnel 2. All suspected cases of glaucoma should be referred to qualified eye care personnel for confirmation of diagnosis and treatment plan.

Nonpharmacological management
- If there is any suspicion of glaucoma, the patient must be referred for accurate testing.
- Patients over the age of 35 years should be encouraged to have their eye pressure tested routinely if possible (e.g., when going to opticians to buy glasses).
- Patients who have been put onto maintenance therapy with specific medicines that decrease intraocular pressure (such as acetazolamide) must be encouraged to take their treatment regularly.

Pharmacological management
This is initiated after a diagnosis is reached by an ophthalmologist, refill of some medicines can be done by a Medical Officers and an ophthalmic nurse but with regular review by an eye specialist. Medical treatment should be lifelong unless there are conditions necessitating other interventions.

	Medicine	Dose	Frequency	Duration	Codes
	Timolol 0.25% or 0.5% eye drops	Instil 1 drop in the eyes	Twice daily	Long term	B V
or	Betaxolol 0.25% or 0.5% eye drops	Instil 1 drop in the eyes	Twice daily	Long term	C E

Use lower strength in mild disease and those at risk of complications. In patients who comply to treatment and there is no good response, add

	Medicine	Dose	Frequency	Duration	Codes
	Latanoprost 0.005% eye drops	Instil 1 drop in the eyes	Once daily	Long term	B V
or	Prostamide bimatoprost 0.03% eye drops	Instil 1 drop in the eyes	Once daily	Long term	C E

These may be used as first-line in patients with contraindication of beta-blockers. They can be used as a second-line drug in patients on beta-blockers if the target IOP reduction has not been reached.

***Note:** β-blockers are contraindicated to people who are known to have overt asthma as this group of medication may cause an acute asthmatic attack within a short time following instillation into the eye.*

In patients who are intolerant to prostaglandin analogue or are not responding give:

	Medicine	Dose	Frequency	Duration	Codes
	Brimonidine 0.15-0.2% eye drops	Instil 1 drop in the eyes	Twice daily	Long term	C E

Failure to respond give:

	Medicine	Dose	Frequency	Duration	Codes
	pilocarpine hydrochloride 2% or 4% eye drops	Instil 1 drop in the eyes	Four times daily	Review	C E

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:

	Medicine	Dose	Frequency	Duration	Codes
	Acetazolamide po	250mg	Four times daily	Review	C E

6.8 Uveitis

Is inflammation of the uveal tissue (Iris, choroid and ciliary body) and its adjacent structures. Majority of cases are idiopathic and other cases are due to autoimmune diseases e.g Rheumatoid Arthritis, viral and systemic diseases like Tuberculosis, Leprosy and Syphilis.

It has three main clinical presentations namely acute, chronic and acute on chronic.
The commonest form is acute anterior uveitis, which presents with:

- Painful red eye
- Severe Photophobia
- Excessive tearing
- Blurred vision
- Hyperemic conjuctiva with circumcilliary injection
- Small (miotic), irregular pupil; responds poorly to light
- Slit lamp examination reveals cells and keratic precipitates and hypopyon may be seen in the anterior chamber

Chronic uveitis may lead to cystoid macular oedema, cartaract formation and secondary glaucoma which can lead to visual loss if not treated promptly.

Investigations
These are indicated in bilateral and granulomatous uveitis as they may not be helpful in unilateral and non-granulomatous.

Blood tests
- FBC, ESR, Antinuclear Antibody, VDRL, Urinalysis and HIV Testing

Imaging: Chest X-Rays if Tuberculosis and Sarcoidosis are suspected.

Pharmacological management

	Medicine	Dose	Frequency	Duration	Codes
	Amoxycillin po	500mg	Three times daily	5 days	A V
	Tetracycline eye ointment	Apply to both eyes	Three times daily	3 days	A E
or	Chloramphenicol 1% eye ointment	Apply to the eyes	Three times daily	3 days	A V

Do not pad the eye.
Refer All cases to an eye specialist

6.9 Stye (external hordeolum)

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

Symptoms and signs
- Pain in the eyelid. It is situated at the other edge of the eyelid. It differs from a meibomian abscess, which is situated in the body of the eyelid.
- Red, tender swelling at margin of the eyelid (external stye).
- Red, tender swelling on the inside of the eyelid (internal stye or cyst).
- Pain when touching the swelling.

Nonpharmacological management
- Warm compresses

Pharmacological management

	Medicine	Dose	Frequency	Duration	Codes
	ceftriaxone IIV/IM	1g	Twice daily	3 days	B E
	metronidazole IV	500mg	Three times daily	3 days	B V

6.10 Chalazion (internal hordeolum)

Painless lid swelling.
Refer for I & D by ophthalmic officer

6.11 Orbital cellulitis

This is a "medical emergency"

Orbital cellulitis is an infection of the soft tissues of the orbit posterior to the orbital septum. It may be a continuum of preseptal cellulitis, which is an infection of the soft tissue of the eyelids and periocular region anterior to the orbital septum.

It may result from the extension of an infection from the paranasal sinuses or other periorbital structures such as the face, globe, or lacrimal sac, direct inoculation of the orbit from trauma or surgery or as a haematogenous spread from bacteremia. The infection may rapidly spread to the brain (carvenous sinus thrombosis and brain abscess) or lead to septicaemia.

Signs and symptoms

- Painful proptosis (protrusion of the eye) and ophthalmoplegia are the cardinal signs of orbital cellulitis
- Fever, malaise, and a history of recent sinusitis or upper respiratory tract infection
- Decreased vision
- Swollen eyelids, chemosis, hyperemia of the conjunctiva, and resistance to retropulsion of the globe may be present.

Investigation

- Full Blood Count and ESR
- Blood culture
- CT Scan with Contrast and MRI will help differentiating it with other diseases but also identifying the source or extension of the disease.

Management

Monitor vital signs closely

	Medicine	Dose	Frequency	Duration	Codes
	Ceftriaxone IV/IM	1g	Twice daily	3 days	B E
	Metronidazole IV	500mg	Three times daily	3 days	B V

Refer Urgently to Eye specialist.

6.12 Preseptal Celulitis

Infection of the subcutaneous tissues anterior to the orbital septum

Presentation

- Swollen, firm tender red eyelid
- Free eye movements
- Normal pupillary reaction
- Normal vision
- No chemosis and no proptosis

Non-Pharmacological Treatment

- Apply warm compresses twice a day
- Avoid rubbing the eye

Pharmacological Management

	Medicine	Dose	Frequency	Duration	Codes
	Amoxycillin	500mg	Three times daily	5 days	A E
or	Co-amoxiclav	625mg	Three times daily	5 days	A E
	Paracetamol	1g	Three times daily	3 days	A E

Refer
- If no response after 3 day of medication
- All children

6.13 Dry eye

It occurs when there is inadequate tear volume or function.

Symptoms and Signs
- Feelings of dryness, grittiness, burning and foreign body sensation, usually worse during the day
- Stringy discharge, redness and transient blurring of vision are also common.

Exclude allergic conjunctivitis

Non-Pharmacological Treatment
- Control symptoms since the condition is not curable
- Educate patients to avoid unprescribed eye medications which may worsen the dryness and control their environmental factors by eg. blinking frequently during visual attentive tasks, avoid air conditioners.

Pharmacological Treatment

Tear substitutes

	Medicine	Dose	Frequency	Duration	Codes
	Hydroxypropyl methylcellulose 0.7% eye drops	Instil 1 drop	Four times daily	Long term	C V

6.14 Xerophthalmia

Xerophthalmia refers to the spectrum of ocular disease caused by lack of vitamin A, and is a late manifestation of severe deficiency. Lack of vitamin A in the diet may be caused by malnutrition, malabsorption, chronic alcoholism or by highly selective dieting. The risk in infants is increased if their mothers are malnourished and by coexisting diarrhoea or measles.
Keratomalacia (a sign of Xerophthalmia) is an indicator of very severe vitamin A deficiency and should be treated as a "medical emergency" due to the risk of death, particularly in infants.

Symptoms and Signs
- Poor night vision (in the early stages)
- Dry conjunctiva
- Grey sclera
- Conjuctival folding (wrinkling)
- Keratomalacia (cloudy cornea, soft and ulcerates easily)

Non-pharmacological treatment
- Promotion of breast-feeding
- Measles immunisation

- Vitamin A supplementation, foods rich in Vitamin A [carrot, mango, pumpkin, and paw-paw].

Caution: Discourage mothers from putting any drugs in the eye unless
Prescribed by a clinician

Pharmacological management
Refer all cases all cases of severe vit A deficiency and with signs of xerophthalmia to ophthalmologist.

	Medicine	Dose	Frequency	Duration	Codes
	Vitamin A po	200 000IU	Single Dose on day 1 and Day 2. Repeat after 2 weeks		A V

6.15 Cataract

Diagnostic Criteria
- Cloudiness in the lens seen as a white mark behind the pupil and iris
- Conjunctiva and cornea are clear and the whole iris can be seen clearly

Note:
- Cataract may present in all age groups,blindness due to cataract is reversible
- Treatment is only by surgery
- Early treatment in children is mandatory Referral

Refer all cases to eye surgeon for cataract surgery. Children should be referred immediately, a white pupil in children may be a tumor in the eye and late referral may lead to permanent loss of vision, squint, loss of eye or loss of life.

6.16 Leucocoria

Leucocoria is a white pupipllary reflex

Common causes include:
- Congenital cataract,
- Retinoblastoma,
- Persistent foetal vasculature,
- Retionopathy of prematurity (ROP)

Symptoms and Signs
- White appearance of the pupil instead of the usual black colour on ophthal
- Absent or decreased red reflex on the fundus on examination with an ophthalmoscope

Refer all patients urgently

6.17 Herpes Zoster Ophthalmicus

Herpes Zoster Ophthalmicus occurs when the Varicella Zoster virus reactivates in the trigerminal ganglion and passes down the ophthalmic division of the trigerminal nerve.

Symptoms and Signs
- Painful vesicular rash in the trigerminal V1 area – vesicles on the tip of the nose indicate nasociliary branch involvement, which increases the risk of ocular involvement.
- Some patients may develop conjunctivitis, keratitis, uveitis, retinitis and cranial involvement.

- Chronic ocular inflammation can lead to loss of vision and debilitating post-herpetic neuralgia.

Non Pharmacological

- Offer all patients HIV testing

Pharmacological Management

	Medicine	Dose	Frequency	Duration	Codes
	Acyclovir po	800mg	Every 4 hours whilst awake	7-10 days	A E
	Amitryptilline po	25mg	At night	10 days	B V

Refer

- Vesicles at the tip /side of the nose
- Fluorescein staining of cornea shows corneal/ulceration
- Decreased vision
- Red eye uveitis or keratitis
- Cranial nerve palsies

6.18 Ocular manifestation of common systemic conditions

Table 6.3

Systemic Condition	Ocular manifestation	Management
• **Diabetes**	**Visual loss by:** • cataract formation, • retinopathy and • glaucoma	***Refer*** All diabetic patients for ophthalmic examination at least once a year.
• **Hypertension**	• Visual loss due to retinopathy	***Refer*** All hypertensive patients for ophthalmic examination at least once a year.
• **Tuberculosis**	• May affect vision by: • Direct infection causing a form of uveitis. • Optic neuropathy secondary to anti TB drugs. ***Caution:*** Check visual acuity for all patients before initiation of anti TB drugs	***Refer*** All patients who complain of pain or visual disturbance.
• **Leukaemia**	**May cause** • Reduced vision • Proptosis	***Refer*** all patients with pain, visual disturbance and proptosis.
• **HIV/AIDS**	**Include**: - Herpes zoster ophthalmicus, (the eyeball is affected in about 50% of the cases) - Cytomegalovirus retinitis - Toxoplasmosis - Kaposi's sarcoma and - Tumours of the conjunctiva (more commonly - Conjuctival squamous cell carcinoma ***Caution:*** Check visual acuity in the above conditions and Examine the eye with a torch.	***Refer*** if: • Patient complains of visual loss • Cornea is not clear • Conjunctiva lesions are present

Each health facility or centre should have:

- Vision chart for distance e.g. Snellen chart or logmar chart for both adults and children and near chart for reading
- Pinhole
- Torch and
- An ophthalmoscope.

CHAPTER 7

HAEMATOLOGICAL CONDITIONS

7.1 Anaemia

Anaemia is defined as the reduction of haemoglobin for age and sex of the individual (i.e., <13 g/dL in adult males, <12 g/dL in adult females.

It is clinically recognised by pallor, tiredness and shortness of breath. It is commonly caused by nutritional deficiency of iron, folate or vitamin B12 deficiency, chronic systemic disease or chronic blood loss. The underlying cause should at all times be evaluated.

7.1.1 Iron deficiency anaemia

Results from iron deficiency caused by chronic blood loss or poor nutritional intake. The typical blood picture, with FBC and peripheral blood smear, is hypochromia and macrocytosis (low MCV and low MCH) and low serum ferritin.

Treatment

	Medicine	Dose	Frequency	Duration	Codes
	Ferrous Sulphate po	200mg	Twice daily	3 months	A E

Refer

- Patients with poor response to the above treatment
- Gastroscopy and/or colonoscopy should be considered in adult males and postmenopausal women
- Gynaecological evaluation should be considered in women with heavy menses

7.1.2 Megaloblastic anaemia

It is caused by a deficiency of folate and vitamin B12.
The typical blood picture is that of macrocytosis (elevated MCV) and pancytopenia can result in severe cases. Several medicines may cause a macrocytic anaemia in the absence of folate or vitamin B12 deficiency (e.g hydroxyurea and zidovudine, etc.).

Treatment

	Medicine	Dose	Frequency	Duration	Codes
Folate deficiency	Folic acid po	5mg	Once daily	3 months	A N
Vit B12 deficiency	Vit B12 IM	1mg	Once daily for 5 days, then once a week for 3 weeks, once every second month in pernicious anaemia.		B N

Folate and iron supplementation is recommended along with vitamin B12 injection until the haemoglobin has normalised (usually 1 to 2 months).

Nonpharmacological management
Advise patient to eat a balanced diet (i.e., plenty of leafy foods, beans, liver, meat, eggs, fish).

7.2 Haemostatic and bleeding disorders

A bleeding disorder that may result from a coagulation defect, a vessel defect and a platelet defect. May present from birth or acquired later in life.

Common causes

- Liver disease
- Vitamin K deficiency, especially in newborns
- Drug-induced—herbal preparations, prednisolone, NSAIDs (e.g., aspirin, ibuprofen)
- Bone marrow malignancy (e.g., leukemia)
- Haemophilia
- Severe septicemia resulting in DIC

Nonpharmacological management

- Apply pressure dressing to minimise bleeding where possible.

Pharmacological management

	Medicine	Dose	Frequency	Duration	Codes
In bleeding newborns	Phytomenadione/ Vitamin K IM/IV	1mg for term babies and 0.5mg for preterm babies irrespective of history of Vit K inj. Transfuse with fresh whole blood if patient is severely anaemic or in shock.			A E

Stop any medications thought to be responsible for bleeding or which may aggravate bleeding (see "Common causes" above).

Inherited Bleeding Disorders

- Include Haemophilia A, Haemophilia B and von Willebrand's disease
- These are caused by lack of clotting factors VIII, IX and von Willebrand factor, respectively
- Complications include haemarthrosis which leads to chronic arthropathy, intracranial haemorrhage, soft tissue and muscle haematomas
- Such patients require management and follow up at a hospital level of care
- Avoid taking blood from femoral veins, avoid using central lines, do not aspirate joints, avoid IM injections, and avoid aspirin and NSAIDs.

Treatment

- Replace the appropriate factor (Factor VIII/Factor IX / Cryoprecipitate or FFPs) (V/B), as required, for minor and major bleeding.

Acquired bleeding disorders

Disseminated Intravascular Coagulation (DIC)

- DIC is characterised by systemic activation of blood coagulation with fibrin generation and deposition, leading to microvascular thrombi, resulting in organ or multi-organ dysfunction.
- The consumption of platelets and clotting factors can lead to significant bleeding.
- DIC is a complication of an underlying disorder

Management

- Identify the underlying cause
- Replace haemostatic factors with cryoprecipitate (1 unit/10 kg) (V/B) or IV fresh frozen plasma, FFP (V/B) (15 ml/kg) if bleeding
- Repeat the above replacement every 8 to 12 hours, if patient continues to bleed.
- Monitor PT/INR, APTT, platelet count and fibrinogen levels
- Platelet transfusion should be given if patient is bleeding and the platelet count is below 20 x 10^9.

Refer

- After stabilisation, refer all patients to specialist for further evaluation.
- ***Refer*** any patients requiring surgery.

7.3 Coagulation disorders

Venous thromboembolic disease (VTE) comprises deep vein thrombosis (DVT) and pulmonary thromboembolism (PE).

Deep venous thrombosis

- Characterised by lower (or upper) extremity swelling, tenderness and warmth to touch of the involved limb.
- Diagnosis is primarily clinical and confirmed by Doppler ultrasound or other imaging

Pulmonary thromboembolism

- Characterised by sudden onset of shortness of breath, pleuritic chest pain, cough, haemoptysis.
- Cardiovascular collapse with hypotension and syncope may result with massive PE.
- Tachypnoea, tachycardia, prominent P2 along with cyanosis and fever may be present.
- Patients need to be managed at High Care Unit or Intensive Care.

Treatment for DVT

	Medicine	Dose	Frequency	Duration	Codes
	Warfarin po	5mg	Once daily	3 months then review	B E
			Monitor INR every 48 hours until therapeutic range is achieved (INR of 2 – 3) Overlap warfarin with heparin at initiation of therapy (for at least 5 days).		
Use with	Unfractionated heparin SC	333 units/kg at once, then 250 units/kg every 12 hours for 5 days.			B V
or	Enoxaparin SC	1mg/kg	Twice daily	5 days	B V

Continue warfarin for 3 months, if the precipitating cause has resolved. Specialist review is recommended for unprovoked VTE.

Treatment for Pulmonary Embolism

	Medicine	Dose	Frequency	Duration	Codes
	Unfractionated heparin IV		80 units/kg at once, then 18 units/kg/hr target APTT 2-3 times above baseline		B V
or	Enoxaparin SC	1mg/kg	Twice daily		B V
	Warfarin po	5mg	Once daily	Review	B E

Consider thrombolysis in an ICU level of care in patients with evidence of a massive PE.

Warfarin overdose

If INR is between 4.5 –7.0 and no hemorrhage, withhold warfarin for 1-2 days and review with repeat INR.

	Medicine	Dose	Frequency	Duration	Codes
Where bleeding risk is high	Vitamin K po	1-2.5mg	Daily	Review	A V

If INR is above 7.0 with no hemorrhage,

	Medicine	Dose	Frequency	Duration	Codes
Withhold Warfarin, monitor INR daily	Vitamin K po	5mg	Daily	Review	A V
or	Vitamin K IV	1mg	Slowly daily	Review	A V

If INR is above 7.0 with hemorrhage,

	Medicine	Dose	Frequency	Duration	Codes
Withhold Warfarin, monitor INR daily	Frozen fresh plasma (FFP) IV	20ml/kg	Daily	Review	B V
Plus	Vitamin K IV	5-10mg	Slowly daily according severity	Review	A V

NB: In patients with metallic cardiac valves use vitamin K with caution

7.4 Sickle cell disease

- Sickle cell disease is an inherited disorder characterised by the presence of a mutated form of hemoglobin, hemoglobin S (HbS).
- Red blood cells containing homozygous HbS (HbSS) are prone to repeated sickling when exposed to low oxygen conditions and ultimately assume the sickled shape.
- Individuals with sickle cell trait have < 50% HbS and are usually asymptomatic.

Characteristic features of Sickle cell disease

- Hemolytic anaemia
- Painful vaso-occlussive crises
- Multiple organ damage from microinfarcts affecting the heart, spleen, bones and the central nervous system

Symptoms and signs

- Joint and bone pain, especially during cold wet seasons
- Periodic jaundice
- Abdominal pain, especially in the splenic area
- Spontaneous sustained erection without sexual arousal in male patients (priapism) may occur
- Jaundice
- Pallor
- Hepatomegaly
- Splenomegaly
- There may be old or recent scarification marks suggesting the long history of the illness.

Diagnosis

- FBC
- Sickling test

Confirmatory test:
Haemoglobin electrophoresis

Other ancillary laboratory investigations useful in detection and monitoring of the disease include:
FBC – macrocytosis may indicate increased reticulocytosis or compliance with hydroxyurea therapy
Reticulocyte count – usually ranges from 5 – 15 % in sickle cell disease
Peripheral blood film – may show irreversibly sickled red cells, polychromasia, occasional nucleated red cells, and schistocytes, as well as Howel-Jolly bodies. Target cells may be seen as well.
Biochemical changes include – high LDH, low haptoglobulin, high total and indirect bilirubin and high AST.

Pharmacological management
The patient may present in crisis, in the steady state, or with complications.

Crisis—
- Make a prompt determination precipitating cause (e.g., infection, malaria), and begin treatment.
- Hydration: encourage oral fluids first. Give IV fluids if patient is unable to drink well, has severe pain, abdominal symptoms or is not settling.
- Give IV fluid and electrolyte therapy (usually glucose in sodium chloride):

	Medicine	Dose	Frequency	Duration	Codes
Adults	5% Dextrose in 0.9% Sodium Chloride IV	Maintenance rate according to weight		Review	A V

For analgesia
- Give pain relievers such as paracetamol (A) PO or suppository, every 6–8 hours or ibuprofen (A) PO every 8 hours.

Table 7.3 Pain Reliever Dosage for Sickle Cell Disease Patients in Crisis

Age of Patient	Paracetamol (A)	Ibuprofen (A)
Adults	500 mg – 1 g	400–600 mg

In severe pain

	Medicine	Dose	Frequency	Duration	Codes
Adults	Pethidine IM	25-100mg	Every four hours as required		B E

Blood Transfusion
- Blood transfusion when needed, but not routinely. (Transfusion will be necessary if haemoglobin level is <5 g/dL.)
- Packed red blood cells at 15 ml/kg

Supportive Care and Prevention of Complications
- Advise patient to maintain a good nutritional state.
- Advise patient to seek prompt treatment of infections.
- Encourage drinking plenty of fluids.
- Advise patients to avoid precipitating causes of crises when possible
- Educate patient to inform health workers about their condition.
- Encourage periodic check-ups at the sickle cell clinic.

	Medicine	Dose	Frequency	Duration	Codes
Supplements	Folic acid po	5mg (<1 year give 2.5mg)	Daily	For life	A E

Prevention

- Advise patient to avoid precipitating causes of crisis, if possible (e.g., malaria, pneumonia, exposure to cold weather, other infections).
- Educate patient to tell doctor he has sickle cell disease SC, SS, or other form.
- Encourage patient to get genetic counselling.

Refer all patients with complications such as bleeding into the eye, aseptic necrosis of the hip, priapism, haematuria, stroke, and osteomyelitis.

Hydroxyurea may be initiated in patients who meet specific criteria at a specialist level of care

Indications for hydroxyurea include the following:

Frequent painful episodes (six or more per year)
History of acute chest syndrome
History of other severe vaso-occlusive events
Severe symptomatic anaemia
Severe unremitting chronic pain that cannot be controlled with conservative measures
History of stroke or a high risk for stroke

	Medicine	Dose	Frequency	Duration	Codes
	Hydroxyurea po	Start: 15 mg/kg/day as single dose; monitor patient's blood count every two weeks. Titrate by 5 mg/kg/day every 12weeks			S E

CHAPTER 8

GASTRO-INTESTINAL CONDITIONS

8.1 Diarrhoea

Diarrhoea is defined as the passage of three or more loose or liquid stools per day (or more frequent passage than is normal for the individual), with or without vomiting. Frequent passing of formed stools is not diarrhoea. Diarrhoea is usually a symptom of an infection in the intestinal tract, commonly caused by a virus, but may be caused by bacteria or parasites. Infection is spread through contaminated food or drinking-water, or from person-to-person as a result of poor hygiene.

Special Types of Diarrhoea

- Acute watery diarrhoea: lasts several hours or days, and includes cholera.
- Bloody diarrhoea: consider dysentery or intussusception in a child. See Section on Dysentery, also section on intussusception.
- Diarrhoea with high fever or very ill: consider typhoid. See Section on Typhoid fever.
- Persistent diarrhoea: See section on Persistent diarrhoea.

8.2 Dysentery

Dysentery, or diarrheal stool with blood or mucus, is usually due to bacteria and should be treated as bacillary dysentery. If there is no clinical response within three days manage as amoebic dysentery or refer for formal assessment. Exclude surgical conditions, e.g. intussusception in children. (See section on Intussusception).

Commonly encountered infectious conditions include Shigella, Salmonella, E. Coli, Entamoeba histolytica and Campylobacter.

Refer

- o No response to treatment.
- o Abdominal distension.
- o Intussusception.

8.2.1 Bacillary dysentery (shigellosis) – Notifiable disease

Acute infection of the bowel usually caused by Shigella, Salmonella or Campylobacter. There is sudden onset diarrhoea with: blood (not due to haemorrhoids or anal fissure) or mucous in the stools convulsions (in children) fever, tenesmus. Oral Rehydration Salts

Diagnosis

- o Stool microscopy

Nonpharmacological management

- o Advise patient to—

Use home-based fluid replacement, keep surroundings clean and improve personal hygiene (e.g., hand washing after toilet and before handling food, washing soiled garments).

Pharmacological management

	Medicine	Dose	Frequency	Duration	Codes
Fluid replacement	Oral Rehydration Salts	Adults— 1000–2000 mL ORS stat —PLUS— 200–400 mL ORS per every extra stool passed			A V

—PLUS—

	Medicine	Dose	Frequency	Duration	Codes
	Ciprofloxacin po	500mg	Twice a day	3 days	A V
or	Cotrimoxazole po	960mg	Twice a day	3 days	A V

Note

- o Check for complications such as intestinal perforation or peritonitis. (See section on Acute Abdomen)
- o Ensure adequate urine output
- o Exclude haemolytic uraemic syndrome.

Management of patients presenting with acute watery diarrhoea

Patient with acute watery diarrhoea

→ Look for other associated symptoms, e.g., swelling of legs, respiratory difficulty, anaemia, etc.

↓ Urgently Inform Doctor

Assessment for dehydration - Dhaka Method

	Condition	Normal	Irritable/Less active*	Lethargic/Comatose*
Assess	Eyes	Normal	Sunken	
	Tongue	Normal	Dry	
	Thirst*	Normal	Thirsty (drinks eagerly)	Unable to drink*
	Skin pinch*	Normal	Goes back slowly*	Goes back very slowly*
	Radial pulse*	Normal	Reduced*	Uncountable or absent*
Diagnosis		No sign of dehydration	If at least 2 signs including one (*) sign is present, diagnose Some Dehydration	If some dehydration plus one of the (*) signs are present, diagnose Severe Dehydration
Management		A	B	C

A. No sign of dehydration – ORS

- 50ml ORS per kg body weight over 6 hours plus ongoing losses
- Send patient to home with 4 packets of ORS
- Feeding should be continued

B. Some dehydration – ORS

- 80ml ORS per kg body weight over 4-6 hours plus ongoing losses
- Patient should be kept under observation for 6-12 hours
- Feedin should be continued
- Reassess the dehydration status frequently - hourly
- In case of frequent vomiting (>3 times in 1 hour); Treat with I/V fluid

C. Severe dehydration – I/V

Ringer's lactate

- Star I/V fluid immediately (100ml/kg)

Children >1 year

30ml/kg in first 1 hour
70ml/kg in next 5 hours

Adult and Children > 1 year

30ml/kg in first 1/2 hour
70ml/kg in next 2 1/2 hours

- Encourage the patient to take ORS solution as soon as he/she is able to drink

Refer
- Severe illness.
- Persistent blood in urine microscopically or macroscopically.
- Acute abdominal signs (severe pain, acute tenderness, persistent or bilious vomiting).
- Bloody mucous passed in absence of diarrhoea.
- Failure to respond within 3 days.
- Malnutrition in children.
- Dehydration in children.
- Children < 12 months of age.

Note: If bacillary dysentery becomes an epidemic, report cases to the environmental health officers. Stress that the diarrhoea could not be stopped because health officers want to eradicate the microorganism.

8.2.2 Amoebic dysentery/Amoebiasis

Amoebiasis is an infection caused by the protozoa organism Entamoeba histolytica, which can cause colitis and other extra-intestinal manifestations (amoebic liver abscess). The infection is primarily acquired through ingestion of contaminated food and water and occasionally can be acquired through oral-anal sexual practices.

Diagnostic criteria
- Bloody diarrhoea, crampy abdominal pain, fever, weight loss, peritonitis in severe forms
- Evidence of motile trophozoites or cysts on saline wet mount from a stool specimen

Nonpharmacological management

§Advise the patient to—
- Use home-based fluid replacement, keep surroundings clean and improve personal hygiene (e.g., hand washing after toilet).

Pharmacological management
- Fluid replacement with ORS (A)

Adults—

	Medicine	Dose	Frequency	Duration	Codes
Fluid replacement	Oral Rehydration Salts	Adults— 1000–2000 mL ORS stat —PLUS— 200–400 mL ORS per every extra stool passed			A V

—PLUS—

	Medicine	Dose	Frequency	Duration	Codes
	Metronidazole po	400-800mg	Three times a day	5 days	A V
or	Tinidazole po	2g	Once daily	3 days	A E
or	Secnidazole po	2g	Single dose		A N

Children— (See relevant section in the Paediatric Guideline)

o 500–1000 mL ORS (A) stat—PLUS— 100–200 mL ORS (A) per every extra stool passed.

	Medicine	Dose	Frequency	Duration	Codes
	Metronidazole po	7.5mg/kg	Three times a day	5 days	A V
or	Tinidazole po	50-75mg/kg	At once		A E

Refer all suspected cases unless confirmed by laboratory diagnosis.

8.2.3 Cholera

Cholera is an acute gastrointestinal infection caused by Vibrio cholerae. Infection occurs through ingestion of contaminated water or food by human faeces leading to severe diarrhoea and emesis associated with body fluid and electrolyte depletion.

Diagnostic Criteria

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

Investigation

- Laboratory evidence of dark field microscopic isolation of motile curved bacillus on a wet mount of fresh stool specimen.
- Isolation of bacteria through stool culture.

Note:

- For confirmation at the beginning of an outbreak, rectal swab or stool specimen should be taken from first 5 to 10 suspected cases.
- If any are positive, every tenth case will be sampled for specimen throughout the outbreak
- Manage a suspected cholera case in an isolation ward or in an established Cholera Treatment Centre

Prevention

- Drink water from safe sources (taps, decontaminated deep wells, bottles)
- Boil water or treat it to kill bacteria and make it safe for drinking and other domestic uses
- Wash hands with liquid soap and running water after visiting the toilet, before preparing foods, and before eating
- DO NOT eat uncooked street food and do not eat cooked food that is no longer hot.
- DO NOT eat street prepared fresh fruits. Always eat home prepared fresh fruits

Management

Assess the patient's level of dehydration. It is of paramount importance to make correct diagnosis and administer the right treatment according to the Dhaka method.

- Plan A: No Dehydration,
- Plan B: Moderate Dehydration And
- Plan C: Severe Dehydration.

Pharmacological Treatment:

	Medicine	Dose	Frequency	Duration	Codes
Immediate Fluid replacement	Ringer Lactate or 0,9% Sodium Chloride Solution IV	Give 100 ml/kg IV in 3 hours— 30 ml/kg as rapidly as possible (within 30 min) then 70 ml/kg in the next 2-3 hours. After the initial 30 ml/kg has been administered, the radial pulse should be strong and blood pressure should be normal. If the pulse is not yet strong, continue to give IV fluid rapidly. Administer ORS solution (about 5 ml/kg/h) as soon as the patient can drink, in addition to IV fluid.			A V

- If the patient can drink, begin giving oral rehydration salt solution (ORS) by mouth while the drip is being set up; ORS can provide the potassium, bicarbonate, and glucose that saline solution lacks.
- Give an oral antibiotic to patients with severe dehydration as follows:

Adults (Not for pregnant women)

	Medicine	Dose	Frequency	Duration	Codes
	Ciprofloxacin po	1g	At once		A V
or	Azithromycin po	1g	At once		A V
or	Doxycycline po	300mg	At once		A V

Expectant mothers:

	Medicine	Dose	Frequency	Duration	Codes
	Erythromycin po	500mg	Four times a day	3 days	A V

Children:

	Medicine	Dose	Frequency	Duration	Codes
	Ciprofloxacin po	20mg/kg	At once		A V
or	Azithromycin po	20mg/kg	At once		A V
and	Zinc po	10-20mg	Once a day	10 days	A E

For moderate Dehydration

- Give oral rehydration, approximately 75-100ml/kg in the first four hours
- Reassess after four hours; if improved, continue giving WHO based ORS, in quantity corresponding to losses (e.g. after each stool) or 10 to 20ml/kg. If not improved, treat as severe

If no signs of dehydration

- Patients who have no signs of dehydration when first observed can be treated at home
- Give these patients ORS packets to take home, enough for 2 days
- Demonstrate how to prepare and give the solution
- Instruct the patient or the caretaker to return if any of the following signs develop; increased number of watery stools repeated vomiting or any signs indicating other problems (eg, fever, blood in stool)

8.3 Appendicitis and anal conditions

8.3.1 Anal conditions

8.3.1.1 Anal fissures

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

Symptoms and signs

- Severe pain during and after defecation often associated with bright red streaks of blood on outside of the faeces
- Visible crack when the anal margins are gently separated
- Usually situated in the posterior midline, but may be anterior, especially in females

- A history of constipation
- May follow diarrhoea (laxative abuse)
- Often present in addition to a sentinel pile (an area of hypertrophied skin at the outer end of the fissure)

Management

Non-pharmacological management

- Give dietary advice to promote soft stools, encourage good personal hygiene and advise against anal intercourse.

Pharmacological management

	Medicine	Dose	Frequency	Duration	Codes
	Liquid paraffin po	15-25ml (children 5ml)	At bedtime	3-5 days	A N

Refer for surgical consultation if

- Severe pain
- Recurrent episodes
- Poor response to symptomatic management
- Very tight anus (PR not possible)

8.3.1.2 Haemorrhoids

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

Diagnosis

Proctoscopy is the gold standard for diagnosis

Symptoms and signs

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

Classification of Haemorrhoids

- Grade 1-Internal venous cushion swelling, no protrusion, only bleeds
- Grade 2-Prolapse upon bearing down, but reduce spontaneously
- Grade 3-Prolapse upon bearing down, but needs manual reduction
- Grade 4-Permanent prolapse, and cannot be manually reduced

Description of position of haemorrhoids is looking at the anus as a face of the clock. They are common at 3, 7 and 11 o'clock.

Management

Non-pharmacological management

- Recommend a high-fibre diet to prevent constipation.
- Counsel against chronic use of laxatives.
- Advise patient to avoid straining at stool.

Pharmacological management

	Medicine	Dose	Frequency	Duration	Codes
	Liquid paraffin po	15-25ml	At bedtime	3-5 days	A N
plus	Bismuth subgallate topical compound	Twice daily and after every stool passage		5 days	B E

Refer for surgical management if;
- o Patient experiences severe pain
- o Recurrent episodes
- o Poor response to pharmacological treatment.

Note:

Haemorrhoid surgery for pregnant women should be delayed until after delivery.
- o Infection can complicate haemorrhoids especially grade 4. This infection should first be controlled with hygiene/Sitz baths and antibiotics before surgery

Surgery should be dependent of the available skill/expertise and equipment.

8.3.2 Appendicitis

A severe rapid onset infection of the appendix. At first, the infection is confined to the appendix. If the appendix ruptures, however, the infection can spread to the rest of the abdomen resulting in generalised peritonitis. Inflammation of the appendix is a common problem in children and young adults. The cause is not clear, but appears to be related to a low-fibre diet.

Diagnosis
- o Clinical history of abdomen pain in the midline (suprapubic, umbilical, or epigastric) which migrates to right iliac fossa (McBurney's point). A Rovsings Sign may be positive.
- o Investigations, CBC and Ultrasound of the abdomen-especially in women.
- o Alvarado's score can be used. Also goes by the mnemonic MANTRELS.

Table 8.1 Alvarado's Score

Medicine			Score
Right lower quadrant tenderness	No =0	Yes =2	
Rebound tenderness	No =0	Yes =2	
Elevated Body temperature	Normal =0	>37.3°C =1	
Symptoms			
Migration of pain	No =0	Yes =1	
Anorexia	No =0	Yes =1	
Nausea	No =0	Yes =1	
Laboratory tests			
White Blood Cell Count	<10,000/µL =0	≥10,000/µL =2	
Shift to the left	No =0	Yes =1	
Total			------/10

Scoring:
- 9-10 =Definite appendicitis
- 7-8 =Probable/likely appendicitis
- 5-7 =Possible appendicitis
- 0-4 =Unlikely appendicitis

Symptoms and signs

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

Management

Non-pharmacological/Surgical management

- This is an emergency and referral for surgery should be immediate if appendicitis is suspected.
- An appendicectomy is the treatment of choice (open or laparoscopic)
- Surgical antibiotic prophylaxis with IV ceftriaxone 1g 0.5-2 hours before surgery or at induction of anaesthesia.
- Close monitoring of vital signs

Pharmacological management

	Medicine	Dose	Frequency	Duration	Codes
	Pethidine IM	50-100mg	At once		B E

Withhold oral fluids and food and start an IV.

Refer immediately to hospital

	Medicine	Dose	Frequency	Duration	Codes
	Ceftriaxone IV	1-2g	Twice a day	3 days	B E
plus	Metronidazole IV	500mg	Three times a day	3 days	B V

Note:

- If a diagnosis is made early <24 hours of onset, and immediate surgery is not possible, then a course of IV antibiotics may be of help and an interval appendicectomy recommended.
- Appendicular mass should be managed with IV antibiotics (as above) for 5-7 days while monitoring the size of the mass with clinical examination and ultrasound. If no improvement or the patient deteriorates, open surgical intervention is advised.
- Appendicular abscess should get an incision and drainage with or without appendectomy. IV antibiotics (ceftriaxone and metronidazole) should be instituted immediately. If appendectomy is not done, and elective/interval appendectomy should be planned at least 6 weeks from onset of symptoms
- Appendiceal rupture/perforation has generalised peritonitis and prognosis is poor. Aggressive fluid resuscitation, IV antibiotics and urgent laparotomy are all necessary. The IV antibiotic regime is as for appendiceal abscess above.

Caution: Metronidazole is contraindicated in the first trimester of pregnancy.

—OR—

	Medicine	Dose	Frequency	Duration	Codes
	Clarithromycin po	500mg	Three times a day	7 days	C E
and	Amoxycillin po	1g	Twice daily	7 days	A V
and	Omeprazole po	20mg	Once daily	7 days	B E

8.3.3 Intussusception

The invagination of part of gut into another. This is usually the proximal section of gut into the distal section. It is commonly miss-diagnosed as dysentery.

Clinical features

Bloody diarrhoea which is mucoid in nature (the typical description is red-currant stools)
Acute abdominal pain in a young child (common age is 6 months to 3 years)
Acute abdominal tenderness
Persistent vomiting -bilious
Typically there is no history of transmission of an infectious agent to the patient, e.g. there would be no other people with bloody diarrhoea that came into contact with the patient.

Management

Recognise that this is intussusception, institute rehydration measures according to the rehydration protocols and refer immediately for surgical consultation.

8.4 Peptic ulcer disease

This is the erosion of the lining of the stomach or duodenum slowly begins as a result of excessive acid secretion.

Causes

The causes of a peptic ulcer are emotional stress, medicine side effect(s) (e.g., from indomethacin and aspirin), smoking cigarettes, and infection (Helicobacter pylori). It varies with different people.

Diagnosis

- H. pylori antigen detection
- Endoscopy (upper GIT)

Symptoms and signs

- Epigastric pain 1–2 hours after eating, or with an empty stomach; acute epigastric pain, often radiating to shoulder; epigastric tenderness on palpitation
- Pain that awakens the person in the early hours of the night
- Pain relieved with food or antacid
- Coffee-ground appearance of vomitus
- Black stools (malaena)
- Shock—rapid feeble pulse, clammy skin, and low BP, if complicated by bleeding
- Tenderness in the middle of the abdomen on palpation from the umbilicus to the epigastric area
- When perforated—
  - Sick-looking patient
  - Lying as still as possible

- Elevated temperature
- Abdomen—board-like rigidity, rebound tenderness
- Absent bowel sounds

Non-pharmacological management

- Advise patient to—
  - Stop alcohol, coffee, tea, smoking, and soft drinks—they make the condition worse
  - Eat small meals frequently (e.g., 6 times a day)
  - Avoid spicy foods
  - Discuss with family and friends any stress problems and try to find a way to relieve them.

Pharmacological management

	Medicine	Dose	Frequency	Duration	Codes
	Magnesium trisilicate suspension po	10ml	Three times a day	As required	A E
or	Omeprazole po	20mg	Once daily	As required	B E
or	Famotidine IV or po	40mg	Twice daily	10-14 days	B E
or	Pantoprazole	40mg	Twice daily	10-14 days	B E

For H. pylori eradication:

	Medicine	Dose	Frequency	Duration	Codes
	Clarithromycin po	500mg	Three times a day	10-14 days	C E
and	Amoxycillin po	1g	Twice daily	10-14 days	A V
and	Omeprazole po	20mg	Once daily	10-14 days	B E
Note:	Metronidazole po (if no Clarithromycin) or allergic to penicillin	400mg	Three times a day	10-14 days	B E

8.5 Constipation

Constipation is a condition characterised by hardened faeces and difficulty emptying the bowels.

Causes

- Dietary: lack of roughage, inadequate fluid intake
- In infants: concentrated feedings
- Lack of exercise
- Bedridden patient—especially the elderly
- Certain medicines (e.g., narcotic analgesics)

Symptoms and signs

- Abdominal discomfort
- Small hard stools passed irregularly under strain

Investigations

- X-ray: after barium enema

Non-pharmacological management

- Advise a high-fibre diet.
- Recommend adequate fluid intake.

Pharmacological management

	Medicine	Dose	Frequency	Duration	Codes
	Glycerine suppository rectal	One suppository		As required	B E
or	Liquid paraffin po	10-30m		As required	B E
or	Bisacodyl po	Adults: 10mg Children 5mg	Once at night		A E

Prevention

- Recommend a diet rich in roughage: plenty of vegetables and fruits.
- Advise patient to drink plenty of fluids with meals.
- Encourage increased exercise.

CHAPTER 9

GYNAECOLOGY AND OBSTRETICS

Infertility is defined as the inability to conceive after a year of regular unprotected intercourse. There are three main causes of infertility:

- No or low sperm count in males
- Failure to ovulate in females
- Blocked fallopian tubes in females

Diagnosis and Investigation

- The prevalence of STIs makes tubal blockage the most common cause of infertility in women.
- The patency of tubes may be done, HSG
- Sperm analysis may be done
- Full blood count
- Pelvic ultra sound

Non-pharmacological management

- Management is according to the cause of infertility
- Advise the couple to have unprotected sexual intercourse at least three times a week.

Refer to a gynaecologist for investigations if no pregnancy is achieved in 6 months.

9.2 Abortion

An abortion is defined as the expulsion of the products of conception before the 28th week of gestation. Abortion could be spontaneous (i.e., comes on by itself) or induced. Other types of abortion include threatened abortion, inevitable abortion, incomple abortion and septic abortion. In most of these cases, there is the risk of infection, bleeding, or both.

Symptoms and signs

- History of missed period
- Vaginal bleeding accompanied by abdominal cramps
- If infection is present, there may be—
- Fever and chills
- Foul-smelling vaginal discharge
  - o Lower abdominal tenderness
  - o Signs of shock may be present—
- Cold, moist skin
- Rapid pulse
- Systolic BP <90 mmHg

Nonpharmacological management

- o Monitor vital signs (e.g., BP, pulse), FBC, counsel and support the patient

Refer all women with vaginal bleeding.

Pharmacological management

- Treat for shock with plasma expanders.
- Give blood if indicated.

	Medicine	Dose	Frequency	Duration	Codes
	Oxytocin IM	5-10IU	At once		A V
or	Oxytocin diluted in 1000ml Ringers Lactate or Normal Saline	20-40IU Administer at 5–20 drops per minute, depending on the frequency of contractions. Contraction frequency should not exceed 5 in 10 minutes.			A V
or	Misoprostol po	400mcg At once. Repeat after 30 minutes if bleeding continues.			C N
In Rh-negative mothers	Anti-D immunoglobulin IM	100mcg within 72hours of delivery of the foetus			C V
Treat infection with antibiotics	Amoxycillin po	500mg	Three times a day	7 days	A V
plus	Metronidazole po	400mg	Three times a day	7 days	A V
In cases of penicillin allergy	Eythromycin	500mg	Three times a day	7 days	A V

Caution: Avoid using other myometrial hypertonic agents together with oxytocin.
Refer all patients to facility where uterine evacuation can be performed.

9.3 Threatened abortion

Early vaginal bleeding without low abdominal pain, and foetus is not expelled. The uterus is the size expected by dates, and the cervix is closed.

Non-pharmacological treatment
- Advise the patient to take bed rest.
- Advise the patient to abstain from sex for at least 14 days.
- Continue observing the patient.

Pharmacological treatment

	Medicine	Dose	Frequency	Duration	Codes
	Paracetamol po	1g	3-4 times daily	5 days	A E

Refer all patients to facility where assessment and definitive treatment like uterine evacuation can be performed.

9.4 Anaemia of pregnancy

Anaemia in pregnancy is a common occurrence during pregnancy and arises out of the combination of several factors, among which the most important are:
- Decreased dietary intake of iron-containing foods
- Increased demand by the foetus
- Chronic blood loss

Symptoms and signs
- Increased tiredness and weakness, Pallor of the mucous membranes and nail beds
  - o If the anaemia is severe, oedema and signs of CCF may be present.

Pharmacological Management

	Medicine	Dose	Frequency	Duration	Codes
prevention	Ferrous Sulphate po	200mg	Daily with food	During pregnancy	A E
plus	Folic acid po	5mg	Once a day	During pregnancy	A E
for treatment (Hb<11g/dL)	Ferrous Sulphate po	200mg three times daily with food and for 1 month thereafter for prevention			A E

Refer

- Hb <8 g/dL at any stage
- Hb <10 g/dL in patients over 34 weeks of gestation
- Unresponsive Hb—
- A rise in the Hb of <1.5 g/dL over 2 weeks
- <2 g/dL over 3 weeks in early pregnancy
- Pallor (aneamia) plus signs of chronic disease (e.g., suspicion of TB or the presence of hepatosplenomegaly)
- Evidence of cardiac failure

9.5 Premature rupture of membranes (PROM)

Rupture of membranes before the onset of labour charactarised by draining of amniotic fluid through the cervical canal.
PROM may be Pre-term before 37 Weeks of Amenorrhoea (WOA), or term PROM after 37 WOA

General Management of PROM

- Verify the gestation age of the patient for decision about the care
- Admit the patient
- Vital signs
- Do urine dipstick
- Check foetal Heart rate 4hourly
- Perform CTG
- DO NOT Perform digital vaginal examination if Pre PROM
- Perform sterile speculum exam to confirm drainage of amniotic fluid and exclude obvious cord prolapse
- If in doubt, take of a sample for litmus paper test and fern test.

Management of Pre-Term PROM

- Manage as indicated above
- Strict bed rest
- Before 24WOA, observe vital signs initiate process of uterine evacuation after proper counselling of the mother
- For 32WOA and below magnesium sulphate should be given for neuroprotection when delivery is inevitable.
- Before 34WOA, administer steroids as follows:

	Medicine	Dose	Frequency	Duration	Codes
	Dexamethasone	6mg	12 hourly	48 hours	A E

  - o Women should be observed every 4-6hours for signs of clinical chorioamnionitis e.g fever, uterine tenderness, foetal tachycardia, foul smelling liquor

- Pad count, amount, colour and odour
- Sonar twice a week
- Weekly high vaginal swab and at least a weekly maternal FBC

- Oral antibiotics should be given for prophylaxis

	Medicine	Dose	Frequency	Duration	Codes
	Amoxycillin po	500mg	Three times a day	7 days	A V
or	Erythromycin po	500mg	Four times a day	7 days	A E

- Women with clinical chorioamnionitis should be given broad spectrum antibiotics and delivered urgently

	Medicine	Dose	Frequency	Duration	Codes
	Amoxycillin IV	1g	Three times a day	3 days	A V
or	Erythromycin IV	500mg	Three times a day	3 days	A E

- Deliver the baby if
  - Any evidence of infection
  - Severe oligohydramnios
  - Signs of foetal distress
- Induction should occur at 34WOA or if EFW is >2kg and mother does not go into labour spontaneously.

Management of PROM >34 and PROM >37WOA

- Manage as indicated above in the general management
- Confirm gestational age
- Perform CTG
- If there is no evidence of foetal distress, leave the patient for 24 hours 80% of patients will go into labour with no further intervention
- If she doesn't go into labour within 24 hours assess the patient and bishop score and induce labour
  - If bishop score is less than 6, use misoprostol to ripen cervix
  - If bishop score is 6 or above, use oxytocin
- Consider antibiotic prophylaxis where appropriate

Note

Where facilities for management of PROM <34WOA are not available transfer is preferred while the baby is in utero and tocolysis should be considered.

Induction of Labour

- Definition: initiation of contractions for the purpose of achieving a vaginal birth in a pregnant woman who is not in labour
- Indications - Pre-eclampsia, post term, PROM DM/HTN, Late Intrauterine Fetal Death (IUFD) and Stillbirth - IUFD, Severe Intrauterine growth retardation (IUGR)

	Medicine	Dose	Frequency	Duration	Codes
	Misoprostol	25mcg into the posterior fornix of the vagina			S N
or	Dinoprostone gel	0.5mg into the posterior fornix of the vagina			S N

9.6 Antepartum haemorrhage (APH)

APH is defined as bleeding per vaginum after the 28th week of pregnancy. APH is an emergency. Some of the more common causes of APH include the following:

- Placental
  - o Placenta praevia
  - o Abruptio placentae
- Nonplacental
  - o Vaginal or cervical lesions (e.g., Cancer)
  - o Cervical infections
  - o Trauma
  - o Decidual bleeding
- Unknown

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

Table 9.5 APH Symptoms and Signs

Symptoms and Signs	Cause of Bleeding	
	Placenta Praevia	**Abruptio Placentae**
Bleeding	Always present Bright red	Not always
Abdominal pains	Absent	++
Tender uterus	Absent	++
Presenting part	Not engaged	Engaged
Abdomen	Normal	Larger than gestation age
	Easy-to-feel foetal parts	Foetal parts not palpable

Refer after setting up an IV line.

9.7 Postpartum haemorrhage (PPH)

PPH is defined as blood loss per vaginum after delivery in excess of 500 mL after normal vaginal delivery or 1000mls following caesarean section or less if it affects the general condition of the patient. The two types of PPH are:

- Primary PPH, which occurs in the first 24 hours
- Secondary PPH, which occurs between 24 hours and six weeks.

Causes are summarised as 4Ts

1. Tone of the uterus. Failure of uterus to contract (atony) due to full bladder, big baby, twin pregnancy, grandmaltiparity, etc.
2. Trauma- Damage to or rupture of the perineum, vagina, or uterus (tends to cause bleeding in the first 24 hours), Infection in the uterus
3. Tissue retention. Retained placenta
4. Thrombotic disorders. Thrombocytopenia, DIC.

Clinical features—

- Bleeding from the genital tract which is often >500 mL.
- The uterus may be still large, soft, and not contracted especially in primary PPH.
- In secondary PPH, there may be signs of infection (e.g., fever, abdominal tenderness).

Check for signs of shock if bleeding is severe or of any amount which causes worsening of the patient's condition (see Chapter 19 section on Shock).

Investigations

- Blood for Hb, clotting and grouping.

Nonpharmacological management

Shout for help

- Establish and treat the cause of the bleeding; look for local causes if bleeding continues.
- Check uterus to see if contracted.
- Check if placenta has been expelled. If yes, expel any clots in the birth canal.
- Ensure bladder is emptied.

Pharmacological management

	Medicine	Dose	Frequency	Duration	Codes
start an infusion	Oxytocin diluted in 1000ml 0.9% Normal saline	10-40IU	At once		A V
or	Misoprostol sublingually or rectally	800mcg	At once		S N
or	Ergometrine IV/IM	0.2-0.4mg	Immediately		A V

Use ergometrine with caution in hypertensive patients

1. ***Refer*** to higher level for further management

If the placenta is retained—

- Carry out manual removal of the placenta under general anaesthesia, especially if bleeding is present. ensure there is blood available in case she needs blood transfusion.
- If manual removal is not possible, *refer* for further management.

	Medicine	Dose	Frequency	Duration	Codes
Treat infection with antibiotics	Amoxycillin po	500mg	Three times a day	7 days	A V
plus	Metronidazole po	400mg	Three times a day	7 days	A V
In cases of penicillin allergy	Erythromycin	500mg	Four times a day	7 days	A V

Use ergometrine with caution in hypertensive patients

Prevention of PPH—

Ensure active management of the third stage of labour and delivery by skilled staff and give:

	Medicine	Dose	Frequency	Duration	Codes
	Oxytocin IM	10IU	At once		A V
or	Misoprostol po	600mcg	At once		S N
	5% Dextrose in 0.9% Sodium Chloride IV	Give as replacement and resuscitation fluid			A V

- Examine the placenta to see if it is complete.
- If the placenta is still inside and you have done it before, remove the placenta manually under a general anaesthesia, or *refer* to a higher level centre.
- If you have not had previous experience at removal, *refer* immediately to the hospital.
- If there is still bleeding, examine the cervix and vagina for lacerations. If any are present, suture.
- If you have been unable to suture any lacerations, pack the vagina, and *refer*.
- If after doing the above, there is still bleeding, *refer* immediately to the hospital after packing the vagina.
- If the bleeding has stopped, let the IV fluids continue for at least 24 hours, and give:

	Medicine	Dose	Frequency	Duration	Codes
	Ergometrine po	0.2mg	Three times a day	3 days	A V

- Continue to check for vaginal bleeding, contracted uterus, and full bladder and to monitor the vital signs.

Prolonged labour and other special circumstances—

Give 5 days of prophylactic antibiotics in prolonged or obstructed labour or in presence of other risk factors (e.g., rupture of membranes, birth before arrival at health centre, retained placenta, instrument delivery).

	Medicine	Dose	Frequency	Duration	Codes
	Amoxycillin po	500mg	Three times a day	7 days	A V
plus	Metronidazole po	400mg	Three times a day	7 days	A V
In cases of penicillin allergy	Erythromycin	500mg	Four times a day	7 days	A V

9.8 Cracked nipples during breastfeeding

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

Nonpharmacological management

- o Advise the patient to—
- Clean with mild soap and water.
- Use an emollient (e.g., hind milk or emulsifying ointment) between feedings, and remove by washing before feeding.
  - o If breastfeeding is too painful, the milk should be expressed, and the baby nursed on the other breast until improvement.

9.9 Breast abscess/Mastitis

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

Symptoms and signs

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

Nonpharmacological management

- Apply warm, wet compresses for 15 minutes for 3 days.
- Express milk, and continue feeding.
- Empty the breast completely after feeding

.

Pharmacological management

	Medicine	Dose	Frequency	Duration	Codes
	PhenoxymethyLpenicillin po	500mg	Four times a day	5 days	A V
or	Cloxacillin po	500mg	Four times a day	5 days	A E
In cases of penicillin allergy	Erythromycin po	500mg	Four times a day	5 days	A V

- ***Refer*** if there is no improvement or drainage of abscess.

9.10 Puerperal sepsis

Signs of infection during the first 42 days post-delivery are called puerperal sepsis.

Causes

- Ascending infection from contamination during delivery or abortion due to factors such as gut bacterial infection, obesity, diabetes, impaired immunity, vaginal discharge and trauma, and retention of products of conception
- Bacteria include: Staphylococcus aureus, and Gram-negative bacteria from the gut, (e.g., Escherichia coli, Bacteroides, Streptococcus pyogenes).

Symptoms and signs

- Offensive per vaginum discharge, Fever, Lower abdominal pain, Continuous lochia (>7 days), Uterine subinvolution

Pharmacological management

	Medicine	Dose	Frequency	Duration	Codes
	Amoxycillin IV	500mg	Three times a day	3 days	A V
plus	Gentamicin IV/IM	5-7mg/kg	Twice daily	3 days	A E
plus	Metronidazole IV	500mg	Three times a day	3 days	B V
after clinical improvement, switch to	Metronidazole po	400mg	Three times a day	5 days	A N

Refer to a higher level of care after first doses of antibiotics.

9.11 Dysmenorrhoea

Dysmenorrhoea is pain experienced during the menstrual period that interferes with the normal function. It is common (about 50% of women). Sometimes it is due to underlying infection (secondary dysmenorrhoea) in the pelvic organs (PID). Sometimes no cause can be found (primary dysmenorrhoea).

Symptoms and signs

- Intermittent pain and heaviness in lower abdomen association with the menstrual period
- May be accompanied by— Headache, diarrhoea or constipation, nausea or vomiting

Nonpharmacological management
- Advise and reassure women with primary dysmenorrhoea about the nature of the condition.
- Advise the woman to undertake regular exercise as a part of lifestyle modification.
- Apply heating pack over the lower abdomen and back

Pharmacological management
Primary dysmenorrhoea—

	Medicine	Dose	Frequency	Duration	Codes
	Mefenamic acid po	250-500mg	Three times a day after meals	2-3 days	C E
or	Ibuprofen po	200-400mg	Three times a day after meals	2-3 days	A E

Secondary dysmenorrhoea—
- Treat the underlying condition.

Refer
- Patients with a poor response to management of primary dysmenorrhoea
- Patients with secondary dysmenorrhoea

9.12 Ectopic pregnancy

Ectopic pregnancy is the implantation of a fertilised ovum outside the uterine cavity. The most common place (95%) is in the fallopian tubes.

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

Diagnosis
- Positive pregnancy test
- Pelvic sonography or vaginal scan where available
- All clinical symptoms listed above

Nonpharmacological management
None. ***Refer*** to hospital as an emergency for exploratory laparotomy

Pharmacological management
Pre-hospital—
- Secure IV line with wide-bore cannula (16–18G).
- Give 0.9% sodium chloride (normal saline) (A), or Ringer's lactate (A) to run fast.

Hospital—
- Surgical intervention is needed exploratory laparotomy
- Draw blood samples for grouping and cross matching.
- Refer patient with a sample of blood for typing and cross matching.

9.13 Dysfunctional uterine bleeding

Dysfunctional uterine bleeding is abnormal uterine bleeding not related to any organic disease. Normal menses have a cycle of 21 to 35 days, each lasting 2 to 8 days with loss of up to 80 mL. Table 9.12 lists the causes of dysfunctional uterine bleeding.

Table 9.12 Common Causes of Abnormal Uterine Bleeding by Age

Age	Source
Pre-puberty	Sexual assault
Reproductive age group	Pregnancy-related conditions
Postmenopausal	Malignancy of the genital tract

Pharmacological management

	Medicine	Dose	Frequency	Duration	Codes
	Mefenamic acid po	250-500mg	Three times a day after meals	2-3 days	C E
or	Ibuprofen po	200-400mg	Three times a day after meals	2-3 days	A E
plus	Norgestrel 50micrograms+ ethinylestradiol 500micrograms (Combined oral contraceptive)		Take the active pills only	3 cycles	A V

Refer
If bleeding is heavy and uncontrollable, resuscitate and refer to hospital where a full gynaecological examination and laboratory investigations can be done.

9.14 Postmenopausal Bleeding

Postmenopausal bleeding is bleeding after the cessation of menses. It is usually due to malignancies and should be referred to a gynaecologist.

9.15 Pregnancy-induced hypertension—pre-eclampsia, eclampsia, or pre-eclamptic toxaemia

Pregnancy-induced hypertension is hypertension at 20 weeks of gestation or more accompanied by:
- Proteinuria, oedema, or both
- BP of 140/90 mmHg or higher (***Refer*** to ANC Guidelines for detailed information)

Eclampsia is the presence of seizures in patients with hypertension.

9.15.1 Severe pre-eclampsia

Severe pre-eclampsia is a hypertensive condition of pregnancy that may result in maternal convulsions.

Pharmacological management

Set up an IV line

	Medicine	Dose	Frequency	Duration	Codes
Loading dose	Magnesium sulphate IV	Give 2 g of 50% magnesium sulphate solution IV over 10-15 minutes. Follow promptly with 10 g of 50% magnesium sulphate solution: administer 5 g in each buttock deep IM with 1 mL of 2% lignocaine in the same syringe. If convulsions recur after 15 minutes, give 2 g of 50% magnesium sulphate solution IV over 5 minutes.			C V
Maintenance dose	Magnesium sulphate IV/IM	Give 5 g of 50% magnesium sulphate solution with 1 mL of 2% lignocaine (C) in the same syringe by deep IM injection into alternate buttocks every 4 hours. Continue treatment for 24 hours after delivery or last convulsion, whichever occurs last. If 50% solution is not available, give 1 g of 20% magnesium sulphate solution IV every hour by continuous infusion.			C V
Alternatively use	Diazepam IV	Diazepam 10 mg IV slowly over 2 minutes as a loading dose. If convulsions recur after 15 minutes, repeat loading dose.			B V
Maintenance dose	Diazepam IV or rectal	Diazepam 40 mg in 500 mL 0.9% sodium chloride (normal saline) or Ringer's lactate. For rectal administration of diazepam —Give a loading dose of 20 mg in 10 mL syringe. If convulsions not controlled in 10 minutes, administer additional 10 mg. Be prepared to assist ventilation.			B V

Caution: Maternal respiratory depression may occur if diazepam dose exceeds 30 mg in 1 hour. Assist respiration if necessary. Do not give more than 100 mg in 24 hours.

Caution: Monitor for signs of magnesium toxicity:
Respiratory rate (should be >12b/min), Patellar reflexes (should be present), Urinary output (should be >30ml/hr).
If signs of toxicity are present, give antidote for magnesium sulphate:

	Medicine	Dose	Frequency	Duration	Codes
	Calcium Gluconate IV	1–2 g slow iv, and repeat as needed until respiratory rate increases.			A E

Refer to Hospital for urgent delivery or termination of pregnancy.

9.15.2 Eclampsia

Eclampsia is pregnancy-induced hypertension with convulsions.

Pharmacological management

Treat as severe pre-eclampsia above (9.151).
In hospital, if BP is >110 mmHg diastolic or >160 mmHg systolic:

	Medicine	Dose	Frequency	Duration	Codes
	Dihydralazine IV	6.25mg iv over 5mins , and repeat as needed until respiratory rate increases.			B V
	Nifedipine po	20mg	Every 12 hours for 1-2doses until delivery		B E

Note: Aim to deliver within 8 hours for unconscious patient; for conscious patients, aim for 12 hours.

Refer to Hospital for urgent deliver

9.16 Abnormal vaginal discharge

Symptoms and signs

In all cases, abnormal increase of vaginal discharge, described as follows—

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

Differential diagnosis

- Cancer of the cervix, especially in older women with many children (multiparous), causes a blood-stained smelly discharge.

Causes

Usually due to vaginal infection by *Trichomonas vaginalis, Candida albicans,* and bacterial *vaginosis* or *Chlamydia trachomatis*.

Diagnosis

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

Nonpharmacological management

- Counsel on compliance and risk reduction for transmission of STIs and HIV.
- Provide and promote use of condoms.
  - o Notify partners and contacts.

	Medicine	Dose	Frequency	Duration	Codes
for suspected gonorrhea	Ciprofloxacin po	1g	At once		A V
plus	Doxycycline po	100mg	Twice daily	7 days	A V
plus	Metronidazole po	2g	At once		A V
or	Metronidazole po	400mg	Twice daily	7 days	A V

	Medicine	Dose	Frequency	Duration	Codes
for suspected gonorrhea	Spectinomycin im	2g	At once		A E
plus	Erythromycin po	500mg	Four times a day	7 days	A V
plus	Metronidazole po	2g	At once		A V
or	Metronidazole po	400mg	Twice daily	7 days	A V

	Medicine	Dose	Frequency	Duration	Codes
	Clotrimazole pessaries	500mg	At night as a single dose		A E
or	Nystatin pessaries	100 000IU	Twice a day	14 days	A E

9.17 Pelvic inflammatory disease

PID is an upper genital tract infection usually acquired sexually and is polymicrobial in nature. Common microorganisms include *Neisseria gonorrhoeae, C. trachomatis,* and anaerobes.

Symptoms and signs

- Abdominal pain
- Pain during sexual intercourse
- Abnormal vaginal discharge
- Abnormal uterine bleeding
- Pain during urination
- Fever
- Nausea and vomiting

Pharmacological management

	Medicine	Dose	Frequency	Duration	Codes
	Azithromycin po	1g	At once		B V
plus	Spectinomycin IM	2g	At once		A E
plus	Ceftriaxone IM	250mg	At once		A V
or	Doxycycline po	100mg	Twice a day	14 days	A V
plus	Metronidazole po	400mg	Twice a day	14 days	A V

Refer to a hospital if—

- A surgical emergency (e.g., appendicitis and ectopic pregnancy) cannot be excluded.
- A pelvic abscess is suspected.
- The patient is pregnant.

9.18 Genital ulcer disease

A genital ulcer is the loss of continuity of the skin and mucosa of the genitalia.

Causes

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

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

Symptoms and signs

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

Investigations

- Swab: for microscopy
- Blood: for VDRL/RPR
- VIA

Nonpharmacological management

- Advise patient on prevention of STIs and safe sex practices.

Pharmacological management

If blisters or vesicles are present—

	Medicine	Dose	Frequency	Duration	Codes
	Acyclovir po	200-800mg	Every 5 hours	5 days	A E
if RPR test is positive	Benzathine benzylpenicillin IM	2.4MU	At once		A V
in penicillin allergy give	Erythromycin po	500mg	Four times a day	7 days	A V

If blisters or vesicles are absent—

	Medicine	Dose	Frequency	Duration	Codes
	Ciprofloxacin po	200mg	Twice daily	3 days	A V
if RPR test is positive	Benzathine benzylpenicillin IM	2.4MU	At once		A V
in penicillin allergy give	Erythromycin po	500mg	Four times a day	7 days	A V

Refer for specialist management if—

- Ulcer persists for >10 days and partners were treated
- Blisters or vesicles persist

Note: Genital ulcers may appear together with enlarged and fluctuating inguinal lymph nodes (buboes), which should be aspirated through normal skin and never incised.

9.19 Sexual assault

Conduct of any sexual act performed on another person without consent or with consent but with a minor.

Clinical evaluation

- History of the event (date, time, location)
- Nature of the penetration
- Did the victim wash or douche?
- Was condom used?
- Number of assailants?
- Is the victim sexually active?
- Use of contraception?
- The last menstrual period?
- History of medical illnesses (e.g., HIV)?
- Physical examination to note any type of body injuries
- Emotional status
- Examination of the external genitalia (inspection for tears, ecchymosis, abrasions, swelling, redness)
- Speculum examination (vaginal or cervical swab for sperm analysis)
- Collect forensic specimen when applicable

.

Notify the Social Welfare for psychological support (counselling).

Baseline laboratory tests
- HIV, RPR, HBSAg , Pregnancy test
- High Vaginal Swab (HVS)

Pharmacological management
- Start treatment of the patient with PEP without waiting for the police forms.
- Provide psychological support (counselling).
- Prevent pregnancy (i.e., emergency contraception within 72 hours or IUD within 5 days).
- Provide STI prophylaxis

Adult non-pregnant women

	Medicine	Dose	Frequency	Duration	Codes
	Ceftriaxone IM	250mg	At once		B V
plus	Metronidazole po	400mg	At once		A V
plus	Doxycycline po	100mg	Twice daily	7 days	A V

Children and pregnant women—

	Medicine	Dose	Frequency	Duration	Codes
	Spectinomycin IM	20-50mg/kg	At once		A E
plus	Erythromycin po	30-50mg/kg	Four times a day		A V
plus	Metronidazole po	5-7.5mg/kg	Three times a day	7 days	A V

Provide HIV prophylaxis as soon as possible— (See to PEP guidelines for details.)

9.20 Family planning

The ability of an individual or couple to choose freely when to start having children, how they would like to have and how to space them, and when to stop having children.

9.20.1 Condom (male and Female) – Barrier Methods

A sheath made of latex, or other material that covers the penis (Male Condoms) or inserted into the vagina (Female Condoms) during sexual intercourse .
Condoms are to be used by all sexually active individuals with every sex act, even if the women is on any contraceptive (Family Planning) method - DUAL PROTECTION.
For more details on condoms, refer to Family Planning guidelines, 2015.

Advantages
- Provides triple protection (Protects against STIs and HIV infection as well as unplanned pregnancy).
- Encourages partner communication.

Disadvantages
- Some men may have difficulty maintaining an erection with male condom on, therefore client to be advised and encouraged on the use of female condom by the female partner.
- Occasional sensitivity to latex or lubricants.

Management

- Advice clients to use condoms consistently and correctly with every sex act to ensure protection and prevention from HIV new infection and reinfection, STIs and unplanned / unwanted pregnancy.
- Female condom can now be inserted immediately before sexual encounter like the male condom.
- Use one condom (Male / Female – NOT BOTH CONDOMS) per sexual round / act.
- Ensure client understands how to insert and use a condom (Male / Female).
- Ensure client understands correct and consistent condom use, condom storage, and condom disposal.

9.20.2 Combined Oral Contraceptive (COC) Pill

The COC pill contains an oestrogen plus a progestogen.

Indications

- Sexually active women needing highly effective FP method
- Non-breastfeeding clients.
- Clients with dysmenorrhoea
- Clients with heavy periods or ovulation pain.

Contraindications and Risk Factors for Complications

- For further details and guidance, consult the WHO – Medical Eligibility Criteria (MEC) Wheel with details of conditions on MEC category 3 and 4 for clear and more guidance.
- Diastolic BP >100 mmHg
- Heart disease
- Thromboembolic disease
- Active liver disease
- Within 2 weeks of childbirth
- Known or suspected cervical cancer
- Undiagnosed breast lumps or breast cancer
- Pregnancy (known or suspected)

Disadvantages and common side effects

- Spotting, nausea, within first few months
- May cause headaches, weight gain
- Suppresses lactation

Pharmacological management

	Medicine	Dose	Frequency	Duration	Codes
	Combined oral contraceptive 30-35mcg ethinyloestradiol + 150-250mcg Levonorgestrel	1 tablet	Once daily at the same time	3 months	A E

- Explain carefully how to take the tablets and ensure client understands, including information on what to do if doses are missed or there are side effects.

Complication

- Reduced milk production in breast feeding women
- Can increase the risk of myocardial infection in women with existing risk factors such as smoking, diabetes or hypertension

9.20.3 Progestogen-only Pill (POP)

The POP is also known as the "mini-pill." It contains synthetic progestogens such as norethisterone, levonorgestrel, desogestrel or norgestrel. They are suitable for lactating mothers.

Indications

- Breastfeeding women after 3 weeks postpartum

	Medicine	Dose	Frequency	Duration	Codes
	Progestogen only pill	1 tablet	Once daily at the same time	3 months	A E

Contraindications

- Breast or genital cancer (known or suspected)
- Pregnancy (known or suspected)
- Undiagnosed vaginal bleeding

Disadvantages and common side effects

- Spotting, amenorrhoea
- Unpredictable, irregular periods
- Explain carefully how to take the tablets and ensure client understands, and what to do if doses are missed or there are side effects.

9.20.4 Progestogen-only Injectable Contraceptive

Contains Progesterone only in smaller varying doses systematically distributed over a specified duration in the body.

There are two types:

- Norethisterone Enanthate (NST) – administered every 8 weeks.
- Depot MedroxyProgesterone Acetate (DMPA) – administered every 12 weeks

Indications

- Highly effective if used correctly and consistently.
- Breastfeeding postpartum women
- Unknown, Known or suspected HIV-positive women who needs an effective FP method
- Women who cannot use COC due to estrogen content
- Women awaiting surgical contraception
- Suitable for women with risk factors such as heart problems, stroke and thrombosis.

Contraindications

Refer to Family planning Guidelines and WHO – MEC Wheel for detailed information.

- Current Breast cancer.
- Liver Tumors (Benign and Malignant).
- Systemic lupus erythematous (Assosicated with severe thrombocytopenia / client is on Immuno Suppressive Treatment).

Disadvantages and common side effects

- May cause changes in menstrual bleeding patterns, such as spotting, heavy / prolonged vaginal bleeding during first 1–2 months after injection.
- Weight gain
- Loss of libido
- Delayed return to fertility—hormones cannot be reversed immediately.

Pharmacological management

	Medicine	Dose	Frequency	Duration	Codes
	Norethisterone Enanthate (NET- EN)/(NST) IM	200mg	Once every 8 weeks		A V
or	Depot MedroxyProgesterone Acetate (DMPA)/Depo – Provera IM	150mg	Once every 8 weeks		A V

- According to WHO – MEC, 2015 MedroxyProgesterone Acetate comes in two forms:
- (IM administration -150mg), in inner aspect of gluteal muscle.
- (Subcutaneous administration – 104mg), in the deltoid muscle.

Note: Do not rub the area. Doing so increases absorption and shortens hormonal effect in the body.

9.20.5 Progestogen-only Subdermal Implants.

Small flexible progestogen-releasing, plastic silicone rods, surgically inserted under the skin of a woman's upper arm, which releases the hormone slowly over a period of time to prevent a pregnancy.

There are two types of Implants.
- Levonorgestrel (Jadelle) – 2 rods - Prevents pregnancy for up to 5 years.
- Etonogestrel (Implanon) – 1 rod - Prevents pregnancy for up to 3 years.

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

Contraindications.
- Same as for POP (progestogen only pill).

Advantages
- Highly effective provides 99.98% protection against pregnancy.
- It is effective within 8 hours of insertion.
- Fertility returns almost immediately after removal.
- Low level of user responsibility.
- Can be used by breast feeding women starting immediately after child birth.
- Reduces iron deficiency anaemia by stimulating erythropoietin production.

Disadvantages and common side effects
- Irregular bleeding, spotting, or heavy bleeding in first few months (up to 6 months for some women).
- Amenorrhoea
- Possibility of local infection at insertion site
- Requires trained provider to insert and remove
- Drug – Drug Interactions on TB drugs, Anti-Epileptic Treatment, and some ARVs (Effavirenz reduces efficacy from 5 years to 18 months), thus indicating a need for DUAL PROTECTION or an alternative method.

Warning signs
Caution: The following require urgent return to clinic—
- Heavy vaginal bleeding
- Severe chest pain

- Pus, bleeding, or pain at insertion site on arm

Management

- Insert the implant subdermally under the skin of the upper arm following recommended procedures.
- Carefully explain warning signs and emphasise the need to return if they occur.
- Advise client to return—
    - After 2 weeks to examine implant site
    - After 3 months for first routine follow-up
    - Annually until implant removal for routine follow-up

9.20.6 Intra Uterine Contraceptive Device (IUCD)

An IUCD is an easily reversible, small flexible plastic device, long-term, nonhormonal FP method, inserted into the uterine cavity, effective for up to 10 years. An IUCD can be inserted as soon as 6 weeks postpartum (e.g., Copper T380A).

Indications

- Women in stable monogamous relationships wanting long-term contraception
- Breastfeeding mothers
- When hormonal FP methods are contraindicated
- Provides immediate protection after insertion

Contraindications

- Pregnancy (known or suspected)
- PID or history of PID in last 3 months
- Undiagnosed abnormal uterine bleeding
- Women at risk of STIs including HIV (e.g., women with, or whose partners have, multiple sexual partners)
- Reduced immunity (e.g., in DM or HIV/AIDS or with current or active STI) for initiation of IUCD.
- Severe anaemia or heavy menstrual bleeding

Disadvantages and common side effects

- Mild cramps during first 3–5 days after insertion
- Longer and heavier menstrual blood loss in first 3 months
- Vaginal discharge in first 3 months
- Spotting or bleeding between periods

Management

- Requires trained service provider for insertion and removal.
- Insert the IUCD closely following recommended procedures and explaining to the client as each step is undertaken.
- Carefully explain possible side effects and what to do if they should arise.
- Advise client:
    - To abstain from intercourse for 7 days after insertion
    - To avoid douching
    - Encourage client not to have more than one sexual partner
    - To use condoms if any risk of STIs including HIV
    - To report to the clinic promptly if she has any of the following—
        - Late period or pregnancy

- Abdominal pain during intercourse
- Exposure to STI
- Feeling unwell with chills or fever
- Shorter, longer, or missing strings
- Feeling the hard part of IUCD in vagina or at cervix

9.20.7 Natural FP Method.

Natural Family Planning Methods – (NFPM), These are methods that do not include the use of chemicals / hormones or devices for pregnancy prevention.

They include:

- Abstinence
- Fertility Awareness Based Methods
- Lactational Amenorrhea (LAM)
- Coitus Interruptus (CI)

9.20.8 Abstinence

Intentionally choosing not to have sexual intercourse (primary / secondary).

Nonpharmacological management

- Explain to the client the advantages and disadvantages as follows:

Advantages:

- Encourages couples' communication on FP.
- No side effects.
- It is supported by religious and cultural institutions.
- Delays sexual debut for young people.
- Provides 100% protection against pregnancy, STIs and HIV.

Disadvantages:

- Both partners must decide, agree and be committed to abstinence.
- It requires self – control and commitment as can have high failure rate, especially if drugs and alcohol are used.

9.20.9 Fertility Awareness Method

Fertility Awareness-Based Method of FP that relies on the change in the nature of vaginal mucus during the menstrual cycle or awareness of the start and end of fertile period of a women's menstrual cycle. During this time, the couple avoids pregnancy by changing sexual behaviour as follows:

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

Nonpharmacological management

Explain the following facts to the client:

- Basal Body Temperature (BBT) – There is slight elevation of basal body temperature around the time of ovulation (0.20 – 0.50°C)

- Cervical mucus or ovulation (Billings) - Cervical mucus increases in amount and becomes thin, stretchy around the time of ovulation.
- Calendar or rhythm (Ogino – Klaus) – using the womens menstrual cycle, the fertile days are calculated.
- Advise client to always use condoms with fertility awareness method if there is any risk of exposure to STIs or HIV.

Note: The combination of Billings and BBT (symptom – thermal method) changes in the feel of the cervix, calendar calculations or several others enables a more accurate identification of fertile time.

Advantages:
- No side effects.
- Improves knowledge of menstrual cycle and reporoductive system.
- Improves shared responsibility by couple.

Disadvantages:
- No protection against STIs and HIV.
- Need cooperation and commitment by both partners.
- Requires intensive education and instruction and accurate daily record keeping before confidence is developed for use of method.

9.20.10: Lactational Amenorrhoea Method (LAM)

A temporal FP methods based on the natural effects of breastfeeding. LAM requires 3 criteria which all must be met:
- The mother has not resumed menses since delivery.
- The baby is fully or nearly fully breastfed (Exclusive Breastfeeding).
- The bay is less than six months old.

Nonpharmacological management
- Explain the following facts on advantages and disadvantages to the client:

Advantages
- Universally available and free.
- Encourages breastfeeding.
- Breastfeeding practices required by LAM have other health benefits for baby and mother.

Disadvantages
- No protection against STIs and HIV.
- Effectiveness after exclusive breastfeeding period is not certain.
- Frequent breastfeeding for especially working mothers may be difficult or inconvenient.

9.20.11 Voluntary surgical contraception for men: Vasectomy

Vasectomy is the surgical procedure intended to provide life – long, permanent and very effective protection against pregnancy by cutting and tying the vas deferens, through a small incision in the scrotum and operation is performed under local anesthesia by a trained service provider.

Indications
- Fully aware, counseled clients who have voluntarily signed the consent form
- Males of couples who have definitely reached their desired family size and want no more children and in which the woman cannot risk another pregnancy due to age or health problems

Management
- Ensure client understands how the method works and that it is—
- Permanent and irreversible
- Highly effective
- Explain to client that vasectomy is not castration and that sexual ability or activity is not affected.
- Explain to the client that he will need to use a condom for at least 3 months after the procedure.

9.20.12 Voluntary surgical contraception for women: Bilateral Tubal Ligation (BTL)

BTL is a minor surgical operation that involves cutting and tying the fallopian tubes in order to prevent the sperm from reaching the ovum in the fallopian tube, hence fertilisation cannot take place.

Indications
- Same as for vasectomy but information targeting females

Management
- Ensure client understands how the method works and that it is—
- Permanent and irreversible
- Highly and immediately effective
- Explain to client that the couple will need to use condoms if there is any risk of exposure to STIs or HIV

9.20.13 Emergency Contraception (EC)

EC refers to the type of contraception that is used following unprotected sexual intercourse prevent unintended pregnancy (Sometimes known as morning after pill / post coital contraception). It is not a routine contraceptive method but only used in cases of unprotected sex, torn condom or sexual assault.

The EC / postcoital prevention must be taken as soon as possible, preferably within 12 hours, but not later than 72 hours after the sexual intercourse.

Pharmacological management

	Medicine	Dose	Frequency	Duration	Codes
	Combined oral contraceptive 30-35mcg Ethinyloestradiol + 150-250mcg Levonorgestrel	4 tablets	Immediately, then after 12 hours		A E
or	**Combined oral contraceptive** 50mcg Ethinyloestradiol + 150-250mcg Levonorgestrel	2 tablets	Immediately, then after 12 hours		A E
or	Norgestrel 500micrograms and Ethinylestradiol 50 micrograms	2 tablets	Immediately, then after 12 hours	7 days	A E
or	Levonorgestrel 750mcg	2 tablets	At once		A E
or	Insert an IUCD – Copper T -380 A within 5 days of unprotected intercourse. However, it can only be prescribed and be given by a medical doctor after conclusive rule out of potential pregnancy and STI presence.				

Treatment to be given within 72 hours of unprotected intercourse

Caution: Emergency oral contraceptives must be used within 72 hours of unprotected intercourse.

CHAPTER 10

INFECTIONS AND INFESTATIONS

10.1 Brucellosis

A bacterial infection of acute or insidious onset (also known as u*ndulant fever, Malta fever, or abortus fever*). It is common as an occupational disease among people working with infected livestock or handling associated fresh animal products, particularly when the worker has skin wounds. For example, butchers, farmers, abattoir workers, and veterinarians are at higher risk for this disease as well as those people who eat unpasteurised milk and cheese from infected livestock.

Causes

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

Symptoms and signs

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

Investigations

- **Blood:** for compliment fixation test or agglutination test (where possible)
- Isolation of the infectious agent from blood, bone marrow, or other tissues by culture

Pharmacological management

	Medicine	Dose	Frequency	Duration	Codes
	Doxycycline po	100mg	Twice daily	6 weeks	A V
plus	Streptomycin IM	1g	Daily	2 weeks	B V
or	Gentamicin IV	5-7mg/kg	Daily	2 weeks	A V
or	Ciprofloxacin po	500mg	Twice daily	2 weeks	A V

Caution: Doxycycline and Gentamicin are contraindicated in pregnancy.

In children > 8 year

	Medicine	Dose	Frequency	Duration	Codes
	Doxycycline po	2mg/kg	Twice daily	6 weeks	A V
plus	Streptomycin IM	15mg/kg	Daily	2 weeks	B V
or	Gentamicin IV	7.5mg/kg	Daily in 1-3 divided doses	2 weeks	A V
or	Ciprofloxacin po	500mg	Twice daily	2 weeks	A V

Caution: Ciprofloxacin is contraindicated in children younger than 12 years of age. Children > 8 years—

	Medicine	Dose	Frequency	Duration	Codes
	Cotrimoxazole po	24mg/kg	Twice daily	6 weeks	A V
or	Gentamicin IV	7.5mg/kg	Daily in 1-3 divided doses	2 weeks	A V

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

10.2 Chicken pox

Chicken pox is a contagious viral disease that presents 2–3 weeks after exposure to the organism (*Varicella zoster* virus). Chicken pox is infective from the start of the fever until 6 days after the lesions have appeared or until all the lesions have crusted. The infection is self-limiting, with a duration of about 1 week.

Symptoms and signs
Fatigue, then the rash appears; lack of appetite; headache; fever; rash that has the following characteristics - starts out as flat red areas; develops into raised papules, and then changes to vesicles with crusts; papules and vesicles may develop at the same time; mucous membranes may be affected.

Diagnosis is mainly based on symptoms and signs.

Nonpharmacological management
Advise caregiver to: Provide adequate hydration; Cut patient's fingernails short, and discourage scratching; Isolate infected person until all lesions have crusted.

Pharmacological management

	Medicine	Dose	Frequency	Duration	Codes
For itch	Calamine lotion	Applied as needed		1 week	A V
In severe cases	Chlorpheniramine po	4 mg adults; 0.1mg/kg children	Three to four times daily	1 week	A E

Caution: Do not give an antihistamine to children < 2 years of age.
For fever with distress:

	Medicine	Dose	Frequency	Duration	Codes
Adults	Paracetamol po	4–6 hourly when required to a maximum of 4 doses per 24 hours. Maximum dose: 15 mg/kg/dose; and 4g in 24 hours			A E
Children	Paracetamol po	10–15 mg/kg/dose 6 hourly when required		1 week	A E

If skin infection is present due to scratching, treat as for bacterial skin infection with Cloxacillin (A) 500mg PO every 6 hours for 7 days.

	Medicine	Dose	Frequency	Duration	Codes
	Cloxacillin po	500mg	Four times daily		A E

Treatments with antiviral agents are recommended for:
- Immunocompromised patients.
- Visceral involvement.
- All patients with severe chickenpox (irrespective of duration of rash).
- Extensive rash.
- Pregnant women.

- Hemorrhagic rash.
- Presence of complications.
- Adults and adolescents presenting within 48 hours of the onset of the rash.

	Medicine	Dose	Frequency	Duration	Codes
Adults	Acyclovir po	800mg	Four times daily	1 week	A E
Children	Acyclovir po	20mg/kg	Four times daily	1 week	A E

Refer
- Complications such as meningitis, encephalitis, or pneumonia
- Severely ill adults
- Babies under 6 months
- Pregnant women

10.3 Helminthic infestations

10.3.1 Roundworm (Ascariasis)

Roundworms are 20–30 cm long, pink or white in colour, and found in the gastrointestinal tract (GIT) as intestinal parasites. They are spread from feces to mouth. When in the lungs roundworms cause a cough. They are mostly common in school children and young adults.

Diagnosis: Stool microscopy

Symptoms and signs

• Colicky abdominal pain • Cough, fever, blood-tinged sputum if pneumonia develops while roundworms are in the lungs • Worm seen in the sputum or stools • Poor appetite, tired • Diffuse mild abdominal pain (sometimes)	• Distension of the abdomen • If pneumonia develops there is elevated temperature, dullness to percussion at site of pneumonia, rales, occasional ulcers • If the worm load is severe, the worms may form a mass in the right iliac fossa • Intestinal obstruction

Nonpharmacological management

Advise patients to:
- Practise good personal hygiene (i.e., wash hands with soap and water after passing a stool, and before working with food).
- Keep fingernails short and clean.
- Wash fruit and vegetables well before use.
- Keep toilet seats clean.
- Teach children proper toilet use etiquette and to wash hands after using the toilet.
- Do not pollute the soil with sewage or sludge.
- Dispose of faeces properly.

Pharmacological management

	Medicine	Dose	Frequency	Duration	Codes
	Albendazole po	400mg at once	Stat	Stat	A V

Cautions: Anthelmintic medicines including mebendazole are not safe in pregnancy because they may cause congenital defects so delay treatment until after delivery.

Refer
Refer cases with abdomen tenderness, pain and vomiting, or if patient is pregnant.

10.3.2 Hookworm
A chronic parastic infestation of the intestines by hookworms. Hookworm larvae in the soil penetrate the skin (*Necator americanus* OR *Ancylostoma duodenale*).

Symptoms and signs
- Dermatitis (ground itch)
- Cough and inflammation of the trachea (common during larvae migration phase)
- Iron-deficiency anaemia

Differential diagnosis: Other causes of iron-deficiency anaemia

Investigations
- Stool examination for ova

Pharmacological management

	Medicine	Dose	Frequency	Duration	Codes
Adults	Mebendazole po	500mg	Stat	Stat	A E
Children < 2years	Mebendazole po	250mg	Stat	Stat	A E

Prevention: Advise patients to: Avoid walking barefoot; Ensure proper faecal disposal; Deworm children every 3–6 months.

10.3.3 Taeniasis (tapeworm infestation)
Tapeworms are long, segmented worms that require a host in which to mature. Intestinal tapeworms can develop when humans ingest undercooked beef, pork, or fish that contains tapeworm larvae or food contaminated with tapeworm eggs.

Causes and types
- *Taenia saginata* (from undercooked beef)
- *T. solium* (from undercooked pork)
- *Diphyllobothrium latum* (from undercooked fish)

Symptoms and signs
- *T. saginata*
  - Usually asymptomatic but live segments may be passed in stool
  - Epigastric pain, diarrhoea, sometimes weight loss
- *T. solium*
  - Usually asymptomatic but live segments may be passed in stool
  - Heavy larvae infestation causes cysticercosis (muscle pains, weakness, or fever)
  - CNS involvement may cause meningoencephalitis or epilepsy
- *D. latum*
  - Megaloblastic anaemia may occur as a rare complication

Investigations
- Stool: for eggs, proglottids, and, in rare cases, scolex

Pharmacological management

	Medicine	Dose	Frequency	Codes
	Mebendazole po	Adults: 500mg at once; child <2 years: 250 mg at once		A E
or	Niclosamide po	Adults 2g single dose; child <2 years: 500 mg; child 2–6 years: 1 g; Child >6 years: 2 g. The tablet(s) should be chewed at breakfast.		A E
Give a purgative 2 hours after the dose	Bisacodyl pr	Adults: 10mg stat; Children 5mg stat;	At once	A E

Prevention
- Avoid uncooked or undercooked pork, beef, or fish.

10.3.4 Trichuriasis (whipworm infestation)
Infestation of the human caecum and upper colon by Trichuris trichiura (whipworms)

Symptoms and signs
- May be symptomless
- Heavy infestation may cause bloody, mucoid stools and diarrhoea
- Complications include anaemia and prolapse of the rectum

Differential diagnosis
- Other worm infestations
- Other causes of bloody mucoid stools

Investigations
- Stool examination for ova
- Sigmoidoscopy, where facilities available

Pharmacological management

	Medicine	Dose	Frequency	Duration	Codes
	Mebendazole po	Adults: 500mg at once; child <2 years: 250 mg at once			A E

Prevention: Advise patients to: Ensure personal hygieneEnsure proper fecal disposal; Deworm children regularly every 3–6 months.

10.3.5 Onchocerciasis (river blindness) and other filariasis
Onchocerciasis is a chronic filarial disease, mainly affecting the skin and eyes, caused by *Onchocerca volvulus*. It is transmitted by a bite from a female black fly (*Simulium damnosum,* S. naevi, and S. oodi), which breeds in rapidly flowing and well-aerated water.

Symptoms and signs

Skin	Eye
• Fibrous nodules usually in pelvic girdle and lower extremities (due to adult worms) • Intense itchy rash, altered pigmentation, oedema, and atrophy (due to microfilariae) • Loss of skin elasticity leading to hanging groin and sometimes hernia	• Visual disturbances and blindness

Differential diagnosis

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

Investigations

- Skin snip after sunshine to show microfilariae in fresh preparations
- Excision of nodules for adult worms
- Presence of microfilariae in the anterior chamber of the eye

Pharmacological management

	Medicine	Dose	Frequency	Duration	Codes
	Ivermectin po	150 microgram/kg	Once a year		S E

Caution:

- Not recommended in children <5 years or nursing mothers
- No food or alcohol to be taken within 2 hours of a dose.

Ivermectin dose based on Height

Height (cm)	Dose
>158	12 mg
141–158	9 mg
120–140	6 mg
90–119	3 mg
<90	Do not use

10.3.6 Schistosomiasis (bilharziasis)

Disease of the large intestine and the urinary tract due to infestation by a Schistosoma (blood fluke). The larvae form (cercariae) of Schistosoma penetrate the skin from contaminated water.

Types:

- *Schistosoma haematobium* (urinary tract)
- *S. mansoni* (gut)
- *S. japonicum* (gut)

Symptoms and signs

S. haematobium (urinary tract)	S. mansoni (GIT)
• Painless, blood-stained urine at the end of urination (i.e., terminal haematuria) • Frequency of urinating (i.e., cystitis and fibrosis)	• Abdominal pain • Frequent stool with blood-stained mucus • Palpable liver (hepatomegally); signs of portal hypertension and haematemesis

Non Pharmacological Management

- Isolate patient from immunocompromised or pregnant non-immune individuals (who may develop severe chickenpox).
- Offer HIV test.

Management

	Medicine	Dose	Frequency	Duration	Codes
Topical treatment	Calamine lotion	Apply twice daily			A E
For wound care	Povidone iodine lotion	Apply twice daily			A E
For post-herpetic neuralgia	Amitriptyline po	25mg at night. Titrate as necessary to a maximum of 75 mg.			A E

Initiate treatment with adjuvant therapy early.
Caution: Avoid carbamazepine in patients on ART.
Antiviral therapy: may decrease the length of time for new vesicle formation, the number of days to attain complete crusting, and the days of acute discomfort. Therapy should be started within 72 hours of onset of symptoms.

	Medicine	Dose	Frequency	Duration	Codes
	Acyclovir po	800mg	Five times daily	1 week	A E

Pain Management: pain is severe and requires active control. A combination of different classes of analgesics is often necessary.

	Medicine	Dose	Frequency	Duration	Codes
	Paracetamol po	1g 4 -6 hourly when required to a maximum of 4 doses per 24 hours.		1 week	A E
	Tramadol po	50mg 6 hourly. If response not adequate increase dose to 100mg 6 hourly		1 week	A E

Only add tramadol, during acute presentation if pain is severe and not adequately controlled.

Refer

- Herpes zoster with secondary dissemination or neurological involvement.
- Ocular involvement (if the tip of the nose is involved then ocular involvement is more likely).
- Uncontrolled pain.

10.4 HIV/AIDS

The human immunodeficiency virus (HIV) is a retrovirus that infects cells of the immune system (mainly CD4 cells), destroying or impairing their function.

Diagnosis

Antibody (Rapid Diagnostic Tests (RDTs) and HIV self-tests (HIVST)) and virological (DNA PCR) tests are used to diagnose HIV in Eswatini. Refer to the latest Integrated HIV Management Guidelines for more information on client counselling and preparation for initiation for newly identified HIV-positive patients.

Management of HIV

Antiretroviral medicines (ARVs) are used to prevent acquisition of HIV, to suppress viral load, and to stop viral replication for persons already infected with the virus.

10.4.1 Prevention of HIV

A combination of biomedical, socio-behavioral and structural interventions that are human-rights based and evidence informed, are offered to all sexually active individuals, including adolescents. Refer to the latest Integrated HIV Management Guidelines for detailed information on these prevention interventions. Post exposure prophylaxis (PEP), Pre-exposure prophylaxis (PrEP), and Voluntary Male Medical Circumcision (VMMC) are used to prevent HIV acquisition.

Post-Exposure Prophylaxis (PEP)

All persons exposed to HIV accidentally, occupationally, sexually or otherwise should access PEP as early as 1 hour and within 72 hours of exposure to minimise the risk of transmission of HIV and other blood-borne pathogens. All registered doctors and nurses at all levels of care can prescribe ARV medicines for PEP for any individual who presents with a history of exposure to HIV in the past 72 hours. Recommended medicines for PEP are:

Population Group	Medicine	Dose	Frequency	Duration	Codes
Adults/ Adolescents ≥ 30 kg	Tenofovir disoproxyl fumarate (TDF)* + Lamivudine (3TC) + Dolutegravir (DTG) [TLD] po	300 mg + 300 mg + 50 mg	Once daily	1 Month	A V
Children <30 kg	Abacavir (ABC) + Lamivudine (3TC) + Lopinavir/ritonavir (LPV/r)**	Weight based dosing according to the latest Integrated HIV management Guidelines (po)	Refer to the latest Integrated HIV management guidelines/ Paediatric dosing wheel	1 Month	A V
*Zidovudine (AZT) can be used as an alternative **DTG 10 mg when available ***NB:*** Recommendation is regardless of the risk					

Pre-Exposure Prophylaxis (PrEP)

Pre-exposure prophylaxis (PrEP) should be offered as an additional prevention choice for people at substantial risk of HIV acquisition, as part of a combination of prevention approaches that include HIV testing, risk reduction counselling, male and female condoms, lubricants, antiretroviral therapy medicines and VMMC for all HIV-negative people. PrEP must be taken for 7 days before it becomes fully effective, followed by daily use for the duration of possible exposure to HIV to maintain full protection. Refer to the latest Integrated HIV Management Guidelines for detailed information on PrEP.

Recommended ARV medicines for PrEP:

	Medicine	Dose	Frequency	Duration	Codes
Adults	Tenofovir (TDF*) Lamivudine (3TC)* Dolutegravir (DTG)	300mg + 300mg + 50mg (po)	Once daily	For as long as it is required	A V

*Emtricitabine 200mg can be used in place of lamivudine.

Prevention of Mother to Child Transmission (PMTCT)

Prevention of mother-to-child transmission (PMTCT) is implemented using a 4-pronged approach as detailed in the latest Integrated HIV Management Guidelines. Antenatal care (ANC) services should provide a comprehensive package that includes PMTCT for HIV-positive women. Table 10.5.1 details considerations to be taken into account when attending to HIV-positive women in ANC.

Table 10.4.1 Key Considerations for HIV-Positive Women in Antenatal Care

Target Population	Description of Service
ALL HIV-Positive Women	• Ensure that all HIV-positive women are on ART and have an undetectable viral load. • Initiate prophylaxis for women who are eligible and not already taking it: Cotrimoxazole 960mg once daily (A, V) (PO) Isoniazid (INH) 300mg (A, V), plus Vitamin B6 25mg once daily (A, V) (PO). - Give enhanced infant prophylaxis (eIP) as detailed in Table 10.5.2
Newly positive OR known positive not on ART	• Initiate ART as soon as possible at any gestational age, preferably on the same day and in the ANC (without waiting for the CD4 results and/or other baseline test results). • Preferred first-line regimen for women is TLD once daily PO (A, V). • Ensure mother understands the significance of ART adherence once initiated. • Schedule a follow-up visit for the woman in 2 weeks.
Already on ART	• Check viral load (VL) if not done in the last 3 months. • Continue current ART regimen, if there is no evidence of treatment failure. • If VL is detectable, initiate SUAC and refer to doctor, mother facility, and/or Baylor • Monitor the mother for ART-related adverse events.
Not ready for ART	• Counsel woman on the benefits of early initiation on ART for her own health, for the child and partner. • Address any fears and/or barriers for woman not being ready to initiate ART, including partner support. • Follow up with woman in 2 weeks and initiate ART if she is ready. • If woman is still not ready for ART, continue counselling at every visit.

Treatment for HIV-Positive Pregnant and Lactating Women

The recommended first-line ART for HIV-Positive Pregnant and Lactating Women is:
Once daily fixed dose combination of **TLD** – Tenofovir (TDF*), Lamivudine (3TC)* and Dolutegravir (DTG) (A, V) PO.

- All pregnant women initiated on ART should present for clinical review after 2 weeks of initiation and every month thereafter for provision of routine ANC services and ART refills.
- A detectable viral load in pregnant and lactating women (PLW) should be treated as an emergency due to the increased risk of mother-to-child transmission. Refer to the latest Integrated HIV Management Guidelines for information on action steps for management of a detectable viral load in pregnant and lactating women.

Services for women during labor, delivery and immediately after delivery
Initiate ART in maternity for all women who are HIV-positive and not on ART regardless of WHO staging or CD4.

All HIV-exposed infants should be provided with enhanced infant prophylaxis (eIP). Table 10.5.2 gives information on infant dosing regimens for enhanced infant prophylaxis. For detailed information, see the latest Integrated HIV Management Guidelines.

Table 10.4.2 Dosing regimens for enhanced infant prophylaxis using AZT and NVP

		NVP (A V)	AZT (V, A)
Birth to 6 weeks	Birth weight 2000 - 2499g	10mg (1ml), po, of syrup once daily	10mg twice daily (1ml of syrup twice daily)
	Birth weight ≥2500g	15mg once daily (1.5ml of syrup once daily)	15mg twice daily (1.5ml of syrup twice daily)
> 6 weeks Any weight		20mg (2ml) po, of syrup once daily **OR** (25mg tablet once daily)	STOP

Special considerations for ART in HIV-positive pregnant and lactating women are highlighted in Table 10.5.3.

Table 10.4.3 Special Considerations for ART Regimens in Pregnant and Lactating Women

Condition	Recommended Regimen	Comments
TB	TLD (A, V), po, once a day + DTG (50mg once daily), po (A V) **OR** TDF (300 mg) + 3TC (300 mg) + EFV (400mg) [TLE], po (A V)	• HIV-positive pregnant women with TB coinfection should begin TB treatment as soon as possible and keep a close follow-up schedule. • Double dosing of DTG is necessary. • Refer if necessary.
Moderate to severe anaemia	TLD (A, V), po, once a day **OR** TDF (300 mg) + 3TC (300 mg) + EFV (400mg) [TLE], po (A V) for women who cannot tolerate DTG	• Treat anaemia according to the guidelines, screen for active TB disease and refer if necessary. • Prioritise management of severe anaemia before ART initiation.
Poor renal function (creatinine clearance <50 mL/min)	ABC (300mg) + 3TC* + DTG (50mg), po (A, V)	• Monitor accordingly and refer for further investigation and management of renal insufficiency. • *Please note that the dose of 3TC needs to be adjusted when creatinine clearance is < 50 mL/min.

ART Initiation for birth-tested infants

Infants identified HIV-positive at birth through birth HIV PCR testing should be initiated on ART based on the following algorithm:

Figure 10.4.1: Algorithm for ART initiation for birth-tested infants

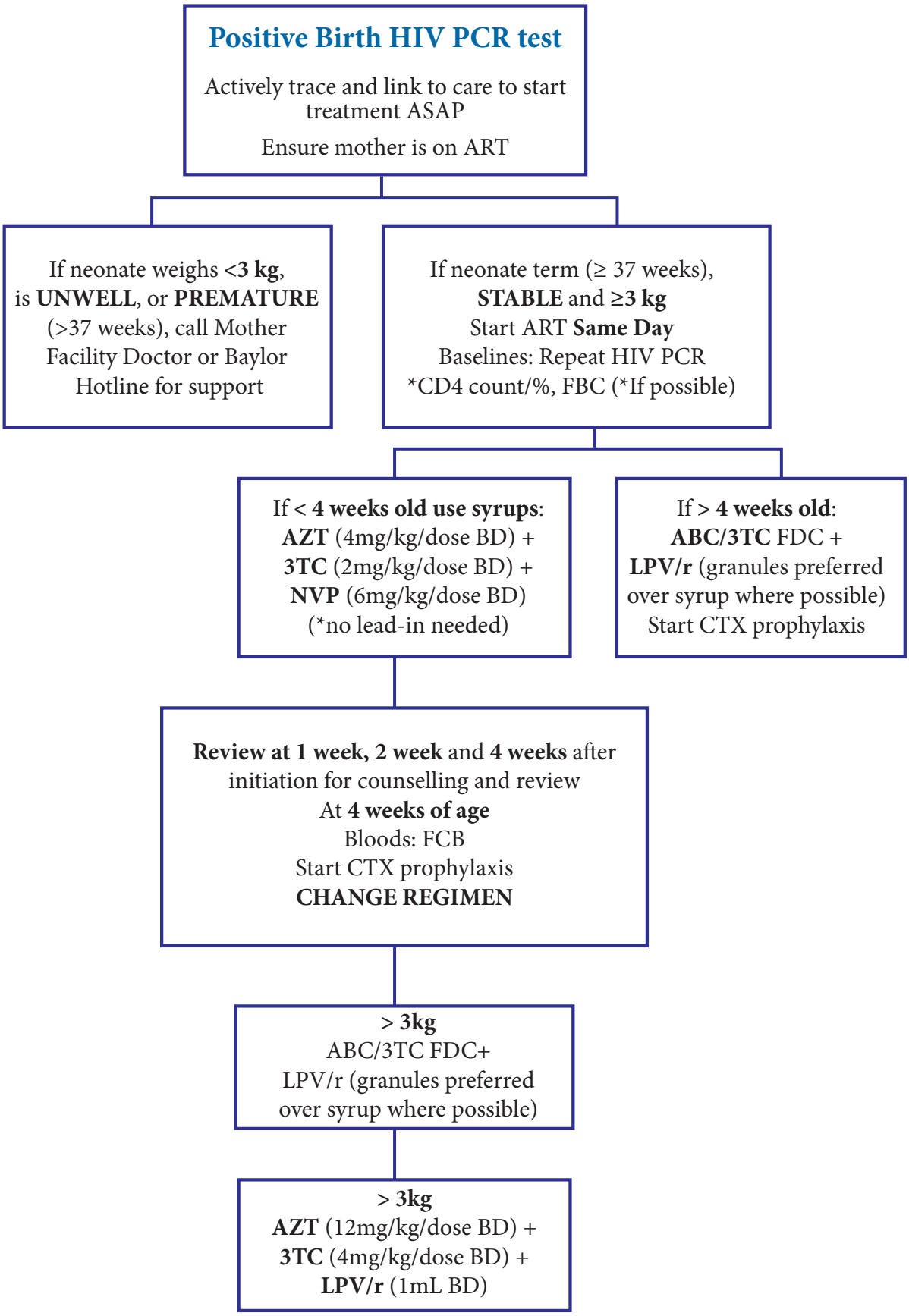


Table 10.4.4 details the recommended first-line ART regimen for newly initiating infants, children and adolescents.

Table 10.4.4: Recommended Regimens for newly initiating Infants, Children and Adolescents

Recommended Regimens for newly initiating Infants, Children and Adolescents					
Weight	≥2.5 Kg	≥3kg AND	6-20kg	20-29.9 kg	≥30 kg
Age	Birth (≥37 Weeks)	≥ 1 month old (* Term Infants only)	See the latest Integrated HIV Management Guidelines	Any	Any
Regimen	AZT+3TC+ NVP, po, (V, A) syrups (Holding Regimen).	ABC+3TC+LPV/r, po, (V, A) Refer to pediatric dosing wheel for doses.	See the latest Integrated HIV Management Guidelines	ABC (300mg) +3TC (300mg) + DTG (50mg), po, (V, A)	TLD (Adult FDC), po, (V, A) once daily
Special considerations		• *AZT/3TC/NVP is a holding regimen only, all infants MUST BE CHANGED to ABC/3TC/LPV/r at 1 month of age (term infants only).* • *AZT/3TC/NVP cannot be given as an FDC, see syrup dosing in Figure 10.5.1* • *ABC and LPV/r are NOT recommended for pre-term infants, term infants < 1 month of age, or those <3kg* • *If needs initiation at < 37 weeks gestation OR < 2.5 kg, call facility Doctor or Baylor Hotline.* o *Monitor the baby for ART-related adverse events*			

10.4.2 Treatment for HIV

Antiretroviral therapy (ART) is used to suppress the virus ideally to undetectable levels. Regimens containing Dolutegravir (DTG) are recommended as first line therapy for all adolescents and adults ≥ 30kg, including pregnant and breastfeeding women. Dolutegravir is also used in second- and third-line regimens if the client has no previous exposure to DTG and there are no contraindications. It is important to monitor all clients for ART-related adverse events.

First line ART for Children and Adolescents

- Children and adolescents should be on optimised ART that will ensure that they are on effective therapy that is easy to dose; with minimal side effects, contraindications, and lower pill burden. The recommended first line regimens for children >3kg are as follows with key considerations noted:
  - o Solid formulations of lopinavir/ritonavir (LPV/r) as soon as possible.
  - o Transition to DTG-containing regimens as soon as possible based on child's weight ≥30kgs. Once DTG 10mg is available, it can be given to children ≥3kg.
  - o Rapid phase-out of nevirapine (NVP)-based regimens based on child's weight.

Table 10.5.5 shows recommended regimens for children and adolescents initiating ART, while Table 10.5.6 shows ART that can be used to initiate children and adolescents if they cannot be initiated with the regimes detailed in Table 10.4.5.

Table 10.4.5 Recommended first-line ART regimen for newly initiating children and adolescents

Recommended Regimens for newly initiating Infants, Children and Adolescents			
Weight	>20 Kg	20-29.9 kg	≥30 kg
Regimen	ABC/3TC+LPV/r (A, V) If DTG 10mg is available, give it to children ≥3kg	ABC+3TC+LPV/r (A, V) If DTG 10mg is available, give it to children ≥3kg	TLD
Special considerations		*LPV/r is not recommended for infants < 2 weeks of age. LPV/r tablets should not be cut, split, dissolved, chewed or crushed as bioavailability is reduced when not swallowed whole. Transition from LPV/r solution/ granules to LPV/r 100mg/25mg tablets as soon as the child is safely able to swallow tablets to reduce pill burden.*	

Table 10.4.6: Alternative ART regimens for newly initiating children and adolescents

Alternative Regimens for newly initiating Children and Adolescents			
Weight	<20 kg	20-29.9 kg	≥30 kg
Regimen	AZT/3TC+LPV/r	AZT/3TC+DTG	TLE
Special considerations			
Regimen	ABC/3TC+EFV AZT/3TC+EFV AZT/3TV/NVP	ABC/3TC+LPV/r AZT/3TC+LPV/r ABC/3TC+EFV AZT/3TC+EFV	ABC / 3TC + DTG AZT/3TC+DTG TDF (or ABC) + 3TC + EFV
		EFV should not be used in children < 3 years old *LPV/r tablets should not be cut, split, dissolved, chewed or crushed as bioavailability is seriously reduced when not swallowed whole. Transition from LPV/r solution/ granules to LPV/r 100mg/25mg tablets as soon as the child is safely able to swallow tablets to reduce pill burden* *NVP is least preferred and can ONLY be used for infants < 20kg initiating at < 4 weeks (birth tested)*	

Second Line ART for children and adolescents

The recommended second-line ART for children and adolescents should consist of 2 nucleoside reverse-transcriptase inhibitors (NRTIs) plus a ritonavir-boosted protease inhibitor. Recommended 2nd line ART regimens for children and adolescents are highlighted in Table 10.4.7.

Table10.4.7: Recommendations for optimised 2nd line ART in children and adolescents

Weight*	If current 1st line ART	Preferred 2nd line ART	Alternative 2nd line Regimen
< 20 kg	ABC+3TC+LPV/r or DTG (10mg)	*Consult multidisciplinary team at mother facility to motivate for genotyping through Baylor.*	
	AZT+3TC+LPV/r or DTG (10mg)		
	ABC +3TC + EFV or NVP	AZT+3TC+LPV/r or DTG (10mg)	*Consult multidisciplinary team or call the Baylor HIV/TB Hotline*

Weight*	If current 1st line ART	Preferred 2nd line ART	Alternative 2nd line Regimen
20 – 29.9 kg	ABC+3TC+DTG	AZT+3TC+ LPV/r	*Consult multidisciplinary team or call the Baylor HIV/TB Hotline*
	AZT+3TC+DTG	ABC+3TC+LPV/r	*Consult multidisciplinary team or call the Baylor HIV/TB Hotline*
	ABC+3TC+EFV (or NVP)	AZT+3TC + DTG	AZT+3TC+LPV/r
	AZT+3TC+EFV (or NVP)	ABC+3TC+DTG	ABC+3TC+LPV/r
>30kg- 39.9Kg	TDF (or ABC) +3TC+DTG	ABC+3TC+LPV/r	*Consult multidisciplinary team or call the Baylor HIV/TB Hotline*
	AZT+3TC+DTG	TDF+3TC+LPV/r	ABC+3TC+LPV/r
	ABC+3TC+ EFV (or NVP)	AZT+3TC+DTG	AZT+3TC+LPV/r TDF+3TC+LPV/r
	TDF+3TC+EFV (or NVP)	AZT+3TC+DTG	TDF+3TC+LPV/r ABC+3TC+LPV/r
	AZT+3TC+EFV (or NVP)	TDF+3TC+DTG	AZT+3TC+LPV/r
> 40kg	TDF (or ABC) +3TC+DTG	AZT+3TC+ ATV/r(A)	AZT+3TC+LPV/r(A)
	AZT+3TC+DTG(A)	TDF+3TC+ATV/r(A)	ABC+3TC+ATV/r (LPV/r) (A) TDF+3TC+LPV/r (A)
	AZT+3TC+EFV (or NVP) (A)	TDF+3TC+DTG (A)	TDF+3TC+LPV/r (A) ABC+3TC+LPV/r (A)
	ABC+3TC+EFV (or NVP) (A)	AZT+3TC+DTG (A)	AZT+3TC+ATV/r (LPV/r) (A, V) TDF+3TC+ATV/r (LPV/r) (A, V)
	TDF+3TC+EFV (or NVP) (A)	AZT+3TC+DTG (A)	AZT+3TC+ATV/r (LPV/r) (A, V)

In children with TB/HIV coinfection, initiate TB treatment before ART to avoid severe immune reconstitution inflammatory syndrome (IRIS). All HIV-infected children diagnosed with TB should be initiated on ART within 2 weeks after starting anti-TB treatment. The recommended ART for drug-sensitive TB/HIV coinfection in children and adolescents is detailed in the Table 10.4.8 below.

Table 10.4.8: Recommended ART for Drug-Sensitive TB/HIV Co-infection

Initiating ART on TB Treatment		
Age/Weight	**Regimen**	**Comments**
< 3 years or < 10 kg	LPV/r with 1:1 ritonavir boosting (recommended) Or ABC+3TC+AZT (recommended if ritonavir not available) Or ABC or AZT+3TC+NVP	• AAvoid NVP if prior exposure • Start NVP at full dose and adjust to 200 mg/ m2/ dose if formulation allows • NVP: Check VL at end of TB Rx. If < 1000 copies/ mL continue NVP; If >1000 copies/mL change to LPV/r + change NRTI • NEVER continue ABC+3TC+AZT after TB Rx

Initiating ART on TB Treatment		
Age/Weight	**Regimen**	**Comments**
3-10 years and >10 kg	ABC+3TC+EFV (recommended) Or ABC+3TC+AZT	• NVP can be substituted for EFV if intolerance or cannot swallow (see above box) • NEVER continue ABC+3TC+AZT after TB Rx
> 10 years	ABC+3TC+EFV	• TDF vs. ABC selection based on weight/age • If VL undetectable at end of TB Rx can switch to TDF+3TC+DTG (40 Kg or more) 2 weeks after completion of RIF
Refer to job aid for 1:1 LPV/r dosing **General Principles** • Attempt to provide the most potent ART regimen possible while on ATT • Attempt to avoid ONE drug changes between drug classes if VL is detectable • Consider ART and PMTCT history when changing ART regimens • Consult with Baylor TB/HIV hotline with any questions		

First line ART for Adults

The recommended first line ART for adolescents and adults ≥ 30kg is:
Once daily fixed dose combination of TLD (A, V), po

Alternative First Line Regimen: ABC +3TC+ DTG AZT +3TC+DTG TDF+ 3TC+ EFV ABC+3TC+EFV AZ-T+3TC+EFV

For special consideration for TB/HIV co-infected clients refer to the latest Integrated HIV Management Guidelines.

Second line ART for Adults

The recommended second-line ART for adults and adolescents should consist of 2 nucleoside reverse-transcriptase inhibitors (NRTIs) plus a ritonavir-boosted protease inhibitor. Atazanavir/ritonavir (ATV/r) is preferred to lopinavir/ritonavir (LPV/r) due to the reduced pill burden (1 tablet once a day), better tolerability and reduced cost. Recommended 2nd line ART regimens for adults are highlighted in Table 10.5.4.

Table 10.4.9 Recommendations for second line ART for Adults

First-Line ART	Preferred Second Line	Alternative Second Line
TLD	AZT + 3TC + ATV/r (A)*	AZT + 3TC + LPV/r (A)*
TLE		
TLN		
AZT + 3TC + EFV	TDF + 3TC + ATV/r (A)*	TDF + 3TC + LPV/r (A)*
AZT + 3TC + NVP		
AZT + 3TC + DTG		
ABC-based first-line regimen	AZT + 3TC + ATV/r (A)*	AZT + 3TC + ATV/r (A)*

*In consultation with the Doctor for switching

10.4.3 Clients failing second line regimens

Before considering third-line therapy, adherence interventions should be intensified (e.g., stepped-up adherence counselling sessions), and barriers to adherence addressed. Children, adolescents, and adults who fail to suppress and have detectable viral loads while on a 2nd line ART regimen must be evaluated for HIV-drug resistance (HIVDR) using the HIVDR risk evaluation tool. If this tool shows that the client is highly likely to be failing, a motivation for genotyping must be submitted to the third-line committee at snapthirdline@gmail.com. Refer to HIV Genotyping and 3rd line SOP for detailed information on management of HIVDR. Regimens for third line ART are individualised for each client based on the genotype test results and are chosen in collaboration with the 3rd line committee.

10.4.4 Models of ART Service Delivery (Differentiated Services Delivery - DSD)

After 1 year on ART, stable clients should be offered an opportunity to choose one of the different ART service delivery (DSD) models to enhance their retention in care and improve viral suppression. Long-term care and adherence should be promoted by allowing clients with undetectable viral loads (VL) to choose models of care that best suit their needs when accessing ART services. Unstable clients should be offered intensive DSD models which best suit their needs e.g. advanced disease package, mainstream etc.

Further guidance is provided through the CommART delivery guidelines (2016) and SOPs (2016).

10.4.5 Advanced HIV Package

Advanced HIV Disease (AHD) is defined as CD<200cells/ml. This definition includes adults, adolescents, and children above five (5) years of age living with HIV. Children < 5years living with HIV are considered as having advanced HIV Disease. Clients with AHD are at high risk of opportunistic (OIs) including cryptococcal meningitis, TB, toxoplasmosis, and other bacterial infections. These patients are at high risk of morbidity and mortality.

Cryptococcal Infection

Clients with cryptococcal infection may present with or without symptoms of meningitis. Cryptococcal disease is an opportunistic infection that occurs primarily among people with advanced HIV disease and is an important cause of morbidity and mortality.

Screening, diagnosis, and treatment of cryptococcal infection (and TB) is the cornerstone of advanced HIV disease management.

Cryptococcal Infection pre-emptive treatment

Pre-emotive treatment is treatment of cryptococcal infection to prevent the development of cryptococcal disease (with signs and symptoms). Treatment involves induction, consolidation and maintenance phases as shown below;

- **Induction (2 weeks)**

	Medicine	Dose	Frequency	Duration	Codes
Adults	Fluconazole po	800mg	Daily	2 weeks	B V
Children and adolescents	Fluconazole po	12mg/kg/day for up to a maximum of 800mg/day		2 weeks	B V

- **Consolidation I (2 weeks)**
  - o Screen for symptoms:
  - o If negative, start

	Medicine	Dose	Frequency	Duration	Codes
Adults	Fluconazole po	400mg	Daily	2 weeks	B V
Children and adolescents	Fluconazole po	6-12mg/kg/day for up to a maximum of 400mg/day		2 weeks	B V

- If symptoms arise, refer for lumbar puncture.
  - o Start ART if stable (after 4 weeks of antifungal therapy)

- **Consolidation II (6 weeks)**
  - o Screen for symptoms:
  - o If symptom screen is negative, continue

	Medicine	Dose	Frequency	Duration	Codes
Adults	Fluconazole po	400mg	Daily	6 weeks	B V
Children and adolescents	Fluconazole po	6mg/kg/day for up to a maximum of 200mg/day		6 weeks	B V

  - o If positive, refer for lumbar puncture.

- **Maintenance:**
  - o Screen for symptoms.
  - o If negative, give fluconazole for at least one year as follows:

	Medicine	Dose	Frequency	Duration	Codes
Adults	Fluconazole po	400mg	Daily	≥1 year	B V
Children and adolescents	Fluconazole po	6mg/kg/day for up to a maximum of 200mg/day		≥1 year	B V

  - o Continue treatment until stable on ART, with a CD4 count above 350cells/ml and an undetectable viral load.
  - o If symptoms arise, refer for lumbar puncture.

Cryptococcal Meningitis

- **Signs and symptoms of Cryptococcal meningitis include:** headache, neck stiffness, blurred vision, vomiting and fever.

Diagnosis

- All clients with CD4<100 cells/ml should get serum CrAg test for screening (reflex testing). Symptomatic patients with a positive serum CrAg should get an urgent lumbar puncture done to rule out cryptococcal meningitis. Serum (plasma or whole blood can also be used) CrAg is used for screening for Cryptococcal infection.
- CSF CrAg is preferred for diagnosis. India ink can be used if CSF CrAg is unavailable.
  Treatment for Cryptococcal meningitis involves induction, consolidation and maintenance phases as shown below:

- **Induction phase (2 weeks):**
  - o Pre-emptive hydration and electrolyte replacement.

Pre-emptive hydration and electrolyte replacement is important to reduce the risk of Cryptococcal meningitis associated complications.

	Medicine	Dose	Frequency	Duration	Codes
	Sodium chloride IV	1L	Over 2 hours before each Amphotericin B infusion		B V
add	Potassium Chloride IV	20 mmol in 1litre Sodium chloride			B V
and	Potassium Chloride po	600mg	Twice daily	During treatment	A E
and	Magnesium Sulphate po	500mg	Twice daily		B E

Preferred regimen (adults, adolescence, children)

Alternative regimens,

	Medicine	Dose	Frequency	Duration	Codes
	Fluconazole po or IV	1200mg adults; 12mg/kg/day children	Daily	2 weeks	B V
plus	Flucytosine IV	100 mg/kg/day divided into 4 doses per day			B E

or

	Medicine	Dose	Frequency	Duration	Codes
	Amphotericin B Deoxycholate IV	1mg/kg/day			B V
Plus	Fluconazole	200mg/day for adults, 12mg/kg/day for Children and adolescence (up-to 800mg/day)			B V

Closely monitor for Amphotericin B toxicity

- Monitor for signs and symptoms of raised intracranial pressure. Repeated lumbar punctures may be necessary for symptomatic patients or if intracranial pressure is above 20cmH_2O.
- The use of corticosteroids and diuretics is NOT recommended in routine management of cryptococcal meningitis. *(short course of steroids may be considered in patients with Cryptococcal meningitis IRIS, AND are deteriorating).*

- **Consolidation I: (4 weeks)**

	Medicine	Dose	Frequency	Duration	Codes
Adults	Fluconazole po	800mg	Daily	4 weeks	B V
Children and adolescents	Fluconazole	12mg/kg/day for up to a maximum of 800mg/day		4 weeks	B V

  - o Start ART if stable (after 6 weeks of antifungal therapy)

- **Consolidation II: (4 weeks)**

	Medicine	Dose	Frequency	Duration	Codes
Adults	Fluconazole po	800mg	Daily	4 weeks	B V
Children and adolescents	Fluconazole	6-12mg/kg/day for up to a maximum of 800mg/day		4 weeks	B V

- **Maintenance**

	Medicine	Dose	Frequency	Duration	Codes
Adults	Fluconazole po	200mg	Once daily	One year	B V
Children and adolescents	Fluconazole	6mg/kg/day for up to a maximum of 200mg/day		One year	B V

- Continue fluconazole until patient is stable and CD4 > 100 cells/ml (25% for children 2-5 years) and undetectable viral load.
- Do not discontinue maintenance therapy for children under 2 years old.
- *If Liposomal Am B is available, it is the drug of choice in place of Am B deoxycholate, especially in patients with renal insufficiency. (for dosage, refer to the AHD SOPs).*
- The following is the recommended package of care for clients with AHD:
  - (CrAg, TB-LAM for CD4 below 100 copies/ml)

10.4.6 Latent TB Infection Treatment (TB Preventive Therapy)

Treatment of latent TB infection can reduce the risk of developing active TB by 60 – 90%. TB screening using the national TB screening tool is mandatory before offering TB preventive Therapy (TPT).

Treatment options

Preferred regimen:

	Medicine	Dose	Frequency	Duration	Codes
	Isoniazid po	300mg once a day for 6 months for adults and adolescents regardless of HIV status. (see table below for pediatric dosing).			A V

Table 10.4.9

Weight Bands	Dose Given(mg)	Weight Bands
>5	50	1/2tablet
5.1-9.9	100	1 tablet
10-13.9	150	1 ½ tablets (½ adult 300mg)
14-19.9	200	2 tablets
20—24.9	250	2 ½ tablets
>25 to adult	300	3 tablets (or 1 adult 300mg)
Pyridoxine1-2mg/kg daily for adults with each dose of Isoniazid to reduce the risk of peripheral neuropathy		

10.5 Malaria

Malaria is an infection of red blood cells by a parasite micro-organism called Plasmodium, which is spread by a bite of the female anopheles mosquito.

Note: Malaria is a notifiable disease in Eswatini. All cases should be reported. Call 977 immediately. Five species of Plasmodium are known to cause Malaria in humans in Africa: Plasmodium falciparum (P. falciparum), Plasmodium vivax (P. vivax), Plasmodium ovale (P. ovale), Plasmodium malariae (P. malariae), and Plasmodium knowlesi (P. knowlesi).

In Eswatini, *P. falciparum* is the most common and the most dangerous of the malaria species. Malaria caused by *P. falciparum* is an acute febrile illness that may progress rapidly to severe disease if not diagnosed early and treated adequately. The most important element in the diagnosis of Malaria is a high index of suspicion in both endemic and non-endemic areas. The progression of *P. falciparum* malaria to severe disease is rapid and early diagnosis and effective treatment is crucial.

10.5.1 Uncomplicated Malaria

Uncomplicated Malaria is defined as symptomatic Malaria without signs of severity or evidence (clinical or laboratory) of vital organ dysfunction.

Symptoms and signs

- Fever, Headache
- Joint pains, Malaise
- Vomiting/diarrhea
- Body ache, Body weakness
- Poor appetite
- Pallor
- Enlarged spleen

Diagnosis

The clinical features listed above are not specific for Malaria and can be found in several other febrile conditions. Therefore, it is necessary to confirm Malaria parasites infection and investigate for other causes of febrile illness. Parasite-based diagnosis is recommended for all patients presenting with signs and symptoms of Malaria.

The recommended investigations are:

- Quality Malaria Microscopy or
- Quality Malaria Rapid Diagnostic Tests (m RDTs)

Note: It is compulsory to test and confirm all suspected Malaria patients. Give antimalarial medicine only to those clients who test positive.

Non-Pharmacological Management

- Continue with feeding and fluid intake
- For fever, tepid sponge with lukewarm water
- Refer immediately if the condition worsens or on the fourth day if symptoms persist.

Pharmacological Management

Artemether (20mg)-Lumefantrine (120mg) (ALU) (A, V) fixed dose combination (FDC) Table.

Table 10.5.1 Dosing of Artemether (20mg) + Lumefantrine (120mg) (A,V) Tablets

Weight (kg)	Age (yrs.)	Number of Tables and Timing of Dosage				
		0hr	24hr	36hr	48hr	60hr
5–14	<3	1	1	1	1	1
14–25	≥3-8	2	2	2	2	2
25–34	≥8-14	3	3	3	3	3
≥34	>14	4	4	4	4	4

Analgesic Medicines

- Patients with high fever (38.50°C and above) should be given an anti-pyretic medicine like paracetamol (A, V) or aspirin (A, V) every 4 to 6 hours (maximum 4 doses in 24 hours) until symptoms resolve, usually after two days.
- Children below 12 years should not be given aspirin because of the risk of developing Reye's syndrome.

10.5.2 Severe Malaria

In a patient with P. falciparum asexual parasitaemia and no other obvious cause of symptoms, the presence of one or more of features listed below classify the patient as suffering from severe Malaria.

Symptoms and signs

- Prostration/extreme weakness
- Impaired consciousness
- Change of behaviour
- Convulsions
- Respiratory distress (due to lactic acidosis and/or pulmonary edema)
- Bleeding tendency/DIC
- Jaundice
- Circulatory collapse/shock
- Vomiting everything
- Inability to drink or breast feed

Diagnosis

- In severe Malaria, blood slide (BS) is the recommended malaria test - it quantifies parasitemia. In severely ill patients receiving injectable antimalarial medicine, serial BS investigations monitors the level of parasitemia to verify malaria recovery, or if clinical condition is not improving, to rule out another serious condition.
- Blood film for malaria parasites.
- Blood glucose estimation in patients with altered consciousness.
- Haematocrit and/or haemoglobin estimation.
- Lumbar puncture to exclude meningitis (if facilities for LP assessment are available).
- Serum creatinine or urea - to assess kidney function.
- Electrolytes - for early detection of acute renal failure.
- Full blood cell count and differential white cell count for additional diagnosis of other infectious diseases.

- Blood gases, pH and anion gap - to diagnose acidosis.
- Radiological investigation: Chest X-ray; look for pulmonary edema or lobar consolidation.

Non Pharmacological Treatment

Management of severe malaria comprises four main principles: rapid clinical assessment, management of emergency conditions, specific antimalarial treatment and supportive care. Severe malaria is a medical emergency. A rapid assessment must be conducted including airway, breathing, circulation, coma, convulsion, and dehydration status. Differential diagnosis must be made. If effective management of severe malaria and supportive care for complications is not possible, patients should be given pre-referral treatment and referred immediately to an appropriate facility for continued treatment.

Pharmacological Treatment

	Medicine	Dose	Frequency	Duration	Codes
	Artesunate IV or IM	2.4mg/kg body weight given on admission, then at 12 hours, and at 24 hours regardless of patient's recovery. Dosing fo children weighing less than 20kg: 3mg/kg/dose; same schedule as indicated above (0, 12, 24 hours)		3 days	A V

- Complete Artesunate injection treatment by giving a complete course (3 days) of Artemether plus Lumefantrine (ALU).

Injectable Artesunate has 2-steps dilutions

- **Step 1:** The powder for injection should be diluted with 1ml of 5% sodium bicarbonate solution (provided in each box) and shaken vigorously 2-3 minutes for better dissolving until the solution becomes clear.

- **Step 2:** For slow intravenous infusion (3-4 minutes), add 5ml of 5% dextrose or normal saline, to obtain Artesunate concentration of 10mg/ml. For deep intra-muscular injection, add 2ml of 5% dextrose or normal saline to obtain an Artesunate concentration of 20mg/ml.

Table 10.5.2 Dilution of Artesunante injection

Route	IV Injection			IM Injection		
Strength	30mg	60mg	120mg	30mg	60mg	120mg
Sodium Bicarbonate 5%	0.5	1	2	0.5	1	2
Normal Saline or 5% of glucose	2.5	5	10	1	2	4
Total (ml)	3	6	12	1.5	3	6
Artesunate concentration	10	10	10	20	20	20

Table 10.5.3 Dosage schedule for Artesunate injection

Weight	Dose	ml per dose strength 60mg		Vials of Artesunate 60mg needed
Kg	mg/kg	iv	i/m*	
		10 mg/ml	20 mg/ml	
<5	3.0	1.5	1	1
5-8	3.0	2	1	1
9-12	3.0	4	2	1
13-16	3.0	5	3	1
17-20	3.0	6	3	1
21-25	2.4	6	3	1
26-29	2.4	7	4	2
30-33	2.4	8	4	2
34-37	2.4	9	5	2
38-41	2.4	10	5	2
42-45	2.4	11	6	2
46-50	2.4	12	6	2
51-54	2.4	13	7	3
55-58	2.4	14	7	3
59-62	2.4	15	8	3
63-66	2.4	16	8	3
67-70	2.4	17	9	3
71-75	2.4	18	9	3
76-79	2.4	19	10	4
80-83	2.4	20	10	4
84-87	2.4	21	11	4
88-91	2.4	22	11	4
92-95	2.4	23	12	4
96-100	2.4	24	12	4

*Half the dose is rounded up to 1 ml; **Ful vial (s) might not be required for a given weight band.
The left-over solution must be discarded within 1 hour of preparation and must not be used.

Management of complications

In an attempt to reduce the unacceptably high mortality of severe Malaria, patients require intensive care. Clinical observations should be made as frequently as possible. Airway maintenance, nurse on side, fanning if hyperpyrexia is present, and fluid balance review.

- ***Coma (cerebral Malaria):*** maintain airway, nurse on side, and exclude other causes of coma (e.g. hypoglycemia, bacterial meningitis); avoid giving corticosteroids.
- ***Hyperpyrexia:*** fanning, paracetamol if patient can swallow
- ***Convulsions:*** maintain airways;

Medicine	Dose	Frequency	Duration	Codes
Diazepam iv or rectal	0.15 mg/kg (maximum 10mg for adults) slow bolus IV injection. In children, diazepam rectal route should be used. Give a dose of 0.5-1.0 mg/kg. If convulsions persist after 10 minutes, repeat rectal diazepam treatment as above. Should convulsions continue despite a second dose, give a further dose of rectal diazepam or phenobarbitone 20mg/kg IM or IV after another 10 minutes.			B V

Hypoglycemia: **r**emains a major problem in the management of severe malaria especially in young children and pregnant women. It should be deliberately looked for and treated accordingly.
Urgent and repeated blood glucose screening.

In children:

Medicine	Dose	Frequency	Duration	Codes
10% dextrose (5ml/kg) or 25% dextrose (2.5ml/kg) bolus	If 50% dextrose solution is available, it should be diluted to make 25% by adding an equal volume of water for injection or normal saline. In adults: give 125ml of 10% dextrose OR 5ml of 25% dextrose as bolus.			A V

Where dextrose is not available, sugar water should be prepared by mixing 20g of sugar (4-level tea spoons) with 200 ml of clean water. 50 ml of this solution is given ORALLY or by nasogastric tube if unconscious.

- ***Severe anaemia:*** transfusion of packed cells if haemoglobin is equal or less than 4 g/dl and/or signs of heart failure and/or signs of respiratory distress are present.
- ***Acute pulmonary oedema:*** Check for restlessness, frothy sputum, basal crepitation, low oxygen saturation (< 95%). Prop patient up to 45 degree angle; review fluid balance and run patient on "dry side"; give diuretic (IV Furosemide) but avoiding inadequate perfusion of kidneys; set up Central Venous pressure (CVP) line, give oxygen. Intubation /ventilation may be necessary. Refer to Chapter 18 for detailed information on managing medical emergencies.
- ***Acute renal failure:*** exclude pre-renal causes, check fluid balance and urinary sodium.
- If adequately hydrated (CVP>5cm) try diuretics. Haemodialysis /hemofiltration (or if available peritoneal dialysis) should be started early in established renal failure. ***Refer*** to Chapter 18 for detailed information on managing medical emergencies..

Management of Malaria in pregnancy
Uncomplicated

- First trimester of pregnancy
  - o A: Quinine tablets (A, V) 10mg/kg eight hourly for seven days
- Second and Third trimester of pregnancy
  - o During the second and third trimesters of pregnancy Artemether-Lumefantrine (A, V) is the drug of choice.

Severe

- The management of severe malaria in pregnant women does not differ from the management of severe malaria in other adult patients.
- For further details, refer to the national malaria guidelines.

10.6 Measles

An acute, highly communicable viral infection characterised by a generalised skin rash, fever, and inflammation of mucus membrane. It is caused by measles virus, which is spread by droplet infection and direct contact.

Note: Measles is a notifiable disease in Eswatini. All cases should be reported. Call 977 immediately.

Symptoms and signs
Catarrhal stage: fever, runny nose, barking cough, misery, anorexia, vomiting, conjunctivitis, Koplik spots (diagnostic), and later, generalised maculopapular skin rash.

Desquamation stage: Diarrhoea (common), skin lesions peel off, rash fades, temperature falls.

Complications
Secondary bacterial respiratory tract infection (e.g., bronchopneumonia), Laryngotracheobronchitis, especially following diarrhea, Cancrum oris (from mouth sepsis), Otitis media, Corneal ulceration and panophthalmitis (leads to blindness), and Demyelinating encephalitis.

Differential diagnosis: German measles (Rubella)
Investigations: Clinical diagnosis is sufficient though virus isolation is possible. Investigate complications.

Pharmacological management (symptomatic)

	Medicine	Dose	Frequency	Duration	Codes
	Tetracycline eye ointment 1%	apply to the eye	Daily	5 days	A E
plus	Vitamin A po	First dose at diagnosis, 2nd dose the next day, and 3rd dose 2–4 weeks later.		4 weeks	A V

- Increase fluid intake.

Prevention: measles vaccination, and avoiding contact between infected and uninfected persons.

10.7 Poliomyelitis

An acute viral infection characterised by acute onset of flaccid paralysis of skeletal muscles. It is transmitted primarily by person-to-person contact through the faecal-oral route.

Cause
- Polio virus (enterovirus) Types I, II, and III.

Clinical features
- Majority of cases are asymptomatic; only 1% result in flaccid paralysis
- Minor illness of fever, malaise, headache, and vomiting
- May progress to severe muscle pain
- Paralysis is characteristically asymmetric
- Paralysis of respiratory muscles is life threatening (bulbar polio)
- Aseptic meningitis may occur as a complication
- Strain and intramuscular injections precipitate and may worsen paralysis

Differential diagnosis
- Guillain-Barré syndrome

10.8 Sexually transmitted infections

STIs are infections acquired through sexual activities. Different microorganisms are responsible for STIs: viral, bacterial, protozoal, and fungal.

Diagnosis
There are three approaches to STI diagnosis:
- Clinical diagnosis
- Syndromic diagnosis
- Etiological diagnosis - RPR, VDRL, TPHA, DNA amplification, swabs - depending on the type of STI

Symptoms and signs
- Depending on the sites and the type of STI (see national STI guidelines)
- Urethral discharge
- Vaginal discharge
- Genital ulcer
- Dysuria
- Genital pruritus
- Genital warts

Nonpharmacological management
- Health education on risk reduction and adherence and completion of treatment
- Condom promotion, demonstration and supply
- HIV testing and counselling (HTC)
- Male circumcision
- Notification and management of sexual partner(s)
- Follow-up visits where necessary

Pharmacological management
Refer to national STI guidelines.

Refer
- Poor response to treatment
- See national STI guidelines for complications needing referral.

10.9 Tetanus

Bacterial disease characterized by intermittent spasms (twitching) of voluntary muscles. It is caused by the exotoxin of Clostridium tetani. Tetanus spores enter the body through deep, penetrating skin wounds; the umbilical cord of the newborn; ear infections; or wounds produced during delivery and septic abortions.

Symptoms and signs
- Stiff jaw (trismus)
- Generalised spasms induced by sounds, strong light characterised by grimace (risus sardonicus)
- Arching of back (opisthotonus) with the patient remaining clearly conscious.

Differential diagnosis

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

Non-pharmacological management

- Nurse patient intensively in a quiet isolated area.
- Maintain close observation and attention to airway (intubate if necessary), temperature, and spasms.
- Insert NGT for nutrition, hydration, and medicine administration.
- For neonates, have a mucous extractor or other suction available for use as required.
- Maintain fluid balance and adequate hydration, initially by IV if required, later by NGT.
- Prevent aspiration of fluid into the lungs.
- Maintain adequate nutrition. For the neonate, use expressed breast milk via NGT.
- Avoid IM injections as much as possible; use alternative routes (e.g., NGT, rectal)

When possible—

- Change from parenteral to oral medication as soon as possible.
- Keep patient handling to a minimum to avoid provoking spasms.
- Clean wounds and remove necrotic tissues.
- For neonates, thoroughly clean umbilical area.

Pharmacological management

Adults and Children

	Medicine	Dose	Frequency	Duration	Codes
Antibiotic	Benzylpenicillin	Adults 1–2 MU; Children 50,000–100,000 IU/kg	Every 6 hours	10 days	A V
Spasm control	Chlorpromazine (A) adults:100 mg; children 12.5–25 mg alternating with Diazepam (B) adults: 2–3 mg; children 0.5–1 mg/kg by NGT every 4–6 hours				
Neutralise toxin tetanus immunoglobulin human (TIG) 150 IU/kg for adults and children IM into multiple sites. If TIG is not available, give tetanus antitoxin (anti-tetanus serum) give 20,000 IU for adults and 10 000IU for children as IV single dose (after test dose of 1,500 IU SC).					

- In children, prevent future tetanus by ensuring full course of immunisation with DPT vaccine after recovery.

Neonates—

	Medicine	Dose	Frequency	Duration	Codes
Antibiotic	Benzylpenicillin	100,000 IU/kg	Every 12 hours	10 days	A V
Spasm control	Chlorpromazine (A) 12.5-25 mg; alternating with diazepam 0.5–1 mg/kg by NGT every 4–6 hrs Diazepam (B) adults: 2–3 mg; children 0.5–1 mg/kg by NGT every 4–6 hours				
Neutralize toxin tetanus immunoglobulin human (TIG) 150 IU/kg for adults and children IM into multiple sites. If TIG is not available, give tetanus antitoxin (anti-tetanus serum) give 20,000 IUfor adults and 10 000IU for children as IV single dose (after test dose of 1,500 IU SC).					

- Prevent future tetanus: after recovery ensure full course of immunisation with DPT vaccine

Tetanus prevention

- Ensure childhood immunisation. Immunise all children against tetanus during routine childhood immunisation. See Table 10.1A.
- Use prophylaxis against neonatal tetanus—
    - o Immunise all pregnant women and women of childbearing age (15–45 years) against tetanus with TT vaccine (A*) 0.5 mL IM into the upper arm or upper outer thigh as outlined in Table 10.12.
    - o Ensure hygienic deliveries including proper cutting and care of umbilical cords.
- Use prophylaxis in patients at risk of tetanus as a result of contaminated wounds, bites, and burns.
- General measures
- Ensure adequate surgical toilet and proper care of wounds.
- Passive immunisation
    - o Give TIG:
        - Child <5 years: 75 IU IM
        - Child 5–10 years: 125 IU IM
        - Child >10 years and adult: 250 IU IM

        —OR—
    - o **Only** if TIG is not available, give tetanus toxoid (anti-tetanus serum) 1,500 IU deep SC or IM
    - o Active immunisation
        - For unimmunised or never fully immunised patients, give a full course of vaccination: three doses of TT vaccine 0.5 mL deep SC or IM at intervals of 4 weeks (A*).
        - For fully immunised patients but last booster >10 years ago, give one booster dose of TT vaccine 0.5mL deep SC or IM (A*).

Table 10.9.1 Vaccine Recommended Timing for Women of Childbearing Age and Pregnant Women

Dose	Schedule
TT1 (1st dose)	At first contact with the woman (e.g., at the first antenatal visit, or as early as possible during pregnancy).
TT2 (2nd dose)	At least 4 weeks after TT1.
TT3 (3rd dose)	At least 6 months after TT2 or as early as possible during a subsequent pregnancy.
TT4 (4th dose)	At least 1 year after TT3 or as early as possible during a subsequent pregnancy.
TT5 (5th dose)	At least 1 year after TT4 or as early as possible during a subsequent pregnancy.

Table notes:

- ***Refer*** to immunisation schedule, for general information on administration, storage, and handling of vaccines.
- Store TT at +2–8°C. Do not freeze TT.

10.10 Tuberculosis (PTB)

10.10.1 Pulmonary tuberculosis (PTB)

Key signs and symptoms of TB in adults and children

- Cough, night sweats, fever, unintended weight loss

Other possible symptoms of TB in children

- Poor weight gain/failure to thrive, history of contact with a TB case and reduced playfulness

Diagnosis of TB

The National TB control programme manual recommends the use of rapid molecar diagnostic test as the inial test in all persons presumed with TB.

Initial TB diagnostic tests

- Xpert MTB/RIF Ultra testing
- MGIT culture and DST

*For further diagnostic tests refer to the National Tuberculosis Diagnostic Algorithm within the latest National Tuberculosis Control Program Manual.

NB: HIV testing should be done to all patients presumed or confirmed to have TB.

Pharmacological management for new and previously treated patients

Adults

Table 10.10.1 Recommended treatment regimen and anti-TB drug dosages for new and previously treated TB cases

Phase of treatment Drugs		Weight in Kg			
		30-39.9	40-54.9	55-70	>70
Intensive phase of 2 months	RHZE)* (A) (150mg/75mg/400mg/275mg)	2 tabs	3 tabs	4 tabs	5 tabs
Continuation phase of 4 months	(RH)* (A) (150mg/75mg)	2 tabs	3 tabs	4 tabs	5 tabs

Source: Extracted from the National Tuberculosis Control Programme Manual, 2019

*Fixed-dose combination (FDC) drugs
All patients should be given Vitamin B6 (Pyridoxine) (A) for the whole duration of treatment.

Table 10.10.2 Treatment of TB disease in children

Weight bands	Intensive phase		Continuous phase	How to prepare medication
	(RHZ) * (A) (75/50/150mg)	E (A) (100mg)	(RH) * (A) (75/50mg)	Dissolve the tablet(s) of RHZ in 10-20 ml of safe drinking water. Once fully dissolved, mix in the completely crushed tablet(s) of Ethambutol and give ALL of this solution to the child.
<2kg	¼	¼	¼	
2-3kg	½	½	½	
3-3.9kg	¾	¾	¾	
4-7.9kg	1	1	1	
8-11.9kg	2	2	2	
12-15.9kg	3	3	3	
16-24.9kg	4	4	4	
Vit B6 (A)	Give 1-2 mg/kg			
Ethambutol is not dissolvable: crush before adding to solution				

Source: Extracted from the Guidelines for the Management of Tuberculosis in children and adolescents, 2019.

*Fixed-dose combination (FDC) drugs
*Children above 25kg use adult dosing.

Pharmacological management for TB/HIV co-infected patients

- For all TB/HIV co-infected patients who are on TB treatment give
- Cotrimoxazole (A) prophylaxis

The recommended first-line ART regimen for adults and adolescents in Eswatini is a once-daily fixed-dose combination of:
TLD (A) PLUS Single dose DTG (50 mg) (A) after 12 hours
**Note*: DTG is taken twice a day

Contact Investigation

This is the process of finding, notifying, screening and treating persons who might have latent TB infection or TB disease as a result of recent contact with a person diagnosed with TB disease.

Pharmacological management of TB contacts

All children household contacts or close contacts of TB patients who do not have active TB disease should be offered TB Preventive Therapy (TPT).

Refer to the Standard Treatment Guidelines HIV Chapter for treatment options

10.10.2 Extrapulmonary TB

Symptoms and signs are the same as in PTB, but they could be specific depending on the site of the infection.

Common Types of extra-pulmonary TB

- TB lymphadenitis, pleural TB, TB meningitis, abdominal TB, pericardial TB, TB of the bones, miliary TB.

Diagnosis of Extra-pulmonary TB

- TB lymphadenitis, pleural TB, TB meningitis, abdominal TB, pericardial TB, TB of the bones, miliary TB.

Diagnosis of Extra-pulmonary TB

Diagnosis depends on the site of the organ. Treatment* is similar as in PTB, however there are exceptions such as; TB meningitis, TB pericarditis, TB of the bones and TB in pregnancy.

*For detailed information, refer to the latest National Tuberculosis Control Programme Manual.

10.10.3 Drug-resistant tuberculosis (DR-TB)

DR-TB cases are classified in different types based on drug susceptibility testing (DST) of clinical isolates confirmed to be M. tuberculosis. According to the WHO 2018/2019 DR-TB guidelines the classification based on resistance includes:

- **Mono-drug resistant TB:** resistance to one of the first-line medicines only.
- **Poly drug resistant TB (PDR):** resistance to more than one of first-line medicine other than both rifampicin and isoniazid together.
- **Multi drug resistant TB (MDR-TB):** resistance to at least isoniazid and rifampicin.
- **Pre-XDR-TB:** resistance to either fluoroquinolone or injectable in addition to multi drug-resistance
- **Fluoroquinolone drug-resistance (FDR)**: resistance to any fluoroquinolone in addition to multi drug-resistance.
- **Extensively drug resistant TB (XDR-TB**): resistance to both fluoroquinolone and injectable in addition to multi drug-resistance.
- **Rifampicin Resistance (RR)**: resistance to rifampicin detected using phenotypic or genotypic methods, with or without resistance to other anti-TB drugs. It includes any resistance to rifampicin, in the form of mono-resistance, poly-resistance, MDR, Pre-XDR and XDR.
- **Presumptive DR-TB patient**: Symptomatic patients with significant risk or with history of contact with a patient diagnosed of DR-TB and has been started on treatment in the absence of confirmed laboratory diagnosis, mostly in children.

Extracted from the National Guidelines for the Medical Management of Drug-Resistant Tuberculosis, 2019.

Diagnosis includes laboratory tests

- Xpert MTB/RIF Ultra testing
- MGIT culture and DST

For further diagnostic tests refer to the latest version of the National TB Diagnostic Algorithm.

Pharmacological management

- MDR-TB—Treatment initiation should only be done at accredited MDR sites.

Table 10.10.3 Classification (groups) of second line anti-tuberculosis drugs

Group	Medicines
Group A: Include all three medicines (unless they cannot be used)	Levofloxacin (Lfx) (S) **OR**
	Moxifloxacin (Mfx) (S)
	Bedaquiline (Bdq) (S)
	Linezolid (Lzd) (S)
Group B: Include both medicines (unless they cannot be used)	Clofazimine (Cfz) (S)
	Cycloserine (Cs) (S) **OR**
	Terizidone (Trd) (S)
Group C: Add to complete the regimen and when medicines from Groups A and B cannot be used	Ethambutol (E) (A)
	Delamanid (Dlm) (S)
	Pyrazinamide (Z) (A)
	Imipenem-cilastatin (Ipm-Cln) (S) **OR**
	Meropenem (Mpm) (S)
	Amikacin (Am) (B)
	(**OR** Streptomycin) (S) (S)
	Ethionamide (Eto) (S) **OR**
	Prothionamide (Pto) (S)
	P-aminosalicylic acid (PAS) (S)

Extracted from the National Guidelines for the Medical Management of Drug-Resistant Tuberculosis, 2019.

Table 10.10.4 The model regimens for Adults with DR-TB

Number	Type of patient	Proposed regimen (Note: BDQ should be given for 24 weeks)
1.	INH mono	6RZE
2.	PDR/RR/MDR-TB (adults) standard	6 Lfx[1]. , Bdq[2], Lzd[3], Cfz, Trd **12-14** Lfx, Lzd, Cfz, Trd[4]
3.	MDR+FQ Resistant TB(New)	6 Bdq, Lzd, Dlm, Cfz, Trd (Z or E) **12-14** Lzd, Dlm, Cfz, Trd (Z or E) [5]/
4.	MDR-TB treatment failure	**Individualised regimen according to DST and drug history** ***Send to Expert committee for advice.***
5.	HIV co-infected	Same as for PDR/RR/MDR-TB, MDR+FQ Preferred ART regimen is TDF/3TC/DTG
6.	EP MDR-TB	Same as RR/MDR, MDR+FQ resistance
7 (a)	Shorter MDR-TB regimen – Current with Amikacin	**4-6** (Am-Mfx[h]-Pto-Cfz-Z- H[h]-E) / **5** (Mfx-Cfz-Pto-Z-E)
7 (b)	All oral Shorter MDR-TB regimen (complete change with group A, B and C drugs)	**9-12** Bdq-Lfx-Lzd-Dlm-Cfz (9 months if converted by 4 months) – **under operational research setting.**

Table 10.10.5 Detailed information for INH Mono and Poly drug resistance TB

Type of patient	6 (H)RZE
H-r TB (with positive culture/smear at 2 months or culture reversion in continuation phase)	MDR TB regimen, while further DST (phenotypic/genotypic) results are being awaited.
H and E(±S) H and Z(±S) H,E,Z(±S)	MDR TB regimen

For children refer to the latest Guidelines for the Management of Tuberculosis in Children and Adolescents. All patients should be given vitamin B6 (Pyridoxine) (A) for the whole duration of treatment.

Adjuvant Therapy

- The adjuvant use of corticosteroids in DR-TB patients has been shown to reduce mortality and can be beneficial in conditions such as severe respiratory insufficiency, and central nervous system, pericardial involvement and laryngeal TB.

	Medicine	Dose	Frequency	Duration	Codes
	Prednisolone po	Starting at approximately 1-2 mg/kg and gradually decreasing the dose to a total daily dose of 10 mg when a long course is indicated.			B V

- Nutritional Support

The following are some specific options (adult doses) for nausea and vomiting:

	Medicine	Dose	Frequency	Duration	Codes
1st option	Metoclopramide po or IM/I	Every 4 to 6 hours as needed, given 30 minutes before morning and/or afternoon dose of anti-TB drugs			B E
2nd option	Promethazine po or IM	12.5 to 25 mg	30 minutes before the dose and every 6 hours as needed		A V
3rd option	Ondansetron po	8 mg 30 minutes before the morning dose and again 30 minutes before evening dose			S E

Pharmacological management for TB/HIV co-infected patients
TLD (A), PO, once daily plus DTG (50mg)

For all TB/HIV co-infected patients who are on TB treatment give:
Co-trimoxazole (A, V) prophylaxis.

10.11 Typhoid fever (enteric fever)

It is an acute systemic disease resulting from infection by Salmonella typhoid and S.paratyphi, serovar group A and B respectively. Infection is acquired through ingestion of contaminated food and water. Following treatment, about 10% of patients relapse and up to 3% become chronic carriers of the infection.

Diagnostic criteria

- Fever, severe headache, abdominal and muscle pains (myalgia)
- Delirium, obtundation, intestinal hemorrhage, bowel perforation,
- Sequela neuropsychiatric complications Plus

- Laboratory evidence of positive cultures from bone marrow aspirates; blood or stool done within 1 week of acute infection OR
- Serological evidence of rising high titers above 1:160 (Widal test), OR
- Indirect fluorescent VI antibody, ELISA for immunoglobulin M (IgM) and IgG antibodies to S Typhi polysaccharide.

Symptoms and signs
- Gradual onset of chills and malaise, headache, anorexia, epistaxis, and back- ache, usually occurring 10–15 days after infection
- Abdominal pain and tenderness are prominent features
- Temperature rises in steps
- Relative bradycardia
- Delirium and stupor
- Tender splenomegaly (common)

Note: A single positive screening does not indicate presence of infection.

Nonpharmacological management
Ensure adequate rehydration

Pharmacological management for new infections
Adults—

Pharmacological management for chronic carriers
- Treat for 4–6 weeks.

	Medicine	Dose	Frequency	Duration	Codes
	Co-trimoxazole po	Adult 960mg; children 24 mg/kg	Every 12 hours	3 days	A V
or	Chloramphenicol IM/V or po	Adults 1g; children 25 mg/kg	Every 6 hours	10–14 days	C E
	Ciprofloxacin po	Adults 500–750 mg; children 10–15 mg/kg **Caution**: Contra-indicated in pregnancy	Every 12 hours	5–14 days	A V

Children—

	Medicine	Dose	Frequency	Duration	Codes
	Ciprofloxacin po	500–750mg Contra-indicated in pregnancy	Every 12 hours	4-6 weeks	A V
or	Amoxicillin po	250mg	Every 8 hours	4-6 weeks	A V
In penicillin allergy	Erythromycin po	500mg	Every 6 hours	4-6 weeks	A V

Prevention
- Proper faecal disposal
- Use of safe clean water for drinking
- Good personal hygiene, especially hand washing
- Good food hygiene

10.12 Coronavirus disease

Coronavirus disease (COVID-19) is a disease that is characterised by severe acute respiratory syndrome (SARI) and is caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) formerly called the novel Coronavirus (nCov19). For management of COVID-19 always refer to the latest national guidelines as it is a novel virus and information is evolving. Information for this section was mostly taken from the Version 2 2020 edition of Eswatini Covid-19 Clinical Case Management Guidelines.

Presentation may vary from asymptomatic infection to mild illness to moderate illness to severe illness and critical illness.

Common signs and symptoms include fever and/or chills, difficulty in breathing, shortness of breath Cough (dry of productive), sore throat, muscle and joint pain, headache, and other cold-like symptoms.

Less common symptoms may include diarrhea, nausea and vomiting, lack of smell or taste and delirium.

ASYMPTOMATIC OR PRESYMPTOMATIC INFECTION

Clinical presentation
Patients have positive SARS-CoV-2 results yet do not have any signs or symptoms

Management

- Assess whether patient qualifies for home care isolation or hospital isolation
- Counsel patient on IPC measures and seeking medical attention if they become symptomatic.
- NO need for additional laboratory testing, NO specific treatment
- Monitor patient's temperature daily and request reporting of any symptoms as soon as possible.

MILD ILLNESS- uncomplicated upper respiratory tract infection

Clinical presentation: fever, fatigue, cough (with or without sputum), headache, sore throat, nasal congestion and/or anosmia. Elderly and immunosuppressed may present with atypical symptoms.

Signs and Symptoms

- SpO_2 ≥94%, Respiratory rate <20 b/min, Heart rate <100b/min, Temp 36-38.5°C, Mental status normal

Management:

- Assess patient if they qualify for home care isolation hospital isolation.
- All patients with symptomatic COVID- 19 and risk factors for severe disease should be closely monitored (elderly with co-morbidities). These patients can progress VERY RAPIDLY.
- Patient should be provided with symptomatic treatment (e.g. Paracetamol for fever)
- Use of antibiotic therapy or prophylaxis is NOT recommended.
- Counsel patient on seeking medical attention if symptoms worsen and respiratory distress occurs.
- NO need for additional laboratory testing.

MODERATE ILLNESS – Mild pneumonia often with localised chest pain, dullness to percussion and crepitations.

Clinical presentation: fever, respiratory symptoms such as cough, shortness of breath and fast breathing. No hypoxia on room air but there can be localised chest pain and dullness to percussion and crepitations.

Signs and symptoms

- SpO_2 ≥94%, RR <30b/min, HR <120b/min, Temp 36-38.5°C, Normal Mental Status, no oxygen requirement.

Management:

- Clients should be admitted as pulmonary disease can rapidly progress in patients with COVID-19.
- Provide symptomatic treatment.
- If bacterial pneumonia or sepsis is strongly suspected:
    - start empiric antibiotics as for community-acquired pneumonia,
    - re-evaluate daily,
    - if no evidence of bacterial infection, stop antibiotics

SEVERE ILLNESS – severe pneumonia

Clinical presentation:

Fever and/or at least one of the criteria for severe pneumonia. Patient becomes anxious and agitated as they become hypoxic; laboured breathing with intercostal recession.

Signs and symptoms

- RR >30b/min, Severe respiratory distress, SpO_2 < 93% on room air

Management:

- Admit to dedicated isolation room
- Closely monitor patients for signs of clinical deterioration: rapidly progressive respiratory failure or sepsis.
- Use conservative fluid management when there is no evidence of shock.
- Give empiric antibiotics within 1 hour of initial assessment for patients with sepsis.
- Empiric therapy should be de-escalated based on microbiology results and clinical judgment:
    - Community acquired pneumonia: Amoxicillin with Clavulanic Acid or Ceftriaxone
    - Atypical pneumonia: Doxycycline, Erythromycin or Azithromycin *(see Section 15.8)*
- Do NOT ROUTINELY GIVE CORTICOSTEROIDS
- Consider dexamethasone 4 mg IV BD for 10 days
- Give supplemental oxygen therapy:
    - Nasal cannula: provides FiO_2 25-40% at 1-5L/min
    - Simple Face mask: provides FiO_2 40-60% at 6- 10L/min
    - Face mask with reservoir bag: provides FiO_2 60 - 95% at 10-15L/min
- Do NOT delay oxygen therapy and watch out Acute respiratory Distress Syndrome

CRITICAL ILLNESS

- CLINICAL SYNDROME: Acute respiratory distress syndrome (ARDS)

Clinical presentation:

- Onset: within 1 week of a known clinical insult or worsening of respiratory symptoms
- Severe hypoxemic respiratory failure: Patient in severe respiratory distress and failing with standard oxygen therapy.

Signs and symptoms:
- Respiratory distress
- Chest imaging: bilateral opacities not explained by volume overload, nodules or lung collapse
- Oxygenation impairment: PaO_2/FiO_2 - < 300 or SpO_2/FiO_2 - < 315

Management

- Mild to moderate ARDS (PaO_2/FiO_2 - < 300 but > 100): consider use of high-flow nasal oxygen (HFNO) or non-invasive continuous positive airway pressure (CPAP).
- Encourage prone position.
- If worsening or in Severe ARDS (PaO_2/FiO_2 - < 100): strongly consider endotracheal intubation and invasive mechanical ventilation.
- Use protective lung strategies – Low Tidal Volume, High PEEP in low lun compliant patients with severe ARDS.
- Prone ventilation for 12-16 hours/day when safe, is recommended.
- Use conservative fluid therapy in patients with ARDS without tissue hypoperfusion
- All patients needing oxygen therapy should be given dexamethasone.

CRITICAL ILLNESS

Clinical syndrome: Sepsis and/or septic shock.

Clinical presentation: severe sepsis and septic shock in adults when infection is suspected or confirmed.

Signs and symptoms
- Hypotension - SBP<100mmHgorMAP<65 mmHg or SBP decrease of > 40mmHg off baseline.
- Persistent hypotension despite fluid resuscitation
- Signs of target organ dysfunction: Altered mental status, tachypnea, hypoxia, oliguria, tachycardia, poor perfusion, hypotension, skin mottling, coagulopathy, thrombocytopenia, acidosis, high lactate, or hyperbilirubinemia.

Management

Fluid management
- Septic shock requires fluid resuscitation with bolus of crystalloids e.g. Ringers Lactate: Adult Bolus: 20 – 30 ml/kg, Children Bolus: 10 – 20ml/kg, run for 30 – 60 minutes
- Target MAP > 65mmHg and serum lactate level between 0.5-1 mmol/L
- If not achieved with fluid resuscitation alone, start vasopressors. Vasopressor of choice is norepinephrine, if not available epinephrine, preferably through central line; if not available, large bore peripheral IV but monitor for extravasation.
- Hourly monitoring of vital signs and ventilation.

- Interventions to prevent complications associated with critical illness should be implemented as per ICU protocols. These should include DVT prophylaxis with low molecular weight heparin (clexane) or unfractionated heparin.

THERE IS NO CURRENT EVIDENCE FROM RCTS TO RECOMMEND ANY SPECIFIC ANTI-NCOV TREATMENT FOR PATIENTS WITH SUSPECTED OR CONFIRMED 2019-NCOV INFECTION.

CHAPTER 11

MUSCULOSKELETAL CONDITIONS

11.1 Gouty Arthritis

11.1.1 Acute Gouty Arthritis

Symptoms and signs
- Severe pain in a single joint usually the 1st metatarsophalangeal joints (MTPJ) often nocturnal.
- Swelling, erythematous, warm and tender.
- Often polyarticular in patients with hypertension treated with HCTZ and alcohol abuse.

Investigations
- Serum uric acid levels > 0.48mml/L.
- Renal function tests
- X-ray of affected joint-periarticular erosions, cliff sign.

Pharmacological Treatment

First line

	Medicine	Dose	Frequency	Duration	Codes
	Ibuprofen po	400mg	Three times a day	5 days	A E
and	Diclofenac po	50mg	Three times a day	5 days	B E
or	Colchicine po	0.5-1 mg 4-6 hrly for 3 days but <6mg a day or until GIT symptoms develop, do not repeat course within 3 days			A N
and	Allopurinol po	100-200mg daily. Increase to maintenance dose of 300-600mg.	Once a day below 300mg. Twice daily for doses above 300mg.	30 days	A E
		Increase dosage if uric acid levels are above 0.5mmol/L then reduce when levels fall below 0.48mmol/L.			

Second line

	Medicine	Dose	Frequency	Duration	Codes
	Piroxicam po	10-20mg	Once a day	5-7 days	B E
in peptic ulcer disease	Meloxicam po	7.5-15mg	Once a day	5-7 days	C E

Refer to hospital if no improvement in acute phase where opioids can be considered or if becomes chronic.

Nonpharmacological Treatment
- Rest and elevation of affected joint during early acute phase
- Reduce weight if obese
- Increase fluid intake (2-3 liters of water a day)
- Avoid alcohol and red meat
- Change from HCTZ to other drug for hypertension

11.1.2 Chronic Gouty Arthritis

Chronic gouty arthritis is gout with one or more of symptoms and signs listed below.
- Many acute attacks (more than four a year)
- Tophi (elbows, ear lobes, finger and toe joints)

- Bony destruction and joint deformities
- Poor renal function, renal stones
- Persistent uric acid levels > 0.5mmol/L

Treatment
- ***Refer*** all patients to hospital.

11.2 Osteoarthritis

Osteoarthritis is a chronic disorder of synovial joints in which there is progressive softening and degeneration of articular cartilage.

Causes
- Increases with age
- Genetic
- Anatomic variations-acetabular dysplasia, post trauma to joints, spinal deformities, malalignment
- Post joint sepsis, occupational and recreational, bone density and obesity
- Primary (idiopathic)

Symptoms and signs
- Pain-worse with activity/cold weather and relieved by rest
- Difficulty with activities of daily living, occupational and recreational activities
- Stiffness, instability, locking, swelling, muscle wasting
- Heberden's or Bouchard's nodes on finger joints
- Deformity, tenderness, normal temperature, crepitus and reduced range of movement

Investigations
- X-ray-joint space narrowing, subchondral sclerosis, marginal osteophytes, subchondral cysts and bone remodeling.
- Arthroscopy

Treatment
- Aim-maintain movement and muscle strength, protect joint from overload, relieve pain and modify activities.

Nonpharmacological
- Reduce weight, physiotherapy, advise patients to keep joints warm
- Walking aid and joint support-bracing

Pharmacological Treatment

First line

	Medicine	Dose	Frequency	Duration	Codes
	Ibuprofen po	400mg	Three times a day as necessary	For life	A E
or	Diclofenac po	500mg	Three times a day as necessary	For life	B E
and	Paracetamol po	500mg-1g	Three times a day as necessary	For life	A E

Second line

	Medicine	Dose	Frequency	Duration	Codes
	Piroxicam po	10-20mg	Once a day when necessary	For life	B E
in peptic ulcer disease	Meloxicam po	7.5-15mg	Once a day when necessary	For life	C E
and	Paracetamol po	500mg -1g	Three or four times a day as necessary	For life	A E

Narcotic/opioid analgesia may be given for severe pain.
Refer patients nonresponsive to conservative treatment to hospital for possible surgical management

11.3 Osteomyelitis

Osteomyelitis is bacterial infection of the bone cortex and bone marrow. The infection is spread through 3 main routes- hematogenous (mainly), contiguous and direct inoculation.
Most infecting organism is S aureus and Salmonella in sickle cell disease.

Symptoms and signs
- Fever, swelling, erythema
- Pain, limp, inability to bear weight
- Scars/ pus discharging sinuses and deformity in chronic cases
- Tenderness and warmth
- Pseudoparalysis in neonates

Investigations
- FBC-elevated white cell and neutrophil count
- CRP elevated in acute cases
- ESR elevated in chronic cases
- Needle aspirate
- Blood culture
- Bone tissue cultures and biopsy diagnostic
- X-ray –changes evident after 10-14 days with periosteal reaction
- MRI scan highly sensitive (97%)
- Bone scan good for multifocal disease

Treatment
Nonpharmacological
- Pain and fever management
- Refer all patients to hospital
- Blood and culture samples before antibiotic therapy
- Surgical drainage of pus collection and send for culture and sensitivity
- Splint affected limb in functional position

Pharmacological Treatment
First line

	Medicine	Dose	Frequency	Duration	Codes
	Cloxacillin IV	2g stat, then 500mg iv four times a day for 2 weeks, then 500mg orally four times a day for four weeks			A E
in penicillin allergy	Erythromycin po	500mg	Four times a day	6 weeks	A E

Second line

	Medicine	Dose	Frequency	Duration	Codes
	Clindamycin iv 600mg 8hrly for adults and children 3-6mg/kg/dose iv 6hrly for patients allergic to penicillin for 2 weeks then oral for 4 weeks				B V
or	Vancomycin adult dose 15-20mg and children 15mg/kg iv 12hrly for methicillin resistant Staphylococcus aureus and patients allergic to penicillin for two weeks.				S E

- Change antibiotic according to culture results
- Monitor treatment response by weekly CRP
- Length of treatment controversial; continue until CRP is normal
- ***NB***! Surgical debridement is recommended for chronic osteomyelitis unless patient is not fit for surgery then antibiotic suppression may be given.

Complications
- Septic arthritis
- Disseminated osteomyelitis
- Pathological fracture
- Malignant transformation

11.4 Pyomyositis

Infection of skeletal muscle mass with a deep-seated pus (sub fascial) collection.

Causes
- Bacterial infection (commonly S aureus)
- Trauma
- Immunocompromise

Symptoms and signs
- History of trauma or immunocompromising condition
- Fever, pain, swelling and erythema over involved muscle
- Warm and tender, fluctuant or tense mass and reduced range of movement
- Pseudoparalysis in young children

Differential diagnosis
- Cellulitis, boils and osteomyelitis

Investigation
- FBC and Culture and Sensitivity
- Pus aspirate Culture and Sensitivity

Treatment

Non-pharmacological
Elevate and immobilise affected limb

Pharmacological Treatment

	Medicine	Dose	Frequency	Duration	Codes
	Cloxacillin IV	2g iv 6 hrly adults and children 25mg/kg body weight iv in 4 divided doses for 5-10 days.			A E
in penicillin allergy	Erythromycin po	500mg po 6 hrly for adults and 15mg/kg body weight po in 4 divided doses for 5-10 days if allergic to penicillin.			A E

Change antibiotic according to culture results.

11.5 Rheumatoid arthritis (RA)

RA is a chronic systemic inflammatory, disease characterised by joint pain, swelling and joint destruction. The cause is not known, the fundamental mechanism is dysregulation of the immune system (autoimmunity).

Symptoms and signs

- Typically women of 30-40 years
- Early morning stiffness that improves with activity
- Symmetrical small joint involvement
- Pain and loss of mobility of proximal joints of the hand mostly and the feet
- Weight loss, weakness, swelling and joint deformity, deformity of spine, hands and feet
- Bouchard's nodes, rheumatoid nodules, spindle shaped fingers, atrophy of the skin and muscles

Investigations

- X-rays- soft tissue swelling, periarticular osteopenia, joint destruction
- Chest X-ray
- Rheumatoid factor (Positive in 80% of patients with RA)
- CRP and ESR
- Renal function tests and synovial biopsy

Treatment

Nonpharmacological

- Rest, occupational and physiotherapy
- Assistive devices for occupational and activities of daily living

Pharmacological

- Nonsteroidal anti-inflammatory drugs and analgesics to control inflammation and pain respectively.
- All patients to be referred to hospital for treatment by specialists with disease modifying anti-rheumatic (DMARDs) agents to minimise joint erosions and deformities and other systemic complications.

11.6 Septic arthritis (pyogenic arthritis)

Septic arthritis is an inflammatory joint disease caused by bacteria, mainly S aureus and Salmonella in sickle cell disease. It is spread by hematogenous route from distant areas of sepsis, contiguous and direct inoculation. Most commonly spread by hematogenous route.

Symptoms and signs

- History of trauma/spontaneous onset
- Fever, pain, inability to bear weight on affected limb, pseudoparalysis in neonates, joint swelling held in partial flexion, limp, warm and tender joint, fluctuant or tense swelling and limited range of movement.

Investigations
- Full blood count-elevated white cell count and neutrophils
- CRP and ESR elevated
- Blood culture
- Joint pus aspirate (gold standard)-MC&S
- Ultrasound to detect joint effusions
- X-ray-no changes early, widened joint space later, articular cartilage erosions in young children
- MRI to detect effusion and associated osteomyelitis

Treatment
Nonpharmacological
- Splint joint in functional position

Pharmacological
- Refer to osteomyelitis
- Refer all patients to hospital for surgical drainage (arthrotomy)

Complications
- Osteomyelitis, disseminated septic arthritis and septicemia

11.7 Back strain

Back strain is strain or micro tear of the muscles and ligaments of the lumbosacral area. It is caused by straining during lifting/pushing/pulling heavy objects, bending or twisting.

Symptoms and signs
- Predisposing event-trauma, heavy lifting or vigorous activity
- Pain in lumbosacral area worsened by activity, sitting and standing for a long period
- Tenderness over lumbosacral area

Investigations
- Lumbosacral X-ray to rule out fractures and other pathological causes.

Management
Nonpharmacological
- Rest (bedrest not >3 days)
- Avoid aggravating activities like heavy lifting, sitting or standing for long periods, twisting and bending
- Sleep on firm mattress, sit upright, apply heat to back and keep warm, use proper body mechanics during activity
- Physiotherapy and lumbosacral orthosis

Pharmacological Treatment

First line

	Medicine	Dose	Frequency	Duration	Codes
	Ibuprofen po	400mg	Three times a day as necessary	1-2 weeks	A E
or	Diclofenac po	50mg	Three times a day as necessary	1-2 weeks	B E
or	Diclofenac suppositories	100mg	Twice daily when necessary	1-2 weeks	B E
and	Paracetamol po	500m-1g	Three or four times a day as necessary	1-2 weeks	A E

Second line

	Medicine	Dose	Frequency	Duration	Codes
	Piroxicam po	10-20mg	Once a day when necessary	1-2 weeks	B E
in peptic ulcer disease	Meloxicam po	7.5-15mg	Once a day when necessary	1-2 weeks	C E
and	Paracetamol po	500mg-1g	Three or four times a day as necessary	1-2 weeks	A N

To avoid addiction, do not give narcotic/opioid analgesics during acute phase for more than five days.

NB: Refer to hospital if the following red flags are present: -

- Recent significant trauma, unexplained weight loss, fever and night sweats, immunosuppression
- Previous or current history of cancer
- IVI drug user, chronic steroid use
- Age>70 or < 20 years
- Duration more than 6 weeks
- Cauda equina syndrome

CHAPTER 12

NUTRITIONAL CONDITIONS

12.1 Malnutrition

Malnutrition refers to deficiencies, excesses or imbalances in a person's intake of energy and/or nutrients. The term malnutrition covers 2 broad groups of conditions. One is 'undernutrition'—which includes stunting (low height for age), wasting (low weight for height), underweight (low weight for age) and micronutrient deficiencies or insufficiencies (a lack of important vitamins and minerals). The other is over nutrition which leads to overweight, obesity and diet-related non-communicable diseases (such as heart disease, stroke, diabetes and cancer).

Undernutrition

There are 4 broad sub-forms of undernutrition: wasting, stunting, underweight, and deficiencies in vitamins and minerals. Low weight-for-height is known as wasting. It usually indicates recent and severe weight loss, moderately or severely wasted has an increased risk of death, but treatment is possible.

Overnutrition

Overweight and obesity is when a person is too heavy for his or her height. Abnormal or excessive fat accumulation can impair health. Body mass index (BMI) is an index of weight-for-height used to classify overweight and obesity.

12.1.1 Severe Acute Malnutrition (SAM)

Diagnosis

Table 12.1 Diagnostic criteria for SAM in children aged 6-59 m0nths months (any one of the following):

Indicator	Measure	Cut-Off
Severe wasting	Weight-for-Height z-score (WHZ)	<–3
	Mid Upper Arm Circumference (MUAC)	<11.5 cm
Bilateral nutritional oedema	MDR+FQ Resistant TB (New)	

Where a suitable measuring device is not available the following less sensitive findings would also indicate the need to manage as severe acute malnutrition:

- **Severe underweight**
  - o WHZ< –3(usually clinically reflective of marasmus) where no other explanation is present, and/or
  - o clinically severe wasting (usually clinically reflective of marasmus – thin arms, thin legs, "old man" appearance, baggy pants folds around buttocks, wasted buttocks).

- Exception
  - o Babies who are premature and low birth weight and are growing parallel to or better than the z-score lines, should not be classified as wasted.

12.1.2 Complicated SAM

Any child with SAM who has any ONE of the following features:

- <6months of age or weighs <3 kg.
- Pitting oedema.
- Refusing feeds or is not eating well.
- Any of the danger signs listed below.

Danger Signs
- Dehydration
- hypoglycaemia
- vomiting
- hypothermia
- respiratory distress (including fast breathing)
- convulsions
- not able to feed
- shock
- lethargy (not alert)
- jaundice
- weeping skin lesions
- bleeding

> All children with complicated SAM are at risk of complications or death.
> ***Refer*** urgently! Stabilise before referral.

Initiate treatment while waiting for transport to a facility that offers inpatient (ITP) management of SAM.

General measures
- Keep the child warm.
- Test for and prevent hypoglycaemia in all children.

If the child is able to swallow:
- If breastfed: ask the mother to breastfeed the child, or give expressed breastmilk.
- If not breastfed: give a breastmilk substitute. Give 30–50 mL before the child is referred.
- If no breastmilk substitute is available, give 30–50 mL of sugar water. To make sugar water: Dissolve 4 level teaspoons of sugar (20 g) in a 200 mL cup of clean water.
- Repeat 2 hourly until the child reaches ITP.

If the child is not able to swallow:
- Insert a nasogastric tube and check the position of the tube.
- Give 50 mL of milk or sugar water by nasogastric tube (as above).
- Repeat 2 hourly until the child reaches ITP.

If blood sugar < 3 mmol/L treat with:
- 10% Glucose:
- Nasogastric tube: 10 mL/kg.
- Intravenous line: 2 mL/kg.

> ***Caution***
> In malnutrition, if IV fluids are required for severe dehydration/shock. Once stable continue with ORS orally or by nasogastric tube.

Treatment of SAM with medical complications

- Medical treatment and nutrition rehabilitation treatment is done in three phases namely stabilisation, transition and rehabilitation following an adapted WHO SAM treatment protocol

The TEN Steps of General Routine Care The process of successful in patient management of patient with SAM involves the following steps:

- *Step 1:* Treat/prevent hypoglycemia
- *Step 2:* Treat/ prevent hypothermia
- *Step 3:* Treat/prevent dehydration
- *Step 4:* Correct electrolyte imbalances
- *Step 5:* Treat/prevent infections
- *Step 6:* Correct micronutrient deficiencies
- *Step 7:* Start cautious feeding
- *Step 8 :* Achieve catch up growth
- *Step 9*: Provide sensory stimulation and emotional support
- *Step 10:* Prepare for follow up after recovery

Cautious feeding in stabilisation and transition phase to prevent death, start feeding cautiously as soon as possible with small amounts of F-75, the "starter" formula until the child is stabilised.

- On the first day, give small amount of F-75 every 2 hours (12 feeds in 24 hours.).If the child is hypoglycemic, give ¼ of the 2-hourly amount every half-hour for the first 2 hours or until the child's blood glucose is at least 3 mmol/l. feed also during the night.

- After the first day, give feeds every 3 hours.
  - Given the child's starting weight and the frequency of feeding, use a table to look up the amount needed per feed
  - If no oedema/oedema grade + and ++ give F75 130 ml/kg/day of F75
  - This amount of F-75 will give the child 100 kcal/kg/day and 1 to 1.5 g protein/kg/day. This amount is appropriate until the child is stabilised.

- If with oedema is +++, give 100 ml/kg/day for the amount of feed to give according to the patient's weight)
  - Feeding the child each child's feeding plan should be recorded on a 24-Hour Food Intake Chart
  - Feed with a cup and a saucer (and spoon, if needed). Encourage the child to finish the feed.
  - Feed a very weak child with a dropper or syringe. Do not use a feeding bottle.
  - never leave the child alone to feed.
  - Encourage breastfeeding. Ensure that the child still gets the required feeds of F-75 even if breastfed.

- Feeding children who have diarrhoea and vomiting
  - If child vomits during or after a feed, estimate the amount vomited and offer that amount of feed again.
  - If child keeps vomiting, offer half the amount of feed twice as often. For example, if the child is supposed to take 40 ml of F-75 every 2 hours, offer half that amount (20 ml) every hour until vomiting stops.

- Nasogastric tube (NGT) feeding

  - Use NGT feeding if child very weak, has painful mouth ulcers, does not take 80% of the feeds for 2-3 consecutive feeds, has pneumonia, has cleft lip/ palate or shows disturbed level of consciousness.
  - At each feed, give the F-75 orally first, then give the remaining amount by NGT.
  - Remove the NG tube when the child takes 80% of the day's amount orally or two consecutive feeds fully by mouth.
  - Record intake and output on a 24-Hour Food Intake Chart
- Transition Phase
  - Transition prepares patients for the rehabilitation/catch up growth phase
  - During this phase, the dietary treatment changes.
  - The duration of treatment in the transition phase is two-to-three days on average and involves:
    - Recognising readiness for transition by return of appetite (easily finishes 3hourly feeds of F75), reduced / minimal oedema (+ /++).
    - Beginning giving RUTF slowly and gradually by performing an acceptance test.
    - Transitioning children from F-75 to RUTF, using any of the two approaches
- Transfer from Transition back to Stabilisation phase if;
  - Re-occurrence/deteriorating of medical complications
  - Loss of appetite and not taking 80% of the prescribed feeds
  - Increasing /development of oedema
  - Significant re-feeding diarrhoea resulting in weight loss
- Progression from Transition to OutPatient Care (OTP)
  - The criteria for transfer from transition to OTP is based on improvements in the child's condition. For children 6-59 months referral to outpatient care to continue treatment until full recovery the following is considered:
  - Good appetite (if the patient passes the acceptance test and takes more than 80 percent of the daily ration of RUTF)
  - Reduced/minimal/no oedema (++/+/no oedema)
  - Medical complications have been resolved
  - Clinically well and alert

- **Step 8:** Achieve 'Catch Up Growth'
  - This phase is marked by increased feeding to recover weight loss: or "Catch-up growth" and should take place in OTP.
  - If an outpatient programme on management of severe malnutrition is in place:
  - Transfer patient to nearest OTP, close to where she lives for rehabilitation when taking the entire amount of RUTF proposed during transition (at least 150 kcal / kg / day).
- Before leaving,give a ration of RUTF(Plumpy Nut) for a week to the caregiver.
- If no programme for outpatient management of severe acute malnutrition is available:
  - Feed freely with F-100 during rehabilitation for at least 150 kcal/kg/day to an upper limit of 220 kcal/kg/day
  - Feed every 3 hours within the range shown on the F-100 Look up Table.
  - Use child's current weight to determine the appropriate range of F-100 for each day.
  - Do not exceed the maximum range for the child's current weight.

12.1.3 Uncomplicated SAM

Children with SAM who meet the following criteria:

- The child is > 6 months of age and weight > 3 kg, and
- There is no pitting oedema, and
- The child is alert (not lethargic), and
- The child has a good appetite and is feeding well,

General measures

- Provide RTUF and/or other nutritional supplements according to supplementation guidelines.
- Regular follow-up to ensure that the child gains weight and remains well.
- Discharge with supplementation, once the following criteria are met:
  - o WHZ (weight-for-height z-score) : >–2 WHZ for two consecutive visits at least one month apart and/or
  - o MUAC: >11.5cm (preferable at 12cm, if MUAC used alone).
- Follow patients for at least 6 months to ensure sustained growth.

Medicine treatment

- Do not repeat if child has received in the past month

Vitamin A (retinol), oral.

	Medicine	Dose	Frequency	Duration	Codes
	Vitamin A (retinol) oral	100 000IU in infants 6-11 months 200 000IU in children 1-5years	Immediately, then once every 6 months Immediately, then once every 6 months		A V
	Multivitamin syrup po	5-10ml	Once a day	6 months	A E

Empiric treatment for worms

	Medicine	Dose	Frequency	Duration	Codes
	Albendazole oral	200mg in children 1-2years 400mg in children over 2 years and adults	At once At once		A V

Referral

- When regular nutritional supplements (RUTF) cannot be provided and follow-up on an ambulatory (outpatient) basis is not possible.
- The child develops pitting oedema or any of the danger signs *(see above)*.
- Failure to gain weight despite provision of nutritional supplements.

12.1.4 Moderate Acute Malnutrition (MAM)

Children and infants older than 6 months who have either:

- A WHZ-score between -2 and -3.
- MUAC between 11.5 cm and 12,5cm.
- No pitting oedema or SAM danger signs (see above).
- Good appetite.

General measures

- Provide RUTF and/or other nutritional supplements according to supplementation guidelines.
- Regular follow-up to ensure that the child gains weight and remains well.

- Discharge with supplementation, once the following criteria are met:
  - WHZ (weight-for-height z-score) : >–2 WHZ for two consecutive visits at least one month apart and/or
  - MUAC: >11.5cm (preferable at 12cm, if MUAC used alone).
- Follow patients for at least 6 months to ensure sustained growth.

Referal
- No response to treatment.
- All children other than those with insufficient food intake.
- Child develops severe acute malnutrition.

12.1.5 Not growing well (including failure to thrive/ growth faltering)
- Children and infants who have either:
- Unsatisfactoryweight gain (growth curve flattening or weight loss) on the Road to Health card

OR
- Low weight for age (but WHZ> –2)

Note: Babies who were premature and are growing parallel to or better than the z-score line, should not be classified as having failure to thrive or not growing well.

Conduct a feeding and clinical assessment to determine the cause.

General measures
- Counselling on nutrition
- Nutritional supplementation should be supplied only if the cause is correctable
- Assess the child's feeding and recommend actions as outlined in annex
- Follow up monthly.

12.2 Overweight and obesity

Obesity is a chronic metabolic disease characterised by an increase of body fat stores. It is affecting not only adults but also children and adolescents worldwide. In clinical practice, the body fatness is estimated by BMI, and the accumulation of intra-abdominal fat (marker for higher metabolic and cardiovascular disease risk) can be assessed by waist circumference.

- A comprehensive history, physical examination and laboratory assessment relevant to the patient's obesity should be obtained. Appropriate goals of weight management emphasise realistic weight loss to achieve a reduction in health risks and should include promotion of weight loss, maintenance and prevention of weight regain. Management of co-morbidities and improving quality of life of obese patients are also included in treatment aims.
- A comprehensive obesity management can only be accomplished by a multidisciplinary obesity management team. Treatment should be based on good clinical care, and evidence-based interventions; should focus on realistic goals and lifelong multidisciplinary management.
- Body mass index (BMI) is a simple index of weight-for-height that is commonly used to classify overweight and obesity in adults (> 19 years)

For adults:
- Overweight is a BMI ≥25; and obesity is a BMI ≥30.

Children aged between 5–19 years:

- Overweight and obesity are defined as follows for children aged between 5–19 years:
- Overweight is BMI-for-age greater than 1 standard deviation above the WHO Growth Reference median; and
- Obesity is greater than 2 standard deviations above the WHO Growth Reference median.

For children< 5 years of age:

- Overweight is weight-for-height greater than 2 standard deviations above WHO Child Growth Standards median; and
- Obesity is weight-for-height greater than 3 standard deviations above the WHO Child Growth Standards median.

General measures

Clinical Evaluation of the Obese Patient

- A comprehensive history, physical examination and laboratory assessment relevant to the patient's obesity should be obtained

History Taking

- Family history
- Dietary habits
- Physical activity frequency and nature
- Eating pattern and possible presence of an eating disorder (binge eating disorder, night eating syndrome, bulimia)
- Presence of depression and other mood disorders

Aims of Treatment

- Treatment of obesity have wider objectives than weight loss alone and include risk reduction and health improvement. Significant clinical benefits may be achieved even by modest weight loss (i.e. 5–10% of initial body weight), and lifestyle modification (improved nutritional content of the diet and modest increases in physical activity. Obesity management cannot focus only on weight (and BMI) reduction.
- Obesity management cannot focus only on weight (and BMI) reduction. More attention is to be paid to waist circumference and the improvement in body composition which is focusing on ameliorating or maintaining FFM and decreasing fat mass.

Prevention of Further Weight Gain

- In overweight patients (BMI 25.0–29.9 kg/m^2) without overt co-morbidities, prevention of further weight gain (through dietary advice and increase in physical activity) rather than weight loss per se may be an appropriate target.

Practical Weight Loss Objectives

- A 5–15% weight loss over a period of 6 months is realistic and of proven health benefit A greater (20% or more) weight loss may be considered for those with greater degrees of obesity (BMI ≥ 35 kg/m2).

Failure to Lose and Maintain Weight

- ***Referral*** to a **Clinical Dietician** (or an obesity management team) should be considered if the patient fails to lose weight in response to the prescribed intervention

CHAPTER 13

PSYCHIATRY

13.1 Depressive disorders

DIAGNOSTIC CRITERIA

- Please refer to DSM V/Mental Health Desk Guide

MANAGEMENT OF DEPRESSIVE DISORDERS

In this guide Depressive disorders includes; Major Depressive Disorder (MDD), Persistent Depressive Disorder (Dysthymia), Disruptive Mood Dysregulation Disorder, Medication/substance Induced Depressive Disorder

Assessment

- Take a comprehensive history; explore all psychological and social issues/stressors affecting the client and support system within patient's life.
- Conduct Mental Status Evaluation, physical examination and suicide risk assessment

First line

	Medicine	Dose	Frequency	Duration	Codes
	Amitriptyline po	Initial dose; 25mg for 3/7, then 50 mg Max. dose;150-200mg a day	Bedtime	Short to long-term	A E
	Then increase the dose gradually by 25mg at an interval of 7-14 days if there is no response				
or	Fluoxetine po	Initial dose;10-20mg Max. dose; 60-80mg a day	Once daily	Short to long-term	A E
	Increase the dose gradually by 10-20mg at an interval of 4 – 8 weeks if there is no response				
or	Sertraline po	Initial dose; 25-50mg	Bedtime	Short to long-term	A E
	Increase the dose gradually by 25-50mg at an interval of 7-14 days if there is no response				

Second line

	Medicine	Dose	Frequency	Duration	Max Dose	Codes
	Selective Serotonin and Norepinephrine Reuptake Inhibitor (SNRI);					
	Duloxetine po	Initial dose; 20-30 mg Max. dose; 120 mg/day	Once daily	Short to long-term	120 mg/day	S E
	Increase the dose gradually by 20mg-30mg at an interval of 7-14 days if there is no response					

If patient presents with insomnia

	Medicine	Dose	Frequency	Duration	Codes
	Promethazine po	25-50mg	Bedtime	5-7 days	A E
or	Lorazepam po	1-2mg	Bedtime	5-7 days	B E

If the patient presents with psychotic symptoms (DEPRESSIVE DISORDER WITH PSYCHOSIS)

- Prescribe antidepressants concurrently with an antipsychotic

First line

	Medicine	Dose	Frequency	Duration	Max Dose	Codes
	Haloperidol po	Initial dose; 1.5-3mg	Once to twice a day	Short to long-term	20mg/day	B E
	Increase the dose gradually by 1.5mg at an interval of 7-14 days if the patient presents with psychosis.					
	Aripiprazole po	Initial dose; 2-5 mg	Once to twice a day	Short to long-term	30mg/day	B E
	Increase the dose gradually at an interval of 3-14 days by 5-10mg if the patient presents with psychosis.					

Second line

	Medicine	Dose	Frequency	Duration	Max Dose	Codes
	Risperidone po	Initial dose; 1-2mg	Once to twice a day	Short to long-term	6mg/day	B E
	Increase the dose gradually at an interval of 3-14 days by 50-200mg if the patient presents with psychosis.					
	Olanzapine po	Initial dose; 5-10mg	Once to twice a day	Short to long-term	25mg/day	B E
	Increase the dose gradually by 5mg at an interval of 7-14 days if the patient presents with psychosis.					

Treatment Duration

- The patient should continue with a therapeutic dose of antidepressant for a minimum of 3 months if first episode and longer (minimum of 3 years) for relapse.
- If the patient had more than 2 episode/s of depression advice lifelong treatment. (B)
- Consult a psychiatrist regarding the decision to discontinue ant depressant medications.

Caution

- SRIs may cause agitation and an increased suicide risk during the first 2–4 weeks.
- TCAs can be fatal in overdose, conduct suicide risk assessment of the patient every follow up visit. Avoid prescribing it to patients with suicidal thoughts/attempt as much as possible.
- Avoid TCAs in the children, elderly and patients with heart disease, urinary retention, glaucoma and epilepsy.
- For depression with psychomotor agitation consider amitriptyline
- Consider Sertraline/Fluoxetine for depression with psychomotor retardation

Refer

For specialist (Psychiatrist) assessment;

- For Psychiatrist assessment; children younger than 12 years of age, pregnant women and breast-feeding mothers and poorly responding depression.

13.2 Anxiety disorders

Anxiety is an emotional response to a perceived or anticipated fear. It is diagnosed as a disorder if there is excessive or persistent fear that impacts daily functioning. There are many types of anxiety disorders, GAD and panic attacks are the commonest ones in the Kingdom of Eswatini.

Diagnostic criteria; generalised anxiety disorder (GAD)

- ***Refer*** to DSM V/Mental Health Desk Guide

Management of GAD & Panic Attacks

i. Assessment

- Screen for and manage causative and comorbid medical illnesses, substance use related disorders and psychological and social stressors.

ii. Non pharmacological interventions

- Psychotherapy is the mainstay of treatment.

iii. Pharmacological management

First Line Short Term Intervention;

	Medicine	Dose	Frequency	Duration	Codes
	Lorazepam po	Initial dose; 1-2 mg Max. 10mg/day	Once to three times a day	Maximum 4 weeks	B E
	Increase the dose gradually by 0.5-2mg at an interval of 3-7 days if the patient still presents with anxiety symptoms				
or	Clonazepam po	Initial dose; 0.5-1mg Max. 4mg/day	Once to twice times a day	Maximum 8 weeks	B E
	Increase the dose gradually by 0.25-0.5mg at an interval of 3-7 days if the patient still presents with anxiety symptoms				

Second Line - For Long Term Management of Anxiety Disorders

	Medicine	Dose	Frequency	Duration	Codes
	Fluoxetine po	Initial dose 10 mg Max. 60mg/day	Once a day	Short to long-term	A E
	Increase the dose gradually by 10mg at an interval of 4-8 weeks if the patient still presents with anxiety symptoms				
or	Sertraline po	Initial dose; 25mg Max. 150mg/day	Bedtime	Short to long-term	A E
	Increase the dose gradually by 25mg at an interval of 7-14 days if the patient still presents with anxiety symptoms				

Caution

- Benzodiazepines are associated with cognitive impairment (drowsiness), warn patients not to drive, swim or operate machinery when using benzodiazepines.
- Elderly are at risk of over-sedation, falls and hip fractures consider low doses of benzodiazepines.
- Dependence may occur after only a few weeks of using benzodiazepines and should not be prescribed continuously for a long time to minimise the risk of dependence.
- Do not prescribe in people at high risk of addiction: e.g. personality disorders and those with previous or current substance misuse.

Treatment Duration

- The patient should continue with a therapeutic dose of antidepressant for a minimum of 3 months if first episode and longer (minimum of 9-12 months) if had previous episode/s.
- The medical practitioner should consider stopping medications only if the patient has had no/minimal symptoms and can carry out routine daily activities. Taper down the dose gradually within three months.
- Psychotherapy may continue even after stopping medications.

13.3 Trauma and stress-related disorders

- Trauma and stress related disorders include disorders in which exposure to a traumatic or stressful event is listed primarily as diagnostic criteria. In this group of disorders, acute stress disorder and post-traumatic stress disorder are the commonest ones.

DIAGNOSTIC CRITERIA

- ***Refer*** to DSM V/Mental Health Desk Guide

NON PHARMACOLOGICAL INTERVENTIONS

- Reassurance and support of patient and family.

PHARMACOLOGICAL INTERVENTIONS

Acute stress disorder:

- Benzodiazepines may be useful in the immediate period following the traumatic event only if the patients experiences severe distress. ***Refer to First line short term management of GAD and panic attacks.***
- Intravenous route with the same doses may be used if oral medications cannot be tolerated.
- Prolonged use for more than a week may be detrimental to adaptation, leading to higher rates of post-traumatic stress disorder.

Post-traumatic stress-disorder:

Prescribe antidepressants, ***Refer to Anxiety disorders second line; Long term management of anxiety disorders.***

TREATMENT DURATION

Refer to Management of Anxiety Disorders

I3.4 Schizophrenia And Other Psychosis

Psychosis is characterised by distortions of thinking i.e. delusions and perception i.e. illusions and hallucinations, as well as inappropriate or narrowed range of emotions. Sleep disturbances, disorganised speech and form of thinking may be present. Severe abnormalities of behavior, such as agitation, excitement and inactivity or hyperactivity may be seen.

DIAGNOSTIC CRITERIA

- ***Refer*** to DSM V/Mental Health Desk Guide

MANAGEMENT OF SCHIZOPHRENIA AND OTHER PSYCHOSIS

i. Acute Phase;

- Consider rapid neuroleptisation/tranquilisation

	Medicine	Dose	Frequency	Duration	Codes
	Haloperidol IM	Initial dose; 5mg Max. 18-20mg/day	Stat dose	Immediate	B E
	Then every half hourly if patient is still agitated up				
or	Chlorpromazine IM	Initial dose; 100-150 mg Max. 600-800mg/day	Stat dose	Immediate	B E
	Then every 4-6 hourly if the patient is still agitated				
Followed by	Diazepam IV	Initial dose; 10-20mg Max. 20mg/day	Stat dose	Immediate	B V
or	Lorazepam IV	Initial dose; 2-4 mg	Stat dose	Immediate	C V
	Then after 4-6hours if the patient is still extremely agitated				

Caution

- Avoid chlorpromazine in elderly and patients with epilepsy as it lowers seizure threshold.
- Always consult with a Psychiatrist when prescribing for violent mentally unstable children, the elderly, pregnant women and breastfeeding mothers.

ii. Maintenance Phase

- This is a short to long-term management after controlling agitation by rapid neuroleptisation

Oral antipsychotics. This table is for quick reference only and is not intended to be an exhaustive guide to the medications and side effects.

First Line

	Medicine	Dose	Frequency	Duration	Max Dose	Codes
	Haloperidol po	Initial dose; 1.5-5mg	Once to twice a day	Long term	20mg/day	B E
	Increase the dose gradually by 1.5-5mg at an interval of 3-14 days if the patient is still unstable.					
or	Sulpride po	Initial dose; 50-200mg	Once to twice a day	Long term	800mg/day	A E
	Increase the dose gradually at an interval of 3-14 days by 50-200mg if the patient is still unstable.					
or	Aripiprazole po	Initial dose; 10-15 mg	Once to twice a day	Short term	30mg/day	B E
	Increase the dose gradually at an interval of 3-14 days by 5-10mg if the patient is still unstable.					

Second Line

	Medicine	Dose	Frequency	Duration	Max Dose	Codes
	Risperidone po	Initial dose; 1-2 mg	Once to twice a day	Long term	20mg/day	B E
	Increase the dose gradually by 0.5-2mg at an interval of 3-14 days if the patient is still unstable.					
or	Olanzapine po	Initial dose; 5-10 mg	Once to twice a day	Long term	800mg/day	B E
	Increase the dose gradually at an interval of 3-14 days by 5mg at a time if the patient is still unstable.					
or	Quetapine po	Initial dose; 25mg	Once to twice a day	Short term	800mg/day	C E
	Increase the dose gradually at an interval of 7-14 days by 50mg - 200mg if the patient is still unstable.					

If the patient presents with insomnia

	Medicine	Dose	Frequency	Duration	Codes
or	Promethazine Hydrochloride po	50-75mg	Bedtime	5-7 days	A E
	Lorazepam po	1-4mg	Bedtime	5-7 days	B E

Long acting depot antipsychotics;

- **Is considered for patients with poor medication adherence or as an adjuvant for resistant cases.**

First Line

	Medicine	Dose	Frequency	Duration	Max Dose	Codes
	Fluphenthixol Decanoate IM	Initial dose; 20mg	Biweekly or monthly	Short to long term	60mg	A V
	Increase the dose biweekly/monthly by 20mg if there is no response.					
or	Zuclopenthixol Decanoate IM	Initial dose; 200mg	Biweekly or monthly	Short to long term	400mg	C E
	Increase the dose biweekly/monthly by 100mg if there is no response.					

- Fluphenthixol Decanoate may induce a mania episode, cautious when prescribing it to patients with bipolar affective disorders.

Second Line

	Medicine	Dose	Frequency	Duration	Codes
	Risperidone Decanoate IM	Initial dose; 12.5 mg Max. 50mg	Biweekly or monthly	Long term	B E
	Increase the dose gradually by 0.5-2mg at an interval of 3-14 days if the patient is still unstable.				

All depot antipsychotic injections must be prescribed together with an anti-cholinergic.

	Medicine	Dose	Frequency	Duration	Codes
	Trihexyphenidyl (artane) po	Initial dose; 12.5 mg Max. 50mg	Biweekly or monthly	Long term	B E
or	Biperiden Hydrochloride po	Initial dose; 2-6mg Max. 50mg	Biweekly or monthly	Long term	B E

TREATMENT DURATION

- Attending medical practitioner should reduce the dose of an antipsychotic medication during each follow up visit if the patient is mentally stable.
- The goal is to maintains the patient with the lowest dose of an antipsychotic.
- Consult a psychiatrist regarding the decision to discontinue antipsychotic medications.
- If the patient had more than 3 episodes of psychosis advise lifelong treatment.

REFER

For violent mentally unstable children, the elderly, pregnant women, breast feeding mothers and physically ill patients.

Caution

- Cautiously when prescribing olanzapine and risperidone to elderly and individuals with obesity, diabetes, hypertension and other cardiovascular system related conditions.
- Prescribe one antipsychotic medication at a time, start with a low dose within the therapeutic range and increase gradually to an optimum dose for at least 4-6 weeks before considering ineffective.
- Treat side effects of medications; do not provide anticholinergic to every patient. ***Refer management of side effects.***
- IM chlorpromazine causes postural hypotension, monitor patients closely and avoid in elderly patients.

PSYCHOSIS DUE TO A GENERAL MEDICAL CONDITION

- Psychosis may present in general conditions such as hypoxia, sepsis, uremia (renal failure), acid base disturbances, hepatic encephalopathy, syphilis, HIV related opportunistic infections, drug overdose.
- General conditions that cause psychosis are often life threatening and antipsychotic medications alone without treating the core cause are of no help.

DIAGNOSTIC CRITERIA

- Please refer DSM V/Mental Health Desk Guide

MANAGEMENT

- Take a comprehensive history that reflects the current mental health status of the patient.
- Conduct thorough physical examination and mental status evaluation, order investigations as appropriate.
- If the physical condition has been treated and the abnormal behavior persists then consider low doses of antipsychotics as follows;

First line

	Medicine	Dose	Frequency	Duration	Max Dose	Codes
	Haloperidol po	Initial dose; 0.75mg to 1.5mg	Once to twice a day	Short term	10mg/day	B E
	Increase the dose gradually every 3-14 days by 0.75-1.5mg increments if there is no improvement.					
or	Aripiprazole po	Initial dose; 2-5 mg	Once to twice a day	Short term	15mg/day	B E
	Increase the dose gradually at an interval of 3-14 days by 2-5mg if the patient is still unstable.					

Second line

	Medicine	Dose	Frequency	Duration	Max Dose	Codes
	Risperidone po	Initial dose; 0.5-1mg	Once to twice a day	Short term	6mg/day	B E
	Increase the dose gradually every 3-14 days by 0.5-1mg increments if there is no improvement					

If the patient presents with insomnia

- Consult a Doctor if the patient is violent and restless

	Medicine	Dose	Frequency	Duration	Max Dose	Codes
	Lorazepam po	0.5-1mg	Bedtime	5-7 days	15mg/day	B E

TREATMENT DURATION

- The attending medical practitioner should reduce the dose of an antipsychotic medication during each follow up visit if the patient is mentally stable and maintains the patient with the lowest dose. (B)
- Consider the decision to discontinue antipsychotic medications if the patient has had no psychotic symptoms and can carry out routine daily activities for at least 3 months. (B)
- Taper down the dose of medicine gradually for a month to 2 months to avoid discontinuation symptoms and reinstitute medications if there is a recurrence. (B)

Caution:

- Avoid benzodiazepines and chlorpromazine as its sedative effects may mask the clinical picture.
- Treat side effects of medications accordingly.

13.5 Bipolar Affective Disorders (BAD)

Bipolar Affective Disorders are characterised by episodes in which the person's mood and activity levels are significantly disturbed.

DIAGNOSTIC CRITERIA BIPOLAR AFFECTIVE DISORDERS

- ***Refer*** to DSM V/Mental Health Desk Guide.

MANAGEMENT OF BIPOLAR AFFECTIVE DISORDER –I, MANIC EPISODE
PHARMACOLOGICAL INTERVENTIONS

Acute phase

- For acute phase of Bipolar Affective Disorder I; refer to Management of psychosis

Maintenance phase

- This is a short to long-term management after controlling agitation by rapid neuroleptisation
- Prescribe an antipsychotic ***(refer management of schizophrenia and other psychosis)*** concurrently with a mood stabiliser

Mood stabilisers

	Medicine	Dose	Frequency	Duration	Codes
	Carbamazepine po	Initial dose; 200mg Max. dose; 600mg /day	Once to twice a day	Long term	B V
	Increase the dose gradually at an interval of 7-14 days by 200mg increments until the mood is stabilised or max dose is reached.				
or	Sodium Valproate CR po	Initial dose; 500mg Max. dose; 2.5g/day	Once to twice a day	Long term	B E
	Increase the dose gradually at an interval of 7-14 days by 200mg-300mg increments until the mood is stabilised.				
or	Lamotrigine po	Initial dose; 25mg po daily for the first 7 days then 50mg 12 hourly. Max. dose; 400-500 mg/day	Once to twice a day	Long term	B E
	Increase the dose gradually at an interval of 7-14 days by 50mg - 100mg increments until the mood is stabilised.				

If the patient presents with insomnia; *refer management of insomnia under Schizophrenia and other psychosis*

MANAGEMENT OF BIPOLAR AFFECTIVE DISORDER –I, DEPRESSIVE EPISODE

- Prescribe an antipsychotic ***(refer management of schizophrenia and other psychosis)*** PLUS a mood stabiliser ***(refer mood stabilisers above)*** PLUS an antidepressant ***(refer management of depressive disorders).***
- Only prescribe an antidepressant if symptoms of depression persist for more than fourteen days.

Caution:

- Check serum levels of Sodium Valproate, Carbamazepine and Lamotrigine levels yearly or every six months if the patient is on a maximum dose. (B)
- Always prescribe carbamazepine together with folic acid 5 mg daily.
- Avoid carbamazepine, phenytoin and phenobarbital to patients who are using HAART as these can reduce serum concentration of non-nucleoside reverse transcriptase inhibitors and protease inhibitors.
- Sodium valproate may induce weight gain as a side effect.
- Lamotrigine does not induce weight gain.
- Do not prescribe an antidepressant alone to a patient with bipolar disorder depressive episode, it may precipitate a manic episode.

TREATMENT DURATION

- Reduce the therapeutic dose of an antipsychotic medication during each follow up visit if the patient is mentally stable while maintaining the therapeutic dose of a mood stabiliser. (B)
- The goal is to maintain the patient with the lowest dose of an antipsychotic.
- If the patient has been on the lowest dose of an antipsychotic without relapse for at least 2 year, gradually discontinue it while maintaining a mood stabiliser. (B)

- Reinstitute antipsychotic medications if there is a relapse.
- Consult a psychiatrist regarding the decision to discontinue a mood stabiliser.

NON PHARMACOLOGICAL INTERVENTIONS;

- ***Refer*** to Mental Health Desk Guide

REFER

For pregnant and breastfeeding women, children and elderly consult a Psychiatrist.

13. 6 Behavioural Disorders

- Behavioural disorders is an umbrella term that includes attention deficit hyperactivity disorder (ADHD), conduct disorders, oppositional defiant disorder, etc.

DIAGNOSTIC CRITERIA

Please refer DSM V/Mental Health Desk Guide

MANAGEMENT

i. Assessment; comprehensive history taking and thorough assessment.
ii. Pharmacotherapy
- Do not prescribe medications for general behavioural disorders for children and adolescents.
- Consider prescribing medications only if psychotherapy failed, and the child is at least 6 years old.

First Line

	Medicine	Dose	Frequency	Duration	Codes
Children >6 years	Methyl phenidate HCL po	Initial dose; 5-10 mg 60 mg/day	Morning to morning & lunchtime	Short to long term	S E
	Increase the dose gradually by 5-10mg at an interval of 7-14 days if the patient is still unstable.				
Adults	Methyl phenidate HCL po	Initial dose; 10-20 mg Max dose 60 mg/day	Morning to morning & lunchtime	Short to long term	S E
	Increase the dose gradually by 10mg at an interval of 7-14 days if the patient is still unstable.				

Second Line

	Medicine	Dose	Frequency	Duration	Codes
Children	Methyl phenidate HCL Extended Release po	Initial dose; 18mg Max. dose; 54 mg/day	Morning to morning & lunchtime	Long term	S N
	Increase the dose gradually by 18mg at an interval of 7-14 days if the patient is still unstable.				
Adults	Methyl phenidate HCL Extended Release po	Initial dose; 18-36mg Max. dose; 72mg/day	Morning to morning & lunchtime	Long term	S N
	Increase the dose gradually by 18mg at an interval of 7-14 days if the patient is still unstable.				

STOPPING MEDICATIONS

- If there is no response after 2-4 months of using maximum dose, refer to the Psychiatrist.

iii. Psychosocial interventions
- ***Refer*** to Mental Health Desk Guide

VI. DEVELOPMENTAL DISORDERS

Autism Spectrum Disorder (ASD)

DIAGNOSTIC CRITERIA

Please refer DSM V/Mental Health Desk Guide

MANAGEMENT

If the client presents with;

- Seizure; prescribe anticonvulsants ***refer to Management of epilepsy***
- Aggression/uncontrolled behaviour

	Medicine	Dose	Frequency	Duration	Codes
	Risperidone po	Initial dose; 0.5-1mg Max. dose 6 mg/day	Once to twice a day	Short to long term	B E
	Increase the dose gradually every 3-14 days by 0.25-1mg increments if there is no improvement				
or	Aripiprazole po	Initial dose; 2mg Max. dose 15 mg/day	Once to twice a day	Short to long term	B E
	Increase the dose gradually at an interval of 3-14 days by 2mg if if there is no improvement.				

13.7 Alcohol and Substance Abuse Related Disorders

DIAGNOSTIC CRITERIA

Please refer DSM V/Mental Health Desk Guide

MANAGEMENT

- Psychotherapy and counselling on behaviour change.
- Check drug levels; levels of alcohol, cannabis, cocaine, heroin, etc. each visit.

HEROINE/COCCAINE

DIAGNOSTIC CRITERIA

Please refer DSM V/Mental Health Desk Guide

MANAGEMENT

Methadone Assisted Therapy (MAT) – Refer Mental Health Desk Guide

13.8. Dementia

DIAGNOSTIC CRITERIA

Please refer DSM V/Mental Health Desk Guide

	Medicine	Dose	Frequency	Duration	Codes
	Donepezil Hydrochloride po	Initial dose; 5mg Max. dose 23 mg/day	Once to twice a day	Long term	S E
	Increase the dose gradually by 5mg at an interval of 4-6 weeks if the patient is still unstable.				

13.9 Managing Side Effects of Psychiatric Medicines

Do not prescribe anticholinergic medication routinely to prevent side effects. It should be prescribed only if the patient presents with antipsychotic related side effects.

- Reassure
- Reassess the patient and conduct MSE, and assess severity of psychotic symptoms;
    - If side effects are too severe regardless of the mental state, change to another class of antipsychotic preferable newer antipsychotics
    - If side effects are not too severe and the patient is mentally stable, reduce the dose of the same antipsychotic medicine
    - If side effects are not too severe but the patient is mentally unstable, change to another class of antipsychotic preferable newer antipsychotics

Then prescribe anticholinergic medications accordingly;

Mild to moderate side effects

	Medicine	Dose	Frequency	Duration	Codes
	Trihexyphenidyl po	Initial dose; 2-5mg Max. dose 15mg/day	Morning to morning & lunchtime	Short/long term	B E
	Increase the dose at an interval of 3-14 days by 2mg if there is no response.				
or	Biperiden HCl po	Initial dose; 2-6mg Max. dose 12mg/day	Morning to morning & lunchtime	Short/long term	B E
	Increase the dose at an interval of 3-14 days by 2mg if there is no response.				

Severe extrapyramidal side effects

First line

	Medicine	Dose	Frequency	Duration	Codes
	Biperiden Hydrochloride IM	Initial dose; 5mg Max dose 10-20mg/day	Stat dose	Immediate	B E
	Repeat the same dose after every 30-60 minutes if there is no response.				

Second line

	Medicine	Dose	Frequency	Duration	Codes
	Diazepam IV	Initial dose; 10-20mg Max. dose 20mg/day	Stat dose	Immediate	B V

EPILEPSY WITH PSYCHOSIS

- Prescribe a low dose of antipsychotic and therapeutic dose of an anticonvulsant ***(Refer management of epilepsy)***.

CHAPTER 14

RENAL & URINARY TRACT CONDITIONS

14.1 Acute cystitis

This is an acute infection of the lower urinary tract by bacteria. Escherichia coli is the most common causative organism. Other microorganisms may be involved, especially in patients previously managed in hospitals. It occurs predominantly in women, especially sexually active women. Urine is turbid and/or bloodstained and tests positive for nitrites.

Symptoms and signs

- Burning or pain on passing urine (dysuria), frequent passing of small amounts of urine, may have lower abdominal pain and tenderness

Investigations

- Urine dipstix– read at 1-2 minutes for nitrites, leucocytes and protein.
- Exclude pregnancy in women.
- Send for urine microscopy, culture and sensitivity (store at 1-4°C until processed to prevent contamination).

- ***Note:*** Exclude sexually transmitted infections, pelvic inflammatory disease.

Nonpharmacological management

- Encourage liberal fluid intake per body weight and ambient temperature recommendations, prevent and treat constipation, encourage complete voiding to avoid urine stasis.

Pharmacological management (check for allergies/sensitivities)
Non pregnant women aged ≥16y

If GFR≥45ml/min/1.73m²

	Medicine	Dose	Frequency	Duration	Codes
First choice	Nitrofurantoin modified release po	100mg	Twice daily	3 days	A E
Second choice (if no better)	Fosfomycin po	3g	At once		C E

If GFR <45ml/min

	Medicine	Dose	Frequency	Duration	Codes
First choice	Amoxycillin po	500mg	Three times a day	7 days	A V
If not on cotrimoxazole prophylaxis:	Trimethoprim po	200mg	Twice daily	3 days	B E

Pregnant women ≥ 12yrs:
If GFR≥45ml/min/1.73m²

	Medicine	Dose	Frequency	Duration	Codes
First choice	Nitrofurantoin modified release po	100mg	Twice daily	7 days	A E
Second choice (if no better) or if GFR<45ml/min	Amoxycillin po	500gmg	Three times a day	7 days	A V
or	Cefalexin po	500mg	Three times a day	7 days	B E

Children <16y:
If GFR ≥45ml/min/1.73m²

	Medicine	Dose	Frequency	Duration	Codes
First choice 12-15yrs	Nitrofurantoin modified release po	100mg	Twice daily	3 days	A E
First choice 3mnth-11yrs	Nitrofurantoin po	500mg	Four times a day	3 days	A V
Second choice 1-11mnths (if no better) or unable to take nitrofurantoin	Amoxycillin po	125mg	Three times a day	3 days	A V
Second choice 1-4 years (if no better) or unable to take nitrofurantoin	Amoxycillin po	250mg	Three times a day	3 days	A V
Second choice 5-15 years if no better) or unable to take nitrofurantoin	Amoxycillin po	500mg	Three times a day	3 days	A V
Alternatively use: 3-11mnths	Cefalexin po	12.5mgkg	Twice daily	3 days	B E
1-4 years	Cefalexin po	12.5mgkg	Twice daily	3 days	B E
5-11 years	Cefalexin po	12.5mgkg	Three times a day	3 days	B E
12-15 years	Cefalexin po	500mg	Twice daily	3 days	B E

Men aged ≥16y:
If GFR ≥45ml/min/1.73m²

	Medicine	Dose	Frequency	Duration	Codes
First choice	Nitrofurantoin modified release po	100mg	Twice a day	7 days	A E
If not on cotrimoxazole prophylaxis:	Trimethoprim po	200mg	Twice a day	7 days	A E

Refer
o Recurrent infections, recent urinary tract instrumentation and unresponsive treatment.

- **Transfer to tertiary centre to exclude underlying predisposing cause – for abdominal ultrasound scan/vesicourethrogram, etc.**

14.2 Acute pyelonephritis

This is an infection of the kidney parenchyma. It may be uncomplicated or complicated (presence of anatomical or structural abnormality). It may be complicated by shock and septicaemia. Urine is turbid and/or bloodstained and tests positive for nitrites.

Symptoms and signs

o Often very ill, fever and rigors, backache, renal angle tenderness.

Nonpharmacological management
o Encourage liberal fluid intake per body weight and ambient temperature recommendations, prevent and treat constipation, encourage complete voiding to avoid urine stasis

Pharmacological management
- Empiric antibiotics until results of microscopy, culture and sensitivity are known
- IV fluid – isotonic fluid per protocol for children and adults (preferably Ringer Lactate)

- Treat with antibiotics for 7-14 days and amend according to culture results after starting empiric cover as below
- Alkalinise urine if recurrent and not proteus mirabilis infection

Empiric antibiotics: (check for allergies/sensitivities)
Non pregnant women and men aged ≥16y:
If able to take oral medication:

	Medicine	Dose	Frequency	Duration	Codes
	Co-amoxiclav po	625mg	Three times daily	7-10 days	B E
	Cefalexin po	500mg	Three times daily	7-10 days	B E
In severely unwell cases	Ceftriaxone IV/IM	1g	Twice daily	10-4 days	B E
or	Co-amoxiclav IV	1.2g	Three times daily	10-4 days	B E
In kidney disease	Co-amoxiclav IV	1.2g	Twice daily	10-4 days	B E

Pregnant women ≥ 12y:
If able to take oral medication:

	Medicine	Dose	Frequency	Duration	Codes
	Cefalexin po	500mg	Three times daily	10-4 days	B E
In severely unwell cases	Ceftriaxone IV/IM	1g	Twice daily	10-4 days	B E

Children <16y:
If able to take oral medication:

	Medicine	Dose	Frequency	Duration	Codes
3-11mnths	Cefalexin po	12.5mg/kg	Twice daily	3 days	B E
1-4 years	Cefalexin po	12.5mg/kg	Twice daily	3 days	B E
5-11 years	Cefalexin po	12.5mg/kg	Three times daily	3 days	B E
12-15 years	Cefalexin po	500mg	Twice daily	3 days	B E
In severe cases	Co-amoxiclav IV	50-75mg/kg/day as a single dose (not used in infants) <6 weeks – consult Paediatrician)		7-10 days	B E
or	Ampicillin IIM/IV	100mg/kg/day	Three times daily	7-10 days	A V

Refer

- **All children** – start dose adjusted treatment and refer; All males; recurrent infections; recent urinary tract instrumentation; unresponsive to treatment or if symptoms do not subside).
- **Transfer to tertiary centre to exclude underlying predisposing cause – for abdominal ultrasound scan/vesicourethrogram, etc.**
- ***Refer*** all patients – risk of septic shock, renal abscesses, associated obstruction etc; need to image kidneys.

14.3 Acute kidney injury

(KDIGO Criteria) - Increase in serum creatinine of ≥ 26.4µmol/l within 48 hours (mortality risk with this level of increase) OR Increase in serum creatinine by ≥ x 1.5 from baseline within 1 to 7 days OR Decline in urine output by < 0.5ml/kg/hour for > 6 hours

Remember it can occur on pre-existing chronic kidney disease

Causes

- **Pre-renal** – diarrhoea, vomiting, severe blood loss, shock, hypotension etc.
- **Intrinsic renal** – drugs, toxins, some traditional and herbal remedies, infections, autoimmune, malignancies eg myeloma etc.
- **Post renal** - urinary tract obstruction from kidney stones, fiboris, ligation, cancer prostate/cervix/rectus etc.

Symptoms and signs

o May be asymptomatic

- **Symptoms of underlying cause** – pre-renal (dehydration, hypotension, tachycardia); intrinsic renal (symptoms of underlying cause – fever, joint pain); post renal (possible difficulty passing urine)
- **May have fluid overload** – edema, difficulty breathing

Essential steps in evaluation and management:

Obtain vital signs

- Pulse, Blood pressure (Aim MAP > 65mmHg), Urine output: aim > 0.5ml/kg/hour (urethral catheter), glucose (glucostix), temperature.

- **Investigations (to exclude potentially life threatening effects of acute kidney injury and reversible cause)**

- **Oxygen saturation**s - aim >95%
- **Urine analysis** - urine dipstick (A) (specific gravity, protein, blood, leucocytes), Urine microscopy - granular casts (acute tubular necrosis/glomerulonephritis), red cell casts (suspect rapidly progressive glomerulonephritis), dysmorphic red blood cells (suspect rapidly progressive glomerulonephritis), leucocytes (suspect pyelonephritis/acute interstitial nephritis), Pregnancy test (pre-eclampsia, septic abortion etc.)
- **Chest X ray** - Pulmonary edema, underlying cause (pneumonia, vasculitis etc.)

- **Blood gas** - hyperkalaemia, metabolic acidosis
- **Cardiac monitor/ECG** - signs of hyperkalaemia/left ventricular hypertrophy/heart block/myocardial ischaemia
- **Abdominal ultrasound scan** - exclude urinary tract obstruction: urgent reversal is required to prevent irreversible kidney failure – urinary catheter, Assess kidney size (normal is 9-12cm), appearance and echogenicity.

Management

- Fluid challenge/inotropes (see Emergency section)

Adults:

- Fluid bolus of 500ml isotonic fluid (preferably Ringer Lactate) over 15 minutes and reassess progress

(BP, pulse, JVP, urine output) up to a total of 2 litres to achieve mean arterial pressure > 65mmHg, continue maintenance fluid 25-35ml/kg/day divided into hourly rate unless fluid overload (use rate mider).

- Start inotropes if adequate fluid challenge but still hypotensive to avoid fluid overload and to ensure tissue perfusion (For example: adrenaline 4mg (4 ampoules) in 200ml of normal saline intravenously via a rate minder at 10ml/hour).
- Discuss with tertiary centre for urgent referral to facility with High care or Intensive care Unit

Children:

- Rehydrate per protocol for age and body weight
- If mild dehydration give oral rehydration solution at 5ml or 1 teaspoon every 5 minutes to replace losses OR 10ml/kg body weight for each loose stool.
- If moderate dehydration give 5ml oral rehydration solution every 5 minutes to total 50-100ml/kg body weight over 2-4 hours.
- If severe dehydration and failed oral rehydration solution start cautious intravenous rehydration – give a bolus of 20ml/kg isotonic fluid such as Ringer Lactate. Followed by maintenance intravenous fluids per paediatric protocols.
- Remember to look for hypoglycaemia/sepsis/other associated complications and start treatment as indicated
- Urgent referral to referral to tertiary hospital. Do not overhydrate as increases risk of mortality.
- **Fluid overload in kidney failure** – oxygen, assisted non-invasive ventilation – CPAP

Adults

	Medicine	Dose	Frequency	Duration	Codes
	Furosemide IV	120mg (Max 500mg/day)	Repeat every 6 hours	Review	B E

Children

	Medicine	Dose	Frequency	Duration	Codes
	Furosemide IV	1-2mg/kg Max 6mg/kg/day	Repeat every 6 hours	Review	B E

Hyperkalaemia (≥6mmol/l): Cardiac monitor (risk of bradycardia, systole and ventricular arrhythmias):

Adults

	Medicine	Dose	Frequency	Duration	Codes
For stabilisation of myocardium	Calcium gluconate 10% IV bolus	10ml over 2 minutes (maximum 20ml)		Review	B E
	Do not use same drip/giving set used for Sodium Bicarbonate				
For shifting potassium	Short acting insulin (actrapid)	5IU in 50ml of 50% dextrose over 30 minutes			B E
plus	Calbutamol nebuliser	10-20mg every 1-2 hours (monitor for tachycardia/ arrthythmias)			B E
	Sodium polystyrene sulfonate (Kayexalate) (***Caution:*** Do not give if bowel pathology).	15g mixed in 100ml water once daily			C E
In fluid overload/edema	Furosemide IV	40-80mg	Repeat in 6 hour to aid urinary potassium loss		A E

Urgent referral for dialysis or acute peritoneal dialysis locally per protocol whilst awaiting transfer or Specialist review.

14.4 Acute and chronic glomerulonephritis

Acute inflammation of the renal glomeruli.

Causes

- Infection (HIV, viral hepatitis – B, C; syphilis, malaria, bilharzia, post streptococcal), autoimmune, malignancies, drugs, congenital).

Symptoms and signs

- Nephrotic syndrome – oedema (puffiness of face, around eyes), may also have leg oedema, ascites, generalised oedema; proteinuria 3+ on standard urine dipstix; low albumin in blood, elevated serum cholesterol
- Nephritic syndrome – oedema, BP elevated, urine analysis – haematuria +/- proteinuria
- Signs of underlying cause – eg throat/skin infection past 2 weeks, autoimmune (fever, arthralgia, sweats, skin rashes/changes, haemoptysis, mucosal ulcers)

Investigations

- Standard urine dipstix – protein, blood
- Blood for albumin, cholesterol, creatinine, urea, electrolytes, HIV, VDRL/RPR/ Hepatitis B surface antigen, Hepatitis C, ASOT (autoimmune screen as indicated in referral centre); throat swab as indicated for MC&S
- Ultrasound: abdomen, kidneys
- May need kidney biopsy at referral centre if no better

Management

- Urgent referral to tertiary centre – ensure appointment within 2 days for directed management (assessment for rapidly progressive glomerulonephritis needing methylprednisone and further tertiary level management)

- Restrict fluid input in oliguria

	Medicine	Dose	Frequency	Duration	Codes
	Furosemide	40 - 80mg	1-2 times a day, at least 6 hours apart	Review	B V

- Whilst awaiting urgent referral treat hypertension with

	Medicine	Dose	Frequency	Duration	Codes
	Enalapril	5mg	Twice a day	Review	B V
In angioedema	Irbesartan	150mg	Once a day	Review	B E

Refer all patients to Paediatrician (children) /Physician or Nephrologist (adults)

14.5 Chronic kidney disease

Figure 14.1

CURRENT CHRONIC KIDNEY DISEASE (CKD) NOMENCLATURE

CKD is defined as abnormalities of kidney structure or function, present for >3 months, with implications for health and CKD is classified based on cause, GFR category, and albuminuria category (CGA).

Prognosis of CKD by GFR and albuminuria category

Prognosis of CKD by GFR and Albuminuria Categories: KDIGO 2012				Persistent albuminuria categories Description and range		
				A1	A2	A3
				Normal to midly increased	Moderately increased	Severely increased
				<30 mg/g <3 mg/mmol	30-300mg/g 3-30mg/mmol	>300 mg/g >30 mg/mmol
GFR categories (ml/min/ 1,73m²) Description amd range	G1	Normal or high	≥90			
	G2	Mildy decreased	60-89			
	G3	Midly to moderately decreased	45-59			
	G4	Moderately to severely decreased	30-44			
	G5	Severely decreased	15-29			
	G6	Kidney failure	<15			

Green: low risk (If no other markers of kidney disease, no CKD); **Yellow:** moderately increased risk; **Orange**: high risk; **Red:** very high risk.

Causes (Many causes are potentially preventable or modifiable if detected early):

- Previous episode of acute kidney injury or acute kidney disease; Intrinsic renal eg polycystic kidneys(hereditary), infections (HIV, hepatitis B, C, HIV, syphilis, malaria), metabolic (obesity, diabetes), hypertension, drugs and toxins; Post renal - Chronic obstruction/posterior urethral valves (developmental)/vesicoureteric reflux (developmental); Renovascular - Atherosclerotic renal artery stenosis, Takayasu's arteritis, fibromascular dysplasia etc.

Symptoms and signs

- May be asymptomatic, fatigue, nausea, vomiting, confusion, shortness of breath, hypertension, edema, pallor (anaemia).

Investigations:

- Urine dipstick – albumin stick if no proteinuria on standard urine dipsticks
- Urine microsocopy for casts, red blood cells (suggest glomerulonephritis)
- Blood for - urea, creatinine, electrolytes, glucose (note may be falsely low due to kidney disease), calcium (expect low pre-dialysis unless other pathology), FBC, liver function, cholesterol, serology (HIV, Hepatitis B, VDRL/RPR), other screens under specialist (autoimmune/myeloma etc.)

Chronic Kidney Disease management check list

- Review medication (over the counter remedies, traditional remedies)
- Dose adjust according to GFR (eg treatment for TB, HIV etc.)
- Stop nephrotoxic medication/remedies eg NSAIDS such as diclofenac
- Dose adjust all medication – use formularies such as South African Medical Formulary

Hypertension management

- Aim BP <140/90mmHg, and <130/80mmHg in proteinuric CKD; Avoid BP < 120/70 mmHg
- See Hypertension Section in Chapter 1 for choice of antihypertensives (first line includes ACEI or ARB and loop diuretic if GFR<45ml/min/1.73m^2)

Diabetes mellitus management: (See Diabetes Guidelines in Endocrine chapter)

- CKD patients are at increased risk of hypoglycaemia
- Stop metformin once GFR <30ml/min/1.73m^2
- In CKD 4-5 only use non-renally cleared sulphonylurea (gliclazide and not glibenclamide) (B)
- Monitor for hypoglycaemia on insulin
- CKD1-4 add statin and low dose aspirin if no contraindication (cardiovascular risk) (B)
- Some of the newer agents may be used in CKD (SGLT2 inhibitors, GLP RAs, DPP4 inhibitors –under Specialist Follow up).

Anaemia:

- Exclude non-renal cause; pre-dialysis aim ≥ 10g/dl using

	Medicine	Dose	Frequency	Duration	Codes
	Ferrous Sulphate po	200mg	Once a day	1 Month	A E

- Dialysis patients - intravenous iron per protocol (C)
- In CKD 5 – use erythropoietin stimulating agents as per protocol

	Medicine	Dose	Frequency	Duration	Codes
	Erythropoietin beta SC	20iu/kg	Once to three times a week	Review	C E
or	Epoietin beta (ircera) SC	0.6 mcg/kg	Once in two weeks	Review	C E

Chronic kidney disease bone and mineral disease:

- Aim phosphate in the normal lab reference range; start phosphate binder in CKD 4

- Calcium based phosphate binder if calcium is not elevated

	Medicine	Dose	Frequency	Duration	Codes
	Calcium acetate/Magnesium Carbonate po	2-3 tablets	Once to three times pre-meal	Review	C E

Non-calcium based phosphate binder if phosphate and calcium are elevated

	Medicine	Dose	Frequency	Duration	Codes
	Sevelamer po	800mg (max 13g daily)	Once to three times pre-meal	Review	C E
		Titrate dose according to phosphate levels			

Usual medication to be taken more than 1 hour before or 3 hours after phosphate binder as can interfere with absorption

- Aim calcium 2.2-2.5mmol/l, use vitamin D if low give

	Medicine	Dose	Frequency	Duration	Codes
	Cholecalciferol po	500 units	Once a day	Review	B E

- In CKD 5 give

	Medicine	Dose	Frequency	Duration	Codes
	1-alfa cholecalciferol	0.25mcg	Once a day	Review	C E
		Titrate dose according to calcium, phosphate, and PTH levels			

Lifestyle/supportive advice:

- If oliguric (CKD 4-5), water restrict to about 1 litre per day, Restrict salt to <5grams daily or <2g sodium per, Low phosphate diet – but avoid over-restriction that can cause malnutrition, Low potassium diet – typically bananas, tomatoes.

Special considerations to slow progression of CKD:

- If proteinuria > 1g/day – include angiotensin converting enzyme inhibitor or angiotensin receptor blocker – monitor creatinine for rise (up to 20% is permitted but if more exclude extra and intrarenal renovascular disease) (B)
- Treat metabolic acidosis <22mmol/l with oral sodium bicarbonate tablets or 5g (1 tspn) mixed in 50ml water or sucked daily (slows progression of CKD) (B)
- Stop nephrotoxic drugs such as non-steroidal anti-inflammatory drugs
- Exercise (30 minutes aerobic exercise x 5 days /week), Stop smoking
- Hold off BP lowering medication if hypotensive (MAP <65mmhg) from eg sepsis or dehydration etc. and restart as indicated once recovered (in adults once BP ≥140/90mmHg)

Immunisation:

- Annual influenza vaccination pre-winter, Pneumococcal vaccination every 5 years, Hepatitis B vaccination to achieve titre of >10mIU/ml (C)

When to refer for dialysis:

- Symptoms of CKD – fluid overload, pruritis, uraemic nausea and vomiting, uraemic encephalopathy, GFR ≤6ml/min even if no symptoms

- Uncontrollable blood pressure and hyperkalaemia
- For removal of dialysable toxins eg amitriptyline, aminophylline, etc.

Special considerations:

- Pre-dental procedures in haemodialysis patients - (ensure no anticoagulation or adequate reversal pre-procedure and prophylactic per unit protocol)

CHAPTER 15

RESPIRATORY CONDITIONS

15.1 Asthma

It is a chronic inflammatory condition of air ways which is usually of allergic origin and characterised by hyper responsive air ways that constrict easily in response to a wide range of stimuli resulting in reversible airway obstruction.

15.1.1 Diagnosis of asthma

Symptoms

- The classic symptoms are wheeze dyspnea and cough either alone or in combination. The symptoms are often worse at night and usually occur in episodes after exposure to triggers. The wheeze is high pitched and heard on exhalation. Some patients experience chest tightness or heaviness of the chest.
- Unexplained nocturnal cough is a common symptom of asthma and the number of nights per week that sleeps disturbed should be documented. In addition, some patients present with productive cough with mucoid or pale-yellow sputum.

Atopy

- A personal or family history of atopy: allergic rhinitis, allergic conjunctivitis, asthma eczema.

Occupational history should be elicited

- Occupational history should be elicited and its relationship with asthma symptoms

Coexisting medical condition

- Asthma may be aggravated by conditions such as rhinitis, obesity, and gastro esophageal reflux.

Medication

- Use of medication such as aspirin, non-steroidal anti-inflammatory and beta blockers should be noted

15.1.2 Physical Examination

- Clinical examination may be normal during asymptomatic phase of asthma
- Check for signs of atopy, rhinitis and eczema
- Chest may be inflated due to air trapping
- Breath sound may be reduced due to due to hyper inflation
- Wheezing usually diffuse and bilateral it is mainly expiratory but becoming inspiratory as airway narrowing worsens
- Chest x-ray should not be done routinely unless it is necessary to rule out other causes

15.1.3 Investigation

- Peak flow meter
- Spirometer
- CBC with differential (look for eosinophilia)
- Response to Broncho dilator-Salbutamol (MDI) 2 puff or nebulise and check the response after 20 minutes.

15.2 Management of asthma

After diagnosing asthma, the following steps should be followed to ensure adequate control is achieved

- Assess severity
- Implement asthma treatment
- Discuss and write up the asthma treatment plan with the patient and caregivers
- Assess the correct and consistent use of inhalers

15.2.1 Assessment of asthma severity of patients who are not on controller inhaler treatment

Assessment of asthma severity using the level and frequency of symptoms and PEF in patients presenting for first time.

Severity	Mild Intermittent	Mild Persistent	Moderate Persistent	Severe Persistent
Day:	☐ ≤2x/week	☐ 3-4x/ week	☐ >4x/week	☐ Continuous
Night:	☐ ≤1x/month	☐ 2-4x /month	☐ >4x/month	☐ Frequent
PEF:	☐ ≥80%	☐ ≥80%	☐ 60%-80%	☐ <60%

15.2.2 Assessment of asthma severity of patients who are on controller inhaler treatment

Mild	Moderate	Severe
Well controlled Step 1&2	Well controlled asthma with Step 3	Well controlled asthma with Step 4 & 5

*Please see stepwise treatment of asthma below

15.2.3 Step wise Implementation of asthma treatment

- Set Goals for control of asthma by establishing patient –health care provider partnership
- Preventive /avoidance measures
- Pharmacotherapy
- Provision of action plan
- Manage comorbidities
- Make an appointment and assess levels of control and follow-up
- Establish patient –health care provider partnership through good communication

15.2.3.1 Set goals by establishing patient –health care provider partnership

- Achieve and maintain control of symptoms
- Maintain normal activity
- Avoid side effects
- Prevent asthma exacerbation
- Avoid adverse effects from asthma medications
- Prevent asthma mortality

15.2.3.2 Preventive /avoidance measures

- Avoidance of triggers wherever possible. Give trigger check list and discuss on how to avoid attacks.

Pharmacological treatment

- Inhalation is the preferable root of drug administration because of rapid onset, direct delivery of the drug into the lung and less side effect.
- Check for any fear and concern or fears about inhaler

- Address the concerns using motivational interview and discuss the importance of inhaler and its advantages over oral medication
- Start either rescuers - Short Acting Beta Agonists (SABA) or preventers- Inhaled Corticosteroids (ICS), Long Acting Beta Agonists (LABA), Leukotriene receptor antagonists (LTRA) and SR theophylline using a stepwise management (see below)
- Demonstrate inhaler technique
- Provide action plan
- Manage comorbidities

Treatment of asthma with inhalers depends on:
- Severity on presentation (see above)
- Risk of future exacerbation (environmental factors or history of exacerbation)
- Current medication,
- Patient profile
- Level of control

How to administer inhaled bronchodilators or preventers

Inhaler without spacer	Inhaler with spacer
• Remove lid from inhaler • Shake inhaler hold inhaler upright • Exhale to residual volume • Keep head upright • Mouthpiece between teeth and lips • Inhale slowly and press canister • Continue slow and deep inhalation Hold breath for 10 second (count 10)	• Remove mouth piece cover from inhaler • Shake inhaler (5x) hold inhaler upright • Exhale to residual volume inhaler with spacer • connect • Keep head upright • Mouthpiece between teeth and lips • Inhale slowly and press canister • Continue slow and deep inhalation • Hold breath for 10 second (count 10)

Table 15.1 Intial asthma treatment

Presenting symptoms	Preferred initial treatment	
Infrequent asthma symptoms less than twice a month	Step 1 see below	
Asthma symptoms or need for reliver twice per month	Step 2 see below	
Troublesome asthma symptoms most days, or waking at night due to asthma especially if any risk factors exist	Step 3 see below	This step should be initiated by specialist. Nurses and GPs can start with step 2 and refer if the patient need to be initiated with step 3

Table 15.2 Stepwise Asthma Management

Step 1	Severity	Treatment	Remark
	Intermittent	Salbutamol 2 puffs PRN	Patient can be treated as step 2 if there is a risk of acute exacerbation

↓ Step Up ↑ Step Down

Step 2	Severity	Treatment	Remark
	Persistent	Low dose Beclomethasone BD OR Montelukast 10 mg od	initiate beclomethasone if there is no response for more than one month with Montelukast Nurses should refer if the asthma is not controlled at this step.
Salbutamol 2 puffs PRN			

↓ Step Up ↑ Step Down

Step 3	Severity	Treatment	Remark
	Persistent	Medium –high dose Beclomethasone OR Low-medium dose Beclomethasone+ Montelukast OR Low-medium dose Beclomethasone +Salmetrol(LABA) OR Low-dose Beclomethasone + SR theophylline	This step should be initiated by Medical officer. If no control at this step refers to specialist. salmeterol should not be prescribed without steroid
Salbutamol 2 puffs PRN			

↓ Step Up ↑ Step Down

Step 4	Severity	Treatment	Remark
	Persistent	Medium–high- dose Beclomethasone + salmeterol OR Low dose Beclomethasone+ Salmeterol (LABA)+Montelukast OR Low-dose Beclomethasone +salmeterol+ SR theophylline	This step should be initiated by specialist if no control refer to pulmonologist
Salbutamol 2 puffs PRN			

↓ Step Up ↑ Step Down

Step 5	Severity	Treatment	Remark
	Persistent	Refer to pulmonologist	

Low, medium and high dose for adults

Low, medium and high daily doses of inhaled corticosteroids (mcg)			
Drug	**Low**	**Medium**	**High**
Beclomethasone (CFC)	200-600mcg	500-1000mcg	>1000mcg
Budesonide	200-400mcg	400-800mcg	>800mcg

Principles of Stepwise Asthma Management

o Short acting Broncho-dilators should be given as needed in all steps. o All persistent asthma should be treated with steroids in a stepwise manner since it reduces exacerbation and hospitalizations. o ICS can also be commenced if the patient has a future risk of adverse outcomes. exacerbation, persistent airflow limitation, persistent exposure to allergens) and comorbidities even the severity is mild intermittent. o Start at dose of steroids appropriate to severity of disease. o For mild persistent asthma 400mcg/day in divided dose is an appropriate starting point for many patients. o Inhaled corticosteroids are first line controllers. o The second line long term drugs can be used as add on therapy.	o LABAs are more effective than leukotriene antagonist e.g montelucast. o LABA can be effective with low and medium dose of ICS instead of using a high dose of ICS. o LABA is not recommended for children less than 6 years old. Better to increase the ICS to higher dose. o Once asthma treatment has been commenced. Ongoing treatment decisions are based on the cycle of assessment, adjustment, and review of response. o Review patient's response after 1-3 month or earlier depending on clinical urgency. o Any step-up should be regarded as a therapeutic trial and the response should be reviewed after 1-3 month or earlier depending the clinical urgency.

15.2.3.3 Stepping up asthma treatment

- Is recommended for patients who fail to respond adequately to initial treatment.
- Before considering any step-up in treatment, correct the following common problems;
- Incorrect inhaler technique
- Poor adherence
- Persistent exposure at home/work such as allergens or medications
- Comorbidities
- Incorrect diagnosis
- In the absence adequate control in Step 2 increase steroids up to 800mcg or step up to step 3
- In step 3 you can add LABA with low and medium dose ICS. Subsequently you can increase the ICS from low dose to medium from medium to high dose of inhaled corticosteroids and increase the dose of ICS to 800-1000mcg.

15.2.3.4 Step down

- Review and consider stepping down at intervals of 6 months or more by maintaining the lowest dose of ICS controlling the symptoms.
- Consider stepping down if there have been no symptoms for 6 -12 months
- Prior to stepping down treatment the patient should be given a written asthma action plan and instructions for how and when to resume their previous treatment if their symptom worsens because of stepping down.

Table 15.2 Procedure for stepping down therapy

Step Down Strategies		
Current step	**Current medication**	**Options for stepping down**
Step 4	Moderate to high dose ICS+LABA	Reduce ICS dose by 50% Then remove LABA and then others after 6 months
Step 3	Low dose ICS+LABA	Reduce ICS by 50%
Step 2	Low dose ICS	Reduce ICS to once daily

15.2.3.5 Comorbidities that need to be addressed

- These are conditions that contribute to poor asthma control and impair quality of life.

Table 15.3 Management of comorbidities in asthma

Comorbidity	Diagnosis	Treatment
Obesity	**Check BMI**	**Weight loss**
Gastro Esophageal Reflux disease (GERD)	Reflux disease (GERD) Symptoms such as heart burn, epigastric pain	Proton pump inhibitors
Anxiety and depression	Screening for anxious and depressive symptomatology	Non-pharmacological and pharmacological treatment or refer to specialist
Allergic Rhinitis	Symptoms	Intranasal corticosteroids

15.2.3.6 Assessment and follow-up

- Set up asthma follow-up clinic
- Conduct regular review of asthma control and assess future risk of adverse out comes (exacerbation, persistent airflow limitation, persistent exposure to allergens and medication side effect) ranging from two weeks up to every three or six month depending the clinical urgency
- Manage and assess comorbidities
- Assess lung function test every 3-6 month
- Check for adherence to medications and reinforce
- Assess future risk of exacerbation persistent airflow limitation and side effects
- Identify barriers for adherence
- Check inhaler technique
- Step up or step down depending on asthma control
- Adjust action plan

15.2.4 Definition of good asthma control

Table 15.4 Definition of asthma control

Characteristic	Controlled	Partly Controlled	Uncontrolled
Day time symptoms	<2/week	<2week	3 or more of partly controlled
Limitations of activities	None	None	
Nocturnal symptoms	None	None	
Need for reliever	<2/week	>2/week	
Lung function (PEF/FEV1)	<2/week	<90% predicted	
Exacerbation	Normal	1 or more/year	

15.2.5 Referral

- In the time of difficulty to diagnose.
- All patients whose asthma is not controlled with step 2 at the clinic level and primary health care level
- Patients who have recurrent acute exacerbation despite being on appropriate steps
- Difficult to initiate inhaler
- Patients on step 3,4, 5 whose asthma is not controlled.
- Exercise induced asthma
- All Patients at step 5

Exercise induced asthma (EIB)

EIB is an airflow obstruction caused by physical exercise It causes shortness of breath, wheezing, coughing and other symptoms during or after exercise.

Management

- Salbutamol inhaler 2 puff 20 minutes before exercise
- Severe form of EIB caused by light exercise might need low dose of inhaled corticosteroids daily

Management of acute exacerbation of asthma

- Check reparatory rate
- Check oxygen saturation
- Start oxygen
- Start Salbutamol nebs every 20 minutes
- If no response adds Ipratropium bromide to salbutamol
- Give prednisone 1mg/kg stat
- If still no response
- Start magnesium sulfate 40mg/kg and continue oxygen and salbutamol nebs with ipratropium bromide
- And refer to high level of care

Treatment Algorithm for Management of Acute Mild, Moderate and Severe Asthma

- Initial assessment and treatment
- History, physical examination, PEFR, FEVI atrial blood
- Oxygen to achieve SaO2>92%
- Inhaled high-dose B2 against every 20 mins for 1 hour via pMDI with space 10-20 puffs for adults and 2-10 puffs fro children at a time or nebulize with Salbutamol (5mg)
- Oral Prednisone 0.5mg

Review during the first hours

Assess physical signs at 15–60 min

Good response

If all are found

- Response sustained 60 min after last treatment
- Physical exam normal (RR, PR, Chest)
- PEFR> 75%
- No distress
- SaO2<92%

Discharge home

- Continue B2 agonist via MDI
- Prednisone 40mg daily for 7days
- Patient education
- Check inhaler technique
- Provide action plan
- Arrange medical follow-up

Incomplete response in 1-2 hours

If any present

- History high risk patient
- Features of mild to moderate attack
- PEFR>50% but <75%
- SnO2 not improving

Admit to hospital

- Nebulize with Salbutamol 5mg neb every 20 minutes continuously
- Oxygen, IV line-fluids
- Oral prednisone 0.5mg/kg or hydrocortisone 100-200mg 6 hourly
- Add anticholinergic ipratropium bromide 0.5mg (1ml) via nebulizer or MDI
- Add Mg SO4 2g/30min infusion
- May repeat Mg SO4 in 12 hours
- Add IV B2 agonist (Salbutamol)
- Consider trying an adrenaline nebulizer, if no relief with multiple doses of Salbutamol nebuliser
- Adrenaline nebs 1:1000 1.5ml in 2-5, mL NS
- Continuous review for complications

Poor responsible in 1-2 hours

If any present

Symptoms or signs of severe or life-threatening asthma drowsiness, confusion exhaustion, silent chest absent, wheeze, cyanosis, bradycardia

PEFR<50%

PaCO2>6Pa

Admit to ICU

- Continuous inhaled B2 agonist with ipratopium promised via nebulizer
- Oxygen, IV fluids
- Iv corticosteroid 6 hourly
- Add MgSO4 2g/30min IV infusion
- May repeat MgSO4 in 12 hours
- Add IV B2=agonist (salbutamol)
- Consider trying an adrenaline nebulizer, if no relief with multiple doses of salbutamol nebulizer
- Adreline nebs 1:1000 1.5ml in 2-5mL NS
- Possible intubation and mechanical ventilation

15.3 COPD

Is a common preventable and treatable disease characterised by non-fully reversible persistent airflow limitation that is usually a progressive and associated with enhanced chronic inflammatory response in the air ways and the lung to noxious particles or gases.

15.3.1 Classification

Chronic Bronchitis

- Is defined as excessive tarcheo-bronchial mucus production resulting in productive cough that occurs for at list 3 months in a year for 2 more consecutive years.

Emphysema

- Emphysema Abnormal dilatation of terminal air spaces with destruction of alveolar septum diagnosed pathologically

Table 15.7 Symptoms

Early Symptoms	With advanced disease
Shortness of breath	Fatigue
Cough	Anorexia
Increased sputum production	Weight loss
Chest tightness	
Wheezing	

Signs

Signs
o Hyper inflated chest + poor chest expansions o Hyper resonant chest with cardiac dullness on percussion o Cricosternal distance o Use of accessory muscles o Paradoxical movements of lower ribs o Peripheral edema cyanosis o JVP

15.3.2 Diagnosis

History

- Age usually >35; history of smoking and check for above symptoms or/and signs

Tests

- FEV1/FVC <0.7(<70%)
- PEFR
- FBC to identify polycythemia or anaemia

Differential diagnosis

- Asthma
- CHF
- Tests
- Bronchiectasis
- Tuberculosis

Severity

Table 15.8 MRC (Medical Research Council) dyspnea scale

Grade	Degree of Breathlessness related to physical activity
1	Not troubled by breathlessness except on strenuous exercise
2	Shortness of breath when hurrying or walking up slight hill
3	Walks slower on level ground because of breathlessness or hast to stop for breath
4	Stops for berth after walking about 100m or after a few minutes on level ground
5	Too breathless to leave the house or breathless on dressing/undressing

Table 15.9

Severity of COPD and expected clinical picture		
Severity	**Clinical state**	**Spirometer**
Mild	Cough but little or breathlessness	FEV1 50-80%
Moderate	Breathlessness, wheezes on excretion, cough + sputum	FEV1 30-49%
Severe	Breathlessness on excretion	FEV1 <30%

15.3.3 Treatment

Non pharmacological

- Smoking session
- Exercise
- Nutrition Weight loss in obese patients improves exercise tolerance
- Influenza and pneumococcal vaccine

Algorithm for the Management of COPD

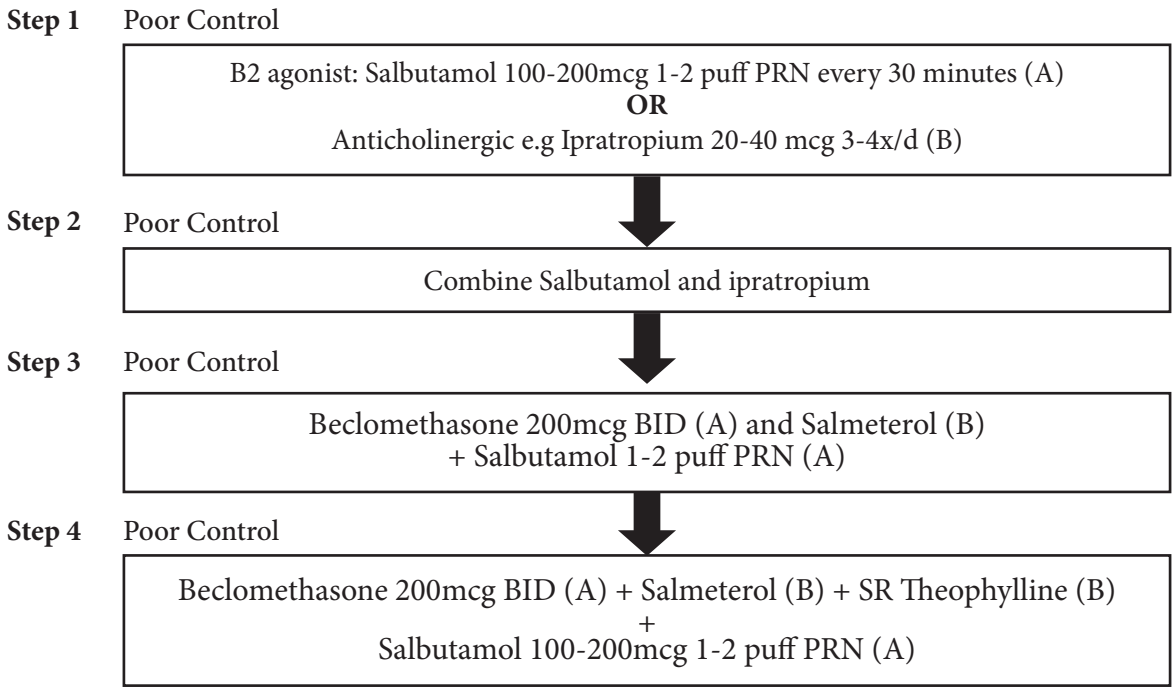


Figure 15.2

Clinical Feature	Treat at Home	Treat at Hospital
Ability to cope home	Yes	No
Breathlessness	Mild	Severe
General condition	Good	Poor-deteriorating
Level of activity	Good	Confined to bed
Cyanosis	No	Yes
Worsening of peripheral edema	No	Yes
Level of consciousness	Normal	Impaired
Social circumstances	Good	Living alone/not coping
Acute confusion	No	Yes
Rapid rate of onset	No	Yes
Significant comorbidity eg cardiac diseases, IDDM	No	Yes
Changes on CXR	No	Present

Referral:
- For clinic and primary health care refer after step 1
- For difficult diagnosis, refer at any level
- For hospital refer to specialist after step 2

15.3.4 Acute Exacerbation of COPD

- Refers to worsening of previous stable condition

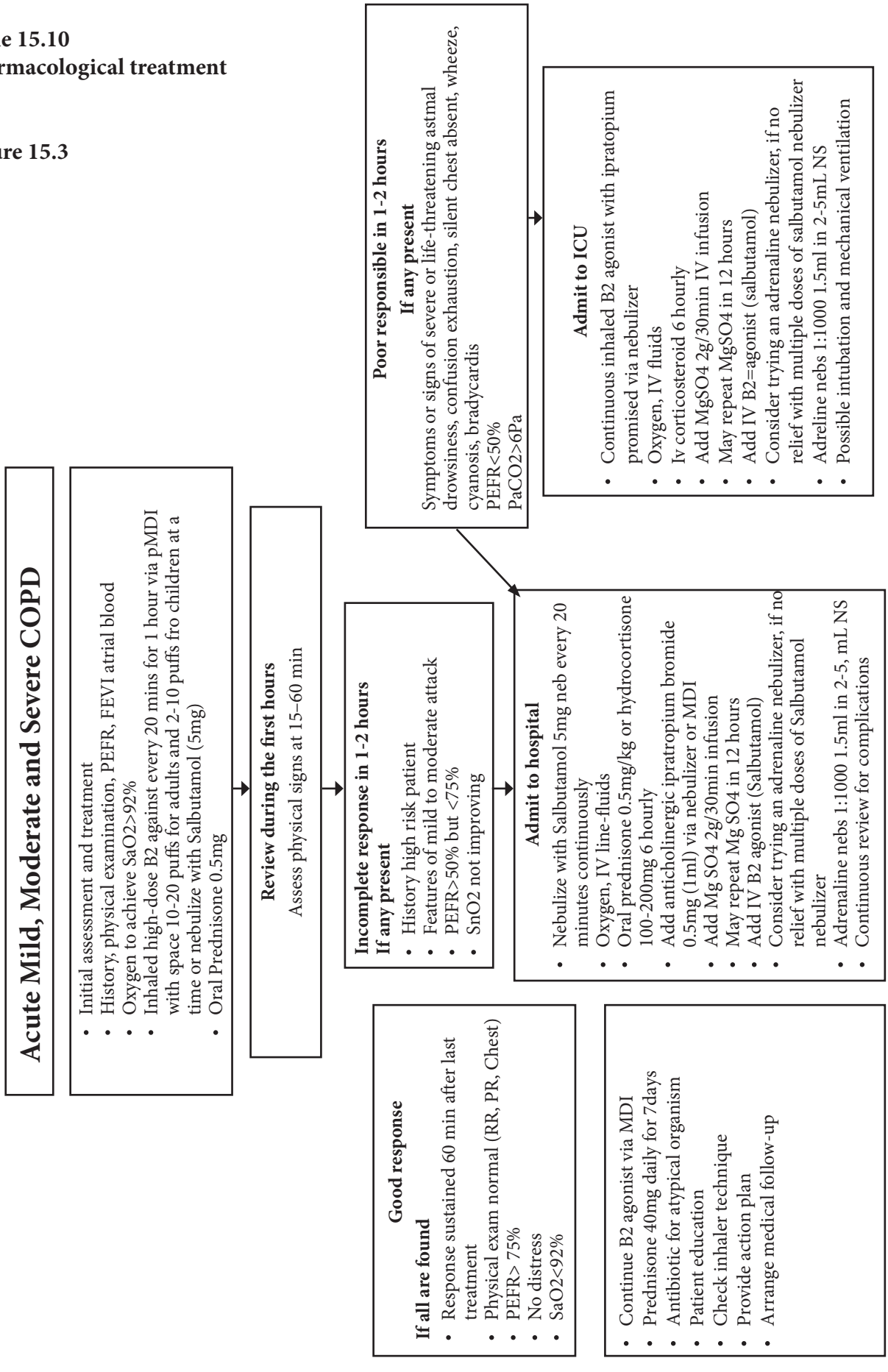
Causes of exacerbation
- Viral upper and lower respiratory tract infection
- Pollutants e.g. Nitrous oxide, ozone

Investigations
- Pulse oxymeter to assess severity
- Saturation: <92% suggest hypoxemia
- CXR –consider if diagnostic doubt and or to excluded other causes of symptoms
- Sputum culture: not recommended routinely in the community

Management
- Decide whether to treat acute exacerbation at home or in the hospital

Table 15.10
Pharmacological treatment

Figure 15.3



15.3.5 Follow-up

- Reassess patient 4-6 weeks after discharge
- Reassess inhaler technique
- Emphasise the benefit of lifestyle modification-smoking cessation exercise, weight loss if obese
- Arrange ongoing regular follow-up

15.4 Acute Bronchitis

- It is the acute inflammation of tracheobronchial tree that usually follows an upper respiratory infection. It is usually viral and can complicate chronic bronchitis duet to Haemophilus influenza and streptococcus pneumonia.

Symptoms

- Cough and sputum (main symptoms)
- Wheeze
- Dyspnea

Treatment

- Symptomatic treatment
- Inhaled bronchodilators for air flow limitation
- Antibiotics usually not needed in previously healthy adult or child

- Use antibiotics only if evidence of bacterial infection with fever, increased sputum volume and sputum purulence

	Medicine	Dose	Frequency	Duration	Codes
	Amoxycillin po	500mg	Three times a day	5 days	A V
If mycoplasma is suspected	Doxycycline po	100mg	Once daily	5 days	A E

15.5 Influenza and common cold

Influenza causes relatively depilating illness and should not be confused with common cold

Table 15.11

Clinical Feature	Treat at Home	Treat at Hospital
Symptoms	**Common Cold**	**Influenza**
Incubation period	12 hours to 5 hours	1-3 days
Fever	±	++
Cough	Later	±
Sore throat	+ +	-
Sneezing	+	+
Muscle aches	-	+
Toxemia Causes	-	+
Causes	Rhinovirus Parainfluenza Coronavirus	Influenza A Influenza B

Complications
- Secondary bacterial infection
- Pneumonia due to staphylococcus aureus

Treatment
Non pharmacological
- Bed rest until fever subsides
- Analgesics: paracetamol
- Fluids: maintain high fluid intake
- Cough mixture is not indicated

Prevention
- Influenza vaccination

15.6 Pneumonia

It is inflammation of lung tissues characterised by cough with purulent sputum, fever and pleuritc chest pain. At times patient might present with constitutional symptoms (fever malaise and headache) which requires high index of suspicion.

Pneumonia could be typical (community acquired) or atypical.

Typical Pneumonia Causes

Streptococcus pneumonia (majority) and Haemophilus pneumonia.

Atypical Pneumonia Causes
- Mycoplasma pneumonia, Legionella pneumonia, Chlamydia pneumonia and chlamydia psittaci.
- Coxiella burnetti.

Diagnosis
- Symptoms
- Chest xray

Treatment
- Typical Pneumonia

	Medicine	Dose	Frequency	Duration	Codes
First line	Amoxycillin po	500mg	Three times a day	7-10 days	A V
Second line	Amoxicillin clavulanate	675 mg	Three times a day	7-10 days	B E
In severe cases	Amoxicillin clavulanate	1g	Twice a day	3 days	B E

- Atypical Pneumonia

	Medicine	Dose	Frequency	Duration	Codes
First line	Doxycycline po	100mg	Twice a day	14 days	A V
Second line	Erythromycin po	500mg	Four times a day	14 days	B V
In severe cases	Azithromycin po	500mg	Twice a day	7 days	C E

CHAPTER 16

Dermatological Conditions

16.1 Acne vulgaris

An inflammatory disease of the pilosebaceous unit. The disease mainly affects adolescents and young adults but may persist into adulthood.

Causes

- Acne pathogenesis involves a combination of the following factors: follicular hyperkeratinisation leading to obstruction of the pilosebaceous unit, microbial colonisation with P. acnes, increased sebum production, complex inflammatory mechanisms, and hormonal influences.

Grading and classification:

- **Mild acne:**
  - o Predominantly consist of non-inflammatory comedones (blackheads and whiteheads).

- **Moderate acne:**
  - o Consist of a mixture of non-inflammatory comedones and inflammatory pustules as well as inflammatory papules.

- Severe acne:
  - o Consist of widespread nodules and cysts, as well as a preponderance of inflammatory papules and pustules.

Symptoms and signs

- Painful and /or itchy lesions
- Psychological stress due to the presence of the acne
- Blackheads, whiteheads, pustules, inflammatory papules, nodules and pseudocysts on the face, upper arms, upper chest upper back, or shoulders
- May heal with scarring

Nonpharmacological management

Advise the patient to:

- Reduce pilosebaceous duct obstruction by cleansing with mild cleanser and water, avoid excessive washing.
- Avoid greasy or oily moisturisers and hairsprays
- Not to squeeze lesions

Pharmacological management

- **Mild acne:**

	Medicine	Dose	Frequency	Duration	Codes
	Benzoyl peroxide 5% gel	Apply in the morning and wash off in the evening If ineffective or tolerated, increase application to 12 hourly Avoid contact with eyes, mouth, angles of nose and mucous membranes			A N
or	Tretinoin	Apply at night to affected areas at least for 6 weeks. Review patient after 6 weeks			C N

Topical retinoids are indicated for non-inflammatory acne and where benzoyl peroxide alone is not effective. Introduce topical retinoids gradually at night to limit skin irritant effects.

NB: Do Not Use Topical Retinoids In Pregnancy

- **Moderate acne:**
  - o 5% Benzoyl peroxide in morning in combination with topical retinoid at night (as above)

- **For inflammatory acne:**

	Medicine	Dose	Frequency	Duration	Codes
	Doxycycline po	100mg	Once daily	3 months	A V
In women	Cyproterone combined oral contraceptives	1 tablet	Once daily	3 months	B E

Exclude family history of breast cancer or thrombosis before using cyproterone.

Refer
- No improvement after 3 months
- Development of severe complications
- Severe acne

16.2 Furuncles, Carbuncles and Abscesses

A furuncle (boil) is a localised painful infection of a hair follicle, involvement of multiple, adjacent follicles is termed carbuncle. An abscess is a localised infection of the dermis. Most common causative organism is Staphylococcus aureus. Common locations are the face, neck, axillae, buttocks, perineum, and thighs.

Symptoms and signs
- Furuncles appear as firm, tender, red nodules
- Carbuncles begin similarly but become larger in size and can develop multiple draining sinus tracts
- Lesions first firm, but then become soft, with yellow centre; open spontaneously

Nonpharmacological management
- Encourage general hygiene.
- Advise the patient to apply local hot compresses three times daily until the abscess starts draining.
- Drainage of abscess is treatment of choice; surgical incision should be performed only after the lesion is mature (flactuant).

Pharmacological management
Exclude underlying precipitating factors, especially diabetes or immunosuppression.
Systemic antibiotics are indicated for; facial abscess, tender swollen draining lymph nodes, fever, multiple lesions or extensive surrounding cellulitis.

	Medicine	Dose	Frequency	Duration	Codes
	Cloxacillin po	500mg	Four times daily	5-10 days	A E
In penicillin allergy	Erythromycin po	500mg	Four times daily before meals	5 days	A E
or	Clindamycin po	450mg	Three times daily	5 days	C E

Refer

- If no response to antibiotic therapy

16.3 Impetigo

Impetigo is a contagious superficial infection of the skin due to S. aureus and Streptococci that occurs mainly in children. Most seen on the face and/or extremities. Risk factors for infection are; nasal carriage, breaks in the epidermal barrier, eg, atopic dermatitis, arthropod bites, trauma and scabies. Post-streptococcal glomerulonephritis is a potential complication.

Symptoms and signs

- Itchy vesicles/ pustules/ bullae that often start around the nose and may spread to other areas of the body, eg, extremities.
- Lesions have surrounding redness
- Lesions rupture and form characteristic 'honey-colored' crusts
- Heals without scarring

Nonpharmacological management

Advise patient to:

- practice good personal and household hygiene to avoid spreading the infection and to reduce carriage of organism
- Keep breaks in the skin clean.
- Cut fingernails short.
- Wash and soak sores in soapy water to soften and remove crusts.

Pharmacological management

	Medicine	Dose	Frequency	Duration	Codes
	Povidone iodine solution 10%	Apply three times daily		7 days	A E
or	Mupirocin cream	Apply three times daily		7 days	B E
or	Silver sulphadiazine cream	Apply three times daily		7 days	A E

Antibiotic treatment is necessary only if the patient is severely ill, has fever, or has swollen lymph nodes.

	Medicine	Dose	Frequency	Duration	Codes
In adults	Cloxacillin po	500mg	Four times daily	5-7 days	A E
In children under 2yrs	Cloxacillin po	62.5mg	Four times daily	5-7 days	A E
In children 2-10yrs	Cloxacillin po	125mg	Four times daily	5-7 days	A E
In children over 10yrs	Cloxacillin po	250mg	Four times daily	5-7 days	A E

Alternatively,

	Medicine	Dose	Frequency	Duration	Codes
In adults	Cloxacillin po	500mg	Four times daily	5-7 days	A V
In infants 0-6m	Cloxacillin po	62.5mg	Four times daily	5-7 days	A V
In children 6m-10yrs	Cloxacillin po	125mg	Four times daily	5-7 days	A V
In children over 10yrs	Cloxacillin po	250mg	Four times daily	5-7 days	A V

In penicillin allergy or pregnancy,

	Medicine	Dose	Frequency	Duration	Codes
In adults	Erythromycin po	500mg	Four times daily	10 days	A E
In children 5-10kg	Erythromycin po	62.5mg	Four times daily	10 days	A E
In children 10-15kg	Erythromycin po	125mg	Four times daily	10 days	A E
In children over 15kg	Erythromycin po	250mg	Four times daily	10 days	A E

Refer
- If no improvement in 10 days
- Complications such as glomerulonephritis

16.4 Erysipelas

Erysipelas is an infection of the skin involving the upper dermis that characteristically extends into the superficial lymphatics. It is mainly caused by by Streptococcus pyogens. Commonly affected areas are the face, arms and legs. The infection rapidly invades and spreads through the lymphatics, prompt treatment is therefore necessary.

Symptoms and signs
- Red, swollen, tender and hot area of the skin, with well-defined edges
  - o Can be oedematous; pits when pressed
  - o Enlarges each day
- Occasionally, there may be superimposed pustules, vesicle, or blister on the surface of the infected skin
- May be associated with body weakness and pain, chills, fever, and vomiting

Nonpharmacological management
- Wet, hot packs applied for 15 minutes 4 times a day help to relieve the pain and stop the infection from spreading.
- Bed rest, elevate the affected limb

Pharmacological management:
Pain control in adults

	Medicine	Dose	Frequency	Duration	Codes
	Ibuprofen po	400mg	Three times daily after food	5-10 days	A E
or	Paracetamol po	1g	Three to four times daily	5-10 days	A E

Antibiotic therapy

	Medicine	Dose	Frequency	Duration	Codes
	Cloxacillin po	500mg	Four times daily before food	7-10 days	A E
or	PhenoxymethyLpenicillin po	500mg	Three times daily	7-10 days	A V
in penicillin allergy	Erythromycin po	500mg	Four times daily	7-10 days	A E
or	Clindamycin po	450mg	Three times daily	7 days	C E

Children

	Medicine		Dose	Frequency	Duration	Codes
	PhenoxymethyLpenicillin po – 0-3 years		125mg	Three times daily	7 days	A V
	PhenoxymethyLpenicillin po – 3-8 years		250mg	Three times daily	7 days	A V
	PhenoxymethyLpenicillin po –>8 years		500mg	Three times daily	7 days	A V
in penicillin allergy	Erythromycin po –	0-3 years	125mg	Four times daily	7 days	A E
		3-8 years	250mg	Four times daily	7 days	A E
		>8 years	500mg	Four times daily	7 days	A E

Referral

- Urgent: for debridement if necrotising fasciitis is suspected, i.e gangrene, heamorrhagic bullae
- To surgeon for non-response

16. 5 Cellulitis

Cellulitis is a diffuse, spreading infection of the skin, usually following some break or injury of the skin. This affects all the layers (i.e., epidermis, dermis, and subcutaneous tissue), and it does not have clear edges. Most commonly due to streptococcus pyogens or S. aureus.

Symptoms and signs

- Pain
- Headache
- Swelling
- The affected area is usually warm, tender, and swollen.
- There is usually lymphadenitis.
- Fever is usually present.
- Area is tender, warm, red, and firm with an ill-defined border.
- ***Note:*** In a child, osteomyelitis must be excluded.

Nonpharmacological management

- Apply hot mops using a clean cloth in heated saline water for 20 minutes 4 times a day.
- Keep area of infection at rest and elevated.

Pharmacological management

	Medicine	Dose	Frequency	Duration	Codes
	Cloxacillin po	500mg	Four times daily before food	7 days	A E
in penicillin allergy	Erythromycin po	500mg	Four times daily	7 days	A E
or	Clindamycin po	450mg	Three times daily	7 days	C E

For pain

	Medicine	Dose	Frequency	Duration	Codes
	Ibuprofen po	400mg	Three times daily after food	5-10 days	A E
or	Paracetamol po	1g	Three to four times daily	5-10 days	A E

Refer

- Severe cases; refer for parenteral antibiotics
- Recurrent cellulitis associated with underlying conditions, e.g., varicose ulcers
- Acute, severe, or fulminant cellulitis with systemic manifestations

16. 6 Atopic Dermatitis (Eczema)

Eczema is a chronic, inflammatory, relapsing skin disorder characterised by vesicles, weeping and crusting in the acute phase; and thickened, scaly skin in the chronic phase. It occurs most frequently in children but also affects adults. A family history of atopy (eczema, asthma, or allergic rhinitis) is a major risk factor. The following may start or aggravate the condition:

- Dry skin
- Perspiration
- Irritating clothing
- Emotional stress

Symptoms and signs

- General—
- Itching
- In infancy (age<2years)—
  - o Dry, rough, red, papular, and often vesicular eruptions. If vesicles are present, lesions weep and then crust over (often features of acute lesions).
  - o Usually starts after 6 weeks of age
  - o Seen commonly on cheeks, forehead, scalp, neck, elbow creases, and behind the knees
  - o The diaper area and central face tend to be spared

- In childhood (age 2 to 12 years)—
  - o Dry, papular, scaling lesions; less weeping and crusting; usually lesions are hyperpigmented
  - o Intensely itchy and scratched skin
  - o Found at wrists, at the elbow creases, behind the knee, and on neck and eyelids
  - o Often associated with widespread dry skin
  - o >50% of children with the disease go into remission by 12 years of age

- In adolescence and adulthood (age>12years)—
  - o Dry, thickened skin with accentuation of normal lines and folds; often hyperpigmented (subacute to chronic involvement)

- Seen commonly at the elbow creases, behind the knees, neck, under the breasts, and on top of feet and hands.
- May show chronic involvement limited to a particular site, eg, the hands or face

Assessing severity

- 1% of body surface is equal to the size of one hand (including the fingers) of patient

Mild

- Less than 5% body surface involved
- No acute changes
- No significant impact on quality of life

Moderate

- 5-30% body surface involved
- Moderate dermatitis with acute changes
- Mild dermatitis with significant impact on quality of life

Severe

- >30% body surface involved
- Moderate dermatitis with acute changes
- Moderate dermatitis with significant impact on quality of life

Nonpharmacological management

- Advise patient to avoid triggering and exacerbating factors—
  - bath with lukewarm water for a short period of time
  - use non-soap cleansers that are neutral to low pH, hypoallergic, non-irritant and fragrance free
  - Avoid wearing rough, occlusive clothing such as wool.
  - Cut fingernails short
  - Avoid scratching, avoid smoking
  - Diet modification has no role, unless double blind challenge testing proves

Pharmacological management

To relieve skin dryness

	Medicine	Dose	Frequency	Duration	Codes
	Emulsifying ointment (UE)	Apply when necessary as a moisturiser		Long term	A N
	Aqueous cream	Wash or bath and apply in dry areas as a moisturizer			A E

Creams are preferred to ointments for open and oozing lesions in body folds.

	Medicine	Dose	Frequency	Duration	Codes
Mild eczema	Hydrocortisone 1% topical	Apply 12 hrly to body and daily to face until control is achieve Apply sparingly on face and use with caution around eyes.			A E
Moderate and severe eczema	Betamethasone 0.1% topical	Apply 12hrly for 7 days to the affected areas tapper to hydrocortisone until control is achieved and apply sparingly to face, neck, and flexures.		7 days	B V
Reduce to	Betamethasone 25-50% in emulsifying ointment (V/V) topical		Apply 12 hourly	7 days	C N

Maintenance therapy
Improve skin barrier function, control subclinical inflammation, and reduces the frequency of flares
Permanent use of bland moisturisers and cleansers as described above. Apply low potency steroid once a week to areas usually affected

Refer
- If no improvement
- Severe disease
- Potent topical corticosteroids such as clobetasol to be initiated at tertiary institutions
- Systemic immunosuppressants such as prednisolone, azathioprine and cyclosporine are to be specialists initiated

16.6.1 Infected Eczema

Usually due to Staphylococcal and Herpes Simplex infection
- Antibiotic therapy
  - For Staphylococcal infection:

	Medicine	Dose	Frequency	Duration	Codes
	Cloxacillin po	500mg	Four times daily before food	5 days	A E
in penicillin allergy	Erythromycin po	500mg	Four times daily	5 days	A E

Eczema herpeticum

	Medicine	Dose	Frequency	Duration	Codes
	Acyclovir po	400mg	Three times daily after food	7 days	C E

For sedation and relief of itch

	Medicine	Dose	Frequency	Duration	Codes
	Chlorpheniramine po	4mg	At night as needed	5 days	A E
or	Loratadine po	10mg	In the morning as needed	5 days	B E

Referral
- Non-responsive or complicated cases
- Uncertain diagnosis

16. 7 Seborrhoeic dermatitis

Seborrheic dermatitis (SD) is a chronic, recurring inflammatory skin disorder. The condition often occurs as an inflammatory response to Malassezia furfur and tends to occur on seborrheic areas such as the scalp, face, chest, back, axilla and groin areas. Affected individuals are usually healthy, although it has been associated with HIV, Parkinson disease and other neurologic disorders.
SD occurs in infants between the ages of 2 weeks and 12 months, during adolescence and adulthood.

Symptoms and signs
- Infantile type—
  - Soon after birth to about 12 months
  - Distribution "cradle cap," groin, axillae, neck, behind ears
  - Often moist and infected

- Scalp—
  - Diffuse or localised around hair margins
  - Dry or greasy scaling

- Face—
  - Found in eyebrows, nasolabial folds, and moustache area
  - Cheeks, malar area
  - Blepharitis may be present

- Intertriginous eczema
  - Found in the skin folds of axillae, groins, behind the ears, in scrotum area; also found under the breasts, umbilicus and in the abdominal creases

- Otitis externa—
  - Associated with eczema of the outer canal and concha of the ear.
- HIV and seborrheic dermatitis
- SD tends tend to be more extensive and severe in HIV/AIDS patients. It may involve unusual sites such as the extremities and may be difficult to control. The disease may also be a cutaneous manifestation of immune reconstitution inflammatory syndrome in patients on ART.

Nonpharmacological management
- Advise patient (As for atopic dermatitis)

Pharmacological management

	Medicine	Dose	Frequency	Duration	Codes
	Aqueous cream	Use for bathing			A E
or	Emulsifying ointment	Apply as needed			A N
and	Hydrocortisone cream 1% topical	Applied to affected area 2–3 times daily		until improved	A N
for face and scalp lesions	Clotrimazole cream topical	Apply to the affected area twice daily		2 weeks	A V
for scalp itch, scaling and dandruff	Selenium sulphide shampoo	Apply 2 -3 times weekly by lathering on the scalp. Rinse off after 5 - 10 minutes			C N
for moisturisation	Liquid paraffin topical	Apply daily to scalp as a moisturiser			A N
sedation and pruritis control	Chlorpheniramine po	4mg	nocte	until itch is controlled	A E

16. 8 Fungal skin infections

The clinical presentation of fungal infections of the skin vary according to organism, body site infected and the body's response to the infection.

16.8.1 Tinea pedis

Most frequently due to Trichophyton rubrum. T. pedis has various patterns and may affect one or both feet. The infection can also spread to hands and groin via contact.

Symptoms and signs

- Intense itching and burning in between the toes and on the sole of the foot
- Vesicles, scales, and fissures between the toes and on the sole of the foot; may also appear in the hands and groin
- Secondary infection: signs of redness, swelling, and purulent discharge
- The skin between the toes becomes soft, white, and moist
- Patchy fine dry scaling on the sole

Nonpharmacological management

Advise patient to:

- Avoid the use of shared bathing or swimming areas until healed
- Use own towels and toiletries
- Keep feet dry:
- Wear open shoes or sandals
- Wipe out shoes with formalin
- Wear cotton socks (if socks are worn)
- Wash socks daily with soap and water
- Dry between toes after washing the feet or walking in water
- Wash feet with soap and water before treatment application

Pharmacological management

- Topical treatment: apply to the affected area after drying.

	Medicine	Dose	Frequency	Duration	Codes
	Clotrimazole cream topical	Apply three times a day until clear of disease. Continue applying for at least 2 weeks after the lesions have cleared.			A V
If unsuccessful	Ketoconazole po	200mg	Once daily	10 days	A E
		Apply antifungal powder after bathing			
Secondary bacterial infection	Erythromycin po	250-500mg	Every 6 hours	7 days	A E

Refer

- If no improvement after 4 weeks
- If involvement of the nails

16.8.2 Tinea corporis (ringworm of the body)

Tinea corporis is a superficial fungal infection of the body caused by dermatophytes. The lesions are often on exposed parts of the body such as the face but can be found anywhere on the body: arms and breasts, around the waist, buttocks, groin, and back.

Symptoms and signs

- Itchy ring-like patches that enlarge circumferentially
- Ringed, red, scaly, centrally clearing lesion with raised borders (may have vesicles or pustules).
- Central area may heal with hyperpigmentation in dark skin
- Lesions usually on exposed surfaces such as the face and arms; usually on the trunk
- More common in children but also occurs in adults
- Can be single or multiple
- Extensive disease is common in HIV and with steroid applications

Nonpharmacological management

Advise patients:

- Not to share clothes, toilet articles, or towels
- To wash skin well and dry before applying treatment

Pharmacological management

	Medicine	Dose	Frequency	Duration	Codes
	Clotrimazole cream topical	Apply to the affected area three times daily 2 weeks Continue using cream for at least 2 weeks after lesions have cleared			A V
For itch control	Chlorpheniramine po	4mg	Nocte	As long as necessary	A E

Refer

- For extensive disease
- Poor response to treatment within 2 weeks

16.8.3 Tinea capitis (scalp ring worm)

Tinea capitis is a disease caused by superficial fungal infection of the skin of the scalp, with a propensity for attacking hairshafts and follicles. Most common in young children.

Symptoms and signs

- Asymptomatic dry scaly patches on scalp usually with moth-eaten hair loss
- The hairs are broken off at the scalp surface which is scaly
- Kerion maybe present: very inflamed abscess like-l mass that may result in permanent scarring

Non- pharmacological management

- Do not share hairbrushes, combs and towels

Pharmacological management

Children

	Medicine	Dose	Frequency	Duration	Codes
	Ketoconazole shampoo 2%	Apply directly to wet scalp, wash off after 5-10 minutes. Use 3 times weekly.			C N
plus	Griseofulvin po	125-250mg	Daily	6 weeks	A N
and	Benzoic acid ointment	Apply to the scalp	Twice daily	6 weeks	A E
or	Clotrimazole cream	Apply to scalp twice daily	Continue treatment for 2 weeks after lesions clear		A V

For Adults

	Medicine	Dose	Frequency	Duration	Codes
	Griseofulvin po	500mg	Daily	6 weeks	A E

Continue others as above.

Note: take griseofulvin with a fatty meal

Refer
- Uncertain diagnosis
- Poor response within 1 month
- Suspected kerion

16.8.4 Pityriasis (Tinea) versicolor

Common yeast infection of the skin due to Malassezia, in which flaky discolored patches appear on the upper chest and upper back. Most commonly affects young adults and more common in men than women. It is more common in hot, humid climates. It may clear in the winter months and recur each summer.

Symptoms and signs
- Pale or dark scaly patches on upper chest and back
- May affect other seborrheic areas such as the face and upper arms
- Scale maybe subtle but becomes more obvious with gentle scratching or stretching of the skin
- Usually asymptomatic

Non-pharmacological management
- Avoid wearing heavy clothing in hot weather to avoid perspiration

Pharmacological management

	Medicine	Dose	Frequency	Duration	Codes
	Selenium sulphide shampoo 2% lather shampoo on affected areas, leave on for 30 minutes, then wash-off			7 days	C N
	Clotrimazole cream	Apply to affected area	Twice daily	Two weeks	A V

Note: warn patients about white marks persisting long after the scaling and yeast have gone, in such an instance further treatment is unnecessary. Recurrences when conditions for yeast proliferation are conducive is common.

Refer
- Unclear diagnosis
- Poor response to treatment

16.9 Scabies

A common skin infestation caused by, Sarcoptes scabiei. The disease is acquired from contact with infected persons, their clothing, or bed linen contaminated with the adult female mite, its eggs, larvae, or nymphs.

Symptoms and signs
- Patient has intense itching, usually most severe at night.
- Burrows appear in thin lines ending in papules, vesicles or numerous pustules.
- Locations of the lesion includes webs of finger and toes, wrists, elbows, genitalia, buttocks, and umbilical area,
- With increasing pruritus, signs of scratching appear, and secondary bacterial infection may occur
- An allergic erythematous non-specific popular rash may appear, sparing the head and neck
- The face and neck are seldom affected.
- In infants, it may present with bullous formation on the palms and soles.

Nonpharmacological management

- All members of the household should be examined.
- Advise the patient to:
  - o Cut fingernails short, and keep them clean
  - o Wash all linen and underclothes in hot water
  - o Thoroughly wash the whole body with mild soap and water, scrubbing the affected areas with a brush or wash cloth
  - o Rub the affected areas with a washcloth, and dry well with a clean towel
  - o Put on clean, washed clothes after medicine treatment

Pharmacological management

	Medicine	Dose	Frequency	Duration	Codes
	Benzyl benzoate 25% lotion	Apply to the whole body from the neck to the feet., avoid the eyes and allow the lotion to dry. Leave on overnight and wash off after 12hours. Repeat for 3 consecutive days, rest for 7 days and reapply for another 3 days. In children under 6 years: dilute lotion with an equal volume of water and repeat after 5 days.			A N
or	Permenthrin 5% cream	Apply to the whole body from the neck to the feet. Avoid the eyes and allow the lotion to dry. Leave on overnight and wash off after 12hours. Repeat for 3 consecutive days, rest for 7 days and reapply for another 3 days. Same dosage in adults and children			C E
and	10% Sulphur in emulsifying ointment	Apply at night for 3-5 consecutive days. Reduce dosage to 5% in children			C E

Notes:

- Benzyl benzoate lotion is toxic if swallowed.
- Itching may continue for 2–3 weeks after treatment.
- Do not continue if rash or swelling develops.
- For Benzyl benzoate, avoid contact with eyes and broken skin or sores.

For scabies with secondary infection—

	Medicine	Dose	Frequency	Duration	Codes
	Cloxacillin po	500mg	Four times daily	5-10 days	A E
in penicillin allergy	Erythromycin po	500mg	Four times daily before meals	5 days	A V
plus	Povidone iodine lotion	Apply twice daily		5-10 days	C E

Benzyl benzoate is contraindicated in septic scabies and on open wounds.
Once the infection has cleared or has dried up benzyl benzoate can be applied as described above.

For scabies in infants—

	Medicine	Dose	Frequency	Duration	Codes
	2% Sulphur in emulsifying ointment	Apply at night for 3-5 consecutive days			C E

For other parasites—
Use a soothing application such as aqueous cream.
Avoid or destroy the insect causing the problem.

Itch control

	Medicine	Dose	Frequency	Duration	Codes
Adults	Chlorpheniramine po	4mg	Nocte	As long as necessary	A E
6-12 years	Chlorpheniramine po	2-4mg	Nocte	As long as necessary	A E
1-5 years	Chlorpheniramine po	1-2mg	Nocte	As long as necessary	A E
6-12 months	Chlorpheniramine po	1mg	Nocte	As long as necessary	A E

16.10 Urticaria

Urticaria is an acute or chronic recurrent inflammatory condition. It is characterised by itchy wheals (hives) and/or angioedema. Acute urticarial lasts for less than 6 weeks, and the chronic type, lasts from 6 weeks to years. Presumptive triggers include viral infections, medications, food ingestion. The cause is not identified in at least 50% of people with chronic urtacaria.

Symptoms and signs
- Itching
- Burning
- Stinging sensations
- Any or all parts of the body may be affected
- The wheals differ greatly in size and shape and usually appear suddenly.
- These are transient lesions last for a few minutes to several hours (usually less than 24 hours) then disappear spontaneously leaving no signs of them.

Nonpharmacological management
- Identify and avoid triggers, eg, non-essential medicines, food

Pharmacological management

Adults

	Medicine	Dose	Frequency	Duration	Codes
	Chlorpheniramine po	4mg	Nocte	As long as necessary	A E
or	Loratadine po	100mg	Mane	2 weeks	A E
for itch	Calamine lotion	1-2mg	Apply twice daily	2 weeks	A E

Children

	Medicine	Dose	Frequency	Duration	Codes
Adults	Chlorpheniramine po	4mg	Nocte	As long as necessary	A E
6-12 years	Chlorpheniramine po	2-4mg	Nocte	As long as necessary	A E
1-5 years	Chlorpheniramine po	1-2mg	Nocte	As long as necessary	A E
6-12 months	Chlorpheniramine po	1mg	Nocte	As long as necessary	A E

	Medicine	Dose	Frequency	Duration	Codes
or	Prednisolone	5mg	Mane	2 weeks	B V
for itch	Betamethasone Cream	Apply twice daily		2 weeks	A E

Review after 2 weeks. Antihistamine doses can be increased to up to 4 times the standard does if tolerated and/ or patient has poor response to standard doses

Refer
- If no improvement or response after 24 hours
- Associated angioedema
- If progressive illness

16.11 Molluscum contagiosum

Molluscum contagiosum is a common cutaneous infection due to a pox virus. It mainly presents in childhood as multiple soft umbilicated papules. Varies from occasional lesions to large crops of lesions particularly in immunocompromised or HIV-infected patients.

Clinical signs and symptoms
- Dome-shaped papules with central depression (umbilication) commonly on face and genitalia but may be found on any site
- Most lesions will resolve spontaneously except in immunosuppression where infection maybe severe

Non-pharmacological treatment
- Allow lesions to heal spontaneously if few in number and the patient not immunocompromised
- Express manually using gloves. Avoid cross infection since disease is contagious
- Counsel on risk reduction for transmission of STI
- Notify that the partner(s) must be examined and treated
- Pharmacological treatment
- Cryotherapy every 2-3 week

	Medicine	Dose	Frequency	Duration	Codes
	Silver nitrate/potassium nitrate (caustic pencil)	Applied daily to lesions until resolution			A E
or	Podophyllin lotion	Apply to lesion 2 -3 times weekly			A E

- Protect the surrounding normal skin with Vaseline when applying podophylline/ caustic pencil

Refer
- Severe disease

16.12 Viral skin infections

16.12.1 Chicken pox

Is a highly contagious viral infection that causes a diffuse vesicular rash, mainly in children. It is caused by the varicella-zoster virus

Clinical signs and symptoms
- Itchy red papules progressing to vesicles. The vesicles rupture to form crusted erosions
- Involves scalp, face, trunk and limbs. Oral mucosa maybe affected
- Prodromal symptoms such as fever, body malaise, headaches
- Usually more severe in adults and can be life threatening

Non-pharmacological treatment
- Trim children's fingernails to minimise scratching

Pharmacological management
- Take warm bath and apply moisturising cream

	Medicine	Dose	Frequency	Duration	Codes
	Paracetamol po	500mg	Three times daily	3-5days	A E
and	Calamine lotion	Apply daily for 3-5 days to minimise itching			A N
In severe cases and immuno-compromised children	Acyclovir po	400mg	Three times daily	7 days	A E

Immunocompromised patients with disseminated disease require IV acyclovir

Refer
- Disseminated and complicated disease

16.12.2 Herpes zoster (shingles)
Dermatomal eruption of painful vesicles on an erythematous base due to the reactivation of varicella-zoster virus. The primary infection presents as chicken pox, usually during childhood. The disease is more common in adults, especially in the elderly, sick or immune suppressed.

Signs and symptoms
- Severe pain in areas of one or more sensory nerves (dermatome)
- Prodrome of fever, body malaise, headaches
- 1 to 3 days later, crops of closely grouped erythematous papules, that progress into vesicles develop within the unilateral dermatome(s)
- The lesions may become pustular, rupture the crusting over occurs
- Post herpetic neuralgia may occur

Non-pharmacological management
- Bed rest
- Isolate from immunocompromised or pregnant non-immune individuals
- Offer an HIV test, especially on patients <50 years of age

Pharmacological management
Anti viral therapy for:
- Zoster in immunocompromised patients, provided that active lesions are still being formed, and
- In immunocompetent individuals provided they present within 72 hours of onset

	Medicine	Dose	Frequency	Duration	Codes
	Acyclovir po	800mg	Three times daily	7 days	A E
and	Silver sulphadiazine or povidone-iodine cream	Apply 3 times a day if secondary bacterial infection is present			A E

Pain control

- o Pain is very severe and needs active control, a combination of different classes of analgesics is often necessary

	Medicine	Dose	Frequency	Duration	Codes
	Paracetamol po	500mg	Three times daily	3-5days	A E
and	Calamine lotion	Apply daily for 3-5 days to minimise itching			A N
In severe cases and immuno-compromised children	Acyclovir po	400mg	Three times daily	7 days	A E

Post-herpetic neuralgia

Intense pain described as burning, stabbing, or gnawing on area of previous herpes zoster

Pharmacological Treatment

	Medicine	Dose	Frequency	Duration	Codes
	Amitriptyline po	25-150mg	At night	Review	A E
and	Gabapentin po	300-900mg	1-2 times daily	2 weeks	C N

Refer

- Refer if there is no improvement of severe neuralgia.
- Refer immediately in case of herpes zoster ophthalmicus for atropinisation
- Urgent referal if there is involvement of the tip of the nose).

16.13 Psoriasis vulgaris

Chronic inflammatory condition of genetic origin often precipitated or triggered by an event such as an infection, injury, drugs or psychological stress. It may be associated with inflammatory arthropathy. Multiple co-morbidities are recognised especially the metabolic syndrome and hence hypertension, dyslipidaemia and diabetes need to be monitored. Severe psoriasis maybe associated with HIV.

Clinical sign and symptoms

- Scaly, itchy plaques on the extensor surfaces of the knees, elbows, sacrum and scalp
- May involve nails and skin folds
- Lesions are symmetrically distributed
- Well dermacated red plaques with thick silvery scales
- Scales easily peel off, bleeds easily with scratching
- Linear plaques on sites of skin trauma (koebner phenomenon)

Non-pharmacological management

- Counselling regarding precipitating factors and chronicity
- HIV test if acute onset and risk factors present
- Encourage sun exposure as tolerated

Pharmacological treatment

	Medicine	Dose	Frequency	Duration	Codes
	10% crude coal tar cream nocte	Apply to affected areas		Review	C E
	Betamethasone ointment 0.1%	Apply to affected areas	12 hourly	Review	B V
reduce to	Hydrocortisone 1%	Apply to affected areas	12 hourly	Review	A E
	5% salicylic acid in emulsifying ointment	Apply to lesions	In the morning	2 weeks	B C
	15% urea in emulsifying ointment	Apply to lesions	At night	2 weeks	C E
for scalp involvement	Tar based shampoos	Use a scalp cleanser	3 times weekly	4 weeks	A E
	Liquid paraffin	Use a scalp moisturiser	Daily	4 weeks	A E
for itch control	Chlorpheniramine po	4mg	When necessary or twice daily	2 weeks	A E

Refer

- All patients
- Potent topical steroids (clobetasol) and systemic immunosuppresants to be initiated academic institutions

16.14 Stevens Johnson Syndrome (SJS) and Toxic Epidermal Necrolysis (TEN)

Rare but life threating skin and mucous membrane conditions most commonly triggered by medications characterised by extensive blistering and peeling off of skin. SJS and TEN are different ends of the same spectrum; in SJS involvement is <10% of body surface area, in TEN epidermal detachment involves >30% of BSA. Common offending medicines include sulfonamides (Cotrimoxazole), NNRTI's (Nevirapine), antiepileptics (Phenobarbitone, Phenytoin, Carbamazepine, lamotrigine) allopurinol, laxatives and herbal medication

Signs and symptoms

- Abrupt development of dusky red macuar rash, progressing to confluence with epidermal necrosis and large blisters which rupture leaving denuded skin
- Patients almost invariably have a prodrome of fever, malaise, and arthralgias
- Haemorrhagic crusts on lips, and erosions in mouth covered by necrotic white pseudo membrane
- Involvement of the eyes in 70–90% of cases: Erosive conjunctivitis, can lead to scarring
- Involvement of genitalia in 60–70% of cases, with painful erosions, can lead to urethral strictures

Complications:

- Dehydration, electrolyte imbalance, shock, hypoalbuminia, hypo & more commonly hyperthermia, high output cardiac failure, secondary infection & sepsis, adhesions & scarring

Nonpharmacological management:

- Stop all medicines, including complimentary, alternative & self-medication
- The foundation of management is supportive, good nursing and prevention of dehydration and sepsis
- Care should be in high care or intensive care unit with dedicated nursing
- Lukewarm high protein soft or liquid diet, NGT feeds for patients unable to feed only
- Keep patient warm

Pharmacological Treatment

Close monitoring (fluids, nutrition, electrolytes, vital organ function, infection, room temperature)
Skin hygiene: Daily cleansing, bland non-adherent dressings (Vaseline gauze, adaptic dressing)

- Mucous membranes: regular oral, genital and eye care to prevent adhesions and scarring

	Medicine	Dose	Frequency	Duration	Codes
	Glyco thymol washes		Every two hours	7 days	A E

Treat genitalia 4 hourly with sitz bath
Ophthalmologic monitoring is essential, as risk of scarring and blindness is high.
Rehydration: IV rehydration for severe cases, oral rehydration is encouraged, will also prevent pharyngeal adhesions.
Systemic antibiotics given only when sepsis is present, not prophylactically.
Appropriate and adequate analgesia should be given 30 minutes before dressings are changed and when necessary.

Referral:
- All patients to regional & tertiary hospital
- Consult with specialist when re-initiation of medication

16.15 Pruritic Papular Eruption (PPE)

A chronic, waxing and waning skin condition characterised by intensely itchy papules located on the extensor of the upper and lower limbs and the trunk. Facial involvement may occur. The condition is associated with stage 2 HIV infection.

	Medicine	Dose	Frequency	Duration	Codes
	Betamethasone cream 0.1%	Apply to affected area	Twice daily	5 days	A E
for severe disease add	Dapsone po	100mg	Once daily	7 days	C E
	Aqueous cream	Apply as moisturiser	When necessary	7 days	A E
for itch control	Loratadine po	10mg	Morning	7 days	A E
plus	Chlorpheniramine po	4mg	At night	7 days	A E

Refer
- Extensive disease
- Failure to respond in 3 months
- Potent topical corticosteroids to be initiated at tertiary hospital

16.17 Hidradenitis supparativa

A chronic disorder of the apocrine glands involving the formation of abscesses and cysts, often accompanied by scarring and sinus tract formation. Commonly found in the axillae, groin, between the thighs, perianal and perineal areas. Flare-ups may be triggered by perspiration, obesity, hormonal changes (such as menstrual cycles), humidity and heat, and friction from clothing.

General measures
- Avoid tight clothing, lose weight and stop smoking

Refer

- All patients must be referred to dermatologist

16.18 Cutaneous Viral Warts

These are benign proliferations of the skin & mucosa caused by HPV infection, commonly affecting children but may arise at any age. They are spread by direct contact or autoinoculation, may be frequently painful & embarrassing. Immunosuppression can result in malignant transformation of the warts. Warts are described based upon location or morphology:

- Palms & soles
- Underneath the nails
- Plane warts
- Common warts

Non-pharmacological Management:

	Medicine	Dose	Frequency	Duration	Codes
	Salicylic acid 10-40% in emulsifying ointment	Apply in the morning to affected areas		One month	C E
plus	Urea in emulsifying ointment 15%	Apply in the evening		One month	C E
or	Liquid nitrogen for cryotherapy	2-3 weekly until wart resolves			C E
or	Caustic pencil (silver nitrate/ potassium nitrate stick)	Apply daily until lesions resolve			B E
or	Podophyllin resin	Paint 2 – 3 times weekly			A E
or	Trichloroacetic acid 80%	Apply weekly until lesion resolves			C E

16.19 Central Centrifugal Cicatricial Alopecia (CCCA)

Vertex of scalp and spreads outwards. More common in women of African descent. Genetic predisposition but triggered by hair care practices such as excessive pulling of hair from tight braiding, chemical, hair extension, permanent irreversible hair loss may result.

Non-pharmacological

Advice patients to stop traction on hair, avoid chemical hair relaxers, discourage perms, weaves and hair extensions.

Promote minimal hair grooming and encourage short natural hair.

Pharmacological

	Medicine	Dose	Frequency	Duration	Codes
Topical	Clobetasol propionate	Apply twice daily		2 weeks	C E
Systemic	Doxycycline po	Once daily Can double dose to twice daily if doxycycline if well tolerated.		6-9 weeks	C E

Refer
Prompt referral to a specialist Dermatologist for initiation of further treatment.

16.20 Acne-Kelodalis Nuchae

Chronic inflammatory disease occurring at nape of the neck and occipital scalp. It results in fibrosis and scarring. Common in patients of African descent.

Pathogenesis
Closely shaven hair curls back into skin creating a foreign body reaction and inflammation. This leads to keloidal scarring overtime which is the major complication. Other contributory factors are chronic irritation from shirt collar, helmets and chronic bacterial infection.

Non-pharmacological
Avoid shaving hair too low, trim to a minimum of 3mm.

Avoid friction of the neck by high collar, helmets

Encourage patients to use their own hair clippers when they go to the barber.

Pharmacological

	Medicine	Dose	Frequency	Duration	Codes
Topical	Mupirocin ointment	Apply twice daily to pustular lesions		2 weeks	B E
plus	Floucinolone acetonide (cortoderm cream)	Apply daily to affected areas		2 weeks	C E
Systemic	Doxycycline po	Once daily for 12 weeks Can double dose to twice daily if doxycycline if well tolerated.			C E

Refer

To a specialist Dermatologist if response inadequate.

CHAPTER 17

PAIN MANAGEMENT & PALLIATIVE CARE

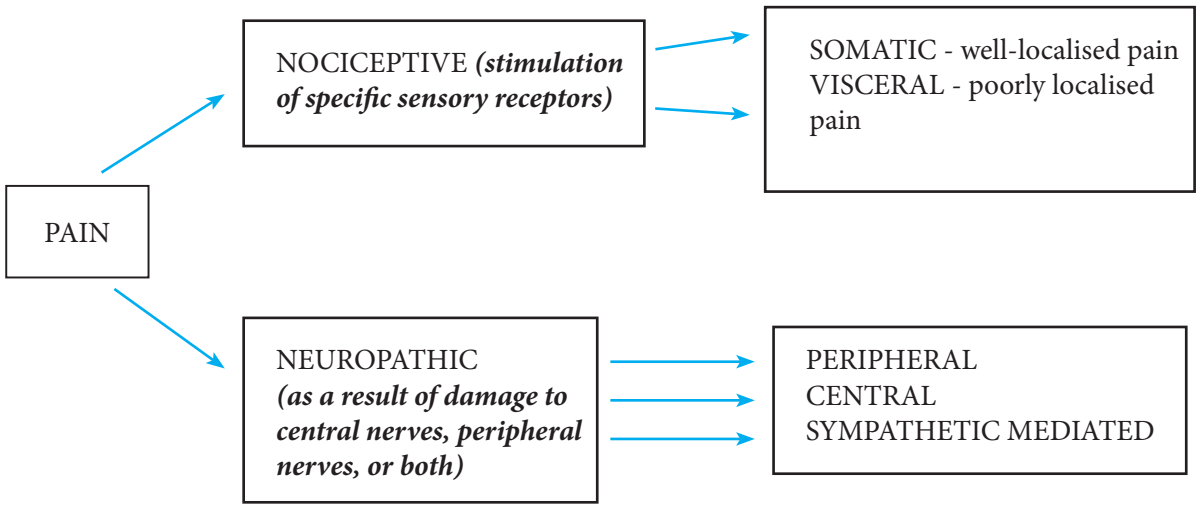
17.1 Pain

Pain is an unpleasant sensory and emotional experience associated with actual or potential tissue damage, or described in terms of such damage. Acute pain is defined as pain of short and limited duration (less than 3 months) resulting from tissue damage. The pain relates to an identifiable cause (trauma, surgery or inflammation). Chronic pain it the pain that persists after the injury heals for more than 3 months.

17.1.1 Types of Pain

It is important to understand the pathophysiology of pain (i.e., nociceptive or neuropathic) because of therapeutic implications.

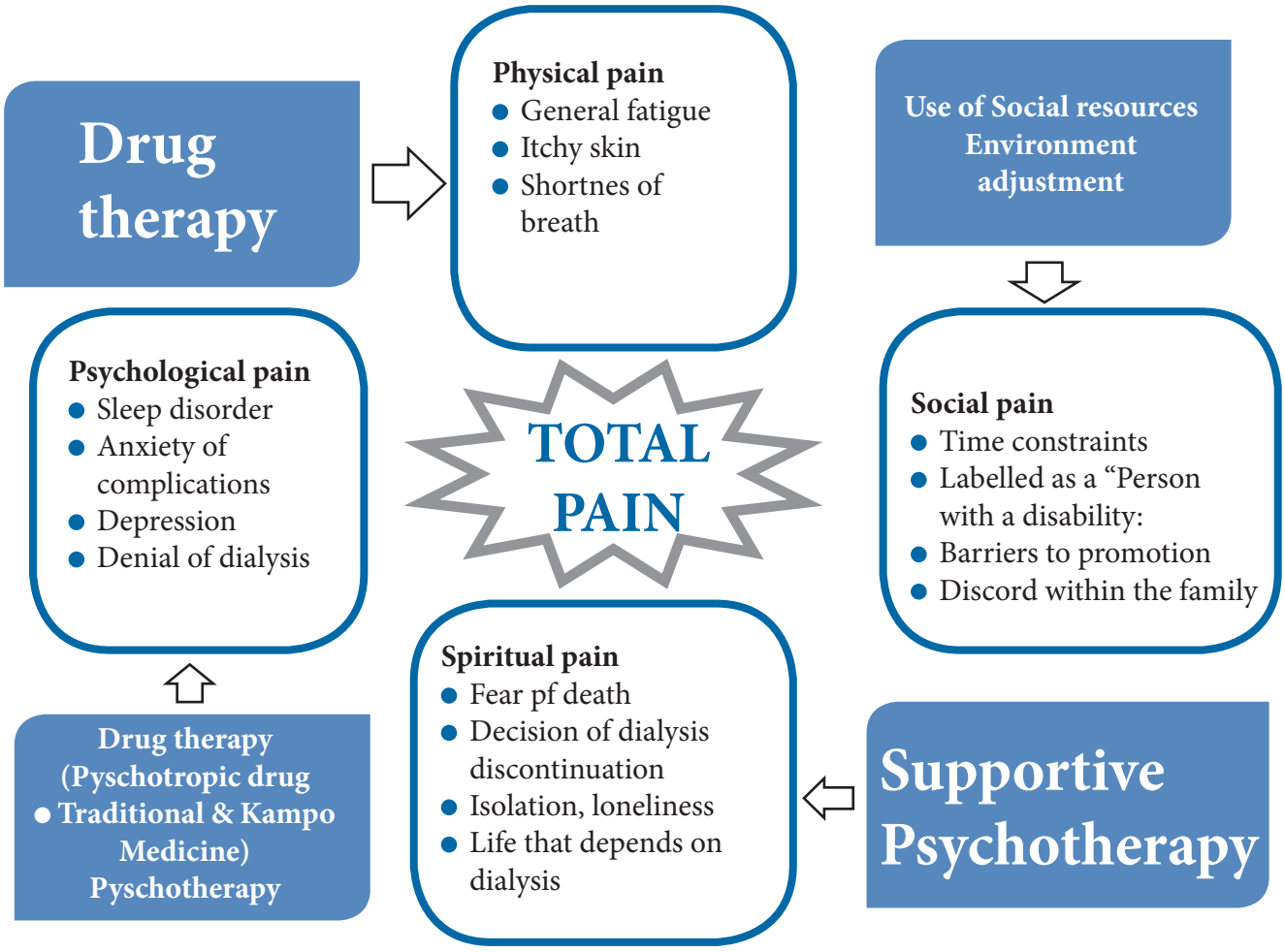
Figure 18.1 Types of Pain



17.2 Concept of Pain

Pain is multidimensional; Cicely Saunders defined the concept of total pain as the suffering that encompasses all of a person's physical, psychological, social, spiritual and practical struggles.

Figure 17.2 Factors contributing to Total Pain



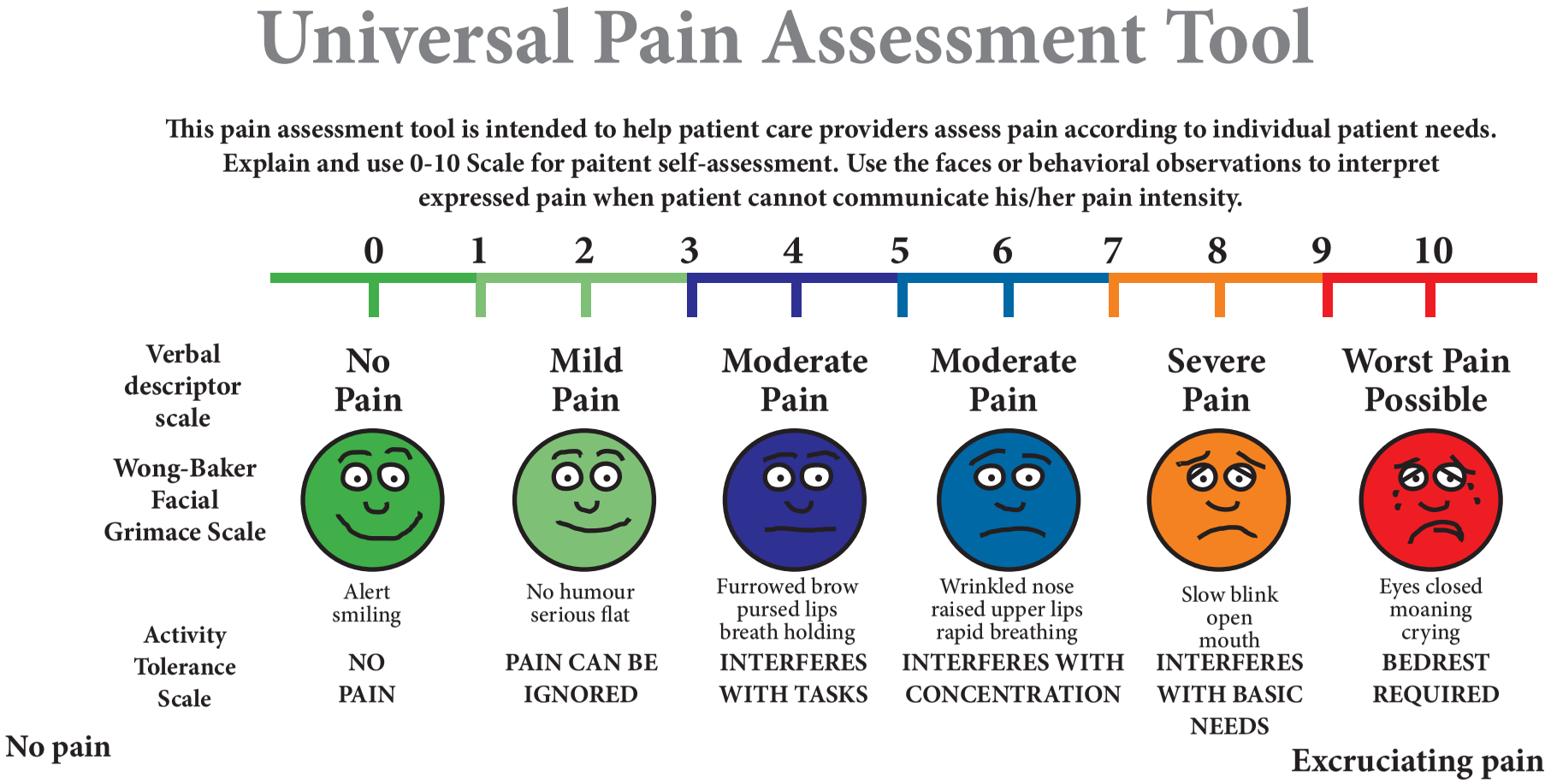
NB. A single individual can be overwhelmed by the concept of total pain so it requires a team approach to address factors that affect pain threshold.

17.3 Pain assessment in adults

Pain severity assessment maybe aided by—

- Visual analogue scales
- Numerical rating scales
- Faces scale

Figure 17.3 Universal Pain Assessment Tool



Adopted from South African Acute Pain Guidelines, 2015

17.4 Pain assessment in children

The body position often reflects pain. Observe the way in which the patient walks, holds his or her body or moves, and the way the body is positioned when lying down. This is particularly important in young children, and those unable to verbalise their pain.

It is useful to—

- Question the child and his or her parents
- Use a pain-rating scale (see Universal Pain Assessment Tool above)
- Evaluate behaviour and physiological changes

Note: A sleeping child, a very quiet child, even a child that is playing is not necessarily pain free. Movement might be painful, or the child might be too sick or too tired to move.

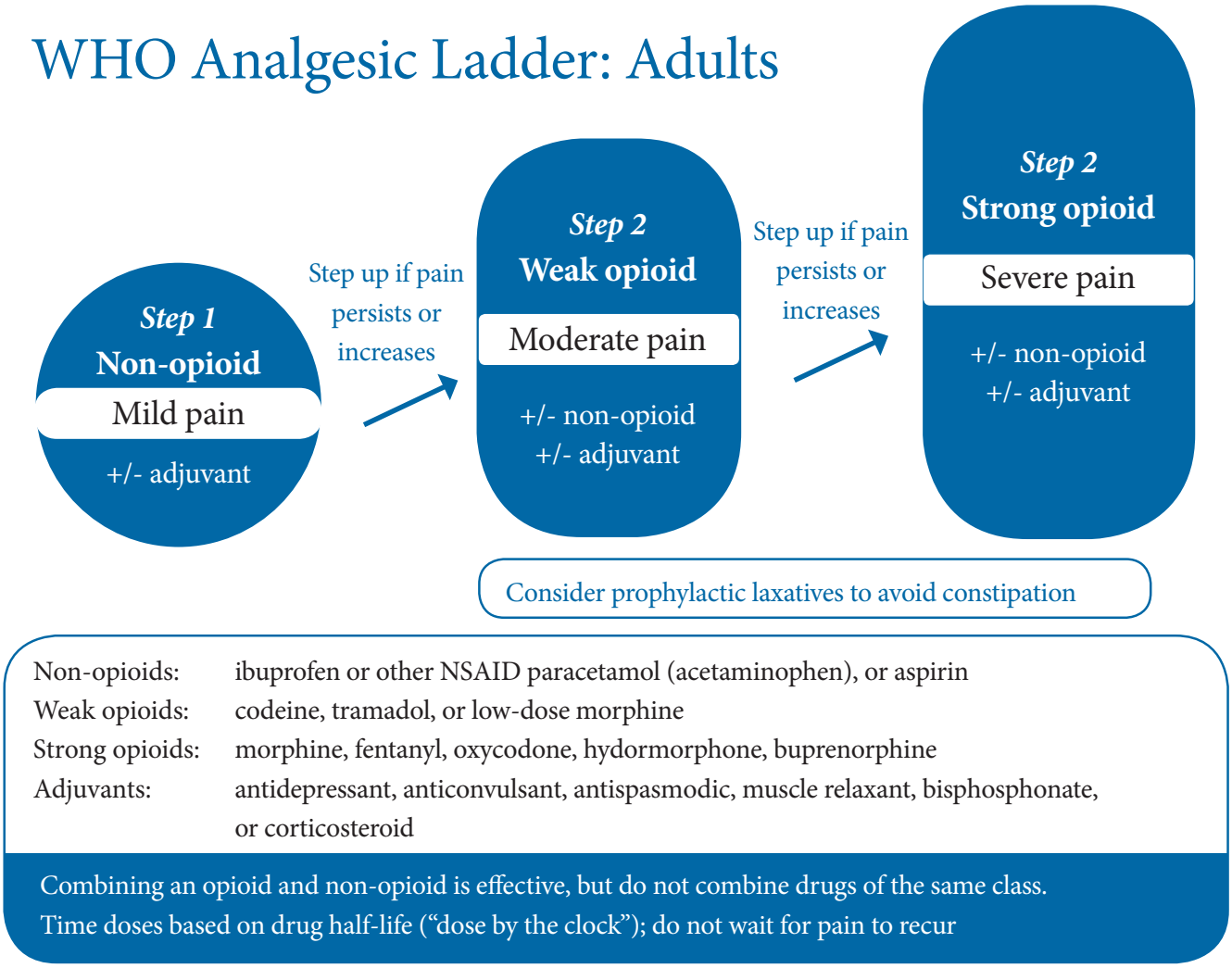
17.5 Principles of Pain management

Pain medication should be taken by:

- By the clock – at regular intervals
- By the mouth – preferable oral medication
- By the ladder – using WHO analgesic ladder
- By the patient – individualise per patient

17.6 Pain management strategy for adults

- Determine the aim of treatment.
- Decide on which analgesics to use first.
- Determine any adjuvants (i.e., co-analgesics) that may be needed to counteract side effects of the analgesics.
- R***efer*** to a social worker or other medical or nonmedical consultant if alternative techniques in managing spiritual, emotional, and social problems are warranted.



17.7 The WHO three-step analgesic ladder

Figure 17.4 WHO Analgesic Ladder: Adults
Adopted from Eswatini National Palliative Care Clinical Guideline

WHO analgesic ladder is a stepwise approach to the treatment of pain

- **Step 1.** Non-opioid + adjuvant (antidepressant). If pain is not controlled by step 1 analgesics, move to step 2 by adding a weak opioid.
- **Step 2.** Non-opioid + opioid for mild to moderate pain + adjuvant. If an opioid for mild to moderate pain has been used to a maximum dose and the patient still has pain, then move to step 3 by changing to a stronger opioid.
- **Step 3.** Non-opioid + strong opioid + adjuvant.

Table 17.1 Medicine to be used in the WHO analgesic pain ladder

Non-opioid

	Medicine	Dose	Frequency	Duration	Codes
	Paracetamol po	500-1g	Three times a day as necessary	Review	A E
		Do not exceed 4 g in 24 hours			
or	Acetylsalicylic acid po	300mg	Four times a day	Review	A E
		Do not exceed 4 g per day. Increased risk of peptic ulceration. Give the prophylactic dose of Omeprazole 20mg po			
or	Ibuprofen po	400mg	Three times a day as necessary	Review	A E
		Do not exceed 1200 mg per day			

Mild to moderate pain: opioid

	Medicine	Dose	Frequency	Duration	Codes
	Codeine phosphate or dihydrocodeine po	30–60 mg	Every 4–6 hours	Review	B E
		Maximum dose is 240mg. Give a laxative to prevent constipation (bisacodyl 5–20 mg)			
or	Tramadol po	50-100mg	Every 6 - 8 hours	Review	B E

Moderate to severe pain: strong opioid

	Medicine	Dose	Frequency	Duration	Codes
	Morphine slow release tablets po	30mg	Every 12 hours when necessary	Review	B E
		Give prophylactic laxative to prevent constipation (bisacodyl 5–20 mg tablets)			
	Morphine oral solution	2.5–20 mg every 4 hours. Dose can be increased by 50% or doubled after 24 hours if pain persists. Give prophylactic laxative to prevent constipation [bisacodyl 5–20 mg tablets]			B E

Management of Opioids related side effects

If patient has this side effect—	Then manage as follows—
• **Constipation**	• Prevent by prophylaxis (unless doing so results in diarrhoea). • Increase fluids and fibre-rich foods. • Give stool softener plus a stimulant **[bisacodyl** 5–10 mg tablets (A)] at the time of prescribing opioids.
• **Nausea or vomiting**	Give an antiemetic, if needed. • **Haloperidol** **—Or—** • **Metoclopramide**
• **Confusion or drowsiness (if due to opioid)** • **Decreased alertness** • **Trouble with decisions**	o Usually occurs at the start of treatment or when dose is increased. Resolves within a few days but can occur at the end of life with renal failure. o Halve dose or increase time between doses. o Provide time with less analgesia when patient wants to be (or needs to be) more fully alert to make decisions.

If patient has this side effect—	Then manage as follows—
• **Twitching (myoclonus); if severe or bothers patient during waking hours**	• If on high dose consider reducing dose or changing opioids. Consult or **refer to higher level hospital**. • Reassess the pain and its treatment. • Give **diazepam** the effect subsides.
• **Somnolence (excessively sleepy)**	o Extended sleep can be from exhaustion due to pain. o If it persists for more than 2 days after starting, reassess level, the type of pain, or both and then consider reducing the dose.
• **Itching**	• May occur with a normal dose. • If present for more than a few days and hard to tolerate, give o **Chlorpheniramine** **—Or—** o **Promethazine**
• **Urinary retention**	• Insert urinary catheter to drain bladder. • Remove catheter because this effect is rare.

	Medicine	Dose	Frequency	Duration	Codes
	Bisacodyl	5-10 mg po	Once a day		A V
	Haloperidol	1.5mg po	Once a day	Three days	B E
	Metoclopramide	10mg po	Three times a day	Review	A V
	Diazepam	5-10 mg po	Three times a day	Review	B V
	Chlorpheniramine	4mg po	Three times a day	Review	A V
	Promethazine	10mg po	Three times a day	Review	A V

17.8 Adjuvant therapy for pain in adults

	Medicine	Dose	Frequency	Duration	Codes
	Amitriptyline po	25-75 mg	At night	Review	B E
		Start with low dose and increase as needed			
or	Clonazepam po	0.5-2mg	Once daily	Review	B E
or	Carbamazepine po	100mg	Twice daily	Review	B V
		Can be increased to 800mg			
or	Sodium valproate po	200mg	Twice daily	3 days	B E

Anxiety related pain

	Medicine	Dose	Frequency	Duration	Codes
	Diazepam po	5mg	8 hourly per day	Review	B V

Bone pain, neuropathic pain, headache related to increased intracranial pressure

	Medicine	Dose	Frequency	Duration	Codes
	Prednisolone po	30mg po	Daily in the morning	Review	B V
or	Dexamethasone po	2-4mg IV	Once daily	Review	B E

Abdominal colicky pain

	Medicine	Dose	Frequency	Duration	Codes
	Hyoscine butylbromide po	10mg po	Once daily	Review	B E

- Metastatic bone pain—
    - ***Refer*** **to hospital**

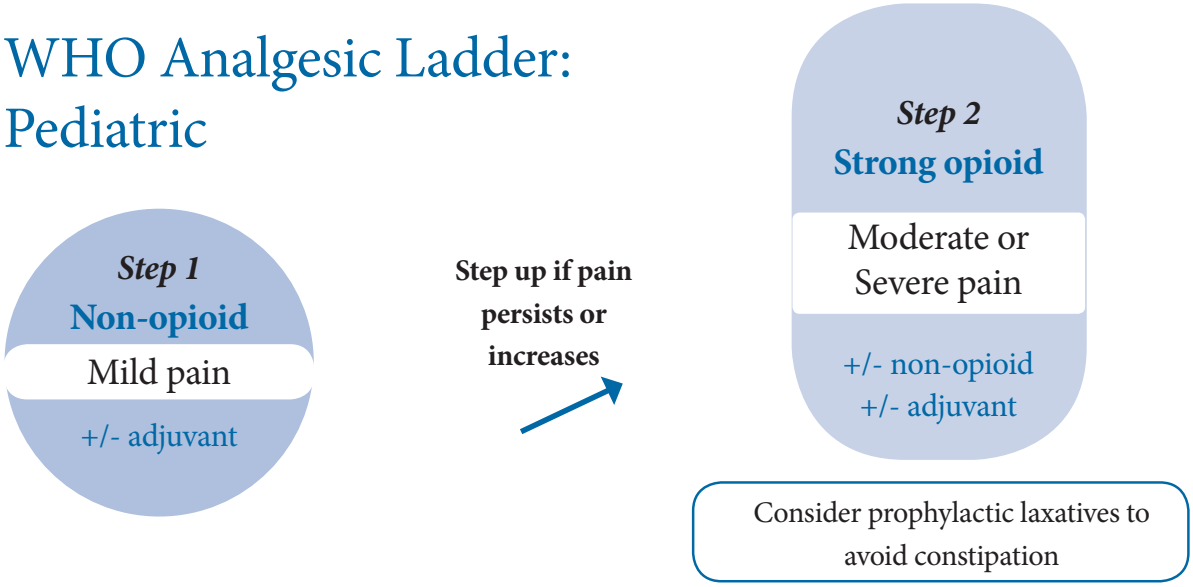
17.9 Pain management strategy for children

General principles to be followed—
- o Treat the underlying cause without increasing the pain
- o Use nonmedicinal support, such as—
- o Emotional support
- o Physical methods such as touching, stroking, massage, and applying ice or heat
- o Cognitive methods such as preparation for procedures, distraction with music or imagery, play
- o Non-harmful traditional practices
- o Use medicines specific to the type of pain.
- o Address psychosocial issues.
- o Continue to assess the pain.

17.10 Pain management in children

Children with HIV rarely need antiemetics and laxatives. Itching with opioids in the first few days is quite common and responds to antihistamines, if necessary. Many children are sleepy initially, and parents should be warned of this and reassured that their child's disease has not suddenly progressed.

Figure 17.5 WHO Analgesic Ladder: Pediatric



Non-opioids Strong opioids Adjuvants	***Age>3 mos:*** ibuprofen or paracetamol (acetaminophen), ***Age>3 mos:*** paracetamol morphine (medicine of choice) or fentanyl, oxycodone, hydormorphone, buprenorphine antidepressant, anticonvulsant, antispasmodic, muscle relaxant, bisphosphonate, or corticosteroid

Combining an opioid and non-opioid is effective, but do not combine drugs of the same class.
Time doses based on drug half-life ("dose by the clock"); do not wait for pain to recur

Adopted from Eswatini National Palliative Care Clinical Guideline

Medicine	Dosage	Dosage
Paracetamol (A)	• Prevent by prophylaxis (unless doing so results in diarrhoea). • 20 mg/kg PO every 6 hours • Maximum dose 90 mg/kg over 24 hours in neonates	A V
Ibuprofen (A)	5–10 mg/kg PO every 6–8 hours	A V
Morphine (B)	Standard starting dose: 0.15–0.3 mg/kg PO every 4 hours • Infants <1 month: 1/3 dose o Children <50 kg: 0.3–1.5 mg/kg every 4 hours o Children >50 kg: 5–10 mg ever 4 hours	B E

17.11 Care of the Terminally Ill

- Good palliative care can greatly relieve the mental and physical suffering of terminally ill patients.

Psychological support

- A full explanation of the illness, the treatment and expected physical symptoms should be discussed (often on several occasions). It is important that health workers be available to provide continuing support. Fear and anxiety about dying, pain and other distressing symptoms are common, and patients may become depressed.

Symptom management

- AIM: To improve quality of life thus relieve and avoid undue suffering.

General management guidelines

- History, physical examination
- Conceptualise likely causes
- Discuss treatment options, assist with decision making
- Provide ongoing patient, family education, support
- Involve members of the entire interdisciplinary team
- Reassess frequently

Palliative Care Emergency - Any change in a patient's condition that requires urgent and immediate intervention. Prompt and thorough assessment is necessary.

Consider the following:
Nature of the emergency, patient condition, disease stage, access to interventions, patient's choices and family choices.

After taking to consideration the above, management then depends on the cause.

CHAPTER 18

EMERGENCIES AND TRAUMA

Note: The conditions described in this chapter are emergencies and must be treated as such. Medicines used for treatment must be properly secured and their use recorded (time, dosage, routine) on the patient's notes and on the letter of referral.

MEDICAL EMERGENCIES

18.1 Acute myocardial infarction

- Acute coronary syndrome reflects any group of clinical symptoms compatible with myocardial ischaemia (sudden reduction or blockage of blood flow in the coronary arteries).
- **It covers:** Unstable angina (UA), Non-ST elevation myocardial infarction (NSTEMI) and ST elevation myocardial infarction (STEMI)
- NSTEMI and UA are closely related conditions except that symptoms are severe and biomarkers (Troponin T or I, CKMB) are positive in NSTEMI.
- In the UA the chest pain comes at rest, lasts for long (>20 min), new onset angina with crescendo pattern in intensity, duration, frequency or in combination of these factors.

Causes

- Atherosclerosis: coronary endothelial plaques (atheromas) reducing or closing the lumen of coronary arteries (MI Type 1)
- Coronary spasm normal coronary arteries (MI Type 2).
- Thrombus or plaque detached while doing PCI (percutaneous interventions) like angioplasty, stent (MI Type 3).
- Thrombus detached when doing surgery like coronary artery bypass graft (MI Type 4).
- All these types of MI have in common the ECG and biomarkers findings.

Symptoms and signs

- Usually sudden onset
- Retrosternal chest pain (angina)or discomfort described as aching, pressure, tightness or burning
- Pain irradiates to the neck, shoulders, arms, jaws, back or upper abdomen
- Nausea and vomiting, dyspnea, heavy sweating, light head, dizziness, fainting, restlessness,
- Unexplained or unusual fatigue
- Symptoms can be atypical in women, older adults, diabetic patients.

Risk factors

- Age, hypertension, Dyslipidemia, smoking, lack of physical activity, unhealthy diet, diabetes, overweight or obesity
- Family history of cardiovascular diseases (HTN, MI, CVA), diabetes, eclampsia or hypertension during pregnancy.

Diagnosis:

- Suspected symptoms and signs
- ECG: to be done ASAP and repeated many times daily if stable or if pain occurs
- ECG changes are dynamic: ST elevation, ample T waves (positive or negative), ST depression, q waves
- Sometimes no ECG changes (NSTEMI).
- ECG very important tool for diagnosis and follow-up.

Biomarkers:

- Troponin T and I: specific and sensitive test, elevated 4-6 hrs after injury, peak at 24 hrs, remain elevated 5-14 days; good to detect old (Myocardial infarction-M).
- CK-MB: less sensitive and specific: elevated at 6th hr and decrease within 3 days.
- Good to follow-up recurrent necrosis and reperfusion progress.
- Others biomarkers: LDH, AST, Myoglobin, fibrinogen ,CRP: less specific ,use them with precaution
- Routine laboratory tests: FBC, Chemistry,
- Chest X-ray, echocardiography

Refer all suspected or diagnosed cases urgently to higher level (HC or hospital).

Management (STEMI, NSTEMI, UA):

- The goals of the treatment are; relieve the pain and distress, improve blood flow in the heart, restore the heart function ASAP and at the best possible level.

Non pharmacological management:

- Strict bed rest, Oxygen by nasal cannula or face mask, Continuous ECG monitoring –ECG if chest pain.
- Oximetry or Arterial blood gas rule out hypoxemia, Soft diet

Pharmacological management

Ideally should be managed in Intensive care unit

	Medicine	Dose	Frequency	Duration	Codes
	Isosobide dinitrate sublingual	5-10 mg	when necessary	Review	B E
		Maximum dose is 20mg. Give a laxative to prevent constipation (bisacodyl 5–20 mg)			
or	Glyceryl trinitrate sublingual	0.5mg	When necessary	Review	B E

If pain is not relieved by nitroglycerin or if pulmonary congestion or if there is severe agitation.

	Medicine	Dose	Frequency	Duration	Codes
	Morphine sulfate iv	Dilute with normal saline to 1mg/ml and give in 1mg boluses max dose 10mg			B E

If pain is ongoing and if no contraindications, use B-blockers

	Medicine	Dose	Frequency	Duration	Codes
	Atenolol po	25-100 mg	Once daily	Review	B E
or	Carvedilol po	3.125-25 mg	Twice daily	Review	B E

If B-blockers are contraindicated or not tolerated, use non dihydropyrindine calcium channel blockers

	Medicine	Dose	Frequency	Duration	Codes
	Verapamil po	120-240 mg	Twice daily	Review	B E

Plus antiplatelets

	Medicine	Dose	Frequency	Duration	Codes
	Acetylsalicylic acid	300mg stat, then 81-100 mg	Once daily	Review	A E
or	Clopidogrel po	300 mg stat then 75mg	Once daily	Review	B E

Or anticoagulants

	Medicine	Dose	Frequency	Duration	Codes
	Unfractionated heparin IV	60mg bolus (4000u max) then12u/kg/h(max 1000 u/h)			A V
or	Clexane sc	1 mg/kg	12 hourly		B E

If there are no contraindications use antithrombolytics (Effective within 12 hours of symptom development)

	Medicine	Dose	Frequency	Duration	Codes
	Alteplase (t-PA) IV	10mg bolus then 90mg in perfusion for 90 min heparin infusion is run concurrently			S V

If necessary, add the following;
Anxiolytic drug e.g midazolam and laxatives e.g Bisacodyl;
ACEI/ARB if hypertension persists despite Nitrate derivates and Beta blockers, if LV dysfunction or Heart failure or Diabetes; *refer to Cardiovascular chapter.*
Antiarrythmias

	Medicine	Dose	Frequency	Duration	Codes
	Amiodarone iv or po	600mg bolus			C V
or	Lignocaine iv	1mg/kg or bolus 100mg			C V

Caution: Do not allow systolic BP to decrease by more than 10 mmHg or pulse rate to increase to above 90 per minute. Monitor the following continuously and also during transfer: pulse, BP respiration depth and rate (count for a full minute).

18.2 Acute pulmonary oedema

Acute pulmonary edema is characterised by sudden accumulation of fluids in the lungs. It is a medical emergency.

Causes:

- Cardiogenic pulmonary edema: coronary artery disease, cardiomyopathies valvulopathies, hypertension.
- Non cardiogenic pulmonary edema: Acute respiratory distress syndrome (ARDS), High altitude, nervous system causes: head injury , seizures Drugs :heroin , cocaine, Aspirin, Pulmonary embolism, viral infections, toxins or smoke inhalation, Drowning.

Symptoms and signs

- Dyspnea increased on exertion or by lying down, feeling of suffocating and dying, wheezing or gasping breath, cold skin, anxiety , restlessness, cough, with frothy sputum bloody stained, palpitations, fatigue.

Physical examination:

- Severe respiratory distress, Frothy blood stained secretions in the mouth and nostrils, Cyanosis, restlessness, confusion , anxiety, Diffuse wheezes and crepitations, Tachycardia or tachyarrhythmia, Very high or low BP, Signs of heart failure if direct cardiac cause

Diagnosis:

- **Suggestive signs and symptoms**
- Chest X-ray (very important to diagnose pulmonary edema): hilar infiltrates, diffuse lung infiltrates with confluent consolidations, B -Kerley lines, cardiomegaly, pleural effusions
- ECG: arrhythmias, myocardial ischaemia
- Arterial blood gas: hypoxaemia
- Echocardiogram: heart function, size of cavities, valves.

Management

- Ideally in intensive care unit care
- High flow 100% oxygen per face mask
- Diuretics: loop diuretics

	Medicine	Dose	Frequency	Duration	Codes
	Furosemide IV	80-120mg iv stat max 240mg when needed			C V

- Morphine sulfate: to relieve anxiety and reduce dyspnea
- Suction airways, monitor diuresis by measuring urine output
- Treat the cause

Differential diagnosis

- It is important to distinguish this condition from an attack of acute bronchial asthma.

Caution: Morphine is contraindicated in acute bronchial asthma

.

Refer to hospital

- All cases urgently
- Administer oxygen therapy during transfer

18.3 Shock

Shock is a state of circulatory collapse leading to reduction in delivery of oxygen and other nutrients to vital organs, which, if prolonged, leads to irreversible multiple organ failure.

Table 18.1 Types of Shock

Types of Shock	Description	Additional Symptoms
Hypovolaemic shock	Most common type of shock. Primary cause is loss of fluid from circulation due to haemorrhage, burns, diarrhoea, or other condition.	**Weak thready pulse, cold and clammy skin**
Cardiogenic shock	Caused by the failure of heart to pump effectively (e.g., in myocardial infarction, cardiac failure)	**Distended neck veins, weak or absent pulses,cold**

Types of Shock	Description	Additional Symptoms
Septic shock	Caused by an overwhelming infection, leading to vasodilation	Elevated body temperature
Anaphylactic shock	Caused by severe allergic reaction to an allergen or medicine	Bronchospasm, angioedema, and/or urticaria
Neurogenic shock	To the spinal cord, resulting in sudden decrease in peripheral vascular resistance and hypotension	Warm and dry skin
Obstructive shock	Caused by obstruction of the great vessels or the heart itself.	Weak or absent pulses, cold peripheries

18.3.1 Hypovolaemic shock

This clinical picture arises from rapid loss of body fluids resulting in an inadequate circulating volume supply of blood to vital organs in the body. Common causes are severe burns, severe bleeding, severe dehydration with persistent vomiting and diarrhoea or cholera (epidemic).

Symptoms and signs

Primary signs—

- Thirst, Feels cold Fully conscious at first Pallor, Pulse rapid and feeble Blood pressure below the normal: 90/60 or less. Skin cold and clammy
  - o Other signs, depending on the cause of the shock, Dehydration in gastroenteritis or cholera

Table 18.2 Stages of hypovolemic shock

Types of Shock	Description
Grade 1	• Up to 15% blood volume loss (750mls) • Up to 15% blood volume loss (750mls) • Blood pressure maintained • Normal respiratory rate • Pallor of the skin
Grade 2	• 15-30% blood volume loss (750 - 1500mls) • Increased respiratory rate • Blood pressure maintained • Increased diastolic pressure • Narrow pulse pressure • Sweating
Grade 3	• 30-40% blood volume loss (1500 - 2000mls) • Systolic BP falls to 100mmHg or less • Marked tachycardia >120 bpm • Marked tachypnoea >30 bpm • Decreased systolic pressure
Grade 4	• Loss greater than 40% (>2000mls) • Extreme tachycardia with weak pulse • Pronounced tachypnoea • Significantly decreased systolic blood pressure of 70 mmHg or less

Management

Goals of management are to:

- Maximise oxygen delivery
- Control further blood loss
- Ensure adequate fluid resuscitation

Nonpharmacological management
- Ensure that the airway is clear.
- Stop any major bleeding by applying pressure dressing and surgical intervention where indicated.
- Assess the cardiac function.
- Place the patient in the anti-shock position: feet up with head down.
- Insert wide-bore IV cannula, and make sure it is running well.

Pharmacological management
- Crystalloids e.g. Ringers lactate or Normal saline 1 – 2 litres in an adult and in children 20ml/kg bolus (A)
- Monitor blood pressure, heart rate and urine output for clinical response
- For haemorrhagic shock transfuse blood products early
  - o Determine the cause of the shock and treat accordingly.

18.3.2 Cardiogenic Shock
Cardiogenic shock is decreased cardiac output leading to tissue hypoxia in the presence of adequeate intravascular volume. Causes include myocardial infarction, cardiomyopathy, valvular heart disease.

Signs and symptoms
- Hypotension, Cold extremities Cyanosis, Arrhythmias.

Management
- Assess airway, breathing circulation.
- Oxygen therapy if hypoxic.
- Do ECG
- Treat the identified cause.
- Fluid resuscitation

	Medicine	Dose	Frequency	Duration	Codes
	Ringers lactate or normal saline IV	For fluid resuscitation	At once		A V

- Inotropic support

	Medicine	Dose	Frequency	Duration	Codes
	Dobutamine IV	5-10mcg/kg/min	Infusion	As needed	S E

18.3.3 Distributive Shock
This happens when the blood vessels are abnormally dilated and presents with a low blood pressure, tachycardia and warm peripheries.

There are 3 causes of this type of shock: anaphylactic shock, septic shock, and neurogenic shock.

18.3.3.1 Septic Shock
- Shock caused by a confirmed or suspected infection, with vasodilatation and increased capillary permeability. It is a systemic inflammatory response syndrome to a documented infection with persistence hypotension.

Signs and symptoms
- May have nonspecific and specific ones to the cause including:
  - o Fever, chills and rigors, agitation and confusion, warm peripheries, tachycardia, hypotension, tachypnea, leukocytosis and oliguria.

Management

- Assess the airway, breathing and circulation.
- Insert a large bore cannula and take blood for blood cultures.

	Medicine	Dose	Frequency	Duration	Codes
Give broad spectrum antibiotic	Ceftriaxone IV	1g	stat then 2g daily	5-7 days	A E
Give fluid resuscitation	Lignocaine IV	30ml/kg and assess for fluid response by monitoring blood pressure,			A V

- If poor or no fluid response start vasopressor infusion

	Medicine	Dose	Frequency	Duration	Codes
	Adrenaline IV	0.05mcg/kg/min (Dilute 4mg of adrenaline in 200ml normal saline) Titrate rate up according to response			B V

18.3.3.2 Anaphylactic shock

An acute potentially life-threatening hypersensitive reaction. It may occur within seconds to minutes after an injection or exposure to any allergen. Common causes: medicines e.g Penicillin, immunisations, snake bites, insect bites or stings, foods, pollen in dust.

Symptoms and signs

- Skin, subcutaneous tissue, and mucosa
  - o Flushing, itching, urticaria (hives), angioedema, morbilliform rash, periorbital itching, erythema and edema, conjunctival erythema, tearing itching of lips, tongue, palate, and external auditory canals; and swelling of lips, tongue, and uvula, itching of genitalia, palms, and soles

- Respiratory
  - o Nasal itching, congestion, rhinorrhea, sneezing, throat itching and tightness, dysphonia, hoarseness, stridor, dry staccato cough Lower airways: increased respiratory rate, shortness of breath, chest tightness, deep cough, wheezing/bronchospasm, decreased peak expiratory flow, Cyanosis Respiratory arrest.

- Gastrointestinal
  - o Abdominal pain, nausea, vomiting (stringy mucus), diarrhea, dysphagia

- Cardiovascular system
  - o Chest pain, Tachycardia, bradycardia (less common), other arrhythmias, palpitations Hypotension, feeling faint, urinary or faecal incontinence, shock Cardiac arrest

- Central nervous system
  - o Aura of impending doom, uneasiness (in infants and children, sudden behavioral change, eg. irritability, cessation of play, clinging to parent); throbbing headache (pre-epinephrine), altered mental status, dizziness, confusion, tunnel vision

- Other
  - o Metallic taste in the mouth Cramps and bleeding due to uterine contractions in females

Emergency management

- Resuscitate (C-A-B) immediately. *See Resuscitation Table.*
- Assess the circulation and breathing.
  - o If there is no heartbeat, perform CPR. Follow Cardiac arrest guideline.
  - o If the patient is breathing but in respiratory distress, give

	Medicine	Dose	Frequency	Duration	Codes
	Oxygen iv	**Adults:** 4–6 L/minute via face mask. **Children:** 4–6 L/minute via nasal cannula			B V

- If the patient is not breathing—
  - o Secure an airway and Ventilate with Ambu Bag
- Or connect to ventilator
- If the patient is in shock
  - o Lay the patient flat with legs raised.
  - o Administer IV solutions.

	Medicine	Dose	Frequency	Duration	Codes
	Normal saline IV	30ml/kg and assess for fluid response by monitoring blood pressure,			A V
or	Ringers lactate IV	run fast			A V
or	Half-strength darrows with 5% dextrose solution	in children 20ml/kg in first 20-60 mins			A V

Pharmacological management

Adults—

	Medicine	Dose	Frequency	Duration	Codes
	adrenaline IM	1:1000 first line of treatment and should be given immediately			B V
If patient is conscious	adrenaline SC	0.5 mL undiluted immediately. Repeat every 10–20 minutes as needed. Check that heart rate is not over 140 beats per minute			B V
If patient is unconscious	adrenaline IV	1:1000 as slow IV, 1 mL diluted with 0.9% sodium chloride (normal saline) to make 10 mL.			B V
plus	hydrocortisone IV	200mg immediately			A V
and	promethazine IM	25-50mg to counteract histamine release			A V
plus in bronchospasm	salbutamol nebs	When necessary			A V

Children—

	Medicine	Dose	Frequency	Duration	Codes
	adrenaline IM	1:1000 first line of treatment and should be given immediately <2 yrs: 0.1ml; 2 – 5 yrs: 0.2ml; 6 – 12 yrs: 0.3ml ; > 12 yrs: 0.5ml			A V
If patient is unconscious	adrenaline IV	1:1000 as slow IV, 1 mL diluted with 0.9% sodium chloride (normal saline) to make 0,1ml/kg. Repeat every 5 minutes when necessary for a maximum of three doses.			A V
plus	hydrocortisone IV	100mg immediately or 5mg/kg			A V
and	promethazine IM	0.25mg/kg to counteract histamine release			A V

	Medicine	Dose	Frequency	Duration	Codes
plus in bronchospasm	Salbutamol nebs	When necessary			A V

Refer to hospital
- Refer as soon as possible.
- A nurse or paramedic must accompany patient.

18.3.3.3 Neurogenic Shock

Neurogenic shock is a state of imbalance between sympathetic and parasympathetic regulation of cardiac action and vascular smooth muscle. Occurs in spinal cord trauma characterised by sudden drop in blood pressure in a patient with high spinal injury.

Signs and symptoms
- Associated spinal injury symptoms, Hypotension, Bradycardia, Temperature dysregulation

Management
- Assess airway, breathing and circulation.
- Stabilise the spine
- Fluid resuscitation

	Medicine	Dose	Frequency	Duration	Codes
	Normal saline IV	30ml/kg and assess for fluid response by monitoring blood pressure,			A V
or	Ringers lactate IV	run fast			A V

For mean arterial pressures 70 – 80mmHg

	Medicine	Dose	Frequency	Duration	Codes
	Adrenaline IV	4mg in 200ml 0.9% sodium chloride (normal saline) and titrate to desired effect			B V

- For management of spinal injury refer to orthopaedic emergencies section.

18.3.4 Obstructive Shock

Obstructive shock is a condition caused by the obstruction of the great vessels or the heart itself.

Causes include:
- Cardiac tamponade, tension pneumothorax and pulmonary embolism

Signs and symptoms
- Hypotension, tachycardia, cold peripheries, distended neck veins and distant heart sounds

Management
- Treat the underlying cause.

18.4 Cardiac arrest

18.4.1 Cardiac arrest in adults

Cardiac arrest is the sudden and usually unexpected cessation of effective cardiac output. Irreversible brain damage can occur within 2–4 minutes.

Symptoms and signs

- Sudden loss of consciousness and collapse Absent carotid pulse and all other pulses, Loss of spontaneous respiration

Emergency treatment

- Diagnose rapidly and commence resuscitation immediately.
- Call for skilled help and a defibrillator.
- Place the patient on a firm, flat surface.
- Initiate C-A-B (Circulation, airway and breathing) sequence of CPR

If possible, get someone to note starting time and document medication and progress.

—OR—

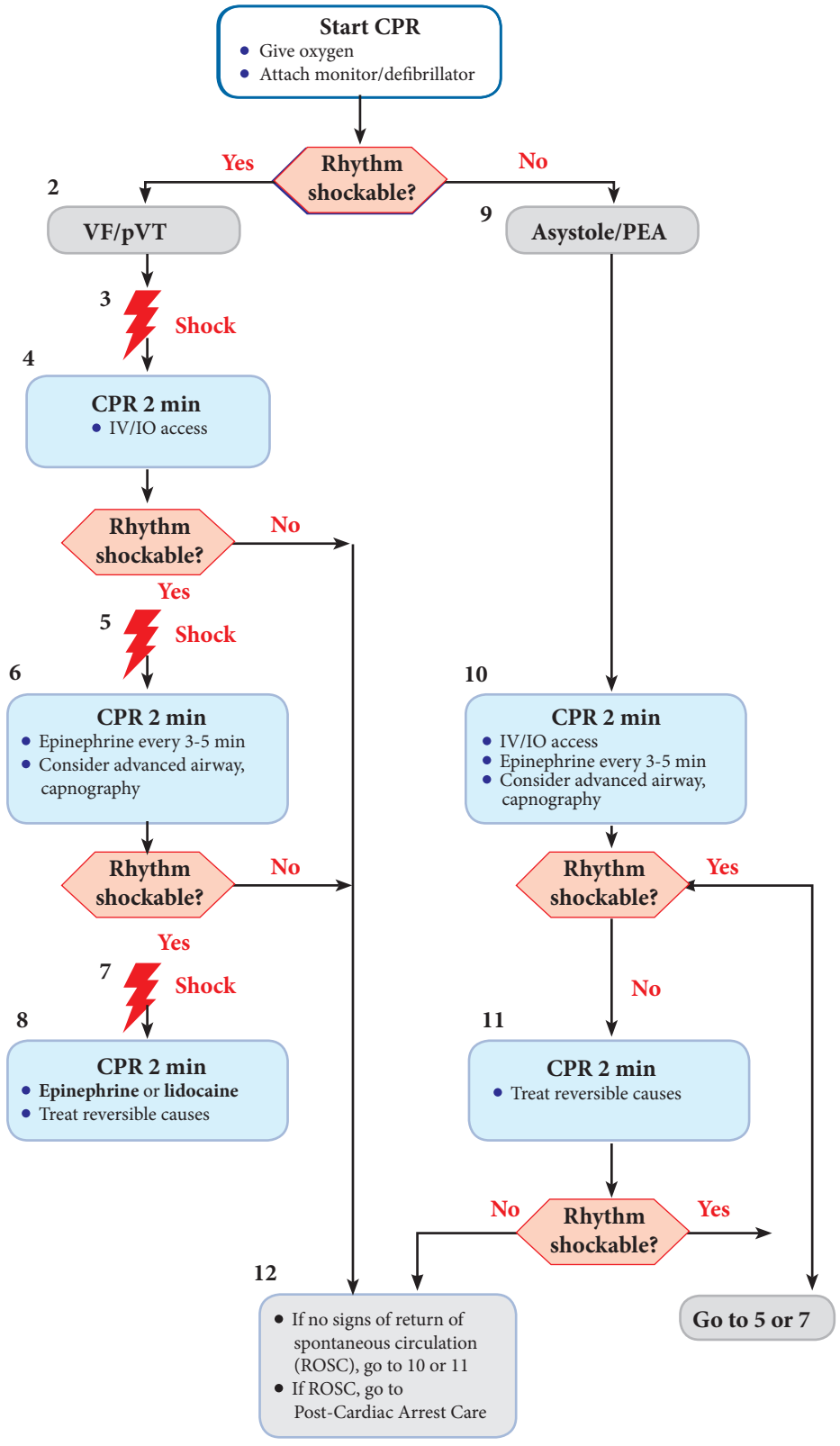
- Collect all ampoules used and total them at the end and record resuscitation notes.
- Put up IV line and run Normal saline or Ringers Lactate (A)
- The cardinal objective is to stabilise the patient for immediate referral

.

Table:18. 3 Sequence of cardiopulmonary resuscitation (CPR) for adults and children

Component	Recommendations		
	Adult	Child	Infant
Recognition	Unresponsive (for all ages)		
	No breathing or no normal breathing	No breathing or only gasping	
	No pulse palpated in 10 seconds		
CPR Sequence	C-A-B		
Compression to ventilation ratio	30:2	30:2 (single rescuer) 15:2 (2 rescuers)	
Airway	• Head tilt, chin lift (suspected trauma: jaw thrust) • Insert artificial airway if available		
Ventilation with advanced airway	• 1 breath every 6 – 8 seconds. Each breath over 1 second with visible chest rise.		
Defibrillation	• Defibrillate as soon as available where indicated (shockable rhythm) • Resume compressions immediately after each shock • Minimize interruptions before and after shock.		
CPR progress	• Check pulse every 2 minutes or after 5 cycles of CPR • Continue until return of spontaneous circulation.		
Adrenaline	Give adrenaline 1mg (A) IV every 3 – 5 seconds	Give adrenaline (A) 10mcg/kg every 3 - 5 seconds	

Figure 18.1 Adult Cardiac Arrest Algorithm *(Adopted from AHA 2015 guidelines)*



CPR Quality

- Push hard (at least 2 inches [5 cm]) and fast (100-120/min) and allow complete chest recoil.
- Minimise interruptions in compressions.
- Avoid excessive ventilation.
- Change compressor every 2 minutes, or sooner if fatigued.
- If no advanced airway, 30:2 compression-ventilation ratio.
- Quantative waveform capnography
  - If P_{ETCO_2},<10mm Hg, attempt to improve CPR quality.
- Intra-arterial pressure
  - If relaxation phase (diastolic) pressure <20 mm Hg, attempt to improve CPR quality.

Shock Energy for Defibrillation

- **Biphasic:** Manufacturer recommendation)e.g., initial dose of 120-200 J); if unknown, use maximu available. Second and subsequent doses should be equivalent, and higher doses may be considered.
- **Monophasic:** 360 J

Drug Therapy

- **Epinephrine IV/IO dose:** 1mg every 3-5 minutes
- **Amiodarone IV/IO dose**: First dose: 300mg bolus. Second dose: 150mg.
  -OR-
  Lidocaine IV/IO dose: First dose: 1-1.5mg/kg. Second dose 0.5-0.75mg/kg.

Advanced Airway

- Endotracheal intubation or supraglottic advance airway
- Waveform capnography or capnometry to confirm and monitor ET tube placement
- Once advance airway in place, give 1 breath every 6 seconds (10 breaths/min) with continuous chest compressions

Return of Spontaneous Circulation (ROSC)

- Pulse and blood pressure
- Abrupt sustained increase in P_{ETCO_2} (typically ≥40mm Hg)
- Spontaneous arterial pressure waves with intra-arterial monitoring

Reversible Causes

- **H**ypovolemia
- **H**ypoxia
- **H**ydrogen ion (acidosis)
- **H**ypo-/hyperkalemia
- **H**ypothermia
- **T**ension pneumothorax
- **T**amponade, cardiac
- **T**oxins
- **T**hrombosis, pulmonary
- **T**hrombosis, coronary

18.5 Poisoning

The entry into the body of toxic substances in amounts that cause dysfunction of body systems.

Causes

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

General management of chemical and medicine poisoning

- If possible, refer all patients who show signs of poisoning to hospital. Send a note of what is known and what treatment has been given. Also refer patients who have taken slow-acting poisons even if they appear well. Slow-acting poisons include—Aspirin, Paracetamol, Iron, Tricyclic antidepressants (e.g., amitriptyline, imipramine) and Paraquat
- Most patients must be treated symptomatically. Knowledge of the poison, however, will help HCWs anticipate the likely effects on the patient.
- Take the following general measures for poisoning:
  o Airway—often impaired in unconscious patients
- Ensure the airway is cleared and maintained; insert an airway protective device if needed.
  o Breathing—
- Assist ventilation if necessary. Give oxygen to correct hypoxia.
  o Circulation—
- Hypotension is common in severe poisoning with CNS depressants. Set up an IV infusion
- A systolic BP <70 mm Hg may cause irreversible brain or renal damage.
- Fluid depletion without hypotension is common after prolonged coma and after aspirin poisoning because of vomiting, sweating, and hyperpnoea.
- Hypertension is less common but may be associated with sympatho- mimetic poisoning (e.g., amphetamines, cocaine).
- Cardiac conduction defects and arrhythmias may occur in acute poisoning, especially with tricyclic antidepressants but these often respond to correction of any hypoxia or acidosis.
- Body temperature—
  o Hypothermia may develop in patients with prolonged unconsciousness, especially after overdose of barbiturates or phenothiazines (e.g., chlorpromazine, trifluoperazine).
  o Cover the patient with a blanket.
- Seizures—
  o Do not treat a single brief convulsion.
  o If convulsions are prolonged or recur frequently, give

	Medicine	Dose	Frequency	Duration	Codes
	Diazepam PR	**Adults:** 10 mg PR repeated if necessary. **Children:** 400 micrograms (0.4 mg)/kg per dose PR			B V
or	Diazepam IV	**Adults:** 10 mg slow IV repeated if necessary (maximum: 30 mg). **Children:** 200 micrograms (0.2 mg/kg). Do not give IM. If IV route is not possible, remove the needle of the syringe, and give the dose PR.			

Removal and elimination of the poison

- Remove poison from the stomach. Balance the dangers of attempting to empty the stomach with the likely toxicity of any swallowed poison as determined by the type of poison and amount swallowed.
- Perform gastric lavage (only useful if done within 2 hours of poison- ingestion).

Cautions:

- Do not attempt gastric lavage in drowsy or comatose patients because of the risk of inhaling stomach contents.
- Do not attempt gastric lavage with corrosive or petroleum products.
- Prevent absorption of the poison. Oral activated charcoal can bind many poisons in the stomach and so reduce their absorption (A). It is safe and especially useful for poisons toxic in small amounts (e.g., antidepressants).

	Medicine	Dose	Frequency	Duration	Codes
	Activated charcoal po	Grind charcoal tablets into a fine powder before mixing with 100–200 mL of water. **Adults:** 50 g **Children:** 25 g (50 g if severe) If patient unable to swallow the charcoal and water mixture (slurry), give by gastric lavage tube.			A V

18.5.1 Acute Organophosphate Poisoning

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

Causes

- Acute organophosphate poisoning may be accidental (e.g., rat poison), intended (i.e., suicidal or homicidal), or occupational hazard (e.g., agricultural workers).

Symptoms and signs

- Patient may smell of the chemicals
- Constricted pupils, cold sweat, anxiety, restlessness, abdominal pain, diarrhoea, and vomiting, twitching, convulsions, bradycardia, excessive salivation, difficulty in breathing

Nonpharmacological management

- Remove contaminated clothing.
- Wash contaminated skin with lots of cold water.
- Establish and maintain the airway. Artificial respiration with air or oxygen may be required during the first 24 hours after poisoning (B).
- Perform gastric lavage if the poison was ingested.

Table 18.4 Pharmacological Management

Drug Name	Type	Dose	Codes
Atropine	Atropine	• Give a bolus loading dose of 0.6 to 3 mg, rapidly IV	A V

- Then administer doubling doses every 5 min until the patient is atropinised (i.e., pupil dilatation, hot dry skin, dry mouth, fast pulse HR >80 bpm, SBP > 80 mmHg, clear lungs)
- Once the patient is atropinised, give an infusion of 10–20% of the total dose required to atropinise the patient each hour in 0.9% saline chloride
- Watch the patient carefully for recurrent cholinergic toxicity or onset of atropine toxicity (see below)
- If cholinergic toxicity recurs at any point, restart the bolus doses until the patient is atropinised again and increase the infusion rate by 20% per hour
- If the patient develops atropine toxicity (tachycardia, absent bowel sounds, hyperthermia, delirium, urinary retention), stop the infusion for 30 min and then start again at a 20% lower dose.

Drug Name	Type	Dose	Codes
Pralidoxime	Oxime AChE reactivator	• Give a loading dose of 20–30 mg kg–1 over 30 min • This dose can be repeated at 6–8 h intervals • Alternatively, a continuous infusion of 5–10 mg kg–1 h –1 can be given in 0.9% sodium chloride • The duration of treatment is uncertain. Treatment can be stopped at 48 h and then restarted if clinical or electrophysiological deterioration occurs. Monitoring of red cell AChE activity can be helpful	B E
Diazepam	GABA-Agonist	• Give 10–20 mg IV to agitated patients, seizures or patients with impaired respiration for whom intubation and ventilation are available. Use Propofol or Midazolam if seizures persist. Avoid Haloperidol and Phenytoin. Avoid Suxamethonium when intubating.	B V

Prevention
- Label agricultural and domestic pesticides properly
- Store such products away from children
- Wear protective clothing when using the products

18.5.2 Aluminium Phosphide (WEEVIL) Poisoning
Aluminium phosphide is used as a fumigant for stored cereal grains. It is highly toxic, especially when consumed from a freshly opened container.

- Death results from profound shock, myocarditis and multiple organ failure.
  - o Fatal dose: 0.15 and 0.5 grams (70kg)
  - o The mortality rate varies from 40 to 80%

Clinical presentation
- After ingestion Aluminium phosphide hydrolises in the gut to produces phosphamine gas (pH3). Phosphamine gas is rapidly absorbed from the stomach. However, due to presence of substituted diphosphines on exposure to air it gives garlicky or decaying fishy odour.

Diagnosis
- Diagnostic by detection of phosphine in exhaled air or gastric aspirate by using silver nitrate impregnated strips.
- Most sensitive test is gas chromatography
- Cytochrome-c oxidase activity in platelets is another marker.

Routine investigations
- FBC, U+E, LFTs, Mg, ECG (to detect arrhythmias early), CXR, ABGs

Treatment of Aluminium Phosphide Poisoning
- Gut decontamination should not be performed if the patient has an unprotected airway without endotracheal intubation.

	Medicine	Dose	Frequency	Duration	Codes
	Potassium permanganate	Gastric lavage (1:10 000) through a nasogastric tube as it oxidises phosphine to nontoxic phosphate.			A E
plus	Activated charcoal po	100 g to reduce absorption if the patient arrives within 1 h after ingestion of a large amount of poison			A E
	Sorbitol solution po	1–2 ml/kg as a cathartic			A E

Additional Measures

- IV. Sodium bicarbonate, magnesium sulfate and calcium gluconate.
- Oral sodium bicarbonate and coconut oil.
- Coconut oil has a positive clinical significance even 6 hours post ingestion.
- Phosphine excretion can be increased by maintaining adequate renal perfusion and urine output
- Conservative and supportive care therapy in ICU

Refer patients to higher facility

18.5.3 Paraffin and Petroleum Products Poisoning

Includes paraffin, petrol, paint thinners, organic solvents

Cause

- Accidental or intentional ingestion
- Toxicity occurs if paraffin is inhaled while being ingested.
- It causes irritation to the eyes and skin.
- Aspiration may cause irritation of the lining of the airway.
- Acute and chronic exposure to paraffin may result in CNS effects including irritability, restlessness, ataxia, drowsiness, convulsion, coma and death
- The principal adverse effect arising from ingestion of kerosene is chemical pneumonitis secondary to aspiration of vomitus.

Immediate signs and symptoms of acute exposure

- *Inhalation*: may cause headache, dizziness, incoordination, and euphoria.
- *Aspiration:* may cause pneumonitis, cough, wheeze, breathlessness, cyanosis and fever.
- *Ingestion:* May cause nausea, vomiting and occasionally diarrhea.
- *Ocular:* Irritation to eyes, causing stinging and burning sensation with lacrimation.
- *Dermal:* Drying and cracking due to the de-fatting action of paraffin, pain with erythema and dermal burns.

Management

- Assess airway and give oxygen
- Ensure adequate ventilation and clear airway by suctioning secretions
- Apply other measures as indicated by the patient's condition:
- Ingestion
  - o Gastric Lavage **should not** be undertaken
  - o Gastric aspiration if presents within 1 hour of ingestion of large amounts.
- Oygen supplementation if showing reparatory symptoms
- Observe for respiratory distress, drowsiness, or convulsions. Admit if any of these is present

Ocular Exposure

- Immediate irrigation of the affected eye with water or 0.9% saline for at least 10 to 15 minutes

Dermal Exposure

- Remove all soiled clothing
- Thoroughly wash contaminated area with soap and water
- Treat symptomatically
- Many patients remain well and need no treatment.

18.5.4 Aspirin Poisoning

Symptoms and signs
Hyperventilation, Tinnitus, deafness, Vasodilation, Sweating, Coma (if very severe poisoning), Complex acid-base disturbances

Management
- Gastric lavage is worthwhile up to 4 hours after poisoning because stomach emptying is delayed.

	Medicine	Dose	Frequency	Duration	Codes
	Activated charcoal po	50g repeated as needed every 4 hours to delay absorption of any remaining salicylate			A E

- Monitor and manage fluids and electrolytes to correct acidosis, hyperpyrexia, hypokalaemia, and dehydration.

- If hypoglycaemia occurs, give

	Medicine	Dose	Frequency	Duration	Codes
	Dextrose 50% as IV bolus	**Adults:** 20 mL **Children:** 1 mL/kg monitor			A V
Anticipate and treat convulsions	Diazepam PR	**Adults:** 10 mg PR repeated if necessary. **Children:** 400 micrograms (0.4 mg)/kg per dose PR			B V
or	Diazepam IV	**Adults:** 10 mg slow IV repeated if necessary (maximum: 30 mg). **Children:** 200 micrograms (0.2 mg/kg). Do not give IM. If IV route is not possible, remove the needle of the syringe, and give the dose PR.			B V

18.5.5 Paracetamol/ Acetaminophen Poisoning
Paracetamol is a non-opioid and a non- steroidal analgesic drug used for mild to moderate pain.
- An overdose occurs when one takes a dose of greater than 4g within 24hrs in adults.
- In children, less than 6yrs, toxicity occurs when a dose greater than 200mg/kg/day is taken

Signs and symptoms of overdose
- Nausea and vomiting, Abdominal pains, Diarrhea, Anorexia, Body malaise, Diaphoresis, Confusion, Hypotension, Jaundice, Acute renal/ hepatic failure

Assessment
- Vital signs and Level of consciousness
- Number of tablets taken, Time overdose took place and Route of administration of overdosed drug
- Whether taken with any other tablets or alcohol
- Whether suicidal or accidental

Management
- Support vital functions by ensuring ABC
- Manage patient according to time of overdose:
  - Within 1 to 2 hours
    - Gastric lavage, plus

	Medicine	Dose	Frequency	Duration	Codes
	Activated charcoal po	50g repeated as needed every 4 hours to delay absorption of any remaining salicylate			A E
Antidote	Acetylcysteine iv or po	1st 150mg/kg in 200ml D5% over 60min (2nd Then 50mg/kg in 50ml D5% over 4hrs, 3rd then 100mg/kg in 1000ml D5% over 16hrs			B E

Within 8 hours

- Antidote – N-acetylcysteine IV or carbocysteine orally.
- Any further N-acetylcysteine is given according to the third infusion regimen.
- Blood tests - LFTs, renal function, clotting profile, acid-base status
  - After 8 hours
- Asses for nausea and vomiting, Right upper quadrant pain, Liver function test, Jaundice
- Antidote given but less effective. Observe for signs of toxicity.
- Avoid giving activated charcoal if giving oral acetylcysteine as it will reduce systemic absorption of the latter and thus negate the effect of oral N-acetylcysteine.

18.5.6 Iron Poisoning

Symptoms and signs

- Nausea, vomiting, abdominal pain and diarrhoea.
- The vomitus and stools are often grey or black.
- In severe poisoning there may be gastrointestinal haemorrhage, hypotension, drowsiness, convulsions and metabolic acidosis.
- 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

Non-Pharmacological Treatment

- Gastric lavage if potentially toxic amounts of iron were taken.

Pharmacological management

	Medicine	Dose	Frequency	Duration	Codes
	Desferrioxamine IV	15 mg/kg/hour by continuous IV infusion in 0.9% sodium chloride (normal saline) or 5% dextrose infusion (maximum dose: 80mg/kg/24hours). Dissolve initially in water for injection (A) (500 mg in 5 mL) then dilute with infusion fluid.			B E

18.5.7 Carbon Monoxide Poisoning

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

Symptoms and signs

- All due to hypoxia - Headache, nausea, vomiting, weakness, collapse, coma, death.

Management

- Remove person to fresh air.
- Clear the airway.

- Give oxygen 100% as soon as possible (A)
- Give artificial respiration as required. Continue until adequate spontaneous breathing starts.
- In severe poisoning, anticipate cerebral oedema and treat with

	Medicine	Dose	Frequency	Duration	Codes
	Mannitol 20% IV	1g/kg by rapid infusion	At once	Over 30 mins	B E

Refer to hospital because of possibility of delayed complications.

18.5.8 Barbiturate Poisoning

Symptoms and signs
- Respiratory depression and coma

Nonpharmacological management
- Monitor vital signs and Perform gastric lavage.

Pharmacological

	Medicine	Dose	Frequency	Duration	Codes
	Activated charcoal po	50-100g repeated as needed every 4 hours to adsorb the poison			A E

18.5.9 Narcotic Analgesic Poisoning

Causes
- Poisoning by morphine, pethidine, codeine, and other opioids.

Signs and symptoms
- *With mild or moderate overdose:* lethargy, with constricted pupils often "pinpoint" size. Blood pressure and pulse rate are decreased, bowel sounds are diminished, and the muscles are flaccid.
- *With higher doses:* coma, accompanied by respiratory depression.
- Apnoea often resulting in sudden death.
- Noncardiogenic pulmonary edema may occur, often after resuscitation and administration of the opiate antagonist naloxone.
- Seizures are not common but occur occasionally with certain compounds (eg, dextromethorphan, meperidine, propoxyphene, and tramadol). Seizures may occur in patients with renal compromise who receive repeated doses of meperidine, due to accumulation of the metabolite normeperidine.
- Cardiotoxicity similar to that in tricyclic antidepressants and quinidine can occur in patients with severe propoxyphene intoxication.
- Some newer synthetic opioids have unpredictable results in overdose since they have mixed agonist and antagonist effects.
- Opioid withdrawal syndrome can cause anxiety, piloerection (goosebumps), abdominal cramps and diarrhea, and insomnia.

Diagnosis
- Good history taking, including past injuries and operations, chronic terminal illness, addiction and access to the drugs.

- Typical manifestations of opiate intoxication are present (pinpoint pupils and respiratory and CNS depression), and the patient quickly awakens after administration of naloxone
- Signs of IV drug abuse (eg, needle track marks) may be present.
- Specific serum levels are not usually performed because of poor correlation with clinical effects. Qualitative screening of the urine is an effective way to confirm recent use. Fentanyl derivatives, tramadol, and some other synthetic opioids may not be detected by routine toxicologic screens
- Useful laboratory studies include electrolytes, glucose, arterial blood gases or pulse oximetry, chest x-ray, and stat serum acetaminophen or salicylate levels (if the ingested overdose was of a combination product).

Emergency treatment

- Maintain an open airway and assist ventilation if necessary
- Administer supplemental oxygen. (A)
- Treat hypoglycaemic coma

	Medicine	Dose	Frequency	Duration	Codes
	50% Dextrose IV	50 mL (25 g) IV. **Children**: 25% dextrose, 2 mL/kg IV			A E
in respiratory depression	Naloxone IM/IV	0.4mg	at once		B V

- Normalise the body temperature
- Control seizures

	Medicine	Dose	Frequency	Duration	Codes
	Diazepam IV	0.1–0.2 mg/kg	at once		B V
and	Pentobarbital IV	5–6 mg/kg slow infusion over 8–10 minutes, then continuous infusion at 0.5–3 mg/kg/h titrated to effect			B E
or	Phenytoin IV	15–20 mg/kg; slow infusion over 25–30 minutes (is considered the anticonvulsant of last choice for most drug-induced seizures)			B E

- Correct hypotension:

	Medicine	Dose	Frequency	Duration	Codes
fluid challenge	Normal sSaline IV	10–20 mL/kg, or another crystalloid solution			A V
plus	Dopamine IV	5–15 mcg/kg/min			C E

- noncardiogenic pulmonary edema / (adult respiratory distress syndrome [ARDS]):
  Avoid excessive fluid administration.
  Administer supplemental oxygen intubation and use of positive end-expiratory pressure (PEEP) ventilation may be necessary to maintain adequate oxygenation.

Specific medications and antidotes

	Medicine	Dose	Frequency	Duration	Codes
	Naloxone IM/ IV	0.4–2 mg is usually effective for heroin overdose. Repeat doses every 2–3 minutes if there is no response, up to a total dose of 10–20 mg if an opioid overdose is strongly suspected.			B V

- Do not release the patient who has awakened after naloxone treatment until at least 3–4 hours have passed since the last dose of naloxone. In general, keep the patient for at least 6–12 hours of observation.

- Sodium bicarbonate may be effective for QRS interval prolongation or hypotension associated with propoxyphene poisoning.
- Prehospital level - Administer activated charcoal if available. Do not induce vomiting, because of the potential for developing lethargy and coma.
- Hospital - Administer activated charcoal. Gastric emptying is not necessary if activated charcoal can be given promptly.

18.5.10 Warfarin Poisoning

Warfarin is an ingredient in some rat poisons.

Management

- Empty the stomach by performing gastric lavage

	Medicine	Dose	Frequency	Duration	Codes
fluid challenge	Activated charcoal po	50-100g at once to absorb any remaining poison			A V
in cases of major bleeding	Phytomenadione (Vitamin K) iv	5 mg. Give very slowly			C E

18.5.11 Alcohol (ethanol) Poisoning

- Alcohol poisoning may be acute or chronic.

18.5.11.1 Acute alcohol poisoning

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

Cause

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

Symptoms and signs

- Smell of alcohol on the breath, Excessive sweating, Dilated pupils
- In later stages, stupor and coma develop
- As coma deepens, the following appear: Thready pulse and falling BP, Fall in body temperature , Noisy breathing

Investigations

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

Management

- Maintain a clear airway.
- Take measures to reduce the special hazard of aspiration of stomach contents.
- Check blood glucose level. If indicated, treat hypoglycaemia.

	Medicine	Dose	Frequency	Duration	Codes
50% dextrose IV	Adults: 20–50 mL IV bolus. Children: 1 mL/kg dilute to 25% Assess clinical and biochemical response over the next 15 minutes, and repeat dextrose 50% IV PRN. Monitor hourly blood glucose levels. Repeat dextrose 50% IV as needed until the patient wakes up.				A V

- Once patient wakes up, continue with oral glucose or sugar solution as required, until the patient can eat a meal.

18.5.11.2 Chronic Alcohol Poisoning

Cause

- Heavy habitual drinking combined with poor nutrition

Symptoms and signs

- Features of malnutrition - Weight loss, Dry scaly skin. Brittle discolored hair, Pale mucous membranes
- Features of cerebral damage - Memory loss, hallucinations, tremors
- Features of liver disease - Poor appetite, Fluid in the abdomen (ascites) as a result of cirrhosis

Pharmacological management

- For delirium,

	Medicine	Dose	Frequency	Duration	Codes
	Diazepam PR	10-30 mg	Repeated every 12hours if necessary.		B V

- Anticipate and treat hypoglycaemia.
- Treatment of thiamine (vitamin B1) deficiency

Non pharmacological management

- Bed rest, Proper diet
- Psychiatric assistance and counselling on alcohol, withdrawal, abstinence, and lifestyle adjustment

18.5.12 Methyl alcohol (methanol) Poisoning

- Methanol is used as an industrial solvent and is an ingredient of methylated spirits.

Symptoms and signs

- Similar to alcohol intoxication or poisoning but milder
- Symptoms do not usually appear until 12–24 hours after ingestion and may include headache, dizziness, nausea, vomiting, vasomotor disturbances, CNS depression, and respiratory failure.
- Toxic metabolites may cause severe acidosis and retinal or optic nerve damage.

Management

- Gastric aspiration and lavage, but only of use if done within 2 hours of ingestion.
- Correct metabolic acidosis with sodium bicarbonate solution 5% (baking soda) PO. Leave the solution in the stomach.
- In severe cases—

	Medicine	Dose	Frequency	Duration	Codes
	Sodium bicarbonate 8.4% IV	50ml slow infusion while monitoring plasma pH			B V
	Alcohol 40% (whisky or brandy) po	30-35ml in 100ml of water every 3 hours until the acidosis has been corrected. This delays oxidation of methanol to toxic metabolites.			C N

  - o Keep the patient warm.
  - o Protect the eyes from strong light.

Refer to hospital for further management.

18.5.13 Tricyclic Antidepressant Overdose

Tricyclic antidepressants (TCA) are used in management of a range of psychiatric disorders and is one of the most frequently abused drugs. It is often used as a sedative, especially in elderly population, commonly referred to as 'sleeping tablets'. Therefore, its availability as an 'over the counter' drug, has lead to its' higher usage in suicidal poisoning. In our setting the most commonly used and overdosed TCA is amitriptyline.

Signs and symptoms

- ANTICHOLINERGIC EFFECTS
  - o Anticholinergic features are common and may result in toxic megacolon and intestinal perforation Others are fever, drowsiness, dry mouth, dilated pupils and urinary retention.
- CARDIOVASCULAR EFFECTS
  - o Sinus tachycardia, Prolongation of the QRS-complex and PR/QT interval predisposing to arrhythmias, Hypotension, Asystole, Cardiogenic shock
- CENTRAL NERVOUS SYSTEM EFFECTS
  - o Coma, Seizures, Myoclonic twitching, opthalmoplegia

Investigations

- ABG – to rule out acidosis, Urea and electrolyte- rule out hypokalemia, Glucose, ECG- QRS duration

Pharmacological Management

- Establish airway and maintain respiration. Monitor ECG until the patient is free of arrhythmia for 24 hours.

	Medicine	Dose	Frequency	Duration	Codes
	Activated charcoal po	Grind charcoal tablets into a fine powder before mixing with 100–200 mL of water. **Adults:** 50 g **Children:** 25 g (50 g if severe) If patient unable to swallow the charcoal and water mixture (slurry), give by gastric lavage tube. Give within the first hour of ingestion.			A V
	Sodium bicarbonate 8.4% IV	50ml slow infusion for alkalinization while monitoring plasma pH (if there is severe metabolic acidosis)			B V
plus	Diazepam IV	0.05-0.1mg/kg to control agitation and seizures			B V
and	Normal saline or ringers lactate IV	10-20 ml/kg boluses for hypotension. Use vasopressors if not responsive.			A V

- Seizure-induced metabolic acidosis may worsen TCA cardiotoxicity. Phenytoin should be avoided in patients with TCA overdose. Intubation and ventilation when necessary.
- CNS depression - prompt intubation at the onset of CNS depression (e.g. GCS<12) – consider a bolus of sodium bicarbonate prior to intubation to guard against worsening acidosis. Hyperventilate intubated patients to pH 7.50-7.55
- Supportive care and monitoring – general measures, including indwelling urinary catheterisation and continuous cardiac monitoring.
- Decontamination – Activated charcoal can be given in TCA ingestions >10 mg/kg, but only after the airway is secured by endotracheal intubation.

18.5.14 Food Poisoning

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

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

Symptoms and signs
- Nausea, vomiting, Intermittent abdominal pain (colic) with associated diarrhea, Fever (especially if poisoning is the infective type)
- May be self-limiting; features disappear without specific treatment
- Botulism - Paralysis of skeletal, ocular, pharyngeal, and respiratory muscles

Investigations
- Good history and examination is important for diagnosis
- Stool: examination for C&S

Management
- Establish the cause and treat accordingly.
- Give oral or IV fluids for rehydration as required.
- ***Refer*** to hospital for further management

18.5.15 Prevention of poisoning
Educate the patient on Dos and Don'ts of poisoning prevention

Do's
- Keep medicines and poison in proper containers and out of reach of children
- Use containers with child resistant caps
- Keep all products in their original container
- Read medicine labels carefully to avoid mistake

Don'ts
- Leave container open
- Transfer products from their origin
- Remove labels from the medicine products
- Put tablets into another container such as purse or envelope
- ***Refer*** to medicine/tablets as sweets
- Take your medicine in front of children as they often copy

18.6 Hyperglycaemic Emergencies (Diabetic Ketoacidosis and Hyperosmolar Hyperglycemic State)
Diabetic Ketoacidosis (DKA)

DKA is characterised by:
- Uncontrolled hyperglycemia
- Increased anion gap metabolic acidosis
- Increased total body ketones

Diagnostic criteria for DKA
- Hyperglycemia > 13.9 mmol/L (prior to insulin administration)
- Acidosis: blood pH < 7.3 or serum bicarbonate < 18 mmol/L

- Ketonemia indicated by β-hydroxybutyrate > 3 mmol/L

Hyperosmolar Hyperglycemic State (HHS)

HHS is a syndrome characterised by:

- Impaired consciousness from slowly developing marked hyperglycemia, hyperosmolality and severe dehydration.
- Typically affects the middle-aged and older patients

Diagnostic criteria

- Uncontrolled hyperglycemia (usually > 40 mmol/L)
- Blood ketones usually negative, urine ketones may be positive
- Serum osmolality is > 320 mOsm/L

Precipitating factors for DKA/HHS

- Infections
- Discontinuation of insulin
- Myocardial infarction
- Cerebrovascular accident
- Restricted water intake in the elderly

General measures

- Secure IV access
- If unconscious with GCS < 8/15, protect the airway and insert an NG tube
- Monitor urine output
- Determine the precipitating cause and treat it.

Investigations

- Blood tests
- Glucose, Urea, Creatinine, electrolytes, anion gap, FBC +differential, HBA1c, cardiac enzymes
- Venous blood gas (VBG)
- Serum ketones, when available
- Urine tests
  - o Urine dipstix for nitrites, blood and proteins
  - o Urine microscopy, culture, and sensitivity
- Chest X-ray
- ECG

Treatment

Diabetic Ketoacidosis (DKA)

Average fluid deficit in adults ranges from 5 – 10 L

	Medicine	Dose	Frequency	Duration	Codes
	Normal saline or ringers lactate IV	Average fluid deficit in adults ranges from 5 – 10 L. Administer 1 – 1.5L of fluid in 1st hour, then 250 – 500ml every hour. Fluids administered in the first 4 hours should not exceed 50ml/kg. Replace the remaining deficit in 48 hours at about 5 ml/kg/hour. Switch to 5% Dextrose once the glucose level is < 14mmol/L. Use 0.45% saline if hyperchloremic acidosis develops in recovery phase of DKA.			A V

Hyperosmolar Hyperglycemic State (HHS)

	Medicine	Dose	Frequency	Duration	Codes
	Normal saline or ringers lactate iv	Administer 1L of normal saline over an hour, if there is no cardiac compromise. Continue with 0.45% saline at 250 – 500ml/hour if the serum sodium is normal or raised. The rate of fluid administration is determined by the state of hydration and urine output. Monitor the serum sodium and choose the appropriate replacement fluid.			

Insulin therapy (V/B)

	Medicine	Dose	Frequency	Duration	Codes
	Insulin	Continuous intravenous therapy is ideally commenced in an ICU or High care setting (for adequate monitoring). Always check the serum potassium prior to insulin infusion. Initial infusion rate at 0.1 unit/kg/hour [usually 5 – 7 units/hour. An example of infusion preparation = add 50 units of short-acting, soluble insulin in 200ml normal saline; where 4ml of prepared solution = 1 unit of soluble insulin, run at 20 – 28 ml/hour, [equivalent to 5 – 7 units/hour] Where an infusion pump is available: add 50 units of soluble insulin in 50 ml of normal saline (where 1ml is equivalent to 1 unit soluble insulin) and run at 5 – 7 ml/hour. Target a drop in plasma glucose of 3 – 4 mmol/L/hr, if not achieved in 1st hour double dose of the infusion rate. o Once plasma glucose is < 14 mmol/L reduce insulin infusion rate by 1 – 2 units/hour and continue adjusting insulin dose hourly. Hourly IM or IV bolus injections of 10 units of soluble insulin per dose is the alternative where IV infusion cannot be safely administered.			B V

- Hourly IM or IV bolus injections of 10 units of soluble insulin per dose
  - o An alternative where IV infusion cannot be safely administered
  - o Switch to subcutaneous insulin:
  - o When the hyperglycemic emergency has resolved
  - o When the patient is fully conscious and eating
  - o When the anion gap and acidosis has resolved. [HCO3 > 18mmol/L, pH > 7.3]
  - o When blood glucose < 15mmol/L

Potassium Replacement given according to the table below:

Potassium levels	KCI Dose
< 3.0 mmol/L	40 mmol/L of KCL per 1 litre of IV fluid
3.1 – 4.0 mmol/L	30 mmol/L of KCL per 1 litre of IV fluid
4.1 – 5.5 mmol/L	20 mmol/L of KCL per 1 litre of IV fluid
> 5.5 mmol/L	Omit KCL

Surgical Emergencies

18.7 Acute Abdomen

The causes of an acute abdomen can be localised to the abdomen but sometimes can be from a systemic non-surgical cause. It is very important to be able to quickly assess and decide whether it is a surgical acute abdomen or medical acute abdomen.

- The usual presentation of a surgical acute abdomen is sudden abdominal pain (colicky or sharp piercing) associated with vomiting and/or constipation. Other features might include abdominal distension and failure to pass flatus.

- The main causes of a surgical acute abdomen are acute appendicitis, acute perforated duodenal ulcers, acute intestinal obstruction, acute cholecystitis, pancreatitis, ectopic pregnancy and ovarian torsion. Non abdominal causes of pain that mimic an acute abdomen are numerous and may include myocardial infarction, pericarditis, pneumonia or pleurisy.

Evaluation

- History and physical examination will help narrow down the differential diagnoses and also determine whether the patient requires emergency surgery. Special attention should be paid to the nature of pain, location, onset, duration, intensity, recurrent nature, aggravating and alleviating factors.
- Physical exam should note the general state of the patient, abdominal distension, surgical scars, tenderness, guarding, rebound tenderness, presence of a mass, rectal, cervical or adnexal tenderness.
- Initial tests might include an FBC, U&Es, amylase, lipase, pregnancy test, urinalysis and LFTs.
- Plain abdominal x-rays may reveal obstruction, perforation (free air under the diaphragm) and other pathology.
- Ultrasound is indicated especially for biliary tract disease, pelvic and urinary system pathology.

Treatment

- Haemodynamically unstable patients might need immediate resuscitation with Normal saline or Ringers lactate, possible transfusion, nasogastric tube for obstruction or persistent vomiting, urinary catheter for monitoring output, broad spectrum empirical antibiotic for peritonitis, suspected perforated viscus or intra-abdominal injection.
- Direct treatment towards the specific condition should be instituted by the specialist after diagnostic workup. (follow the next topics)

INTESTINAL OBSTRUCTION

- Interruption of the normal flow of intestinal content, due to mechanical obstruction or due to functional paralysis.

Causes

- Tumours, Volvulus (Knotting), Adhesions, Inflammatory strictures (e.g. diverticulosis, etc.), Paralytic ileus.

Clinical features

- Small bowel obstruction: cramping abdominal pain, nausea, vomiting, abdominal distention. Due to the accumulation of fluids into the dilated intestinal loops, there is usually a varying degree of dehydration
- Large bowel obstruction: bloating, abdominal pain, constipation, vomiting and nausea less frequent and mainly in proximal colon obstruction; signs of dehydration and shock come later.

Investigations

- Abdominal X-ray (erect) has air-fluid levels), FBC, Chemistry (baseline)

Table 18.5 Management

Pre-operative management

- IV fluids (normal saline, Ringer's Lactate). (A) To correct fluids deficit and replace ongoing losses plus maintenance fluids
- Monitor haemodynamic status (pulse, blood pressure, skin turgor, level of consciousness, hydration of mucosae, urine output at least 0.5–1.0 ml/kg/hour).
- It may take up to 6 hours to re-hydrate. If not responding to IV fluids, suspect septic shock
- Insert urinary catheter to monitor urinary output
- Nasogastric tube for decompression. Pass NGT and connect with a drainage bag to empty the stomach in small bowel obstruction or when clinically indicated
- Nil by mouth (NPO)
- Give appropriate antibiotics. Ceftriaxone 2 g IV (A)once a day. Plus metronidazole 500 mg IV every 8 hours (A) (prophylactic).
- If the patient is in severe colicky pain, give analgesia eg pethidine 50-100 mg IV or IM
- If surgery is indicated and the patient's parameters are near normal after resuscitation, take the patient to the operating theatre for an appropriate surgical relief of the obstruction – This may need surgical consultation.

Intra-operative management

- Blood loss, fluid aspirated from the gut and other fluid losses must be replaced
- Maintenance fluid should be given: 5 ml/kg/hour
- The operation is guided by the cause of the obstruction and the safest procedure possible.

Post-operative management

- Replace all fluid losses and Give maintenance fluid
- Use normal saline or Ringer's lactate solution and 5% dextrose in the ratio 1:2 for the first 24-48 hours post-operatively
- Monitor for adequate rehydration
- Continue with analgesics in the postoperative period.
- Continue with antibiotic treatment where clinically indicated (metronidazole + ceftriaxone +/- gentamycin)
- Antibiotics are guided by the classification of the operation as;
  - Clean procedure
  - Clean-contaminated procedure
  - Dirty procedure

Note:

- In selective cases, non-operative treatment of intestinal obstruction (in particular small bowel obstructions) can be tried.
- The selected cases can be;
  - Appendicular mass, Acute pyo-salpingitis (PID), Some patients with adhesions, Pseudo-obstruction, Plastic peritonitis of TB, acute pancreatitis
- Non-operative management involves NGT decompression, intravenous fluid therapy and antibiotic therapy if indicated
- Monitor clinical progression of obstruction using parameters of;
  - Abdominal pain, Abdominal girth, Amount and colour of NG aspirate, Temperature, pulse and Blood pressure
- If no improvement after 72 hours or the NG content becomes feculent, operative management is indicated for relief of the obstruction – This may need surgical consultation.

Internal Haemorrhage

Internal bleeding (also called internal haemorrhage) is a loss of blood that occurs from the vascular system into a body cavity or space. It is a serious medical emergency and the extent of severity depends on:

- Bleeding rate (hypovolaemic shock)
- Location of the bleeding (damage to specific organs e.g., ruptured spleen, ruptured tubal pregnancy)

Management

Management of Internal Haemorrhage
• Prompt resuscitation o Establish IV lines (2 lines may be necessary) and give fluids rapidly o Draw blood for grouping and cross matching for volume replacement after surgical haemostasis • Invasive surgical intervention to control bleeding is life-saving. (Laparotomy to achieve surgical haemostasis) • Rapid sequence induction of general anaesthesia • Use drugs with minimal or no cardiac depression • Do not delay operation in attempt to stabilise the patient as this may not be achieved

Cholecystitis

- Acute cholecystitis is commonly occurs with cholelithiasis. The definitive treatment for cholecystitis is surgery i.e. open cholecystectomy or laparoscopic cholecystectomy, but it is necessary to give antibiotics for acute cholecystitis.
- Acute cholecystitis typically presents in a forty-year-old, fat, fertile, flatulent and fair female (6Fs), can also occur in males and in a younger or older age group. The symptoms are mainly acute right upper quadrant pain usually at night after a fatty meal with some milder previous episodes of colicky upper abdominal pains. On examination tender right upper quadrant is typical with a positive Murphy sign.

Treatment of Acute Cholecystitis

- Antibiotics and analgesia are important.

	Medicine	Dose	Frequency	Duration	Codes
	Ceftriaxone IV	1g	12 hourly	5-7 days	A E
	Metronidazole IV	500mg	8 hourly	5-7 days	A E
discharge on	Amoxicillin po	500mg	8 hourly	7 days	A V

- Schedule for elective cholecystectomy after six weeks.
- Laparoscopic surgery can however be done early or "hot" cholecystectomy when certain criteria are met based on expertise of the surgeon.

Perforated Duodenal/Gastric Ulcer

- Peptic ulcer disease is generally a medical condition where advances in diagnosis and treatment have made surgical intervention only reserved for its complications.
- Most patients who present with acute perforated duodenal ulcer have had a diagnosis of peptic ulcers before though some have no prior diagnosis or investigations done.
- Presentation is usually of sudden severe epigastric pain which rapidly spreads to the whole abdomen associated with fear of movement. Examination findings are typically those of generalised tenderness with board-like rigidity of the abdomen and rebound tenderness.
- The erect chest X-ray shows free air under the diaphragm in >75% of cases.

Management

- This is surgical emergency.
- Resuscitation with Normal Saline, NGT insertion, analgesia and urinary catheterisation should be done.
- FBC and U+Es are done in preparation for surgery.
- The prognosis is poor if surgery is delayed.
- IV antibiotics should be given as soon as signs of peritonitis are picked.

	Medicine	Dose	Frequency	Duration	Codes
	Ceftriaxone IV	1g	12 hourly	5-7 days	A E
	Metronidazole IV	500mg	8 hourly	5-7 days	A E

- Surgery involves repair of the perforation, a biopsy of the perforation edge, and omental patching.

18.8 Burns

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

Causes

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

Symptoms and signs

- Pain, swelling, Skin changes (hyperaemia, blisters, singed hairs), Skin loss (eschar formation, charring), Reduced use of the affected part
- Systemic effects in severe burns include shock, low urine output, generalised swelling, respiratory insufficiency, deteriorated mental state.

Table 18.6 Classification of the Severity of Burns

Criterion	Description
Depth of the burn—a factor of temperature, of agent, and of contact with the skin	**First-degree burns (Grade 1)** • Superficial epidermal injury with no blisters • Main sign is redness of the skin • Tenderness or hypersensitivity with intact two point discrimination **Second-degree burns** • Partial thickness burn (superficial - Grade 2A or deep - Grade 2B) • Superficial second-degree burns -2A • Blisters result • Pink wound and extremely painful • Deep second-degree burns 2B • A thin eschar is formed • The pale moist wound is painful **Third-degree burns (Grade 3)** • Full-thickness skin destruction • Leather-like rigid eschar • Painless on palpation or pinprick **Fourth-degree burns (Grade 4)** • Full-thickness skin plus fascia, muscle, or bone destruction • Lifeless body part
Percentage of TBSA	• Small areas are estimated using the open palm of the patient to represent 1% TBSA. Large areas estimated using the "Wallace rules of nines" or a Lund-Browder chart

Criterion	Description
Body part injured	• Burns to the face, hands, feet, and perineum are considered severe. • Inhalational Burns are severe and special
Age and general condition of the patient	• In general, children and the elderly fare worse than young adults and need more care. A person who is sick or debilitated at the time of the burn will be more affected than one who is healthy.

Figure 18.3 Lund & Browder Chart for Estimating Percentage of Total Body Surface Area (TBSA) Affected By Burns

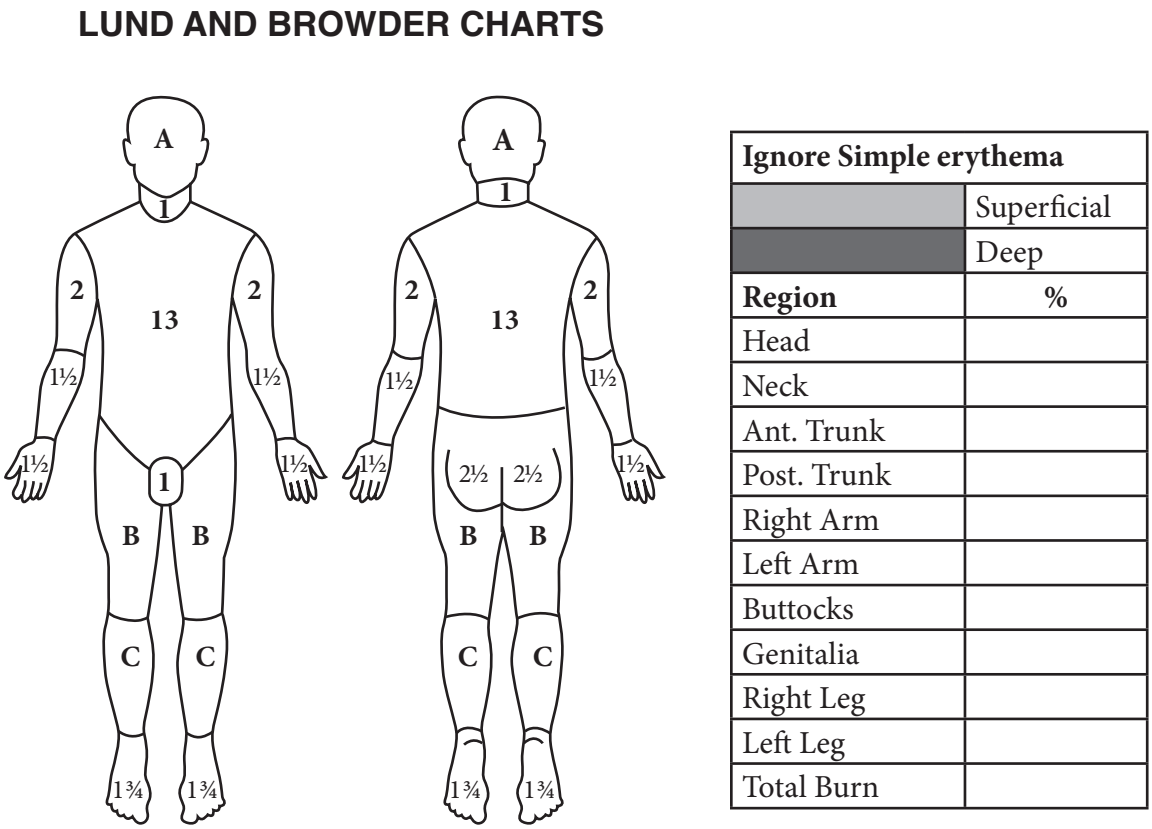


Table 18. 7 Estimating the Body Surface Area for Burns in Children (modified Lund & Browder)

Relative percentage of body surface area affected by growth						
Area	**Ag**	**1 Year**	**5 Year**	**10 Year**	**15 Year**	**Adult**
A=	9½	8½	6½	5½	4½	3½
B=	2¾	3¼	4	4½	4½	4¾
C=	2½	2½	2¾	3	3¼	3½

The Wallace Rule of Nines is inaccurate in children.

- *Children compensate for shock very well, but then collapse rapidly – beware the restless, irritable child.*
- *Do not over-estimate burn size – this will lead to over-hydration.*

Note

- Burn injury may be described as mild, moderate, or severe depending on;
- Depth of the burn (grade)
- Percentage of total body surface area (TBSA) burned
- The body parts injured
- Age or general condition of patient at the time of the burn
- A burn patient may be categorised as follows:
  - o Minor or mild burn:

- Adult with <15% TBSA affected
- Child or elderly person with <10% TBSA affected
- Full-thickness burn with <2% TBSA affected with no serious threat to function
  - o Moderate intermediate burns:
- Adult with partial thickness burn and 15–25% TBSA
- Child or elderly person with partial thickness burn and 10–20% TBSA
- All of the above with no serious threat to function and no cosmetic impairment of eyes, ears, hands, feet, or perineum.
  - o Major severe burns:
- Adult with partial thickness burn >25% or full-thickness burn >10% TBSA
- Child or elderly person with partial thickness burn >10% or full thickness burn of >5% TBSA affected
- Irrespective of age; any burns of the face, eyes, ears, hand, feet, or perineum with cosmetic or functional impairment risks
- Chemical, high-voltage, inhalation burns.

Table 18.8 Management of Burns

Type of Burn	Treatment Measures	Explanation
Mild or moderate burn	**Perform first aid.**	• Stop the burning process and move the patient to safety. Roll patient on the ground if clothing is on fire. • Pour or shower the affected area with water at around 25°C for 15mins to 30mins especially in the first hour after the burn (this may reduce the depth of injury if started immediately). • May cleanse the wound with saline solution or dilute antiseptic solution, Savlon® or Dettol®. • Cover the wound with a clean dry cloth and keep the patient warm
	Give medication.	• Give analgesics IV or PO as required. • If wound is infected, apply silver sulphadiazine 1% cream daily. ***Caution:*** • Contraindicated in pregnancy and breastfeeding. • Dress the wound with paraffin gauze dressing. Place enough dry gauze on top to prevent soiling. • Give TT as prophylaxis against tetanus (i.e., if not fully immunised or if the wound is suspected to be contaminated).
	Replace fluids.	• Give ORS and/or IV fluids as needed depending on the degree of dehydration using Parklands Formula. • Give as much as the patient can take.

Type of Burn	Treatment Measures	Explanation
Mild or moderate burn *(continued)*	**Care for wounds.**	• Leave blisters alone. Do not puncture (except if non-adherent sterile dressing is possible). • Continue to apply antiseptic cream (e.g., silver sulphadiazine 1% cream) if wound is infected. ***Caution:*** • Contraindicated in pregnancy and breastfeeding. • Apply layers of gauze moistened with a saline solution. • Place enough dry gauze on top to prevent seepage to outer layers, and creep bandage to hold dressings. • If in a normal ward, dress whole burn area. Cover loosely with a bandage. Do not wrap limbs; allow movement, especially at the flexures, to prevent contractures. Unless infection ensues, the first dressing should be left undisturbed for up to 3 days (review daily). • Small, superficial, 2° burns may be dressed with paraffin gauze dressing • Change the dressings after 1–2 days and as necessary thereafter.
	Take other measures as needed	• Give appropriate physiotherapy to joints affected (especially the hand). • Provide nutritional support to boost healing. • Provide counselling and psychosocial support to patient and relatives. • Provide health education on burn prevention (e.g., epileptic control).
Severe burn	**Treat as mild or moderate burn (above) but take the following revisions and additions**	
	Replace fluids.	• Give IV fluid replacement in a total volume per 24 hours according to the calculation e.g. by Parkland Formula. Use only crystalloids [i.e., Ringer's lactate or 0.9% sodium chloride (normal saline) and 5% dextrose]. • Give these solutions in a ratio of 2:1 [i.e., 2 units of Ringer's lactate (or normal saline) followed by 1 unit of dextrose 5%]; repeat until total required daily volume is reached.
	Treat infected burns.	• Apply silver sulphadiazine cream 1% daily. Caution: Contraindicated in pregnancy and breastfeeding. • Give an antibiotic as indicated by culture and sensitivity tests. Gram negative organisms are usually implicated later on, and a more appropriate blind therapy before results are obtained. • Adequate analgesia • Reassurance is an essential part of therapy.
	***Refer* for surgery, if needed.**	**Consider surgery if any the following is required—** • Escharotomy and fasciotomy for circumferential limb or tarsal bums. • Escharotomy to excise dead skin. • Skin grafting to cover clean deep bum wounds. • Eye protection (temporary tarsorrhaphy).

General considerations

- **Heat Burns:** Immediate cooling by immersion in water at approximately 25°C for 15mins to 30mins; then apply simple dry dressings (remove clothing if not adherent to burn).
- **Chemical Burns:** If there is dry powder present brush off the excess and then wash preferably with copious amounts of running for at least 20 minutes. Seal with soft paraffin (Vaseline) only what cannot be extracted with water. Avoid contaminating skin that has not been in contact with the chemical. Avoid using acids or alkalis to neutralise the chemicals.
- **Electrical Burns**: Cool burns in same way as heat burns. A patient unconscious from electrical or lightning burns will need urgent cardiac assessment and resuscitation. Defibrillation or external cardiac massage may be lifesaving.

- **Smoke Inhalation Burns:** If occurred in an enclosed area - may need 100 % oxygen (A) and airway management e.g. by intubation or tracheostomy.

Special attention is needed for:

- Burns on face, neck, hands and feet, perineum and joints.
- Circumferential burns (right around / both sides of a limb /region)
- Electrical, lightning, and chemical burns
- Concomitant mechanical trauma, or significant pre-existing medical disorders (e.g. epilepsy, diabetes, malnutrition).
- Very young, very old patients, psychiatric patients, para-suicidal, suspected abuse.
- Monitor patients for Anaemia, infection, contractures, depression, stress ulcers. You can give antacids routinely in patients with stress ulcers.
- Improve general hygiene with an antiseptic shower or bed bath with chlorhexidine or savlon. Catheterise all patients with perineal burns and use Sitz baths. If possible, do not mix old burns with new burn in same cubicle or beds close to each other.

Transferring burn patients

- Severe burns will require long-term special care and should be managed in a suitable hospital (i.e., a burns unit). Always endeavour to transfer burn cases within 24 hours of the burn. Transfer with the following precautions:
- For a short, easy journey—
  - o Commence resuscitation
  - o Make clear summary of records
  - o Send with medical attendant
- For a prolonged or delayed journey—
  - o Resuscitate and transfer when patient stable
  - o Keep the patient warm and covered during journey
  - o Continue management already started

Table 18.9 Calculation and Administration of IV Fluid Replacement

Objective	Volume Needed	Normal Urine Output
To maintain normal physiology as shown by— • Urine output • Vital signs • Mental status	• **The total volume of IV solution required in the first 24 hours of the burns is—4 MU × weight (kg) × % TBSA burned —PLUS—The normal daily fluid requirement.** • Give 50% of this 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— • *Children* (<30 kg wt): 1 mL/kg per hour • *Adults:* 0.5 mL/kg per hour (or approximately 30–50 mL per hour).

Notes:

- he basis of fluid replacement is that fluid is lost from the circulation into the tissues surrounding the burns, and some is lost through the wounds.
- Fluid loss is excessive within 18–30 hours of burns.
- Low intravascular volume results in tissue circulatory insufficiency (shock) with results such as kidney failure and deepening of the burns.

Prevention of burns

- Ensure that the public is aware of burn risks and knows the first-aid method of using water to cool burned skin.
- Advocate construction of raised cooking fireplaces as a safety measure.
- Ensure the safe handling of hot water and food, keeping everything well out of the reach of children.
- Ensure that high-risk persons (e.g., children, epileptic patients, or alcohol or drug abusers) take particular care near fires.
- Encourage the use of solar lamps.

18.9 Chest/Thoracic trauma

Forms of Thoracic injury

- Chest wall injury – Soft tissue, Rib fracture, Flail chest, Sternal fracture and Costochondral separation, Lung Contusion, laceration, hematoma
- Bronchial-pleural injury – Haemothorax, Pneumothorax, Tension pneumothorax, Open/ communicating pneumothorax (sucking wound)
- Diaphragmatic injury
- Cardiac – Tamponade, Myocardial concussion, contusion and rupture
- Vascular injury – intercostal, Great vessel disruption (blunt aortic dissection)
- Oesophageal perforation/disruption
- Tracheobronchial injury, traumatic asphyxia
- Subcutaneous emphysema
- Retained/Impaled Object

They fall into 2 broad categories:

- Blunt chest injury
- Penetrating chest injury

General Rules

Assessment – follow the ATLS protocols

Primary survey – do ABC to identify life threatening injuries which are treated as they are found during primary survey

Secondary survey – Look for other injuries after initial resuscitation

Blunt trauma: If initial CXR is negative, a repeat should be done at 6 hours
Penetrating trauma: If CXR is negative, a repeat CXR should be done at 3 hr.

Management Priorities are;

- Airway control
- Restore blood volume
- Drain haemothorax using a large tube

Imaging should not deter resuscitation and management. Modalities are;

- CXR
- CT chest

Clinical features depend on specific form of injury but in general include;

- Tenderness, ecchymosis, muscle spasm
- Asymmetrical chest movement, deformity

- Snapping sensation with deep inspiration – costochondral separation
- Bruising, seat-belt sign
- Crepitus, subcutaneous air, retained foreign bodies, bony step-offs
- Dyspnoea, absent breath sounds, rales, hypotension, hypoxia, haemoptysis,
- Tachycardia, cyanosis and pneumonitis

INJURIES TO CHEST WALL

Rib fracture:
Most are simple fractures. Their potential complications e.g. pneumothorax, haemothorax, pulmonary contusion, post-traumatic pneumonia, liver/spleen injury are more important than the fracture. In children- rib fractures are correlated with underlying pulmonary injury.

Management

Two goals:
- Pain control
- Maintain pulmonary function

Chest wall binders should be avoided – they promote hypoventilation
Generally, people with >3 rib fractures may need hospitalisation for pulmonary therapy and analgesia.
Intercostal nerve blocks: - give about 12 hrs. of analgesia with 1% lidocaine with 0.25% bupivacaine along the inferior rib margin. Posterior to the site of fracture. Block one rib above and one rib below. Most rib fractures heal within 3-6 weeks. Analgesia is usually needed for 1-2 weeks.

Complications:
- Pneumothorax, haemothorax, pulmonary contusion, post-traumatic pneumonia, liver/spleen injury
- Post-traumatic neuroma
- Costochondral separation
- Separated rib fractures can lead to delayed haemorrhage

Flail chest
Three or more ribs fractured at 2 points leading to paradoxical chest wall motion.

Can also occur with a vertical sternal fracture/costochondral injury

Bilateral flail segments are the most serious

Usually associated with lung parenchymal injury/contusion leading to altered ventilation/oxygenation
The pain from the fractures leads to hypoventilation, hypoxia, atelectasis, etc.

Management:
- Manage the pain and haemo-pneumothorax ASAP before considering intubation
- CPAP / non-invasive oxygenation strategies should be attempted first
- Consider cardiac monitoring and enzymes given the risk for cardiac injury/dysrhythmias
- Chest physiotherapy, oxygen/NIPPV, analgesia

- Consider ORIF of the rib fractures for patients with multiple ribs involved
- Reserve intubation only for ventilatory failure
- Long term issues: Chronic pain, dyspnoea, chest wall deformities

Blunt Chest wall injury (soft tissue)

The chest wall cavity is intact but the kinetic energy is enough to damage liver, lung, kidney, heart, spinal cord.

Management:

- Should be admitted for overnight observation and serial examination
- Consider serial abdominal and chest exams

STERNAL FRACTURE

Due to anterior blunt chest wall trauma, more likely in restrained passengers. Usually due to the diagonal strap running across the sternum. Non-displaced sternal fractures are benign, <1% mortality, and low intra-thoracic morbidity, although mediastinal injuries should be considered. Cardiac complications are rare. Main complications are mediastinal hematomas

Management

- Perform a CT and an ECG if you suspect a sternal fracture
- Analgesia
- Discharge home if no other injuries
- Rarely surgery if displaced
- Lung parenchyma injuries
- Subcutaneous emphysema - Free air in the subcutaneous tissue
- Worsened by positive pressure ventilation

Management:

- Drain the tension pneumothorax or tension pneumomediastinum ASAP
- Smaller accumulations are treated based on underlying injury
- Isolated Subcutaneous emphysema – from a Valsalva - should receive high flow oxygen to help absorb the nitrogen-rich SC air which causes discomfort.

PULMONARY CONTUSION

Bruise to lung parenchyma tissue leading to alveolar haemorrhage and oedema. It is suspected clinically. The onset may be insidious and quickly become severe. Commonly present with rib fractures and flail segments.

Most severe contusions occur in the absence of rib fractures - in paediatric patients (elasticity of the chest leading to more force transmitted to the lung).
CXR may show frank consolidation or patchy, irregular, alveolar infiltrates.

Management:

This involves mostly lung protective strategies which include;

- Avoiding over-administration of IV fluids
- Good pulmonary toileting
- Good pain control

- No colloids
- No prophylactic antibiotics
- Avoiding intubation and mechanical ventilation, especially if chest is flail

If intubation is needed use a double lumen tube so that ventilation strategies can differ between the lungs and consider using CPAP.

Pneumothorax

This is due to an injury in the parietal pleura which leads to paradoxical lung movement (collapse with inspiration due to negative intra- pleural pressure, and expansion with expiration).
There are different types of pneumothorax namely, simple, communicating, tension.

Simple pneumothorax

No communication with the atmosphere, No mediastinal or diaphragm shift.
Often due to rib fractures/penetrating trauma tearing the parietal pleura, or due to blunt chest trauma with a full breath and closed glottis leading to an alveoli rupture.

Management

Size and symptoms usually guides treatment:

- If <15%, Whether blunt or penetrating or spontaneous or traumatic, Usually observation is adequate
- If >15% and/or symptomatic, Tube thoracostomy is the best option
- If there are apical pneumothoraxes:
  - In the setting of penetrating trauma: stable patients with <25% involvement may be followed conservatively
  - In the setting of multisystem trauma – no conservative management. Put a chest tube in 4-5th intercostal space –anterior axillary line placed apical-posteriorly.

Complications:

- Bronchopleural fistula, empyema, scarring, pleural leaks, inter- costal artery/vein injury, pneumonitis,
- Increased risk of re-expansion pulmonary oedema for pneumothoraxes that have been present for >3 days.

Communicating pneumothorax

Open connection with the atmosphere creating a "sucking chest wound"

Leads to paradoxical chest wall and lung movement

Management

- Put an occlusive dressing, that allows air to escape – a flutter valve or three-sided tape.
- In the ER - patient can get a tube thoracostomy in preparation for thoracotomy or intubation.

Tension pneumothorax

Sucking chest wound leading to a one-way valve, drawing more and more air into the chest without an escape. It leads to lung collapse, and contralateral compression of the lung, great vessels and veno-caval structures. This leads to shock, hypoxia, decreased cardiac output and death.

Features are; dyspnoea, subcutaneous emphysema and cyanosis, tachypnoea, tachycardia and altered mental status.

Triad of tension pneumothorax:
- JVP raised
- Absent breath sounds (hyper-resonance)
- Tachycardia

Hypoxia occurs first, and hypotension is a pre-terminal state

Tension pneumothorax is a clinical diagnosis, and x-ray rarely should delay treatment, although findings may be subtle at times.

Management
- Decompress with finger thoracostomy or at least a 5 cm 14G hypodermic needle in 2-3rd ICS in midclavicular line to convert it into a simple pneumothorax.
- Then infect chest tube in 6th interspace anterior axillary line with under-water-seal drainage bottle system

Haemothorax

Can occur with blunt or penetrating trauma and lead to massive blood loss and altered chest ventilation. Can occur with extra-thoracic injury.

Management
- Tube thoracostomy (chest tube)
- Thoracotomy if continued loss of blood >200ml/hr for 3 consecutive hours

Complications:
- Delayed haemothorax - leading to empyema and fibrothorax
- Errors in tube placement leading to lung parenchymal injury or persistent air

Indication for tube thoracostomy (chest tube)
- Traumatic pneumothorax (except asymptomatic, apical pneumothorax)
- Moderate to large pneumothorax
- Respiratory symptoms regardless of size of pneumothorax
- Increasing size of pneumothorax after initial conservative therapy
- Recurrent pneumothorax after removal of chest tube
- Patient requires ventilator support
- Patient requires general anaesthesia
- Haemothorax
- Bilateral pneumothorax regardless of size
- Tension pneumothorax
- Indications for Thoracotomy
- Thoracostomy tube draining >20ml/kg of blood
- Persistent bleeding at a rate >7ml/Kg/hr
- Increasing haemothorax seen on CXR
- Patient remains hypotensive despite adequate resuscitation and other sites of possible bleeding have been ruled out
- Patient decompensates after initial resuscitation

18.10 Abdominal Injury

This may present as a blunt or penetrating injury to the abdomen.

Causes
- Accidents eg Road traffic accidents , falls etc
- Gunshots
- Violence of other forms

Symptoms
- Abdominal pain and distention, Vomiting

Signs
- Distended abdomen
- Tenderness and rebound tenderness
- Guarding
- Tympanic percussion
- Reduced or absent bowel sounds
- Point of penetration

Investigations
- Plain and erect abdominal X-ray
- Abdominal CT scan
- Electrolytes, Urea and Creatinine
- Abdominal ultrasound scan
- Diagnostic peritoneal lavage (not done is FAST is available)
- Blood grouping and cross matching

Treatment
Treatment objectives
- To correct fluid and electrolyte imbalance
- To stop any intra-abdominal bleeding
- To decompress bowel and repair damaged viscus
- To prevent infection
- To relieve pain

Non-pharmacological treatment
Insert an NG tube and advise NPO. Surgical repair of damaged viscus if necessary

Pharmacological treatment is for infection control

	Medicine	Dose	Frequency	Duration	Codes
	Ceftriaxone IV/ IM	500mg	Twice daily	5 days	A E
if gut is injured	Metronidazole IV	500mg	Three times daily	5 days	B V

Refer all cases to a general surgeon.

18.11 Head injury (traumatic brain injury)

Trauma to the head resulting in brain injuries due to:

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

Clinical features

- May be closed (without a laceration) or open (with a laceration), Swelling on the head (scalp hematoma)
- Fracture of the skull, e.g., depressed area of the skull, open fracture (brain matter may be exposed)
- Racoon eyes (haematoma around the eyes), bleeding and/ or leaking of CSF through nose, ears – signs of possible skull base fracture
- Altered level of consciousness, Seizures, Focal neurological deficits (e.g. unequal pupils, unilateral paralysis)
- Signs of raised intracranial pressure (ICP) include: Systolic hypertension, bradycardia and irregular decreased respiration (Cushing's Triad), vomiting.

Table 18.10 Glasgow Coma Scale (GCS) for Adults and Modified GCS for Infants and Children

Response	Value	Adult	Infant/Child
Eye opening	4	Spontaneous	Spontaneous
	3	To speech	To speech
	2	To pain	To pain
	1	None	None
Best verbal response	5	Oriented/Appropriate	Coos and babbles/ Cries appropriately
	4	Confused	Irritable, Cries
	3	Inappropriate words	Cries/Screams inappropriately
	2	Incomprehensible/non-specific sounds	Moans/grunts in response to pain
	1	None	None
Best motor response	6	Obeys command	Moves spontaneously and purposely
	5	Localizes pain	Withdraws in response to touch
	4	Flexion/Withdraws from pain	Flexion/Withdraws in response to pain
	3	Abnormal flexion (decorticate)	Abnormal flexion (decorticate)
	2	Abnormal extension (decerebrate)	Abnormal extension (decerebrate)
	1	None	None
Total Score	**3 - 15**		

AVPU for infants and children

Value	Adult	Infant/Child
A	Alert	GCS >13
V	Responds to voice	GCS 13
P	Responds to pain	GCS 8
U	Unresponsive	GCS <8

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

Low risk mild head injury
- GCS 15 at 2 hours
- No focal neurological deficits
- No signs/symptoms of skull fracture
- No recurrent vomiting
- No risk factors (age >65 years, bleeding disorders, dangerous mechanism)
- Brief LOC (<5 minutes) and post traumatic amnesia (<30 minutes)
- No persistent headache
- No large haematoma/ laceration
- Isolated head injury
- No risk of wrong information

High risk mild head injury
- GCS <15 at 2 hours
- Deterioration of GCS
- Focal neurological deficits
- Clinical suspicion of skull fracture
- Recurrent vomiting
- Known bleeding disorder
- Age >65 years
- Post traumatic seizure
- LOC >5 minutes
- Persistent amnesia
- Persistent abnormal behaviour
- Persistent severe headache
- Large scalp haematoma
- Polytrauma
- Dangerous mechanism (fall from height, car crash etc.)
- Unclear information

Investigations
- Skull X ray useful only to detect fracture
- CT scan is the gold standard for detection of head injury
- Baseline chemistry and FBC

Differential diagnosis
- Alcoholic coma - may occur together with a head injury, Hypoglycaemia, Meningitis, Poisoning, Other causes of coma

Management (general principles)

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

In all cases

- Assess airway, breathing, circulation and disabilities.
- Neurological examination include assessment of the Glasgow Coma Scale (GCS)
- Give resuscitation as required and treat all associated injuries
- Management of head injury is based on classification of the head injury using the Glasgow coma score

Treatment

- Assess mechanism of injury to assess risks of severe injury (which may not be apparent at the beginning)
- Assess medical history to assess risk of complication (e.g., elderly, anticoagulant treatment etc.)
- Assess level of consciousness using GCS or AVPU
- Perform general (including ears) and neurological examination (pupils, motor and sensory examination, reflexes)
- Assess other possible trauma especially if road traffic accident, e.g., abdominal or chest trauma
- DO NOT SEDATE. Do NOT give opioids
- DO NOT give NSAIDs (risk of bleeding)

Management of mild traumatic head injury

- First aid if necessary
- Mild analgesia if necessary e.g. paracetamol
- Observe for at least 4-6 hours, monitor GCS and neurological symptoms
- If low risk (see above)
  - Discharge on analgesia.
  - Advise home observation and return to the facility in case of any change
- If high risk
  - Monitor for 24 hours
  - ***Refer*** immediately if GCS worsens or other clinical signs appear/persist
  - If patient is fine at the end of observation period, send home with instructions to come back in case of any problem (severe headache, seizures, alteration of consciousness, lethargy, change in behaviour etc.)

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

Management of moderate traumatic head injury

- Careful positioning (head up 30°)
- Use fluids with caution
- Keep oxygen saturation >90% and systolic BP >90 mmHg
- ICP control (See below)
- Keep a head injury chart to record the GSC, pupil size, and neurological signs.
- Early CT or observe and refer immediately if not improving in the following hours

Management of severe traumatic head injury
- Care as for moderate head injury
- If open head injury, give first dose of antibiotic prereferably Ceftriaxone

	Medicine	Dose	Frequency	Duration	Codes
	Ceftriaxone IV	2g at once, for children 100mg/kg			A E

- ***Refer*** immediately for neurosurgical and ICU management

Intracranial pressure control measures
- Nurse with head of bed up 30 – 45 degrees
- Give oxygen per face mask. If GCS 8 or below intubate to protect the airway and for controlled ventilation.
- Give osmotherapy to reduce cerebral oedema.

	Medicine	Dose	Frequency	Duration	Codes
	Mannitol 20% IV	1g/kg	12 hourly	5-7 days	B E
	Metronidazole IV	500mg	8 hourly	5-7 days	A E
discharge on	Amoxicillin po	500mg	8 hourly	7 days	A V

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

Note:
- Open head injury—***Refer*** immediately to a specialist after giving general management and ICP control measures. Give an initial dose of **antibiotic** as in meningitis prior to referral.
- Closed head injury—Treat as above depending on severity.

Orthopaedic Emergencies

18.12 Fractures

A fracture is present when there is loss of continuity in the substance of bone.

Causes
- Direct violence-when bone strikes a resistant object or is struck by an object.
- Indirect violence-a twisting or bending force is applied to the bone.

Types of fractures
- Open fracture - there is a wound in continuity with the fracture.
- Closed fracture - the overlying skin is intact or if there are any wounds they are superficial or unrelated to the fracture.
- Fatigue/Stress fracture - stresses repeated with excessive frequency may result in fracture.
- Pathological fracture - is one which occurs in an abnormal or diseased bone.
- Simple fractures - transverse, oblique, spiral

- Complex fractures - comminuted, intraarticular, physeal, fracture dislocation, avulsion.
- Complicated - when there is damage to neighbouring structures.

Diagnosis
- In some cases the diagnosis is unmistakable

History
- What activity was pursued/History of injury
- Pain and bruising, Deformity/swelling, Loss of function

General signs
- Look-swelling, deformity, bruising, open/closed
- Feel-point tenderness, tense/soft, sensation, distal pulses
- Move-reduced/abnormal movement, crepitus (not to be intentionally elicited)

Investigations
- X-ray-AP and lateral, special views for certain fractures.
- CT scan-vertebral, calcaneal acetabular floor, pelvic, other intraarticular fractures.
- Bone scan- stress and pathological fractures
- MRI scan- stress fractures

Treatment
- Primary aims
  - o preserve life
  - o save the limb
  - o sound bony union without deformity
  - o restore function
- Resuscitation if fracture is not the sole injury using ATLS principles
- Pain management
- Splint (immobilise joint above and below) -reduce pain and further damage to surrounding structures.
- Gentle closed reduction if deformity is so great and threatening the skin.
- If open fracture saline irrigation and sterile dressing cover and immediate IVI antibiotic cover (1st generation cephalosporin or cloxacillin /vancomycin if allergic to penicillin) and refer to hospital for debridement and further management.
- Simple fractures can be treated with simple casting or sling
- Complex and complicated fractures to be referred to hospital.

18.13 Dislocation

Complete loss of congruity between the articulating surfaces of a joint. Joints commonly dislocated is the elbow, shoulder, finger, toe, knee and hip joints.

Causes
- Mainly trauma-accidents, sports and violence

Diagnosis
- History
- Pain, Incident leading to dislocation, Felt joint giving way, Loss/abnormal joint movement

Signs
- Abnormal joint position, Tenderness, Reduced/ abnormal movement, Assess neurovascular status

Investigation
- X-ray

Treatment
- ATLS principles
- Assess neurovascular status and record before and after reduction.
- Immediate closed reduction if there is neurovascular compromise.
- Splint appropriately after reduction for 3-4 weeks.
- Refer to hospital all failed closed reductions.
- Refer to hospital all chronic and recurrent dislocations.
- Refer to hospital if no perfusion after reduction.
- NB! Refer posterolateral knee dislocation with medial dimple sign because its irreducible by closed means due to buttonholing into joint capsule.

18.14 Sprains and strains

A sprain is an incomplete tear of a ligament or complex of ligaments responsible for the stability of a joint. A strain is a soft tissue injury or micro-tear of muscle mass or musculotendinous junction.

Causes
- Sport injuries, Slips and twists, Overuse injuries
- ***NB***! In children, elderly and disabled always suspect abuse

Diagnosis
- History of trauma, Pain worse with movement, Swelling/bruising, Inability to use limb, Tenderness, Limited range of motion

Investigation
- X-ray to rule out fractures/dislocations.

Treatment
- Immobilise-firm strapping, bracing, sling or splint.
- Analgesia-adults:

	Medicine	Dose	Frequency	Duration	Codes
	Ibuprofen po	200-400mg	8 hourly	7 days	A E
or	Diclofenac po	50mg	8 hourly	7 days	B E
and	Paracetamol po	15mg/kg	6-8hourly	7 days	A V

- Once acute pain subsides active movements are encouraged and muscle strengthening exercises practised

Refer to hospital if:
- Severe progressive pain, Progressive swelling, Deformity, No response to treatment

	Medicine	Dose	Frequency	Duration	Codes
	Chlorhexidine solution 0.05% topical solution	Apply twice daily	Twice daily	3-5 days	A E
or	Povidone iodine solution 10%	Apply twice daily	Twice daily	3-5 days	A E

18.15 Spinal Injuries

Spinal injuries carry a double threat: damage to the vertebral column and damage to the neural tissues and the main concern being with the latter.

Causes
- Motor vehicle accidents (majority of cases), Sport related injuries, Other-falls and assaults

Diagnosis
- History of trauma from accident or fall, Pain, Neurological symptoms-numbness, weakness, paralysis, loss of sphincter control, Deformity, Bruising, Tenderness, Palpable step, Neurological deficit

Investigations
- X-ray
- CT scan –better evaluation of bony structures
- MRI scan-disc, spinal cord and nerve root evaluation

Types of Injury
- Stable injury is one in which the vertebral components will not be displaced by normal movements.
- Unstable injury is one in which there is a significant risk of displacement and consequent damage or further damage to the neural tissues.

Treatment
- ATLS principles
- Always suspect head injury
- Cervical spine immobilisation with hard collar/ sand bag or pillows
- Place patient on spine board
- Assess neurological status
- Log roll patient and always consider unstable injury until proven otherwise
- Catheterise
- Immediate transfer to hospital for further assessment and treatment

18.16 Bites and stings

18.16.1 Wounds caused by teeth or jaws

Causes
- Can be inflicted by animals or reptiles (e.g., dog, human, or snakes). Specific treatment will depend on the type of bite (see sections below). General instructions are given here.

Nonpharmacological management
- Give first aid—
- Surgical toilet: clean the wound thoroughly with plenty of clean soap and water immediately.
- Remove any dirt or foreign bodies.
- Stop excessive bleeding where necessary.
- Rinse the wound and allow it to dry.

Caution: Do not suture bite wounds.

18.16.2 Snakebite

Symptoms and signs

- Puncture wounds or the lack thereof are not an indication of envenomation.
- Not all signs and symptoms are always present
- Signs and symptoms differ depending of the type of venom but overlap of symptoms is possible.

Table 18.11

Cytotoxic bites *(Painful Progressive Swelling syndrome)*
Local effects: • Pain and swelling with the onset almost immediately after bite; blistering; bleb formation; hemorrhagic edema (Puff adders); delayed tissue necrosis, ecchymosis. **General symptoms:** • Nausea & vomiting; fever; abdominal pain; regional lymphadenopathy **Hematologic effects for Puff adder bites:** • Coagulation derangements; spontaneous mucosal bleeding; thrombocytopenia; epistaxis; anaemia, ecchymosis. • Bruising is common with Mozambique spitting cobra bites. **Renal effects:** • Hematuria; hemoglobinuria; myoglobinuria; renal failure
Neurotoxic bites *(Progressive Weakness syndrome)*:
• Venom is both neurological and neuromuscular, resulting in progressive weakness of the skeletal muscles including the respiratory muscles. • Minimal to mild pain at the bite site; • Paraesthesia of the tongue and lips; profuse sweating excessive secretions; excessive salivation; swallowing difficulties; • Slurred speech; ptosis; diplopia, decending flaccid paralysis, opthalmoplegia.
Haemotoxic bites *(Bleeding syndrome)*:
• Venom causes a pro-coagulant effect and the symptoms present within 4-24 hours: • Oozing of blood from puncture wounds and intravenous sites; gingival bleeding; epistaxis; large bruises; purpura, extensive ecchymosis; hematemesis, melena; haematuria; intracranial bleeding

Nonpharmacological management

- Give first-aid (bag-valve-mask ventilation or mouth-to-mouth breathing may be needed for neurotoxic bites & CPR is indicated for patients in full cardiac arrest); obtain good intravenous access; prepare resuscitation equipment for airway; IV fluids; analgesia (paracetamol is preferred & opiates should be avoided); tetanus toxoid.
- Venom in eyes:
  - o Irrigate eyes with plenty of water
  - o Apply chloramphenicol eye ointment 1%
- When Envenomation is confirmed or suspected:
- Clean wound, mark on the skin a line showing extent of swelling and write the time- with a FELT TIP marker pen. Repeat hourly.
- Keep patient still and calm, moderate elevation of limb (at level of the heart).
- There is no need for bandage, splints, or antibiotics.

Pharmacological management

- ***Note:*** many snake bites do not require antivenom. Use antivenom only as per the Eswatini Snakebite protocols.
- Criteria for referral for administration of antivenom:

- Cytotoxic bites *(Painful progressive swelling)*:
  - Swelling progressing more than 2.5cm per hour, over one major joint in less than an hour, or two joints in less than 4 hours; any swelling reaching the trunk of the body; cardiovascular abnormalities
- Neurotoxic bites (Progressive Weakness syndrome):
  - Respiratory function is compromised; progressive muscle paralysis; difficulty swallowing; hypersalivation; ptosis; progressive hypoventilation, a fall in serial peak flow measurements or declining oxygen saturation levels.

Antivenom:

- Antivenom neutralises a fixed amount of venom. Since snakes inject the same amount of venom into adults and children, the same dose/volume of antivenom must be administered to children as in adults.

- **Polyvalent antivenom** (SAIMR Polyvalent Snakebite Antiserum SAVP) (B*)is supplied in 10 ml ampoules. Venoms of the following Eswatini snakes are used as antigens in the preparation of the polyvalent antivenom: Puff adder, Rinkhals, Black mamba, Snouted cobra and Mozambique spitting cobra. Polyvalent antivenom is ineffective AND SHOULD NOT BE USED in treatment of bites caused by the berg adder, night adders, the burrowing asp and back-fanged snakes (boomslang and vine snake).
- If the above criteria are satisfied:
  - ***Refer*** urgently to suitably equipped Emergency Room for administration of **Polyvalent** (PVA) **antivenom**
  - Monovalent antivenom (SAIMR Boomslang Snakebite Antiserum SAVP) (B*) is supplied in 10 ml ampoules. It is effective against the venom of Boomslang, but not against the venom of the vine snake (bird of twig snake).
- Haemotoxic bites (Bleeding syndrome):
  - Confirmed Boomslang bite; positive 20MWBCT; severe bleeding; severe bleeding away from the bite site.
- If the above criteria are satisfied:
  - ***Refer*** urgently to suitably equipped Emergency Room for administration of **Monovalent** (MVA) antivenom

Administration of antivenom:

- Ensure that the antivenom solution is clear (no particles).
- Regardless of history of allergy, if the clinical situation demands, the Antivenom should be administered.
- All drugs should be ready for the treatment of possible anaphylaxis and 0.5 ml of a 1:1000 solution of adrenaline (0.3 ml of 1:1000 solution in children) should be drawn up to be available for immediate IM administration in case of severe anaphylaxis.
- Pre-treat with 0.25mg subcutaneous adrenaline.
- Corticosteroids & antihistamines are ineffective and possibly harmful in the prevention of anaphylaxis in snakebite, and it diminishes the effect of subcutaneous adrenaline (avoid adrenaline pre-medication in patients with a history of ischemic heart disease; stroke, hypertension and tachyarrhythmias)
- A safe approach if unsure, is to administer 10 vials of PAV or 1 vial of MAV. Draw up the **antivenom** in 10ml syringe and administer by pushing into the IV line over 2 minutes.
- Minimum of 5 Vials should be given for all confirmed envenomations.
- Additional AV may be required if symptoms persist in increments of 2 vials PAV (20 mls) or 1 vial MAV (10ml) over 10 minutes every 2 hours until all the venom has been neutralised.

- ***Refer*** to hospital all cases

18.16.3 Insect Bites and Stings

Causes

- Bees, wasps, hornets, and ants: venom is usually mild but may cause anaphylactic shock in previously sensitised persons.
- Spiders and scorpions: most are non-venomous or only mildly venomous.

Symptoms and signs

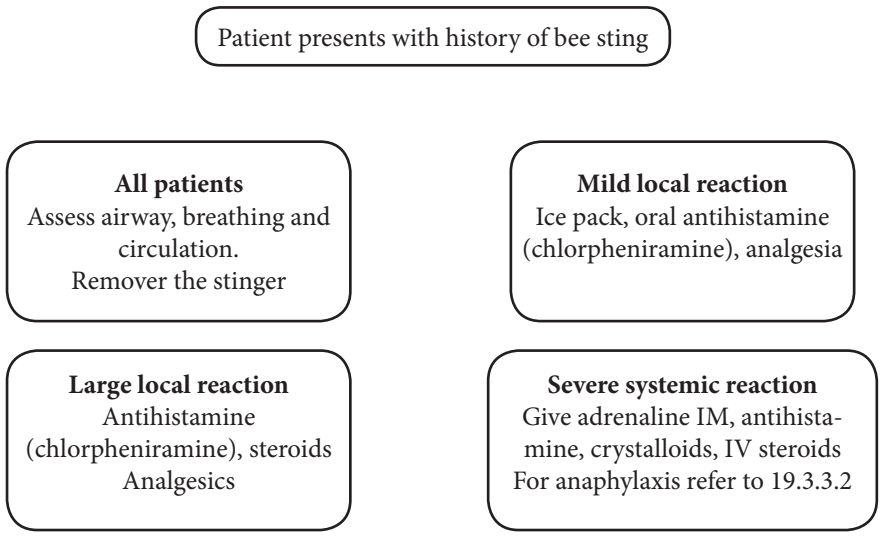
- There are three types of reaction that occur after a sting: a local reaction, a large local reaction and a systemic reaction. Symptoms will depend on the extent of reaction which will include the following:
- Swelling, discolouration, burning sensation, pain at the site of the sting, Headache, dizziness
- May be signs of anaphylactic shock

Management

- Give first aid and supportive therapy if required (e.g., if bite is from highly venomous species).
- If the stinger remains implanted in the skin, remove carefully with forceps or knife blade if necessary.
- If severe local reaction occurs

	Medicine	Dose	Frequency	Duration	Codes
	Chlorpheniramine po	**Adults**— every 6 hours (maximum: 24 mg daily. **Children—1–2 years:** 1 mg PO every 12 hours **2–5 years:** 1 mg PO every 6 hours (maximum: 6 mg daily). **6–12 years:** 2 mg PO every 6 hours (maximum: 12 mg daily) until swelling subsides.			A E
or	in severe pain lignocaine 2%	Infiltrate around the area of the bite			C V

Figure 18.4 Management of a patient with bee sting



Refer **to hospital** if systemic manifestations are present.

18.16.4 Human Bite

The most common type of human bite wound to the hand is a clenched fist injury resulting from striking another person in the mouth. Other common areas are the ears lobes, lips and the nose.

Presentation
- History of violence, though not usually easily communicated, high degree of suspicion is needed.
- Pain
- Obvious wound on parts of body affected.
- Small, short, innocuous-appearing transverse or jagged wound over the dorsal aspect of the MCPJ.
- Over time swelling, erythema, tenderness and purulent discharge.
- Infecting organisms-S aureus, Streptococcus and Eikenella corrodens (polymicrobial).

Management
- X-ray of the hand in hand bites to rule out fractures and tooth fragments in MCPJ.
- HIV testing and PEP within 72 hours if indicated.
- Urgent surgical debridement of the wound and joint capsule is indicated.
- The wound is left open to drain, elevated and splinted in functional position.

	Medicine	Dose	Frequency	Duration	Codes
	Gentamicin IV	240mg	Daily	3 days	A V
plus	Cloxacillin IV	500mg	Four times daily	3 days	A V
plus	Metronidazole IV	500mg	Three times daily	3 days	A V
discharge on	Cloxacillin po	500mg	Four times daily	5 days	A E
and	Metronidazole po	400mg	Three times daily	5 days	A V

NB! All patients are to be referred to hospital immediately for appropriate treatment. A delay of more than 3 days may result in loss of the finger or hand due to osteitis/osteomyelitis.

18.16.5 Animal Bites

Dog bites are the most common bites from domestic animals followed by cat bites. Cat bites become more frequently infected because the cat's needle-like teeth can cause a deep puncture wound.

Presentation
- History of bite from offending animal
- Suspicion of rabies by abnormal animal behavior-attack unprovoked, aggression/too calm, drooling of saliva, hydrophobic.
- Bite marks
- Infecting organisms- Pasteurella canis specific to dogs and Pasteurella multocida specif to cats, and S aureus and Streptococci.
- Teeth marks or scratches, lacerations, Puncture wounds (especially cats)

Complications: bleeding, lesions of deep structures, wound infection (by mixed flora, anaerobes), tissue necrosis, transmission of diseases (tetanus, rabies, others)

Management
- Immediately clean the wound thoroughly with plenty of clean water and soap to remove any dirt or foreign bodies
- Stop excessive bleeding where necessary by applying pressure
- Rinse the wound and allow to dry

- Apply an antiseptic: Chlorhexidine solution 0.05% or povidone iodine solution 10% (A)
- Soak puncture wounds in antiseptic for 15 minutes
- Thorough cleaning, exploration and debridement (under local anaesthesia if possible)
- As a general rule, DO NOT SUTURE BITE WOUNDS
- Refer wounds on hands and face, deep wounds, wounds with tissue defects to hospital for surgical management
- Tetanus prophylaxis: Give TT immunisation (tetanus toxoid, TT 0.5 ml), if not previously immunised within the last 10 years
- Prophylactic antibiotics are indicated in the following situations:
  - Deep puncture wounds (especially Cats)
  - Human bites
  - Severe (deep, extensive) wounds
  - Wounds on face, genitalia, hands
  - Wounds in immunocompromised patients

	Medicine	Dose	Frequency	Duration	Codes
	Amoxycillin po	500mg In children - 15mg/kg	Three times daily Three times daily	5-7 days 5-7 days	A V
and	Metronidazole po	400mg In children - 10-12,5mg/kg	Four times daily Twice daily	5 days	A V

Note: Do not use routine antibiotics for small uncomplicated dog bites/wounds

- **Rabies Post Exposure Prophylaxis**

  - Post exposure prophylaxis effectively prevents the development of rabies after the contact with saliva of infected animals, through bites, scratches, licks on broken skin or mucous membranes. Veterinary Public guidance is necessary.

- **Rabies Treatment**
  - Dealing with the Animal:
  - If the animal can be identified and caught
  - If domestic, confirm rabies vaccination
  - If no information on rabies vaccination or wild: quarantine for 10 days, or euthanise and send to the Veterinary Department for analysis
  - If no signs of rabies infection shown within 10 days: release the animal, stop immunisation
  - If it shows signs of rabies infection: euthanise the animal, and send to the Veterinary Department for verification of the infection
  - If animal cannot be identified
  - Presume animal is infected and patient at risk

Notes
- Consumption of properly cooked rabid meat is not harmful
- Animals at risk: dogs, cats, bats, other wild carnivores
- Non-mammals cannot harbour rabies

Dealing with the patient
- The combination of local wound treatment plus passive immunisation with rabies immunoglobulin (RIG) plus vaccination with rabies vaccine (RV) is recommended for all suspected exposures to rabies

- Since prolonged rabies incubation periods are possible, persons who present for evaluation and treatment even months after having been bitten should be treated in the same way as if the contact occurred recently
- Administration of RIG and vaccine depends on the type of exposure and the animal's condition

Treatment

- Prompt and thorough local treatment is an effective method to reduce risk of infection. Local cleansing is indicated even if the patient presents late For mucous membranes contact, rinse thoroughly with water or normal saline
- As a general rule, DO NOT SUTURE THE WOUND
- If Veterinary Department confirms rabies infection or if animal cannot be identified/tested; Give rabies vaccine+/- rabies immunoglobulin human as per the recommendations

Table 18.12 Recommendations for Rabies Vaccination/Serum

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

Prevention

- Vaccinate all domestic animals against rabies e.g. dogs, cats and others. Use Purified VERO Cell Culture Rabies Vaccine (PVRV), which contains one intramuscular immunising dose (at least 2.5 IU) in 0.5 ml of reconstituted vaccine. RV and RIG are both very expensive and should only be used when there is an absolute indication

- **Post-Exposure Vaccination in Non-Previously Vaccinated Patients.**
  - Give RV to all patients unvaccinated against rabies together with local wound treatment. In severe cases, also give rabies immunoglobulin.
- The 2-1-1 intramuscular regimen induces an early antibody response and may be particularly effective when post-exposure treatment does not include administration of rabies immunoglobulins
  - Day 0: One dose (0.5 ml) in right arm + one dose in left arm
  - Day 7: One dose
  - Day 21: One dose

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

- The alternative 2-site intradermal (ID) regimen uses PVRV intradermal (ID) doses of 0.1 ml (i.e. one fifth of the 0.5 ml IM dose of PVRV)
  - Day 0: one dose of 0.1 ml in each arm (deltoid)
  - Day 3: one dose of 0.1 ml in each arm
  - Day 7: one dose of 0.1 ml in each arm
  - Day 28: one dose of 0.1 ml in each arm

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

- **Post-exposure immunisation in previously vaccinated patients**
  - Intramuscular regimen
  - ***Day 0: One booster dose IM***
  - ***Day 3: One booster dose IM***
- In persons known to have previously received full pre- or post-exposure rabies vaccination within the last 3 years
- Intradermal regimen
  - ***Day 0: One booster dose ID***
  - **Day 3: One booster dose ID**
- Passive immunisation with rabies immunoglobulin (RIG)
- Give in all high risk rabies cases irrespective of the time between exposure and start of treatment BUT within 7 days of first vaccine.
- DO NOT USE in patients previously immunised

- **Pre-exposure immunisation**
  - Offer rabies vaccine to persons at high risk of exposure such as:
  - Laboratory staff working with rabies virus
  - Veterinarians
  - Animal handlers
  - Zoologists/wildlife officers
- Any other persons considered to be at high risk

Regime
  - ***Day 0: One dose IM or ID***
  - ***Day 7: One dose IM or ID***
  - ***Day 28: One dose IM or ID***

Refer to hospital for surgical debridement for severe bites.

CHAPTER 19

ANAESTHESIA

Anaesthetic and sedative medication can only be administered by trained anaesthesia providers. Resuscitation equipment and drugs must be immediately available when administering general or regional anaesthesia. *Resuscitation equipment must include a working self-inflating bag and mask, Laryngoscope and blades, laryngeal mask and appropriate sized endotracheal tubes.*

Table 19.1 Resuscitation (Emergency) drugs

Drug (IV/IM)	Indications	Paediatric Dose	Adult Dose	Codes
Oxygen	Hypoxia. Low GCS Cardiac arrest			A V
Adrenaline	Hypotension, cardiac arrest, Severe bradycardia. Anaphylaxis	- 0.1mg/kg stat. Cardiac arrest: 0.1mg/kg every 3 -5mins. **Consult Anaesthesiologist and ICU**	1mg/kg **Consult Anaesthesiologist and ICU**	A V
Atropine	Severe Bradycardia	10 -20mcg/kg	0.3 – 0.6mg.	A V
Ephedrine	Severe hypotension usually secondary to spinal anaesthesia.		IV 5 – 10mg boluses, Max dose 30mg.	B V
Phenylephrine	Severe hypotension usually secondary to spinal anaesthesia.	2 – 10 mcg/ kg	20 – 100mcg boluses. Dilute 10mg in 500ml NS each ml= 100mcg.	B V
Suxamethonium	Rapid sequence induction. Severe Laryngospasms	2mg/kg	1 -1.5mg/kg	B V

19. 1 Conduct of Anaesthesia

The subsections below outline various medications used in anaesthesia. The dosages used are recommended for healthy patients therefore extra caution is needed when anaesthetising the elderly, critically ill, chronically ill, emergencies and hemodynamically unstable patients.

19.1.1 Pre-Medication

These are medications used to ensure smooth anaesthesia and minimise post anaesthesia complications. They include:

- Sedative and anxiolytics
- Antiemetics – to prevent post-operative nausea and vomiting
- Antacids – given to patient at risk of aspiration e.g pregnant women, patients with abdominal mass and non-fasted patients.

Table 19.2 Premedication given at 30 minutes – Induction

Indication	Drug	Paeds dose	Adult dose	Frequency	Codes
Sedation and anxiolytics 1	Diazepam	0.2 -0.3mg/kg	IV 2 – 10 mg		B V
			PO 0.5 – 0.75mg/		
	Midazolam Or	IV 0.1 -0.2mg/kg	IV 0.5 - 5 mg	30 mins pre induction.	B V
	Lorazepam	0.1mg/kg for Status Max 4mg.	PO: 2 - 4mg	1 – 2 hr pre-operatively	B V
Antiemetic	Dexamethasone	150mcg/kg	IV 2 – 8mg	At induction	A V
	Plus Ondansetron	>2yrs: 0.1mg/kg (1 – 4mg)	IV 4mg	Give over 2 -5 minutes. 30 minutes prior to end of surgery.	C V
	Or Metoclopramide	0.15mg/kg	IV 10mg	At induction	A V
Antacids	Sodium Bicarbonate		10ml po	Given at 30mins pre-induction for pregnant patients for caesarean section.	B V
	Ranitidine Or	1mg/kg	Slow IV 300mg	30 mins pre induction.	A V
	Pantoprazole	Not recommended	Slow IV 40mg	30 mins pre induction.	B V

[1]Monitor for respiratory depression and aponea. Use with caution in elderly and patients with low level of consciousness.

Table 19.3 Antidotes in Anaesthesia

Class	Indication	Drug name	Paediatric Dose	Adult Dose	Codes
Benzodiazepine antagonist	Benzodiazepine overdose	Flumazenil	5mcg/kg stat. Repeat every 60 seconds Consult Anaesthesiologist. Refer to ICU	0.2mg IV bolus then 0.1 mg every 60 seconds. Maximum= 1mg. Consult Anaesthesiol-ogist. Refer to ICU	B E
Opioid antagonist	Opioid overdose.	Naloxone	5 – 10 mcg/kg. Consult Anaesthesiologist. Refer to ICU.	0.2 – 0.4mg titrated to desired effect. Consult Anaesthesiologist. Refer to ICU.	B V
Antimuscarinic effects:	Severe bradycardia, cardiac arrest. Reversal of neostigmine induced side effects	Glycopyrrolate	4 -10 mcg/kg	0.2–0.4mg IV (0.2mg for every 1mg of neostigmine).	B V
		Atropine	10 -20 mcg/kg	0.3 -0.6 mg. Cardiac arrest = 3mg	A V
Anticholines-terase	Reversal of Non depolarising Muscle relaxant	Neostigmine[1] Plus Atropine or Glycopyrrolate (see doses above) IV	50 mcg /kg neostig-mine with atropine 20mcg /kg or Glycopyrrolate 10mcg /kg IV	50 – 70mcg/kg (max 5mg) With atropine 20 mcg/ kg or Glycopyrrolate 10mcg/kg	B V
	Treatment of myasthenia gravis	Neostigmine		15 – 30 mcg po at suitable intervals.	S E

Neostigmine[1] - IV lasts 60 minutes, PO last 2 -4 hours.

19.2 General Anaesthesia

Pre-Induction Drugs include antibiotic prophylaxis and antifibrinolytic drugs and must be given at the right time.

Antibiotic Prophylaxis 30-60 minutes prior to incision

- Prophylaxis refers to the prevention of an infection and can be characterised as primary prophylaxis, secondary prophylaxis, or eradication (ASHP therapeutic guidelines)

Principles

- Timing: Dose should be given 60 minutes prior to incision. Drugs that require long duration of administration may need to be administered 2 hours prior e.g Vancomycin, fluoroquinolones
- Selection and dosing:
  - o Selection depends on type of procedure and reason for prophylaxis (see Table 19.4)
  - o Dose per kg body weight in children or standard dose in adults. Doses may need to be adjusted in the obese.
  - o Repeat dosing is recommended in cases of excessive blood loss and if procedures exceed 2 half-lives of the drugs.

192.1 Antimicrobials for Prophylaxis

Table 19.4

Antimicrobial	Paeds Doses	Adult Doses	Half life (hrs.)	Repeat dosing after (hrs)	Codes
Cefazolin	30mg/kg	2g. 3g if >120kg	1.5 - 2 .5	4	B V
Cefuroxime	50mg/kg	1.5g	1 - 2	4	C V
Cefoxitin	40mg/kg	2g	45 - 60 min	2	S E
Ceftriaxone)	50 -75 mg/kg	2g	5 - 9	N/A	A V
Ciprofloxacin	10mg/kg	400mg	3 - 7	N/A	B V
Levofloxacin	10mg/kg	500mg	6 - 8	N/A	S V
Metronidazole	15mg/kg. 7.5mg/kg in Neonates< 1.2kg	500mg	6 - 8	N/A	A V
Piperacillin-Tazobactam	80mg/kg in 2 -9months. 100mg/kg for above 9 months or >40kg	4.5g	40 - 60 min	2	S V
Vancomycin	15mg/kg	15mg/kg	4 - 8	N/A	S E
Clindamycin*	10mg/kg	600mg	2 - 4	6	B V

**Clindamycin for patients with penicillin allergy*

***NB:** Antibiotic options above to be considered according to surgical procedure as shown in the next section.*

Table 19.5 Recommended antibiotic prophylaxis as per surgical procedure

Procedure	Drug
Gastrointestinal Procedures	
Without entry into GIT lumen	
Entry into GIT lumen	Cefazolin
Appendectomy uncomplicated	Cefazolin + Metronidazole
Small bowel: Obstructed	Cefazolin + Metronidazole
Not obstructed	Cefazolin
Biliary Tract: Elective, Not Infected	Cefazolin
Biliary tract surgery with infection	Ceftriaxone
Hernia	Cefazolin
Laparoscopic, high risk	Cefazolin
Colorectal	Cefazolin + Metronidazole
Orthopedic and Neurosurgical Procedures	
Clean operation involving the hand, knee, or foot, with no implants	None
Spinal procedures with or without instrumentation	Cefazolin
Implantation of internal fixation devices e.g nails, screws, wires, plates	Cefazolin
Hip fracture. Total joint replacement	Cefazolin
Spinal procedures with or without instrumentation	Cefazolin
Neurosurgery	
Elective craniotomy, CSF shunting	Cefazolin
Implantation of intrathecal pumps	Cefazolin
Obstetrics and Gynaecology and Urology Procedures	
Caesarean section	Cefazolin
Hysterectomy vaginal or abdominal	Cefazolin
Urology	
Lower tract instrumentation with risk factors of infection	Cefazolin
Clean without entry into urinary tract	Cefazolin
Clean with entry into urinary tract	Cefazolin +/- Aminoglycoside
Clean contaminated	Cefazolin + Metronidazole

Oral Antibiotics For Colorectal Surgical Prophylaxis – used in conjunction with mechanical bowel preparation.		
Drugs	**Dose**	**Half Life (Hrs)**
Erythromycin	20mg/kg	0.8 – 3
Metronidazole	15mg/kg	6 – 8
Neomycin	15mg/kg	2 -3; only 3% absorbed under normal GIT conditions

Reference: Clinical practice guidelines for antimicrobial prophylaxis in surgery (ASHP therapeutic guideline).

19.2.2 Tranexamic Acid

This is an antifibrinolytic that has been shown to reduce intraoperative blood loss consequently reducing the incidence of perioperative blood transfusions.

It is indicated for all patients who are likely to experience > 500mls for adults or > 10ml/kg blood loss in children.

Each Dose should be given over 10 - 30mins before incision. Mix 1g with 200 ml normal saline

Table 19.6 Tranexamic acid dosing and procedures

Type of Procedure	Dose	Codes
Trauma, ectopic pregnancy	1g IV within 3 hours	B V
Spine surgery	1g IV	B V
Orthopaedic surgery Hip fracture, Femur fracture and Knee	1g IV	B V
Exploratory laparotomies	1g or 10mg/kg	B V
Tonsillectomy, adenoid surgery	1g or 10mg/kg	B V

19.2.3 Induction and Maintenance for General Anesthesia

Genral Anaesthesia

- Includes induction with an inhalational or intravenous anaesthetic, with muscle relaxation, pre-emptive analgesia with maintenance anaesthesia and analgesia

Intravenous anaesthesia drugs

- Give as a slow IV, at appropriate dose, and titrated to effect adequate level of anaesthesia. In haemodynamically unstable patients the preferred choice either ketamine or etomidate.

Table 19.7 Intravenous anesthesia drugs

Drug	Pediatric Dose	Adult Dose	Advantages	Disadvantages/ side effects	Codes
Ketamine	Induction dose • 0.5 – 2mg/kg IV • 5 -10mg/kg IM	Induction dose • 1 -2mg/kg IV • 5-10mg/kg IM	• Bronchodilator– asthma. • Hypotension • Titrate in shock pts. • In emergencies	• Hypertension • Hallucinations • Delirium	B V
Propofol 1% or 2%	• Induction dose 2-4mg/kg • Not recommended for neonates	• Induction dose: 2 -3 mg/kg IV	• Fast induction. • Anti-emesis • Anti-convulsant	• Hypotension, pain on injection • Decrease dose in elderly, • Soyabean and egg allergy	B V
Sodium thiopentone	• 2 -4mg/kg IV for neonates • 5 -6mg/kg	3 -5mg/kg	Anti-seizure	• Cause hypotension • Contraindicated in porphyria	B V
Midazolam	0.1 – 0.3mg/kg	0.1 – 0.3mg/kg	Sedation Anti-seizure Fast onset	Hypotension Respiratory depression	C V
Etomidate	0.3mg/kg	0.15 – 0.3mg/kg		Pain on injection	C E

Inhalational agents

Inhalational anaesthetics (except Isoflurane) can be used as induction agents at higher concentrations for children and patients with difficult airways. For maintenance target the desired Mean alveolar concentration (MAC).

Table 19.8 - List of Inhalational Agents

Drug	MAC in oxygen/air (%)			Caution	Codes
	1 Year	40 Year	80 Year		
Isoflurane	1.49	1.17	0.9	Causes reflex tachycardia. Very irritant to respiratory tract so gas induction not recommended	B V
Sevoflurane	2.29	1.8	1.8	Very pleasant odour. Suitable as induction gas in both children and Adults.	B V
Halothane	0.95	0.75	0.58	Potentiates arrhythmias Risk post exposure hepatitis best avoided in liver disease or if last exposure is within 3 months Not recommended for use in obstetrics (Causes uterine atony)	B V
Nitrous o xide	133	104	81	Reduces use of other inhalational anaesthetics Should be avoided in first trimester. Avoid in craniotomies and patients at high risk of hypoxemia such as infants, Obese, Elderly.	B V

19.2.4 Muscle Relaxants

To facilitate intubation and provide intraoperative muscle relaxation for Surgery. In emergencies, succinylcholine or rocuronium are preferred. Atracurium is preferred in patients with renal failure.

Table 19.9 Depolarising muscle relaxants

Drug	Dose	Time	Caution and Side effects:	Codes
Suxamethonium	Adult 1 – 1.5mg/kg Paeds 1 – 2mg/kg	Onset: 30–60s Duration: 5 minutes	Hyperkalemia, residual pain, prolonged neuromuscular block, Bradycardia. **DO NOT USE** in: Paralysis, Burns, severe trauma, rhabdo-myolysis, severe infection.	B V

Table 19.10 Non-Depolarising muscle relaxants (NDMR)

Drug	Intubation	Maintenance	Duration: Time	Codeds
Rocuronium (A)	Paeds: 0.6 - 1mg/kg	Paeds: 0.1 – 0.15mg/kg	Onset < 60s 10 – 40 mins	B V
	Adult: 0.6 - 1mg/kg	Adult: 0.1 – 0.15mg/kg		
[1]Atracurium (A)	Paeds: 0.3 - 0.6mg/kg	Paeds: 0.1 – 0.2mg/kg	20 – 35 mins	B V
	Adult: 0.3-0.6 mg/kg	Adult: 0.1 -0.2mg/kg		
Pancuronium (A)	Paeds: 0.1mg/kg	Paeds – 0.02mg/kg	45 – 65 mins	B V
	Adult: 0.1 mg/kg	Adult - 0.02mg/kg		

[1]Undergoes temperature and pH -dependent Hoffmann elimination plus nonspecific ester hydrolysis.

19.3 Analgesics

19.3.1 Acute pain

Pre-emptive analgesia is recommended intraoperatively before surgery starts. Pre-emptive analgesia is defined as treatment that is initiated before surgery with the aim of preventing establishment of central sensitisation caused by incisional and inflammatory injuries.

Table 19.11 Analgesics

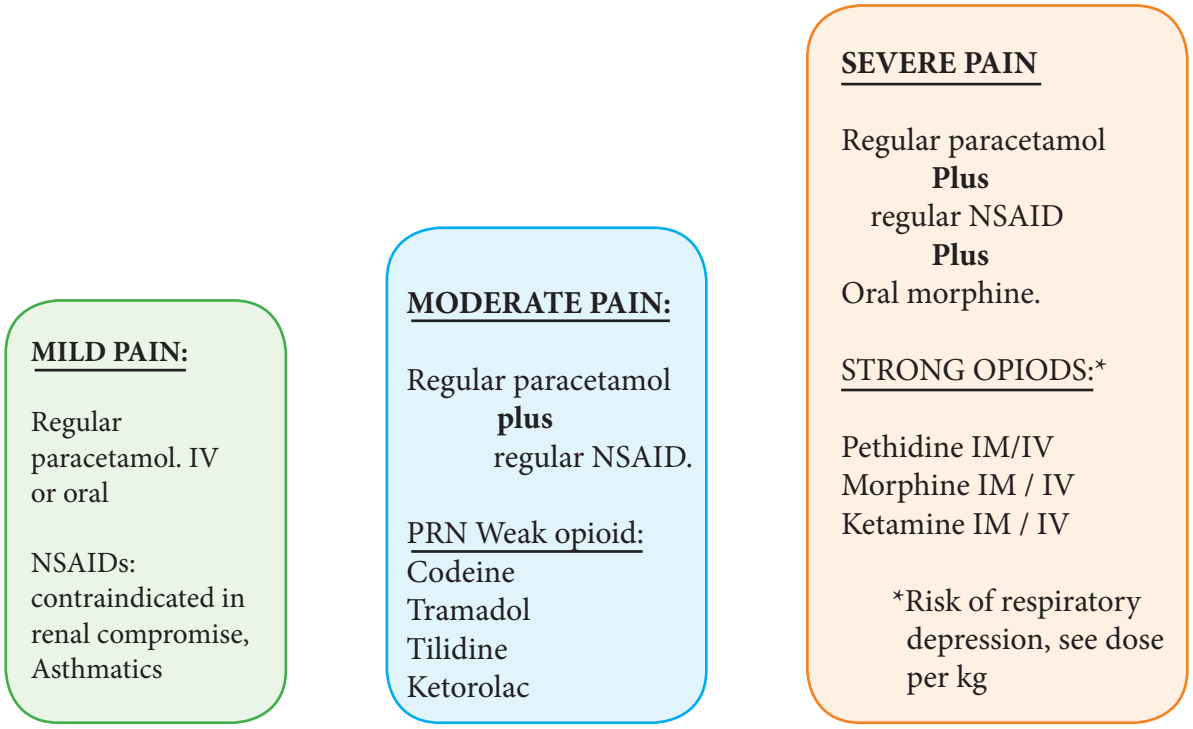
Drug	Paediatric dose	Adult dose	Indication	Codes
Paracetamol	15mg/kg slow IV 20mg/kg- P.O/PR Neonates: 5 -7.5mg/kg. Max neonate: 10 -15mg/kg	0.5 -1g slow IV 8 hourly. 0.5 -1g 6 hourly	Mild to moderate pain. Antipyretic. *IV should be reserved for those with a standing NPO status order.*	Oral A V Rectal B V IV B V
Diclofenac sodium	>1yr. 1mg/kg tds po/PR	100MG pr 25 -50mg po tds Max= 150mg	Mild to moderate pain	Oral/IM B E Rectal B V
Ibrufen	10mg/kg po tds or 5mg/kg 6 hourly if >7kg	400mg 6 hourly	Mild to Moderate pain	A V
Codeine*(C)	1mg/kg 6 hourly	30 -60mg 4 hourly po, IM	Mild to moderate pain	C E
Ketorolac (S)	>6 months. 0.5mg/kg IV max 30mg	10mg then 10 -30mg IV every 4 to 6 hours. Max dose 90mg/day or 60 mg in elderly	Mild to moderate pain	S E
Tramadol (B)	1 -2mg/kg IV/po 6 hourly	50 -100mg slow IV 50 -100mg po	Moderate to Severe pain	B V
Pethidine* (B)	0.5 -1mg/kg IV/IM	1mg/kg IV 25- 100mg IM	Severe pain Analgesic agent of choice in asthma. Postoperative shivering: 10 -25mg STAT. Risk of seizures.	B V
Morphine* (B)	0.05 -0.1mcg/kg IV boluses	0.1mg/kg IV PCA:1mg 5 min lock out	Severe pain. Histamine release	B V
Fentanyl* (B)	1 – 2mcg/kg Max 5mcg/kg	1 -5mcg/kg IV 5- 20mcg spinal 50 -100mcg epidural	Lasts 30 -60 minutes. Very strong opioid. Used in pre-emptive analgesia Intra- operatively- doses can be repeated every 30 -45 minutes*	B V
Tilidine* drops	1mg/kg/ 6 hrly-sublingual (1 drop=2.5mg)	NA	Moderate – Severe pain.	C V
Caffeine (S)	5mg/kg Post op. apnoea	300-500mg 12 hourly po	Mild stimulant Treatment of dural puncture headache	S V
Ketamine (B)		0.25mg /kg IV/IM	Moderate to severe pain	B V

*All Opioids with * should be reviewed for the routine Opioid side effect profile.*
[a] Ketamine is also an IV anaesthetic.

Post-Operative Care

Severe postoperative pain and stress response to surgery cause increased morbidity and mortality. Management of postoperative pain can be guided by the pain assessment tools and the Acute pain ladder.

Figure 19.1: Use the Acute pain ladder for non- malignant acute pain. (Adopted from Oxford Anaesthesia Handbook)

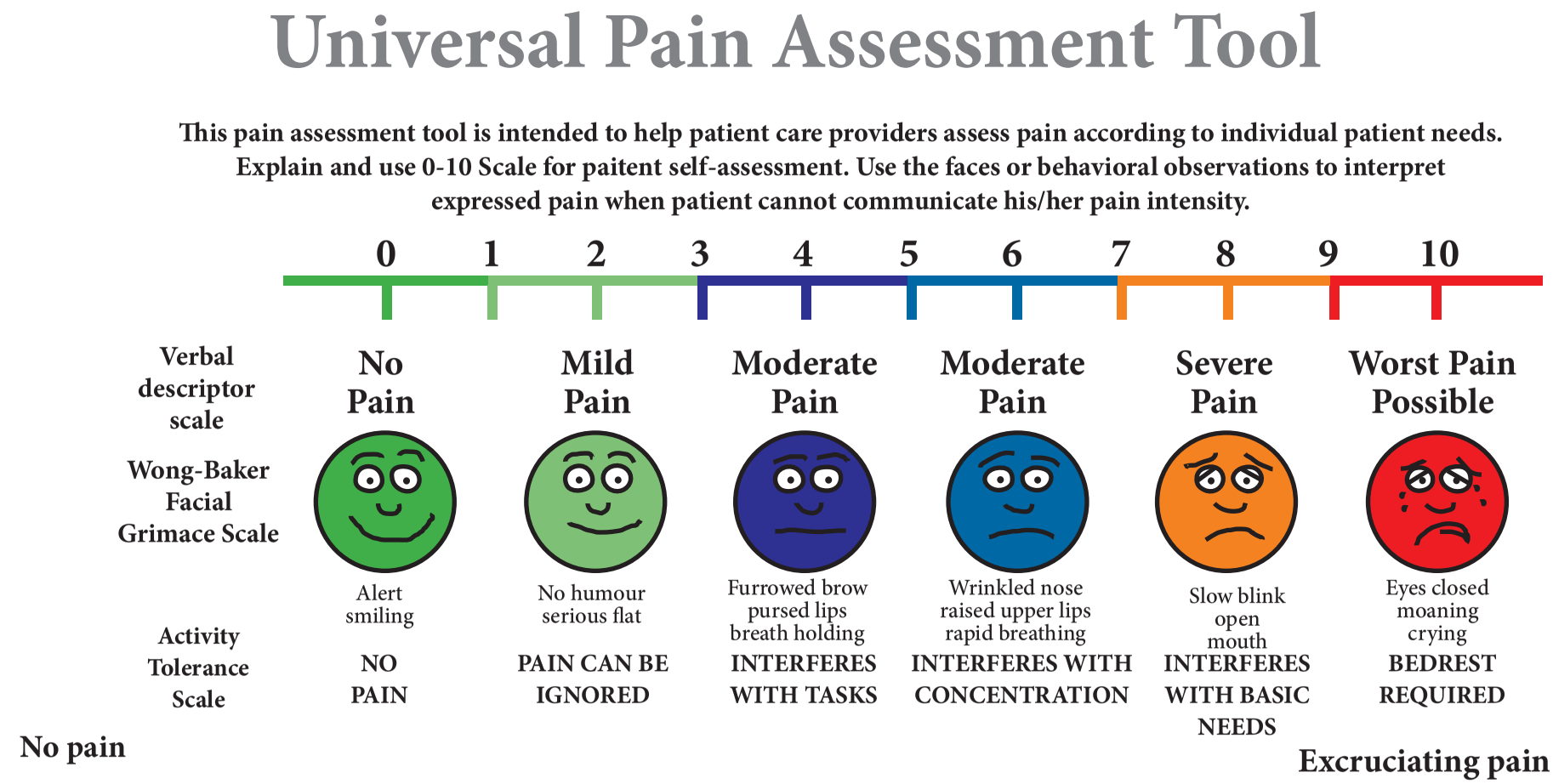


Severe postoperative pain and stress response to surgery cause increased morbidity and mortality. Management of postoperative pain can be guided by the pain assessment tools and the Acute pain ladder.

19.3.2 Measurement of pain

The degree of acute pain can be measured using a pain assessment tool.
Use the Universal Pain Assessment Tool. This combines the Visual analogue numerical scale and the Wong Becker faces

Figure 19.2 Universal Pain Assessment Tool



Adopted from South African Acute Pain Guidelines, 2015

Figure 19.2

Adopted from South African Acute Pain Guidelines, 2015

Table 19.12 The Face, Legs, Activity, Cry , Consolability (FLACC) scale for Neonates:

Criteria	Score 0	Score 1	Score 2
Face	No particular expression or smile	Occasional grimace or frown, withdrawn, uninterested	Frequent to constant quivering chin, clenched jaw
Legs	Normal position or relaxed	Uneasy, restless, tense	Kicking, or legs drawn up
Activity	Lying quietly, normal position, moves easily	Squirming, shifting, back and forth, tense	Arched, rigid or jerking
Cry	No cry (awake or asleep)	Moans or whimpers; occasional complaint	Crying steadily, screams or sobs, frequent complaints
Consolability	Content, relaxed	Reassured by occasional touching, hugging or being talked to, distractible	Difficult to console or comfort

19.4 Local Anaesthesia

Local anaesthetic drugs are used for regional anaesthesia which includes neuraxial anaesthesia, peripheral nerve blocks and local area infiltration.

Neuraxial anaesthesia (spinal and epidural)

- Dosing of local anaesthetics depends upon age and pregnancy. The older the patient the less drug will be needed. Pregnant patients need less than their non-pregnant counterparts. Choice of agent depend on how rapid is the onset desired and the duration of blockade required. For intrathecal anaesthesia hyperbaric solutions (e.g. heavy bupivacaine) can be used to achieve a higher block and plain solutions produce a lower block.
- Only preservative free drugs can be used for neuraxial anaesthesia. Larger doses can cause high spread and risk respiratory depression, hypotension and loss of consciousness.

Spinal anaesthesia

- For reduced risk of post-dural puncture headache (PDPH) pencil point small needles should be used. Recommended spinal needles to be used are 23G to 25G. The 22G should be reserved for elderly with osteophytic back as PDPH is rare in this age group.

Epidural anaesthesia

- It should be done by someone skilled in doing epidural anaesthesia. To do an epidural anaesthesia an epidural set should be used and should contain the following: a Tuohy 18G epidural needle, loss of resistance syringe, epidural catheter, catheter connector and 0.2micron filter.
- Drugs used in epidural anaesthesia are calculated depending on the required volume and desired effect.
- Plain bupivacaine is used for epidural in concentrations 0.0625 to 0.25% depending on desired effect. Opioids that can be added to epidural include preservative free morphine, pethidine and fentanyl.

Peripheral nerve blocks and local infiltration

- As shown on Table 19.12 lignocaine has a faster onset of action than bupivacaine but a shorter duration of action. The choice of local anaesthetic depends on the desired effect.

- The amount of local anaesthetic used should not exceed the recommended maximum dose. If large amounts are need use lower concentration e.g Lignocaine 1% instead of Lignocaine 2%.
- For nerve blocks locoplex needles 50mm and 100mm can be used with or without a nerve stimulator. Echoplex needles are used with ultrasound guidance.

Caution:

- Epinephrine containing lignocaine should not be used for peripheral infiltration e.g fingers, ear, penis.
- Bupivacaine should not be used in mucosal areas as there is increased risk of systemic toxicity.

Table 19.13 Medicines used for regional blocks

Type of Block	Medicine	Onset	Dose	Codes
Epidural **Caudal**	Bupivacaine 0.25% - 0.5% (Plain)	Onset 10 – 15mins Duration 3-6hrs	2mg/kg (15 – 20ml) 1-2ml per dermatome	A V
Spinal Or Saddle	Bupivacaine 5mg/ml with dextrose 80mg/ml (Heavy)	Onset 5-10mins Duration 3hrs	1.5 – 3ml (7.5mg – 15mg)	B V
Spinal	Lignocaine 2% (A) Each ml = 20mg.	Onset 2 - 10mins Duration 1- 2hrs	3mg/kg (75 -100mg)	A V
Brachial Plexus Blocks	Plain Bupivacaine 0.25% -0.5%	Onset 10- 15mins Duration 3-6hrs	2mg/kg (10 -20mls)	A V
	Lignocaine 2% with epinephrine 1:200000	Onset 2 -10mins Duration 1-2hrs	7mg/kg	C V
	Lignocaine 2%	2 – 10mins	3 – 4 mg/kg	A V
	Prilocaine 2%	2 – 10mins	6 mg/kg	C E
	With adrenaline		8 mg/kg	C E
Local Infiltration	Lignocaine 2% with epinephrine 1:200000	2 – 10mins	6 -7 mg/kg	C V
	Lignocaine 2%	2 – 10mins	3 -4mg/kg	A V

Topical local anaesthetic preparations

- EMLA – Eutectic Mixture of Local Anaesthetics (B, V)
  - Contains lidocaine 2.5% plus prilocaine 2.5%
  - Can be applied 1 – 5hrs before venipuncture
  - Side effects: blanching and vasoconstriction.
- Xylocaine spray (B, V)
  - Pump spray containing lignocaine 10% which has lignocaine 10mg, 95% alcohol 24.1%m/v per 0.1ml
  - The metered dose spray is used as topical spray for the larynx at intubation. Each puff is 0.1ml = 10mg. Do not exceed lignocaine toxicity dose.
  - Dose: One (1) puff to children and Three (3) puffs to adults.

19.5 Anticoagulant Use in Anaesthesia

Patients who are on long term use of anticoagulant or antiplatelet drugs are at risk of bleeding intraoperatively. If a patient is on these medication precautions should be taken as giving them neuroaxial anaesthesia poses a risk of getting a spinal cord haematoma. If the patient has to get regional anaesthesia assess the risk the patient getting thromboembolism and consider stopping the medication or changing to heparin. The time of stopping the medication and safety to do depends on the medication being taken.

Table 19.14 Time to stop medication before neuroaxial anaesthesia

Drug	Time	Comment
Aspirin	5 days	Do not stop in cardiac patient with stents
Clopidogrel	7 days	Do not stop in cardiac patient with stents
Warfarin	5 days	Check INR. Consider Fresh frozen plasma if INR > 1.5
Unfractionated heparin	Prophylactic dose: 2hrs Therapeutic dose: 4hrs	Check a PTT
Low molecular weight heparin	Prophylactic dose: 12hrs Therapeutic dose: 24hrs	No need for monitoring
Rivaroxaban	3 days	

19.6 Anaesthesia Related Complications

Table 19.15 Anaesthesia related complications

Complication	Clinical Features	Management
AIRWAY/RESPIRATORY		
Laryngospasm	Stridor	• Avoid painful stimuli. • Administer 100% Oxygen. • Remove irritants from the airway. • Deepen anaesthesia. • Suxamethonium 0.25 -0.5mg/kg for intractable spasm
Bronchospasm	Respiratory distress Wheezes	• 100% Oxygen • Nebulise with Salbutamol 2.5mg.
Hypoxia	Dropping O2 saturation, Restlessness, Altered level of consciousness	• ABCs • Give 100% Oxygen. • Check ETT position
Hypercarbia	End tidal CO^2 > 45mmHg Somnolence Depressed level of consciousness	• Check ABCs turn off all volatile agents. • Hold Suxamethonium. • Hyperventilate with 100% oxygen • Change the circuit and anaesthesia machine. • Dantrolene 2 -3 mg/kg IV. • Call Anaesthesiologist for HELP
Malignant Hyperthermia	High CO2, Low SPO2, High Heart rate, Unstable CVS, High core temperature.	• Check ABCs turn off all volatile agents. • Hold Suxamethonium. • Hyperventilate with 100% oxygen • Change the circuit and anaesthesia machine. • Dantrolene 2 -3 mg/kg IV. • Call Anaesthesiologist for HELP
Anaesthesia induced Hypotension	Defined as SBP< 90mmHg or decrease of > 20% from baseline for 15minutes.	Ephedrine 5 -10mg boluses Phenylephrine IV Fluids doses at 20ml/kg
Anaesthesia induced Hypertension	Defined as SBP >20% above the baseline for 15minutes.	Deepen the anaesthesia. Consider administering strong fast acting opioid. IV labetalol 5 -10mg boluses.

Complication	Clinical Features	Management
CARDIOVASCULAR		
Severe Bradycardia	Defined as pulse rate < 60 beats/ minute	Atropine 0.5mg IV up to 3mg Check depth of anaesthesia. Rule out hypoxia. If persistent, call for help
Arrhythmias		Call for help. Involve Anaesthesiologist Amiodarone IV slow push, IV lignocaine or Magnesium sulphate depending on type of arrhythmia
Blood loss > 20%		FFPS at 15ml/kg, PRBCS 15- 20ml/kg, Cryoprecipitate
OTHER		
Hypothermia	Core temperature; 35.5 ^{o}C	Warm fluids. Forced warm air blankets Warm humidified breathing circuits
Malignant Hyperthermia	Markedly increase in $EtCO_2$ and core temperature, drop in saturation, CVS instability	Stop triggers (volatile agents and suxamethonium), hyperventilate with high flow oxygen, Dantrolene 1-10mg/kg
Post-operative shivering		Pethidine 10 – 25mg
Hyperkalemia	Peaked T waves on ECG K + above 5.5mmol/l	Soluble short acting Insulin 10IU, 50ml Dextrose 50%, salbutamol 10mg, 10ml Calcium Gluconate 10%
Hypokalemia		10-20mmol/l in 1 litre of saline over 1 - 2 hours
Seizures		Stabilise the airway. Give Diazepam. Call for help
Hyoglycaemia	Blood glucose; 4.0mmol/l	50% dextrose 20 – 50ml recheck blood glucose after an hour
Hyperglycaemia		Identify the cause. Rule out recent dextrose infusions. Actrapid (short acting insulin) sliding scale

CHAPTER 20

ONCOLOGY

20.1 Overview of Cancer Care in Eswatini

20.1.1 How to Approach Care for a Cancer Patient

A cancer patient has complex needs that includes medical (e.g. pain), surgical (e.g. bowel obstruction), psychological (e.g. support structure), nutritional, and spiritual. Patients may present to their primary healthcare provider (oncology team, local hospital, casualty or GP) with symptoms due to their cancer, secondary complications or side effects from their treatment. The Eswatini National Oncology guidelines provide a detailed and practical way on how to manage the most commonly occurring problems experienced in oncology.

20.1.1.1 Basics of Cancer Treatment

Types of Treatment

Oncology treatment can be local or systemic.

- Local treatment: surgery, radiotherapy.
- Systemic treatment: chemotherapy, endocrine treatment, immunotherapy and targeted therapies (e.g. monoclonal antibodies or small molecules which target specific receptors or cell signaling pathways).

Treatment aims

- Curative: treatment given as the definitive treatment of choice depending on the cancer type
- Radical: usually refers to chemotherapy or radiotherapy or chemo-radiotherapy given with a curative intent
- Neo-adjuvant: treatment given before a definitive treatment with the aim to enable or facilitate the procedure that improves the chance of cure
- Adjuvant: this is treatment given after definitive treatment, usually post an oncologic surgery, aimed at reducing the chance of recurrence, targeting micrometastatic disease or R1 operations
- Palliative: aimed at improving a patient's quality of life through alleviating or relieving symptoms caused by the presence of cancer, physically or physiologically

A diagnosis of cancer is a catastrophic event and affects all aspects of life for patients. Cancer treatment has also become more complex and aggressive. It is, therefore, crucial to identify and address the information needs of cancer patients in order to help them make decisions and cope, potentially improving their satisfaction with the services received and health outcomes.

- Clear and concise information on the diagnosis, or suspicion thereof
- Adequate and timely pain control
- Prompt reversal or correction of deranged physiology; FBC, renal functions
- Tissue diagnosis of solid tumour. Kindly arrange for an expedited biopsy, and call pathologist for prioritisation of results.
- Contact treating oncology unit prior to referral for guidance on completion of pre-treatment investigation (differs by cancer type). This is in order to avoid the delay in the initiation of appropriate care and treatment (refer to the Eswatini oncology treatment guidelines)
- Early referral to the following;
- Psychologist for the important psychosocial needs of the patient and family
- Dietician
- Palliative care team, irrespective of disease stage, but a diagnosis of a cancer
- Social worker
- Treat the presenting oncology related emergency promptly (see guidelines for common emergencies below).

20.2 Baseline investigations for common cancers; checklists

Prior to referring a confirmed or suspicious case of cancer, kindly perform specific investigations as indicated below. The main cause of morbidity and/or mortality in cancer patients is not the presence of the cancer, but the deranged physiology as the result of the disease process or treatment. It is imperative that the referring healthcare professional recognises this early, and if possible, provides the necessary treatment promptly. The resulting deranged physiology if unattended to, or delay in correcting it, has the potential to move a patient from a curative to palliative one due to change in performance status, or inability to metabolise the needed drugs or intervention.

20.2.1 Cervical cancer

Diagnostic Category	Investigation
Pathology	• Biopsy performed with the aid of colposcopy (colposcopy directed biopsy) is the standard method for diagnosis of cervical pre-cancer lesions and pre-clinical invasive cancer • A full pathology report including cell type and differentiation
Blood Tests	A full biochemistry report, including: • KFT • LFT • FBC and differential count
Radiology	• Reports from abdominal pelvic ultrasound and chest X-ray • Baseline chest CT with contrast recommended if available and no renal impairment • MRI is recommended and to be requested by the oncologist • ***Note:*** an MRI is recommended over a CT scan due to better soft tissue visualization • Nephrostomy to be performed by a urologist if available and proper infection controls are in place • PET scan recommended when available
Breast Cancer Screening	• To be offered to all patients

20.2.2 Breast cancer

Diagnostic Category	Investigation
Biopsy	Biopsy techniques: • Excision • Lumpectomy • Fine needle aspiration cytology (FNAC) • Ultrasound guided biopsies are preferred in less experienced hands
Pathology	A full pathology report including immunohistochemistry (IHC)
Blood Tests	A full biochemistry report, including: • KFT • LFT • FBC and differential count

Diagnostic Category	Investigation
Radiology	• Echocardiogram report • Contrasted CT scan – must include chest, abdomen and pelvis to rule out metastasis • Chest X-ray prior to surgery to rule out effusions • For all local advanced breast cancers upon recommendation of radiologist if CT does not show metastasis: Diffusion weighted imaging (DWI) with MRI to image spine • ***Note:*** DWI is recommended in place of a bone scan that is not available in Eswatini • Bilateral mammogram required for every patient for staging • Mammogram should include ultrasound bilaterally and axillar lymph nodes, routine supraclavicular ultrasound

20.2.3 Lymphoma

Diagnostic Category	Investigation
Biopsy	• A whole node excision biopsy by a Medical Officer • Bone Marrow Aspirate Trephine (BMAT)
Pathology	• A full pathology report with IHC and cell of origin defined • Blood smear

Blood Tests	• A full biochemistry report, including:
	  • KFT
	  • LFT
	  • Uric acid
	  • LDH
	  • CMP
	• FBC and differential count
	• Erythrocyte sedimentation rate (ESR)
	• Hepatitis B Surface Antigen (HBsAg), Hepatitis C Virus and HIV tests

Radiology	• Echocardiogram report • Contrasted CT scan – must include neck, chest, abdomen and pelvis • PET scan for Deauville scoring, if available

20.2.4 Common childhood leukemias

Diagnostic Category	Investigation
Biopsy	• BMAT • Tissue biopsy for peripheral involvement • Lumbar puncture r/o CNS involvement
Pathology	• A full pathology report with IHC • Immunophenotyping • Cytogenic analysis – karyotyping, FISH, flow cytometry

Blood Tests	• A full biochemistry report, including:
	  • UEC
	  • LFT
	  • Uric acid
	  • LDH
	  • CMP
	  • DIC (prolonged prothrombin time, low fibrinogen and fibrinogen degradation products)
	• FBC, differential count and blood film (high WCC with neutropenia, blasts)

Diagnostic Category	Investigation
Radiology	• ECG • Echocardiogram report prior to using anthracyclines or ERNA • Chest X-ray • Ultrasound of abdomen • CT of brain is neurological symptoms

20.2.5 Adult Leukemias

Diagnostic Category	Investigation
Biopsy	• BMAT • Tissue biopsy for peripheral involvement • Lumbar puncture if CNS involvement is suspected
Pathology	• A full pathology report with IHC • Immunophenotyping • Cytogenic analysis – karyotyping, FISH, flow cytometry

Blood Tests	• A full biochemistry report, including:
	  • UEC
	  • LFT
	  • Uric acid
	  • LDH
	  • CMP
	  • DIC (prolonged prothrombin time, low fibrinogen and fibrinogen degradation products)
	• FBC, differential count and blood film (high WCC with neutropenia, blasts)

Radiology	• ECG • Echocardiogram report prior to using anthracyclines or ERNA • Chest X-ray • Ultrasound of abdomen • CT of brain is neurological symptoms

20.2.6 Kaposi's Sarcoma

Kaposi sarcoma is a vascular malignancy found almost exclusively in HIV positive individuals, however, can also be seen in other chronically immunosuppressed patients such as following organ transplantation.

It has been associated with human herpes virus (HHV-8), and is seen as a marker of AIDS progression. Lesions are often multifocal and can be quite aggressive, involving the skin, lungs, gastrointestinal tract, and other organ systems. The oral cavity is frequently involved, with lesions occurring most often on the palate.

Signs and symptoms

- The appearance ranges from flat and plaque-like to nodular with varying shades of red, blue, and purple
- They do not blanch with pressure, distinguishing them from hemangiomas.

Diagnosis

- Evaluation and assessment regarding underlying immune status.
- Biopsy: Yes.

Treatment
Continue ART

	Medicine	Dose	Frequency	Duration	Codes
	Pegylated liposomal Doxorubicin iv	20mg/m^2	Every 2 weeks	3 days	C V
or	Paclitalxel iv	100 mg/m^2 every 2 weeks or 135mg/m^2 iv every 3weeks			C V

Follow-up: Close follow-up to monitor lesions and progression of underlying disease.

Diagnostic Category	Investigation
Biopsy	• Tissue biopsy
Pathology	• A full histology report

Blood Tests	• A full biochemistry report, including:
	  • KFT
	  • LFT
	• FBC and diff
	• Faecal occult blood

Radiology	• CT scan chest if chest Xray suspiciousn • Chest Xray to exclude TB or pulmonary involvement
Other	• Endoscopy if symptomatic

20.2.7 Prostate Cancer

Diagnostic Category	Investigation
Biopsy	• 12 core TRUS-guided biopsy
Pathology	• A full histology report

Blood Tests	• Prostate specific antigen (PSA) test
	  • PSA doubling time
	  • PSA density
	  • PSA velocity
	• FBC & DC
	• LFTs, renal functions

Radiology	• Ultrasound pelvis and abdomen • Chest Xray • MRI prostate sequences if for prostatectomy on risk stratification • If PSA >20 → bone scan or MRI DWI (high risk)
Other	• Endoscopy if symptomatic

20.2.8 Colorectal cancer

Diagnostic Category	Investigation
Biopsy	• Biopsy tissue

Pathology	• A full pathology report, no cytology required
	• Full panel of MSI proteins:
	  • MLH1
	  • MSH2
	  • MSH6
	  • PMS2

Diagnostic Category	Investigation

Blood Tests	• Chemistry
	  • KFT
	  • LFT
	  • Carcinoembryonic Antigen (CEA)
	• FBC with differential count

Radiology	• Ultrasound of abdomen • CT Scan of abdomen, pelvis and chest
Other	• Colonoscopy and sigmoidoscopy • Endoscopy and gastroscopy

20.3 Common Oncologic Emergencies

An oncologic emergency is defined as any acute potentially morbid or life-threatening event directly or indirectly related to a patient's tumour or its treatment.

Oncologic emergencies may be categorised by their system of origin, as metabolic, or as hematologic.

20.3.1 Bleeding & anaemia in cancer

Overview

Bleeding can occur in up to 10% of patients with advanced cancer. This may increase to up to 30% in those with a haematological malignancy. The commonest solid tumour presenting with bleeding is cervical cancer.

Anaemia is a reduction in [Hb], RCC, packed cell volume

- Hb <13.5g/Dl in male;
- Hb <11.5g/Dl in female

Maybe attributed to underlying co morbidities including:

- Bleeding/Haemolysis
- Hereditary disease
- Renal insufficiency
- Nutritional deficiency
- Anaemia of chronic disease or combinations of these

Maybe due to tumour/cancer:

- Bone marrow infiltration
- Cytokine production which leads to iron sequestration
- Chronic blood loss at tumour sites
- Nutritional deficiency (appetite suppression)
- Haemolysis (immune mediated antibodies)
- Changes in coagulation capability

Maybe due to cancer therapy:

- Myelosuppressive chemotherapy (platinum)
- Haemolytic anaemia (Fludarabine)
- Microangiopathy (Gemcitabine)
- Renal toxicity (platinum) leads to decreased erythropoietin production
- Pelvic/Skeletal irradiation

Table 20.2 Causes based on classifications

Macrocytic	Normocytic Normochromic	Microcytic
>100FL	**80-100FL**	**<80FL**
High reticulocyte count Haemorrhage Haemolysis DIC Vasculitis Auto-immune	Haemorrhage haemolysis Chronic diseases Liver Malignancy Renal failure HIV Bone marrow infiltration Chronic inflammation	Fe deficiency (low transferrin) Thalassaemia Lead poisoning Sideroblastic
Megaloblastic Vit B12 (+ folic acid) deficiency		
Non-megaloblastic Liver disease Hypothyroidism Alcoholism/Medications		

Management

Stop causative factor

- Blood transfusion with low Hb - when indicated and patient is symptomatic or has a co morbidity which could necessitate transfusion (e.g. cardiac disease).
- Erythropoietin Therapy
- Erythropoiesis-stimulating agent (EPO/ESA)
    - Reduces transfusion requirements
- Important side effects
    - Increased VTE; can lead to increased mortality and tumour progression (FDA don't recommend use in radical patients), especially if used to Hb >12g/Dl. Only give if Hb <10
    - Fatigue
    - Seizures shown in patients with renal failure
- Need at least 2 weeks of treatment before effect seen
- Haematinics (FeSO4, folate, Vit C)

20.3.2 Hypercalcemia

- The most common cancers are lung cancer, multiple myeloma and renal cell carcinoma.

Causes of Hypercalcaemia

Primary hyperparathyroidism and malignancy are the most common causes of hypercalcaemia, accounting for more than 90% of cases. Hypercalcaemia of malignancy is the most common cause of hypercalcaemia in the inpatient setting.

Parathyroid- related

- Primary hyperparathyroidism
- Solitary parathyroid adenoma
- Primary parathyroid hyperplasia
- Parathyroid carcinoma
- Multiple endocrine neoplasia (MEN)
- Familial isolated hyperparathyroidism
- Lithium use

Malignancy-related

- Humoral hypercalcaemia of malignancy (PTHrP) (80% of cases)
- Osteolytic metastases (20% cases)
- Vitamin D mediated (1,25-dihydroxyvitamin D) (1% of cases)
- Ectopic PTH secretion (1% of cases)

Table 20.3

Humoral (PTHrP)	Osteolytic Metastases	1,25-dihydroxyvitamin D	Ectopic PTH secretion
Squamous cell carcinoma	5 Breast Cancer	Lymphoma (NHL, HL)	Ovarian Cancer
Renal Ca	Multiple Myeloma	Ovarian dysgerminomas	Lung Cancer
Bladder Cancer	Lymphoma	Check INR.	Thyroid papillary Cancer
Breast Cancer	Leukemia	Check a PTT	Neuroectodermal tumour
Ovarian Cancer		No need for monitoring	Rhabdomyosarcoma
NHL			Pancreatic Cancer

Vitamin-D related

- Hyper vitaminosis D (vitamin D intoxication)
- Elevated 1,25(OH) 2D levels (e.g. sarcoidosis, tuberculosis
- Rebound hypercalcaemia after rhabdomyolysis

High bone-turnover rates

- Hyperthyroidism
- Multiple myeloma
- Prolonged immobilisation
- Paget's disease
- Thiazide use
- Vitamin A intoxication.

Renal failure

- Severe secondary hyperparathyroidism
- Tertiary hyperparathyroidism
- Aluminum intoxication
- Milk-alkali syndrome

Initial Assessment and Investigations

History and examination

Symptoms are usually dictated by the level of serum calcium and the rate of change of serum calcium. "Stones, bones, abdominal moans and psychic groans" is a phrase used to memorise the major clinical manifestations of hypercalcaemia.

- N**eurocognitive:** anxiety, mood changes, decrease in cognitive function, malaise, lethargy, confusion, and coma.
- **GIT:** constipation, anorexia, nausea and vomiting.
- **Renal:** nephrogenic diabetes insipidus with resultant polyuria, renal vasoconstriction, distal renal tubular acidosis, nephrolithiasis and chronic renal failure.
- **Musculoskeletal:** profound muscle weakness, bone pain.

- **Cardiovascular:** shortening of the QT interval and dysrhythmias.

Laboratory Evaluation

Confirm Hypercalcemia:
- Serum total calcium (recheck if only one measurement)
- Serum corrected calcium equation:

Ca (mmol/L) + 0.02 (albumin (g/L)

After hypercalcemia is established:
- Serum phosphorus
- Creatinine with estimated GFR
- PTHrP
- 25 (OH) D
- 1,25 (OH) 2D

Additional laboratory evaluation to consider if diagnosis is still uncertain:
- SPEP, UPEP serum-free light chains, serum and urine IFE
- Skeletal survey
- Vitamin A levels

Assess severity of hypercalcaemia
- Mild hypercalcaemia < 3 mmol/L.
- Moderate hypercalcaemia 3-3.5 mmol/L.
- Severe hypercalcaemia > 3.5 mmol/L.

Table 20.4 Treatment according to severity

MILD HYPERCALCAEMIA < 3 MMOL/L	• Does not require immediate treatment. • Avoid factors that can aggravate hyperCa2+ (thiazide diuretics, volume depletion, inactivity, high calcium diet). • Adequate hydration (6-8 glasses of water/ day).
MODERATE HYPERCALCAEMIA 3-3.5 MMOL/L	• Patients are asymptomatic or mildly symptomatic (often chronic). • Same precautions as for mild hypercalcaemia. • An acute rise may result in symptoms which requires treatment as described for severe hypercalcaemia.
SEVERE HYPERCALCAEMIA > 3.5 MMOL/L	• Aim is to promote calcium renal excretion and inhibit bone resorption. • Aggressive treatment is required. • Volume expansion with normal saline: 1-2L as initial bolus and then maintenance fluids at 200-300 ml/h for next 2-3 days or until volume replete. • Fluids to be adjusted to maintain urine output 100-150mls/h. • Caution in patients with CCF or anuric renal failure as risk of fluid overload. Use smaller volumes of isotonic saline in these patients. • Loop diuretics are not recommended for routine use. • Furosemide should be reserved only for patients with heart failure and those who need diuresis. Its overall efficacy has been shown to be limited, and it often exacerbates dehydration and fluid loss. • Bisphosphonates (Zoledronic acid 4mg IV over 15mins or Pamidronate 60-90mg over 2h). • Glucocorticoids: Hydrocorticsone200 -400mg/d for 3-4 days and then to prednisone 10-20mg/day for 7 days or Prednisone 40-60 mg/day for 10 days. • +/- Calcitonin (4 IU/kg IM/SC).

Table 20.5 Zoledronic Acid Reduced Doses for Patients with Baseline CrCl Less than or Equal to 60 mL/min

Baseline Creatinine Clearance (Ml/Min)	Zoledronic Acid Recommended Dose
>60	4mg
50-60	3.5 mg
40-49	3.3 mg
30-39	3 mg

Figure 20.1 Management summary

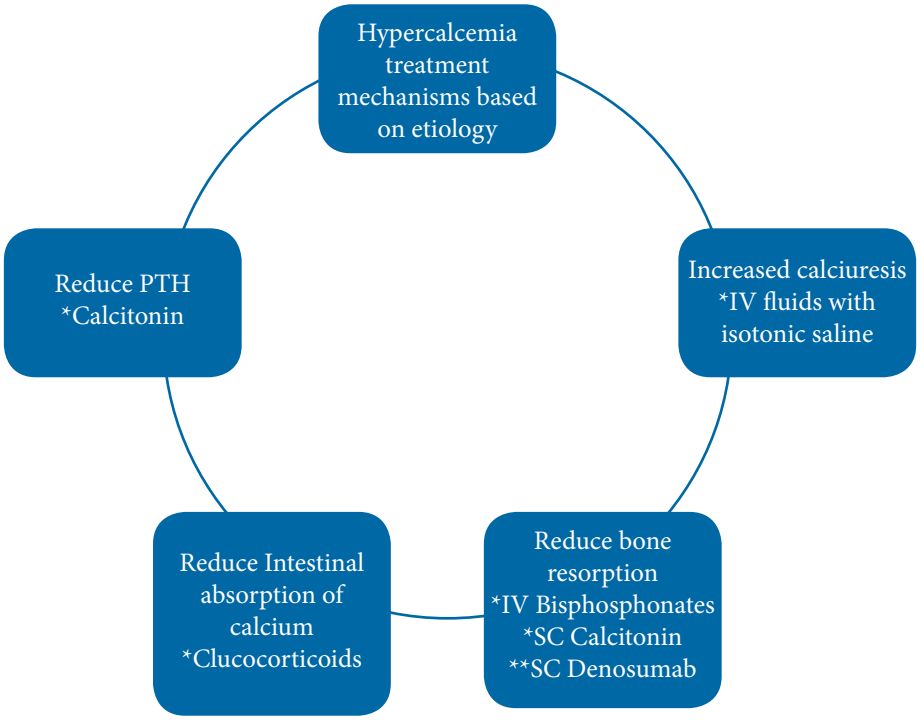


Table 20.6 Summary of treatment options for management of hypercalcaemia

Agent	Regimen	Onset	Duration
0.9% Sodium chloride	2-4 L IV/day	Immediate	2-3 days
Calcitonin	4-8 units/kg SQ q 6-12 hours	4-6 hours	Up to 3 days
Bisphosphonates			
Pamidronate	60-90 mg IV over 2-6 hours	48 hours	3-4 weeks
Zoledronic Acid	3-4 mg IV over 15-30 minutes	48 hours	3-4 weeks
Corticosteroids	200-400 mg hydrocortisone IV/day for 3-5 days	7 days	Unclear, perhaps 1 week
Gallium nitrate	200 mg/m2 daily for 5 days	4 days	2 weeks
Denosumab	120 mg SQ weekly for 4 weeks, then monthly thereafter	7-10 days	3-4 months

20.3.3 Tumour lysis syndrome(TLS)

- TLS is a metabolic syndrome caused by massive tumour cell lysis leading to the release of intracellular contents.
- TLS is characterised by hyperuricemia, hyperphosphatemia, hyperkalemia and hypocalcaemia. Morbidity and mortality is high without prompt recognition and early therapeutic intervention. Prevention of TLS may be more effective than treatment.

Table 20.7 Cairo-Bishop Classification

Element	Laboratory TLS	Clinical TLS
0.9% Sodium chloride	Abnormality in two or more of the following, occurring 3 days before or 7 days after chemotherapy	Laboratory TLS plus one or more of the following:
Uric acid	≥ 8mg/dl (≥ 476 umol/L) or 25% increase from baseline	Increased serum creatinine (1.5 x upper limit of normal)
Potassium	≥ 6.0 mmol/L or 25% increase from baseline	Cardiac arrhythmia or sudden death
Phosphorous	≥ 2.1 mmol/L (children) or ≥1.45 mmol/L (adults) or 25% increase from baseline	Seizure
Calcium	≤ 1.75 mmol/L (7mg/dl) or 25% decrease from baseline	
≤ 1.75 mmol/L (7mg/dl) or 25% decrease from baseline		

TLS occurs in the following settings

- After the initiation of cytotoxic chemotherapy (24-72hrs)
- Spontaneously
- Monoclonal antibody therapy
- Ionising radiation (TBI in transplant setting)
- Embolisation
- Radio frequency ablation
- Glucocorticoids
- Haemopoietic stem cell transplant.

Risk Stratification

- Assess whether there is evidence of laboratory or clinical TLS at diagnosis;
- Assess tumour related factors (type of malignancy and burden of disease);
- Assess patient related factors.

TUMOUR-RELATED FACTORS

Intrinsic tumour related factors

- High tumour cell proliferation rate.
- Chemo-sensitivity of the malignancy.
- Large tumour burden:

- Bulky disease > 10cm in diameter and/or
- WCC > 50000/umol (pretreatment);
- Pretreatment LDH > 2 x ULN;
- Organ infiltration (hepatomegaly, splenomegaly, kidney infiltration); and
- Bone marrow involvement.

Table 20.8 Type of malignancy

High risk (>5% risk)	Intermediate risk (1-5% risk)	Low risk (<1% risk)
• Burkitts lymphoma	• Highly chemotherapy sensitive solid tumors (neublastoma, germ cell tumor, small-cell lung cancer) with bulky or advantage stage disease	• Most solid tumor's
• DLBCL, transformed, and mantle cell lymphomas		• Multiple myeloma
• Lymphoblastic lymphoma		• Indolent NHL
• Intermediate risk disease with renal dysfunction and/or renal involvement		• Hodgkins lymphoma
• Intermediate risk disease with uric acid, potassium, and/or phosphate > ULN		

PATIENT-RELATED FACTORS

- Increased age (reduction in GFR, reduced renal reserve, complicate volume replacement due to higher rates of cardiac dysfunction);
- Volume depletion (decreased oral intake, nausea, vomiting, diarrhea);
- Pre-existing nephropathy or exposure to nephrotoxins (NSAIDs, ACE-I, ARBs);
- Pre-existing hyperuricemia or hyperphosphatemia; and
- Concomitant use of drugs that increase uric acid levels (alcohol, ascorbic acid, aspirin, cisplatin, thiazide diuretics, ethambutol, pyrazinamide).

TLS Prophylaxis

- The key to the management of TLS is recognising patients at risk and using prophylactic measures to prevent its occurrence.
- Prophylaxis is only useful during the first course of treatment and at future points where re-induction or salvage chemotherapy is used.
- There is no rationale for using prophylaxis in the setting of consolidation therapy including bone marrow transplant if patient is in or near to a remission.

Table 20.9

Low Risk	Intemediate Risk	High Risk
Monitoring	Monitoring	Monitoring
Hydration (N/Saline or 5% Dextrose, 3l/24hrs before initiating chemo)	Hydration	Hydration
+/- Allopurinol	Allopurinol – start 24 to 48 hours before start of induction chemotherapy and continued for 3 to 7 days.	Rasburicase
Allopurinol		Allopurinol

Table 20.10 Allopurinol dose against renal creatinine clearance reduction

Creatinine Clearance	Allopurinol dose
≥ 20 mL/min	300 mg/d
10-20 mL/min	200 mg/d
3-10 mL/min	100 mg/d
<3 mL/min	100 mg/36-48h

Monitoring

- Urine output hourly.
- Fluid balance assessment every 6 hours.
- UA, K+, CMP, creatinine and LDH 6 hours after initiation of chemotherapy and every 6-12 hours thereafter.
- For high risk patients test at 6 hours.
- Intermediate risk test at 12 hours.
- If no evidence of TLS after 36 hours patients can be discharged.

Management of established TLS

PRINCIPLES

- Multidisciplinary approach (hematologists, nephrologists & ICU).
- Frequent monitoring (continuous cardiac monitoring and measurement of electrolytes, and renal function every 4-6hours).
- Correct specific electrolyte abnormalities.
- Refer for dialysis when indicated.

FLUID BALANCE

- Maintain high urine output with vigorous hydration.
- 3l every 24hrs in adults with urine output > 100ml/m2/hr.
- Isotonic fluid with no K+ added.
- Fluid balance assessment 6 hourly.
- Document all fluid losses (vomiting diarrhea).
- Daily weights.
- Reduction in urine output should prompt reassessment: physical obstruction to urine flow by tumour.
- Alkalinisation of urine is not recommended.

20.4 Correction of other electrolyte abnormalities in cancer patients

Table 20.11

Complication	Manifestations	Management
Hyperkalemia	• ECG abnormalities • Muscle cramps, weakness, paresthesia's • Nausea, vomiting & diarrhoea	• Aggressive hydration • Kayexalate (15-30mg in 50-100ml water 6 hourly orally • Calcium gluconate (10mls of 10% solution IV over 2-5mins) • Hypertonic dextrose + insulin (Glucose 50-100ml of 50% solution with 10U Actrapid IV over 15-30 mins) • Nebulised Salbutamol 10-20mg over 15 mins • Loop diuretics: Furosemide 40-80mg IV (0,5-1mg/kg) over 1-2min • Frequent measurement of K+ levels (every 4 to 6 hours) and continuous cardiac monitoring
Hyperphosphatemia	• Acute renal failure • Secondary hypocalcemia	• Aggressive hydration • Hypertonic dextrose + insulin • Oral Phosphate binders

Complication	Manifestations	Management
Hypocalcemia	• Muscle twitches, cramps, tetany, and parasthesia • Mental status changes, confusion, delirium and seizures	• Manage hyperphosphatemia • Asymptomatic hypocalcemia should not be treated • Symptomatic hypocalcemia should be treated with calcium gluconate at lowest standard doses
Hyperuricemia	• Acute renal failure	• Aggressive hydration • Allopurinol: has no effect on pre-existing uric acid levels, UA usually do not fall until 48 to 72 hours of treatment • Hemadialysis
Lactic acidosis	• Acidemia	• Volume replacement • Correct acidosis

20.5 Pain in a cancer patient

More than half of all cancer patients will experience pain, which may be associated with both the disease and its treatment. Generally, pain is moderate to severe and will significantly impact on emotional wellbeing, disability and quality of life. In long-term cancer survivors, it can become persistent and chronic.

Refer to Pain and Palliative care chapter

20.5.1 Types of pain

Table 20.12 Types of Pain

Element	Laboratory TLS
Acute	• Definite onset, limited duration • Identifiable cause • Associated with anxiety and sympathetic drive • Treatment directed at the cause • Includes breakthrough on a background of controlled chronic pain
Chronic	• Prolonged fluctuating, ill-defined onset • Persists beyond stimulus • Driven by central sensitization • Associated with acute episodes of breakthrough pain • Treatment directed at underlying disease if possible, psychological and supportive care
Incident/Procedural	• Associated with specific movement/following a procedure • NB children – NB manage
Breakthrough	• Transient exacerbation • Background of controlled chronic pain

Table 20.13 Type of Pain and Analgesics (refer to WHO pain ladder)

High risk (>5% risk)	Intermediate risk (1-5% risk)	Low risk (<1% risk)
• Nociceptive pain: mild	• Non-opioids +/– weak opioids	• NSAIDs (brief trial)
• Nociceptive pain: moderate to severe	• Strong opioids	• NSAIDs • Radiotherapy • Surgery
• Neuropathic pain: mild	• May not be indicated	• Tricyclic antidepressants • Typical and atypical anticonvulsants
• Neuropathic pain: moderate to severe	• Strong opioids • Pregabalin • Gabapentin • SNRIs (for DPN) • TCAs • Topical • lidocaine	• Tricyclic antidepressants • Typical and atypical anticonvulsants • Radiation • Surgery

20.6 Nausea and Vomiting

Vomiting results from a multistep pathway controlled by the brain. Vomiting is triggered by afferent impulses to the vomiting centre (located in the medulla). Different modalities act at different sites and neuroreceptors.

Principal Neuroreceptors:

- Serotonin (5HT3) receptors
- Dopamine receptors

Table 20.14 Anti-emetics

Receptor Name	Drug	Area	Side Effects
5HT3	Ondansetron	Postrema and peripheral and vagal nerve terminals	Not for delayed nausea; headache, constipation, fatigue, dry mouth
Dopamine	Metoclopramide Prochlorperazine Haloperidol (D2)	Postrema (medulla)	Extra-pyramidal side-effects e.g. akathisia & dystonia
Acetylcholine	Cyclizine	Peripheral- and increased gastric emptying	Drowsiness, headache, dry mouth
Corticosteroid	Dexamethasone	Crosses blood brain barrier	Gastric ulceration, insomnia, euphoria, hyperglycemia, proximal muscle weakness, AVN femoral head, adrenal suppression
Histamine	Cyclizine	Gastro intestinal tract and vestibular area	Drowsiness, headache, dry mouth
Cannabinoid	Tetrahydrocannibinol (THC) Dronabinol Nabilone	Medula	Drowsiness, dizziness, paranoid thinking, headache
Neurokinin-1	Aprepitant	Medulla (binds to substance - p)	Tiredness, nausea, vomiting

20.6.1 Different types of nausea and vomiting

Chemotherapy induced Vomiting (CINV)

- Acute (minutes to hours; resolves in 24 hours)
- Delayed (>24hours after chemo; can last 6-7days)
- Anticipatory (before chemo; anxiety)
- Breakthrough (despite treatment; requires rescue treatment)
- Refractory (failure of all treatment)

Presentation

- Acute: Young, female, non-drinker, motion sickness
- Delayed: Cisplatin, carboplatin, cyclophosphamide, Adriamycin.

Radiation Induced Nausea and vomiting

- Biggest risk with whole body- and upper abdominal radiotherapy. (Due to rapidly dividing GI tract cells)
- Larger fractional dose, larger amount of tissue involved and larger total dose will increase nausea and vomiting.

Table 20.15

Emetic Risk	Drug Categories
High (>90% of patients will experience N&V with these drugs)	Doxorubicin, Epirubicin, Cyclophosphamide, Cisplat, Dacarbazine, Ifosphamide (high dose), Carmustine, Crizotinib, Olaparib
Moderate (30-90%)	Carboplatin, Actinomycin D, Cytarabine, Oxaliplatin, Irinotecan, Methotrexate, Temozolamide, Interferon-A
Low (10-30%)	5FU, Etoposide, Docetaxel, Paclitaxel, Gemcitabine, Mitomycin C, Pemetrexate, Topotecan, Nibs
Minimal (<10%)	Bleomycin, Vinca Alkaloids, Temsirolimus, Mabs,

Treatment Regimens
Table 20.16

Emetic Risk	Drug Categories
High emetic risk:	• Aprepitant (125mg po stat) • Granisetron (1-3mg IV stat) • (Or Ondansetron 8mg IV) • Dexamethasone (12-20mg stat IV)
Moderate emetic risk:	• Granisetron (1-3mg IV) • (Or Ondansetron 8mg IV) • Dexamethasone (12-20mg IV)
Low Emetic risk:	• Dexamethasone 8mg IV or • Metoclopramide 10mg IV or • Prochlorperazine 10mg IV or • Ondansetron 8mg
Prescription to take home:	
High Risk (D2-4):	• Aprepitant 80mg daily
Moderate (D2-3):	• Dexamethasone 8mg daily • Ondansetron 8mg 12 hrly or • Dexamethasone 8mg daily

20.7 Neutropenia and neutropenic sepsis

Definition of severe neutropenia:
- ANC<1.0 x 109/L and expected to fall over the next 48 hours
- ANC <0.5 x 109/L

Febrile neutropenia:
- One temperature >38.5° or two readings of >38° 1 hour apart.

Cause

- Reduction in bone marrow stem cells secondary to chemo or tumour infiltration
- Increased destruction in circulation (immune mediated)
- Shift from marginal pool to tissue

Patients at risk for neutropenia/ sepsis:
- Patients receiving myelosuppressive chemotherapy
- Patients receiving pelvic radiotherapy

- Patients with bone marrow infiltration by malignancy
- Patients receiving dose dense chemotherapy
- Patients who developed neutropenia with previous chemo cycles
- Patients with poor nutritional status (low Albumin) and poor PS
- Patients with co morbidities (HIV, Diabetes Mellitus)
- Patients at extremes of age
- Female patients

Investigations:
- Clinical examination
- FBC & diff, U&E, LFT, Clotting profile (D-dimers), Blood culture (and lines)
- Urine MC& S, Stool MC&S, Throat/skin lesion swabs
- CXR
- O2 saturation and blood gases
- Discuss with Microbiologist and Infectious diseases.

Management of Neutropenia
Asymptomatic Neutropenia
- Adequate counselling regarding fever and risks
- Prophylactic antibiotic

	Medicine	Dose	Frequency	Duration	Codes
	Ciprofloxacin po	750mg	Twice daily	5 days	A V
plus	Amoxycillin and clavulanic acid po	1g	Twice daily	5 days	B E
in penicillin allergy	Clarithromycin po	500mg	Twice daily	5 days	B E

Neutropenic sepsis
- Admit and isolate the patient
- Barrier nursing
- IV antibiotics

	Medicine	Dose	Frequency	Duration	Codes
	Piperacillin + tazobactam IV	4.5g	Three times daily	Review	S E
plus	Amikacin IV	7.5mg/kg bolus then 1g daily		Review	C E

Monitor peak and trough levels, Modify antibiotics as appropriate according to any culture results in consultation with microbiologist.

- **Herpes infection**

	Medicine	Dose	Frequency	Duration	Codes
	Acyclovir IV	10mg/kg or 250mg	Three times daily	7 days	C E

- Fluid resuscitation (monitor input/output)

- **Anti-fungal**

	Medicine	Dose	Frequency	Duration	Codes
	Amphotericin B IV	1mg in 200ml 5% DW over 4 hours – if no reaction, 0.25mg/kg IV in 5% DW over 6 hours via CVP/Hickman line. Escalate to 0.5mg/kg on D2. Further increase to 1mg/kg possibly if aspergillus suspected or isolated			B V

Initial test dose with methylprednisolone and promethazine cover 1 hour before, Highly nephrotoxic - U+E, Creat daily (hypokalaemia*). Pethidine may be required for allergic reactions.

Consider administering Liposomal Amphotericin which is less nephrotoxic.

- If neutrophil count >0.5 or no CVP: Itraconazole 200mg BD
- *Fluconazole only effective against candida and not aspergillus*

- Remove central lines
- Infectious diseases/microbiology consult
- Repeat all cultures at day 5
- Full work up as described above
- Daily FBC & diff to monitor neutrophil count
- G-CSF

	Medicine	Dose	Frequency	Duration	Codes
	Filgrastim s/c	30MIU/d until neutrophils >0.5 on 2 consecutive days		Review	C E
or	Lenograstim s/c	5-10mcg/d until neutrophils >0.5 on 2 consecutive days			

- Once a patient has recovered, Pegfilgastrim (Neulasta, Long acting) can be administered prophylactically. It is important to note that once a patient develops neutropenia despite Pegfilgastrim administration, Filgrastrim should not be administered.

Survivorship and Follow-up

Patients must be informed that they will require long-term follow-up once treatment has concluded. Patients that have completed treatment should be stepped down from tertiary care to a regional hospital with a specialist or an experienced general medical officer for long-term follow-up.

SECTION B

ESSENTIAL MEDICINE LIST

MEDICINE	STRENGTH	DOSAGE FORM	LEVELOF USE	VEN
ALIMENTARY TRACT AND METABOLISM				
Antacids, antiflatulents				
Magnesium trisilicate		Suspension	A	E
Sodium bicarbonate	650mg	Granules	B	V
Antipeptic ulcerants				
Omeprazole	20mg	Capsule	B	E
Famotidine	20mg	Tablet	B	E
Famotidine	20mg	Injection	B	B
Pantoprazole	40mg	Injection	B	E
Antispasmodics And Anticholinergics				
Hyoscine butylbromide	10mg	Tablet	A	E
Antidiarrhoeals				
Oral Rehydration salts		Powder	A	V
Antiemetics and antinauseants				
Metoclopramide	10mg	Tablet	B	E
Metoclopramide	10mg	Injection	B	V
Promethazine	25mg	Tablet	A	E
Promethazine	25mg	Injection	A	E
Cyclizine	50mg	Tablet	B	N
Ondansetron	4mg	Tablet	S	E
Laxatives				
Glycerine, adult	1.698ML/2.4g	Suppository	B	E
Bisacodyl	5mg	Tablet	A	E
Antihaemorrhoidals				
Liquid paraffin BP		Liquid	B	E
Bismuth subgallate compound (bismuth subgallate + bismuth oxide + zinc oxide)	59mg+24mg +256mg	Ointment	B	E
Insulins				
Biphasic insulin	100 units/ml	Injection	B	V
Intermediate-acting insulin	100 units/ml	Injection	B	V
Insulin, soluble	100 units/ml	Injection	B	V
Oral antidiabetics				
Metformin	500mg, 850MG	Tablet	A	V
Glibenclamide	5mg	Tablet	B	V
Gliclazide	40mg	Tablet	B	V
Vitamins				
Ascorbic Acid	250mg	Tablet	A	N
Cholecalciferol	500 units	Tablet	B	E
Multivitamins		Tablet	A	N
One alpha (Vitamin D analogues)	0,25MCG	Tablet	C	E
Phytomenadione	10mg	Tablet	A	V
Phytomenadione	10mg	Injection	A	E
Pyridoxine	25mg, 50mg	Tablet	A	E

MEDICINE	STRENGTH	DOSAGE FORM	LEVELOF USE	VEN
ALIMENTARY TRACT AND METABOLISM				
Vitamins (continued)				
Vitamin B Complex		Tablets	A	E
Vitamin B1 (thiamine)	100mg	Injection	A	N
Vitamin B1 (thiamine)	100mg	Tablet	A	N
Vitamin B12	1mg	Injection	B	N
Mineral Supplements				
Potassium chloride	20%	Injection	B	V
Potassium chloride	600mg	Tablet	A	E
Calcium gluconate	10%	Injection	B	E
Zinc Sulphate	20mg	Tablet	A	E
HAEMOTOLOGICAL CONDITIONS				
Blood products and blood substitutes				
Packed red blood cells			B	V
Frozen Fresh plasma			B	V
Polygeline		Infusion	B	V
Anti-anaemics				
Erythropoietin beta	4 000IU	Injection	C	E
Epoietin beta	50mcg/0,3ml	Injection	C	E
Ferrous sulphate	200mg	Tablets	A	E
Folic Acid	5mg	Tablet	A	E
Anticoagulants				
Heparin	5000IU	Injection	C	V
Enoxaparin	40mg	Injection	B	V
Warfarin	5mg	Tablet	B	E
Thrombolytics				
Alteplase (t-PA)	50mg	injection	S	V
Anti-platelets				
Clopidogrel	75mg	Tablet	B	E
Antihaemorrhagics				
Tranexamic acid	500mg	Injection	B	E
Tranexamic acid	500mg	Tablet	B	E
IV Solutions				
Dextrose in Sodium chloride	5%+0,9%	Infusion	A	V
Dextrose	10%	Infusion	B	E
Dextrose	50%	Infusion	A	V
Half-strength darrows with 5% dextrose solution		Infusion	A	V
Normal saline	0,45%, 0,9%	Infusion	A	V
Ringer lactate		Infusion	A	V
Sodium bicarbonate	8.4%	Injection	B	V
Sorbitol solution	3%	solution	B	E
Dextrose + sodium chloride	5% + 0.9%	Infusion	A	V

MEDICINE	STRENGTH	DOSAGE FORM	LEVEL OF USE	VEN
CARDIOVASCULAR SYSTEM				
Cardiac Therapy				
Adrenaline	1mg	Injection	A	V
Isosorbide dinitrate sublingual	5mg	Tablet	B	E
Digoxin	0.25mg	Tablet	S	E
Amiodarone	600mg	Injection	C	V
Amiodarone	200mg	Tablet	C	V
Atropine	0,1mg	Injection	B	V
Glyceryl trinitrate	5mg	Injection	C	E
Glyceryl trinitrate	0,5mg	Tablet	B	E
Isosorbide dinitrate	5-10mg	Tablet	B	E
Antihypertensives and antihypotensives				
Dihydralazine	2.5mg	Injection	B	V
Methyldopa	250mg	Tablet	B	V
Hydralazine	25mg	Tablet	C	E
Magnesium Sulphate	50%	Injection	C	V
Minoxidil	5mg, 10mg	Tablet	C	E
Diuretics				
Furosemide	40mg	Tablet	B	V
Furosemide	20mg	Injection	B	V
Hydrochlorothiazide	25mg	Tablet	A	V
Spironolactone	25mg, 100mg	Tablet	B	E
Alpha-blocking agents				
Doxazosin	4mg	Tablet	C	V
Beta-blocking agents				
Atenolol	50mg	Tablet	B	V
Carvedilol	6.25mg, 12.5mg	Tablet	B	E
Labetalol	5mg	Injection	C	V
Propranolol	10mg, 40mg	Tablet	B	V
Calcium channel blockers				
Amlodipine	5mg, 10mg	Tablet	B	E
Nifedipine SR	10mg, 20mg, 30mg	Tablet	B	V
Nifedipine	10mg	Tablet	B	V
Nimodipine	60mg	Tablet	S	E
Verapamil	40mg, 120mg	Tablet	B	E
ACE Inhibitors				
Enalapril	5mg, 10mg, 20mg	Tablet	B	V
Irbesartan	150mg	Tablet	B	V
Lisinopril	10mg, 20mg	Tablet	B	E
Lipid modifying agents				
Simvastatin	10mg	Tablet	B	E
Atorvastatin	20mg	Tablet	B	E

MEDICINE	STRENGTH	DOSAGE FORM	LEVEL OF USE	VEN
DERMATOLOGICALS				
Anti-infective Dermatologicals				
Silver sulphadiazine cream	1%	Cream	A	E
Mupirocin cream	2%	Cream	B	E
Sulphur	2%,10%	Ointment	C	E
Acyclovir	5%	Cream	A	E
Clotrimazole cream	1%	Cream	A	V
Ketoconazole shampoo	2%	Shampoo	C	N
Nystatin	100 000IU	Cream	A	E
Selenium sulphide	2%	Shampoo	C	N
Urea	15%	Ointment	C	E
Benzoic Acid	6%	Ointment	A	E
Emolients and protectives				
Aqueous cream		Cream	A	E
Emulsifying ointment		Ointment	A	E
Liquid paraffin		Lotion	A	N
Antipruritics				
Calamine lotion		Lotion	A	V
Antipsoriatics				
Salicylic acid	5%	Ointment	C	N
Crude coal tar	10%	Cream/OInt	C	E
Corticosteroids for dermatologic use				
Hydrocortisone	1%	Cream/Oint	A	E
Betamethasone	0.10%	Cream/Oint	B	N
Dexamethasone	0.10%	Cream/oint	B	E
Triamcinolone acetonide	0.10%	Cream	B	E
Antiseptics and disinfectants				
Glycothymol PB		Solution	A	E
Gentain violet	0.50%	Solution	A	E
Chlorhexidine digluconate	0.20%	Solution	A	E
Povidone iodine	10%	Solution/Cream	A	E
Chemotherapeutics for dermatological use				
Liquid nitrogen for cryotherapy		Gas	C	E
Podophyllin	15%	Lotion	A	E
Silver nitrate/potassium nitrate (caustic pencil)	40%	Pencil	B	E
Trichloroacetic acid	80%	Solution	C	E
Anti-scabies medicines				
Benzyl benzoate	25%	Lotion	A	N
Permenthrin	5%	Cream	C	E
Anti-acne preparations				
Cyproterone combined oral contraceptives		Tablets	B	E

MEDICINE	STRENGTH	DOSAGE FORM	LEVEL OF USE	VEN
DERMATOLOGICALS				
Anti-acne preparations (continued)				
Benzoyl peroxide	5%	gel	A	N
Tretinoin	0.025%	Cream	C	N
GYNAECOLOGY AND OBSTETRICS				
Gynacological anti-infectives and anti-septics				
Nystatin	100 000 IU	Pessary	A	E
Clotrimazole	500mg	Pessary	A	E
Oxytocics				
Misoprostol	200mcg	Tablet	C	N
Ergometrine	0.5mg	Injection	A	V
Ergometrine	0,2mg	Tablet	A	V
Oxytocin	10 IU	Injection	A	V
Hormonal and Barrier Contraceptives methods				
Levonorgestrel (Jadelle)	75 mg	Implant	A	V
Etonogestrel (Implanon)	68 mg	Implant	A	V
Intrauterine Contraceptive Device (IUCD)-Copper T -330 A	260mg Cu		A	E
Norgestrel ethinylestradiol	50+500 mcg	Tablet	A	E
Ethinyloestradiol + levonogestrel	50mc-g+150-250mcg	Tablet	A	E
Ethinyloestradiol + levonogestrel	30-35mg + 150-250mg	Tablet	A	E
Norethisterone enanthate (NST)	200mcg	Injection	A	V
Depot Medroxyprogesterone (DMPA)	150mg	Injection	A	V
Levonorgestrel	750mcg	Tablet	A	E
Prostaglandins				
Dinoprostone gel	0.5mg	Gel	B	E
SYSTEMIC HORMONES, excluding SEX HORMONES				
Calcitonin	100 IU	Injection	C	E
Systemic corticosteroids				
Dexamethasone	4mg	Injection	B	V
Dexamethasone	4mg	Tablet	B	E
Hydrocortisone	100mg	Injection	A	V
Methylprednisolone	40mg, 500mg	injection	C	E
Prednisolone	5mg, 20mg	Tablet	B	V
Triamcinalone	400mg	Intravitreal	S	V
INFECTIONS AND INFESTATIONS				
Tetracyclines				
Tigecycline	50mg	Injection	S	E
Doxycycline	100mg	Tablet	A	V
Amphenicols				
Chloramphenicol	1g	Injection	C	E
Chloramphenicol	250mg	Tablet	C	E

MEDICINE	STRENGTH	DOSAGE FORM	LEVEL OF USE	VEN
INFECTIONS AND INFESTATIONS				
Floroquinolones				
Ciprofloxacin	500mg	Tablet	A	V
Ciprofloxacin	200mg/100ml	Injection	B	E
Aminoglycosides				
Gentamycin	40mg/ml	Injection	B	V
Neomycin	500mg	Tablet	B	E
Spectinomycin	2gm	Injection	A	E
Vancomycin	1g	Injection	S	E
Carbapenems				
Meropenem	500mg, 1 g	Injection	S	E
Cephalosporines				
Cephazolin	1g	Injections	B	E
Cefotaxime	500mg	Injection	B	E
Cefoxitin	1g	Injections	S	E
Ceftriaxone	250mg, 1g	injection	B	V
Cefuroxime	1.5g	Injection	S	V
Cephalexin	500mg	Tablet	B	E
Macrolides				
Azithromycin	500mg	Tablet	A	V
Clarithromycin	500mg	Tablet	C	E
Clindamycin	600mg	Injection	C	E
Clindamycin	150mg, 300mg	Capsule	C	E
Erythromycin	250mg, 500mg	Tablet	A	V
Penicillins				
Ampicillin	500mg, 1 g	Injection	A	V
Amoxicillin	250mg, 500mg	Capsule	A	V
Amoxycillin + Clavulanic acid	500mg+125mg/ 250mg +125mg/ 875mg +125mg	Tablet	B	E
Benzathine Benzylpenicillin	2,4mu	Injection	A	V
Benzylpenicillin	5MU	Injection	A	E
Cloxacillin	250mg, 500mg	Capsule	A	E
Cloxacillin	500mg	Injection	A	E
Phenoxymethylpenicilin	250mg	Tablet	A	V
Piperacillin + tazobactam	4g+500mg/vial	Injection	S	E
Sulphonamides with anti-infectives in combination				
Co-Trimoxazole	800/160mg	Tablet	A	V
Co-Trimoxazole	400/80mg	Tablet	A	V
All other infectives				
Dapsone	100mg	Tablet	C	E
Fosfomycin	1g	Tablet	B	E
Nitrofurantoin	100mg	Tablet	A	E
Trimethoprim	200mg	Tablet	B	E

MEDICINE	STRENGTH	DOSAGE FORM	LEVEL OF USE	VEN
INFECTIONS AND INFESTATIONS (continued)				
Systemic antimycotics				
Amphotericin B	50mg	Injection	B	V
Fluconazole	200mg	Tablet	B	V
Fluconazole	400mg	Tablet	B	V
Fluconazole	2mg/ml	Injection	B	V
Itraconazole po	200mg	Tablet	C	E
Ketoconazole	200mg	Tablet	A	E
Griseofulvin	500mg	Tablet	A	E
Flucytocine	2,5g/250ml	Infusion	B	E
Tuberculostatics				
Rifampicin	150mg	Capsule	B	V
Isoniazid	300mg	Tablet	A	V
Rifampicin+Isoniazide+Pyrazinamide+Ethambutol	150/75/400/275 mg	Tablet	A	V
Rifampicin+Isoniazide	150/75mg	Tablet	A	V
Ethambutol	400mg	Tablet	A	V
Moxifloxacin	400mg	Tablet	B	V
Bedaquiline	100mg	Tablet	B	V
Linezolid	400mg	Tablet	B	V
Clofazimine	100mg	Tablet	B	V
Terizidone	250mg	Capsule	B	V
Cycloserine	250mg	Capsule	B	V
Delaminid	50mg	Tablet	B	V
Pyazinamide	500mg	Tablet	B	V
Imipenem-cilastatin	500mg/500mg	Injection	B	V
Streptomycin	1g	Injection	C	V
Ethionamide	250mg	Tablet	B	V
Prothionamide	250mg	Tablet	B	V
P-aminosalicylic acid	4g	Sachet	B	V
Antivirals for systemic use				
Acyclovir	200mg, 400mg	Tablet	A	E
Acyclovir	50mg/ml	Injection	C	E
Ganciclovir	500mg	Injection	S	V
Antivirals				
Abacavir	300mg	Tablet	A	V
Abacavir+Lamivudine	600+300mg	Tablet	A	V
Atazanavir+Ritonavir	300mg+100mg	Tablet	A	V
Dolutegravir	50mg	Tablet	A	V
Efavirenz	600mg	Tablet	A	V
Lamivudine	50mg/5ml	Solution	A	V
Lamivudine	150mg	Tablet	A	V

MEDICINE	STRENGTH	DOSAGE FORM	LEVEL OF USE	VEN
INFECTIONS AND INFESTATIONS (continued)				
Antivirals (continued)				
Lopinavir+ Ritonavir	40+10mg	Granules	A	V
Lopinavir+ Ritonavir	(80mg+20mg)/ml	Solution	A	V
Lopinavir+ Ritonavir	100+25mg	Tablet	A	V
Lopinavir+ Ritonavir	200+50mg	Tablet	A	V
Tenofovir	300mg	Tablet	A	V
Tenofovir+Lamivudine+Dolutegravir	300mg+300mg+50mg	Tablet	A	V
Tenofovir+Lamivudine+Efavirenz	300mg+300mg+600mg	Tablet	A	V
Zidovudine	300mg	Tablet	A	V
Zidovudine+Lamivudine	300+150mg	Tablet	A	V
Antimalarials				
Artemeter-Lumefantrine	20/120mg	Tablet	A	V
Artesunate	60mg	Injection	B	V
Mefloquine	250mg	Tablet	A	E
Primaquine	7,5mg	Tablet	A	V
Quinine	600mg	Injection	B	V
Quinine	300mg	Tablet	B	V
Immune sera and immunoglobulins				
Anti-D immunoglobulin	100mcg	Injection	C	V
Antivenom polyvalent		Injection	B	V
Rabies vaccine		Injection	B	V
Rabies immunoglobulin		injection	B	V
MUSCULOSKELETAL SYSTEM				
Anti-inflammatory and antirheumatic products (including paracetamol)				
Acetylsalicylic acid	81mg, 100mg, 300mg	Tablet	A	E
Diclofenac sodium suppisotory	50mg	Tablet	B	E
Diclofenac sodium	100mg	Suppository	B	E
Diclofenac sodium	75mg/3ml	Injection	A	V
Diclofenac sodium	100mg	Suppository	A	E
Ibuprofen	200mg, 400mg	Tablet	A	E
Ketorolac	15mg/ml	Injection	S	E
Mefenamic acid	250mg, 500mg	Tablet	C	E
Meloxicam	7.5 – 15mg	Capsule	C	E
Paracetamol	1g	Injection	B	E
Paracetamol	500mg	Tablet	A	E
Piroxicam	10mg	Capsule	B	E
Muscle relaxants				
Atracurium	50mg	Injection	B	V

MEDICINE	STRENGTH	DOSAGE FORM	LEVEL OF USE	VEN
MUSCULOSKELETAL SYSTEM (continued)				
Muscle relaxants (continued)				
Orphenadrine	50mg	Tablet	B	E
Pancuronium	10mg	Injection	B	V
Rocuronium	50mg	Injection	B	V
Suxamethonium	100mg	Injection	B	V
Anti-gout preparations				
Allopurinol	300mg	Tablet	B	E
Colchicine	0.5mg	Tablet	A	N
RENAL & URINARY TRACT SYSTEM				
Potassium Removing Agent / Hyperkalemis				
Sodium polystyrene sulfonate (kayexalate)	15gm	Powder	C	E
Phosphate binders				
Calcium acetate	667mg	Tablet	C	E
Magnesium carbonate	500mg	Tablet	C	E
Sevelamer	800mg	Tablet	C	E
NERVOUS SYSTEM				
General Anaesthetics				
Ketamine	50mg	Injection	B	V
Propofol	1%	Injection	B	V
Sodium thiopentone	1mg/10ml	Injection	B	V
Etomidate	2mg	Injection	C	E
Isoflurane	250ml	Liquid	B	V
Sevoflurane	250ml	Liquid	B	V
Halothane	250ml	Liquid	B	V
Local Anaesthetics				
Ephedrine	5-10mg	Injection	A	V
Lignocaine	2%	Injection	A	V
Bupivaciane PLAIN	0,25mg	Injection	A	V
Bupivaciane with dextrose	5mg+80mg / ml	Injection	B	V
Prilocaine	2%	Injection	C	V
Resuscitation medicines				
Phenylephrine	2-10mcg	Injection	A	V
Dobutamine	5-10mcg/kg	Injection	S	E
Opioid analgesics				
Codeine phosphate	30mg	Tablet	B	E
Tramadol hydrochloride	50mg, 100mg	Tablet	B	E
Morphine SR	10mg, 30mg	Tablet	B	E
Morphine	5mg, 20mg	Syrup	B	E
Morphine	15mg	Injection	B	E
Paracetamol+codeine phosphate	500+8mg	Tablet	B	N
Pethidine	50mg, 100mg	Injection	B	E

MEDICINE	STRENGTH	DOSAGE FORM	LEVEL OF USE	VEN
NERVOUS SYSTEM (continued)				
Opioid analgesics (continued)				
Fentanyl	500mcg	Injection	B	E
Tilidine	2,5mg/ml	Drops	C	E
Anti-epileptics				
Carbamazepine	400mg	Tablet	B	V
Carbamazepine CR	200mg	Tablet	B	V
Clonazepam	0.5mg, 2mg	Tablet	B	E
Gabapentin	300mg	Tablet	C	E
Lamotrigine	25mg	Tablet	B	E
Levetiracetam	250mg	Tablet	A	V
Pentobarbitone	200mg	Injection	B	E
Phenobarbitone	200mg	Injection	B	E
Phenobarbitone	30mg	Tablet	B	E
Phenytoin	100mg	Tablet	B	E
Phenytoin	250mg	Injection	B	E
Sodium valproate	100mg	Injection	B	E
Sodium valproate CR	200mg	Tablet	B	E
Sodium valproate CR	500mg	Tablet	B	E
Sodium valproate CR	300mg	Tablet	B	E
Antiparkinsons agents /Anticholinergics				
Biperiden	2mg	Tablet	B	E
Biperiden	2mg/ml	Injection	B	E
Carbidopa/levodopa	25mg, 100mg	Tablet	B	E
Trihexyphenidyl	2mg, 5mg	Tablet	B	E
Anti-psychotic agents				
Aripiprazole	2mg,5mg, 10mg	Tablet	B	E
Chlorpromazine	100mg	Injection	C	E
Chlorpromazine	50, 100mg	Tablet	B	E
Flupenthixol decanoate	200mg/ml	Injection	C	V
Haloperidol	1,5mg, 5mg	Tablet	B	E
Haloperidol	5mg/ml	Injection	C	V
Olanzapine	5mg, 10mg	Tablet	B	E
Quetapine	25mg, 50mg, 200mg	Tablet	C	E
Risperidone	2mg	Tablet	B	E
Risperidone	25 mg	Injection	B	E
Sulpiride	50mg, 200mg	Tablets	B	E
Zuclopenthixol decanoate	200mg	Injection	C	E
Anxiolytics				
Clonazepam	0.5mg	Tablet	B	N
Diazepam	5mg	Tablet	B	V
Diazepam	10mg/ml	Injection	B	V
Lorazepam	4mg/ml	Injection	B	E
Lorazepam	1mg, 4mg	Tablet	B	E

MEDICINE	STRENGTH	DOSAGE FORM	LEVEL OF USE	VEN
NERVOUS SYSTEM (continued)				
Anxiolytics (continued)				
Midazolam	10mg	Injection	B	E
Antidepressants				
Amitriptyline	25mg, 50mg	Tablet	A	E
Fluoxetine	10mg, 20mg	Tablet	B	E
Sertraline	50mg	Tablet	A	N
Duloxetine	20mg	Tablet	B	E
Psychostimulants				
Methylphenidate	10mg	Tablet	S	N
Caffeine	500mg	Injection	S	E
Caffeine	100mg	Tablet	S	E
Medicines used to treat Dementia				
Donepezil	5mg	Tablets	B	E
ANTIPASITIC PRODUCTS, INSECTICIDES & REPELLANTS				
Antiprotozoals				
Metronidazole	200mg,400mg	Tablet	A	V
Metronidazole	500mg	Injection	B	V
Tinidazole	500mg	Tablet	A	N
Secnidazole	500mg	Tablet	A	N
Antihelminthics				
Albendazole	400mg	Tablet	A	V
Ivermectin	3mg	Tablet	S	E
Mebendazole	250mg, 500mg	Tablet	A	E
Niclosamide	500mg	Tablet	A	E
Praziquantel	600mg	Tablet	A	E
RESPIRATORY SYSTEM				
Nasal decongestant & other decongestants for topical use				
Beclomethasone diproprionate	0.05%	Nasal spray	B	V
Ephedrine	0.50%	Nasal drops	B	E
Fluticasone	100mcg	Nasal spray	B	E
Sodium chloride	0.90%	Nose drops	A	E
Xylometazoline	0.10%	nasal drops	B	E
Anti-asthmatics				
Beclomethasone inhaler	100mcg	Inhaler	B	V
Budesonide	100mcg	Inhaler	B	E
Montelukast	10mg	Tablet	B	E
Salbutamol inhaler	100mcg	Inhaler	A	V
Ipratropium Bromide + Salbutamol	0,5mg+2,5mg	Nebuliser	A	E
Salmeterol	50mcg	Inhaler	B	E
Theophylline SR anhydrouse	200mg	Tablet	S	E

MEDICINE	STRENGTH	DOSAGE FORM	LEVEL OF USE	VEN
RESPIRATORY SYSTEM (continued)				
Systemic antihistamines				
Chlorpheniramine	4mg	Tablet	A	E
Cetirizine	10mg	Tablet	B	E
Loratidine	10mg	Tablet	B	E
SENSORY ORGANS – OPTHALMOLOGICALS				
Anti-infectives				
Acyclovir	1%	Ointment	C	V
Chloramphenicol	0.01	Eye Ointment	A	V
Chloramphenicol	0.01	Eye Drops	A	E
Ciprofloxacin	0.3%	Eye drops	B	V
Gatifloxacin	0.3%	Eye drops	S	E
Gentamycin	0.003	Eye drops	B	E
Moxifloxacin	0.3%	Eye drops	S	V
Natamycin	0.05	Eye drops	C	V
Natamycin	0.05	Ointment	C	V
Ofloxacin	0.003	Eye drops	C	V
Tetracycline	0.01	Eye Ointment	A	E
Corticosteroides				
Prednisolone	0.001	Eye drops	C	V
Dexamethasone	0.001	Eye drops	B	V
Hydrocortisone	0.01	Eye drops	B	E
Betamethasone	0.1%	Eye drops	B	V
Fluorometholone	0.001	Eye Drops	B	N
Corticosteroides & Anti-infectives in combination				
Dexamethasone + chloramphenicol	0.1% + 0.5%	Eye drops	B	V
Dexamethasone+ chloramphenicol + neomycin	0.1% + 0.5% + 0.35%	Eye drops	B	N
Antiglaucoma and Miotics				
Acetazolamide	250mg	Tablet	B	E
Dorzolamide	10 mg/mL	Eye drops	C	V
Timolol	0.25%, 0.5%	Eye drops	B	V
Betaxolol	0.25% or 0.5%	Eye drops	C	E
Latanoprost	0.005%	Eye drops	B	V
Prostamide bimatoprost	0.03%	Eye drops	C	E
Pilocarpine	10 mg/0.5 mL	Injection	C	E
Pilocarpine hydrochloride	2%	Eye drops	C	V
Glycerin / glycerol	-	Solution	B	E
Brimonidine	0,15%,0,2%	Eye drops	C	E
Fixed Combinations				
Timolol+Latanoprost (Ganforte)	0.5%+ 0.03%	Eye drops	C	E
Timolol+Brimonidine (Combigan)	0.5%+0.2%	Eye drops	C	E
Mydriatrics and cycloplegics				
Atropine	10mg/ml	Eye drops	B	E

MEDICINE	STRENGTH	DOSAGE FORM	LEVEL OF USE	VEN
SENSORY ORGANS – OPTHALMOLOGICALS (continued)				
Mydriatrics and cycloplegics				
Homatropine	0.02	Eye drops	B	E
Decongestants ant ant-allergics				
Oxymetazoline	0,005% v/v	Eye drops	A	E
Sodium chromoglycate	2%v/v	Eye drops	A	E
Antazoline+tetrazoline	0,5+0,4 mg/ml	Eye drops	B	E
Anaesthetics				
Oxybuprocaine hydrochloride	0.40%	Eye Drops	B	E
Tear replacements				
Hydroxypropyl methylcellulose	0.02	Eye drops	C	V
Polyacrylic acid	2 mg/g	Liquid gel	C	N
Tears Naturelle®	—	Eye drops	B	N
Diagnostic agents				
Balance salt solution (BSS) vacolitres for cataract surgery	-	Solution	B	V
Fluoresin sodium	1mg	Paper strip	B	E
Flurescein	1%	Eye drops	B	E
Intra-ocular lenses (various powers) posterior chamber and anterior chamber	-	Lense	C	V
Methylene Blue		Solution	C	V
SENSORY ORGANS-OTOLOGICALS				
Anti-infectives				
Chloramphenicol	0.50%	Ear drops	B	N
Acetic acid	2%	Ear drops	B	N
Ciprofloxacin	0.30%	Ear drops	B	E
Clotrimazole	1%	Ear drops	B	V
SENSORY ORGANS - VARIOUS				
Anti - Poisoning agents				
Flumazenil	0,1mg/ml	Injection	B	E
Activated charcoal	100mg	Tablet	A	E
Pralidoxime	300mg/ml	Injection	B	V
Potassium permanganate	400mg	Tablet	A	E
Sorbitol	70%	Solution	A	E
Acetylcysteine	500mg	Tablet	B	E
N-acetylcysteine	200mG	Injection	B	E
Desferrioxamine	500mg	Injection	B	E
Naloxone	0,4mg/ml	Injection	B	V
Glycopyrrolate	0,2-0,4mg/ml	Injection	B	V
Neostigmine	1mg/ml	Injection	A	V
Dopamine	40mg	Injection	C	E
Glucagon	1mg	Injection	B	E
Methionine	2,5g	Tablet	B	E
Alcohol (whisky or brandy)	40%	solution	B	V

MEDICINE	STRENGTH	DOSAGE FORM	LEVEL OF USE	VEN
SENSORY ORGANS - VARIOUS				
Medical gases				
Medical oxygen	100%	Gas	A	V
Nitrous oxide	100%	Gas	B	V
DENTAL CONDITIONS				
Hydrogen peroxide mouth wash	3%	Solution	A	V
Amlexanox	5%	Paste	C	E
Povidone Iodine	1%	Mouthwash	A	E
Miconazole	2%	Oral Gel	B	E
Nystatin	100 000IU	Suspension	A	E
Other medicines used in dental and oral condition				
Carnoy's solution	-	Solution	S	E
Neurobine forte	-	Tablet	S	E
Polymethyl methacrylate (PMMA)	-	Powder	S	E
ONCOLOGY				
Medicines used in oncology				
Bevacizumab	25mg/ml	Intravitreal	S	V
Denosumab	120mg/1,7ml	Injection	S	E
Filgrastim	30Mio.IU	Injection	S	E
Gallium nitrate	200mg	Injection	S	E
Lenograstim	5-10mcg	Injection	S	E
Pamidronate	60-90mg	Injection	S	E
Zoledronic acid	4mg	Injection	S	E
Doxorubicin	50mg	Injection	C	V
Paclitaxel	100mg	Injection	C	V
Aprepitant	125mg/80mg	Capsule	C	E
Granisetron	3mg/3ml	Injection	C	E
Ondansetron	8mg/4ml	Injection	C	E
Hydroxyurea	200mg	Injection	S	E

Annex 1. Motion to Amend the STG/EML

Return to: Ministry of Health
Department: Pharmaceutical Services, PO Box 5, Mbabane
Motion To Amend The STG/EML

SECTION 1: TO BE COMPLETED BY APPLICANT (The applicant can be prescriber, dispenser, Pharmacy Therapeutic Committee, secretariat)	
Name:	Designation:
Name of Facility:	Region:
Date of Submission:	Signature:
Request for changes to (tick appropriate) ☐ Standard Treatment Guideline ☐ Essential Medicines List	
Has the motion been presented, reviewed, and approved by one of the following (kindly attach minutes of meeting)? ☐ Hospital/Institution Pharmacy Therapeutic Committee ☐ Regional Pharmacy Therapeutic Committee	

PART A: AMENDMENTS TO THE STG Note: If the proposed change involves medicines used for the management of the condition, please also complete PART B
Indicate the condition to be changed Condition:
Request for the following changes to be made on the STG:
Reasons for the request:
Evidence:

Annex 1. Motion to Amend the STG/EML (continued)

PART B: AMENDMENTS TO THE EML
Type of Request (tick appropriate): ☐ Deletion of listed medicine ☐ Addition of a new medicine ☐ Replacement of a listed medicine ☐ Reclassification of a listed medicine
For replacements, please complete below: Replacement of *(generic name, strength, and dosage form):* Replacement with *(generic name, strength, and dosage form):*
For reclassifications, please complete below: Reclassification of *(generic name, strength, and dosage form):* From this class: To this class:
For additions please complete below: Addition of *(generic name, strength, and dosage form):*
For deletions please complete below: Deletion of *(generic name, strength, and dosage form):*
Reasons for request:
Evidence:

Annex 1 . Motion to Amend the STG/EML (continued)

SECTION 2: TO BE COMPLETED BY CMS
Estimated cost of proposed medicine: E _____ per _____ Current cost of similar acting medicine(s) on the EML 1. Name, strength, dosage form: E _____ per _____

SECTION 3: TO BE COMPLETED BY STANDARD TREATMENT GUIDELINES & ESSENTIAL MEDICINES LIST COMMITTEE	
For requested changes to STGs ☐ Accept proposed changes to the STG ☐ Deny/Reject proposed changes to the STG Reasons for decision:	
For requested changes to EML ☐ Accept proposed changes to the EML ☐ Deny/Reject proposed changes to the EML Reasons for decision:	
Signature of STG/EML Secretariat:	Date:
Signature of STG/EML Chairperson:	Date:

USAID GLOBAL HEALTH SUPPLY CHAIN PROGRAM

Procurement and Supply Management