THE REPUBLIC OF UGANDA

MINISTRY OF HEALTH

UGANDA CLINICAL GUIDELINES 2016

National Guidelines for Management of Common Conditions

Published by the Ministry of Health Uganda
First edition: January 2003 (reprint: July 2004, May 2005)
Revised: January 2010, November 2012, December 2016

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Every effort has been made to ensure that the information in this book is accurate, complete, and conforms to the current therapeutic practice. However, the publisher, editor, and contributors cannot be held responsible for any errors, omissions, individual patient responses to recommended therapies, or other consequences that may arise from its use.

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Foreword

The overall goal of Uganda's health system is to provide accessible, equitable, and quality services to the population, in order to promote a healthy and productive life, which is a necessary factor for achieving socio-economic growth and national development.

Currently, the health system is faced with multiple challenges that include a high burden of infectious diseases that remain major causes of morbidity and mortality, such as HIV, malaria, tuberculosis, lower respiratory tract infections, malnutrition, and meningitis. In addition, new threats keep emerging, for example, epidemics of hepatitis B, yellow fever, haemorrhagic fevers and nodding disease. The increase of non-communicable conditions including diabetes, hypertension, heart disease, and mental disorders complicates the scenario.

The push towards universal health coverage, including universal access to ART and particular attention to neonatal, child, adolescent and maternal health, is also placing more demands on a system with limited resources.

To respond appropriately, the health system has to ensure high standards of quality and efficiency in service delivery. The Uganda Clinical Guidelines helps to achieve these standards by presenting updated, practical, and useful information on the diagnosis and management of common conditions in Uganda. They also provide a rational basis for an efficient procurement and supply system that ensures the availability of safe, efficacious, quality medicines and health supplies.

The guidelines are based on principles of scientific evidence, cost effectiveness, and prioritization of conditions to maximize the health benefit with limited resources.

The regular update of treatment and dispensing guidelines and essential medicines lists is one of the key interventions in the Health Sector Development Plan 2015-2020 to promote the appropriate use of health products and technologies.

Therefore, I wish to thank the Medicines and Procurement Management Technical Working Group, the task force and all stakeholders who participated in the development of this document.

Dr Jane Ruth Aceng
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Preface

The Uganda Clinical Guidelines (UCG) evolved from the National Standard Treatment Guidelines 1993, which were the first of the type published in Uganda. Before then, individual guidelines existed to manage a limited number of specific conditions.

The purpose of national standard treatment guidelines is to provide evidence-based, practical, and implementable guidance to prescribers to provide the most cost-effective and affordable treatment of priority health conditions in a country.

Together with the *Practical Guidelines for Dispensing at Lower/Higher Health Facility Level,* which provide information about medicine characteristics, administration, and side effects, the UCG are designed as a practical tool to support daily clinical practice by providing a reliable reference for health workers on appropriate management of Uganda's common health conditions. It also gives health managers a reference tool to assess and measure service quality.

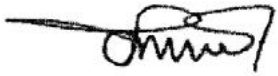
The guidelines are also the basis for the formulation of the essential medicines and health supplies list of Uganda (EMHSLU) which are used to guide supply and procurement. This allows for more efficient use of limited resources to improve rational prescribing.

The treatments described in the UCG are the nationally recognised standard treatments, and in many cases, they are derived from those recommended in the Ministry of Health Vertical Programmes, World Health Organisation, and other international guidelines.

The guidelines have been reviewed and updated through a six-month process involving extensive consultations with public health programs staff, medical experts, and health workers of all cadres.

As medicine is an ever-evolving field, this manual is to be used for guidance, but cannot replace clinical judgement in individual cases.

The Ministry of Health and all those involved in updating the UCG sincerely hope that the UCG will make a significant contribution to ongoing improvements in national therapeutic services and medicines utilisation.



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Acknowledgements

The UCG 2016 was produced by the Ministry of Health with financial assistance from the USAID-funded Uganda Health Supply Chain (UHSC), and the Clinton Health Access Initiative (CHAI).

We extend sincere gratitude to all health workers from the health facilities, academia, Ministry of Health Programmes and Departments, Uganda National Health Laboratory Services, Regional and District Health Offices, World Health Organisation Country Office, Private-not-for-profit organisations and development partners who have cooperated extensively to make sure the UCG 2016 update occurred comprehensively and in line with national and international policies.

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Finally, we thank the taskforce secretariat Dr. Monica Imi, Juliet Namugambe Kitutu and Linacy Nampa who have worked tirelessly to ensure that the UCG 2016 update is completed.

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Abbreviations

3TC	lamivudine
ABC	abacavir
Ab	antibody
ACE	angiotensin converting enzyme
ACP	Aids Control Program
ACT	artemisinin-based combination therapy
ACTH	Adrenocorticotropic Hormone
ADHD	attention deficit hyperactivity disorder
ADR	adverse drug reaction
AFASS	acceptable, feasible, affordable, sustainable and safe
(A)AFB	(alcohol) acid-fast bacillus
AIDS	acquired immunodeficiency syndrome
ALP	alkaline phosphatase
ALT	alanine aminotransferase
AMI	acute myocardial infarction
ANC	antenatal care
APH	antepartum haemorrhage
APPE	appropriate personal protective equipment
APRI	aspartate aminotransferase (AST) to platelets ratio index
aPTT	activated partial thromboplastin time
AQ	amodiaquine
ARB	aldosterone receptor blocker
ART	antiretroviral therapy

ARV	antiretroviral
AS	artesunate
ASA	acetylsalicylic acid
ASOT	anti-streptolysin O titre
AST	aspartate aminotransferase
ATV	atazanavir
AZT	zidovudine
BCG	Bacillus Calmette-Guérin
BMI	body mass index
BNP	brain natriuretic peptide
BP	blood pressure
BPH	benign prostatic hyperplasia
bpm	beats per minute
BSE	breast self-examination
BUN	blood urea nitrogen
C&S	culture and sensitivity
Ca2+	calcium
CBC	complete blood count
CCB	calcium channel blocker
CD4	cluster of differentiation 4
CIN	cervical intraepithelial neoplasia
CK	creatin kinase
CKD	chronic kidney disease
CLL	chronic lymphocytic leukaemia
CM	cryptococcal meningitis

CML	chronic myeloid leukaemia
CMM	cervical mucus method
CMV	cytomegalovirus
CNS	central nervous system
COC	combined oral contraceptive
COPD	chronic obstructive pulmonary disease
CPD	cephalopelvic disproportion
CPK	creatine phosphokinase
CrAg	cryptococcal antigen
CRP	C-reactive protein
CSF	cerebrospinal fluid
CT	computed tomography
CuIUD	copper bearing intra-uterine device
CVD	cardiovascular disease
CXR	chest X-ray
DBP	diastolic blood pressure
DBS	dried blood spots
DHA	dihydroartemisinin
DIC	disseminated intravascular coagulation
DKA	diabetic ketoacidosis
DMPA	depot medroxyprogesterone acetate
DNA	deoxyribonucleic acid
DOT	directly observed therapy
DOTS	directly observed treatment, short-course
DPT	diphtheria, pertussis, and tetanus

DRE	digital rectal exam
DRV	darunavir
DST	drug susceptibility testing
DT	dispersible tablet
DTG	dolutegravir
DVT	deep vein thrombosis
EBV	Epstein-Barr virus
EC	enteric coated
ECG	electrocardiogram
ECP	emergency contraceptive pill
EDD	estimated delivery date
EFV	efavirenz
ELISA	enzyme-linked immunosorbent assay
eMTCT	elimination of mother-to-child transmission
ENT	ear, nose, and throat
ESR	erythrocyte sedimentation rate
ETV	etravirine
F-75/F-100	therapeutic milk formula 75 or 100 kcals/100 ml
FB	foreign body
FBC	full blood count
FDC	fixed dose combination
FEV	forced expiratory volume
FNAC	fine needle aspiration cytology
FP	family planning
FSH	follicle stimulating hormone

G6PD	glucose 6 phosphate dehydrogenase
GBV	gender-based violence
GDM	gestational diabetes mellitus
GERD	gastroesophageal reflux disease
GFR	glomerular filtration rate
GGT	gamma-glutamyl transferase
GIT	gastrointestinal tract
H	hospital
HAART	highly active antiretroviral therapy
Hb	haemoglobin
HB	hepatitis B
HbA1c	glycated haemoglobin, haemoglobin A1c
HBeAg	hepatitis B envelope antigen
HbF	foetal haemoglobin F
HbS	abnormal haemoglobin
HBsAg	hepatitis B surface antigen
HBV	hepatitis B virus
HC	health centre
Hct/Ht	haematocrit
HCW	health care worker
HDU	high dependency unit
HE	hepatic encephalopathy
HepB	hepatitis B
HHS	hyperosmolar hyperglycaemic state
Hib	Haemophilus influenzae type B

HIV	human immunodeficiency virus
HPV	human papilloma virus
HR	heart rate
HRP	high-risk pregnancy
HRS	hepatorenal syndrome
HSV	herpes simplex virus
HVS	high vaginal swab
ICCM	Integrated Community Case Management
ICU	intensive care unit
Ig	Immunoglobulin
IM	intramuscular
IMNCI	Integrated Management of Neonatal and Childhood Illness
IMPAC	Integrated Management of Pregnancy and Childbirth
INH	isoniazid
INR	international normalised ratio
IOP	intraocular pressure
IPT	intermittent preventive treatment
IPT	isoniazid preventive therapy
IPTp	intermittent preventive treatment of malaria in pregnancy
IPV	injectable polio vaccine
IRIS	immune reconstitution inflammatory syndrome
ITN	insecticide-treated nets
IU	international units

IUD	intrauterine device
IUGR	intrauterine growth restriction
IV	intravenous
IYCF	infant and young child feeding
IVU	intravenous urogram
JMS	Joint Medical Store
JVP	jugular vein pressure
KOH	potassium hydroxide
LAM	lactational amenorrhoea
LBW	low birth weight
LDH	lactate dehydrogenase
LFT	liver function test
LGV	lymphogranuloma venerium
LH	luteinizing hormone
LLINs	long-lasting insecticide treated nets
LMP	last menstrual period
LMWH	low molecular weight heparin
LNG	levonorgestrel
LOC	level of care
LP	lumbar puncture
LPV	lopinavir
LTBI	latent tuberculosis infection
Max	maximum dose
MB	multibacillary
mcg	microgram

MCH	maternal and child health
MCH	mean corpuscular (cell) haemoglobin
MCV	mean corpuscular volume
MDR-TB	multi-drug resistant tuberculosis
MDT	multi-drug therapy
MDVP	multi-dose vial policy
mhGAP	mental health Gap Action Program
MOH	Ministry of Health
MRI	magnetic resonance imaging
MRSA	multi-resistant Staphylococcus aureus
MTB	Mycobacterium tuberculosis
MU	mega unit
MUAC	mid-upper arm circumference
NaCl	sodium chloride
NBTS	National Blood Transfusion Services
NCD	noncommunicable disease
NDA	National Drug Authority
NET-EN	norethisterone enanthate
NG	nasogastric
NGT	nasogastric tube
NMS	National Medical Store
NMCP	National Malaria Control Program
NNRTI	non-nucleoside reverse transcriptase inhibitors
NPH	neutral protamine Hagedorn (isophane insulin)
NPO	nil per os (nothing by mouth)

NR	national referral (hospital)
NS	normal saline
NSAID	nonsteroidal anti-inflammatory drugs
NTLP	National Tuberculosis and Leprosy Programme
NTRL	National Tb reference laboratory
NtRTI	nucleoside reverse transcriptase inhibitors
NVP	nevirapine
OI	opportunistic infection
OPD	outpatient department
OPV	oral polio vaccine
ORS	oral rehydration solution
OTC	Over the counter
PAP	Papanicolaou smear/test
PB	paucibacillary
PBC	primary biliary cirrhosis
PCP	Pneumocystis jirovecii pneumonia
PCR	polymerase chain reaction
PCV	pneumococcal conjugate vaccine
PE	pulmonary embolism
PEFR	peak expiratory flow rate
PEM	protein energy malnutrition
PEP	post-exposure prophylaxis
PGD	Practical Guidelines for Dispensing at Lower/ Higher Level Health Facilities
PI	protease inhibitor

PID	pelvic inflammatory disease
PIH	pregnancy induced hypertension
PMTCT	prevention of maternal-to-child transmission
PNFP	private not for profit
POC	products of conception
POI	progestogen only injection
POIM	progestogen only implant
POP	progestogen only pill
PPD	purified protein derivative
PPE	personal protective equipment
PPH	postpartum haemorrhage
PPQ	piperaquine
PrEP	pre-exposure prophylaxis
prn	as needed
PROM	premature rupture of membrane
PSA	prostate specific antigen
PT	prothrombin time
PTT	partial thromboplastin time
PUD	peptic ulcer disease
PV	per vagina
QA	quality assurance
RAL	raltegravir
RBC	red blood cell
RDT	rapid diagnostic test
RHD	rheumatic heart disease

RIA	radio immune assay
RF	rheumatoid factor
RFT	renal function test
RH	rifampicin + isoniazid
RHZE	rifampicin + isoniazid + pyrazinamide + ethambutol
RIF	rifampicin
RL	Ringer's lactate
RNA	ribonucleic acid
RPR	rapid plasma reagin [assay]
RR	regional referral
RR-TB	rifampicin-resistant tuberculosis
RTV	ritonavir
RUTF	ready-to-use therapeutic food
SAM	severe acute malnutrition
SARS	severe acute respiratory syndrome
SBP	systolic blood pressure
SC	subcutaneous
SCA	sickle cell anaemia
SCC	squamous cell carcinoma
SCD	sickle cell disease
sdNVP	single dose nevirapine
SFH	symphysis- fundal height
SJS	Stevens-Johnson syndrome
SP	sulphadoxine + pyrimethamine

SpO2	arterial oxygen saturation
SSRI	selective serotonin reuptake inhibitor
STI	sexually transmitted infections
T3 or T4	thyroxine 3 or 4
TB	tuberculosis
TDF	tenofovir disoproxil fumarate
TEN	toxic epidermal necrolysis
TIG	tetanus immunoglobulin human
TSH	thyroid stimulating hormone
TST	tuberculin skin test
TT	tetanus toxoid
U/S or US	ultrasound sonography
UBTS	Uganda Blood Transfusion Service
UCU	Uganda Cancer Institute
UCMB	Uganda catholic Medical Bureau
UE	urea electrolytes
UHI	Uganda Heart Institute
UHSC	Uganda Health Supply Chain
ULN	upper limit of normal
UNEPI	Uganda National Expanded Program on Immunisation
UNHLS	Uganda National Health Laboratory Services
USAID	United States Agency for International Development
UTI	urinary tract infection
UV	ultraviolet

UVF	ureterovaginal fistula
UVRI	Uganda Virus Research Institute
VCT	voluntary counselling and testing [HIV]
VDRL	Venereal Disease Research Laboratory [test]
VEN	Vital Essential Necessary
VHT	Village Health Team
VIA	visual inspection with acetic acid
VILI	visual inspection with Lugol's iodine
VL	viral load
VSC	voluntary surgical contraception
VTE	venous thromboembolism
VVF	vulvovaginal fistula
VVM	vaccine vial monitor
VZV	varicella zoster virus
WB	whole blood
WBC	white blood cell
WFA	weight for age
WFH/L	weight for height/ length
WHO	World Health Organisation
WOA	weeks of amenorrhea
XDR-TB	extensively drug resistant tuberculosis
ZN	Ziehl- Neelsen [stain]
Zn	zinc

Introduction to Uganda Clinical Guidelines 2016

This fully updated publication replaces the UCG 2012 and is being circulated to all public and private sector prescribers, pharmacists, and regulatory authorities in the country.

Most of those who receive the UCG should also receive a carefully designed orientation to introduce the UCG, its contents, the presentation of information, and how to use it to best effect. The new features and changes should also be highlighted to familiarize users with the structure and content and improve use in the daily practice.

The following sections will present the structure and main features of the manual to highlight the changes in this latest edition and help the user become familiar with the book and use it effectively.

What is the aim of the UCG?

The UCG aims to provide easy-to-use, practical, complete, and useful information on how to correctly diagnose and manage all common conditions you are likely to encounter. This will ensure that patients receive the best possible clinical services and obtain prompt and effective relief from or cure of their complaint, thereby making the most appropriate use of scarce diagnostic and clinical resources, including medicines.

Why is the UCG necessary?

Medicine is an ever-evolving and expanding field in terms of needs and knowledge. The UCG helps the country to prioritize and effectively use limited resources by guiding the procurement system to ensure the availability of the most needed medicines and supplies.

In the context of new knowledge and changing priorities, as a tool, the UCG assists health workers in their daily practice by providing information in an easy-to-follow and practical format.

How do I use the UCG?

First of all, familiarize yourself with it. Check the table of contents and see how the chapters are arranged and organized.

NEW FEATURE
The order of chapters has been re-arranged compared to previous versions: The first two general chapters (EMERGENCIES AND TRAUMA, INFECTIONS) are followed by chapters based on body system or specialty, then the cluster of maternal and child health, and finally, specialty chapters.

Most chapters are organised by disease monographs, arranged either in alphabetical order or another logical order (e.g., according to occurrence of disease progression). However, some chapters are organised according to syndrome or symptoms (e.g. child health, palliative care, oncology, sexually

transmitted infections, emergencies, and trauma), while TB and HIV are presented as individual sub-chapters.

NEW FEATURE
The chapters of EMERGENCIES, RADIOLOGY, PALLIATIVE CARE, and ONCOLOGY have been added, with focus on primary care (prevention and early recognition of symptoms).

Disease monographs are organized in the order of: definition, cause/risk factors, clinical features and complications, differential diagnosis, investigations, management, and prevention.

NEW FEATURE
Management sections have been organised in TABLES to make them easier to find and use. Treatments are presented in logical order from non-pharmacological to pharmacological, from the lower to the higher level of care. Where possible, alternatives and second-line options have been presented, as well as referral criteria.

Medicines are presented by their generic name, in **bold.** Unless otherwise specified, dosages are for adults and via oral route. Children's dosages are added whenever indicated, as well as duration and other instructions.

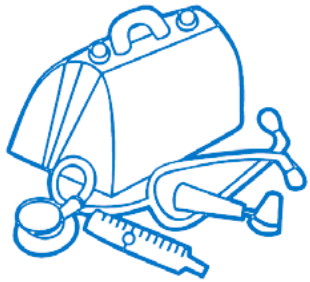
The level of care (LOC) is an important feature; it provides information about the level at which the condition can be appropriately managed. Often, treatment can be initiated at lower level, but the patient needs to be referred for further management, or for second-line treatment, or for complications. HC1-4 refers to health centres of different levels (with HC1 being the community level), H to general hospital, RR to regional referral hospital, and NR to national referral hospital.

After familiarizing, try using it! Practice finding conditions and looking them up to see how they are managed, using either the table of contents at the beginning or the index at the end.

Read all the introductory sections. They will give you useful advice for your daily practice. There is always something new to learn or to be reminded of.

Use it in your daily practice. The UCG is designed as a simple reference manual to keep at your work station, where you can consult it any time. Using it in front of patients and colleagues will show that you care deeply about the quality of your work, and it will provide good examples to other health workers.

The UCG cannot replace health workers' knowledge and skills; like your thermometer and stethoscope, it is a tool to help improve clinical practice by providing a quick and easily available summary of the recommended management of common health conditions.



What is the difference between the UCG and a textbook?

The UCG gives a summary of recommendations for managing priority conditions in Uganda. It does not provide extensive or in-depth information about all diseases and all treatments available in the world.

Conditions have been selected based on their prevalence in the country and their impact on the population's health status. Treatments have been selected based on the following criteria:

Scientific evidence: recommendations are evidence- based, from international literature and local experts. For example, the situation analysis on antimicrobial resistance in Uganda conducted by the National Academy of Sciences has been used to guide the choice of antibiotic treatments.

Cost-effectiveness: treatments have been selected based on their effectiveness, but also their affordability, to get the best "value for money", meaning the maximum benefit with the limited resources available. For example, a liver transplant is a very effective way to treat terminal cirrhosis, but it is definitely not affordable—money is better invested in treating patients with chronic hepatitis B!

What has changed compared to the previous edition?

- There are more chapters and the order has been re-arranged as explained before.
- The management sections have been re-edited to be more user-friendly, using the suggestions collected during a user survey.
- New diseases have been added, following new epidemics and public health priorities (e.g., viral haemorrhagic fevers, yellow fever, nodding disease, sickle cell disease, newborn illnesses).
- More attention has been paid to non-communicable chronic diseases; for example, stroke and chronic obstructive pulmonary disease (COPD) have been added, and sections on diabetes, hypertension, asthma, and mental conditions have been expanded.
- Recommendations have been aligned with the most recent national and international guidelines related to ART, TB, malaria, IMNCI, IMPAC, mhGAP (see the list of references in Appendix 5).
- Medications have been added or deleted and level of care has changed according to recent evidence and national policies.

What about the Essential Medicines and Health Supply List (EMHSLU)?

The EMHSLU is the necessary complement to the UCG, because it lists all the medicines that are necessary to appropriately manage common conditions. In fact, the EMHSLU is revised in parallel with the UCG, from which it is extracted.

To implement the recommendations in the UCG, the medicines listed in the EMHSLU have to be procured and distributed in adequate quantity. This is why the procurement and supply system plays a fundamental role in the provision of quality health care.

The EMHSLU has all the medicines recommended in the UCG, with specification of the level of care (LOC) at which they can start being used, but it also has additional "specialty" medicines, which are items used at referral level (regional or national) or in the context of specialized services. They may not be included in the UCG, which focus more on primary care, but are still part of the list because they need to be procured to ensure the provision of a wider range of services at secondary and tertiary levels.

In the context of limited resources, it is very important to learn to prioritize medicines for procurement: this is reflected by the vital, essential, necessary (VEN) classification in the EMHSLU, introduced in 2012.

Medicines are classified into three categories according to health impact:

V: vital medicines are potentially life-saving, and lack of availability would cause serious harm and side effects. These must ALWAYS be available—for example insulin, metformin, most antibiotics, first-line antimalarials, some anti-epileptics, and parenteral diuretics.

E: essential medicines are important; they are used to treat common illnesses that are maybe less severe but still significant. They are not absolutely needed for the provision of basic health care (e.g., anti-helminthics, pain killers).

N: necessary (or some times called non-essential) medicines are used for minor or self-limiting illnesses, or may have a limited efficacy, or a higher cost compared to the benefit.

Every effort has to be made to ensure health facilities do not suffer stock-outs of VITAL MEDICINES.

Why is a laboratory test menu in the appendix?

Laboratory is an important tool in supporting the diagnosis and management of various conditions. Tests are listed according to the level at which they can be performed, in order to inform to health workers on the available diagnostics at each level for the suspected condition and guide on managemeent or referral decisions.

PRIMARY HEALTH CARE

Definition

Primary health care is ***essential health care*** based on practical, scientifically sound, and socially acceptable methods and technologies. Primary health care should be universally ***accessible*** to individuals and families ***in the community*** through their full ***participation*** and at a cost that the community and country can afford in the spirit of ***self-reliance*** and ***self-determination.***

Primary health care forms an integral part of both the country's health system, of which it is the main focus, and of the community's overall social and economic development.

Primary health care brings health care as close as possible to where people live and work and is the community's ***first level of contact*** with the national health system.

"Primary health care is the ***key to the attainment of the goal of Health for All.***"

—Declaration of Alma-Ata International Conference on Primary Health Care, Alma-Ata, USSR, 6–12 September 1978

How to diagnose and treat in primary care

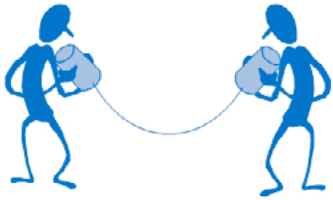
The principles of health care are the same wherever it takes place.

"Listen to the patient; he is telling you the diagnosis"

—Sir William Osler, MD, 1849–1919.

Communication skills in the consultation room

Good communication skills are essential for making a correct diagnosis and for explaining or counselling on the illness, its treatment, and prevention of future illness.



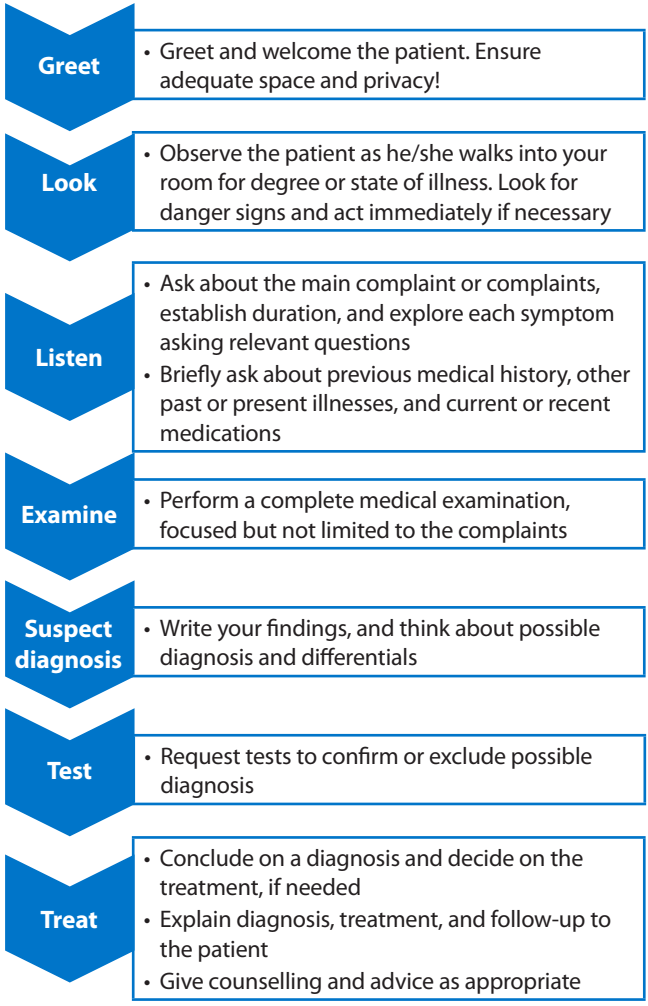
At the beginning of the consultation, use open questions, which allow the patient to express him or herself freely, listen without interrupting, and give him or her the chance to share their interpretations, fears, and worries.

The Golden Minute

The golden 60 seconds at the start of the consultation is eliciting ideas, concerns, and expectations without interrupting.

Move to more specific questions later, to ask for further details and clarifications.

The Seven Steps in a Primary Care Consultation



CHRONIC CARE

Health workers are having to deal more and more with chronic diseases and conditions that require additional attention, such as hypertension, chronic heart problems, diabetes, cancers, mental conditions, HIV/AIDS, and TB.

Communication is even more important to:

- Find out the duration of the symptoms, previous diagnosis, previous or current treatments, and impact on the daily life
- Explain the nature and management of the condition to the patient and counsel on lifestyle and adjustment

Chronic diseases require long-term (sometimes lifelong) follow-up and treatment:

- Counsel and advise the patient on the importance of follow-up and treatment adherence
- Set up a system for scheduling appointments (on the model of HIV care!)
- At each monitoring visit, determine whether the patient's condition is improving, stable, or deteriorating and assess whether patients are taking prescribed treatments properly (the right medicines, in the right doses, at the right time). Try to be consistent in prescribing, and change the regimen only if it is not working or has side effects. If a treatment is working and well tolerated, maintain it!
- Counsel and motivate the patient to follow lifestyle recommendations
- Assess the need for further support (e.g., pain management, counselling, etc.)

A chronic care system requires collaboration among and integration of all levels of health care:

- Higher levels of care may be responsible for initial diagnosis and prescription of treatment and periodic reviews and re-assessment in case of problems or complications

- Lower levels of care (including the community!) may be responsible for routine follow-up, counselling and education, medication refills, and prompt and early referral in case of problems

APPROPRIATE MEDICINE USE

According to WHO, "Rational [appropriate] use of medicines requires that patients receive medications appropriate to their clinical needs, in doses that meet their own individual requirements, for an adequate period of time, and at the lowest cost to them and their community".

Inappropriate medicine use can not only harm the patient, but by wasting resources, may limit the possibility of other people getting health care!

Both health workers and patients have an important role to play in ensuring appropriate use by:

- Prescribing (and taking) medicines ONLY when they are needed
- Avoiding giving unnecessary multiple medications to satisfy patients' demands or for financial gain
- Avoiding expensive alternative or second-line medications when an effective and inexpensive first-line is available
- Avoiding injections when oral treatment is perfectly adequate
- Ensuring that the correct dose and duration of treatment is prescribed
- Providing adequate information and counselling to the patient to ensure adherence with instructions.

ANTIMICROBIAL RESISTANCE (AMR)

According to the WHO definition—

> "Antimicrobial resistance occurs when microorganisms such as bacteria, viruses, fungi and parasites change in ways that render the medications used to cure the infections they cause ineffective. ....Antimicrobial resistance is facilitated by the inappropriate use of medicines, for example, when taking substandard doses or not finishing a prescribed course of treatment. Low-quality medicines, wrong prescriptions and poor infection prevention and control also encourage the development and spread of drug resistance".

The problem of AMR is a serious threat for the modern world:

- The resistance of malaria parasites has caused several changes in antimalarial regimens in the last 15 years
- MDR-TB (multi-drug resistant tuberculosis) is spreading and requires long and complex treatments
- HIV resistance is a serious concern, especially after long-term treatment
- AMR is spreading and in some cases commonly used antimicrobials are not as effective as before

Inappropriate use of antibiotics (in human medicine but also in animal agriculture), poor quality products, and ineffective infection control measures are all contributing factors. We are seriously at risk of finding ourselves in a situation with no affordable antimicrobial available to cure common and dangerous infections.

It is URGENT that both health workers and patients become aware of the problem and start acting by:

- Using antimicrobials only when it is really necessary and according to recommendations (e.g. not for simple viral infections!)

- Avoiding self-prescription of antibiotics
- Avoiding using last generation and broad spectrum antibiotics as first-line treatment
- Prescribing correct dosages for the correct duration and ensuring adherence to the prescription
- Practising strict measures of infection control in health facilities
- Improving hygiene and sanitation in the community, thereby reducing the circulation of germs.

PRESCRIBING GUIDELINES

The new *PGD (Practical Guidelines for Dispensing at Lower/ Higher Level Health Facilities),* published in 2014 and 2015, provide comprehensive information about how to prescribe and dispense the medicines listed in the EMHSLU and UCG 2016.

Carefully consider the following key questions before writing any prescription:

QUESTION	COMMENTS
Does the diagnosed condition require drug treatment?	• Not all patients or conditions need a prescription for medicines (condition is self-limiting): non-medicine treatments or simple advice may be more suitable in certain situations
Is the prescribed treatment likely to have optimum therapeutic effect and to benefit the patient?	Good therapeutics depends on: • Accurate diagnosis of the condition • Knowledge of the relevant available medicines • Selection of the most appropriate medicine and of the most appropriate dose, route, and duration

	• In all cases, carefully consider the expected benefit of a prescribed medication against its potential risks
Is the selected dose-form the most appropriate?	• For systemic medications, ALWAYS USE THE ORAL ROUTE if possible, as it is the cheapest and least hazardous route • Always resist patient demands for you to prescribe injections or other expensive dose forms when they are not clearly indicated or appropriate • LIMIT INJECTIONS to situations where they are absolutely necessary (they carry risks and are more expensive) • Always explain to the patient the reasons to choose a certain route
Can I justify using a combination of medicines? Do I really need to prescribe more than one medicine?	• Do not prescribe a combination of medicines unless they have a proven and significant therapeutic advantage over corresponding single ingredient preparations • Do not practice multiple medicine prescribing (polypharmacy), especially when the diagnosis is uncertain. It is a tremendous waste of resources and puts the patient at increased risk without clear benefit

Have I taken into account all relevant patient criteria?	Consider the following: • Age, gender, weight—especially of children • Likelihood of side effects (including allergies) • Presence of renal or hepatic disease (many medicines may have to be used in reduced doses or avoided completely) • Any other medicines the patient may be taking (risk of unwanted medicine interactions or adverse effects) • Pregnancy and breastfeeding: only use medicines in pregnancy if the expected benefit to the mother is greater than any risk to the foetus/ baby and avoid all medicines if possible during the first trimester (the first three months of pregnancy) • Likely degree of adherence to treatment (simpler, shorter dosage regimes increase the chance of the patient correctly following prescribed therapy)

Prescribing placebos

Avoid placebos whenever possible. Instead, spend some time reassuring and educating the patient. Use home remedies when possible (e.g., honey for cough in adults and children above 1 year).

Prescription writing

A wrong prescription is very risky for you and your patient.

Unclear, incomplete, or inaccurate prescriptions are very dangerous for the patient. To avoid problems, follow the guidance below in writing your prescriptions:

NO	PRESCRIPTION WRITING RULES
1	• Write all prescriptions legibly in ink • Poor writing may lead to errors in interpretation by the dispenser, which may have harmful and possibly life-threatening consequences for the patient
2	• Write the full name, age, gender, and address of the patient, and sign and date the prescription form • All prescriptions should clearly indicate the name and address of the prescriber and of the facility • A PRESCRIPTION IS A LEGAL DOCUMENT
3	• Write the name of the medicine or preparation using its full generic name. • Unofficial abbreviations, trade names, and obsolete names should not be used
4	State the strength of the medicine prescribed where relevant: • Quantities of one gram or more should be written as 1g, 2.5g, 10g, and so on • Quantities <1g but >1mg should be expressed in milligrams rather than grams, for example, 500mg and not 0.5g • Quantities <1mg should be expressed in micrograms and not in mg, for example, 100 micrograms rather than 0.1 mg or 100 mcg

	• If decimal figures are used, always write a zero in front of the decimal point where there is no other figure, for example 0.5 ml and not .5 ml
5	• Always state dose regimen in full: – Dose size – Dose frequency – Duration of treatment • The quantity to be dispensed is calculated from the regimen. • For example, doxycycline 100 mg every 12 hours for 7 days = to be dispensed: 14 tablets of 100 mg. • For in-patients, clearly state the route of administration and specify time of administration, if relevant
6	• Avoid use of instructions like "prn" or "to be used/taken as required". Indicate a suitable dose frequency instead • In the few cases where "as required" is appropriate, always state the actual quantity of the medicine to be supplied, when to take it and maximum amount
7	• Where relevant, always remember to include on the prescription any special instructions necessary for the correct use of a medicine or preparation, for example "before food" or "apply sparingly"

Controlled medicine prescriptions

These medicines are covered by the provisions of the National Drug Policy and Authority Act 1993, which should be consulted for details of the appropriate legal requirements as required.

Medicines covered by the Act and appear in the UCG 2016 or EMHSLU 2016 include:

• Morphine injection

- Morphine oral solution
- Papaveretum + hyoscine injection
- Pethidine injection

These are all medicines of potential abuse that may result in dependence. All procedures involving them should be carefully recorded in the appropriate record books.

They may only be prescribed by authorised prescribers who must observe the following legal requirements:

- Prescriptions must be in the prescriber's own handwriting, with a signature, date, and the prescriber's address
- Prescriptions must state the name and address of the patient
- Prescriptions must state the total amount of the product to be supplied in words and figures
- It is an offence for a prescriber to issue and for a pharmacy to dispense prescriptions for controlled medicines unless they are in full compliance with the requirements of the law.

Notes

- Specialised palliative care nurses and clinical officers are authorised to prescribe oral morphine and other medicines used in palliative care.
- Morphine rarely causes psychological dependence when prescribed for severe pain.
- In certain exceptional circumstances, senior nurses in charge of departments, wards, or theatres and midwives may also obtain and administer certain specified controlled medicines. Consult the relevant sections of the Act for details of the appropriate legal requirements in each case.
- Hospital in-patient prescriptions written on treatment cards or case sheets and signed/dated by the person administering the medicine are considered as compliant under the Act.

Prescribing in children and the elderly

In these guidelines, paediatric medicine doses are usually given according to body weight and not age, and are therefore expressed as mg/kg.

The main reason for this is that children of the same age may vary significantly in weight. Thus, it is safer and more accurate to prescribe medicines according to body weight. Moreover, this should encourage the good practice of weighing children whenever possible.

However, as a guide to prescribing by weight when a weighing scale is not available, the weight-for-age charts at the end of Chapter 17 can be used as an estimate for children from 1-24 months and 2-15 years, respectively. Always use lean/ideal body weight for children who are overweight/obese to avoid giving them overdoses.

Note: Paediatric doses calculated using mg/kg should not exceed the normal adult dose.

In the case of some medicines that have a wide therapeutic range and a good safety profile, dosages are given for age ranges for easy reference.

Prescriptions in the elderly also need additional attention because the elderly are more prone to side effects, they are more likely to take several medications (polypharmacy) with possible interactions, and they often have co-morbidities that can affect their response to medicines. Reduced doses and careful monitoring are always advised, and specific warnings have been added for some medicines.

Medicine interactions

Before prescribing any medicine, take care to avoid problems of interactions with other medicines by obtaining details of any other medication that the patient is taking, whether the medication is:

- Also prescribed at the same time
- Previously prescribed by another prescriber for the same or another condition and currently being taken by the patient
- Purchased or otherwise obtained by the patient for the purposes of self-medication at home

Note on interactions with alcohol. If a prescribed medicine interacts with alcohol (for example, metronidazole, diazepam, anti-diabetic medicines, and tricyclic antidepressants), caution the patient to avoid taking alcoholic drinks during the course of treatment and for 48 hours afterwards.

Patient counselling

This vital part of patient management is sadly often neglected with potentially serious consequences.

Although counselling the patient may take time, if done systematically, it should only take a few minutes and could make the difference between treatment success and failure.

Include the following key components when counselling the patient:

- Explain the diagnosis and the likely cause of the disease or condition and discuss the proposed approach to treatment
- Describe the prescribed medicine therapy in detail including:

  - Medicine name
  - Function of the medicine
  - Dose regimen (size, frequency, duration)
  - Any additional instructions on correct use or storage of the medicine
  - Any likely side effects and what to do if they occur
  - Advise on important medicine interactions (including with alcohol)
- Give advice on how to contribute to the success of the treatment (for example, rest, diet, fluids, other lifestyle changes) and how to avoid the same problem in the future
- Ensure the patient or caretaker fully understands the information and advice provided—ask him or her to repeat key points
- Ensure the patient is satisfied with the proposed treatment and has an opportunity to raise any problems or queries with you

1. Emergencies and Trauma

1.1 COMMON EMERGENCIES

1.1.1 Anaphylactic Shock

ICD10 CODE: T78.2

Severe allergic reaction that occurs rapidly (seconds or minutes) after administration, or exposure, and may be life threatening. It generally affects the whole body.

Causes

- Allergy to pollens, some medicines (e.g. penicillins, vaccines, acetylsalicylic acid), or certain foods (e.g. eggs, fish, cow's milk, nuts, some food additives)
- Reaction to insect bites, e.g. wasps and bees

Clinical features

- Body itching, hives (urticarial rash), swelling of lips, eyes, tongue
- Difficulty in breathing (stridor, wheezing)
- Hypotension and sudden collapse, excessive sweating, thin pulse
- Abdominal cramps, vomiting and diarrhoea

Differential diagnosis

- Other causes of shock, e.g. haemorrhagic (due to bleeding), hypovolemic (severe dehydration), septic
- Asthma, foreign body in airways

Management

TREATMENT	LOC
General measures ▶ Determine and remove the cause ▶ Secure the airways ▶ Restore BP: lay the patient flat and raise feet ▶ Keep patient warm	**HC2**

▶ **Sodium chloride** 0.9% infusion 20 ml/kg by IV infusion over 60 minutes – Start rapidly then adjust rate according to BP ▶ Administer **oxygen**	**HC3** **HC4**
▶ **Adrenaline (epinephrine)** injection 1 in 1000 (1 mg/ml) 0.5 mg (0.5 ml) IM immediately, into anterolateral thigh – Repeat every 5-10 minutes according to BP, pulse rate, and respiratory function until better *Child <6 years:* 150 micrograms (0.15 ml) *Child 6-12 years:* 300 micrograms (0.3 ml) ***In severely affected patients*** ▶ **Hydrocortisone** 200 mg IM or slow IV stat *Child <1 year:* 25 mg *Child 1-5 years:* 50 mg *Child 6-12 years:* 100 mg ***If urticaria/itching*** ▶ Give an **antihistamine** as useful adjunctive treatment e.g. **chlorpheniramine** 4 mg ever 6 hours *Child 1-2 years*: 1mg every 12 hours *Child 2-5 years*: 1 mg every 6 hours *Child 5-12 years*: 2 mg every 6 hours – or **promethazine** 25-50 mg by deep IM or very slow IV (or oral) *Child 1-5 years:* 5 mg by deep IM *Child 5-10 years:* 6.25-12.5 mg by deep IM – Repeat dose every 8 hours for 24-48 hours to prevent relapse ▶ Repeat **adrenaline** and **hydrocortisone** every 2-6 hours prn depending on the patient's progress	**HC2** **HC3** **HC2** **HC4**

Notes

- Adrenaline: IM is the route of choice: absorption is rapid and more reliable than SC
- Monitor the patient for several hours (reaction may recur after several hours)
- If drug reaction, compile adverse drug reaction reporting form (see **appendix 2**)

Prevention

- Always ask about allergies before giving patients new medicine
- Keep emergency drugs at hand at health facilities and in situatiuons where risk of anaphlaxis is high, e.g. visiting bee hives or places that usually harbour snakes
- Counsel allergic patients to wear alert bracelet or tag

1.1.2 Hypovolaemic Shock

ICD10 CODE: R57.1

Condition caused by severe acute loss of intravascular fluids leading to inadequate circulating volume and inadequate perfusion.

Causes

- Loss of blood due to internal or external haemorrhage (e.g. post partum haemorrhage, splenic rupture etc.)
- Acute loss of fluids, e.g. in gastroenteritis, or extensive burns

Clinical features

- High heart rate, fast breathing rate
- Thin or absent pulse, cold extremities, slow capillary refill
- Low blood pressure
- Mental agitation, confusion

Classification of hypovolaemia in adults

INDICATOR	CLASS 1 MILD	CLASS 2 PRO-GRESSING	CLASS 3 SEVERE	CLASS 4 END STAGE
Blood loss (Litres)	<0.75	0.75 – 1.5	1.5 –2	>2
% of total blood volume loss	<15	15- 30	30 – 40	>40
Pulse rate	Normal	>100	>120	>140
Pulse pressure	Normal	↓	↓↓	↓↓/A
Systolic BP	Normal	N	↓	↓↓
Capillary refill	Normal	↑	↑↑	Absent
Respiratory rate	Normal	20 – 30	30 – 40	>45 or gasping
Mental state	Alert	Anxious	Confused	Confused/ unconscious
Urine output (ml/h)	>30	20 - 30	5 – 20	<5

Differential diagnosis

- Other types of shock

Management in adults

TREATMENT	LOC
▶ Control obvious bleeding with pressure ▶ Keep patient laying down with raised legs	**HC3**

If established hypovolaemia class 2 and above ▶ Set 2 large bore IV lines ▶ IV fluids **Normal Saline 0.9%** (or **Ringer's lactate**) 20-30 ml/kg over 60 minutes according to response – If possible, warm the fluid – Start rapidly, monitor BP – Assess response to fluid resuscitation: BP, HR, RR, capillary refill, consciousness and urinary output ▶ If internal or external haemorrhage, consider blood transfusion ***If rapid improvement and stable (blood loss <20% and not progressing)*** ▶ Slow IV fluids to maintenance levels ▶ No immediate transfusion but do cross-matching ▶ Regular reassessment ▶ Detailed examination and definitive treatment according to the cause ***If transient improvement (blood loss 20-40% or ongoing bleeding)*** ▶ Rapid administration of fluids ▶ Initiate blood transfusion (see section **11. 2**) ▶ Regular reassessment ▶ Detailed examination and early surgery ***If no improvement*** ▶ Vigorous fluid administration ▶ **Urgent** blood transfusion ▶ Immediate surgery	**HC4**
Caution △ Do not use glucose solutions or plain water as replacement fluids	

1.1.2.1 Hypovolaemic Shock In Children

Principles of management are similar to the ones in adults BUT:

- Recognising this may be more difficult than in adults
- Vital signs may change little, even when up to 25% of blood volume is lost (class 1 and 2 hypovolaemia)
- Tachycardia is often the first response to hypovolaemia but may also be caused by fear or pain

Classification of hypovolaemia in children

INDICATOR	CLASS 1 MILD	CLASS 2 PROGRES-SING	CLASS 3 SEVERE	CLASS 4 END STAGE
% of total blood volume loss	<15	15-25	25-40	>40
Pulse rate	Normal	>150	>150	>150
Pulse pressure	Normal	N	↓	Absent
Systolic BP	Normal	N	↓	Absent
Capillary refill	Normal	↑	↑↑	Absent
Respiratory rate	Normal	N/↑	↑↑	↑↑ Slow sighing
Mental state	Normal	Irritable	Lethargic	Comatose
Urine output (ml/kg/ hour)	<1	<1	<1	<1

Normal ranges for vital signs in children

AGE (YEARS)	PULSE (RATE/MIN)	SYSTOLIC BP (MMHG)	RESPIRATION (RATE/MIN)	BLOOD VOL (ML/KG)
<1	120–160	70–90	30–40	85–90
1–5	100–120	80–90	25–30	80
6–12	80–100	90–110	20–25	80
>12	60–100	100–120	15–20	70

Management

TREATMENT	LOC
▶ Initial fluid challenge should represent 25% of blood volume as signs of hypovolaemia may only show after this amount is lost ▶ If there are signs of class 2 hypovolaemia or greater, give 20-30 ml/kg of **Normal Saline 0.9%** (or **Ringer's lactate**) over 60 minutes – Start rapidly – Monitor BP – Reduce rate depending on BP response ▶ Depending on response, repeat up to 3 times if necessary i.e. up to max 60 ml/kg	**HC3**
If no response: ▶ Give further **IV fluids** and blood transfusion ▶ Initially transfuse 20 ml/kg of **whole blood** or 10 ml/kg of **packed cells** (only in severe anaemia)	**HC4**

1.1.3 Dehydration

ICD10 CODE: E86.0

A condition brought about by the loss of significant quantities of fluids and salts from the body.

Causes

- Vomiting and/or diarrhoea
- Decreased fluid intake
- Excessive loss of fluids, e.g. due to polyuria in diabetes, excessive sweating as in high fever, burns

Clinical features

- Apathy, sunken eyes/fontanel, loss of skin turgor (especially in children)
- Hypotension, tachycardia, deep (acidotic) breathing, dry mucosae, poor or no urine output

1.1.3.1 Dehydration in Children under 5 years

Assess degree of dehydration following the table below.

Clinical features of dehydration in children

	DEGREE OF DEHYDRATION		
SIGNS	**NONE**	**SOME**	**SEVERE**
General condition	Well, alert	Restless, irritable	Lethargic, drowsy or unconscious
Eyes	Not sunken	Sunken	Sunken
Fontanel	Not sunken	Sunken	Sunken
Ability to drink	Drinks normally	Drinks eagerly, thirsty	Drinks poorly or not able to drink
Skin pinch	Goes back immediately	Goes back slowly; <2 seconds	Goes back very slowly; >2 seconds
Treatment	Plan A	Plan B	Plan C

Management

Plan A (No dehydration and for prevention)

TREATMENT	LOC
▶ Counsel the mother on the 4 rules of home treatment: extra fluids (ORS), continue feeding, zinc supplementation, when to return ▶ Give extra fluids: as much as the child will take – *If child exclusively breastfed*, give **ORS** or safe clean water in addition to breast milk – *If child not exclusively breastfed*, give one or more of: **ORS**, soup, rice-water, yoghurt, clean water – In addition to the usual fluid intake, give **ORS** after each loose stool or episode of vomiting *Child <2 years:* 50-100 ml *Child 2-5 years:* 100-200 ml – Give the mother 2 packets to use at home – Giving ORS is especially important if the child has been treated with Plan B or Plan C during current visit – Give frequent small sips from a cup ▶ Advice the mother to continue or increase breastfeeding ***If child vomits, wait 10 minutes, then give more slowly*** – In a child with high fever or respiratory distress, give plenty of fluids to counter the increased fluid losses in these conditions – Continue giving extra fluid as well as **ORS** until the diarrhoea or other cause of dehydration stops ▶ If diarrhoea, give Zinc supplementation *Child <6 months*: 10 mg once a day for 10 days *Child >6 months*: 20 mg once a day for 10 days	**HC2**

Plan B (Some dehydration)

TREATMENT	LOC
▶ Give ORS in the following approximate amounts during the first 4 hours **AGE (MONTHS)** / **<4** / **4–12** / **13–24** / **25–60** **Weight (kg)** / <6 / 6–9.9 / 10–11.9 / 12–19 **ORS (ml)** / 200–400 / 400–700 / 700–900 / 900–1400 – Only use child's age if weight is not known – You can also calculate the approximate amount of **ORS** to give a child in the first 4 hours as weight (kg) x 75 ml ▶ Show the mother how to give the ORS – Give frequent small sips from a cup – If the child wants more than is shown in the table, give more as required – If the child vomits, wait 10 minutes, then continue more slowly ▶ For infants <6 months who are not breastfed, also give 100-200 ml of clean water during the first 4 hours ▶ Reassess patient frequently (every 30-60 minutes) for classification of dehydration and selection of Treatment Plan ***After 4 hours*** ▶ Reassess the patient ▶ Reclassify the degree of dehydration ▶ Select the appropriate Treatment Plan A, B or C ▶ Begin feeding the child in the clinic	**HC2**

If mother must leave before completing the child's treatment ▶ Show her how to prepare **ORS** at home and how much ORS to give to finish the 4-hour treatment – Give her enough packets to complete this and 2 more to complete Plan A at home ▶ Counsel mother on the 4 rules of home treatment: extra fluids, continue feeding, zinc, when to return	

Plan C (Severe dehydration)

TREATMENT	LOC
If you are unable to give IV fluids and this therapy is not available nearby (within 30 minutes) but a nasogastric tube (NGT) is available or the child can drink ▶ Start rehydration with **ORS** by NGT or by mouth: Give 20 ml/kg/hour for 6 hours (total = 120 ml/kg) ▶ Reassess the child every 1-2 hours – If there is repeated vomiting or increasing abdominal distension, give more slowly – If hydration status is not improving within 3 hours, refer the child urgently for IV therapy ▶ After 6 hours, reassess the child ▶ Classify the degree of dehydration ▶ Select appropriate **Plan A, B,** or **C** to continue treatment	**HC2**

If you are unable to give IV fluids but IV treatment is available nearby (i.e. within 30 minutes) **HC2**

▶ Refer urgently for IV treatment

If the child can drink:

▶ Provide mother with **ORS** and show her how to give frequent sips during the trip to the referral facility

If you are able to give IV fluids **HC3**

▶ Set up an IV line immediately

– If child can drink, give **ORS** while the drip is set up

▶ Give 100 ml/kg of **Ringer's Lactate**

– Or half-strength **Darrow's solution** in glucose 2.5% or **sodium chloride** 0.9%

– Divide the IV fluid as follows:

AGE	FIRST GIVE 30 ML/KG IN:	THEN GIVE 70 ML/KG IN:
Infants <1 years	1 hour*	5 hours*
Child 1-5 years	30 minutes*	2½ hours*

** Repeat once if radial pulse still very weak/ undetectable*

▶ Reassess patient frequently (every 30-60 minutes) to re-classify dehydration and treatment plan

If the patient is not improving

▶ Give the **IV fluids** more rapidly

As soon as patient can drink, usually after 3-4 hours in infants or 1-2 hours in children

▶ Also give **ORS** 5 ml/kg/hour

▶ Continue to reassess patient frequently; classify degree of dehydration; and select appropriate Plan A, B, or C to continue treatment	

Note

- If possible, observe child for at least 6 hours after rehydration to ensure that the mother can correctly use ORS to maintain hydration

1.1.3.2 Dehydration in Older Children and Adults

Assess degree of dehydration following the table below.

CLINICAL FEATURE	DEGREE OF DEHYDRATION		
	MILD	MODERATE	SEVERE
General appearance	Thirsty, alert	Thirsty, alert	Generally conscious, anxious, clammy, cold extremities, cyanosis, wrinkly skin of fingers, muscle cramps, dizzy if standing
Pulse	Normal	Rapid	Rapid, thready, sometimes absent
Respiration	Normal	Deep, may be rapid	Deep and rapid
Systolic BP	Normal	Normal	Low, may be immeasurable

Skin pinch	Returns rapidly	Returns slowly	Returns very slowly (>2 seconds)
Eyes	Normal	Sunken	Very sunken
Tears	Present	Absent	Absent
Mucous membranes	Moist	Dry	Very dry
Urine output	Normal	Reduced, dark urine	Anuria, empty bladder
Note ◆ At least 2 of these signs must be present			

Management

TREATMENT	LOC
Mild dehydration ▶ Give oral **ORS** 25 ml/kg in the first 4 hours – Increase or mantain until clinical improvement	**HC2**
Moderate dehydration ▶ Give oral **ORS** 50 mg/kg in the first 4 hours	
Severe dehydration ▶ **Ringer's lactate** (or **Normal Saline** 0.9%) IV, 50 ml/kg in the first 4 hours – Give IV fluids rapidly until radial pulse can be felt, then adjust rate – Re-evaluate vitals after 4 hours	**HC3**
Volumes that are given over the first 24 hours in adults are shown in the table below	

TIME PERIOD	VOLUME OF IV FLUID
First hour	1 L
Next 3 hours	2 L
Next 20 hours	3 L

- After 4 hours, evaluate rehydration in terms of clinical signs (**NOT** in terms of volumes of fluid given)
- As soon as signs of dehydration have disappeared (but not before), start **fluid maintenance therapy** alternating **ORS** and **water** (to avoid hypernatraemia) as much as the patient wants

Continue for as long as the cause of the original dehydration persists

Notes

- Volumes shown are guidelines only. If necessary, volumes can be increased or initial high rate of administration maintained until clinical improvement occurs
- In addition to **ORS**, other fluids, such as soup, fruit juice, and safe clean water may be given
  - Initially, adults can take up to 750 ml ORS/hour.
- If **sodium lactate compound** IV infusion (**Ringer's Lactate**) is not available, use half-strength **Darrow's solution** in glucose 2.5% or **sodium chloride** infusion 0.9%, However, both of these are less effective
- Continued nutrition is important, and food should be continued during treatment for dehydration

Caution

△ Avoid artificially sweetened juices

Prevention (for all age groups)

- Encourage prompt use of ORS at home if the person is vomiting and/or having diarrhoea

1.1.4 Fluids and Electrolytes Imbalances

ICD10 CODE: E87.8

A condition where losses of bodily fluids from whatever cause has led to significant disturbance in the normal fluid and electrolyte levels needed to maintain physiological functions.

Causes

Disorders may occur in the fluid volume, concentration (sodium composition), and distribution of fluid and other electrolytes and ph.

The main cause is problems in intake, loss and/or distribution and balance between water and electrolytes, as shown in the table below.

MECHANISM	EXAMPLES
Gastrointestinal loss	• Excessive vomiting and diarrhoea • Nasogastric drainage • Fistula drainage
Haemorrhage	• Internal or external
Fluid sequestration	• Paralytic ileus, intestinal obstruction • Peritonitis
Loss through skin/wounds	• Sweating • Extensive burns
Urinary loss	• Decompensated diabetes

Fluid retention and electrolytes or water imbalances	• Renal, hepatic and heart failure (see specific section for management)
Reduced intake	• Post operative patients
Excessive intake	• Water intoxication, IV fluids overload

Clinical features

- Dehydration in mild/moderate fluid (water and electrolytes) deficiency
- Hypovolaemic shock in severe fluid deficiency
- Oedema (including pulmonary oedema) in fluid excess
- Specific effects due to electrolytes imbalances

Management

IV fluids and electrolytes therapy has three main objectives:

- Replace lost body fluids and continuing losses
- Correct eventual imbalances
- Maintain daily fluid requirements

Always use an IV drip in patients who are seriously ill (except patients in congestive heart failure; for these, use only an indwelling needle) and may need IV drugs or surgery.

If the fluid is not needed urgently, run it slowly to keep the IV line open.

Maintenance fluid therapy

TREATMENT	LOC
▶ Administer daily fluid and electrolyte requirements to any patient not able to feed ▶ The basic 24-hour maintenance requirement for an adult is 2.5-3 litres – One third of these daily fluids should be (isotonic) **sodium chloride** 0.9% infusion (or **Ringer's Lactate**), the other two thirds **Glucose** 5% infusion ▶ As well as the daily requirements, replace fluid lost due to the particular condition according to the assessed degree of dehydration	**HC3**
Notes ◆ Closely monitor all IV drips to ensure that the rate is adjusted as required ◆ Check the drip site daily for any signs of infection; change drip site every 2-3 days or when the drip goes into tissues (extravasation)	

Replacement therapy in specific conditions

TREATMENT	LOC
Dehydration ▶ See section **1.1.3**	**HC3**
Diarrhoea and vomiting with severe dehydration, paralytic ileus, intestinal obstruction ▶ Replace fluid losses with isotonic (sodium) solutions containing potassium e.g. compound **sodium lactate infusion** (**Ringer's Lactate solution**) ▶ Or half-strength **Darrow's solution** in **2.5% glucose infusion**	

Haemorrhage ***If there is blood loss and the patient is not in shock*** ▶ Use **sodium chloride** 0.9% infusion for blood volume replacement giving 0.5-1 L in the 1st hour and not more than 2-3 L in 4 hours ***If there is blood loss >1 litre*** ▶ Give 1-2 units of blood to replace volume and concentration	
Shock ▶ Give **Ringer's Lactate** or **sodium chloride** 0.9% infusion 20 ml/kg IV over 60 minutes for initial volume resuscitation – Start rapidly, closely monitor BP – Reduce the rate according to BP response ▶ In patients with severe shock and significant haemorrhage, give a **blood transfusion**	
Notes ◆ Closely monitor all IV drips to ensure that the rate is adjusted as required ◆ Check the drip site daily for any signs of infection; change drip site every 2-3 days or when the drip goes into tissues (extravasation)	

1.1.4.1 IV Fluids in Children

Fluid management in children

TREATMENT	LOC
▶ Total daily maintenance fluid requirement is 100 ml/kg for the first 10 kg plus 50 ml/kg for the next 10 kg plus 25 ml/kg for each subsequent kg ▶ Give more than above if child is dehydrated or in fluid loss or fever (10% more for each 1°C of fever)	**HC4**

▶ Monitor IV fluids very carefully because of risk of overload ▶ Fluids which can be used for maintenance: – Half **normal saline** plus 5% or **10% dextrose** – **Ringer's lactate** with 5% dextrose – **Normal saline** with 5% dextrose – Do not use **Dextrose 5%** alone	

Fluid management in neonates

TREATMENT	LOC
▶ Encourage mother to breastfeed or if child unable, give expressed breast milk via NGT ▶ Withhold oral feeding in case of bowel obstruction, necrotizing enterocolitis, or if feeding is not tolerated (abdominal distension, vomiting everything) ▶ Withhold oral feeding in acute phase of severe sickness, in infants who are lethargic, unconscious or having frequent convulsions **Total amount of fluids (oral and/or IV)** Day 1: 60 ml/kg/day of **Dextrose 10%** Day 2: 90 ml/kg/day of **Dextrose 10%** Day 3: 120 ml/kg/day of half normal saline and dextrose 5% Day 4 onwards: 150 ml/kg/day ▶ If only IV fluids are given, do not exceed 100 ml/kg/day unless child is dehydrated, under a radiant heater or phototherapy ▶ If facial swelling develops, reduce rate of infusion ▶ When oral feeding is well established, raise the total amount to 180 ml/kg/day	**HC4**

Shock in non-malnourished child

TREATMENT	LOC
▶ Use **Ringer's lactate** or **normal saline** ▶ Infuse 20 ml/kg as rapidly as possible	**HC3**
If no improvement ▶ Repeat 10-20 ml/kg of IV fluids ▶ If bleeding, give blood at 20 ml/kg	**HC4**
If still no improvement ▶ Give another 20 ml/kg of IV fluids	
If no improvement further still ▶ Suspect septic shock ▶ Repeat 20 ml/kg IV fluids and consider adrenaline or dopamine	
If improvement noted at any stage (reducing heart rate, increase in blood pressure and pulse volume, capillary refill <2 seconds) ▶ Give 70 ml/kg of **Ringer's lactate** (or **Normal saline** if Ringer's not available) over 5 hours (if infant <12 months) or 2.5 hours (if child >12 months)	

Note

- In children with suspected malaria or anaemia with shock, IV fluids should be administered cautiously and blood should be used in severe anaemia

Shock in malnourished child

TREATMENT	LOC
▶ In malnourished children, give 15 ml/kg over 1 hour, use one of the following: – **Ringer's lactate** with **5% glucose** – **Half strength darrow's solution** with **5% glucose**	**HC3**

– **0.45% Sodium chloride** plus **5% glucose** ▶ Repeat once ***If signs of improvement*** ▶ Switch to oral or NGT **ReSoMal** at 10 ml/kg/hour for up to 10 hours ***If no improvement*** ▶ Give maintenance IV fluids 4 ml/kg/hour ▶ Transfuse 10 ml/kg slowly (over 3 hours) ▶ Start refeeding ▶ Start IV antibiotics	**HC4**

Commonly used IV fluids and indication

NAME	COMPOSITION	INDICATIONS
Sodium Chloride 0.9% (normal saline)	Na 154 mmol/L Cl 154 mmol/L	Shock, dehydration in adults (and children) Maintenance fluid in adults
Dextrose (Glucose) 5%	Glucose 25 g in 500 ml	Maintenance fluid in adults
Dextrose (Glucose) 10%[1] *(to be prepared)*	Glucose 50 g in 500 ml	Hypoglycaemia in children and adults Maintenance fluids in newborns day 1 and 2
Dextrose 50%	Glucose 50 g in 100 ml	Hypoglycaemia in adults
Ringer's lactate (Sodium lactate compound, Harmann's solution)	Na 130 mmol/L K 5.4 mmol/L Ca 1.8 mmol/L	Shock, dehydration in children (and adults) Maintenance fluid in adults

½ strenghth Darrow's solution in 5% glucose	Na 61 mmol/L K 17 mmol/L Glucose 25 g in 500 ml	Shock and dehydration in malnourished children
Half normal saline (Nacl 0.45%) dextrose 5%[2] *(to be prepared)*	Na 77 mmol/L Cl 77 mmol/L Glucose 25 g in 500 ml	Maintenance fluid in children Shock and dehydration in malnourished children
Normal saline or Ringer's lactate with 5% dextrose[3] *(to be prepared)*	Na 154/130 K 0/5.4 Glucose 25 g in 500 ml	Maintenance fluid in children

Note

1 Prepare from Dextrose 5% and 50%:
- Remove 50 ml from Dextrose 5% 500 ml bottle and discard
- Replace with 50 ml of Dextrose 50%. Shake
- Follow normal aseptic techniques
- Use immediately, DO NOT STORE

2 Prepare from Normal saline 500 ml bottle and dextrose 5% and 50%
- Replace 250 ml of Normal saline with 225 ml of Dextrose 5% and 25 ml of Dextrose 50%

3 Prepare by replacing 50 ml of normal saline or Ringer's 500 ml bottle with 50 ml of Dextrose 50%

1.1.5 Febrile Convulsions ICD10 CODE: R56

A generalized tonic-clonic seizure associated with a rapid rise in temperature due to an extracranial illness. It is a diagnosis of exclusion: specific conditions (cerebral malaria, meningitis, epilepsy) should be excluded. It commonly affects children from age 3 months to 6 years.

Causes

- Malaria
- Respiratory tract infections
- Urinary tract infections
- Other febrile conditions

Clinical features

- Elevated temperature (>38°C)
- Convulsions usually brief and self limiting (usually <5 minutes, always <15 minutes) but may recur if temperature remains high
- No neurological abnormality in the period between convulsions
- Generally benign and with good prognosis

Differential diagnosis

- Epilepsy, brain lesions, meningitis, encephalitis
- Trauma (head injury)
- Hypoglycaemia
- If intracranial pathology cannot be clinically excluded (especially in children <2 years) consider lumbar puncture or treat children empirically for meningitis

Investigations

- Blood: Slide/RDT for malaria parasites
- Random blood glucose
- Full blood count
- LP and CSF examination

- Urinalysis, culture and sensitivity
- Chest X-ray

Management

TREATMENT	LOC
▶ Use tepid sponging to help lower temperature ▶ Give an antipyretic: **paracetamol** 15 mg/kg every 6 hours until fever subsides	HC2
If convulsing ▶ Give **diazepam** 500 micrograms/kg rectally (using suppositories/rectal tube or diluted parenteral solution) – Maximum dose is 10 mg – Repeat prn after 10 minutes	
If unconscious ▶ Position the patient on the side (recovery position) and ensure airways, breathing and circulation (ABC)	
If persistent convulsions ▶ see section 9.1.1	HC4

Prevention

- Educate caregivers on how to control fever (tepid sponging and paracetamol)

1.1.6 Hypoglycaemia

ICD10 CODE: E16.2

A clinical condition due to reduced levels of blood sugar (glucose). Symptoms generally occur with a blood glucose <3.0 mmol/L (55 mg/dl).

Causes

- Overdose of insulin or anti-diabetic medicines
- Excessive alcohol intake

- Sepsis, critical illnesses
- Hepatic disease
- Prematurity
- Starvation
- Operations to reduce the size of the stomach (gastrectomy)
- Tumours of the pancreas (insulinomas)
- Certain drugs e.g. quinine
- Hormone deficiencies (cortisol, growth hormone)

Clinical features

- Early symptoms: hunger, dizziness, tremors, sweating, nervousness and confusion
- Profuse sweating, palpitations, weakness
- Convulsions
- Loss of consciousness

Differential diagnosis

- Other causes of loss of consciousness (poisoning, head injury etc.)

Investigations

- Blood sugar (generally <3.0 mmol/L)
- Specific investigations: to exclude other causes of hypoglycaemia

Management

TREATMENT	LOC
If patient is able to swallow	**HC2**
▶ Oral **glucose** or **sugar** 10-20 g in 100-200 ml water (2-4 teaspoons) is usually taken initially and repeated after 15 minutes if necessary	
If patient is unconscious	
▶ *Adults*: **glucose 50%** 20-50 ml IV slowly (3 ml/ minute) or diluted with normal saline, followed by **10 % glucose** solution by drip at 5-10 mg /kg/	**HC3**

minute until patient regains consciousness, then encourage oral snacks *Child*: Dextrose 10% IV 2-5 ml/kg ▶ If patient does not regain consciousness after 30 minutes, consider other causes of coma ▶ Monitor blood sugar for several hours (at least 12 if hypoglycaemia caused by oral antidiabetics) and investigate the cause – manage accordingly	

Note

- After dextrose 50%, flush the IV line to avoid sclerosis of the vein (dextrose is very irritant)
- Preparation of Dextrose 10% from Dextrose 5% and Dextrose 50%:
  - Remove 50 ml from Dextrose 5% bottle and discard
  - Replace with 50 ml of Dextrose 50%. Shake
  - Follow normal aseptic techniques
  - Use immediately, DO NOT STORE

Prevention

- Educate patients at risk of hypoglycaemia on recognition of early symptoms e.g. diabetics, patients who have had a gastrectomy
- Advise patients at risk to have regular meals and to always have glucose or sugar with them for emergency treatment of hypoglycaemia
- Advise diabetic patients to carry an identification tag

1.2 TRAUMA AND INJURIES

1.2.1 Bites and Stings

Wounds caused by teeth, fangs or stings.

Causes

- Animals (e.g. dogs, snakes), humans or insects

Clinical features

- Depend on the cause

General management

TREATMENT	LOC
First aid	**HC2**
▶ Immediately clean the wound thoroughly with plenty of clean water and soap to remove any dirt or foreign bodies	
▶ Stop excessive bleeding by applying pressure where necessary	
▶ Rinse the wound and allow to dry	
▶ Apply an antiseptic: **Chlorhexidine** solution 0.05% or **Povidone iodine** solution 10%	
Supportive therapy	
▶ Treat anaphylactic shock (see section 1.1.1)	**HC3**
▶ Treat swelling if significant as necessary, using ice packs or cold compresses	
▶ Give **analgesics** prn	
▶ Reassure and immobilise the patient	
Antibiotics	
▶ Give only for infected or high-risk wounds including:	
– Moderate to severe wounds with extensive tissue damage	
– Very contaminated wounds	
– Deep puncture wounds (especially by cats)	

– Wounds on hands, feet, genitalia or face – Wounds with underlying structures involved – Wounds in immunocompromised patients ▶ See next sections on wound management, human and animal bites for more details ***Tetanus prophylaxis*** ▶ Give TT immunisation (**tetanus toxoid**, TT 0.5 ml) if not previously immunised within the last 10 years	
Caution △ Do not suture bite wounds	

1.2.1.1 Snakebites

ICD10 CODE: W59.11, T63

Snakebites can cause local effects (swelling, redness, laceration) and in case of poisonous snakes, local and systemic effects caused by envenomation. More than 50% of bites are "dry" i.e. no envenomation occurs, and most bites are from non-venomous snakes.

In the event that poison is injected, the effect depends on the type of venom, quantity, location of the bite and size and general condition of the victim.

Cause

- Common poisonous snakes in Uganda: puff adder, Gabon viper, black and green mambas, boomslang and several cobras

Clinical features

- Puncture wounds, pain, swelling, discoloration

If cytotoxic venom

- Extensive local damage with swelling, pain, regional lymphadenopathy – starting 10-30 minutes after the bite

If neurotoxic venom (e.g. green and black mamba)

- Weakness and paralysis of skeletal and respiratory

muscles (drooping eyelids, difficulty in swallowing, double vision, slurred speech, difficulty in breathing) – starting 15-30 minutes after the bite
- Excessive sweating and salivation

If hemotoxic venom
- Bleeding, oozing from the site, bloody blisters
- Haematuria, haematemesis – even after some days

Investigations
➢ Whole blood clotting test at arrival and every 4-6 hours for the first day: put 2-5 ml of blood in a dry tube and observe after 30 minutes: if incomplete or no clotting, it indicates coagulation abnormalities

Management

TREATMENT	LOC
▶ Wash site with a lot of clean water ▶ Wipe away excess venom ▶ Assess skin for fang penetration ▶ If there is a wound, clean it with a lot of clean water ***If signs of fang penetration*** ▶ Apply firm crepe bandage to entire limb to ensure constant pressure (except if cytotoxic) ▶ Immobilise limb with a splint ▶ Analgesic e.g. **paracetamol** (avoid aspirin) ▶ If no signs and symptoms for 6-8 hours: most likely bite without envenomation ▶ Observation for 12-24 hours recommended ▶ **Tetanus toxoid** (TT) IM 0.5 ml if not previously immunised in the last 10 years ***If local necrosis develops*** ▶ Remove blisters, clean and dress daily, debride after lesions stabilise (minimum 15 days)	**HC2**

Venom in eyes ▶ Irrigate eyes with plenty of water ▶ Cover with eye pads	
Criteria for referral for administration of antivenom • Signs of systemic poisoning (paralysis, respiratory difficulty, bleeding) • Spreading local damage: – Swelling of hand or foot (site of most bites) within 1 hour of bite – Swelling of elbow or knee within 3 hours of bite – Swelling of groin or chest at any time – Significant swelling of head or neck ▶ **Antivenom sera polyvalent (E & C Africa)** – Check package insert for IV dosage details. Ensure the solution is clear and check that patient has no history of allergy ***Antibiotics*** ▶ Indicated only if wound is infected	**H**
Caution △ Do not apply a tourniquet △ Do not squeeze or incise the wound △ Do not attempt to suck the venom out	

1.2.1.2 Insect Bites & Stings

ICD10 CODE: T63.4

Causes

- Bees, wasps, hornets and ants: venom is usually mild and causes only local reaction but may cause anaphylactic shock in previously sensitized persons
- Spiders and scorpions: Most are non-venomous or only mildly venomous
- Other stinging insects

Clinical features

- Swelling, discolouration, burning sensation, pain at the site of the sting
- There may be signs of anaphylactic shock

Differential diagnosis

- Allergic reaction

MANAGEMENT	LOC
▶ If the sting remains implanted in the skin, carefully remove with a needle or knife blade ▶ Apply cold water/ice ***If severe local reaction*** ▶ Give **chlorpheniramine** 4 mg every 6 hours (max: 24 mg daily) until swelling subsides *Child 1-2 years:* 1 mg every 12 hours *Child 2-5 years:* 1 mg every 6 hours (max: 6 mg daily) *Child 6-12 years:* 2 mg every 6 hours (max: 12 mg daily) ▶ Apply **calamine lotion** prn every 6 hours ***If very painful scorpion sting*** ▶ Infiltrate 2 ml of **lignocaine** 2% around the area of the bite ***If signs of systemic envenomation*** ▶ Refer	**HC2**

Prevention

- Clear overgrown vegetation/bushes around the home
- Prevent children from playing in the bush
- Cover exposed skin while moving in the bush
- Use pest control methods to clear insect colonies

1.2.1.3 Animal and Human Bites

ICD10 CODE: W50.3, W54.0

Clinical features

- Teeth marks or scratches, lacerations
- Puncture wounds (especially cats)
- Complications: bleeding, lesions of deep structures, wound infection (by mixed flora, anaerobs), tissue necrosis, transmission of diseases (tetanus, rabies, others)

MANAGEMENT	LOC
First aid	**HC2**
▶ 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%	
▶ Soak punture wounds in antiseptic for 15 minutes	
▶ Thorough cleaning, exploration and debridement (under local anesthesia 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	**HC4**
Tetanus prophylaxis	
▶ Give TT immunisation (**tetanus toxoid**, TT 0.5 ml) if not previously immunised within the last 10 years	

Prophylactic antibiotics ▶ Indicated in the following situations: – Deep puncture wounds (especially Cats) – Human bites – Severe (deep, extensive) wounds – Wounds on face, genitalia, hands – Wounds in immunicompromised hosts ▶ **Amoxicillin** 500 mg every 8 hours for 5-7 days *Child*: 15 mg/kg per dose ▶ Plus **Metronidazole** 400 mg every 12 hours *Child*: 10-12.5 mg/kg per dose	**HC2**
Note ◆ Do not use routine antibiotics for small uncomplicated dog bites/wounds	

1.2.1.4 Rabies Post Exposure Prophylaxis

ICD10 CODE: Z20.3, Z23

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.

For further details refer to *Rabies Post-Exposure Treatment Guidelines*, Veterinary Public Health Unit, Community Health Dept, Ministry of Health, September 2001

General management

Dealing with the animal

TREATMENT	LOC
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 (only dogs, cats or endangered species) or kill humanely and	**HC2**

send the head 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: kill the animal, remove its head, and send to the Veterinary Department for verification of the infection ***If animal cannot be identified*** ▶ Presume animal 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 Rabies IG and vaccine depends on the type of exposure and the animal's condition

TREATMENT	LOC
▶ LOCAL WOUND TREATMENT: Prompt and thorough local treatment is an effective method to reduce risk of infection ▶ For mucous mebranes contact, rinse throroughly with water or normal saline	**HC2**

▶ Local cleansing is indicated even if the patient presents late ▶ 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 in the next table	**H**

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

Administration of Rabies Vaccine (RV)

The following schedules 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

This 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 doses

- 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

Alternative: 2-site intradermal (ID) regimen

This 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

In persons known to have previously received full pre- or post-exposure rabies vaccination within the last 3 years

Intramuscular regimen

- Day 0: One booster dose IM
- Day 3: One booster dose IM

Intradermal regimen

- Day 0: One booster dose ID
- Day 3: One booster dose ID

Note

- If incompletely vaccinated or immunosuppressed: give full post exposure regimen

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 patient previously immunised.

Human rabies immunoglobulin (HRIG)

- **HRIG** 20 IU/kg (do not exceed)
  - Infiltrate as much as possible of this dose around the wound/s (if multiple wounds and insufficient quantity, dilute it 2 to 3 fold with normal saline)
  - Give the remainder IM into gluteal muscle
  - Follow this with a complete course of **rabies vaccine**
  - The first dose of vaccine should be given at the same time as the immunoglobulin, but at a *different site*

Notes

- If RIG not available at first visit, its administration can be delayed up to 7 days after the first dose of vaccine

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

- Day 0: One dose IM or ID
- Day 7: One dose IM or ID
- Day 28: One dose IM or ID

1.2.2 Fractures

ICD10 CODE: S00-T88

A fracture is a complete or incomplete break in a bone.

Causes

- Trauma e.g. road traffic accident, assault, falls, sports
- Bone weakening by disease, e.g., cancer, TB, osteomyelitis, osteoporosis

Clinical features

- Pain, tenderness, swelling, deformity
- Inability to use/move the affected part
- May be open (with a wound) or closed

Differential diagnosis

- Sprain, dislocations
- Infection (bone, joints and muscles)
- Bone cancer

Investigations

➢ X-ray: 2 views (AP and lateral) including the joints above and below

Management

Suspected fractures should be referred to HC4 or Hospital after initial care.

TREATMENT	LOC
If polytrauma ▶ Assess and manage airways ▶ Assess and treat shock (see section 1.1.2) ***Closed fractures*** ▶ Assess nerve and blood supply distal to the injury: if no sensation/pulse, refer as an emergency ▶ Immobilise the affected part with a splint ▶ Apply ice or cold compresses ▶ Elevate any involved limb	HC2

▶ Give an **analgesic** e.g. **paracetamol** 1 g every 6-8 hours to relieve pain *Child*: 10 mg/kg every 6-8 hours ▶ For severe pain, use opioids stat – **Morphine** 5-10 mg IV or **Pethidine** 50-100 mg IM ▶ Refer to hospital for further management	**HC4**
Open fractures ▶ Stop any bleeding by applying pressure ▶ Clean open wound and cover with sterile dressing ▶ Give **Tetanus Toxoid** if not fully vaccinated ▶ Start **antibiotic** – **Amoxicillin** 500 mg every 8 hours *Child:* 25 mg/kg every 8 hours (or 40 mg/kg every 12 hours)	**HC2**
If severe soft tissue damage ▶ Add **gentamicin** 2.5 mg/kg every 8 hours ▶ Refer URGENTLY to hospital for further management	**HC3**

Note

◆ Treat sprains, strains and dislocations as above

Caution

△ Do not give pethidine and morphine for rib fractures and head injuries as they cause respiratory depression

1.2.3 Burns

ICD10 CODE: T20-T25

Tissue injury caused by thermal, chemical, electrical, or radiation energy.

Causes

- Thermal, e.g., hot fluids, flame, steam, hot solids, sun
- Chemical, e.g., acids, alkalis, and other caustic chemicals
- Electrical, e.g., domestic (low voltage) transmission lines (high voltage), lightening
- Radiation, e.g., exposure to excess radiotherapy or radioactive materials

Clinical features

- Pain, swelling
- Skin changes (hyperaemia, blisters, singed hairs)
- Skin loss (eschar formation, charring)
- Reduced ability to use the affected part
- **Systemic effects** in severe/extensive burns include shock, low urine output, generalised swelling, respiratory insufficiency, deteriorated mental state
- Breathing difficulty, hoarse voice and cough in smoke inhalation injury – medical emergency

Criteria for classification of the severity of burns

The following criteria are used to classify burns:

CRITERIA	LEVEL
Depth of the burn (a factor of temperature, of agent, and of duration of contact with the skin)	***1st Degree burns*** Superficial epidermal injury with no blisters. Main sign is redness of the skin, tenderness, or hyper sensitivity with intact two-point discrimination. Healing in 7 days

	2nd Degree burns or Partial thickness burns It is a dermal injury that is sub-classified as superficial and deep 2nd degree burns. In superficial 2nd degree burns, blisters result, the pink moist wound is painful. A thin eschar is formed. Heals in 10-14 days. In deep 2nd degree burns, blisters are lacking, the wound is pale, moderately painful, a thick escar is formed. Heals in >1 month, requiring surgical debridement ***3rd Degree burns*** Full thickness skin destruction, leather-like rigid eschar. Painless on palpation or pinprick. Requires skin graft ***4th Degree burns*** Full thickness skin and fascia, muscles, or bone destruction. Lifeless body part
Percentage of total body surface area (TBSA)	Small areas are estimated using the open palm of the patient to represent 1% TBSA. Large areas estimated using the "rules of nines" or a Lund-Browder chart. Count all areas except the ones with erythema only
The body parts injured	Face, neck, hands, feet, perineum and major joints burns are considered severe
Age/general condition	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

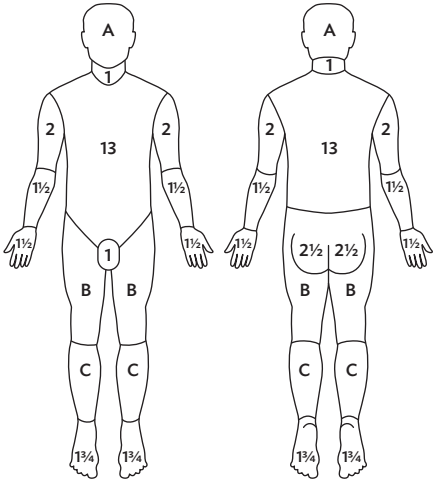
Categorisation of severity of burns

Using the above criteria, a burn patient may be categorised as follows:

SEVERITY	CRITERIA
Minor/mild burn	– Adult with <15% TBSA affected or – Child/elderly with <10% TBSA affected or – Full thickness burn with <2% TBSA affected and no serious threat to function
Moderate (intermediate) burn	– Adult with partial thickness burn 15-25% TBSA or – Child/elderly with partial thickness burn 10-20% TBSA – All above with no serious threat to function and no cosmetic impairment of eyes, ears, hands, feet or perineum
Major (severe) burn	***Adult with*** – Partial thickness burn >25% TBSA or – Full thickness burn >10% TBSA ***Child/elderly with*** – Partial thickness burn >20% TBSA or full thickness burn of >5% TBSA affected ***Irrespective of age*** – Any burns of the face and eyes, neck, ears, hand, feet, perineum and major joints with cosmetic or functional impairment risks, circumferential burns – Chemical, high voltage, inhalation burns – Any burn with associated major trauma

Chart for Estimating Percentage of Total Body Surface Area (TBSA) Burnt

LUND AND BROWDER CHARTS



Ignore simple erythema

Superficial

Deep

Region	%
Head	
Neck	
Ant. Trunk	
Post. Trunk	
Right Arm	
Left Arm	
Buttocks	
Genitalia	
Right Leg	
Left Leg	
Total Burn	

Relative percentage of body surface area affected by growth

Area	Age 0	1	5	10	15	Adult
A = ½ of head	9½	8½	6½	5½	4½	3½
B = ½ of one thigh	2¾	3¼	4	4½	4½	4¾
C = ½ of one lower leg	2½	2½	2¾	3	3¼	3½

Management

TREATMENT	LOC
Mild/moderate burns – First aid	
▶ Stop the burning process and move the patient to safety ▶ Roll on the ground if clothing is on fire ▶ Switch off electricity ▶ Cool the burn by pouring or showering or soaking the affected area with cold water for 30 minutes, especially in the first hour after the burn (this may reduce the depth of injury if started immediately), ▶ Remove soaked clothes, wash off chemicals, remove any constrictive clothing/rings ▶ Clean the wound with clean water ▶ Cover the wound with a clean dry cloth and keep the patient warm	**HC1**
At health facility	
▶ Give oral or IV **analgesics** as required ▶ If TBSA <10% and patient able to drink, give oral fluids otherwise consider IV ▶ Give TT if not fully immunised ▶ Leave small blisters alone, drain large blisters and dress if closed dressing method is being used	**HC2**
▶ Dress with **silver sulphadiazine cream 1**%, add saline moistened gauze or paraffin gauze and dry gauze on top to prevent seepage ▶ Small superficial 2nd degree burns can be dressed directly with paraffin gauze dressing ▶ Change after 1-3 days then prn ▶ Patient may be exposed in a bed cradle if there are extensive burns ▶ Saline bath should be done before wound dressing	**HC3**

▶ If wound infected dress more frequenly with **silver sulphadiazine** cream until infection is controlled	
Severe burns	
▶ First aid and wound management as above PLUS	**HC3**
▶ Give **IV fluid** replacement in a total volume per 24 hours according to the calculation in the box below (use **crystalloids**, i.e., **Ringer's lactate**, or **normal saline**)	
▶ If patient in shock, run the IV fluids fast until BP improves (see section **1.1.2**)	
▶ Manage pain as necessary	
▶ Refer for admission	**HC4**
▶ Monitor vital signs and urine output	
▶ Use antibiotics if there are systemic signs of infection: **benzylpenicillin** 3 MU every 6 hours +/- **gentamicin 5-7 mg/kg** IV or IM once a day	
▶ Blood transfusion may be necessary	
▶ If signs/symptoms of inhalation injury, give oxygen and refer for advanced life support (refer to regional level)	
Surgery	
▶ Escharotomy and fasciotomy for circumferential finger, hand, limb or torso burns	**H**
▶ Escharectomy to excise dead skin	
▶ Skin grafting to cover clean deep burn wounds	
Eye injury	**HC2**
▶ Irrigate with abundant sterile saline	
▶ Place eye pad over eye ointment and refer	
Additional care	
▶ Nutritional support	
▶ Physiotherapy of affected limb	

▶ Counselling and psychosocial support ▶ Health education on prevention (e.g. epilepsy control)	
Caution ▶ Silver sulphadiazine contraindicated in pregnancy, breastfeeding and premature babies	

Fluid replacement in burns

- The objective is to maintain normal physiology as shown by urine output, vital signs and mental status
- Fluid is lost from the circulation into the tissues surrounding the burns and some is lost through the wounds, especially in 18-30 hours after the burns
- Low intravascular volume results in tissue circulatory insufficiency (shock) with results such as kidney failure and deepening of the burns
- The fluid requirements are often very high and so should be given as necessary to ensure adequate urine output

TREATMENT	LOC
▶ Give oral fluids (**ORS** or others) and/or **IV fluids** e.g. **normal saline** or **Ringer's Lactate** depending on the degree of loss of intravascular fluid ▶ The total volume of IV solution required in the first 24 hours of the burns is: **4 ml x weight (kg) x % TBSA burned plus the normal daily fluid requirement** ▶ Give 50% of fluid replacement in the first 8 hours and 50% in the next 16 hours. The fluid input is balanced against the urine output. The normal urine output is: Children (<30 kg) 1-2 ml/kg/hour and adults 0.5 ml/kg/hour (30-50 ml /hour)	**HC2** **HC3**

Prevention

- Public awareness of burn risks and first aid water use in cooling burnt skin
- Construction of raised cooking fire places as safety measure
- Ensure safe handling of hot water and food, keep well out of the reach of children
- Particular care of high risk persons near fires e.g. children, epileptic patients, alcohol or drug abusers
- Encourage people to use closed flames e.g. hurricane lamps. Avoid candles.
- Be ware of possible cases of child abuse

1.2.4 Wounds

ICD10 CODE: S00-T88

Any break in the continuity of the skin or mucosa or disruption in the integrity of tissue due to injury.

Causes

- Sharp objects, e.g. knife, causing cuts, punctures
- Blunt objects causing bruises, abrasions, lacerations
- Infections, e.g. abscess
- Bites, e.g. insect, animal, human
- Missile and blast injury, e.g. gunshot, mines, exlosives, landmines
- Crush injury, e.g. RTA, building collapse

Clinical features

- Raw area of broken skin or mucous membrane
- Pain, swelling, bleeding, discharge
- Reduced use of affected part
- Cuts: sharp edges
- Lacerations: Irregular edges
- Abrasions: loss of surface skin
- Bruises: subcutaneous bleeding e.g. black eye

Management

TREATMENT	LOC
Minor cuts and bruises ▶ First aid, tetanus prophylaxis, dressing and pain management ▶ Antibiotics are not usually required but if the wound is grossly contaminated, give – **Cloxacillin** or **amoxicillin** 500 mg every 6 hours as empiric treatment *Child:* 125-250 mg every 6 hours	**HC2**
Deep and/or extensive ▶ Identify the cause of the wound or injury if possible ▶ Wash affected part and wound with plenty of water or saline solution – (you can also clean with **chlorhexidine** 0.05% or **hydrogen peroxide** 6% diluted with equal amount of saline to 3% if wound is contaminated) ▶ Explore the wound under local anesthesia to ascertain the extent of the damage and remove foreign bodies ▶ Surgical toilet: carry out debridement to freshen the wound ▶ Tetanus prophylaxis, pain management, immobilization	**HC4**
If wound is clean and fresh (<8 hours) ▶ Carry out primary closure by suturing under local anaesthetic – Use **lignocaine hydrochloride** 2% (dilute to 1% with equal volume of water for injection)	**HC3**

If wound is >8 hours old or dirty

- ▶ Clean thoroughly and dress daily
- ▶ Check the state of the wound for 2-3 days
- ▶ Carry out delayed primary closure if clean
  - – Use this for wounds up to 2-4 days old

If wound >4 days old or deep pucture wound, contaminated wounds, bite/gunshot wounds, abscess cavity

- ▶ Let it heal by secondary closure (granulation tissue)
- ▶ Dress daily if contaminated/dirty, every other day if clean
- ▶ Pack cavities (e.g. abscesses) with saline-soaked gauzes

In case of extensive/deep wound

- ▶ Consider closure with skin graft/flap

Note

- ◆ Use antibiotic prophylaxis in very contaminated wounds
- ◆ Use antibiotic treatment in infected wounds (wounds with local signs of infections e.g. cellulitis, lymphagitic streaking, purulence, malodor), – with or without systemic signs (fever, chills etc.)

1.2.5 Head Injuries

ICD10 CODE: S00-S09

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)

Causes

- Road traffic accident
- Assault, fall or a blow to the head

Clinical features

- May be closed (without a cut) or open (with a cut)
- 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

Severe head injury

- Altered level of consciousness, agitation, coma (see GCS below)
- Seizures, focal neurological deficits, pupil abnormalities

Minor head injury (concussion)

- Transient and short lived loss of mental function, e.g., loss of consciousness (<5 minutes), transient amnesia, headache, disorientation, dizziness, drowsiness, vomiting – symptoms should improve by 4 hours after the trauma

Severity classification of head injuries

Head injuries are classified based on Glasgow Coma Scale (GCS) score as:

- Severe (GCS 3-8)
- Moderate (GCS 9-13)
- Mild (GCS > 13)

Glasgow Coma Scale (GCS)

EYE OPENING	VERBAL RESPONSE	MOTOR RESPONSE
1 = No response	1 = No response	1 = No response
2 = Open in response to pain	2 = Incomprehensible sounds (grunting in children)	2= Extension to painful stimuli (decerebrate)
3 = Open in response to voice	3 = Inappropriate words (cries and screams/cries inappropriately in children)	3 = Abnormal flexion to painful stimuli (decorticate)
4 = Open spontaneously	4 = Disoriented able to converse (use words inappropriately / cries in children)	4 = Flexion/ withdrawal from painful stimuli
NA	5 = Oriented able to converse (use words appropriately/ cries appropriately in children)	5 = Localize pain
NA		6 = Obeys command (NA in children <1 yr)

For infants and children use AVPU

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	HIGH 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	• 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

Differential diagnosis

- Alcoholic coma - may occur together with a head injury
- Hypoglycaemia
- Meningitis
- Poisoning
- Other cause 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

TREATMENT	LOC
▶ 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)	**HC3**

Management of mild traumatic head injury

TREATMENT	LOC
▶ 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 **paracetamol** ▶ 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.)	**HC3**

Note

- Headaches and dizziness following mild traumatic brain injury may persist for weeks/months

Management of moderate traumatic head injury

TREATMENT	LOC
▶ Refer to hospital for appropriate management ▶ Careful positioning (head 300 up) ▶ Use fluids with caution ▶ Keep oxygen saturation >90% and systolic BP >90 mmHg ▶ Monitor GCS, pupils and neurological signs	**H**

▶ Early CT if available, otherwise observe and refer immediately if not improving in the following hours	**NR**

Management of severe traumatic head injury

TREATMENT	LOC
▶ Refer immediately for specialist management ▶ Supportive care as per moderate head injury ▶ If open head injury, give first dose of antibiotic prereferral – **Ceftriaxone** 2 g IV *Child*: 100 mg/kg	**NR**

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)

1.2.6 Sexual Assault/Rape

ICD10 CODE Z04.4

Rape is typically defined as oral, anal or vaginal penetration that involves threats or force against an unwilling person.

Such penetration, whether wanted or not, is considered statutory rape if victims are younger than the age of consent (18 years).

Sexual assault or any other sexual contact that results from coercion is rape, including seduction of a child through offers of affection or bribes; it also includes being touched, grabbed, kissed or shown genitals.

Clinical features

Rape may result in the following:

- Extragenital injury
- Genital injury (usually minor, but some vaginal lacerations can be severe)
- Psychologic symptoms: often the most prominent
  - *Short term:* fear, nightmares, sleep problems, anger, embarrassment
  - *Long term:* Post traumatic Stress Disorder, an anxiety disorder; symptoms include re-experiencing (e.g., flashbacks, intrusive upsetting thoughts or images), avoidance (e.g., of trauma-related situations, thoughts, and feelings) and hyperarousal (e.g., sleep difficulties, irritability, concentration problems).
  - Symptoms last for >1 month and significantly impair social and occupational functioning.
  - Shame, guilt or a combination of both
- Sexually transmitted infections (STIs, e.g., hepatitis, syphilis, gonorrhea, chlamydial infection, trichomoniasis, HIV infection)
- Pregnancy (may occur)

Investigations

- Pregnancy test
- HIV, hepatitis B and RPR tests

Management

Whenever possible, assessment of a rape case should be done by a specially trained provider. Victims are traumatized so should be approached with empathy and respect. Explain and ask consent for every step undertaken.

The goals are:

- Medical assessment and treatment of injuries
- Assessment, treatment and prevention of pregnancy and STIs

- Collection of forensic evidence
- Psychologic evaluation and support

TREATMENT	LOC
▶ Advise not to throw out or change clothing, wash, shower, douche, brush their teeth or use mouthwash; doing so may destroy evidence	HC2
▶ **Initial assessment (history and examination) – use standard forms if available** – Type of injuries sustained (particularly to the mouth, breasts, vagina and rectum) – Any bleeding from or abrasions on the patient or assailant (to help assess the risk of transmission of HIV and hepatitis) – Description of the attack (e.g., the orifices which were penetrated, whether ejaculation occurred, or whether a condom was used) – Assailant's use of aggression, threats, weapons and violent behavior – Description of the assailant – Use of contraceptives (to assess risk of pregnancy), previous coitus (to assess validity of sperm testing) – Clearly describe size, extent, nature of any injury. If possible take photos of the lesions (with patient's consent)	HC4
▶ **Test for HIV, RPR, hepatitis B and pregnancy, to assess baseline status of the patient** – If possible test for flunitrazepam and gamma hydroxybutyrate ("rape drugs")	HC4

▶ **Collect forensic evidence (with standard kits if available)** – Condition of clothing (e.g., damaged, stained, adhering foreign material) – Small samples of clothing including an unstained sample, given to the police or laboratory – Hair samples, including loose hairs adhering to the patient or clothing, semen-encrusted pubic hair, and clipped scalp and pubic hairs of the patient (at least 10 of each for comparison) – Semen taken from the cervix, vagina, rectum, mouth and thighs – Blood taken from the patient – Dried samples of the assailant's blood taken from the patient's body and clothing – Urine, saliva – Smears of buccal mucosa – Fingernail clippings and scrapings – Other specimen as indicated by the history or physical examination	**HC4**
▶ **Prophylaxis for STD including:** – **Ceftriaxone** 125 mg IM or **cefixime** 400 mg orally stat – **Azithromycin** 1 g stat or **doxycycline** 100 mg twice a day for 1 week – **Metronidazole** 2 g stat – HIV Post Exposure Prophylaxis if within 72 hours: *Adults :* **TDF+3TC+ATV/r** for 28 days *Children:* **ABC+3TC+LPV/r** ▶ **Hepatitis B vaccine** if not already immunised ▶ Emergency contraception if within 72 hours (but may be useful up to 5 days after)	**HC4**

– **Levonorgestrel** 1.5 mg (double the dose if patient is HIV positive on ARVs)	
▶ **Counselling:** use common sense measures (e.g., reassurance, general support, non-judgmental attitude) to relieve strong emotions of guilt or anxiety ▶ Provide links and referral to: – Long term psycho-social support – Legal counseling – Police- investigations, restraining orders – Child protection services – Economic empowerment, emergency shelters – Long-term case management	

Notes

- Because the full psychologic effects cannot always be ascertained at the first examination, follow-up visits should be scheduled at 2 week intervals
- Reporting: Health facilities should use HMIS 105 to report Gender-Based Violence (GBV)

Harm classification for police reporting

- Harm: any body hurt, disease or disorders, whether permanent or temporary
- Grievous harm: any harm which amounts to a main or dangerous harm, or seriously or permanently injures health, or causes permanent disfigurement or any permanent injeury to any internal or external organ, membrane or sense
- Dangerous harm: means harm endangering life
- ”Main” means the destruction or permanent disabling of any external membrane or sense

1.3 POISONING

1.3.1 General Management of Poisoning

ICD10 CODE: T36-T50

Bodily entry of toxic substances in amounts that cause dysfunction of body systems.

Causes

- Microorganisms (food poisoning)
- Fluids and gases (organic), e.g., agricultural chemicals, petrol, paraffin, carbon monoxide
- Metal poisoning (inorganic), e.g., lead, mercury, copper
- Alcohol, drugs of abuse, medicines (in excessive amounts)

Acute poisoning can occur by ingestion, inhalation, injection or cutaneous/mucosal absorption.

Exposure can be intentional (e.g., suicide or homicide attempt), unintentional (e.g., medication error) or environmental/ occupational.

Principles of general management

- If possible, refer patients showing signs of poisoning to hospital for admission. Send a note of what is known about the poison and what treatment has been given
- Also refer/admit patients who have taken slow-acting poisons even if they appear well. These include: acetylsalicylic acid, iron, paracetamol, tricyclic antidepressants (e.g., amitriptyline, imipramine), paraquat, modified-release products
- Optimal management of the poisoned patient depends upon the specific poison(s) involved, the presenting and predicted severity of illness and time that has elapsed between exposure and presentation
- Treatment includes supportive care, decontamination, antidotal therapy and enhanced elimination techniques

- It may not always be possible to identify the poison and the amount taken. Anyway,
  - Only a few poisons have specific antidotes
  - Few patients need active removal of the poison
  - Most patients must be treated symptomatically

However, knowledge of the poison will help you anticipate the likely effects on the patient.

1.3.1.1 Supportive Treatment in Poisoning

TREATMENT	LOC
▶ Ensure safety of the patient and minimize/stop exposure e.g. wash off/clean skin with water and soap ▶ Monitor and stabilize all vitals (blood pressure, heart rate, respiratory rate, oxygen saturation AND temperature)	**HC2**
Airway and breathing (often impaired in unconscious patient) ▶ Ensure the airway is cleared and maintained – Insert an airway cannula if necessary ▶ Position patient semiprone to minimise risk of inhalation of vomit ▶ Assist ventilation if necessary ▶ Administer **oxygen** if necessary	**HC2** **HC4**
Blood pressure – Hypotension is common in severe poisoning with CNS depressants. A systolic BP <70 mmHg may cause irreversible brain or renal damage ▶ Carry the patient's head down on the stretcher and nurse in this position in the ambulance	**HC2**

▶ Set up an **IV normal saline** line – Fluid depletion without hypotension is common after prolonged coma and after aspirin poisoning due to vomiting, sweating and hyperpnoea ▶ Hypertension is less common but may be associated with sympathomimetic poisoning e.g. amphetamines, cocaine, pseudoephedrine	**HC3**
Heart – Cardiac conduction defects and arrhythmias may occur in acute poisoning especially with tricyclic antidepressants, but the defects usually respond to correction of any hypoxia or acidosis	**HC4**
Body temperature – Hypothermia may develop in patients with prolonged unconciousness especially after overdose of barbiturates or phenothiazines e.g., chlorpromazine, trifluoperazine – Hypothermia may be missed unless temperature is monitored – Treat by covering the patient with a blanket ▶ Hyperthermia may occur with anticholinergics and sympathomimetics – Treat by tepid sponging and antipyretics if appropriate	**HC2**
Convulsions ▶ **Diazepam** 10 mg rectally repeated if necessary *Child:* 0.5 mg/kg per dose (1.5-2.5 mg if <1 month, 5 mg if 1 month-2 years, 5-10 mg if 2-12 years) Or **diazepam** 5- 10 mg slow IV repeated if necessary max 30 mg *Child:* 200 micrograms (0.2 mg)/kg max 10 mg	**HC2** **HC3**

Other considerations	HC4
▶ Counsel patient and families concerning poisoning ▶ A psychiatric evaluation is necessary if poisoning was intentional ▶ If environmental or ccupational exposure, follow up to assess if other people have been affected and take appropriate measures	

1.3.1.2 Removal and Elimination of Ingested Poison

Removal and elimination of poison (decontamination) has to be implemented AFTER stabilization of vital signs.

Removal from the stomach

- Balance the dangers of attempting to empty the stomach against the likely toxicity of any swallowed poison as determined by the type of poison and amount swallowed against the risk of inhalation
- Do not induce vomiting
- Gastric lavage
  - Only useful if done within 2 hours of poisoning (except with salicylates or anticholinergics when it may be of use within 4 to 6 hours)
  - Seldom practicable or necessary before the patient reaches hospital
  - Contraindications: drowsy or comatose patients and if poisoning with corrosive or petroleum products

Prevention of absorption and active elimination

- Oral **activated charcoal** can bind many poisons in the stomach and reduce their absorption
- It is more effective the sooner it is given but may still work up to 2 hours after poisoning (longer with modified-release products and anticholinergics)
- Contraindications

- Depressed mental status
- Late presentation
- Ingestion of corrosives and petroleum products
- Toxins poorly absorbed by charcoal (e.g. metals like iron, lithium, alcohol)
- Intestinal obstruction

• It is generally safe and especially useful for poisons toxic in small amounts, e.g. antidepressants

TREATMENT	LOC
Prevention of absorption ▶ Dose: **activated charcoal powder** 50 g *Child*: 0.5-1 g/kg – Grind tablets into a fine powder before mixing with 100-200 ml of water (50 g = 200 tablets of 250 mg) – If patient unable to swallow the charcoal/water mixture (slurry), give by gastric lavage tube ***Active elimination*** ▶ Repeated doses of **activated charcoal** may be beneficial in some cases, e.g., acetylsalicylic acid, carbamazepine, phenobarbital, phenytoin, quinine, theophylline – Give **activated charcoal** 50 g repeated every 4 hours ▶ Treat any vomiting as this may reduce the effectiveness of the charcoal ***In case of intolerance*** ▶ Reduce dose and increase frequency, e.g., 25 g every 2 hours, or 12.5 g every hour	**HC2**

1.3.2 Acute Organophosphate Poisoning

ICD10 CODE: T60.0

Organophosphates are ingredients of some pesticides and insecticides intended for agricultural and household use.

Poisoning occurs by ingestion, inhalation or absorption through the skin.

Causes

- May be accidental, e.g., contamination of food
- Intended poisoning, i.e., suicidal or homicidal
- Occupational hazard, e.g., agricultural workers

Clinical features

- 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, abundant respiratory secretions
- Headache, hypotension, urine incontinence
- Coma

Differential diagnosis

- Other causes of poisoning
- Other causes of convulsions

Management

TREATMENT	LOC
▶ Remove contaminated clothing (use gloves) ▶ Wash contaminated skin with lots of water ▶ Establish and maintain the airway	HC4

▶ **Atropine** 2-4 mg IM or IV (according to the severity of the poisoning) *Child:* 0.05 mg/kg per dose – Double dose every 3-5 minutes until signs of atropinisation occur (stopping of bronchial secretions and broncoconstrictions) – Continuous infusion of **atropine** 0.05 mg/kg/hour may be necessary – Reduce dose of atropine slowly over 24 hours but monitor for patient's status ▶ Assisted respiration with air or **oxygen** may be required during the first 24 hours after poisoning ▶ Give **IV fluids**, e.g., **normal saline** prn for dehydration, hypovolaemia, and shock ▶ Prevent and treat convulsions with **diazepam** 10 mg IV *Child*: 0.2 mg/kg IV or 0.5 mg/kg rectal ▶ **Salbutamol** 5 mg (2.5 mg for children <5 years) nebulisation if bronchospasm: ▶ Perform gastric lavage if the poison was ingested (up to 6 hours after ingestion) but consider risk of aspiration ▶ Give standard dose of **activated charcoal** if patient presents within 2 (up to 4) hours ▶ Monitor patient for a few days (worsening can occur a few days after ingestion)	
In moderate to severe poisoning (only if not responding to adequate doses of atropine) ▶ Add **pralidoxime mesylate** 30 mg/kg IV over 30 minutes *Child*: 25-50 mg/kg IV – Continue with infusion 8 mg/kg/hour *Child*: 10-20 mg/kg/hour	**RR**

Note

- **Pralidoxime**: Only effective if given within 24 hours of poisoning

Prevention

- Label agricultural and domestic pesticides properly – do not use unlabelled bottles for pesticides
- Store such products away from children
- Wear protective clothing when using the products

1.3.3 Paraffin and Other Petroleum Products Poisoning

ICD10 CODE: T53.7

Includes paraffin, petrol, paint thinners, organic solvents, and turpentine.

Clinical features

- Patient may smell of paraffin/other petroleum product
- Burning sensation in mouth and throat
- Patient looks pale (transient cyanosis)
- Vomiting, diarrhoea, bloody stools
- Cough, dyspnoea, wheezing, tachypnoea, nasal flaring (due to chemical pneumonitis)
- Lethargy, convulsions, difficulty in breathing

The main risk is damage to lung tissue due to aspiration. AVOID gastric lavage or use of emetics as this may lead to inhalation of gastric content and pneumonitis

Differential diagnosis

- Other causes of poisoning
- Acute infections

Management

TREATMENT	LOC
Treatment is supportive and symptomatic ▶ Remove clothes and wash skin if contaminated ▶ Avoid gastric lavage or use of an emetic ▶ Charcoal is NOT useful ▶ Give **oxygen** if patient has hypoxia	**HC4**

Prevention

- Store paraffin and other petroleum products safely (e.g. in a locked cupboard, out of reach of children)
- Do not store paraffin and other petroleum products in common beverage bottles

1.3.4 Acetylsalicylic Acid (Aspirin) Poisoning

ICD10 CODE: T39.0

Overdose of ASA, due to consumption of >10 g of ASA in adults and 3 g in children.

Clinical features

- Mild to moderate toxicity (after 1-2 hours): hyperventilation, tinnitus, deafness, nausea, vomiting, dizziness, vasodilation
- Severe toxicity: hyperpyrexia, convulsions, altered mental status, non cardiac pulmonary oedema, coma
- Complex acid-base disturbances (acidosis)

Management

TREATMENT	LOC
Stabilise vital signs ▶ **Oxygen** and **IV fluids** as necessary ▶ Gastric lavage: worthwhile up to 4 hours after poisoning as stomach emptying is delayed	**H**

▶ **Activated charcoal** 50 g repeated as needed every 4 hours or 25 g repeated prn every 2 hours – It delays absorption of any remaining salicylate ▶ Treat/prevent hypoglycaemia with **Dextrose 50%** 50-100 ml (**Dextrose 10%** 2-5 ml/kg in children) ▶ Tepid sponging for hyperpyrexia ▶ Treat convulsions with IV **diazepam** 10 mg prn ***Refer to higher level of care if coma, pulmonary oedema, renal insufficiency, clinical deterioration in spite of above measures*** ▶ Treat acidosis and enhance renal excretion in symptomatic patients with **Sodium bicarbonate** – Bolus 1-2 mEq/kg (max 100 mEq) in 3-5 minutes – Followed by an infusion of 50-75 mEq in 500 ml of **Dextrose 5 %**; run at 250 ml/hour in adults (run at 1.5-2 times maintenance in children) – Mantain urine pH 7.5-8	**RR**

1.3.5 Paracetamol Poisoning

ICD10 CODE: T39.1

Accidental or intentional assumption of excessive amount of paracetamol. Toxic dose: >150 mg/kg or >7.5 g (200 mg/kg for children <6 years)

Clinical features

- First 24 hours: asymptomatic or aspecific symptoms such as nausea and vomiting, malaise, anorexia, abdominal pain
- In patients with mild poisoning, symptoms will resolve and patient will recover. In patients with severe poisoning, symptoms will progress to the next phase
- In 24-72 hours: progressive signs of hepatic toxicity (e.g. right upper quadrant abdominal pain, enlarged tender liver, increased transaminases)
- After 72 hours: signs and symptoms peak at 72-96 hours

and this may be followed by full recovery in 5-7 days or progression into irreversible hepatic failure (less frequently renal failure) and death

Investigations

- Monitor liver function, renal funtion, INR
- Rule out pregnancy (it crosses the placental barrier)

Management

Treatment	LOC
▶ Give repeated doses of **activated charcoal** (25-50 g every 4 hours) ▶ If ingestion was <2 hours, empty the stomach to remove any remaining medicine using gastric lavage ▶ Give **acetylcysteine** IV preferrably within 8 hours from ingestion; if patient presents later, give it anyway – 150 mg/kg (max 15 g) in 200 ml of Dextrose 5% in 60 minutes followed by – 50 mg/kg (max 5 g) in Dextrose 5% 500 ml in 4 hours followed by – 100 mg/kg (max 10 g) in Dextrose 5% 1000 ml in 16 hours ▶ Supportive treatment	**HC2** **H**

Note

- Acetylcysteine may cause histamine release, mimicking an allergic reaction. If patient is stable, slow the infusion. If bronchospasm, stop the infusion

1.3.6 Iron Poisoning

ICD10 CODE: T45.4

Common in children, due to the candy-like aspect of iron tablets. Ingestion of a quantity <40 mg/kg of elemental iron is unlikely to cause problems. Doses >60 mg/kg can cause serious toxicity.

Note: the common tablet of 200 mg of an iron salt contains 60-65 mg of elemental iron.

Clinical features

- Clinical symptoms vary according to the time from ingestion

TIME	SYMPTOMS
Phase 1 (30 minutes to 6 hours)	Initial symptoms (by corrosive action of iron in GIT): nausea, vomiting (may be blood stained), abdominal pain, shock, metabolic acidosis
Phase 2 (6–12 hours)	Symptoms improve or disappear
Phase 3 (12-48 hours)	Severe shock, vascular collapse, metabolic acidosis, hypoglycaemia, convulsions, coma
Phase 4 (2-4 days)	Liver and renal failure, pulmonary oedema
Phase 5 (>4 days)	Gastrointestinal scarring and obstruction in survivors

Management

TREATMENT	LOC
▶ Gastric lavage if ingestion within 1 hour from arrival or pills visible in the stomach at X-ray ▶ NB: charcoal is NOT EFFECTIVE ▶ Patients who are asymptomatic after 6 hours from ingestion most likely do not need specific treatment. Monitor for at least 12 hours ▶ **IV fluids** to manage shock and hypovolaemia	**H**
Indication for use of antidote: – Severe symptoms – Metabolic acidosis ▶ **Desferroxamine** continuous infusion 15 mg/kg/hour in normal saline or glucose 5% – Do not use for more than 24 hours – Increase IV fluids if BP drops – Continue until metabolic acidosis clears or clinical condition improves – Contraindication: renal failure/anuria	**NR**

1.3.7 Carbon Monoxide Poisoning ICD10 CODE: T58

Usually due to inhalation in confined spaces of smoke, car exhaust or fumes caused by incomplete combustion of fuel gases e.g. use of charcoal stoves in unventilated rooms.

Cause

- Carbon monoxide, a colourless and odourless non-irritating gas

Clinical features

- Due to hypoxia
- Headache, nausea, vomiting, dizziness, confusion, weakness
- Collapse, seizures, coma, death

Management

TREATMENT	LOC
▶ Move person to fresh air ▶ Clear the airway ▶ Give **oxygen** 100% (use non-rebreather masks) as soon as possible ▶ IV fluids for hypotension ▶ **Diazepam** for seizures	**HC4**

1.3.8 Barbiturate Poisoning

ICD10 CODE: T42.3

Barbiturates are used in the treatment of epilepsy and convulsions (e.g. phenobarbital).

Clinical features

- Confusion, irritability, combativeness
- Drowsiness, lethargy
- Hypotension, bradycardia or tachycardia, until shock
- Respiratory depression, until coma

Management

TREATMENT	LOC
Supportive care ▶ **Oxygen** therapy ▶ **IV fluids** for hypotension ▶ **Charcoal** may be useful but only if given within 1 hour from ingestion and if the patient is not drowsy (risk of inhalation) ▶ Refer for ventilatory support if necessary ▶ Alkalinisation to increase renal excretion – **Sodium bicarbonate** 1 mEq/kg bolus followed by infusion (specialist only)	**H** **RR**

1.3.9 Opioid Poisoning

ICD10 CODE: T40

Voluntary or accidental overdose of opioid drugs like codeine, morphine, heroin used for therapeutic or recreational purposes.

Clinical features

- Respiratory depression
- Hypotension, hypothermia
- Pinpoint pupils
- Decreased mental status until coma

Management

TREATMENT	LOC
Antidote: ▶ **Naloxone** 0.4-2 mg IV or IM, repeat every 2-3 minutes if not improving until max 10 mg *Child*: 0.01 mg/kg, increase to 0.1 mg/kg if necessary ▶ Aim at restoring ventilation not consciousness ▶ Repeated doses or infusion may be necessary ▶ Manage complications accordingly	**H**
Note ◆ **Naloxone** doses used in acute poisoning may not be suitable for treating opioid-induced respiratory depression and sedation in palliative care and in chronic opioid use	

1.3.10 Warfarin Poisoning

ICD10 CODE: T45.5

Overdose may result from accidental ingestion of rat poison (containing a warfarin-like substance) or overdose of warfarin used for therapeutic purposes.

Warfarin inhibits the production of coagulation factors in the liver.

Clinical features

- Bleeding (can be life threatening) internal or from mucosae
- Usually evident 24 hours after ingestion

Management

TREATMENT	LOC
▶ Empty the stomach ▶ Give activated **charcoal** 50 g if presenting early *Child*: 25 g (50 g if severe) ▶ **Phytomenadione** (vitamin K1) 5 mg IV slowly ▶ Supportive treatment (IV fluids, blood transfusion, fresh frozen plasma if active bleeding)	**HC2** **HC4** **RR**
Note ◆ Intoxication with rat poison may require prolonged treatment with vitamin K	

1.3.11 Methyl Alcohol (Methanol) Poisoning

ICD10 CODE: T51.1

Methanol is used as an industrial solvent and is an ingredient of methylated spirits. It is often ingested for self-harm or as a substitute for alcohol. It can form in home-distilled crude alcohol due to incomplete conversion to ethanol.

A dose >1 g/kg is potentially lethal: it is transformed into toxic metabolites and causes profound acidosis.

Clinical features

- Initial inebriation (as in alcohol assumption)
- Latent asymptomatic period of 12-24 hours
- Headache, dizziness, nausea, vomiting, visual disturbances, CNS depression and respiratory failure
- Toxic metabolites may cause severe acidosis and retinal/optic nerve damage

Management

TREATMENT	LOC
▶ Gastric aspiration and lavage – Only use if done within 2 hours of ingestion (it has a very rapid absorption) ▶ Charcoal is NOT USEFUL ▶ Give 1.5-2 ml/kg of oral **alcohol** 40% (e.g. waragi, whisky, brandy) in 180 ml of water as loading dose, oral or via NGT – Maintenance dose: 0.3 ml/kg/hour ▶ **Sodium bicarbonate** 50-100 ml IV over 30-45 minutes ▶ Check for and correct hypoglycaemia	**H**

1.3.12 Alcohol (Ethanol) Poisoning ICD10 CODE: T51

Alcohol poisoning may be acute or chronic.

1.3.12.1 Acute Alcohol Poisoning

Symptoms of alcoholic poisoning following ingestion of a large amount of alcohol over a short period.

Cause

- Deliberate consumption of excessive alcohol in a short period of time
- Accidental ingestion (may occur in children)

Clinical features

- Smell of alcohol in the breath
- Slurred speech, uninhibited behaviour,
- Altered cognition and perception
- Nausea and vomiting
- Excessive sweating, dilated pupils
- Hypoglycaemia and hypothermia
- In later stages, stupor and coma develop

As coma deepens the following appear:

- Thready pulse and falling BP
- Fall in body temperature
- Noisy breathing

Differential diagnosis

Other causes of coma:

- Malaria and other intracranial infections
- Diabetes mellitus
- Head injury
- Stroke (cerebrovascular accidents)

Low blood sugar (hypoglycaemia) due to other causes

- Poisoning by other medicines e.g. narcotics
- Mental illness

Investigations

➢ Blood: alcohol content, glucose level
➢ Urine: for glucose and protein
➢ Lumbar puncture

Management

TREATMENT	LOC
▶ Manage airways (ventilation may be needed)	H
▶ Correct hypothermia and hypovolaemia if present	
▶ Check and correct hypoglycaemia with **Dextrose 50%** 20-50 ml IV	
– Give it via NGT or rectal if IV not available	
– Maintain infusion of **Dextrose 5-10%** until patient wakes up and can eat	
▶ **Thiamine** IV 100 mg in 1 L of **Dextrose 5%**	H

1.3.12.2 Chronic Alcohol Poisoning

Cause

- Heavy habitual drinking combined with poor nutrition

Clinical features

Features of malnutrition

- Weight loss, dry scaly skin
- Brittle discolored hair, pale mucous membranes

Cerebral damage

- Memory loss, hallucinations, tremors

Liver disease

- Poor appetite
- Fluid in the abdomen (ascites) as a result of cirrhosis

Withdrawal

- Mild: 12-48 hours after the last drink, with anxiety, agitation, insomnia, tremors, palpitation, sweating. If not progressing it may resolve over 24-48 hours
- Severe: seizures, hallucinations (from 12 to 48 hours after the last drink)
- Very severe: delirium tremens characterized by hallucinations, disorientation, tachycardia, hypertension, hyperthermia, agitation, and diaphoresis In the absence of complications, symptoms of delirium tremens typically persist for up to seven days

Wernicke encephalopathy

- Due to thiamine deficiency. Common in chronic alcohol abuse
- Characterized by acute mental confusion, ataxia (unstable gait) and nystagmus/ophthalmoplegia (abnormal eye movements)

Management

TREATMENT	LOC
Withdrawal syndrome	
▶ Supportive care (IV fluids, nutrition)	**HC3**
▶ Check and correct hypoglycaemia with **Dextrose 50%** 20-50 ml IV	
– Give it via NGT or rectal if IV not available	
– Maintain infusion of Dextrose until patient wakes up and can eat	
▶ **Diazepam** 5-10 mg every 10 minutes until appropriate sedation is achieved	
– Very high doses may be required	
– Monitor respiration	
▶ If not responsing, consider **phenobarbital** 100-200 mg slow IV but it has a risk of respiratory depression and hypotension	**HC4**
▶ **Thiamine** IV 100 mg in 1 L of Dextrose 5%	
▶ If delirium or hallucinations persist in spite of treatment, consider **haloperidol** 2.5-5 mg up to 3 times a day	
If Wernicke encephalopathy	
▶ **Thiamine** 100 mg IV or IM every 8 hours for 3-5 days	
Note	
◆ See section **9.2.5**. for general management of alcohol use disorders	

1.3.13 Food Poisoning ICD10 CODE: A05

Illness caused by consumption of food or water contaminated by certain pathogenic microorganisms. It usually affects large numbers of people after ingestion of communal food in homes, hospitals, hotels and parties.

Causes

- Can be infective or toxic
- Infective: by bacteria e.g. *Salmonella typhimurium, Campylobacter jejuni, Bacillus cereus*
- Toxic: by toxins from *Staphylococcus aureus* and *Clostridium botulinum*

Clinical features

- Nausea, vomiting
- Intermittent abdominal pain (colic) with associated diarrhoea
- Fever (especially if poisoning is the infective type)
- Often self-limiting

Botulism

- Paralysis of skeletal, ocular, pharyngeal and respiratory muscles

Differential diagnosis

- Cholera, dysentery
- Other causes of stomach and intestinal infections

Investigations

➢ Good history and examination is important for diagnosis
➢ Stool microscopy, C&S

Management

TREATMENT	LOC
▶ Establish the cause and treat accordingly ▶ Give **oral (ORS) or IV fluids (Normal saline)** for rehydration as required ▶ For pain, give **paracetamol** 1 g every 4-6 hours *Child:* 10 mg/kg per dose	**HC2**
If diarrhoea severe and persisting or bloody, high fever ▶ Give an **antibiotic** for 3-7 days, depending on response: – **Ciprofloxacin** 500 mg every 12 hours *Child*: 10 mg/kg per dose – Or **erythromycin** 500 mg every 6 hours *Child*: 10 mg/kg per dose	**HC2**

Prevention

- Heat cooked foods thoroughly before eating and avoid eating cold left-over cooked foods
- Ensure adequate personal and domestic hygiene

2. Infectious Diseases

2.1 BACTERIAL INFECTIONS

2.1.1 Anthrax

ICD10 CODE: A22.10-A22.9

Anthrax is an acute zoonotic infectious disease caused by the bacterium *Bacillus anthracis*. It most commonly occurs in wild and domestic animals, such as cattle, sheep, goats, camels, antelopes, and other herbivores. *B. anthracis* spores can live in the soil for many years.

It occurs in humans when they are exposed to infected animals or tissue from infected animals. The incubation period is usually 1-3 days. **Anthrax is a notifiable disease.**

Cause

- Exposure to *B. anthracis* spores by handling products from infected animals or by inhaling anthrax spores from contaminated animal products
- Anthrax can also be spread by eating undercooked meat from infected animals

Clinical features

Symptoms vary depending on how the disease was contracted, and usually occur within 7 days

TYPE	FEATURES
Cutaneous	• 95% of anthrax infections occur through skin cut or abrasion • Starts as raised itchy bump that resembles an insect bite • Within 1-2 days, it develops into a vesicle and then a painless ulcer, usually 1-3 cm in diameter, with a characteristic black

	necrotic (dying) area in the centre (eschar) • Lymph glands in adjacent area may swell • About 20% of untreated cutaneous anthrax results in death
Inhalation	• Initial symptoms resemble a cold • After several days, symptoms may progress to severe breathing problems and shock • Inhalation anthrax is usually fatal
Gastro-intestinal	• Acute inflammation of the intestinal tract • Initial signs of nausea, loss of appetite, vomiting and fever • Then abdominal pain, vomiting blood, and severe diarrhoea • Intestinal anthrax results in death in 25% to 60% of the cases

Investigations

- Isolation of *Bacillus anthracis* from blood, skin lesions, or respiratory secretions
- Or measure specific antibodies in the blood of persons with suspected infection

Management

TREATMENT	LOC
Cutaneous anthrax ▶ Treat for 7–10 days ▶ First line is **ciprofloxacin** 500 mg every 12 hours ▶ Alternatives: **doxycycline** 100 mg every 12 hours ▶ Or **amoxicillin** 1 g every 8 hours	**HC2**

If suspected systemic disease ▶ Refer for treatment with IV antibiotics	RR
Note ▶ To be effective, treatment should be initiated early. If left untreated, the disease can be fatal	

Prevention

The following public measures are key for quick prevention and control of anthrax infection:

- Health education and information
- Proper disposal by burying of carcasses, hides and skins; (no burning as it can spread spores)
- No skinning of dead animals; this allows spore formation, which can stay in soil for decades
- No eating of meat from dead animals
- Restrict movement of animals and animal by-products from infected to non-infected areas
- Mass vaccination of animals in endemic areas
- Vaccination using human anthrax vaccine for:
  - Persons who work directly with the organism in the laboratory
  - Persons who handle potentially infected animal products in high-incidence areas

2.1.2 Brucellosis

ICD10CODE: A23.9

(Undulant fever, malta fever, abortus fever)

A zoonotic bacterial infection of acute onset. Common as an occupational disease among people working with infected livestock or associated fresh animal products, for example butchers, farmers, abattoir workers, and vendors of contaminated roasted meat (muchomo). Incubation is 2-4 weeks on average, but it can be from 1 to 8 weeks.

Causes

- *Brucella abortus* (cattle)
- *Brucella canis* (dog)
- *Brucella melitensis* (goats and sheep)
- *Brucella suis* (pigs)

Clinical features

- Intermittent (fluctuating) fever
- Aches and pains
- Orchitis (inflammation of the testes)
- Vertebrae osteomyelitis (uncommon but characteristic)

Differential diagnosis

- Typhoid fever, malaria, tuberculosis
- Trypanosomiasis (sleeping sickness)
- Other causes of prolonged fever

Investigations

➢ Blood: complement fixation test or agglutination test (where possible)

The interpretation of serological tests can be difficult, particularly in endemic areas where a high proportion of the population has antibodies against brucellosis. Positive serological test results can persist long after recovery in treated individuals so results have to be interpreted on the basis of the clinical picture.

➢ Isolation of the infectious agent from blood, bone marrow, or other tissues by culture

Management

TREATMENT	LOC
Adult and child > 8 years: ▶ **Doxycycline** 100 mg every 12 hours for 6 weeks *Child* > 8 years: 2 mg/kg per dose	**HC4**

▶ Plus **gentamicin** 5-7 mg/kg IV daily for 2 weeks *Child < 8 years*: 7.5 mg/kg daily in 1-3 divided doses – Or **ciprofloxacin** 500 mg twice daily for 2 weeks *Child < 12 years*: do not use ***Children below 8 years*** ▶ **Cotrimoxazole** 24 mg/kg every 12 hours for 6 weeks ▶ Plus **gentamicin** 5-7 mg/kg IV in single or divided doses for 2 weeks	
Caution △ Treatment duration must be adhered to at all times △ Ciprofloxacin is contraindicated in children <12 years △ **Doxycyline, gentamicin**: Contraindicated in pregnancy	

Prevention

- Provide public health education on
  - Drinking only pasteurised or boiled milk
  - Careful handling of pigs, goats, dogs, and cattle if a person has wounds or cuts
  - Provide veterinary services for domestic animals

2.1.3 Diphtheria

ICD10 CODE: A36.9

An acute bacterial infection caused by *Corynebacterium diphtheriae*, which is spread through droplet infection and mainly occurs in the nasopharynx. The bacteria produce a toxin which is responsible for the systemic effects. Incubation period is 2-7 days.

Cause

- Toxin of *Corynebacterium diphtheriae*

Clinical features

- Pseudomembranous tonsillitis (grey, tough and very stickly membranes) with dysphagia, cervical adenitis, at times progressing to massive swelling of the neck
- Airway obstruction and possible suffocation when infection extends to the nasal passages, larynx, trachea and bronchi
- Low grade fever
- Effects of the toxin: cardiac dysfunction (myocarditis with heart failure), neuropathies 1-3 months after the onset affecting swallowing, vision, breathing and ambulation
- Renal failure

Investigation

➢ Culture from throat swab

Management

TREATMENT	LOC
▶ Refer urgently to hospital ▶ Isolate (contact and droplet precautions) until 3 throat swabs (nose, throat, or skin) are negative ▶ Give **procaine benzylpenicillin** 1.2 MIU daily IM until patients can switch to oral *Child*: **procaine benzylpenicillin** 50,000 IU/kg per day IM once daily until patient can swallow ***When patient is able to swallow*** ▶ Give **Penicillin V** 250 mg every 6 hours per day to complete 14 days. *Child 1-6 years:* 125 mg 6 hourly *Child< 1 years:* 12.5 mg/kg every 6 hours ***In case of penicillin allergy*** ▶ **Erythromycin** 500 mg every 6 hours for 14 days *Child*: 50 mg/kg every 6 hours	**H**

Prevention

- Isolation of patient and proper management of close contacts
  - Monitor close contacts for 7 days and give prophylactic antibiotics: single dose **benzathine penicillin** IM (child <10 years: 600,000 IU, child >10 yrs and adults: 1.2 MIU)
  - Verify immunisation status, complete if needed, give a booster if the last dose was more than a year before
- Immunise all children during routine childhood immunisation

2.1.4 Leprosy

ICD10 CODE: A30.0

A chronic infectious disease caused by *Mycobacterium leprae* - an acid-fast bacillus. It mainly affects the skin, peripheral nerves and mucous membranes. It is transmitted from one person to another via the respiratory tract (possibly, very rarely, through broken skin). It is classified into paucibacillary (PB) or Multibacillary (MB) Leprosy.

Clinical features

- One or more hypopigmented (pale) skin patches with definite loss of sensation
- There may be skin nodules or smooth, shiny diffuse thickening of the skin without loss of sensation
- Damage to peripheral nerves: thickened nerve, loss of function and weakness of muscles supplied by affected nerves

Tuberculoid or Paucibacillary (PB) leprosy

- 1-5 patches

Lepromatous or Multibacillary (MB) Leprosy

- More than 5 patches

Differential diagnosis

- Hypopigmentation e.g. birthmark, early vitiligo
- Fungal infections of the skin

- Other nodular conditions, e.g. Kaposi's sarcoma, neurofibromatosis, secondary syphilis
- Other causes of peripheral nerve damage, e.g. diabetes mellitus
- Psoriasis, molluscum contagiosum

Investigations

- In most cases, a definite diagnosis of leprosy can be made using clinical signs alone
- At referral centre: stain slit skin smears for Acid Fast Bacilli (AFB)
- Skin biopsies NOT recommended as a routine procedure

Management

Multi-drug therapy (MDT) for leprosy is presented in the form of various monthly dose blister packs for PB leprosy and MB leprosy, with special packs for children.

TREATMENT	LOC
Paucibacillary leprosy (Treat for 6 months) ▶ The standard **adult** PB treatment regimen is: – **Rifampicin** 600 mg once a month – **Dapsone** 100 mg tab once daily ▶ The standard **child** (10-14 years) PB treatment regimen is: – **Rifampicin** 450 mg once a month – **Dapsone** 50 mg once daily	**HC3**
Multibacillary leprosy (Treat for 12 months) ▶ The standard **adult** MB treatment regimen is: – **Rifampicin** 600 mg once a month – **Clofazimine** 300 mg once a month and 50 mg daily – **Dapsone** 100 mg once daily ▶ The standard **child** (10-14 years) PB treatment regimen is: – **Rifampicin** 450 mg once monthly	**HC3**

– **Clofazimine** 150 mg once a month and 50 mg every other day – **Dapsone** 50 mg daily ▶ Ensure that patients take their medicines regularly and complete the dose	
MDT for children <10 years of age ▶ Appropriate dose is determined based on body weight – **Rifampicin** 10 mg/kg once monthly – **Clofazimine** 6 mg/kg once a month and 1 mg/kg daily – **Dapsone** 2 mg/kg daily ▶ The standard child blister pack may be broken up so that the appropriate dose is given	
Steroids for treatment of severe leprae reactions ▶ **Prednisolone** 40 mg once daily in morning – Treat for 12 weeks in PB and 24 weeks in MB – Reduce dose gradually by 10–5 mg once every 2 weeks (PB) or 3 weeks (MB)	**RR**

Note

- In patients co-infected with HIV, do not use dapsone. In PB leprosy, substitute dapsone with clofazimine in appropriate doses
- Health worker should directly observe that the medicines taken once a month are actually swallowed
- Treatment durations longer than 12 months and steroids for leprae reactions should only be prescribed by specialists at referral centres
- **Lepra reactions**: sudden inflammation (pain, redness, swelling, new lesions, loss of nerve function) in skin lesions or nerves of a person with leprosy. They can occur before, during or after MDT completion.

- Severe leprae reaction (Type 2) are also known as Erythema Nodosum Leprosum (ENL or Type 2 reactions)
- All patients should undergo rehabilitation and physiotherapy
- Counsel patient on: need to complete treatment, presence of residual signs after completion of treatment
- Presence of residual signs or post-treatment reactions is NOT an indication to re-start the treatment
- Refer to the National Tuberculosis and Leprosy Programme (NTLP) manual 2016 for more details

Prevention

- Early diagnosis of cases and effective treatment
- Screening of contacts of known patients
- BCG vaccination may be helpful

2.1.5 Meningitis

ICD10 CODES: A39.0 (MENINGOCOCCAL), G00, G01, G02

Meningitis is acute inflammation of the meninges (the membranes covering the brain). **Bacterial meningitis is a notifiable disease.**

Causative organisms

- Most commonly bacterial: *Streptococcus pneumoniae, Haemophilus influenzae* type b (mainly in young children), *Neisseria meningitidis,* Enteric bacilli
- Viral (*HSV, enteroviruses, HIV, VZV etc)*
- *Cryptococcus neoformans* (in the immune-suppressed)
- *Mycobacterium tuberculosis*

Clinical features

- Rapid onset of fever
- Severe headache and neck stiffness or pain
- Photophobia

- Haemorrhagic rash (*N.meningitidis* infection)
- Convulsions, altered mental state, confusion, coma
- In mycobacterial and cryptococcal meningitis, the clinical presentation can be sub-acute , over a period of several days or 1-2 weeks

Differential diagnosis

- Brain abscess
- Space-occupying lesions in the brain
- Drug reactions or intoxications

Investigations

- CSF: usually cloudy if bacterial, clear if viral. Analyse for white cell count and type, protein, sugar, Indian-ink staining (for Cryptococcus), gram stain, culture and sensitivity
- Blood: For serological studies and full blood count
- Chest X-ray and ultrasound to look for possible primary site

Management

Because of the potential severity of the disease, refer all patients to hospital after pre-referral dose of antibiotic. Carry out lumbar puncture promptly and initiate empirical antibiotic regimen

Treatment depends on whether the causative organisms are already identified or not.

TREATMENT	LOC
General measures ▶ IV fluids ▶ Control of temperature ▶ Nutrition support (NGT if necessary)	**HC4**

Causative organisms not yet identified ▶ Start initial appropriate empirical broad spectrum therapy – **Ceftriaxone** 2 g IV or IM every 12 hours for 10-14 days *Child*: 100 mg/kg daily dose given as above – Change to cheaper effective antibiotic if and when C&S results become available ***If ceftriaxone not available/not improving*** ▶ Use **chloramphenicol** 1 g IV every 6 hours for up to 14 days (use **IM** if IV not possible) *Child*: 25 mg/kg per dose ***Once clinical improvement occurs*** – Change to 500-750 mg orally every 6 hours to complete the course; *Child*: 25 mg/kg per dose	
Causative organisms identified ***Streptococcus pneumoniae (10-14 day course; up to 21 days in severe case)*** ▶ **Benzylpenicillin** 3-4 MU IV or IM every 4 hours *Child*: 100,000 IU/kg per dose ▶ Or **ceftriaxone** 2 g IV or IM every 12 hours *Child*: 100 mg/kg daily dose	**H**
Haemophilus influenzae (10 day course) ▶ **Ceftriaxone** 2 g IV or IM every 12 hours *Child*: 100 mg/kg per dose Only if the isolate is reported to be susceptible to the particular drug ▶ Change to **chloramphenicol** 1 g IV every 6 hours *Child*: 25 mg/kg per dose ▶ Or **ampicillin** 2-3 g IV every 4-6 hours *Child*: 50 mg/kg per dose	**H**

Neisseria meningitidis (up to 14 day course) ▶ **Benzylpenicillin** IV 5-6 MU every 6 hours *Child*: 100,000-150,000 IU/kg every 6 hours ▶ Or **Ceftriaxone** 2 g IV or IM every 12 hours *Child*: 100 mg/kg daily dose ▶ Or **Chloramphenicol** 1 g IV every 6 hours (**IM** if IV not possible) *Child*: 25 mg/kg IV per dose ***Once clinical improvement occurs*** – Change to **chloramphenical** 500-750 mg orally every 6 hours to complete the course *Child*: 25 mg/kg per dose **Note:** Consider prophylaxis of close contacts (especially children < 5 years): ▶ *Adults and children* >12 years: **Ciprofloxacin** 500 mg single dose *Child* <12 yrs: 10 mg/kg single dose ▶ Alternative (e.g. in pregnancy): **ceftriaxone** 250 mg IM single dose *Child* < 12 yrs: 150 mg IM single dose	**H**
Listeria monocytogenes (at least 3 weeks course) Common cause of meningitis in neonates and immunosuppressed adults ▶ **Benzylpenicillin** 3 MU IV or IM every 4 hours ▶ Or **ampicillin** 3 g IV every 6 hours **Notes** ◆ Both medicines are equally effective ◆ Therapy may need to be prolonged for up to 6 weeks in some patients	**H**

Prevention

- Avoid overcrowding
- Improve sanitation and nutrition

- Prompt treatment of primary infection (e.g. in respiratory tract)
- Immunisation as per national schedules
- Mass immunisation if *N. Meningitis* epidemic

2.1.5.1 Neonatal Meningitis

Bacterial infection of the meninges in the first month of life.

- Organisms causing neonatal meningitis are similar to those causing neonatal septicaemia and pneumonia, i.e. *S.pneumoniae*, group A & B streptococci, and enteric Gram-negative bacilli.
  - *Meningitis due to group B streptococci:* These organisms often colonise the vagina and rectum of pregnant women, can be transmitted to babies during labour, and cause infection. Meningitis and septicaemia during the 1st week after birth may be particularly severe.
- Clinical presentation is aspecific with temperature disturbances, lethargy, irritability, vomiting, feeding problems, convulsions, apnoea, bulging fontanel

Management

TREATMENT	LOC
Refer to hospital after initial dose of antibiotics ***Supportive care*** ▶ Keep baby warm ▶ For high temperature control environment (undress), avoid paracetamol ▶ Prevent hypoglycaemia (breastfeeding if tolerated/possible, NGT or IV glucose) ▶ Ensure hydration/nutrition ▶ Give oxygen if needed (SpO2 <92%) ***Empirical regimen (for 21 days)*** ▶ **Ampicillin IV** *Neonate < 7 days:* 50-100 mg/kg every 12 hours	**H**

Neonate > 7 days: 50-100 mg/kg every 8 hours ▶ Plus **Gentamicin** 2.5 mg/kg IV every 12 hours ***If group B streptococci*** ▶ **Benzylpenicillin** 100,000-150,000 IU/kg IV every 4-6 hours *Neonates <7 days*: 50,000-100,000 IU/kg IV every 8 hours ▶ Plus **gentamicin** 2.5 mg/kg IV every 12 hours ▶ Continue treatment for a total of 3 weeks	

2.1.5.2 Cryptococcal Meningitis ICD10 CODE: B45.1

Fungal meningitis caused by *Crypotococcus neoformans* and usually occurs in severely immunosuppressed patients (e.g. advanced HIV, usually CD4 < 100).

- It commonly presents with headache, fever, malaise developing over 1 or 2 weeks, progressing into confusion, photophobia, stiff neck

➢ Diagnosis is through identification of the microorganism in the CSF with Indian Ink stain, antigen in CSF or culture

Management

TREATMENT	LOC
▶ Refer to hospital ▶ See section 3.5.1.2 for more details	H

2.1.5.3 TB Meningitis ICD10 CODE: A17.0

Meningitis caused by M. tuberculosis. Onset may be gradual with fatigue, fever, vomiting, weight loss, irritability, headache, progressing to confusion, focal neurological deficits, meningeal irritation, till coma.

➢ For diagnosis: check CSF (raised protein, lymphocytosis), look for possible primary TB site

Management

TREATMENT	LOC
▶ Refer to hospital ▶ Treat as per pulmonary TB but continuation phase is 10 months instead of 4 **(2RHZE/10RH)** ▶ See section **5.3** for more details	**H**

2.1.6 Plague

ICD10 CODE: A20.9

Severe acute bacterial infection with high fatality rate transmitted by infected rodent fleas. **It is a notifiable disease.**

Cause

- *Yersinia pestis* (a coccobacillus) transmitted from ground rodents to man by bites from infected fleas
- It may also be spread from person to person by droplet infection and may occur in epidemics

Clinical features

TYPE	FEATURES
Bubonic (A20.0)	• Involves lymph nodes (usually femoral and inguinal) • Rapidly rising temperature with rigors • Headache
Pneumonic (A20.2)	• Very infectious and highly fatal: PATIENT MUST BE ISOLATED – Death occurs within 2 days if not treated early • Infection is localised in the lungs with fever, general malaise, headache, and frothy blood stained sputum • May be complicated by respiratory and cardiac distress

Septicaemia (A20.7)	• Complication of the primary infection due to toxins • There is high fever, nose bleeding, diarrhoea, heart failure, disseminated intravascular coagulation, skin necrosis, and shock

Differential diagnosis

- Malaria, typhoid
- Lymphogranuloma venereum
- Pneumonia

Investigations

- Bubo aspirate: for microscopy, C&S
- Blood and sputum: check for presence of the bacilli

Management

TREATMENT	LOC
▶ **Doxycycline** 100 mg every 12 hours for 14 days *Child* > 8 years: 2 mg/kg per dose	**HC2**
Alternatives: ▶ **Chloramphenicol** 500 mg orally or IV every 6 hours for 10 days *Child*: 25 mg/kg per dose ▶ Or **gentamicin** 1.7 mg/kg (adult and child) IV or IM every 8 hours for 7-10 days	**HC4**
Note ◆ For use in pregnancy, consider gentamicin	

Prevention

- Health education
- Improved housing
- Destruction of rats (rodents) and fleas
- Early detection and treatment to reduce further spread

2.1.7 Septicaemia

ICD10 CODE: A41.9

Blood infection due to various bacteria which may be associated with infection in specific sites (e.g. lungs, urinary tract, gastrointestinal tract) or there may be no specific focus. It is life threatening because it can progress into multi-organ dysfunction and septic shock.

Cause

- Organisms commonly involved are *Staphylococcus aureus, Klebsiella, Pseudomonas, Staphylococcus epidermidis, fungal (Candida spp), Coliforms* and *Salmonella spp, Pneumococci, Proteus spp*

Risk factors

- Extremes of age (children, elderly)
- Diabetes, cancer, immunosuppression
- Hospital admission
- Community acquired pneumonia

Clinical features

- Fever, prostration (extreme tiredness)
- Hypotension, anaemia
- Toxic shock is a complication
- Signs and symptoms of the primary site of infection (e.g. pneumonia)

Differential diagnosis

- Severe cerebral malaria
- Meningitis
- Typhoid fever (enteric fever)
- Infective endocarditis

Investigations

➢ Look for possible primary source of infection
➢ Blood: WBC count, culture and sensitivity

Management

Septicaemia is a life threating condition, refer to hospital after pre-referral dose of antibiotics.

TREATMENT	LOC
General measures ▶ IV fluids ▶ Control of temperature ▶ Nutrition support (NGT if necessary) ▶ Monitoring of vitals and urinary output ***If known focus of infection, treat immediately with IV antibiotics as per guidelines. If unknown focus, give:*** ***Adult*** ▶ **Gentamicin** 7 mg/kg IV every 24 hours or 1.5-2 mg/kg IV or IM every 8 hours ▶ Plus either **cloxacillin** 2 g IV every 4-6 hours ▶ Or **chloramphenicol** 750 mg IV every 6 hours ***Child*** ▶ **Gentamicin** 3.5-4 mg/kg IV every 8 hours (*neonate:* every 8-12 hours) ▶ Plus either: **Ceftriaxone** 50 mg/kg every 8 hours (< *7 days old:* every 12 hours) ▶ Or **cloxacillin** 50 mg/kg IV every 4-6 hours ▶ Or **benzylpenicillin** 50,000 IU/kg IV every 4-6 hours	H

Prevention

- Protect groups at risk, for example immunosuppressed and post-surgical patients
- Follow strictly aseptic surgical procedures

2.1.7.1 Neonatal Septicaemia

Organism causing neonatal septicemia are similar to the ones causing neonatal pneumonia and meningitis. Refer to hospital after pre-referral dose of antibiotics.

Management

TREATMENT	LOC
Supportive care ▶ Keep baby warm ▶ For high temperature, control environment i.e. (undress), avoid paracetamol ▶ Prevent hypoglycaemia (breastfeeding if tolerated/possible, NGT or IV glucose) ▶ Ensure hydration/nutrition ▶ Give oxygen if needed (SpO2 < 90%) ***First line treatment*** ▶ Give **ampicillin** 50 mg/kg IV every 6 hours plus **gentamicin** 5 mg/kg every 24 hours for 10 days ***If risk of staphylococcus infection (infected umbilicus or multiple skin pustules,*** ▶ Give **cloxacillin** 50 mg/Kg IV/IM every 6 hours and **gentamicin** 5-7 mg/Kg every 24 hours – Clean infected umbilicus and pustules and apply **gentian violet** ***If no improvement after 48-72 hours change from ampicillin to:*** ▶ **Ceftriaxone** 100 mg/kg daily	H

2.1.8 Tetanus

ICD10 CODE: A35

Bacterial disease characterised by intermittent spasms (twitching) of voluntary muscles. Incubation period is from few days to few weeks (average7-10 days).

Cause

- Exotoxin of *Clostridium tetani*
- Common sources of infection: tetanus spores enter the body through deep penetrating skin wounds, the umbilical cord of the newborn, ear infection, or wounds produced during delivery and septic abortions

Clinical features

- Stiff jaw, difficulty in opening mouth (trismus)
- Generalised spasms induced by sounds and/or strong light, characterised by grimace (risus sardonicus)
- Arching of back (opisthotonus) with the patient remaining clearly conscious
- Fever
- Glottal spasms and difficulty in breathing
- Absence of a visible wound does not exclude tetanus

Differential diagnosis

- Meningoencephalitis, meningitis
- Phenothiazine side-effects
- Febrile convulsions

Management

TREATMENT	LOC
General measures ▶ If at HC2 or 3, refer to hospital ▶ Nurse patient intensively in a quiet isolated area ▶ Maintain close observation and attention to airway, temperature, and spasms ▶ Insert nasogastric tube (NGT) for nutrition, hydration, and medicine administration	**H**

▶ Oxygen therapy if needed ▶ Prevent aspiration of fluid into the lungs ▶ Avoid IM injections as much as possible; use alternative routes (e.g. NGT, rectal) where possible ▶ Maintain adequate nutrition as spasms result in hugh metabolic demands ▶ Treat respiratory failure in ICU with ventilation	**RR**
Neutralise toxin ▶ Give **tetanus immunoglobulin human (TIG)** – 150 IU/kg (adults and children). Give the dose in at least 2 different sites IM, different from the tetanus toxoid site ▶ In addition, administer full course of age-appropriate TT vaccine (TT or DPT) – starting immediately ▶ See also section **18.2.3**	**H**
Treatment to eliminate source of toxin ▶ Clean wounds and remove necrotic tissue. ***First line antibiotics*** ▶ **Metronidazole** 500 mg every 8 hours IV or by mouth for 7 days *Child:* 7.5 mg/kg every 8 hours ***Second line antibiotics*** ▶ **Benzylpenicillin** 2.5 MU every 6 hours for 10 days *Child*: 50,000-100,000 IU/kg per dose	**H**
Control muscle spasms ***First line*** ▶ **Diazepam** 10 mg (IV or rectal) every 1 to 4 hours ▶ *Child:* 0.2 mg/kg IV or 0.5 mg/kg rectal (maximum of 10 mg) every 1 to 4 hours	**H**

Other agents ▶ **Magnesium sulphate** (alone or with diazepam): 5 g (or 75 mg/kg) IV loading dose then 2 g/hour till spasm control is achieved – Monitor knee-jerk reflex, stop infusion if absent ▶ Or **chlorpromazine** (alone or alternate with diazepam) 50-100 mg IM every 4-8 hours *Child*: 4-12 mg IM every 4-8 hours or ▶ 12.5 mg-25 mg by NGT every 4-6 hours – Continue for as long as spasms/rigidity lasts	
Control pain ▶ **Morphine** 2.5-10 mg IV every 4-6 hours (monitor for respiratory depression) *Child*: 0.1 mg/kg per dose ▶ **Paracetamol** 1 g every 8 hours *Child*: 10 mg/kg every 6 hours	**H**

Prevention

- Immunise all children against tetanus during routine childhood immunisation
- Proper wound care and immunisation (see chapter 18):
  - Full course if patient not immunised or not fully immunised
  - Booster if fully immunised but last dose >10 years ago
  - Fully immunised who had a booster <10 years ago do not need any specific treatment
- Prophylaxis in patients at risk as a result of contaminated wounds: give Tetanus immunoglobulin human (TIG) IM
  Child < 5 years: 75 IU
  Child 5-10 years: 125 IU
  Child > 10 years and adults: 250 IU
  Double the dose if heavy contamination or wound obtained > 24 hours.

2.1.8.1 Neonatal Tetanus

ICD10 CODE: A33

Neonatal tetanus is a notifiable disease

- Caused by infection of the umbilicus through cutting of the cord with unsterile instruments or from putting cow dung or other unsuitable materials on the stump
- Usually presents 3-14 days after birth with irritability and difficulty in feeding due to masseter (jaw muscle) spasm, rigidity, generalised muscle spasms. The neonate behaves normally for the first few days before the symptoms appear.

Management

TREATMENT	LOC
▶ Refer to hospital immediately	**H**
General measures	
▶ Nurse in quite, dark and cool environment	
▶ Suction the mouth and turn the infant 30 min after sedative. A mucous extractor or other suction should be available for use prn	
▶ Ensure hydration/feeding	
– Start with IV fluids (half saline and dextrose 5%)	
– Put NGT and start feeding with expressed breast milk 24 hours after admission– in small frequent feeds	
– Monitor and manitain body tempeature	
– Monitor cardiorespiratory function closely. Refer for ICU management if possible	**RR**
Neutralise toxin	**H**
▶ Give **tetanus immunoglobulin human (TIG)**	
– 500 IU IM. Give the dose in at least 2 different sites IM, different from the tetanus toxoid site	
▶ In additon give 1st dose of DPT	

Treatment to eliminate source of toxin ▶ Clean and debride the infected umbilicus ***First line antibiotics*** ▶ **Metronidazole** loading dose 15 mg/kg over 60 min then – *Infant <4 weeks :* 7.5 mg/kg every 12 hours for 14 days – *Infant >4 weeks:* 7.5 mg/kg every 8 hours for 14 days ***Second line antibiotics*** ▶ **Benzylpenicillin** 100,000 IU/kg every 12 hours for 10-14 days	**H**
Control muscle spasm ▶ **Diazepam** 0.2 mg/kg IV or 0.5 mg/kg rectal every 1 to 4 hours ***Other medicines*** ▶ **Chlorpromazine** oral 1 mg/kg 8 hourly via NGT	

Prevention

- Immunise all pregnant women during routine ANC visits
- Proper cord care

2.1.9 Typhoid Fever (Enteric Fever)

ICD10 CODE: A01.00

Bacterial infection characterised by fever and abdominal symptoms. It is spread through contaminated food and water.

Causes

- *Salmonella typhi* and *S. paratyphi* A & B

Clinical features

- Gradual onset of chills and malaise, headache, anorexia, epistaxis, backache, and constipation

- Usually occurring 10-15 days after infection
- Abdominal pain and tenderness are prominent features
- High fever > 38°C
- Delirium and stupor in advanced stages
- Tender splenomegaly, relative bradycardia, cough
- Complications may include perforation of the gut with peritonitis, gastrointestinal hemorrhage

Differential diagnosis

- Severe malaria, other severe febrile illnesses

Investigations

- Blood culture (most reliable)
- Stool culture
- Rapid antibody test (e.g. Tubex, Typhidot) – not very sensitive or specific, possibly useful in epidemics

Widal's agglutination reaction is neither sensitive nor specific for typhoid diagnosis: a single positive screening does not indicate presence of infection

Management

TREATMENT	LOC
▶ **Ciprofloxacin** 500 mg every 12 hours for 10–14 days *Child*: 10-15 mg/kg per dose	**HC3**
Other antibiotics ▶ **Chloramphenicol** 500 mg 6 hourly for 10 days *Child:* 25 mg/kg IV, IM or oral for 10-14 days	**HC3**
In severe, resistant forms or pregnancy ▶ **Ceftriaxone** 1 g IV every 12 hours for 10-14 days *Child*: 50 mg/kg per dose ***Alternative in pregnancy*** ▶ **Amoxicillin** 1 g every 8 hours for 10 days *Child*: 10-15 mg/kg per dose	**HC4**

Chronic carriers (treat for 4-6 weeks)	**HC3**
▶ **Ciprofloxacin** 500-750 mg every 12 hours	
▶ *Child*: 10-15 mg/kg per dose	
▶ Refer complications (e.g. perforation) to a higher level of care	**H**
Note	
◆ Fever may persists for few days after starting treatment	

Prevention

- Early detection, isolation, treatment, and reporting
- Proper faecal disposal
- Use of safe clean water for drinking
- Personal hygiene especially hand washing
- Good food hygiene

2.1.10 Typhus Fever

ICD10 CODE: A75.9

Febrile infection caused by *Rickettsia* species

Causes

- Epidemic louse-borne typhus fever: caused by *Rickettsia prowazeki*; the common type in Uganda, which is transmitted to man (the reservoir) by lice
- Murine (endemic) typhus fever: caused by *Rickettsia typhi* (mooseri) and transmitted by rat fleas. Rats and mice are the reservoir
- Scrub typhus fever (mite-borne typhus): caused by *R. tsutsugamushi* and transmitted by rodent mites

Clinical features

- Headaches, fever, chills, severe weakness, muscle pains
- Macular rash that appears on the 5th day on the rest of the body except the face, palms, and soles
- Jaundice, confusion, drowsiness
- Murine typhus has a similar picture but is less severe

Differential diagnosis

- Any cause of fever such as malaria, HIV, UTI, or typhoid

Investigations

➢ Blood: For Weil-Felix reaction

Management

TREATMENT	LOC
▶ **Doxycycline** 100 mg every 12 hours for 5-7 days *Child* > 8 years: 2 mg/kg per dose	**HC2**
▶ Or **chloramphenicol** 500 mg orally or IV every 6 hours for 5 days *Child*: 15 mg/kg per dose	**HC4**
Note ◆ One single dose of doxycycline 200 mg may cure epidemic typhus but there is risk of relapse	

Prevention

- Personal hygiene
- Destruction of lice and rodents

2.2 FUNGAL INFECTIONS

2.2.1 Candidiasis

ICD10 CODE: B37

Fungal infection usually confined to the mucous membranes and external layers of skin. Severe forms are usually associated with immunosuppressive conditions, such as HIV/AIDS, diabetes, pregnancy, cancer, prolonged antibiotic use, and steroids.

Causes

- *Candida albicans*, transmitted by direct contact

Clinical features

It may present as:

- Oral thrush
- Intertrigo (between skin folds)
- Vulvo vaginitis and abnormal vaginal discharge (vaginal candida is not a sexually transmitted disease)
- Chronic paronychia (inflammation involving the proximal and lateral fingernail folds)
- Gastrointestinal candidiasis may present with pain on swallowing, vomiting, diarrhoea, epigastric and retrosternal pain

Investigations

- Diagnosis is mainly clinical
- Smear examination with potassium hydroxide (KOH)

Management

TREATMENT	LOC
Oral candidiasis	
▶ **Nystatin tablets** 500,000-1,000,000 IU every 6 hours for 10 days (chewed then swallowed)	**HC3**
Child < 5 years: **Nystatin oral suspension** 100,000 IU every 6 hours for 10 days	**HC2**
Child 5-12 years: 200,000 IU per dose every 6 hours for 10 days	
Oropharyngeal candidiasis	**HC3**
▶ **Fluconazole** loading dose 400 mg, then 150-200 mg daily for 14-21 days	
Child: loading dose 6 mg/kg, then 3 mg/kg daily	
Vaginal	**HC2**
▶ Insert **clotrimazole pessary** 100 mg high into the vagina with an applicator each night for 6 days or twice a day for 3 days	

▶ Or insert one **nystatin pessary** 100,000 IU each night for 10 days ▶ For recurrent vaginal candidiasis, give **fluconazole** 150-200 mg once daily for 5 days	
Chronic paronychia ▶ Keep hand dry and wear gloves for wet work ▶ **Hydrocortisone** cream twice daily ***If not responding*** ▶ **Betametasone** cream twice daily ▶ **Fluconazole** 150-200 mg once a day for 5-7 days	**HC3** **HC4**
Intertrigo ▶ **Clotrimazole** cream twice a day for 2-4 weeks ▶ In severe forms use **fluconazole** 150-200 mg once a day for 14-21 days	**HC3**

Prevention

- Early detection and treatment
- Improve personal hygiene
- Avoid unnecessary antibiotics

2.3 VIRAL INFECTIONS

2.3.1 Avian Influenza

ICD10 CODE: J09.X2

Influenza caused by avian (bird) influenza Type A viruses (mainly H5N1 strain). It is endemic in the poultry population in Eurasia and can occasionally be transmitted to humans through direct contact with sick birds (inhalation of infectious droplets). Disease can be mild or severe and has limited potential to spread from person to person but there is risk of mutations giving rise to a very infectious virus which could cause widespread epidemics. **Avian flu is a notifiable disease.**

Cause

- Avian (bird) influenza Type A viruses

Clinical features

- Conjuctivitis
- Flu symptoms: fever, cough, sore throat, muscle aches
- Gastrointestinal (diarrhoea) and neurological symptoms
- In some cases, severe acute respiratory syndrome (SARS)

Investigations

➢ Blood and respiratory specimens, nose swab: lab test for influenza and rule out bacterial infection
– Testing must be in a special laboratory

Management

TREATMENT	LOC
If patient requires hospitalisation ▶ Hospitalise patient under appropriate infection control precautions ▶ Administer **oxygen** as required. Avoid nebulisers and high air flow oxygen masks ▶ Give **paracetamol** or **ibuprofen** for fever prn ▶ Give **oseltamivir** phosphate in patients ≥ 1 year who have been symptomatic for no more than two days. Treat for 5 days as below: *Adults and children ≥ 13 years*: 75 mg twice daily *Child > 1 year* and < 15 kg: 30 mg twice daily *Child 15– 23 kg:* 45 mg twice daily *Child 23–40 kg body weight:* 60 mg twice daily *Child > 40 kg body weight:* 75 mg twice daily ▶ ***If a case does not require hospitalisation*** ▶ Educate the patient and his/her family on: – Personal hygiene and infection control measures – Hand-washing, use of a paper or surgical mask by the ill person	**RR**

– Restriction of social contacts – Seek prompt medical care if the condition worsens ***Prophylactic use of oseltamivir*** ▶ Indicated in persons 13 years and above who have come into contact with affected birds/patients ▶ Close contact: 75 mg once daily for at least 7 days ▶ Community contacts: 75 mg once daily up to 6 weeks ▶ Protection lasts only during the period of chemoprophylaxis	

Discharge policy

- Infection control precautions for adult patients should remain in place for 7 days after resolution of fever and for 21 days in children younger than 12 years
- Children should not attend school during this period

Control and Prevention of Nosocomial Spread of Influenza A (H5N1)

Health workers should observe the following to prevent the spread of avian influenza in the health care facilities:

- Observe droplet and contact precautions. In addition, get negative pressure room if available
- Isolate the patient to a single room
- Place beds more than 1 metre apart and preferably separated by a physical barrier (e.g. curtain, partition)
- Appropriate personal protective equipment (APPE) in all those entering patients' rooms. APPE includes high efficiency mask, gown, face shield or goggles, and gloves
- Limit the number of health care workers (HCWs) and other hospital employees who have direct contact with the patient(s). These HCWs should:

– Be properly trained in infection control precautions

  - Monitor their own temperature twice daily and report any febrile event to hospital authorities
- A HCW who has a fever (>380C) and who has had direct patient contact should be treated immediately
- Restrict the number of visitors, provide them with APPE, and instruct them in its use

2.3.2 Chickenpox

ICD10 CODE: B01

A highly contagious viral infection. Patients are contagious from 2 days before onset of the rash until all lesions have crusted. An attack of chicken pox usually confers lifelong immunity. Disease is more severe and complicated in adults.

Causes

- *Varicella Zoster virus* (VZV) by droplet infection

Clinical features

- Incubation period is 14 days, but shorter in immuno-compromised host
- Mild fevers occur 10-20 days after exposure
- Prodromal symptoms consisting of low fever, headache, and malaise occurring 2 to 3 days before the eruption
- Eruptive phase: they appear as macules, papules, vesicles, pustules and crusts. The most characteristic lesion is a vesicle looking like a drop of water on the skin. Vesicles rupture easily and may become infected
- The rash begins on the trunk and spreads to the face and extremities
- Lesions of different stages (crops) exist together at the same time in any given body area
- Complications may include septicaemia, pneumonia, fulminating haemorrhagic varicella, and meningoencephalitis

Differential diagnosis

- Drug-induced eruption
- Scabies
- Insect bites
- Erythema multiforme, impetigo
- Other viral infections with fever and skin rash

Investigations

➢ Virus isolation possible but not necessary
➢ Diagnosis is practically clinical

Management

TREATMENT	LOC
Symptomatic and supportive treatment	**HC2**
▶ Apply **calamine** lotion every 12 hours	
▶ Cool, wet compresses to provide relief	
▶ **Chlorpheniramine:** A*dult* 4 mg every 12 hours Child <5 years: 1-2 mg every 12 hours for 3 days	
▶ Pain relief: **paracetamol** 10 mg/kg every 6 hours	
In adults and children >12 years consider antivirals:	
▶ Oral **aciclovir** 800 mg every 6 hours for 7 days	**HC4**
▶ Keep child at home/remove from school till healed to avoid spread	

Prevention

- Isolation of infected patient
- Avoid contact between infected persons and immuno-suppressed persons

2.3.3 Measles

ICD10 CODE: B05

An acute, highly communicable viral infection characterized by a generalised skin rash, fever, and inflammation of mucous membranes. **Measles is a notifiable disease.**

Cause

- Measles virus spreads by droplet infection and direct contact

Clinical features

- Catarrhal stage: high fever, Koplik's spots (diagnostic) runny nose, barking cough, conjunctivitis
- Misery, anorexia, vomiting, diarrhoea
- Later: generalised maculopapular skin rash followed by desquamation after few days

Complications

- Secondary bacterial respiratory tract infection, e.g. bronchopneumonia, otitis media
- Severe acute malnutrition especially following diarrhoea
- Cancrum oris (from mouth sepsis)
- Corneal ulceration and panophthalmitis – can lead to blindness
- Demyelinating encephalitis
- Thrombocytopaenic purpura

Differential diagnosis

- German measles (Rubella)
- Other viral diseases causing skin rash

Investigations

➢ Clinical diagnosis is sufficient though virus isolation is possible

Management (symptomatic)

TREATMENT	LOC
▶ Isolate patients (at home or health centre) ▶ **Paracetamol** prn for fever ▶ Apply **tetracycline** eye ointment 1% every 12 hours for 5 days ▶ Increase fluid and nutritional intake (high risk of malnutrition and dehydration)	**HC2**

▶ Give 3 doses of **vitamin A**: first dose at diagnosis, 2nd dose the next day and 3rd dose on day 14 *Child <6 months:* 50,000 IU *Child 6-12 months:* 100,000 IU *Child >12 months*: 200,000 IU ▶ Monitor for and treat secondary bacterial infections with appropriate antibiotics immediately ▶ Refer to hospital in case of complications	

Prevention

- Measles vaccination (see chapter 18)
- Avoid contact between infected and uninfected persons
- Educate the public against the common local myths e.g. stopping to feed meat and fish to measles patients

2.3.4 Poliomyelitis

ICD10 CODE: A80.3

An acute viral infection characterised by acute onset of flaccid paralysis of skeletal muscles. It is transmitted from person to person through the faecal-oral route. **Poliomyelitis is a notifiable disease.**

Cause

- Polio virus (enterovirus) types I, II, and III

Clinical features

- Majority of cases are asymptomatic, only 1% result in flaccid paralysis
- Non paralytic form: minor illness of fever, malaise, headache, and vomiting, muscle pains, spontaneous recovery in 10 days
- Paralytic form: after the aspecific symptoms, rapid onset (from morning to evening) of asymmetric flaccid paralysis, predominantly of the lower limbs, with ascending progression

- Paralysis of respiratory muscles is life threatening (bulbar polio)
- Aseptic meningitis may occur as a complication

Differential diagnosis

- Guillain-Barré syndrome
- Traumatic neuritis
- Transverse myelitis
- Pesticides and food poisoning

Consider all cass of Acute Flaccid Paralysis as possible Poliomyelitis: alert the district focal person for epidemic control, and send 2 stool samples (refrigerated).

Investigations

- Isolation of the virus from stool samples
- Viral culture

Management

TREATMENT	LOC
Acute stage Poliomyelitis in this stage without paralysis is difficult to diagnose ***Paralytic form*** ▶ If paralysis is recent, rest the patient completely **Note**: Do not give IM injections as they make the paralysis worse ▶ Refer the patient to a hospital for supportive care ▶ After recovery (if partially/not immunised), complete recommended immunisation schedule ***Chronic stage*** ▶ Encourage active use of the limb to restore muscle function/physiotherapy ▶ In event of severe contractures, refer for corrective surgery	**H**

Prevention

- Isolate patient for nursing and treatment, applying contact and droplets precautions
- Immunise all children below 5 years from the area of the suspected case
- If case is confirmed, organize mass immunisation campaign
- Proper disposal of children's faeces
- Immunisation (see chapter 18)
- Proper hygiene and sanitation

2.3.5 Rabies

ICD10 CODE: A82

Rabies is a viral infection of wild and domestic animals, transmitted to human by saliva of infected animals through bites, scratch or licks on broken skin or mucuos membranes. Once symptoms develop, rabies presents itself as a fatal encephalitis: there is no cure and treatment is palliative. Before symptomatic disease has developed, rabies can effectively be prevented by post-exposure prophylaxis.

Cause

- Rabies virus. Incubation is average 20-90 days but can be shorter in severe exposure (multiple bites, bites on face/neck) of even longer (> a year) in a few cases

Clinical features

- Itching or paraesthesiae (abnormal sensation) around site of exposure, malaise, fever
- Neurologic phase
  - Furious form: psychomotor agitation or hydrophobia (throat spasm and panic, triggered by attempt to drink or sight/sound/touch of water) and aerophobia (similar response to a draft of air)
  - Paralytic form (rarer): progressive ascending paralysis

Management

TREATMENT	LOC
▶ There is no cure. In case of suspected exposure, take all the appropriate steps to prevent the infection (see section 1.2.1.3 on animal bites) ▶ Start as soon as the exposure happens or as soon as the patient comes for medical attention, regardless of whatever time has passed from the exposure ▶ Admit case ▶ Palliative and supportive care ▶ Observe strict hygienic precautions – Avoid contact with patient's body fluids or secretions – PPE (personal protective equipment) △ Caution: the patient may bite ▶ Counsel caregivers on rabies and consequences	H

2.3.6 Viral Haemorrhagic Fevers

2.3.6.1 Ebola and Marburg

ICD10 CODE: A99

Ebola and Marburg are severe zoonotic multisystem febrile diseases caused by RNA viruses. **They are notifiable diseases.**

Cause

- Ebola and Marburg viruses. Transmission to humans happens through contact with meat or body fluids of an infected animal. The disease can then be transmitted from human to human through body fluids (including semen for months after recovery) and it is highly contagious.

Risk factors

- Communities around game parks
- Communities in endemic area

- Cultural practices like burial rituals
- Poor infection control policies
- History of exposure to infected people in the last 2 to 21 days i.e sexual partner, breastfeeding mothers
- Recent contact with infected animals e.g monkeys, bats, infected game meat

Clinical features

- *Early signs (non specific):* sudden fever, weakness, headache, muscle pains, loss of appetite, conjunctivitis
- *Late signs:*
  - Diarrhoea (watery or bloody), vomiting
  - Mucosal and gastrointestinal bleeding: chest pain, respiratory distress, circulatory shock
  - CNS dysfunction, confusion, seizures
  - Miscarriage in pregnancy
  - Elevated AST and ALT, kidney injury, electrolyte abnormalities

Note: Haemorrhage is seen in less than a third of Ebola patients

Differential diagnosis

- Malaria, rickettsiosis, meningitis
- Shigellosis, typhoid
- Anthrax, sepsis, viral hepatitis, dengue, leptospirosis

Investigations

- Send blood sample to referral laboratory (UVRI Entebbe) for specific testing
- Notify district epidemic focal person

Management

TREATMENT	LOC
▶ Refer all patients to regional referral hospital for management in an appropriate setting ▶ Notify the district health team	RR

Safety of health workers: maximum level of infection control procedures

- Strict isolation of suspect cases
- Use of adequate protective gear
- Minimize invasive intervention
- Safe handling of linen
- Appropriate use of chlorine mixtures
- Proper disposal of health care waste

Patient care

- Supportive treatment of signs and symptoms
  - Replace and monitor fluids and electrolytes for patients with diarrhoea or vomiting

Triage and contact tracing

- Triage patient (those who had contact with a patient or not)
- Contact identification, contact listing and contact follow up

Dead Body handling

- Avoid washing or touching the dead
- There should be no gathering at funerals
- The dead should be buried promptly by a designated burial team

Prevention

- Health education of the population (e.g. avoid eating wild animals)
- Effective outbreak communication and having haemorrhagic viral fever protocols in place
- Appropriate safety gear for patients/health workers in suspect cases
- Modification of burial practices
- Use of condoms

2.3.6.2 Yellow Fever

ICD 10 CODE: A95

An acute viral haemorrhagic fever transmitted through the bite of infected female *Aedes aegypti* mosquito. Incubation period is 3 to 6 days. **It is a notifiable disease.**

Cause

- Yellow fever RNA virus

Risk factors

- Residents in endemic area
- Hunters and settlers around game parks

Clinical features

First stage:

- Fever, chills, headache, backache, muscle pain, prostration, nausea, vomiting, fatigue. Usually resolves within 3-4 days.

Second stage:

- About 15% of cases enter into a second or toxic stage after 1-2 day of remission: high fever, prostration, signs and symptoms of hepatic failure, renal failure and bleeding (jaundice, nose bleeding, gingival bleeding, vomiting blood, blood in stool)
- About half of these patients die within 7-10 days

Differential diagnosis

- Hepatitis E, liver failure
- Malaria, Ebola

Investigations

➢ PCR in early phases
➢ ELISA in the late stage

Management

TREATMENT	LOC
▶ Refer all cases to regional referral hospital ▶ Notify the district health team ▶ There is no specific antiviral drug treatment ▶ Supportive treatment is recommended: – Rehydration – Management of liver and kidney failure – Antipyretics for fever – Blood transfusion ▶ Treat associated bacterial infections with antibiotics	**RR**

Note

- Individuals who have recovered from a yellow fever infection develop life-long immunity

Prevention

- Vaccination (see chapter 18)
- Elimination of mosquito breeding sites
- Epidemic preparedness i.e prompt detection and treatment

2.4 HELMINTHES PARASITES

2.4.1 Intestinal Worms

ICD10 CODE: B83.9

Intestinal worms enter the human body through ingestion of the worm eggs in food or water via dirty hands or through injured skin when walking barefoot. Examples include:

TYPE OF INFESTATION	FEATURES
Ascariasis *Ascaris lumbricoides* (round worm). Infests small intestines	• Oro-faecal transmission • Usually few or no symptoms • Persistent dry irritating cough • Patient may pass out live worms through the anus, nose, or mouth • Pneumonitis- Loeffler's syndrome • Heavy infestations may cause nutritional deficiencies • Worms may also cause obstruction to bowel, bile duct, pancreatic duct, or appendix
Enterobiasis (threadworm) *Enterobias vermicularis*	• Transmitted by faecal-oral route • Mainly affects children • Intense itching at the anal orifice
Hook worm Caused by *Necator americanus* and *Ancylostoma duodenale*	• Chronic parasitic infestation of the intestines • Transmitted by penetration of the skin by larvae from the soil • Dermatitis (ground itch) • Cough and inflammation of the trachea (tracheitis) common during larvae migration phase • Iron-deficiency anaemia

	• Reduced blood proteins in heavy infestations
Strongyloidiasis *Strongyloides stercoralis*	• Skin symptoms: Itchy eruption at the site of larval penetration • Intestinal symptoms e.g. abdominal pain, diarrhoea, and weight loss • Lung symptoms due to larvae in the lungs, e.g. cough and wheezing • Specific organ involvement, e.g. meningoencephalitis • Hyperinfection syndrome: Occurs when immunity against auto-infection fails, e.g. in immunosuppressed cases
Trichuriasis Whip worm Infests human caecum and upper colon	• May be symptomless • Heavy infestation may cause bloody, mucoid stools, and diarrhoea • Complications include anaemia and prolapse of the rectum

Differential diagnosis

- Other causes of cough, diarrhea
- Other causes of intestinal obstruction and nutritional deficiency
- Loeffler's Syndrome
- Other causes of iron-deficiency anaemia

Investigations

➢ Stool examination for ova, live worms or segments
➢ Full blood count

Management

TREATMENT	LOC
Roundworm, threadworm, hookworm, whipworm	**HC1**
▶ **Albendazole** 400 mg single dose *Child <2 years:* 200 mg	
▶ **Mebendazole** 500 mg single dose *Child <2 years:* 250 mg	
Strongyloides	
▶ **Albendazole** 400 mg every 12 hours for 3 days	
▶ Or **Ivermectin** 150 micrograms/kg single dose	**HC3**
Child: see dose table in the section **1.4.5**	

Prevention

- Proper faecal disposal
- Personal and food hygiene
- Regular deworming of children every 3-6 months
- Avoid walking barefoot

2.4.1.1 Taeniasis (Tapeworm) ICD10 CODE: B68

An infestation caused by Taenia (*Taenia saginata* (from undercooked beef), *Taenia solium* (from undercooked pork), *Diphyllobothrium latum* (from undercooked fish).

Cause

- *Adult Tapeworms:* intestinal infestation, by ingestion of undercooked meat containing cysticerci (larval form of the worm)
- *Larvae forms (cysticercosis):* by ingestion of food/water contaminated by eggs of *T.solium*. The eggs hatch in the intestine, the embryos invade the intestinal walls and disseminate in the brain, muscles or other organs

Clinical features

T. saginata, T.solium (adult tapeworm)

- Usually asymptomatic, but live segments may be passed
- Epigastric pain, diarrhoea, sometimes weight loss

Cysticercosis

- Muscular: muscle pains, weakness, fever, subcutaneous nodules
- Neurocysticercosis: headache, convulsions, coma, meningo-encephalitis, epilepsy
- Ocular: exophthalmia, strabismus, iritis

D. latum

- Usually asymptomatic, but mild symptoms may occur
- Megaloblastic anaemia may occur as a rare complication

Differential diagnosis

- Other intestinal worm infestations

Investigations

➢ Laboratory: eggs, worm segments in stool or collected from perianal skin (scotch tape method)

➢ Cysticercosis: hypereosinophilia in blood and CSF

Management

TREATMENT	LOC
Tapeworm	
▶ **Praziquantel** 5-10 mg/kg single dose	**HC3**
Alternative	
▶ **Niclosamide**	**HC4**
Adult and child > 6 years: 2 g single dose	
Child < 2 years: 500 mg	
Child 2-6 years: 1 g	
– Give **Bisacodyl** 2 hours after the dose	

Cysticercosis ▶ Refer to specialised facilties ▶ Antiparasitic treatment without diagnosis of location by CT or MRI scan can worsen symptoms, and even threaten the life of the patient. ▶ Neurosurgical treatment required	**RR**

Prevention

- Cook all fish and meat thorougly
- Proper hygiene: handwashing, nail cutting, proper disposal of faeces

2.4.2 Echinococcosis (Hydatid Disease)

ICD 10 CODE: B67

Tissue infestation by larvae of *Echinococcus granulosus.* It is transmitted through direct contact with dogs or by ingesting water and food contaminated by dog faeces.

Clinical features

- Cough, chest pain
- Liver cysts may be asymptomatic but may also give abdominal pain, palpable mass and jaundice (if the bile duct is obstructed)
- Rupture of cysts may cause fever, urticaria, or anaphylactic reaction
- Pulmonary cysts can be seen on chest X-ray and may rupture to cause cough, chest pain and haemoptysis

Differential diagnosis

- Amoebiasis, hepatoma
- Other causes of liver mass and obstructive jaundice
- Tuberculosis (TB)

Investigations

- Skin test
- Ultrasound
- Chest X-ray: for pulmonary cysts
- Serological tests
- Needle aspiration under Ultrasound Sonography (US) or CT-scan guidance

Management

TREATMENT	LOC
Refer for specialist management ▶ Surgical excision ***Prior to surgery or in cases not amenable to surgery*** ▶ **Albendazole** – *Child >2 years and adults:* 7.5 mg/kg every 12 hours for 3-6 months	**RR**

Prevention

- Food hygiene
- Health education
- Proper disposal of faeces

2.4.3 Dracunculiasis (Guinea Worm)

ICD10 CODE: B72

An infestation of the subcutaneous and deeper tissue with the guinea worm. **It is a notifiable disease.**

Cause

- *Dracunculus medinensis*, transmitted to man by drinking water containing cyclops (waterflea or small crustacean) infected with larvae of the guinea worm

Clinical features

- Adult worm may be felt beneath the skin
- Local redness, tenderness, and blister (usually on the

foot) at the point where the worm comes out of the skin to discharge larvae into the water
- There may be fever, nausea, vomiting, diarrhoea, dyspnoea, generalised urticaria, and eosinophilia before vesicle formation
- Complications may include cellulitis, septicaemia, and aseptic or pyogenic arthritis; tetanus may also occur

Differential diagnosis
- Cellulitis from any other causes
- Myositis

Investigations
➢ Recognition of the adult worm under the skin
➢ X-ray may show calcified worms

Management

TREATMENT	LOC
There is no known drug treatment for guinea worm ***All patients:*** ▶ To facilitate removal of the worm, slowly and carefully roll it onto a small stick over a period of days ▶ Dress the wound occlusively to prevent the worm passing ova into the water ▶ Give **analgesics** for as long as necessary ***If there is ulceration and secondary infection give:*** ▶ **Amoxicillin** 500 mg every 8 hours for 5 days *Child*: 250 mg every 8 hours for 5 days ▶ Or **cloxacillin** 500 mg every 6 hours for 5 days	**HC2**

Prevention
- Filter or boil drinking water
- Infected persons should avoid all contact with sources of drinking water

2.4.4 Lymphatic Filariasis ICD10 CODE: B74.9

Lymphatic filariasis is a disease caused by tissue dwelling nematode, transmitted by the *Aedes aegypti* mosquito bite

Causes

- *Wuchereria bancrofti*

Clinical features

Acute

- Adenolymphangitis- inflammation of lymph nodes and lymphatic vessels (lower limbs, external genitalia, testis, epididymis or breast)
- With or without general signs like fever, nausea, vomiting
- Attacks resolve spontaneously in one week and recur regularly in patients with chronic disease

Chronic

- Lymphoedema (chronic hard swelling) of limbs or external genitalia, hydrocele, chronic epididymo orchitis, initially reversible but progressively chronic and severe (elephantiasis)

Differential diagnosis

- DVT
- Cellulitis

Investigations

➢ Blood slide for Microfilaria (collect specimen between 9 pm and 3 am)

Management

TREATMENT	LOC
Case treatment ▶ Supportive treatment during an attack (bed rest, limb elevation, analgesics, cooling, hydration)	**HC2**

▶ **Doxycycline** 100 mg twice a day for 4-6 weeks (do not administer antiparasitic treatment during an acute attack) ***Chronic case*** ▶ Supportive treatment: bandage during the day, elevation of affected limb at rest, analgesics and surgery (hydrocelectomy) ***Large scale treatment/preventive chemotherapy*** Give annually to all population at risk, for 4-6 years ▶ **Ivermectin** 150-200 mcg/kg plus **albendazole** 400 mg single dose – Not effective against adult worms – Ivermectin is not recommended in children < 5 years, pregnancy, or breast-feeding mothers – No food or alcohol to be taken within 2 hours of a dose	

Prevention

- Use of treated mosquito nets
- Patient Education

2.4.5 Onchocerciasis (River Blindness)

ICD10 CODE: B73.0

Chronic filarial disease present in areas around rivers

Cause

- *Onchocerca volvulus*, transmitted by a bite from a female black fly (*Simulium damnosum, S. naevi* and *S. oodi*, etc), which breeds in rapidly flowing and well-aerated water

Clinical features

Skin

- *Onchocercoma:* painless smooth subcutaneous nodules containing adult worms, adherent to underlying tissues,

usually on body prominences like iliac crests, pelvic girdle, ribs, skull
- *Acute papular onchodermatitis:* Intense pruritic rash, oedema (due to microfilariae)
- Late chronic skin lesions: dry thickened peeling skin (lizard skin), atrophy, patchy depigmentation

Eye
- Inflammation of the eye (of the cornea, uvea, retina) leading to 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
- High eosinophils at the blood slide/CBC
- Excision of nodules for adult worms
- Slit-lamp eye examination for microfilariae in the anterior chamber of eye

Management

TREATMENT	LOC
Case treatment (adult worms) ▶ **Doxycycline** 100 mg twice a day for 6 weeks followed by ▶ **Ivermectin** 150 micrograms/kg single dose ***Mass treatment*** ▶ **Ivermectin** 150 micrograms/kg once yearly for 10-14 years (see also dose table below) – Not recommended in children <5 years, pregnancy, or breast-feeding mothers	**HC3**

– No food or alcohol should 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

Prevention

- Vector control
- Mass chemoprophylaxis

2.4.6 Schistosomiasis (Bilharziasis)

ICD10 CODE: B65.1

Disease of the large intestine and the urinary tract due to infestation by a Schistosoma blood fluke.

Causes

- The larvae form (cercariae) of *Schistosoma* penetrate the skin from contaminated water and they migrate to different parts of the body, usually the urinary tract (*Schistosoma haematobium*) and the gut (*S. mansoni*)

Clinical features

S. haematobium (urinary tract)

- Painless blood stained urine at the end of urination - terminal haematuria
- Frequent and painful micturition
- In females: low abdominal pain and abnormal vaginal discharge

- Late complications: fibrosis of bladder and ureters with increased UTI risks, hydronephrosis, infertility

S. mansoni (gastrointestinal tract)

- Abdominal pain, frequent stool with blood-stained mucus, hepatomegaly
- Chronic cases: hepatic fibrosis with cirrhosis and portal hypertension, haematemesis/melena are frequent

Differential diagnosis

- Cancer of the bladder (*S. haematobium*)
- Dysentery (*S. mansoni*)

Investigations

- History of staying in an endemic area (exposure to water bodies)
- Urine examination (for *S. haematobium ova*)
- Stool examination (for *S. mansoni ova*)
- Rectal snip (for *S. mansoni)*

Management

TREATMENT	LOC
▶ **Praziquantel** 40 mg/kg single dose ▶ Refer patient if they develop obstruction or bleeding	**HC4**

Prevention

- Avoid urinating or defecating in or near water
- Avoid washing or stepping in contaminated water
- Effective treatment of cases
- Clear bushes around landing sites

2.5 PROTOZOAL PARASITES

2.5.1 Leishmaniasis ICD10 CODE: B55

A chronic systemic infectious disease transmitted by the bite of a sand fly.

Cause

- Flagellated protozoa *Leishmania* species

Clinical features

Visceral Leishmaniasis (Kala-azar)

- Chronic disease characterized by fever, hepatosplenomegaly, lymphadenopathy, anaemia, leucopenia, progressive emaciation and weakness
- Fever of gradual onset, irregular, with 2 daily peaks and alternating periods of apyrexia
- The disease progresses over several months and is fatal if not treated
- After recovery from Kala-azar, skin (cutaneous) leishmaniasis may develop

Cutaneous and Mucosal Leishmaniasis (Oriental sore)

- Starts as papule, enlarges to become an indolent ulcer
- Secondary bacterial infection is common

Differential diagnosis

- Other causes of chronic fever, e.g. brucellosis
- (For dermal leishmaniasis) Other causes of cutaneous lesions, e.g. leprosy

Investigations

- ➢ Stained smears from bone marrow, spleen, liver, lymph nodes, or blood to demonstrate Leishman Donovan bodies
- ➢ Culture of the above materials to isolate the parasites
- ➢ Serological tests, e.g. indirect fluorescent antibodies
- ➢ Leishmanin skin test (negative in Kala-azar)

Management

Refer all cases to regional referral hospital

TREATMENT	LOC
Cutaneous Leishmaniasis (all patients) ▶ Frequently heals spontaneously but if severe or persistent, treat as for Visceral Leishmaniasis below ***Visceral Leishmaniasis (Kala-azar): All patients*** ▶ Combination: **Sodium stibogluconate** 20 mg/kg per day IM or IV for 17 days ▶ Plus **paromomycin** 15 mg/kg [11 mg base] per day IM for 17 days ***Alternative first line treatment is:*** ▶ **Sodium Stibogluconate** 20 mg/kg per day for 30 days (in case paromomycin is contraindicated) ***In relapse or pregnancy*** ▶ Liposomal **amphotericin B** (e.g. AmBisome) 3 mg/kg per day for 10 days ***In HIV+ patients*** ▶ **Liposomal amphotericin B** 5 mg/kg per day for 8 days	**RR**
Post Kala-Azar Dermal Leishmaniasis (PKDL) ▶ Rare in Uganda ▶ **Sodium Stibogluconate** injection 20 mg/kg/day until clinical cure. Several weeks or even months of treatment are necessary	**RR**
Note ◆ Continue treatment until no parasites detected in 2 consecutive splenic aspirates taken 14 days apart ◆ Patients who relapse after a 1st course of treatment with **Sodium stibogluconate** should immediately be re-treated with **Ambisome** 3 mg/kg/day for 10 days	

Prevention

- Case detection and prompt treatment
- Residual insecticide spraying
- Elimination of breeding places

2.5.2 Malaria

ICD10 CODE: B50

Malaria is an acute febrile illness caused by infection with Plasmodium parasites and is transmitted from person to person by an infected female anopheles mosquito.

Cause

- There are five Plasmodium species of malaria parasites which infect humans namely: *P. falciparum, P. vivax, P. ovale, P. malariae* and *P. knowlesi.*
  - *P. falciparum* is the most virulent and also the most common malaria parasite in Uganda.

2.5.2.1 Clinical Features of Malaria

- It may be asymptomatic, mild illness (uncomplicated malaria) or severe illness (severe malaria)
- Intermittent fever is the most characteristic symptom of malaria. Three classical stages can be distinguished in a typical attack of malaria:
  - *The cold stage:* the patient feels cold and shivers
  - *The hot stage:* the patient feels hot
  - *The sweating stage:* associated with sweating and relief of symptoms
- A complete physical examination has to be performed in any patient presenting with fever or history of fever
- When people are frequently exposed to malaria, they develop partial immunity. In such people, the classical stages of a malaria attack above may not be observed
- Also, in people who have had partial treatment with antimalarial medicines, these classical stages may not be pronounced

Uncomplicated Malaria

ICD 10 CODE: B50.9

Common symptoms/signs of uncomplicated malaria

- Fever: above 37.5°C (taken from the axilla) or history of fever
- Loss of appetite, mild vomiting, diarrhoea
- Weakness, headache, joint and muscle pain
- Mild anaemia (mild pallor of palms and mucous membranes); occurs commonly in children
- Mild dehydration (dry mouth, coated tongue, and sunken eyes). In adults, sunken eyes are usually a sign of severe dehydration
- Enlarged spleen (in acute malaria it may be minimally enlarged, soft and mildly tender)

Complicated/Severe Malaria

ICD10 CODE: B50.0, B50.8

It is an immediate threat to life and is therefore a medical emergency. Malaria is regarded as severe if there are asexual forms of *P. falciparum* in blood plus one or more of the following complications in the table below.

Classical definition of severe malaria

COMPLICATION	CRITERION FOR DIAGNOSIS
Defining manifestations	
Cerebral malaria	Deep coma (unable to localise a painful stimulus), Normal CSF, *parasitaemia*
Severe anaemia	Hb <5g/dl with *parasitaemia* (<7 g/dl in pregnancy)
Respiratory distress	Tachypnoea, nasal flaring and intercostal recession in a patient with *parasitaemia*
Hypoglycaemia	Blood glucose <40 mg/dl (2.2 mmol/L) with *parasitaemia*

COMPLICATION	CRITERION FOR DIAGNOSIS
Circulatory collapse	Clinical shock (systolic pressure <50 mmHg for children and <80mmHg for adults, with cold peripheries, clammy skin) with *parasitaemia*
Renal failure	Urine output < 12 ml/kg in 24 hours and plasma creatinine > 3.0 mg/dl, with *parasitaemia*
Spontaneous bleeding	P*arasitaemia* with unexplained spontaneous bleeding (haematemesis, melaena, or prolonged bleeding from nose, gum or venipuncture site
Repeated convulsions	2 or more convulsions in 24 hours, with *parasitaemia*
Acidosis	Deep (acidotic) breathing and plasma bicarbonate <15 mmol/L, with *parasitaemia*
Haemoglobinuria	*Parasitaemia*, haemoglobin in urine (dark coloured urine but no RBC's)
Pulmonary Oedema	Deep breathing, fast breathing, laboured breathing (nasal flaring, intercostal recession and chest in-drawing), Cheyne stokes breathing
Supporting manifestations (some other signs in addition to above complications)	
Impaired consciousness	*Parasitaemia* with depressed level of consciousness but can localize a painful stimulus, or change of behavior, confusion, drowsiness

COMPLICATION	CRITERION FOR DIAGNOSIS
Jaundice	*Parasitaemia* with unexplained jaundice
Prostration	Unable to sit, in a child normally able to do so or unable to drink in one too young to sit
Severe vomiting	Vomiting everything, not able to drink or breastfeed
Severe dehydration	Sunken eyes, coated tongue, lethargy, inability to drink
Hyperpyrexia	Temperature >39.50 C, with *parasitaemia*
Hyper-parasitaemia	Parasite count > 250,000 /µl, > 10%
Threatening abortion	Uterine contractions and vaginal bleeding

Differential diagnosis

- Respiratory tract infection
- Urinary tract infection
- Meningitis, otitis media, tonsillitis
- Abscess, skin sepsis
- Measles or other infections with rashes (before rash comes)

2.5.2.2 Investigations for Malaria

Note: All suspected malaria patients MUST be tested by blood slide or RDT before they are treated. NOT all fevers are malaria.

- RDT or thick blood slide for diagnosis of malaria
- Random blood sugar and Hb level if clinically indicated
- Lumbar puncture: in case of convulsion/coma and negative malaria tests

➢ Thin film for parasite identification

Note on RDTs

- RDTs (Rapid Diagnostic tests) detect malaria antigen (not whole parasites like the blood slide) and remain positive for 2 weeks after effective treatment
- RDT do not become negative if the patient has already taken antimalarials
- RDTs are reliable, quick and easily accessible tools for malaria diagnosis.

A blood slide for microscopy is specifically recommended over RDT in the following situations:

➢ Patients who have taken antimalarial treatment for 2 days and symptoms persist
➢ Patients who completed treatment but come back within 2 weeks
➢ RDT negative patients without any other evident cause of fever (current RDTs detect only *P.falciparum*)

2.5.2.3 Management of Malaria

NATIONAL MALARIA TREATMENT POLICY (2015)	
Uncomplicated Malaria	
All patients: including children <4 months of age and pregnant women in 2nd and 3rd trimesters	***First line medicine*** ▶ **Artemether/Lumefantrine** ***First line alternative*** ▶ **Artesunate/Amodiaquine** ***Second line medicine*** ▶ **Dihydroartemisin/ Piperaquine** ▶ If not available: quinine tablets
Pregnant women 1st trimester	▶ **Quinine** tablets ▶ ACT may be used if quinine not available

Severe Malaria	
All age groups or patient categories	***First line*** ▶ IV **Artesunate** ***First line alternative*** ▶ IV **Quinine** ▶ Or **Artemether** injection ***Pre-referral treatment*** ▶ Rectal artesunate
Intermittent preventive treatment in pregnancy	
▶ **Sulfadoxine/Pyrimethamine (SP)** for IPT. Start at 13 weeks and give monthly till delivery	

Treatment of uncomplicated malaria

The following tables contain dosages for medicines used in treatment of uncomplicated malaria.

Dosage of artemether/lumefantrine 20/120 mg

WEIGHT (KG)	AGE	DAY 1	DAY 2	DAY 3
5–14	4 months–3 years	1 tab twice daily	1 tab twice daily	1 tab twice daily
15–24	3–7 years	2 tab twice daily	2 tab twice daily	2 tab twice daily
25–34	7–12 years	3 tab twice daily	3 tab twice daily	3 tab twice daily
>35	> 12 years	4 tab twice daily	4 tab twice daily	4 tab twice daily
Note: Give doses every 12 hours				

Dosage of artesunate (AS) tablets 50 mg once a day

AGE	DAY 1	DAY 2	DAY 3
5–11 months	25 mg (½ tab)	25 mg (½ tab)	25 mg (½ tab)
1–6 years	50 mg (1 tab)	50 mg (1 tab)	50 mg (1 tab)
7–13 years	100 mg (2 tabs)	100 mg (2 tabs)	100 mg (2 tabs)
>13 years	200 mg (4 tabs)	200 mg (4 tabs)	200 mg (4 tabs)
Note: Do not use artesunate alone, give with amodiaquine tabs			

Dosage of amodiaquine (AQ) 153 mg tablets

AGE	DAY 1	DAY 2	DAY 3
5–11 months	76 mg (1/2 tab)	76 mg (1/2 tab)	76 mg (1/2 tab)
1–6 years	153 mg (1 tab)	153 mg (1 tab)	153 mg (1tab)
7–13 years	306 mg (2 tabs)	306 mg (2 tabs)	306 mg (2 tabs)
>13 years	612 mg (4 tabs)	612 mg (4 tabs)	612 mg (4 tabs)
Note: Do not use amodiaquine alone, use with artesunate tabs			

Dosage of dihydroartemisinin (DHA)/Piperaquine tablets (PPQ) (40/320 mg) tablets

WEIGHT (KG)	AGE	DAY 1	DAY 2	DAY 3
5–9.9	6 month–1 year	0.5	0.5	0.5
10–20	2–7 years	1	1	1

20–40	8–13 years	2	2	2
≥ 40	≥ 14 years	3	3	3

Dosage of quinine tablets (1 quinine tab = 300 mg salt)

WEIGHT (KG)	AGE	DOSE (TO BE GIVEN EVERY 8 HOURS FOR 7 DAYS)
5–10	3 months–1 year	75 mg (¼ tab)
10–18	1–5 years	150 mg (½ tab)
18–24	5–7 years	225 mg (¾ tab)
24–30	7–10 years	300 mg (1 tab)
30–40	10–13 years	375 mg (1¼ tab)
40–50	13–15 years	450 mg (1½ tab)
> 50	> 15 years	600 (2 tabs)

Management of severe malaria

General principles

- Manage complications as recommended in the section below
- Manage fluids very carefully. Adults with severe malaria are very vunerable to fluid overload, while children are more likely to be dehydrated
- Monitor vitals signs carefully including urine output
- Intravenous artesunate is the medicine of choice
  - At a health unit without admission and IV drug administration facilities, give a pre-referral dose of rectal artesunate (see dosing tables below) as soon as possible and refer for further management
  - At a health unit with admission and IV drug administration facilities, treat with IV artesunate as in the table below
  - If IV route is not possible, use IM route

- If artesunate not available, use IM **artemether** (into the thigh, never in the buttock) or IV **quinine**

Dosage of rectal artesunate in children

WEIGHT (KG)	AGE	ARTESUNATE DOSE (MG)	REGIMEN (SINGLE DOSE)
< 6	2–4 months	50 mg	1 supp (50 mg)
6–11.9	4 months-2 years	100 mg	2 supp (50 mg)
12–19	2–5 years	150 mg	3 supp (50 mg)
20–29	6–10 years	200 mg	1 supp (200 mg)
30–39	10–13 years	300 mg	1 supp (200 mg) + 2 supp (50 mg)

Note

- In the event that an artesunate suppository is expelled from the rectum within 30 minutes of insertion, insert a repeat dose.
- Hold the buttocks (especially in young children) together for 10 minutes to ensure retention of rectal dose

Dosage of rectal artesunate in adults

WEIGHT (KG)	ARTESUNATE DOSE	REGIMEN (SINGLE DOSE)
< 40	10 mg/kg bodyweight	Use appropriate number of rectal supp (see table above)
40–59	400 mg	2 supp of 200 mg
60–80	800 mg	4 supp of 200 mg
> 80	1200 mg	6 supp of 200 mg

Dosage of intravenous artesunate for severe malaria

Artesunate IV		
DOSE	**TIME**	**QUANTITY**
First dose: on admission Loading dose	At 0 hours	*Child less than 20 kg:* 3 mg/kg *Adults and child >20kg:* 2.4 mg/kg
Second dose	At 12 hours	
Third dose	At 24 hours	
Then once a day until patient is able to tolerate oral medication, then give a full course of oral ACT		

Preparation of IV or IM artesunate

- IV **artesunate** is usually dispensed in powder vial of 60 mg, pre-packed with **sodium bicarbonate** solution 1 ml
- Calculate the dose in mg according to the weight and the number of vials needed
- Reconstitute each vial separately, and use within 1 hour
- Reconstitution: inject all the content of the bicarbonate ampoule (1 ml) in the artesunate vial. Shake gently till solution become clear (discard if not clear after 2 minutes)

IV use

- Dilution: dilute solution by adding 5 ml of **sodium chloride** 0.9% (normal saline) or **Dextrose** 5%, obtaining a concentration of 10 mg/ml
- Calculate the required volume and withdraw
- Give by IV injection slowly over 5 minutes

IM use

- Dilution: dilute solution by adding 2 ml of **sodium chloride** 0.9%, obtaining a concentration of 20 mg/ml
  - Inject into the upper outer anterior thigh, NEVER in the buttock

DO NOT USE WATER FOR INJECTION FOR DILUTION

Dosage of IM artemether

Artemether		
DOSE	**TIME**	**QUANTITY**
First dose: on admission Loading dose	At 0 hours	3.2 mg/kg
Second dose	At 24 hours	1.6 mg/kg
Third dose	At 48 hours	1.6 mg/kg
Then once a day until patient is able to tolerate oral medication, then give a full course of oral ACT		

Dosage of quinine IV

Dose	▶ 10 mg/kg in **dextrose** 5% every 8 hours till patient is able to tolerate oral medication ▶ Then complete with a full dose of ACT (3 days) or quinine tablets to complete 7 days

2.5.2.4 Management of Complications of Severe Malaria

COMPLICATION	TREATMENT
Hyperpyrexia	▶ Give **paracetamol** 1 g every 6 hours *Child*: 10 mg/kg + tepid sponging + fanning

Convulsions	▶ Give **diazepam** 0.2 mg/kg (max 10 mg) slow IV or (in adults) IM or 0.5 mg/kg rectally ***If convulsions still persist:*** ▶ Give **phenobarbital** 200 mg IM/IV *Child*: 10-15 mg/kg loading dose then 2.5 mg/kg once or twice daily if still necessary or ▶ Or **phenytoin** 15 mg/kg loading dose
Hypoglycaemia	▶ *Adult:* **dextrose 25%** 2 ml/kg by slow IV bolus over 3-5 min (to prepare, take dextrose 50% 1 ml/kg and dilute with an equal volume of water for injections) ▶ *Child:* **dextrose 10%** 5 ml/kg by slow IV bolus over 5-7 min (to prepare, take 1 ml/kg of dextrose 50% and dilute with 4 ml/kg water for injection) ▶ DO NOT GIVE UNDILUTED 50% dextrose ▶ Monitor blood glucose frequently ▶ Ensure patient is feeding
Acidosis	▶ Correct fluid & electrolyte balance ▶ If there is severe acidosis without sodium depletion: – Give **sodium bicarbonate** 8.4% infusion 50 ml IV – Monitor plasma pH

Severe anaemia	▶ Do blood grouping and cross-matching ▶ Transfuse patient with **packed cells** 10-15 ml/kg or **whole blood** 20 ml/kg especially if the anaemia is also causing heart failure ▶ Repeat Hb before discharge and preferably 28 days after discharge
Pulmonary Oedema	▶ Regulate the IV infusion (do not overload with IV fluids) ▶ Prop up the patient ▶ Give **oxygen** ▶ Give **furosemide** 1-2 mg/kg
Acute Renal Failure	▶ Urine output: <17 ml/hour for adult or <0.3 ml/kg/hour for a child ▶ Check to ensure that the cause of oliguria is not dehydration or shock ▶ *If due to acute renal failure*: Give a challenge dose of **furosemide** 40 mg IM or slow IV (*child*: 1 mg/kg) ***If this fails:*** ▶ Refer for peritoneal dialysis or haemodialysis
Shock	▶ If systolic BP <80 mmHg (adult) or <50 mmHg (*child*) or if peripheral pulse absent and capillary refill is slow (>2 seconds) – Raise the foot of the bed – Give **sodium chloride** 0.9% by fast IV infusion bolus 20 ml/kg in 15 min – Review fluid balance and urinary outputs

	– Look for evidence of haemorrhage or septicaemia and treat accordingly
Haemoglobinuria (intravascular haemolysis)	▶ Rehydrate the patient ▶ Assess for anaemia and transfuse if necessary
Dehydration	▶ Rehydrate using ORS or IV RL or NS (see rehydration, section **1.1.3**) ▶ Over-enthusiasitc IV infusion may harm the patient and lead to fluid overlaod and pulmonary oedema
Bleeding	▶ Transfuse patient with **whole fresh blood** to provide lacking clotting factors
Coma	▶ Check and treat for hypoglycaemia: if not responding within 20 min, consider another cause ▶ Provide intensive nursing care with: – IV drip (for rehydration and IV medication) – NGT (for feeding and oral medication) – Urethral catheter (to monitor urine output) – Turning of patient frequently to avoid bed sores

Criteria for referral to regional/tertiary hospital

- Persistent renal failure needing dialysis
- Any complication that cannot be managed locally

2.5.2.5 Management of RDT/Blood Smear Negative Patients

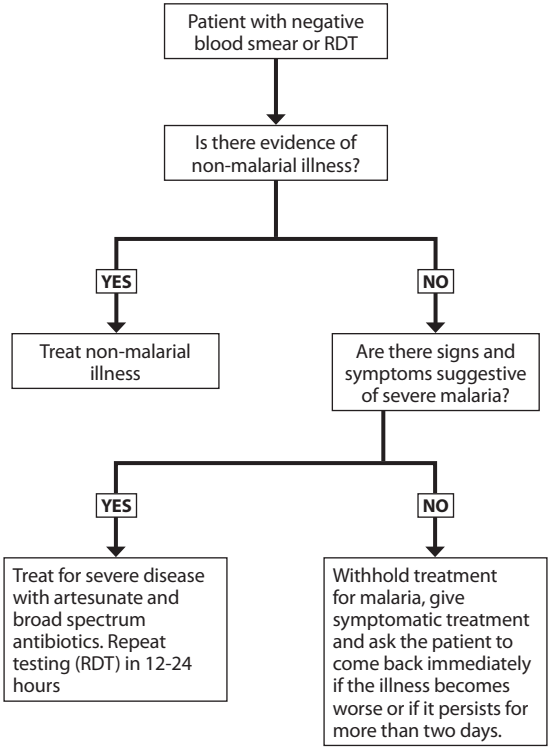
Patients who have a negative malaria test (most likely, if RDT is used) do not have malaria so other causes of fever have to be investigated for appropriate treatment.

- Re-assess patient history, clinical signs and laboratory results. Consider other frequent causes of fever such as:
  - If running nose, sore throat and cough: viral upper respiratory infection
  - If swollen tonsils with exudate on it: tonsilitis
  - If ear pain and discharge: otitis
  - If cough, rapid breathing and difficulty in breathing: pneumonia
  - If urinary symptoms: urinary tract infection
  - If vomiting, diarrhoea and abdominal pain: gastro-enteritis
  - If skin rash: measles or other viral rash
- If malaria is still suspected, investigate according to the flowchart below
  - If signs/symptoms of severe malaria, RDT and blood slide negative but no other diagnosis is found, consider treating for malaria anyway but repeat RDTs after 24 hours to confirm
  - If RDT and blood slide negative, no signs of other illness and no signs of severe sickness (patient has no danger signs) treat symptomatically with antipyretics, advise patient to return immediately if condition worsens or in 2 days if fever persists.

Possible reasons for false negative tests (test is negative but patient has malaria):

- Low peripheral parasitaemia
- Technical error in performing the test or test reagents that are out of date

- Sequestration of parasites in the internal organs
- Having already taken antimalarial drugs, inadequate or incomplete dose: this affects only microscopy, while RDT remains positive even if the patient has already taken an antimalarial
- Using prophylactic treatment for malaria



2.5.2.6 Malaria Prophylaxis

Not recommended for all those living in a highly endemic area like Uganda. However, it is recommended for certain high-risk groups but is *not 100% effective.*

PATIENT GROUP	PROPHYLAXIS
Pregnancy In endemic areas, pregnant women carry malaria parasites in their blood or placenta, which is harmful to the health of both mother and foetus	▶ Give **intermittent preventive treatment (IPT)** to ensure the well-being of mother and foetus ▶ **SP single dose** (3 tabs) given at 13 weeks and continued monthly until delivery ▶ Ensure doses are taken under supervision by the health provider as directly observed therapy (DOT) ▶ Record doses on the patient's card and treatment register and summarise further in the delivery book and monthly returns ▶ Do not give SP in HIV patients on **cotrimoxazole**
Sicke cell disease	▶ **Chloroquine** *Adult:* 300 mg base weekly *Child*: 5 mg (base)/kg weekly ▶ or **Sulphadoxine-pyrimethamine (SP)** - see **section 11.1.3**
People living with HIV	▶ **Cotrimoxazole** daily as per national guidelines
Non-immune visitors/tourists	▶ **Mefloquine** *Adult:* 250 mg once weekly *Child*: 5 mg/kg once weekly

2.5.2.7 Malaria Prevention and Control

Give effective treatment and prophylaxis

- Eliminate parasites from the human population by early diagnosis and effective treatment
- Protect vulnerable groups with chemoprophylaxis
- Give IPT to all pregnant women

Reduce human-mosquito contact

- Use insecticide-treated materials (e.g. bed nets)
- Destroy adult mosquitoes by indoor residual spraying of dwellings with insecticide or use of knock-down sprays
- Screen houses
- Carefully select house sites avoiding mosquito-infested areas
- Wear clothes which cover the arms and legs and use repellent mosquito coils and creams/sprays on the skin when sitting outdoors at night

Control mosquito breeding sites

- Eliminate collections of stagnant water where mosquitoes breed, e.g. in empty cans/ containers, potholes, old car tyres, plastic bags, and footprints by disposal, draining, or covering with soil or sand
- Destroy mosquito larvae by dosing stagnant water bodies with larvicides or with biological methods (e.g. larvae-eating fish)

Give public health education on the above measures

2.5.3 Human African Trypanosomiasis (Sleeping Sickness)

ICD10 CODE: B56

A disease caused by trypanosomes (a protozoa) and transmitted to humans by several species of tsetse fly

Cause

- *Trypanosoma rhodesiense* (mostly in the Central and Eastern regions of Uganda)
- *Trypanosoma gambiense* (mostly in West Nile region)

Clinical features

- May be history of tsetse fly bite and swelling at site of bite after 7-14 days (more often in *T. rhodesiense*, rarely in *T. Gambiense)*

T. Rhodesiense

- Incubation is 2-3 weeks
- Early stage (haemolymphatic stage): headache not responding to common analgesics, fever, generalised lymphadenopathy, joint pains
- Late stage (meningoencephalitis stage): after some weeks, neurological and psychiatric symptoms like apathy, day sleepiness, paralysis, seizures
- If not treated: cachexia, lethargy, coma and death within 3-6 months

T. gambiense

- Similar to the rhodesiense but less acute and with slower progression
- Incubation can last several years

Differential diagnosis

- Malaria, meningitis
- TB, HIV/AIDS

Investigations

➢ Blood: Slides for trypanosomes

➢ CSF: For trypanosomes, lymphocyte count
➢ Aspirate from chancre/lymph node: for trypanosomes

Management

This is based on the findings of the CSF analysis, determining the stage of disease. To determine the medicine of choice, the disease is divided into two stages: *early* and *late stage*

STAGE	FEATURES
Early (first) stage	• CSF is normal • Lymphocytes <5 cells/mm^3 • Total protein <37 mg/dl (by dye-binding protein assay) or < 25 mg/dl (by Double Standard & Centrifuge Method) • Absence of trypanosomes (by Double Standard and Centrifuge Method)
Late (second) stage	• Lymphocytes > 5 cell/ mm3 And/or • Presence of trypanosomes

Patient with suspected or diagnosed sleeping sickness should be managed at referral facilities.

TREATMENT	
Early (first) stage ***T. rhodesiense sleeping sickness*** For both children and adults ▶ **Suramin** IV – A test dose of 5 mg/kg of body weight should first be administered to test for anaphylactic reaction – Followed by five injections of 20 mg/kg every 5 days interval Day 0: 5 mg/kg body weight Day 3: 20 mg/kg body weight Day 8: 20 mg/kg body weight	**RR**

Day 13: 20 mg/kg body weight Day 18: 20 mg/kg body weight Day 23: 20 mg/kg body weight If anaphylaxis: do not administer ***T. gambiense sleeping sickness*** For both children and adults ▶ **Pentamidine** IM 4 mg/kg daily for 7 days – Give food 1 hour before to prevent hypoglycaemia – The patient should be in a supine position during administration and 1 hour after to prevent hypotension	
Late (second) stage ***T. rhodesiense sleeping sickness*** For both children and adults ▶ IV **Melarsoprol** 2.2 mg/kg body weight daily for 10 days ***T.gambiense sleeping sickness*** ***Children ≤ 12 years and <35 kg*** ▶ **Eflornithine** IV 150 mg/kg 6 hourly for 14 days (total dose of 600 mg/kg/day. Dilute 150 mg/kg dose of eflornithine into the 100 ml of distilled water. Administer the infusion over at least 2 hours ***Children >12 years up to 15 years*** ▶ **Eflornithine** IV 100 mg/kg 6 hourly for 14 days (total dose of 400 mg/kg per day). Dilute the eflornithine dose of 100 mg/kg into the 100 ml of distilled water. Administer the infusion over at least 2 hours (rate 20 drops/minute)	

Adults >15 years

- **Nifurtimox/Elfornithine** combination therapy (NECT)
- **Nifurtimox:** 5 mg/kg every 8 hours orally for 10 days (15 mg/kg/day)
- Plus Eflornithine 200 mg/kg 12 hourly for 7 days (400 mg/kg/day). Dilute Eflornithine dose of 200 mg/kg into 250 ml of distilled water and administer the infusion over at least 2 hours (50 drops/minute)
- Infusions are given slowly to prevent convulsions

Relapses

▶ IV **melarsoprol** 2.2 mg/kg once daily for 10 days

Note

- **Corticosteroids**: Should be given to patients with late trypanosomiasis on melarsoprol who may have hypoadrenalism - the steroids may also reduce any drug reactions
- Do not give hydrocortisone after day 24, even though the melarsoprol treatment is not yet complete
- If **prednisolone** is used instead of hydrocortisone, the anti-inflammatory action is similar but the correction of the hypoadrenalism will be much less marked
- **Suramin**: Do not use this medicine for early or late stage *T. gambiense* treatment in onchocerciasis-endemic areas as it may cause blindness in any onchocerciasis-infected patients by killing the filariae in the eye

Prevention

- Trapping of tsetse flies
- Clearing of bushes around homes and paths
- Early detection and treatment of cases

3. HIV/AIDS and Sexually Transmitted Infections

Always refer to the latest Ministry of Health *PMTCT, ART, and STI Guidelines* for the management of HIV and Sexually Transmitted Infections. This section has been adapted from the "*Consolidated guidelines for prevention and treatment of HIV in Uganda, 2016*".

3.1 HIV INFECTION AND ACQUIRED IMMUNODEFICIENCY SYNDROME (AIDS)

ICD 10 CODE: B20

Acquired Immunodeficiency Syndrome (AIDS) is a condition of reduced immunity as a result of infection with the Human Immunodeficiency Virus (HIV). HIV should be confirmed with an HIV test.

Test and Treat policy
Uganda has adopted the "Test and Treat Policy", which involves providing lifelong antiretroviral therapy (ART) to ALL people living with HIV irrespective of CD4 count or clinical staging.

Causes

- Human Immunodeficiency Virus

Modes of transmission

- Sexual intercourse with an HIV-infected person
- Transfusion with HIV-infected blood
- Mother-To-Child Transmission during pregnancy, delivery, or through breastfeeding

- HIV-contaminated sharp instruments, e.g. dental and surgical equipment, needles, scalpels, razors, hair shaving equipment, nail cutters, and other sharp objects
- Exposure to HIV-infected materials through an open wound or cut

Epidemiological risk factors for HIV

- Present or past high-risk behaviour (multiple sexual partners)
- Loss of a spouse or partner from HIV disease
- Having sexually transmitted infections, especially Herpes simplex virus type 2
- Being an uncircumcised man
- Being in an HIV-discordant sexual relationship or marriage
- History of blood transfusion between 1975 and 1986

3.1.1 Clinical Features of HIV

The **WHO Clinical Staging of HIV for adults and children** in the tables below shows the typical clinical features of HIV infection. The staging is based on demonstration of one or more opportunistic infections or key findings and correlates with disease progression and prognosis of survival.

WHO Staging for HIV Infection and Disease in Adults and Adolescents

Clinical Stage I: Asymptomatic

1. Asymptomatic
2. Persistent generalised lymphadenopathy

Performance Scale 1: asymptomatic, normal activity

Clinical Stage II: Mild

1. Moderate weight loss (< 10% of presumed or measured body weight)
2. Minor mucocutaneous manifestations (seborrheic dermatitis, prurigo, fungal nail infections, recurrent oral ulcerations, angular stomatitis/cheilitis)
3. Herpes zoster within the last 5 years
4. Recurrent upper respiratory tract infections (e.g. bacterial sinusitis, tonsillitis, otitis media, and pharyngitis)

And/or performance scale 2: symptomatic but normal activity

Clinical Stage III: Advanced

1. Severe weight loss (more than 10% of presumed or measured body weight)
2. Unexplained chronic diarrhoea for longer than 1 month
3. Unexplained persistent fever, intermittent or constant, for longer than 1 month
4. Persistent oral candidiasis
5. Oral hairy leukoplakia
6. Pulmonary tuberculosis
7. Severe bacterial infections (such as pneumonia, pyomyositis, empyema, bacteraemia or meningitis)
8. Acute necrotizing ulcerative stomatitis, gingivitis or periodontitis
9. Unexplained anaemia (< 8 g/dl), neutropenia (< 0.5×10^9 per litre), or chronic thrombocytopenia (< 50×10^9 per litre)

And/or performance scale 3: Bed ridden for less than 50% of the day during the last month

Clinical Stage IV: Severe

1. HIV wasting syndrome: weight loss of more than 10% and unexplained chronic diarrhoea for more than 1 month, chronic weakness, or unexplained prolonged fever for more than 1 month
2. Pneumocystis jirovecii pneumonia (PCP)
3. Recurrent severe bacterial pneumonia
4. Toxoplasmosis of the brain
5. Cryptosporidiosis with diarrhoea for longer than 1 month
6. Chronic isosporiasis
7. Extrapulmonary cryptococcosis including meningitis
8. Cytomegalovirus infection (retinitis or other organs)
9. Herpes simplex virus (HSV) infection (orolabial, genital or anorectal of >1 month's duration or visceral at any site)
10. Progressive multifocal leukoencephalopathy (PML)
11. Any disseminated endemic mycosis such as histoplasmosis, coccidioidomycosis
12. Candidiasis of the oesophagus, trachea, bronchi, or lungs
13. Disseminated non-tuberculous mycobacterial infection
14. Recurrent septicaemia (including non-typhoid salmonella)
15. Extrapulmonary tuberculosis
16. Lymphoma (cerebral or B-cell non-Hodgkin)
17. Invasive cancer of the cervix
18. Kaposi sarcoma
19. HIV encephalopathy – disabling cognitive and/or motor dysfunction interfering with activities of daily living, progressing slowly over weeks or months, in the absence of concurrent illness or condition other than HIV infection that could account for the findings

20. Atypical disseminated leishmaniasis
21. Symptomatic HIV-associated nephropathy or symptomatic HIV associated cardiomyopathy

And/or performance scale 4: Bed-ridden for more than 50% of the day during the last month

WHO Clinical Staging of HIV for Infants and Children with HIV Infection

Clinical Stage I: Asymptomatic

1. Asymptomatic
2. Persistent generalised lymphadenopathy

Clinical Stage II: Mild

1. Unexplained persistent hepatosplenomegaly
2. Papular pruritic eruptions
3. Extensive wart virus infection
4. Extensive molluscum contagiosum
5. Recurrent oral ulceration
6. Unexplained persistent parotid enlargement
7. Lineal gingival erythema
8. Herpes zoster
9. Recurrent or chronic upper respiratory tract infections (otitis media, otorrhoea, sinusitis, tonsillitis)
10. Fungal nail infections

Clinical Stage III: Advanced

1. Unexplained moderate malnutrition not adequately responding to standard therapy
2. Unexplained persistent diarrhoea (14 days or more)
3. Unexplained persistent fever (above 37.5°C, intermittent or constant for longer than one month)
4. Persistent oral candidiasis (after first 6 weeks of life)
5. Oral hairy leukoplakia
6. Acute necrotizing ulcerative gingivitis/periodontitis

7. Lymph node TB
8. Pulmonary TB
9. Severe recurrent bacterial pneumonia
10. Symptomatic lymphoid interstitial pneumonitis
11. Chronic HIV-associated lung disease including bronchiectasis
12 Unexplained anaemia (< 8 g/dL), neutropenia (< 0.5 x 10^9/L) or chronic thrombocytopenia (< 50 x 10^9/ L)

Clinical Stage IV: Severe

1. Unexplained severe wasting, stunting or severe malnutrition not responding to standard therapy
2. Pneumocystis jirovecii pneumonia (PCP)
3. Recurrent severe bacterial infections (e.g. empyema, pyomyositis, bone or joint infection, meningitis but excluding pneumonia)
4. Chronic herpes simplex infection (orolabial or cutaneous of more than one month's duration, or visceral at any site)
5. Extrapulmonary TB
6. Kaposi sarcoma
7. Oesophageal candidiasis (or candidiasis of trachea, bronchi or lungs)
8. Central nervous system toxoplasmosis (after the neonatal period)
9. HIV encephalopathy
10. Cytomegalovirus (CMV) infection, retinitis, or of other organs with onset at age > 1 month
11. Extrapulmonary cryptococcosis (including meningitis)
12. Disseminated endemic mycosis (extrapulmonary histoplasmosis, coccidiomycosis)
13. Chronic cryptosporidiosis (with diarrhoea)
14. Chronic isosporiasis

15. Disseminated non-tuberculous mycobacterial infection
16. Cerebral or B cell non-Hodgkin lymphoma
17. Progressive multifocal leukoencephalopathy
18. HIV-associated cardiomyopathy or nephropathy

Differential diagnosis

- TB
- Untreated diabetes mellitus
- Malnutrition
- Cancer
- Other chronic diseases

3.1.2 Diagnosis and Investigations of HIV

HIV testing is the point of entry into comprehensive care HIV services. Since an early diagnosis is fundamental for early treatment, good prognosis and reduction in transmission, HIV testing should be offered to all patients at any level of care and at any occasion possible: **provider-initiated HIV testing and counselling.**

Pre and post counselling and consent are needed except in the following situations:

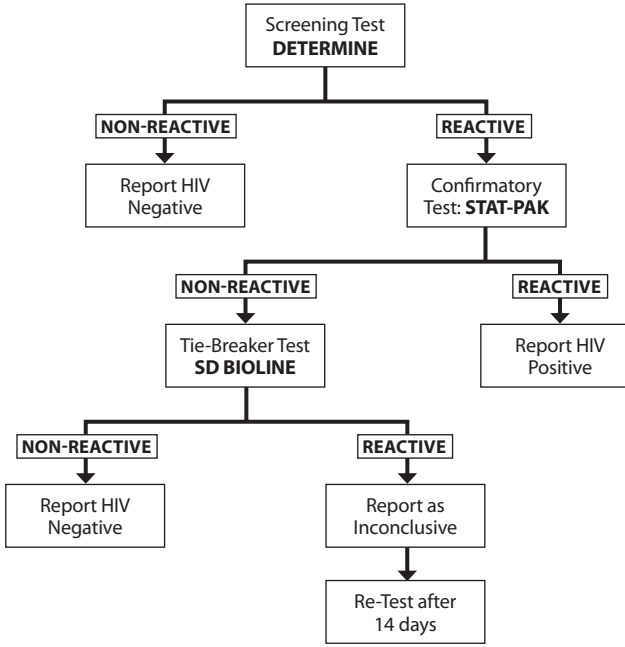
- **Diagnostic testing:** test carried out on very sick, unconscious, symptomatic or mentall ill by attending health care team for the purpose of better patient management
- **Routine testing:** for individuals likely to pose a risk of HIV infection to others e.g. pregnant and breastfeeding mothers, sexual offenders and survivors, blood or body tissue or organ donors. Individuals tested using this appraoch must be given an opportunity to know their status

If a patient is positive, he/she must be IMMEDIATELY connected to HIV care services.

In adults and children >18 months, testing is based on serological (antibody) testing.

Due to the window period between infection and production of detectable levels of antibodies, patients who are negative should be re-tested after three months if they had a possible exposure in the 3 months before the test.

Serial HIV Testing Algorithm for testing persons above 18 months of age in Uganda, 2016



Serological testing is available from HC2 level.

In children below 18 months, testing is virological, that is based on direct detection of viral DNA (DNA-PCR). Virological testing (DNA-PCR and viral load) is done on DBS (dried blood spots) samples which can be collected from HC2 and are sent to a central national laboratory through the hub system.

HIV testing in children less than 18 months

The recommended test for children <18 months is virological (DNA-PCR) testing, since antibody tests will detect antibodies passed to the child from the mother (so the test can give a false positive).

If the mother is HIV negative:

- The child is classified was HIV negative

If the mother if positive:

- Do DNA PCR at 6 weeks of age or at an earlier opportunity thereafter
  - Start cotrimoxazole prophylaxis till HIV status is confirmed
- If PCR is positive, enroll child for ART
- If PCR is negative and child never breasfed: child is negative.
  - Stop cotrimoxazole.
  - Follow up every 3 months and do HIV rapid test (serological) at 18 months.
- If PCR is negative BUT child is breastfeeding/has breasfed in the last 6 weeks, re-check PCR 6 weeks after cessation of breastfeeding.

If mother's status is unknown:

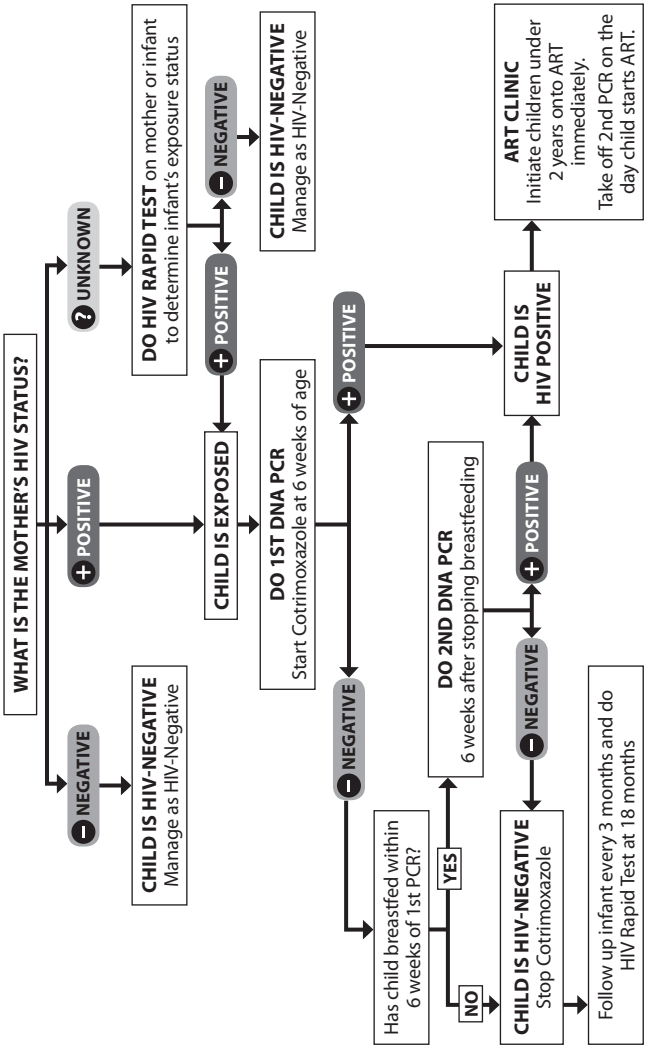
- Test the mother and continue management according to the result

If mother unavailable:

- Perform rapid antibody testing on the child. The result will give indication on the mother's status:
  - If the test is negative: mother and child negative
  - If the test is positive, follow algorithm for positive mother.

Other tests in HIV management

TEST	DESCRIPTION	LOC
CD4	It measures the level of CD4 T lymphocytes, a subtype white blood cell. It reflects the level of compromise of the immune system. It is used for initial assessment pre ART and for monitoring of ART effect.	**HC2**
Viral Load	It measures the quantity of virus in the blood. It is used to monitor the effect of ARVs. It is currently done by DBS (Dried Blood Spot)	**HC2**


WHAT IS THE MOTHER'S HIV STATUS?
NEGATIVE
CHILD IS HIV-NEGATIVE
Manage as HIV-Negative
POSITIVE
UNKNOWN
DO HIV RAPID TEST on mother or infant to determine infant's exposure status
POSITIVE
NEGATIVE
CHILD IS EXPOSED
CHILD IS HIV-NEGATIVE
Manage as HIV-Negative
DO 1ST DNA PCR
Start Cotrimoxazole at 6 weeks of age
NEGATIVE
POSITIVE
Has child breastfed within 6 weeks of 1st PCR?
YES
NO
DO 2ND DNA PCR
6 weeks after stopping breastfeeding
CHILD IS HIV-NEGATIVE
Stop Cotrimoxazole
NEGATIVE
POSITIVE
CHILD IS HIV POSITIVE
ART CLINIC
Initiate children under 2 years onto ART immediately.
Take off 2nd PCR on the day child starts ART.
Follow up infant every 3 months and do HIV Rapid Test at 18 months

3.1.3 Management of HIV Infection

HIV is managed through a comprehensive approach that combines specific ARV treatment with other measures including prophylaxis against opportunistic infections, counselling and adherence support.

3.1.3.1 Measures before ARV Treatment

Even without the use of specific ARV treatment, there are many ways in which good HIV management can help patients:

TREATMENT	LOC
Prophylaxis against opportunistic infections ▶ **Cotrimoxazole** 960 mg once daily for adults and children >30 kg *Child* <5 kg: 120 mg once daily *Child* 5-14.9 kg: 240 mg once daily *Child* 15-29.9 kg: 480 mg once daily ▶ Contraindications: known allergies, severe anaemia and neutropenia ▶ Alternative: **dapsone** *Adults and child >12 years*: **dapsone** 100 mg daily *Children below 12 years:* **dapsone** 2 mg/kg daily	**HC2**
IPT (Isoniazid Preventive treatment) ▶ Give **isoniazid** daily for 6 months in all adults, adolesents and children >12 months living with HIV and in whom TB disease has been excluded ▶ If child <12 months, give only if history of contact with TB case and no active disease – Dose 5 mg/kg in adults (max 300 mg) and 10 mg/kg in children (max 300 mg)	**HC3**

Prompt and appropriate medical care ▶ By treating opportunistic infections as they occur ▶ By treating symptoms, such as pain, diarrhoea, and skin problems, as they develop ▶ Going for treatment promptly if unwell	**HC3**
Positive living ▶ Encouraging patient/family to help themselves by: – Eating a balanced diet – Engaging in regular exercise – Keeping active and resting well – Spending quality time with family and friends – Obtaining support from a counsellor – Abstaining from sex or being faithful to one partner – Using a condom to help ensure safe sex	**HC2**

3.1.3.2 General Principles of Antiretroviral Treatment (ART)

Initial evaluation checklist for patients starting ART

Before initiating ART, a full evaluation of the patient must be done. This includes:

- Assessment of the history, physical exam and baseline laboratory tests to assess disease progression and any other conditions
- Staging the patient's stage using WHO clinical staging
- Counselling and assessing patient's readiness to start ART

Assessment of patient's history

- Level of understanding of HIV/AIDS
- Length of time since the diagnosis of HIV infection
- Demographics and lifestyle: whether employed and nature of work
- History of previous ART, prior use of **nevirapine** during pregnancy

- Pregnancy risks: contraception options and choices, current or planned pregnancy, access to contraceptive services
- Sexual risks and disclosure: willingness to practice safer sex, disclosure of HIV serostatus, use of condoms, HIV counselling, and testing of sex partners and children
- Symptoms of chronic pain and depression
- History of opportunistic infections and other significant illnesses e.g. TB and STIs, hospitalisations, and surgeries
- Current medications (including anti-TB drugs, traditional therapies, etc.)

Physical exam

- Weight
- Nutritional status
- Functional capacity and level of disability
- Vital signs, skin, eyes, oropharynx (presence of thrush), lymph nodes, lungs, heart, abdomen, genital tract (STIs), extremities, nervous system

Baseline laboratory tests to assess immunosuppression and disease aggressiveness

- Confirming HIV serostatus
- CD4 testing
- Pregnancy test
- Full blood count particularly for patients starting on a AZT-containing regimen

Baseline Labs to assess general health and diagnose any pre-existing HIV complications

- Sputum smear for AFB for patients who have coughed for > 2-3 weeks and a chest X-ray for patients who have unproductive cough or whose AFB smears are negative
- Urine analysis for proteinuria, particularly for patients starting on TDF-containing regimen
- Syphilis screening
- Hepatitis B screening

- Liver and renal function tests if available
- Cryptococcal antigen screening for patients whose CD4 count is < 100 cells/ml
- Symptom-directed lab tests to diagnose pre-existing illnesses

Staging of disease

- Using WHO clinical criteria (see tables above)

Counselling and assessment of patient's readiness to start therapy

- Assess for education, information or counselling support needs
- Develop an adherence plan

Background of ART

A cure for HIV is not yet available, but by using highly active antiretroviral therapy (HAART), it is possible to promote growth in children and prolong the survival of all HIV infected patients, reduce their morbidity, and improve their quality of life.

Highly active antiretroviral therapy (HAART) is defined as therapy which is potent enough to suppress HIV viraemia to undetectable levels (< 50 copies/mL), and is durable in its virologic effect.

- HAART conventionally includes three or more medicines from at least two classes to achieve full and durable suppression of viral load
- Known sub-optimal regimens, e.g. monotherapy, double nucleoside, or certain triple nucleoside combinations are not HAART and are contraindicated in HIV disease

Goals of treatment with antiretroviral medicines are to:

- Inhibit viral replication as reflected in plasma HIV concentration to as low as possible and for as long as possible. This promotes restoration of the immune system.

- Preserve or enhance the immune function (CD4 restoration), which prevents/delays the clinical progression of HIV disease
- Minimise toxicities and side effects associated with the medicines
- Improve quality of life and reduce HIV-related morbidity and mortality
- Promote growth and neurological development in children

Tools to achieve the goals of therapy

- Maximisation of adherence to ART: adequate support to patient to adhere to treatment and/or access to community/facility level adherence counselling
  - Disclosure of HIV serostatus reinforces patient's adherence to ART
- Rational sequencing of medicines to preserve future treatment options
- Use of ARV medicine resistance testing when appropriate and available
- Use of viral load estimates for monitoring

Principles of ART

Antiretroviral therapy is part of comprehensive HIV care. The guiding principles of good ART include:

- Efficacy and durability of the chosen medicine regimens
- Freedom from serious adverse effects; low toxicity
- Ease of administration including no food restrictions, better palatability, and lower pill burden
- Affordability and availability of medicines and medicine combinations
- Organised sequencing – spares other available formulations for use in second line while allowing for harmonisation of regimens across age and population
- Ongoing support of the patient to maintain adherence

Limitations of ART

- Antiretroviral medicines are not a cure for HIV but greatly improve quality of life when used appropriately
- ARVs are relatively expensive, require an adequate infrastructure, and knowledgeable healthcare workers
- Medicine interactions and resistance may decrease the potency of ARVs
- Patients may develop adverse medicine reactions
- Patients have to take at least 95% of their pills in order to respond well (adherence is key to successful therapy)
- The medications have to be taken for life
- Some patients may not respond (benefit) to treatment and continue to regress in spite of high adherence
- Children are dependent on adults for adherence to ART

Available agents for ART

At present, antiretroviral medicines come in six classes, which attack different sites and stages of the HIV life cycle, thereby interfering with its reproduction.

CLASS	EXAMPLES
Nucleoside reverse transcriptase inhibitors (NtRTIs) incorporate themselves into the DNA of the virus, thereby stopping the building process	**Tenofovir** (TDF) **Zidovudine** (AZT) **Lamivudine** (3TC) **Abacavir** (ABC)
Non-nucleoside reverse transcriptase inhibitors (NNRTIs) stop HIV production by binding directly onto the reverse transcriptase enzyme, and prevent the conversion of RNA to DNA	**Efavirenz** (EFV) **Nevirapine** (NVP) **Etravirine** (ETV)

Integrase inhibitors interfere with the HIV DNA's ability to insert itself into the host DNA and copy itself.	**Dolutegravir** (DTG) **Raltegravir** (RAL)
Protease inhibitors (PIs) prevent HIV from being successfully assembled and released from the infected CD4 cell. Boosted PIs are combinations of low-dose ritonavir (RTV) with a PI for pharmacoenhancement	**Atazanavir** (ATV) **Lopinavir** (LPV) **Darunavir** (DRV) **Ritonavir** (RTV, abbreviated as "r" if boosting other PIs, e.g. ATV/r, LPV/r
Entry inhibitors (HIV fusion inhibitors) prevent the HIV virus particle from infecting the CD4 cell	**Enfuvirtide** (T-20)
CCR5 antagonists block the CCR5 co-receptor molecules that HIV uses to infect new target T-cells. Some forms of HIV use a different co-receptor and thus, some patients may not benefit from maraviroc	**Maraviroc**

Initiation of ART

It is recommended to initiate ART at the earliest opportunity in all documented HIV-infected adults, adolescents and children regardless of CD4 count and WHO clinical staging (Test and Treat)

Evidence and programmatic experience have shown that early initiation of ART results in reduced mortality, morbidity and HIV transmission outcomes. However, priority should be given to patients with lower CD4 counts as well as those who are symptomatic

A CD4 count is not necessary for initiation but it can be useful to assess risk of opportunistic infections.

ART in children

The vast majority (about 90%) of infants and children with HIV acquire the infection through mother-to-child transmission.

HIV infection follows a more aggressive course among infants and children than among adults; 30% die by age 1 year and 50% die by age 2 years without access to life-saving medicines, including ART and preventive interventions, such as cotrimoxazole prophylaxis.

Early HIV diagnosis and ARV treatment is critical for infants. A significant number of lives can be saved by initiating ART for HIV-positive infants immediately after diagnosis within the first 12 weeks of life.

General principles

- ARV doses need to be adjusted from time to time as the children grow quickly and thus, their weight changes.
- Before a child begins ART, the following assessments must be made:
  - Readiness of parents/caretakers or child (if older) to start ART
  - Complete pre-treatment baseline assessment (see previous sections)

3.1.3.3 Recommended First Line Regimens in Adults, Adolescents, Pregnant Women and Children

HIV management guidelines are constantly being updated according to evidence and public policy decisions. Always refer to the latest official guidelines.

The current edition of UCG comes just before the new ART guidelines are being rolled out. Prescribers should continue to use the 2014 guidelines where drugs prescribed in the 2016 guidelines are not available.

ART regimens in children are age and weight dependent. When children grow, doses and regimens have to be changed according to guidelines below.

E.g. a child started at age 2 on ABC+3TC+LPV/r will transition to ABC+3TC+EFV when age >3 and weight >15 kg..

PATIENT CATEGORY	INDICATION	ARV REGIMEN
Adults and adolescents aged 10 years and older (>35 kg)	**Recommended 1st Line Regimen** • Adults and adolescents initiating ART	TDF+3TC+EFV[1]
	If EFV is contraindicated[2]	TDF+3TC+ NVP (2014 guidelines)
		TDF+3TC+DTG (2016 guidelines)

	If TDF is contraindicated[3]	AZT+ 3TC+ EFV AZT + 3TC + NVP (2014 guidelines)
		ABC+3TC+DTG (2016 guidelines)
Pregnant and breastfeeding women	**Recommended 1st Line Regimen** • Pregnant OR breastfeeding women initiating ART	TDF+3TC+EFV[1]
	If TDF[3] and/ or EFV[2] contraindicated	ABC + 3TC + ATV/r
Children aged 3 to less than 10 years old or <35kg	**Recommended 1st Line Regimen** • Children 3-< 10 years initiating ART	ABC+3TC+EFV
	If EFV is contraindicated[2]	ABC + 3TC+NVP (2014 and 2016 guidelines)
Children <3 years of age or <15 kg	**Recommended 1st Line Regimen** • Children <3 years initiating ART	ABC+3TC+LPV/r Syrup or Pellets[4] (2014 and 2016 guidelines)
	If unable to use LPV/r	ABC + 3TC + NVP (2014 and 2016 guidelines)

Notes

1 **TDF/3TC/EFV** has low toxicity, once daily administration, and is effective against hepatitis B. It is a relatively inexpensive regimen and does not cause anaemia as AZT (which can then be reserved for second line). EFV has less risk of treatment failure than NVP.

2 **Contraindications for EFV:**
- Severe clinical depression or psychosis
- Patient receiving Benzodiazepines or Carbamazepine
- Ongoing complications of neurological disease that block ability to assess side effects of EFV
- Age < 3 yrs or weight < 15 kg

3 **Contraindications for TDF**
- Renal disease and/or GFR < 60
- Adolescents below 35 kg

4 Children unable to swallow pellets can start on nevirapine and then be switched to LPV/r when able to swallow

- Triple NRTI regimens are now discouraged due to high virological failure rates and decrease of patient's future ART options

Important drug interactions

- Oral contraceptives: EFV/NVP increase their metabolism causing possible increased risk of contraceptive failure. Use additional barrier method
- Injectable progesteron-only contraceptives and IUDs: there is no significant interaction with ARVs and can be used effectively
- Levonorgestrel implants: effect reduced by EFV and NVP, use additional barrier method
- For emergency contraception: double the dose
- Rifampicin: increase metabolism of PI/nevirapine. See TB-HIV section.

3.1.3.4 Monitoring of ART

The purpose of monitoring patients on ART is to assess:

- Response to ART and early detection of treatment failure
- Side effects and toxicity
- Adherence

The schedule of monitoring visits follow a pre-set calendar for the 1st one year after initiation of ART, i.e:

- At 1, 2 and 3 months from start of ART
- At 6, 9, 12 months

After 12 months from initiation of ART, the *Differentiated Model of Care Delivery* is followed, in which schedule and modalities of periodic checks are based on individual needs and characteristics of the patient.

The aim of this model is:

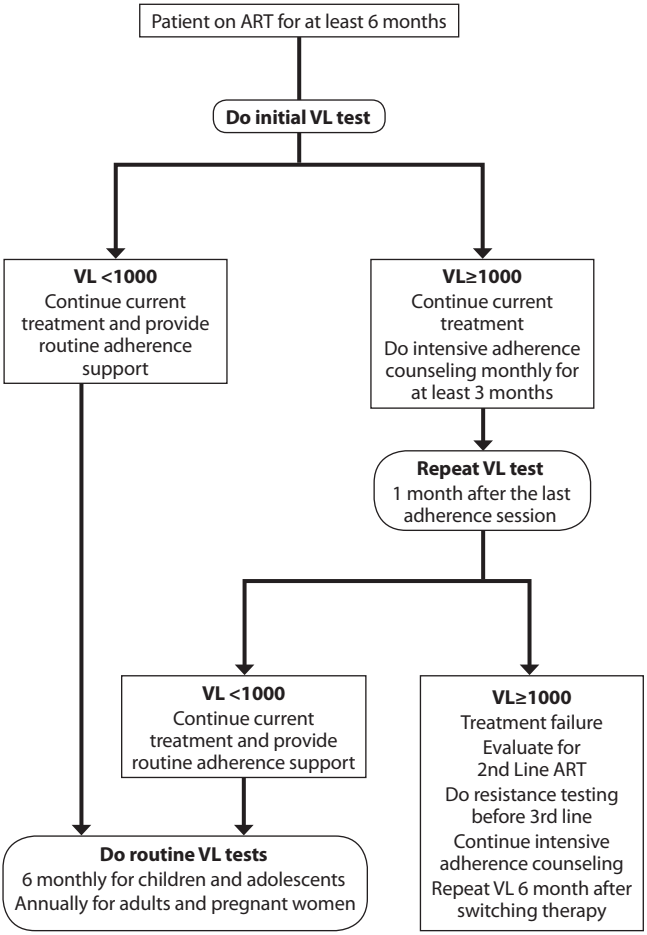
- A client centered approach, so that stable patients have spaced checks and fast tracks drug pick ups
- More efficient use of resources by avoiding overcrowding and long waiting times
- More focus on unstable/complex patients

(Refer to MOH HIV/ART guidelines for more details).

TYPE OF MONITORING	COMPONENTS
Clinical Monitoring	– Screen for and manage opportunistic infections (OI) and STI – Assess for pregnancy, and/or use or need of FP – Screen and manage co-morbidities including depression – Weight and nutritional assessement – Disclosure

	For children and adolescents: – Growth and development, school attendance, behavioural issues, sexual awareness
Laboratory Monitoring	**Viral load** ➢ Is preferred method to monitor response to ART and treatment failure: – First VL: done at 6 months from initiation – In adults: annually thereafter if patient is suppressed (< 1000 copies/ml) – In children and adolescents < 19 years: every 6 months if patient is suppressed – In pregnant women: at first ANC visit regardless of previous checks – If patients not suppressed: see algorithm below
	CD4 monitoring ➢ Recommended at baseline to screen for risk of opportunistic infections ➢ In patients who are suppressed but are in clinical stage 3-4 ➢ In patients on prophylaxis for cryptococcus to inform decison on when to stop fluconazole
	Other tests – According to clinical findings

Viral load testing algorithm



3.1.3.5 ARV Toxicity

ARV drugs can cause a wide range of toxicities, from mild to life threatening.

Active monitoring and management of toxicities and side effects is important not only to avoid negative medical outcome but also to ensure that they do not negatively affect adherence.

CATEGORY	ACTION
Severe Life-Threatening Reactions (e.g. SJS/TEN, severe hepatitis	**Immediately** discontinue all ARV drugs (possibly all drugs in general), manage the medical event and substitute the offending drug when the patient is stabilised
Severe Reactions (e.g. Hepatitis, anaemia)	Stop the offending drug and substitute it without stopping the ART (if clinically possible)
Moderate Reactionsy (Gynaecomastia, lipodystrophy)	Substitute with a drug in the same ARV class but with a different toxicity profile, or with a drug in a different class Do not discontinue ART. Continuation of ART as long as feasible. If the patient does not improve on symptomatic therapy, consider single-drug substitution
Mild Reactions (Headache, minor rash, nausea)	Do not discontinue or substitute ART. Reassure the patient or caregiver that while the reaction may be bothersome, it does not require a change in therapy and often it subsides in few weeks.

	Provide support to mitigate the adverse reactions as well as counseling about the events

DRUG AND SIDE EFFECTS	MANAGEMENT
Zidovudine (AZT) ***Mild toxicities*** Blue to black discoloration of nails, nausea, and headache ***Major toxicities*** – Anaemia, neutropenia – Lactic acidosis, fatty liver – Myopathy, liposystrophy – Severe vomiting – Diabetes mellitus	▶ Avoid if Hb < 7.5 g/dL ▶ Transfuse if needed ▶ Replace with TDF or ABC
Nevirapine (NVP) ***Mild toxicities*** – Skin rash ***Major toxicities*** – Acute symptomatic hepatitis – Severe hypersensitivity (SJS, TEN)	▶ Use loading dose (1/2 dose for 2 weeks) ▶ If mild: continue cautiously, give anti-histamine ▶ If severe: substitute with DTG
Dolutegravir (DTG) ***Major toxicities*** – Hepatitis, hypersensitivity	▶ Replace with ATV/r
Abacavir (ABC) ***Major toxicities*** – Hypersensitivity reaction – Lactic acidosis and hepatosteatosis	▶ Replace with TDF or AZT

Tenofovir (TDF) ***Mild toxicity*** – Sleep disturbances, headache, dizziness, stomach upset ***Major reaction*** – Renal dysfunction (weeks to months) – Reduced mineral density – Lactic acidosis, fatty liver	▶ Subsitute with ABC
Efavirenz (EFV) ***Mild toxicities*** Dizziness, headache, sleep disturbances, rash ***Major toxicities*** – Pesistent CNS symptoms, confusion, psychosis, convulsions – Hepatitis, gynaecomastia	▶ If mild rash and CNS disturbances, reassure and wait ▶ If severe, replace with NVP/DTG
Lopinavir/ritonavir (LPV/r) ***Mild reaction*** – Gastrointestinal upset ***Major reaction*** – Hepatotoxicity – Pancreatitis, dyslipidemia – ECG abnormalities – Patient unable to tolerate taste	▶ Substitute with NVP ▶ If dyslipidemia switch to ATV/r ▶ Avoid in patients with ECG abnormalities

Atazanavir/ritonavir (ATV/r) ***Mild toxicity*** – Benign unconjugated hyperbilirubinemia – Nephrolithiasis ***Major toxicity*** – Dyslipidemia – ECG abnormalities (prolonged PR/QRS)	▶ If hyperbilirubinemia, reassure ▶ If dyslipidemia: treat with atorvastatin 10 mg ▶ Use with caution in patient with ECG abnormalities ▶ Increase hydration if history of kidney stones
Raltegravir (RAL) ***Major reactions*** – Rhabdomyolisis, myopathy	**Management** ▶ Switch to PI or etravirine

3.1.3.6 Recommended Second Line Regimens in Adults, Adolescents, Pregnant Women and Children

Patients may need to be swiched to second line regimens in case of treatment failure, and to third line if they fail on second line drugs. Third line regimens require resistance testing to inform the choice of appropriate drugs, and needs referral to specialised ART centres.

Factors involved in treatment failure are poor adherence, inadequate drug levels or prior existing drug resistance.

Before switching therapy, it is essential to assess and address adherence issues, and provide intensive adherence counselling if necessary.

Criteria for defining treatment failure are presented in the following table:

DEFINITION	COMMENT
VIROLOGICAL FAILURE Two consecutive viral loads >1000 copies/ml, done at three to six months apart, with intensive adherence support following the 1st VL test	Patient should have been on ART for at least six months
CLINICAL FAILURE ***Adults and adolescents:*** New or recurrent WHO clinical stage 3 or 4 (with exception of TB) in a patient who has been on effective ART regimen for at least six months ***Children:*** New or recurrent WHO clinical stage 3 or stage 4 event (with the exception of TB) in a patient who has been on effective ART regimen for at least six months	The condition must be differentiated from Immune Reconstitution Inflammatory Syndrome (IRIS) occurring after initiating ART

POPULATION	FAILING FIRST-LINE REGIMENS	SECOND-LINE REGIMENS
Adults, Pregnant and Breastfeeding Women, and Adolescents	TDF + 3TC + EFV	AZT+3TC+ATV/r (Recommended) or AZT+3TC+LPV/r[1] (alternative)
	TDF + 3TC + DTG	
	TDF+3TC+NVP	
	ABC+ 3TC+ DTG	
	ABC+ 3TC+ EFV	
	ABC+3TC+NVP	
	AZT+3TC+EFV	TDF+3TC+ATV/r (Recommended) or TDF+3TC+LPV/r
	AZT+3TC+NVP	
	TDF+3TC+ATV/r	AZT/3TC/LPV/r[2]
	AZT+3TC+ATV/r	TDF/3TC/LPV/r[2]
Children 3 – 9.9 Years	ABC + 3TC + EFV	AZT+3TC+LPV/r[3]
	ABC+ 3TC + NVP	
	AZT+3TC+NVP	ABC+3TC+LPV/r[3]
	AZT/3TC/EFV	
	AZT+3TC+LPV/r	ABC+3TC+RAL
	ABC+3TC+LPV/r	AZT+3TC+RAL
Children Under 3 Years	ABC+3TC+LPV/r Pellets	AZT+3TC+RAL
	AZT+3TC+LPV/r pellets	ABC+3TC+RAL
	ABC +3TC+NVP	AZT+3TC+LPV/r

1 LPV/r should be used as alternative to ATV/r ONLY if patient weighs < 40 kg
2 LPV/r can be used by ATV/r experienced individuals
3 Lopinavir in children 3-10 years is preferred because there is no optimal formulation of ATV/r yet

Paediatric ARV Dosing Tables

FORMULATION	WEIGHT (KG) 3–5.9	6–9.9	10–13.9	14–19.9	20–24.9	25–34.9
ABC/3TC 120/60mg Take at night	1 od	1.5 od	2 od	2.5 od	3 od	
AZT/3TC 60/30mg	1 bd	1.5 bd	2 bd	2.5 bd	3 bd	
AZT/3TC/NVP 60/30/50mg	1 bd	1.5 bd	2 bd	2.5 bd	3 bd	
ABC 60mg Take at night	1 od	1.5 od	2 od			
EFV 200 mg Take at night			1 od	1.5 od	1.5 od	2 od
NVP 10 mg/ml syrup	5ml bd	8 ml bd	10 ml bd			
NVP 50 mg tablet	1 bd	1.5 bd	2 bd	2.5 bd	3 bd	
LPV/r 40/10 mg[1] pellets	2 bd	3 bd	4 bd			
LPV/r 100/25 mg tablet[2]			2 om 1 on	2 bd	2 bd	3 bd
Ral 100 mg chewable tab				1 bd	1.5 bd	
DRV 75 mg + (RTV 100 mg)[3]			3 bd	5 bd	5 bd	
RTV 25 mg				2 bd	2 bd	3 bd

FORMULATION	WEIGHT (KG) 3–5.9	6–9.9	10–13.9	14–19.9	20–24.9	25–34.9
Cotrimoxazole 120 mg	1 od	2 od	2 od	4 od		
Isoniazid 100 mg	0.5 od	1 od	1.5 od	2 od	2.5 od	

Notes

- **od = once daily, bd = twice daily, om = morning, on = night**

1 For children ≥10 kg that are able to swallow tablets, give LPV/r 100/25 mg tablet

2 Tablets of LPV/r 100/25 mg can be substituted with 1 tablet of LPV/r 200/50 mg in order to reduce the pill burden. Administer tablets fully intact/whole i.e. not cut or crushed

3 DRV must be administered with 2 tablets of RTV 25 mg in children ≤15 to 25 kg and 3 tablets of RTV 25 mg in children above 25 kg. DRV is always taken with food

4 DRV 600 mg must be co-administered with RTV 100 mg

5 SQV 500 mg must be co-administered with RTV 100 mg, and should only be used in adolescents and adults above 16 years

Adult ARV Dosing Tables

FORMULATION	WEIGHT (KG) 20–24.9	25–34.9	ADOLESCENTS >35 KG AND ADULTS
ABC/3TC 600/300 mg		1 od	1 od
AZT/3TC 300/150 mg		1 bd	1 bd

FORMULATION	WEIGHT (KG)		
	20–24.9	25–34.9	ADOLESCENTS >35 KG AND ADULTS
AZT/3TC/NVP 300/150/200 mg		1 bd	1 bd
TDF/3TC/EFV 300/300/600 mg			1 od, At night
DTG 50 mg			1 od
LPV/r 200/50 mg	1 bd	2 in morn 1 at night	2 bd
ATV/r 300/100 mg			1 od
RAL 400 mg Twice daily		1 bd	1 bd
DRV 600 mg[1] (+ RTV 100 mg)			1 bd
RTV 100 mg			1 bd
ETV 200 mg			1 bd
SQV 500 mg[2] (+ RTV 100 mg)			2 bd
Cotrimoxazole 960 mg	0.5	1 od	1 od
Dapsone 100 mg		1 od	1 od
Isoniazid 300 mg		1 od	1 od

Notes

1 DRV 600 mg must be co-administered with RTV 100 mg

2 SQV 500 mg must be co-administered with RTV 100 mg, and should only be used in adolescents and adults above 16 years.

3.1.4 Mother-to-Child Transmission of HIV

Approximately one-third of the women who are infected with HIV can pass it to their babies.

Cause

Time of transmission

- During pregnancy (15-20%)
- During time of labour and delivery (60%-70%)
- After delivery through breast feeding (15%-20%)

Pre-disposing factors

- High maternal viral load
- Depleted maternal immunity (e.g. very low CD4 count)
- Prolonged rupture of membranes
- Intra-partum haemorrhage and invasive obstetrical procedures
- If delivering twins, first twin is at higher risk of infection than second twin
- Premature baby is at higher risk than term baby
- Mixed feeding carries a higher risk than exclusive breastfeeding or use of replacement feeding

Investigations

- Blood: HIV serological test
- HIV DNA PCR testing of babies (see algorithm in section 3.1.2 above)

Management

All HIV services for pregnant mothers are offered in the MCH clinic. After delivery, mother and baby will remain in the MCH postnatal clinic till HIV status of the child is confirmed, then they will be transferred to the general ART clinic.

The current policy aims at **elimination of Mother-to-Child Transmission (eMTCT)** through provision of a continuum of care with the following elements:

- Primary HIV prevention for men, women and adolescents
- Prevention of unintended pregnancies among women living with HIV
- Prevention of HIV transmission from women living with HIV to their infants
- Provision of treatment, care and support to ALL women infected with HIV, their children and their families

3.1.4.1 Management of HIV Positive Pregnant Mother

Key Interventions for eMTCT

- Routine HIV Counseling and Testing during ANC (at 1st contact. If negative, repeat HIV test in the third trimester/ labour.
- Enrolment in HIV care if mother is positive and not yet on treatment
- If mother already on ART, perform viral load and continue current regimen
- ART in pregnancy, labour and post-partum, and for life – Option B+

Management

TREATMENT	LOC
Recommended ARV for option B+ ▶ One daily Fixed Dose Combination (FDC) pill containing **TDF + 3TC + EFV** started early in pregnancy *irrespective of the CD4 cell count* and continue during labour and delivery, and for life ***Alternative regimen for women who may not tolerate the recommended option are:*** ▶ If TDF contraindicated: ABC+3TC+EFV ▶ If EFV contraindicated: TDF + 3TC + ATV/r (see section 3.1.3.3)	**HC2**

Prophylaxis for opportunistic infections	**HC2**
▶ **Cotrimoxazole** 960 mg 1 tab daily during pregnancy and postpartum – Mothers on cotrimoxazole DO NOT NEED IPTp with SP for malaria	

Notes

- TDF and EFV are safe to use in pregnancy
- Those newly diagnosed during labour will begin HAART for life after delivery

Caution

△ In case of low body weight, high creatinine, diabetes, hypertension, chronic renal disease, and concomitant nephrotoxic medications: perform renal function investigations before starting TDF

△ TDF is contraindicated in advanced chronic renal disease

3.1.4.2 Care of HIV Exposed Infant

HIV-exposed infants should receive care at the mother-baby care point together with their mothers until they are 18 months of age. The goals of HIV-exposed infant care services are:

- To prevent the infant from being HIV infected
- Among those who get infected: to diagnose HIV infection early and treat
- Offer child survival interventions to prevent early death from preventable childhood illnesses

The HIV Exposed Infant and the mother should consistently visit the health facility at least nine times during that period.

The visits are synchronised with the child's immunisation schedule (i.e., at 6, 10 and 14 weeks, then at 5, 6, 9, 12, 15 and 18 months).

Management

TREATMENT	LOC
Nevirapine prophylaxis ▶ Provide **NVP** syrup from birth for 6 weeks ▶ Give NVP for 12 weeks for babies at *high risk,* that is breastfeeding infants who mothers: – Have received ART for 4 weeks or less before delivery; or – Have VL >1000 copies in 4 weeks before delivery; or – Diagnosed with HIV during 3rd trimester or breastfeeding period (Postnatal) ▶ Do PCR at 6 weeks (or at first encounter after this age) and start cotrimoxazole prophylaxis – If PCR positive, start treatment with ARVs and cotrimoxazole and repeat PCR (for confirmation) – If PCR negative and baby never breastfed, child is confirmed HIV negative. Stop cotrimoxazole, continue clinical monitoring and do HIV serology test at 18 months. – If PCR negative but baby has breastfed/is breasfeeding, start/continue cotrimoxazole prophylaxis and repeat PCR 6 weeks after stopping breastfeeding ▶ Follow up **any** exposed child and do PCR if they develop any clinical symptom suggestive of HIV at any time and independently of previously negative results ▶ For negative infants, do serology at 18 months before final discharge	**HC3**

Dosages of nevirapine – *Child 0-6 weeks, 2-2.5 Kg:* 10 mg once daily (1 ml of syrup 10 mg/ml) – *Child 0-6 weeks, >2.5 kg:* 15 mg once daily (1.5 ml of syrup 10 mg/ml) – *Child 6 weeks – 12 weeks:* 20 mg once daily (2 ml)	
Cotrimoxazole prophylaxis ▶ Provide cotrimoxazole prophylaxis to all HIV-exposed infants from 6 weeks of age until they are proven to be uninfected. Dosages: *Child <5 kg:* 120 mg once daily *Child 5-14.9 kg:* 240 mg once daily ▶ Infants who become HIV infected should continue to receive cotrimoxazole prophylaxis for life ▶ If cotrimoxazole is contraindicated, offer **dapsone** at a dose of 2 mg/kg once daily (up to 100 mg max)	**HC2**
Isoniazid (INH) preventive therapy (IPT) ▶ Give INH for six months to HIV-exposed infant who are exposed to TB (close contact with PTB case) after excluding TB disease (see section **5.3.2.3**). ▶ Dose: **Isoniazid** 10 mg/kg + **pyridoxine** 25 mg daily ▶ For newborn infants, if the mother has TB disease and has been on anti-TB drugs for at least two weeks before delivery, INH prophylaxis is not required.	**HC3**

Immunisation ▶ Immunise HIV exposed children as per national immunisation schedule ▶ In case of missed BCG at birth, do not give if child has symptomatic HIV ▶ Avoid yellow fever vaccine in symptomatic HIV ▶ Measles vaccine can be given even in symptomatic HIV	

Counselling on infant feeding choice

- Explain the risks of HIV transmission by breastfeeding (15%) and other risks of not breastfeeding (malnutrition, diarrhoea)
- Mixed feeding may also increase risk of HIV transmission and diarrhoea
- Tell her about options for feeding, advantages, and risks
- Help her to assess choices, decide on the best option, and then support her choice

Feeding options

- **Recommended option:** Exclusive breastfeeding then complementary feeding after child is 6 months old
- Exclusive breastfeeding stopping at 3-6 months old if replacement feeding possible after this
- If replacement feeding introduced early, mother must stop breastfeeding
- Replacement feeding with home-prepared formula or commercial formula and then family foods (provided this is acceptable, feasible, safe, and sustainable/ affordable)

If mother chooses breastfeeding

- The risk may be reduced by keeping the breasts healthy (mastitis and cracked nipples raise HIV infection risk)
- Advise exclusive breastfeeding for 3-6 months

If mother chooses replacement feeding

- Counsel and teach her on safe preparation, hygiene, amounts, times to feed the baby etc.
- Follow up within a week from birth and at any visit to health facility.

3.1.5 Opportunistic Infections in HIV

3.1.5.1 Tuberculosis and HIV Co-Infection

Active TB may be present when ART needs to be initiated or it may develop during treatment.

TB and HIV care for co-infected patients should be provided in an integrated manner under one roof by one care team (one-stop-shop).

Co-management of TB and HIV is complicated by:

- Drug interactions between rifampicin and both the NNRTI and PI classes
- Immune reconstitution inflammatory syndrome (IRIS)
- Pill burden, overlapping toxicities and adherence issues.

Management

ART should be initiated in all TB/HIV co-infected people irrespective of their clinical stage or CD4 count. However, the timing of initiation of treatment may differ based on whether the patient is diagnosed with TB before or after initiating ART.

SITUATION	RECOMMENDATIONS
TB patients diagnosed with HIV	Start anti-TB medicines immediately, THEN start ARVs 2 weeks later (see table below)
Patient already on ART, diagnosed with TB	Start anti-TB medicines immediately, adjust regimen as per guidelines below

ADULT TB patients diagnosed with TB but with CD4 <50	Start anti-TB medicines immediately, start ARVs before completing 2 weeks

ARV regimen in ART-naive patients on TB treatment

AGE GROUP	RECOMMENDED REGIMEN
Adults, Pregnant and Breastfeeding Women, and Adolescents	TDF+3TC+EFV
Children aged 3 - < 12 years	ABC+3TC+EFV
Children 0 - < 3 years	ABC+3TC+AZT

ARV regimen substitution for patients initiating TB treatment while on ART

AGE GROUP	REGIMEN WHEN DIAGNOSED WITH TB	RECOMMENDED ACTION/ SUBSTITUTION
Adults, Pregnant and Breastfeeding Women and Adolescents	If on EFV-based regimen	Continue with the same regimen
	If on DTG based regimen	Continue the same regimen but double the dose of DTG (give DTG twice daily)
	If on NVP based regimen	Substitute NVP with EFV. If EFV is contraindicated, give DTG as above. If DTG not available, give a triple NRTI regimen (ABC+3TC+AZT).

	If on LPV/r based regimen	Continue the same regimen and give Rifabutin for TB treatment
	If on ATV/r based regimen	
Children aged 3 - <12 years	If on EFV-based regimen	Continue the same regimen
	If on NVP or based regimen	Substitute NVP with EFV. If EFV is contraindicated, give a triple NRTI regimen (ABC+3TC+AZT)
	LPV/r	Continue the same regimen and give Rifabutin for TB treatment
Children 0 - <3 years	If on LPV/r or NVP based regimen	Give triple NRTI regimen ABC+3TC+AZT

Second line ART for patients with TB

- There are significant drug interactions with PIs and rifampicin.
- If **rifabutin** is available, it may be used in place of **rifampicin** with ATV/r or LPV/r, but it is contraindicated in patients with WBC counts below 1000/mm^3.
- Maintaining PI in second line regimens while switching from Rifampicin to Rifabutin (if available) is ideal

TB prevention

- BCG immunisation: it protects children against severe forms of TB. It can be given at birth. If delayed, avoid in symptomatic HIV
- IPT (Isoniazid Preventive Treatment) (see section 5.3.2.3)

3.1.5.2 Cryptococcal Meningitis

ICD10 CODE: B45

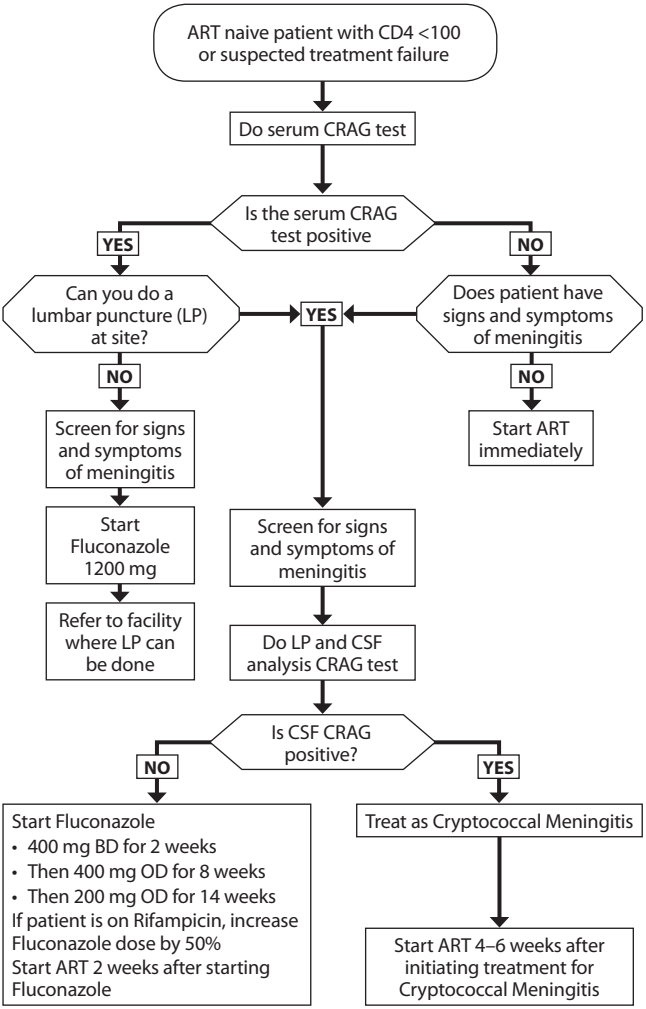
Crytococcal meningitis is an opportunistic infection caused by a fungus *Cryptococcus neoformans*.

In Uganda, cryptococcal meningitis (CM) associated mortality is up to 39%. Patients with a CD4 cell count of <100 are at the highest risk, so early screening and management is critical.

Screening In ART-Naive Patients

- Screen routinely for Cryptococcal Meningitis with the cryptococcal antigen (CrAg) test (a bedside finger prick test):
  - All ART naive individuals with CD4 <100 cells/μL
  - Patients on ART with viral load (VL >1000 copies/ml) or clinical (stage 3 or 4 disease) failure
- If serum CrAg negative and no signs of meningitis: start ART immediately (or switch regimen)
- If CrAg positive and/or signs or symptoms of meningitis (headache, presence of seizures, altered consciousness, photophobia, neck stiffness, and a positive Kernigs' sign)
  - Perform lumbar puncture and test for CSF CrAg (culture if possible)
- If CSF CrAg positive, diagnose and treat for Cryptococcal Meningitis
- If CSF CrAg negative but blood CrAg positive, give pre emptive treatment for asymptomatic cryptococcal disease or non CNS cryptococcal disease

Cryptococcal screening algorithm



Management

Pre-emptive treatment for cryptococcoal disease

TREATMENT	LOC
Induction Phase ▶ **Fluconazole** 800 mg for 2 weeks or 12 mg /kg/day for individuals below 19 years ***Consolidation Phase*** ▶ **Fluconazole** 400 mg (or 6 mg/kg/day up to 400 mg) for 8 weeks ***Maintenance dose*** ▶ **Fluconazole** 200 mg for 14 weeks	**HC4**

Cryptococcal Meningitis

- It commonly presents with headache, fever, malaise developing over 1-2 weeks, progressing into confusion, photophobia, stiff neck

➢ Diagnosis is through identification of the microorganism in the CSF with Indian Ink stain, antigen in CSF or culture

Management

TREATMENT	LOC
Induction phase (2 weeks)	
Recommended:	
▶ **Amphotericin** B 0.7-1 mg/kg/day +	**H**
▶ **Flucytosine** (100 mg/kg/day in four divided doses)	**RR**
OR	
High-dose **fluconazole** 800 mg/day (12 mg/kg in children)	**HC4**
OR	
▶ **Amphotericin B** short course 5-7 days + high-dose **fluconazole** 800 mg/day, (12 mg/kg in children)	

Alternative: ▶ **Fluconazole** 1200 mg/day (12 mg/kg/day in children and adolescents <19kg)	
Consolidation phase (8 weeks) ▶ **Fluconazole** 400-800 mg/day (or 6-12 mg/kg/day in children) if Amphotericin is used in induction phase ▶ **Fluconazole** 800 mg (12 mg/kg/day) if amphotericin short course-high dose fluconazole regimen used ▶ Initiate ART 4-6 weeks after starting CM treatment and there is clinical response to antifungal therapy	**HC4**
Maintenance phase ▶ **Fluconazole** 200 mg/day (or 6 mg/kg/day max 200 mg for children) ***Criteria for stopping after 1 year of maintenance phase*** – *Adults* VL <1,000 copies/mm3 & CD4 ≥100 for 6 months or CD4 ≥200 if viral load not available. – *Children:* If CD4% >25% or suppressed viral load	**HC4**
Adequate control of elevated CSF pressure ▶ Control of increased intracranial pressure improves survival by 25% in persons with cryptococcal meningitis ▶ All patients with a CSF Pressure >250 mmHg will need a therapeutic LP the following day to reduce the CSF pressure to < 200 mmHg ▶ In the absence of a manometer, one may use an IV giving set to create an improvised manometer measuring the height with a meter stick	

▶ Removing 20-30 mL of CSF (even in the absence of a manometer) may be adequate to decrease CSF pressure. Most patients will need 2-3 LPs during the induction phase	

Notes

Preventing Amphotericin toxicity:

- To prevent nephrotoxicity and hypokalaemia, do:
  - Pre-hydration with 1 L Normal saline before starting the daily amphotericin dose;
  - Monitor serum potassium and creatinine levels at initiation and at least twice weekly to detect changes in renal function;
  - Routine administration of 40 mEq/day of potassium chloride can decrease the incidence of amphotericin-related hypokalaemia;
  - Consider alternate day amphotericin if creatinine is >3 mg/dl
- Other options for treatment are a combination of Flucytosine (100 mg/kg/day in four divided doses) and fluconazole 800-1200 mg daily
- Fluconazole dose should be increased by 50% for patients on rifampicin
- Amphotericin and fluconazole are not recommended during pregnancy but use if benefit to mother outweighs risk. Avoid Flucytosine

Relapse Cases

- Present with a recurrence of symptoms of meningitis and have a positive CSF culture following a prior confirmed diagnosis of cryptococcal meningitis
- Evaluate for drug resistance:
- Send CSF to Microbiology reference laboratory (CPHL or Makerere University) for Culture and sensitivity testing

– If there are no drug resistance results, re-initiate the induction therapy for 2 weeks and complete other phases of treatment.

3.1.5.3 Hepatitis B and HIV Co-Infection ICD10 CODE: B18

- Hepatitis B virus (HBV) is the leading cause of chronic liver disease among HIV patients. In Uganda, the prevalence of Hepatitis B among HIV patients is estimated to be at 17%. (See section 6.5.2 for more details on hepatitis B infection)
- All HIV-infected patients initiating and those failing ART should be routinely screened for HBV infection using Hep B surface Antigen (HBsAg)
- People living with HIV with a positive HBsAg should have other complementary tests at baseline and repeated every 6 months and these include:

– A complete blood count
– Liver function tests: ALT, AST, albumin, bilirubin, PT-INR
– Liver ultrasound scan: to assess stage of liver fibrosis

- Repeat tests every 6 months since patients with chronic HBV infection are at increased risk for hepatocellular carcinoma

Management of HBV/HIV co-infection

The goal of HBV/HIV treatment is to prevent dual disease progression and to reduce HBV-related morbidity and mortality.

TREATMENT	LOC
Preferably ART regimen containing: ▶ **TDF** 300 mg + **3TC** 300 mg PO once daily for life ▶ After 6 months of treatment, patients should be evaluated for HBV treatment failure	**H**

If jaundice, malaise and abdominal right upper quadrant pain are present or if liver function tests are abnormal ▶ Do HBV DNA (hepatitis viral load) if any of the above is present ***Treatment Failure*** ▶ Patients with HB VL >2000 IU/ml at 24 weeks of therapy should be referred for further evaluation and management	

Prevention of HBV infection

- Counseling: emphasize sexual transmission as well as the risks associated with sharing needles and syringes, tattooing or body-piercing
- Advise patients with chronic HBV disease to avoid alcohol consumption
- All household members and sexual partners of people living with HIV with HBV should be screened for HBsAG
- HBV Vaccination is the most effective way to prevent HBV infection and its consequences
  - All HIV-infected patients who test negative on HBsAg should be vaccinated with HBV vaccine
  - All sexual partners and contacts should receive HBV vaccination regardless of whether they are HIV-infected or not

3.1.5.4 Pneumocystis Pneumonia **ICD10 CODE: B59**

Interstitial pneumonitis caused by the parasite *Pneumocystis jirovecii* (formerly carinii). It is common in severely immunosuppresed patients (e.g. in HIV).

Clinical features

- Fever
- Dry cough
- Shortness of breath (significant hypoxemia)

Investigations

➢ Chest x-ray shows characteristic bilateral interstitial infiltrates

Management

TREATMENT	LOC
Pneumocystis Jirovecii pneumonia	**HC4**
▶ Give **oxygen** if SpO2 <94%	
▶ **Cotrimoxazole** 120 mg/kg/daily in 2-4 divided doses for 21 days	
– For example **cotrimoxazole** 480 mg tablets: If patient is < 60 kg: give 3 tablets If patient >60 kg: give 4 tablets	
▶ Plus **prednisolone** 2 mg/kg daily in 3 divided doses for 5 days, then reduce dose to complete 21 days of treatment	
Or (in patients who cannot tolerate or do not respond to cotrimoxazole)	
▶ **Pentamidine** 4 mg/kg by IV infusion daily for 21 days	**RR**
– Reduce dose in renal impairment	
– Avoid direct bolus injections whenever possible but if unavoidable, never give rapidly	
Alternative regimen (21-day course) if above not available/ tolerated	**H**
– **Clindamycin** 600 mg every 8 hours	
– Plus **dapsone** 100 mg daily	
Prophylaxis Give to all patients with history of PCP infection and consider also for severely immunocompromised patients	
– **Cotrimoxazole** 960 mg daily or	**HC2**
– **Dapsone** 100 mg daily	**HC3**
– Continue until immunity recovers sufficiently	

3.1.5.5 Other Diseases

People living with HIV are at higher risk of acquiring any other infection and diseases, including non-communicable diseases, due to HIV itself and drug side effects.

- Treat any other infection (e.g. malaria, STI) as per guidelines for the general population
- Screen regularly for NCD (diabetes, hypertension and depression)
- Screen women at enrolment in HIV care and then annually for cervical cancer using Visual Inspection with Acetic Acid (VIA) (see section 12.2.2)

3.1.6 Prevention of HIV

Behavioural change

- Always follow safe sex practices (e.g. use condoms; avoid multiple sexual partners)
- Never share used needles, syringes, razors, hair shavers, nail cutters, and other sharp objects
- Avoid tattooing, body-piercing, and scarification unless carried out under strictly hygenic conditions in properly controlled premises
- Delay start of sexual activity in adolescence
- Discourage cross generational and transactional sex
- Avoid violence and abuse

Biomedical prevention interventions

- PMTCT
- Safe Male Circumcision
- ART with viral suppression
- PEP (Post Exposure Prophylaxis)
- PrEP (Pre Exposure Prophylaxis)
- Blood transfusion safety
- STI screening and treatment
- Safe infusion and injection practices
- Adherence to infection control procedures

3.1.6.1 Post-Exposure Prophylaxis ICD10 CODE: Z20.6

Post-exposure prophylaxis (PEP) is the short-term use of ARVs to reduce the likelihood of acquiring HIV infection after potential occupational or non-occupational exposure.

Types of Exposure:

- **Occupational exposures:** Occur in health care settings and include sharps and needlestick injuries or splashes of body fluids to the skin and mucous membranes
- **Non-occupational exposures:** Include unprotected sex, exposure following assault like in rape & defilement, road traffic accidents and injuries at construction sites where exposure to body fluids occur

Steps in providing PEP

TREATMENT	LOC
Step 1: Rapid assessment and first aid Conduct a rapid assessment of the client to assess exposure and risk and provide immediate care ***Occupation exposure:*** After a needle stick or sharp injury: ▶ Do not squeeze or rub the injury site ▶ Wash the site immediately with soap or mild disinfectant (chlorhexidine gluconate solution) or, use antiseptic hand rub/ gel if no running water (do not use strong irritating antiseptics (like bleach or iodine) After a splash of blood or body fluids in contact with intact skin/broken: ▶ Wash the area immediately or use antiseptic hand rub/ gel if no running water (don't use strong irritating antiseptics) After a splash of blood or body fluids contact with mucosae: ▶ Wash abundantly with water	**HC2**

Step 2: Eligibility assessment ***Provide PEP when:*** – Exposure occurred within the past 72 hours; and – The exposed individual is not infected with HIV; and – The 'source' is HIV-infected or has unknown HIV status or high risk ***Do not provide PEP when:*** – The exposed individual is already HIV positive; – When the source is established to be HIV negative; – Exposure to bodily fluids that do not pose a significant risk: e.g. to tears, non-blood-stained saliva, urine, and sweat, or small splashes on intact skin – Exposed people who decline an HIV test	
Step 3: Counseling and support ▶ Counsel on: – The risk of HIV from the exposure – Risks and benefits of PEP – Side effects of ARVs – Provide enhanced adherence counseling if PEP is prescribed – Link for further support for sexual assault cases (see below)	
Step 4: Prescription ▶ PEP should be started as early as possible, and not beyond 72 hours from exposure ▶ Recommended regimens: – *Adults :* TDF+3TC+ATV/r – *Children:* ABC+3TC+LPV/r ▶ A complete course of PEP should run for 28 days	

▶ Do not delay the first doses because of lack of baseline HIV Test	
Step 5: Follow up ▶ To monitor adherence and manage side effects ▶ Discontinue PEP after 28 days ▶ Perform follow-up HIV testing 6-week, 3 and 6 months after exposure – If HIV infected, provide counseling and link to HIV clinic for care and treatment – If HIV uninfected, provide HIV prevention education/risk reduction.	

Post-rape care (see also section 1.2.6)

Health facilities should provide the following clinical services as part of post-rape care:

- Initial assessment of the client
- Rapid HIV testing and referral to care and treatment if HIV-infected
- Post-exposure prophylaxis (PEP) for HIV
- STI screening/testing and treatment
- Forensic interviews and examinations
- Emergency contraception – if person reached within the first 72 hours
- Counselling

The health facility should also identify, refer and link clients to non-clinical services

- Some of the services include the following:
- Long term psycho-social support
- Legal counseling
- Police investigations, restraining orders
- Child protection services (e.g. emergency out of family care, reintegration into family care or permanent options when reintegration into family is impossible)

- Economic empowerment
- Emergency shelters
- Long-term case management

Reporting: Health facilities should use HMIS 105 to report Gender Based Violence (GBV)

3.1.7 Psychosocial Support for HIV Positive Persons

HIV positive persons benefit greatly from the following support after the first impact of the test result is overcome:

- Provide of emotional support
- Help the person understand the social, medical, and psychological implications for him/herself, the unborn child (in the case of a pregnant woman), and any sexual partners
- Connect the person with support services, including (religious) support groups, orphan care, income-generating activities, home care and others
- Help the person find strategies to involve his/her partner and extended family in sharing responsibility
- Help the person identify someone from the community to support and care for him/her
- Discuss with HIV positive mothers how to provide for the other children in the family
- Help him/her identify a person from the extended family or community who will provide support
- As appropriate, confirm and support information given in HIV counselling and testing on mother-to-child transmission, possibility of ARV treatment, safer sex, infant feeding and FP advice
- Help the person to understand and develop strategies to apply new information within daily life.

3.2 SEXUALLY TRANSMITTED INFECTIONS (STI)

STIs are a collection of disorders, several of which are better regarded as syndromes for more effective management using a syndromic approach.

Prevention of STIs

General preventive measures include:

- Give health education about STIs
- Provide specific education on the need for early reporting and compliance with treatment
- Ensure notification and treatment of sexual partners
- Counsel patient on risk reduction e.g. practice of safe sex by using condoms, remaining faithful to one sexual partner, personal hygiene
- Provide condoms
- If necessary and possible, schedule return visits

3.2.1 Urethral Discharge Syndrome (Male)

ICD10 CODE: R36

It refers to urethral discharge in men with or without dysuria, caused by a number of diseases usually spread by sexual intercourse, which produce similar manifestations in males and may be difficult to distinguish clinically.

Causes

- Common: *Neisseria gonorrhoea* (causing gonorrhoea), *Chlamydia trachomatis* and *Ureaplasma urealyticum*
- Uncommon*: Trichomonas vaginalis*

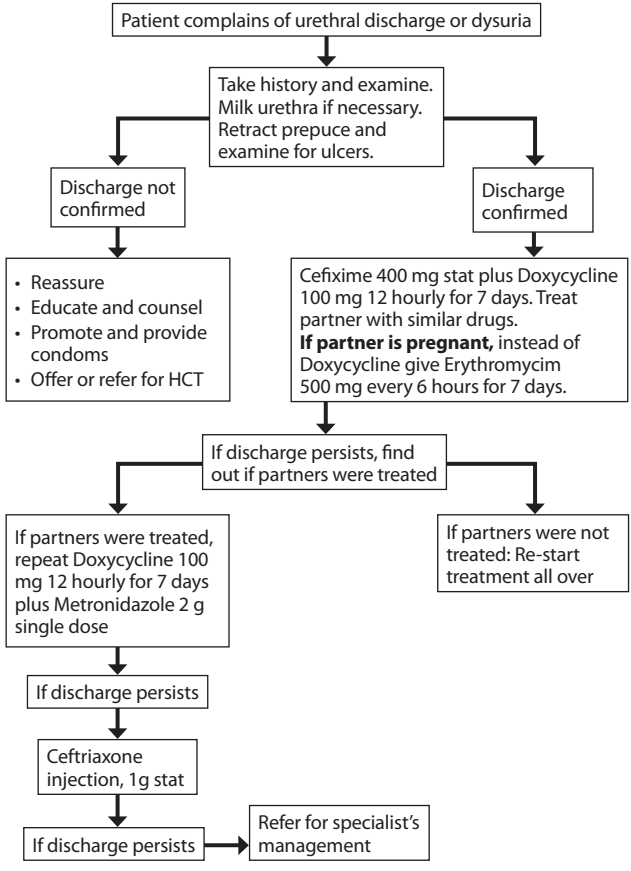
Clinical features

- Mucus or pus at the tip of the penis; staining underwear
- Burning pain on passing urine (dysuria), frequent urination

Investigations

- Pus swab: Gram stain, culture and sensitivity
- Blood: Screen for syphilis and HIV
- Examine patient carefully to confirm discharge

Management



TREATMENT	LOC
▶ Take history and examine the client. Milk urethra if discharge is not obvious ▶ Retract prepuce and examine for ulcers ▶ Treat both patient and sexual partners ▶ Advise abstinence or condom use	HC2
Medicines ▶ **Ceftriaxone** 250 mg IM or **Cefixime** 400 mg single dose plus ▶ **Doxycycline** 100 mg every 12 hours for 7 days	HC3
If partner is pregnant ▶ Substitute doxycycline with **erythromycin** 500 mg every 6 hours for 7 days ▶ or **Azithromycin** 1 g stat if available	
If discharge or dysuria persists and partners were treated: ▶ Exclude presence of ulcers under prepuce ▶ Repeat **doxycycline** 100 mg every 12 hours for 7 days ▶ Also give **metronidazole** 2 g single dose	
If discharge or dysuria persists and partners were not treated: ▶ Start the initial treatment all over again and treat partners	
If dicharge persists still ▶ **Ceftriaxone** 1 g IM ▶ Refer for specialist management if not better	

3.2.2 Abnormal Vaginal Discharge Syndrome

ICD10 CODE: N76

Often the first evidence of genital infection although absence of abnormal vaginal discharge does not mean absence of infection. Normal discharge is small in quantity and white to colourless. Not all vaginal infections are sexually transmitted diseases.

Causes

Can be a variety and often mixture of organisms

- Vaginitis: by *Candida albicanis, Trichomonas vaginalis or* bacterial vaginosis (by *Gardnerella vaginalis, Mycoplasma hominis*)
- Cervicitis: commonly due to gonorrhoea and chlamydia: usually asymptomatic and rarely a cause of abnormal vaginal discharge.

Clinical features

- Increased quantity of discharge, abnormal colour and odour
- Lower abdominal pain, itching and pain at sexual intercourse may be present
- *In Candida albicans* vaginitis: very itchy thick or lumpy white discharge, red inflamed vulva
- *Trichomonas vaginalis:* itchy greenish-yellow frothy discharge with offensive smell
- *Bacterial vaginosis:* thin discharge with a fishy smell from the vagina

Candida vaginitis and bacterial vaginosis are NOT sexually transmitted diseases, even though sexual activity is a risk factor.

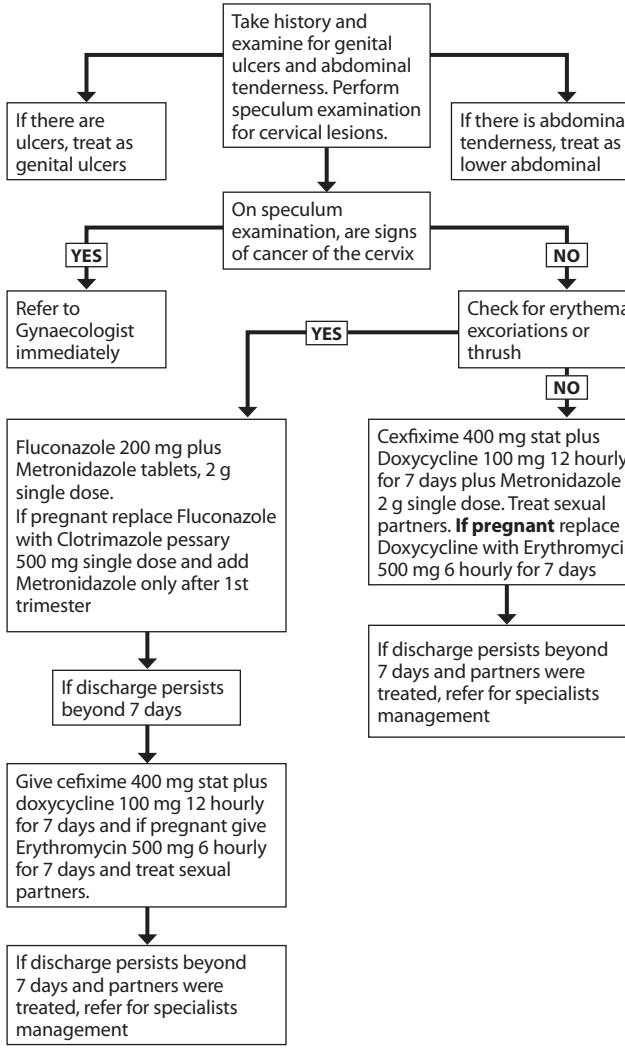
- Gonorrhoea causes cervicitis and rarely vaginitis. There is a purulent thin mucoid slightly yellow pus discharge with no smell and non-itchy
- Chlamydia causes cervicitis which may present with a non-itchy, thin, colourless discharge

Differential diagnosis

- Cancer of the cervix (blood-stained smelly discharge)
- Intra-vaginal use of detergents, chemicals, physical agents and herbs, chronic tampon use, allergic vaginitis

Investigations

- Speculum examination
- Pus swab: microscopy, Gram stain, C&S
- Blood: syphilis tests (RPR/VDRL)
- HIV Testing


Take history and examine for genital ulcers and abdominal tenderness. Perform speculum examination for cervical lesions.
If there are ulcers, treat as genital ulcers
If there is abdominal tenderness, treat as lower abdominal
On speculum examination, are signs of cancer of the cervix
YES
NO
Refer to Gynaecologist immediately
YES
Check for erythema excoriations or thrush
NO
Fluconazole 200 mg plus Metronidazole tablets, 2 g single dose.
If pregnant replace Fluconazole with Clotrimazole pessary 500 mg single dose and add Metronidazole only after 1st trimester
Cexfixime 400 mg stat plus Doxycycline 100 mg 12 hourly for 7 days plus Metronidazole 2 g single dose. Treat sexual partners. If pregnant replace Doxycycline with Erythromycin 500 mg 6 hourly for 7 days
If discharge persists beyond 7 days
If discharge persists beyond 7 days and partners were treated, refer for specialists management
Give cefixime 400 mg stat plus doxycycline 100 mg 12 hourly for 7 days and if pregnant give Erythromycin 500 mg 6 hourly for 7 days and treat sexual partners.
If discharge persists beyond 7 days and partners were treated, refer for specialists management

Management

TREATMENT	LOC
▶ Take history and examine for genital ulcers, abdominal tenderness ▶ Perform speculum examination for cervical lesions ▶ Assess risk for sexually transmitted disease ***If there is lower abdominal tenderness and sexually active:*** ▶ Treat as in PID (see section **14.1.2**)	
If no lower abdominal pain and discharge is thick and lumpy, vagina is itchy and erythema or excoriations are present: likely Candida ▶ Give **clotrimazole** pessaries 100 mg; insert high in vagina once daily before bedtime for 6 days or twice daily for 3 days ▶ Or **fluconazole** 200 mg tablets single dose, orally ▶ ± **Metronidazole** 2 g stat dose	**HC2**
If abundant/smelly discharge/vaginosis: possible trichomonas or vaginosis ▶ **Metronidazole** 2 g stat	**HC2**
If purulent discharge, or high risk of STD, or previous treatment non effective: treat for gonorrhea, and chlamydia, and trichomonas ▶ Give **cefixime** 400 mg stat or **ceftriaxone** 250 mg IM stat ▶ Plus **doxycycline** 100 mg 12 hourly for 7 days ▶ Plus **metronidazole** 2 g stat	**HC3**

However if client is pregnant ▶ Replace **doxycycline** with **erythromycin** 500 mg 6 hourly for 7 days or – **Azithromycin** 1 g stat ▶ Treat the partner ***If discharge or dysuria still persists and partners treated:*** ▶ Refer for further management	**HC3**

3.2.3 Pelvic Inflammatory Disease (PID)

See section **14.1.2**

3.2.4 Genital Ulcer Disease (GUD) Syndrome

ICD10 CODES: N76.5-6, N48.5

Genital ulcer syndrome is one of the commonest syndromes that affect men and women. Single or multiple ulcers can be present.

Causes

Multiple organisms can cause genital sores, commonly:

- *Treponema pallidum* bacteria: syphilis
- *Herpes simplex* virus: genital herpes
- *Haemophilus ducreyi*: Chancroid
- *Donovania granulomatis:* Granuloma inguinale
- Chlamydia strains: lymphogranuloma venerium (LGV)

Clinical features

Mixed infections are common

- *Primary syphilis:* the ulcer is at first painless and may be between or on the labia or on the penis
- *Secondary syphilis:* multiple, painless ulcers on the penis or vulva

- *Genital Herpes:* small, multiple, usually painful blisters, vesicles, or ulcers. Often recurrent
- *Granuloma inguinale:* an irregular ulcer which increases in size and may cover a large area
- *Chancroid:* multiple, large, irregular ulcers with enlarged painful suppurating lymph nodes

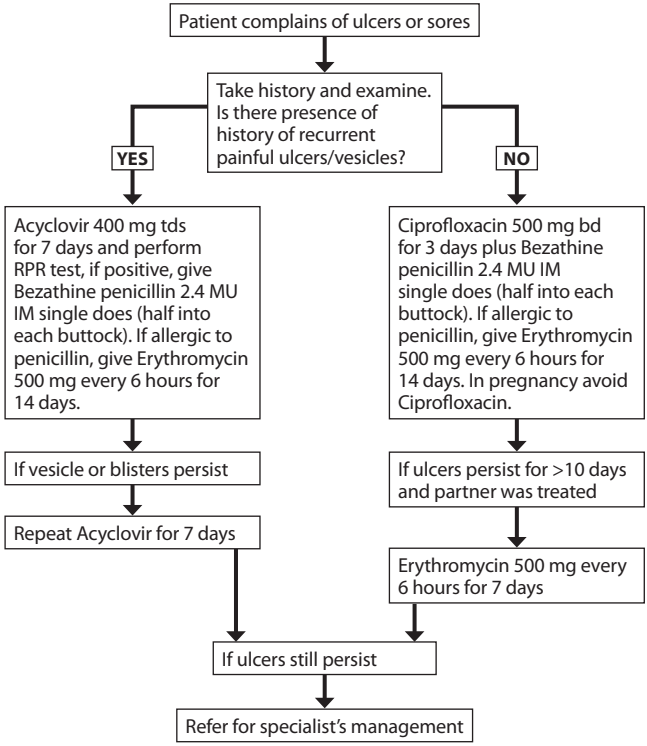
Differential diagnosis

- Cancer of the penis in elderly men
- Cancer of the vulva in women >50 years

Investigations

➢ Swab: for microscopy
➢ Blood: for VDRL/TPR

Management



TREATMENT	LOC
Multiple painful blisters or vesicles: likely herpes	
▶ **Aciclovir** 400 mg every 5 hours for 7 days	**HC4**
▶ If RPR positive add **Benzathine penicillin** 2.4 MU IM single dose (half in each buttock)	**HC3**
▶ If lesions persist, repeat **acyclovir** for 7 days	

All other cases

- **Ciprofloxacin** 500 mg every 12 hours for 3 days plus **Benzathine penicillin** 2.4 MU IM single dose (half into each buttock)
- In penicillin allergy, give **Erythromycin** 500 mg every 6 hours for 14 days

If ulcer persists >10 days and partner was treated

- Add **Erythromicin** 500 mg every 6 hours for 7 days

If ulcer still persists

- Refer for specialist management

Note

- Negative RPR does not exclude early syphilis
- Genital ulcers may appear with enlarged and fluctuating inguinal lymph nodes (buboes). Do not incise buboes

3.2.5 Inguinal Swelling (Bubo) ICD 10 CODE: A57

It is an STI syndrome presenting as localised swellings or enlarged lymph glands in the groin and femoral area.

Causes

- Chlamydia strains: lymphogranuloma venerium (LGV)
- *Heamophilus ducreyi*: chancroid
- *Treponema pallidum:* syphilis

Clinical features

- Excessively swollen inguinal glands
- Pain, tenderness
- Swellings may become fluctuant if pus forms

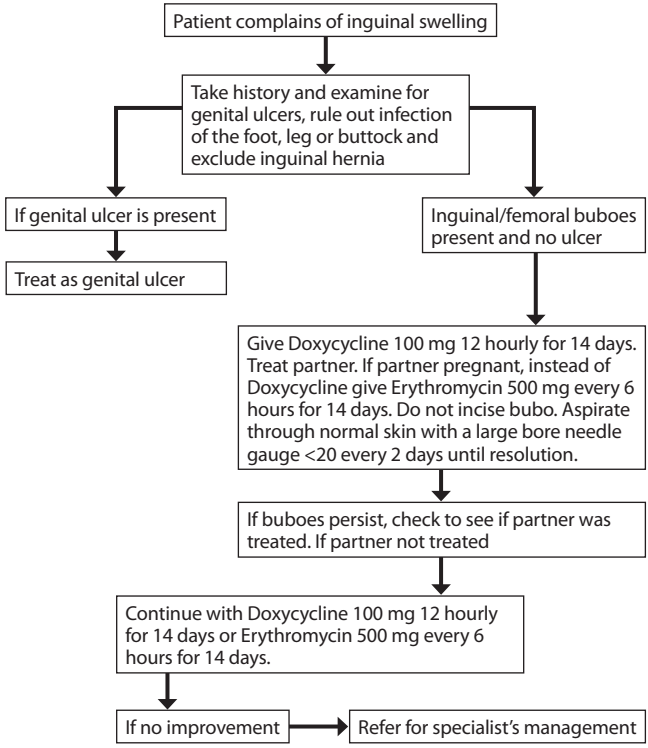
Differential diagnosis

- Other causes of swollen inguinal lymph nodes, e.g. leg ulcer
- Obstructed inguinal hernia

Investigations

- As for Genital Ulcers
- C&S of pus

Management



TREATMENT	LOC
▶ Examine for genital ulcers, rule out infection of the foot, leg or buttock and exclude inguinal hernia ▶ If genital ulcer is present, treat as per above protocol ▶ Give **doxycycline** 100 mg 12 hourly for 14 days ▶ Treat partner	**HC2**
If partner is pregnant ▶ Give **erythromycin** 500 mg every 6 hours for 14 days	**HC3**
If bubo persisting, and partner was not treated ▶ Continue treatment for 14 days	
If not improving ▶ Refer for specialist management	
Caution △ Do not incise bubo. Aspirate through normal skin with a large bore needle gauge <20 every 2 days until resolution △ Alternative to doxycycline: azithromycin 1 g single dose	

3.2.6 Genital Warts

ICD10 CODE: A63.0

Superficial mucocutaneous infection

Causes

- Human papilloma virus (HPV): causes viral warts (condylomata acuminata)
- *Treponema pallidum:* causes syphilitic warts (condylomata lata)
- *Molluscum contagiosum* virus

Clinical features

- Penis, foreskin, labia and vagina are the most common sites of the warts
- Warts can be variable in number and size, either few or multiple, small to very large
- HPV warts: soft fleshy growth on genitals
- Syphilitic warts: flat-topped and broad based growth
- Molluscum contagiosum: light coloured, umbilicated growths on the face and genital areas

Differential diagnosis

- Rashes
- Eruptive skin lesions

Management

TREATMENT	LOC
▶ Advise on personal hygiene ▶ Treat underlying infection	
HPV viral warts	
▶ Apply **podophyllum resin** paint 15% to the warts 1–3 times weekly until warts have resolved; may require multiple weekly treatments – Protect normal skin with petroleum jelly before application – Apply precisely on the lesion avoiding normal skin – Wash off with water 4 hours after each application △ Do not use in pregnancy	**HC4**
If no improvement after 3 applications	
▶ Refer for specialist management	
Syphilitic Warts	
▶ Give: **benzathine penicillin** injection 2.4 MU single dose (half into each buttock)	**HC3**

Molluscum contagiosum ▶ Usually self limiting ▶ Treat underlying conditions that may be compromising the person's immunity	

3.2.7 Syphilis

ICD10 CODE: A51-53

Complex chronic bacterial infection affecting a variety of organs and with multiple manifestations.

Cause

- Treponema pallidum
- Transmitted sexually and from mother to foetus, rarely through blood transfusion or non sexual contact

Clinical features

The disease has several stages

- *Primary syphilis:* 10-90 days following inoculation, characterized by a painless genital ulcer with clean base and indurated margins, regional lymphadenopathy. It can heal spontaneously but the disease will progress to secondary lesions
- *Secondary syphilis:* few weeks to months (max 6 months) from primary lesions, characterised by:
  - Generalised maculopapular rash
  - Mucous membranes lesions (patches and ulcers)
  - Weeping papules (condyloma alata) in moist skin areas
  - Generalized non tender lymphadenopathy
  - Fever, meningitis, hepatitis, osteitis, arthritis, iritis
- *Early latent syphilis (<1 year in duration):* clinically quiescent but possible relapse of secondary syphilis
- *Late latent syphilis:* clinically quiescent, not very infectious (but possible maternal foetal transmission)
- *Late (tertiary) syphilis:* at any time after secondary syphilis (even many years):

- Infiltrative tumour of skin, bones, liver
- Aortitis, aneurysms, aortic regurgitation
- Central nervous system disorders (neurosyphilis): meningo vascular syphilis, hemiparesis, seizures, progressive degeneration with paraesthesias, shooting pains, dementia, psychosis

Investigations

- Non-treponemal antibody tests (VDRL and RPR)
  - Positive 4-6 weeks after infection
  - Used as screening test
  - Possibility of false positive
  - Remains positive 6-12 months after treatment
- Treponemal antibody tests (TPHA): very sensitive, used to confirm a positive non-treponemal test. Remains positive for long even after treatment so its positivity may not indicate active disease.

Management

TREATMENT	LOC
Primary, seconday and early latent syphilis ▶ **Benzathine penicillin** 2.4 million IU IM stat, half in each buttock ▶ or **Doxycycline** 100 mg every 12 hours for 14 days	**HC3**
Late latent or uncertain duration, or tertiary without neurosyphilis ▶ **Benzathine penicillin** 2.4 million IU IM weekly for 3 weeks ▶ Or **Doxycycline** 100 mg every 12 hours for 28 days	**HC3**
Neurosyphilis ▶ **Benzylpenicillin** 4 million IU IV every 4 hours or ▶ **Ceftriaxone** 2 g IV or IM daily for 10-14 days	**HC2** **HC3**

Followed by ▶ **Benzathine penicillin** 2.4 million IU IM weekly for 3 weeks ▶ Treat partner(s), abstain from sex during treatment and 10 days after	**HC3**

3.2.8 Other Genital Infections

3.2.8.1 Balanitis

ICD10 CODE: N48.1

Inflammation of the glans penis

Cause

- Usually caused by Candida, rarely by Trichomonas

Clinical features

- Discharge, erythema, erosions
- Prepuce is retractable

Management

TREATMENT	LOC
▶ **Fluconazole** 200 mg stat ▶ Plus **metronidazole** 400 mg every 12 hours for 7 days ▶ Advise on hygiene and circumcision ***If not better:*** ▶ Treat partner	**HC3**

3.2.8.2 Painful Scrotal Swelling

ICD10 CODE: N45

Inflammation of epididymis and testis

Causes

- Usually caused by *N. gonorrhoea*, Chlamydia

Clinical features

- Acute painful and tender unilateral swelling of epididymus and testis, with or without urethral discharge

Differential diagnosis

- Acute testicular torsion
- Scrotal hernia, tumors

Management

TREATMENT	LOC
▶ Treat as per urethral discharge protocol above (section 3.2.1)	HC3

3.2.9 Congenital STI Syndromes

Congenital STIs in newborns occur as a result of infection of babies in utero or during delivery as a complication of untreated STIs among mothers. Syphilis, HIV, gonococcal, chlamydia and herpes simplex are the most serious congenital STIs.

3.2.9.1 Neonatal Conjunctivitis (Ophthalmia Neonatorum)

ICD10 CODE: P39.1

Refers to conjunctival infection of neonates by STI organisms in the infected mother's birth canal. It is a very serious condition that can lead to corneal ulceration and ultimately to blindness. Blindness in children is associated with high infant morbidity and mortality.

Causes

- Commonly caused by *Neisseria gonorrhoeae* and *Chlamydia trachomatis*
- Other non-STI causes of neonatal conjunctivitis predisposed by difficult labour such as early rupture of membranes, vacuum extraction or other assisted vaginal delivery

Clinical features

- Purulent discharge from one or both eyes within 30 days from birth
- Inflamed and swollen eyelids
- Complications of untreated conjuctivitis: corneal ulceration, perforation, scarring and blindness

Investigations

➢ Pus swab: Gram stain, Culture & Sensitivity

Management

TREATMENT	LOC
Treatment should cover both gonorrhoea and chlamydia	
▶ Start cleaning with normal saline and apply **tetracycline ointment** every hour while referring for systemic treatment	**HC2**
▶ **Ceftriaxone** 125 mg single dose IM plus **azithromycin** syrup 20 mg/kg orally, once daily for 3 days	**HC3**
▶ Irrigate the eyes with saline or sterile water	
▶ Use gloves and wash hands thoroughly after handling the eyelids	
▶ Cover the eye with gauze while opening the eyelid as pus may be under pressure	
▶ Topical **tetracycline** eye ointment has NO added benefit in active disease	
▶ Treat both parents for Gonorrhoea and Chlamydia and screen for HIV and syphilis	

Prevention

- Screen and treat all infected mothers in antenatal care
- Apply prophylactic tetracycline eye ointment 1% to both eyes of ALL newborns at the time of delivery

3.2.9.2 Congenital Syphilis ICD10 CODE: A50

It is a serious debilitating and disfiguring condition that can be fatal. About one third of syphilis infected mothers have adverse pregnancy outcome, one third give birth to a healthy baby, while the remaining third may result into congenital syphilis infection.

Cause

- *Treponema pallidum* bacteria

Clinical features

- May be asymptomatic
- Early congenital syphilis: begins to show after 6-8 weeks of delivery
  - Snuffle, palmar/plantar bullae, hepatosplenomegaly, pallor, joint swelling with or without paralysis and cutaneous lesions. These signs are non-specific.
- Late congenital syphilis: begins to show at 2 years
  - Microcephaly, depressed nasal bridge, arched palate, perforated nasal septum, failure to thrive, mental sub normality and musculoskeletal abnormalities

Investigations

Preferably perform the tests on mother:

- VDRL/RPR
- TPHA

Management of congenital syphilis

TREATMENT	LOC
▶ Assume cerebrospinal involvement in all babies less than 2 years ▶ Aqueous **benzylpenicillin** 150,000 IU/kg body weight IV every 12 hours for a total of 10 days ▶ OR **procaine penicillin,** 50,000 IU/kg body weight, IM single dose daily for 10 days	**HC3**

▶ Treat both parents for syphilis with **benzathine penicillin** 2.4 MU single dose (half on each buttock)	

Note

- Assume that infants whose mothers had untreated syphilis or started treatment within 30 days of delivery have congenital syphilis
- If mother is diagnosed with syphilis during pregnancy, use benzathine penicilln as first line since erythromycin does not cross the placental barrier and therefore does not effectively prevent in utero acquisition of congenital syphilis
- Do not use doxycycline in pregnancy

Prevention

- Routine screening and treatment of syphilis infected mothers in antenatal clinics

4. Cardiovascular Diseases

4.1.1 Deep Vein Thrombosis/Pulmonary Embolism (DVT/PE)

ICD10 CODE: I82.409

Clot formation within the deep venous system, usually of the calf, thigh, or pelvic veins. The clot can cause a local problem at site of formation or dislodge, leading to thromboembolism in various parts of the body, particularly the lungs (pulmonary embolism).

Causes

- Venous stasis (slowing of blood flow)
- Increased coagulability states
- Endothelial injury

Risk factors

- Immobilisation, prolonged bed rest, surgery, limb paralysis
- Heart failure, myocardial infarction
- Blunt trauma, venous injury including cannulation
- Oral contraceptive pills, pregnancy and postpartum
- Malignancies and chemotherapy
- Long distance air travel

Clinical features

- 50% of cases may be clinically silent
- Pain, swelling and warmth of the calf, thigh, and groin
- Dislodgement of the thrombus may lead to pulmonary embolism characterised by dyspnoea, tachycardia, chest pain, hypotension
- Half of the cases of PE are associated with silent DVT

Differential diagnosis

- Cellulitis, myositis, phlebitis, contusion
- For PE: any other cause of dyspnoea and chest pain

Investigations

- Compression ultrasound +/- doppler
- In case of pulmonary embolism: chest CT angiogram
- Other useful tests (not specific): blood D-dimer, ECG, Chest X ray, echo cardiogram

Management

TREATMENT	LOC
▶ **Enoxaparin (Low molecular weight heparin-LMWH)** 1 mg/kg every 12 hours for at least 5 days	H
– No monitoring is required	
▶ Plus **warfarin** 5 mg single dose given in the evening, commencing on the same day as the heparin	H
– Maintenance dose: 2.5-7.5 mg single dose daily, adjusted according to the INR 2 -3	
If enoxaparin not available	
– **Unfractionated heparin** given as: 5000 units IV bolus and then 1000 units hourly or 17500 units subcutaneuosly 12 hourly for 5 days. Adjust dose according to activated partial thromboplastin time (APTT)	H
– Or 333 units/kg SC as an initial dose followed by 250 units/kg SC every 12 hours	
– Plus **warfarin** as above	

Notes

- Monitor for bleeding complications
- See section **1.3.10.** for treatment of warfarin overdose and *PGD 2015* monograph on protamine for excessive heparin dose
- Do not start therapy with warfarin alone because it initially increases risk of thrombus progression

Prevention

- Early mobilisation
- Prophylaxis with **enoxaparin** 40 mg SC daily in any acutely ill medical patient and in prolonged admission

4.1.2 Infective Endocarditis

ICD10 CODE: I33.0

An infection of the heart valves and lining of the heart chambers by microorganisms, usually bacterial, rarely fungal.

Causes

It is classified into 3 types:

- ***Sub-acute endocarditis:*** caused by low virulence organisms such as *Streptococcus viridans*
- ***Acute endocarditis:*** caused by common pyogenic organisms such as *Staphylococcus aureus*
- ***Post-operative endocarditis:*** following cardiac surgery and prosthetic heart valve placement. The most common organism involved is *Staphylococcus aureus*

Clinical features

- Disease may present as acute or chronic depending on the microorganism involved and patient's condition
- Fatigue, weight loss
- Low grade fever and chills or acute severe septicaemia
- Embolic phenomena affecting various body organs (e.g. brain)
- Heart failure, prominent and changing heart murmurs
- Splenomegaly, hepatomegaly
- Anaemia
- Splinter haemorrhages (nail bed and retina)
- Finger clubbing
- Diagnostic triad: persistent fever, emboli, changing murmur

Risk factors

- Rheumatic heart disease, congenital heart disease
- Prosthetic valve
- Invasive dental/diagnostic/surgical procedures (including cardiac catheterization)
- Immunosuppression
- IV drug use/abuse

Note: Any unexplained fever in a patient with a heart valve problem should be regarded as endocarditis

Differential diagnosis

- Cardiac failure with heart murmurs
- Febrile conditions associated with anaemia

Investigations

- Blood cultures: These are usually positive and all efforts should be made to identify the responsible pathogen and obtain sensitivity data
- At least 3 sets of blood cultures (8 ml) each should be obtained (each from a separate venipucture) at least one hour apart
- Blood: Complete blood count, ESR
- Urinalysis for microscopic haematuria, proteinuria
- Echocardiography
- ECG

Management

TREATMENT	LOC
▶ Bed rest ▶ Treat complications e.g. heart failure ***Initial empirical antibiotic therapy*** ▶ **Benzylpenicillin** 5 MU IV every 6 hours for 4 weeks	**H**

Child: **Benzylpenicillin** 50,000 IU/kg every 6 hours for 4 weeks ▶ Plus **gentamicin** 1 mg/kg IV every 8 hours for 2 weeks ***If staphylococcus suspected, (acute onset) add:*** ▶ **Cloxacillin** IV 3 g every 6 hours *Child:* 50 mg/kg every 6 hours for 4 weeks ***If MRSA (Multi-Resistant Staphylococcus aureus)*** ▶ **Vancomycin** 500 mg IV every 6 hours ▶ *Child:* 10 mg/kg (infused over 1 hour) 6 hourly for 6 weeks ***Once a pathogen has been identified*** ▶ Amend treatment to correspond with the sensitivity results	**RR**

Prevention

- Prophylaxis in case of dental procedures and tonsillectomy in patients at risk (valvular defects, congenital heart disease, prosthetic valve). Give **amoxicillin** 2 g (50 mg/kg for children) as a single dose, 1 hour before the procedure.

4.1.3 Heart Failure

ICD10 CODE: I50

Clinical syndrome caused by inadequate cardiac output for the body's needs, despite adequate venous return.

For management purposes, it can be classified into:

- Congestive/acute heart failure
- Chronic heart failure
- Acute pulmonary oedema (see next section)

Causes

- Hypertension
- Valvular heart disease, e.g. rheumatic heart disease

- Myocardial infarction
- Myocarditis
- Prolonged rapid irregular heartbeat (arrhythmias)
- Congenital heart disease
- Severe anaemia, thyroid disease

Clinical features

Infants and young children

- Respiratory distress with rapid respiration, cyanosis, wheezing, subcostal, intercostal, and sternal recession
- Rapid pulse, gallop rhythm, excessive sweating
- Tender hepatomegaly
- Difficulty with feeding
- Cardiomegaly

Older children and adults

- Palpitations, shortness of breath, exercise intolerance
- Fatigue, orthopnea, exertional dyspnoea, wheezing
- Rapid pulse, gallop rhythm
- Raised jugular venous pressure (JVP)
- Dependent oedema, enlarged tender liver
- Basal crepitations

Differential diagnosis

- Severe anaemia, severe acute malnutrition
- Nephrotic syndrome, cirrhosis
- Severe pneumonia
- Any severe sickness in infants

Investigations

- ➢ Chest X-ray
- ➢ Blood: Haemogram (for ESR, anaemia)
- ➢ Urea and electrolytes
- ➢ Echocardiogram, ECG

Management of congestive heart failure

TREATMENT	LOC
▶ Bed rest with head of bed elevated ▶ Prop up patient in sitting position ▶ Reduce salt intake and limit fluid intake (1-1.5 L/day)	HC4
▶ **Furosemide** 20-40 mg oral or IV daily for every 12 hours increasing as required to 80-160 mg according to response *Child*: 1 mg/kg oral or IV daily or every 12 hours according to response (max: 8 mg/kg daily)	HC4
▶ **ACE inhibitors:** start with low dose **enalapril** (or **lisinopril**) 2.5 mg once daily, increase gradually over 2 weeks to 10-20 mg (max 40 mg) if tolerated ▶ *Child*: 0.1-1 mg/kg daily in 1-2 doses	HC4
Or ▶ **Captopril** 6.25-12.5 mg 8 -12 hourly, increase over 2-4 weeks to max 150 mg daily in divided doses ▶ *Child:* 0.1-0.3 mg/kg daily every 8-12 hours	H
If available and when patient stable add: ▶ **Carvedidol** 3.125 mg every 12 hours, increase gradually every 2 weeks to max 25 mg 12 hourly *Child:* 0.05 mg/kg every 12 hours, increase gradually to max 0.35 mg/kg every 12 hours	H
Additional medicines (second/third line) ▶ **Spironolactone** 25-50 mg once a day *Child*: Initially 1.5-3 mg/kg daily in divided doses	H
▶ **Digoxin** 125-250 micrograms/daily *Child maintenance dose:* 15 micrograms/kg daily	HC4

Caution

△ Use ACE inhibitors and beta blockers with caution if systolic BP is less than 90 mmHg: monitor renal function

△ Use digoxin with caution in elderly and renal disease

Prevention

- Management of risk factors
- Early diagnosis and treatment of the cause (e.g. hypertension)
- Treatment adherence

Chronic heart failure

Patients with chronic heart failure need continuous treatment to control symptoms and prevent disease progression and complications.

Management

TREATMENT	LOC
▶ Periodic monitoring of body weight, blood pressure, heart rate, respiratory rate and oxygen saturation	HC2
▶ Salt and fluid restriction	
▶ Limit alcohol intake	
▶ Regular exercise within limits of symptoms	
▶ Continued treatment with the medicines listed above, with doses progressively increased to achieve control	HC4

4.1.4 Pulmonary Oedema ICD10 CODE: I50.21

Congestion of the lung tissue with fluid, usually due to heart failure.

Cause

- Cardiogenic
- Severe fluid overload e.g. in renal failure or iatrogenic
- Non-cardiogenic pulmonary oedema: severe pneumonia, altitude sickness, inhalation of toxic gases, acute respiratory distress syndrome

Clinical features

- Severe dyspnoea, rapid breathing, breathlessness
- Tachycardia, wheezing
- Cough with frothy blood stained sputum

Differential diagnosis

- Pneumonia, pleural effusion
- Foreign body
- Trauma (pneumothorax, pulmonary contusion)

Investigations

- Chest X-ray
- ECG
- Renal function, electrolytes
- Echocardiography

Management

TREATMENT	LOC
Acute ▶ Prop up patient in sitting position ▶ High concentration **oxygen** : start with 5 L/min, aim at SpO2 >95%	**HC4**

▶ **Furosemide** 40-80 mg IM or slow IV - Repeat prn up to 2 hourly according to response *Child:* 0.5-1.5 mg/kg every 8-12 hours (max: 6 mg/kg) daily)	**HC4**
▶ **Glyceryl trinitrate** 500 microgram sublingually every 4-6 hours	**H**
▶ Give **morphine** 5-15 mg IM or 2-4 mg slow IV *Child*: 0.1 mg/kg slow IV single dose ▶ Repeat these every 4-6 hours till there is improvement	**HC4**
Consider also	
▶ **Digoxin** loading dose IV 250 micrograms 3-4 times in the first 24 hours then maintenance dose of 125-250 micrograms daily *Child*: 10 mg/Kg per dose as above then maintenance dose of 15 microgram/kg/day	**H**
Caution △ Do not give loading dose if patient has had digoxin within the past 14 days but give maintenance dose	

Prevention

- Early diagnosis and treatment of cardiac conditions
- Compliance with treatment for chronic cardiac conditions
- Avoid fluid overload

4.1.5 Atrial Fibrillation

ICD10 CODE: I48

Common cardiac arrhythmia characterised by irregular pulse due to the loss of the regular atrial electrical activity. Its onset can be acute or chronic, and it can be symptomatic or asymptomatic.

Risk factors

- Heart disease (heart failure, valvular heart diseases, ischaemic heart disease)
- Thyroid disease (hyperthyroidism)

Clinical features

- Irregular pulse (frequency and volume), heart rate can be either normal or very high
- Acute onset (often with high heart rate): palpitations, dizziness, fainting, chest pain, shortness of breath
- Chronic (with normal or almost normal heart rate): often asymptomatic, discovered at routine checks
- It can precipitate heart failure or pulmonary oedema
- It can cause embolic stroke if clots form in the heart and are then dislodged to the brain circulation

Investigations

➢ ECG

Objectives

- Control heart rate
- Restore normal rhythm if possible (specialist only)
- Prevent or treat complications
- Treat underlying conditions

Management

TREATMENT	LOC
If acute onset, high heart rate or patient in congestive heart failure and/or pulmonary oedema: ▶ Treat heart failure as per guidelines (section 4.1.3), use **digoxin** and or **carvedilol** to reduce heart rate	**HC4**
If acute onset and high heart rate but no signs of heart failure: ▶ Use **atenolol** 50 mg to control heart rate	**HC4**
If chronic but normal heart rate: ▶ Only treat underlying conditions ▶ Refer to regional level to assess indication for anticoagulation with **aspirin** or **warfarin** to prevent stroke	**H**

4.1.6 Hypertension ICD10 code: I10

Persistently high resting blood pressure (>140/90 mmHg for at least two measurements five minutes apart with patient seated) on at least 2 or 3 occasions 1 week apart.

Classification of blood pressure (BP)

CATEGORY	SBP MMHG		DBP MMHG
Normal	<120	and	<80
Pre-hypertension	120-139	or	80-89
Hypertension, stage 1	140-159	or	90-99
Hypertension, stage 2	>160	or	>100
SBP=systolic blood pressure; DBP=diastolic blood pressure			

Causes

- In the majority of cases, the cause is not known (essential hypertension)

Secondary hypertension is associated with:

- Kidney diseases
- Endocrine diseases
- Eclampsia/pre-eclampsia
- Medicines (steroids and decongestants containing caffeine and pseudoephedrine)

Risk factors

- Family history, race
- Obesity, physical inactivity
- Excessive intake of salt and alcohol
- Diabetes and dyslipidaemia

Clinical features

The majority of cases are symptomless and are only discovered on routine examination or screening.

General symptoms include:

- Headache
- Palpitations, dizziness

Hypertension may present as a complication affecting:

- Brain (stroke)
- Heart (heart failure)
- Kidney (renal failure)
- Eyes (impairment of vision)

Differential diagnosis

- Anxiety

Investigations

To identify complications and possible cases of secondary hypertension:

➢ Urine analysis
➢ Blood sugar
➢ Plasma urea and electrolytes

- Chest X-ray
- ECG

Management of hypertension

Target: blood pressure below 140/90 mmHg

TREATMENT	LOC
Stage 1 ***Lifestyle adjustments*** ▶ Do not add extra salt to cooked food, increase physical activity/exercise, reduce body weight ▶ Stop smoking ▶ Decrease alcohol intake ***If all the above fail (within 3 months), initiate medicine therapy*** ▶ Give **bendroflumethiazide** 2.5-5 mg each morning ▶ If not controlled after 1 month, treat as in stage 2	**HC3**
Stage 2 ▶ Emphasize lifestyle changes ▶ **Bendroflumethiazide** 2.5-5 mg each morning Plus ▶ **Calcium channel blocker** (CCB) e.g. – **Nifedipine** 20-40 mg every 12 hours ***Alternative in special situation (diabetes, heart failure):*** ▶ **ACE inhibitor** e.g. – **Enalapril** 5-20 mg once daily (max 40 mg) or – **Captopril** 6.25-25 (max 50 mg) every 8 hours ***If intolerence to ACE inhibitors*** ▶ Angiotensin II receptor antagonist (ARB) e.g. – **Losartan** 50 mg once or twice daily	**HC3** **HC4** **H**

If not controlled after one month with 2 medicines, ▶ Use 3 drugs (bendroflumethiazide plus ACE inhibitor plus calcium channel blocker) ***If not controlled, increase all medicines to maximum dose and consider adding beta blockers*** ▶ **Atenolol** 50-100 mg daily	**HC4** **H**
If BP >180/110 mmHg, but patient is asymptomatic and there is no evidence of complications ▶ Observe the patient for some hours and start treatment with 2 medicines ▶ **Bendroflumethazide** plus **Calcium channel blocker** or **ACE inhibitor**	**HC4**
If not better after one week, add a third medicine ***If not better, consider adding*** ▶ **Beta blockers: atenolol** 25-100 mg daily or ▶ **Hydralazine** 25-50 mg every 12 hours	**H**
Note ◆ **Bendroflumethiazide:** Potassium supplements are seldom required; only use in susceptible patients	
Cautions △ In pregnancy, do NOT use ACE inibitors and diuretics. Methyldopa and calcium channel blockers are safe to use △ Atenolol: do not use in heart failure or asthma. Use carvedilol if necessary.	

Choice of antihypertensive medicine

Choice of medicine may depend on concomitant risk factors/ other conditions: the table below indicates the suitable medicines for such patients.

RISK FACTOR	DIURETIC	BETA BLOCKER	ACE INHIBITOR /ARBS	CCB	ALDOSTERON ANTAGONIST
Heart failure	✓	✓*	✓		✓
Post myocardial infarction		✓	✓		
Angina		✓		✓	
Diabetes	✓		✓	✓	
Mild/moderate kidney disease	✓		✓		
Advanced chronic kidney disease	✓	✓		✓	
Stroke	✓			✓	
**Carvedilol only*					

Prevention

- Regular physical exercise
- Reduce salt intake
- Healthy diet, stop smoking
- Periodic screening of blood pressure

4.1.6.1 Hypertensive Emergencies and Urgency

ICD10 CODE: I16.2

Hypertensive emergency

BP >180/110 mmHg with symptoms and acute life threatening complications:

- Hypertensive encephalopathy (severe headache, confusion, seizures, visual disturbances)
- Acute angina or acute myocardial infarction (AMI)
- Pulmonary oedema

- Acute kidney failure
- Acute aortic dissection
- Eclampsia or pre-eclampsia (sections **16.3.7** and **16.3.8**)

Management

TREATMENT	LOC
▶ Admit and give parenteral medicines. Aim at lowering the blood pressure over 24 hours (not too rapidly except if absolutely necessary) ▶ Treatment depends also on the presenting complications – In acute ischaemic stroke, do not lower below 220/120 mmHg – In acute aortic dissection, lower BP rapidly – In pulmonary oedema, AMI: treat the complication ▶ Give IV **furosemide** 40-80 mg ▶ If aggressive BP lowering is needed, use IV **hydralazine** 5-10 mg slowly over 20 minutes. Check blood pressure regularly, repeat dose after 20-30 minutes if necessary	**HC4**

Hypertensive urgency

BP > 180/110 mmHg with symptoms and/or has evidence of progressive target organ damage (kidney insufficiency, eye problems, etc.)

Management

TREATMENT	LOC
▶ Admit ▶ Treat with combination of oral antihypertensive therapy (ace inhibitor + calcium channel blocker ± diuretics) ▶ Aim at lowering blood pressure over the next 48-72 hours	**HC4**

4.1.7 Ischaemic Heart Disease (Coronary Heart Disease)

ICD10 CODE: I20, I21, I25

A condition in which there is insufficient blood flow through the coronary arteries of the heart, thus leading to ischaemia and/or infarction.

Cause

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

Risk factors

- Hypertension, diabetes mellitus
- Smoking
- Obesity, unhealthy diet, physical inactivity
- Hyperlipidemia
- Family history of heart disease

Clinical features

- **Acute coronary syndrome (including acute myocardial infarction):** prolonged chest pain, which may be localised on the left or central part of the chest, ranging from mild to severe, at times radiating to the left arm, neck and back, and associated with sweating, dyspnoea, vomiting, anxiety, low BP, tachycardia
- **Stable angina:** tightness in the chest or a sense of oppression worsening on exertion, relieved by rest and lasting only a few minutes
- **Sudden cardiac death:** usually due to fatal arrhytmias

Differential diagnosis

- Indigestion, hiatus hernia, peptic ulcer
- Pleurisy, pericarditis, pulmonary embolism
- Dissecting aneurysm

Investigations

- Cardiac enzymes (CPK, troponin)
- ECG (at rest and stress ECG)
- Echocardiogram

Management of acute coronary syndrome

TREATMENT	LOC
▶ Give **acetylsalicylic acid** 300 mg single dose (to be chewed)	**HC2**
Refer immediately to hospital	**H**
▶ **Glyceryl trinitrate** 500 micrograms sublingually Repeat after 5 min if no response ▶ **Oxygen** therapy if SpO2 < 94% ▶ **Morphine** 2.5-5 mg IV if persisting pain ▶ **Simvastatin** 40 mg or **atorvastatin** 40 mg ▶ **Enoxaparin** 1 mg/kg SC every 12 hours ▶ Treat complications accordingly (pulmonary oedema, arrhythmias)	
Consider adding:	**H**
▶ **Beta** blockers if no contraindications (SBP <90 mmHg, HR <60 bpm) e.g. **Atenolol** 25-50 mg daily – Ensure close observation of the pulse rate and circulatory status ▶ **ACE inhibitor** e.g. **enalapril** 2.5-10 mg/daily ▶ Refer for further management to higher level of care if unstable	
When patient is stable, continue with:	
▶ **Acetylsalicylic acid** 75 mg once daily, ▶ **Atorvastatin** 40 mg daily ▶ **Beta blocker** (atenolol or carvedilol) and **ACE inhibitor** if tolerated ▶ Emphasize life changes (healthy diet, no smoking, regular exercise, control of other risk factors)	

Management of stable angina

TREATMENT	LOC
▶ Aggressive control of risk factors (hypertension, diabetes, smoking, obesity) ▶ **Acetylsalicylic acid** 75-150 mg mg once a day ▶ **Atorvastatin** 40 mg once a day ▶ **Beta blockers** (e.g. **atenolol** 25-100 mg) if not diabetic ▶ Refer to higher level if still uncontrolled	**HC4** **H**

Prevention

- Low fat, low cholesterol diet
- Stop smoking
- Effective control of hypertension and diabetes mellitus
- Consider treatment with acetylsalicylic acid and statin in patients with multiple risk factors

4.1.8 Pericarditis

ICD10 CODE: I30

Inflammation of the heart membrane (pericardium), which may be:

– Acute and self-limiting, sub-acute or chronic
– Fibrinous, serous, haemorrhagic or purulent

Causes

- Idiopathic or viral (most common causes) e.g. Coxsackie A & B, influenza A & B, varicella
- Bacterial e.g. mycobacterium, staphylococcus, meningococcus, streptococcus, pneumococcus, gonococcus, mycoplasma
- Fungal: Histoplasmosis
- Severe kidney failure (less common)
- Hypersensitivity such as acute rheumatic fever
- Myocardial infarction
- Radiation, trauma, neoplasms

Clinical features

- ***Pericarditis without effusion:*** retrosternal pain radiating to shoulder, which worsens on deep breathing, movement, change of position or exercise; pericardial rub is a diagnostic sign
- ***Pericardial effusion:*** reduced cardiac impulses, muffled heart sounds, cardiomegaly
- ***Cardiac tamponade*** (compression) in case of massive effusion or constrictive pericarditis: dyspnoea, restlessness, rising pulmonary and systemic venous pressure, rapid heart rate, pulsus paradoxus, low BP, and low output cardiac failure

Differential diagnosis

- Other causes of chest pain
- Other cause of heart failure

Investigations

➢ ECG, chest X-ray
➢ Echo-cardiography

Management

TREATMENT	LOC
If viral or idiopathic ▶ Rest ▶ **Ibuprofen** 600 mg every 8 hours ▶ If there is fluid, perform tapping ***If other causes, treat accordingly***	**H**

Prevention

- Early detection and treatment of potential (treatable) causes

4.1.9 Rheumatic Fever

ICD10 CODE: I00, I01

A systemic connective tissue disease which follows a streptococcal upper respiratory tract infection. It may involve the heart, joints, skin, subcutaneous tissue, and CNS. The first attack usually occurs between ages of 3–15 years.

Causes

- Hypersensitivity reaction to group A streptococcal throat infection

Clinical features

- Arthritis (migrating asymmetric polyarthritis)
- Acute rheumatic carditis, signs of cardiac failure, murmurs and pericarditis
- Subcutaneous nodules
- Chorea (involuntary movements of limbs)
- Skin rash
- Other minor signs/symptoms: fever, arthralgia, laboratory findings

Differential diagnosis

- Any form of arthralgia/arthritis including sickle cell disease, haemophilia
- Pyrexia with cardiac failure

Investigations

- Blood: Haemogram (raised ESR)
- Chest X-ray
- ECG
- Echocardiography
- Antistreptolysin O titre (ASOT)

Diagnostic criteria (revised Jones criteria)

- Evidence of recent streptococcal infection
  - Elevated ASO-titer or other streptococcal Ab titres or positive throat swab for group A beta-hemolyticus streptococcus

PLUS

- Two major manifestations or one major and two minor manifestations

MAJOR MANIFESTATIONS	MINOR MANIFESTATIONS
• Polyarthritis • Carditis • Erythema marginatum • Subcutaneous nodules • Sydehnam's chorea	• Polyarthralgia • Fever • Acute phase reactants (increased ESR/CRP) • ECG: prolonged PR in the absence of carditis

Management

TREATMENT	LOC
▶ Bed rest ***To eradicate any streptococci:*** ▶ **Phenoxymethylpenicillin (Pen V)** 250 mg every 6 hours for 10 days *Child:* 125 mg per dose ▶ Or **Benzathine benzylpenicillin** dose 1.2 MU IM stat *Child < 30 kg:* 0.6 MU *Child* > 30 kg: 1.2 MU ***To treat the inflammation*** ▶ **Acetylsalicylic acid** 4-8 g/day untill signs of inflammation subside (usually 4-8 weeks) *Child*: 80-100 mg/kg/day in 3 doses ▶ Plus **magnesium trisilicate compound** 2-4 tablets every 8 hours Taken 30 minutes after the acetylsalicylic acid tablets ***If allergic to aspirin*** ▶ Low dose **steroid**	**HC4**

If carditis/heart failure symptoms ▶ Treat as per heart failure guidelines (section 4.1.3) ▶ Consider high dose steroids (specialist only) ***If chorea:*** ▶ **Valproate** 10-20 mg/kg/day	**H**
Prophylaxis ***To prevent further episodes*** ▶ **Pen V** 500 mg 12 hourly *Child*: 125-250 mg 12 hourly ▶ Or **Benzathine benzylpenicillin** 1.2 MU IM every 4 weeks *Child <30 kg:* 0.6 MU ***If allergic to penicillin:*** ▶ **Erythromycin** 250 mg 12 hourly ▶ *Child:* 10 mg/kg twice a day ***Duration of prophylaxis depends on severity of disease:*** – Rheumatic fever without carditis: for 5 years or until age 18 or 21 years old – Carditis but no residual heart disease: for 10 years or until age 25 years old – Carditis with residual heart disease: untill age 40-45 years or for life	**HC3**

Prevention

- Early diagnosis and treatment of group A Streptococcus throat infection
- Avoid overcrowding, good housing
- Good nutrition

4.1.10 Rheumatic Heart Disease ICD10 CODE: I05-I09

Disease of the heart valves following an episode of rheumatic fever. The valves commonly involved are:

- Mitral valve, leading to stenosis, incompetence, or both
- Aortic valve, leading to stenosis and incompetence or both

Clinical features

- Heart failure
- Arrhythmias, palpitations
- Thromboembolic problems e.g. stroke
- Heart murmurs depending on valves affected and nature of effect caused
- The patient may be asymptomatic and the valvular lesion discovered as an incidental finding
- Increased cardiac demand as in pregnancy and anaemia may present as congestive cardiac failure

Differential diagnosis

- Other causes of cardiac failure

Investigations

- Chest X-ray
- ECG where available
- Echocardiography

Management

TREATMENT	LOC
▶ Treat heart failure if present	HC4
▶ Prophylaxis for life as in rheumatic fever above	
▶ Cardiac surgery if necessary (only at national referral hospital)	NR

4.1.11 Stroke

ICD10 CODE: I63

A cerebral neurological dysfunction due to a problem in blood circulation: a clot (ischaemic stroke) or bleeding (haemorrhagic stroke).

Causes

- Clot (a thrombus in a brain vessel or an embolus from a clot sowhere else) – most common
- Haemorrhage (from trauma or spontaneous)

Clinical features

- Focal neurological deficits as one-sided weakness (face, arm, leg. Note that eyes are not affected) – hemiparesis or hemiplegia
- Difficulty in speaking/swallowing
- Severe headache (especially in haemorrhage)
- Alteration of consciousness
- Convulsions

Investigations

➢ CT scan brain

In the absence of neuroimaging, the following clinical features may help to distinguish the stroke subtypes.

TYPE	CLINICAL COURSE	RISK FACTORS	OTHER CLUES
Intracerebral haemorrhage	Gradual progression over minutes/ hours	Hypertension, trauma, bleeding disorders, illicit drugs	Patients may have reduced alertness and severe headache

Subarachnoid haemorrhage	Abrupt onset of very severe headache, focal symptoms less common	Smoking, hypertension, illicit drugs, but at times none (due to rupture of congenital aneurysms)	Patients may have reduced alertness It may happen in young people
Ischaemic (thrombotic)	Gradual development of focal deficits over hours or days	Age, smoking, diabetes, dyslipidemia	Symptoms can improve and worsen in the following days
Ischaemic (embolic)	Sudden onset of focal deficits	As above plus valvular heart disease and arrhythmias	Often improves slowly

Management

TREATMENT	LOC
General care ▶ Ensure airways and respiration if unconscious ▶ Do not give anything by mouth before assessing the ability to swallow, to avoid risk of inhalation ▶ IV or NGT for hydration and nutrition if unable to swallow ▶ Control blood sugar with insulin if diabetic	**H**

If ischaemic stroke	**H**
▶ **Aspirin** 150-300 mg every 24 hours	
▶ In the acute phase, treat hypertension only if extreme (more than 220/120) or if there are other complications (pulmonary oedema, angina, etc), otherwise re-start antihypertensive 24 hours after the event and reduce blood pressure slowly	
▶ Consider DVT prophylaxis with **enoxaparin** 40 mg SC daily	
If stroke clinically haemorrhagic	
▶ Supportive care as above	
▶ Refer for CT scan and neurosurgical evaluation	
Chronic care of ischaemic stroke	
▶ Early mobilization and physiotherapy	
▶ **Aspirin** 75-100 mg once daily for life	**HC4**
▶ **Atorvastatin** 40 mg daily for life	**H**
▶ Control of risk factors	

5. Respiratory Diseases

5.1 NON-INFECTIOUS RESPIRATORY DISEASES

5.1.1 Asthma

ICD10 CODE: J45

A chronic inflammatory disease of the airways which leads to muscle spasm, mucus plugging, and oedema. It results in recurrent wheezing, cough, breathlessness, and chest tightness.

Acute attacks may be precipitated by upper respiratory tract infections (e.g. flu) and exposure to irritant substances (e.g. dust, exercise, and cold).

Causes

- Not known but associated with allergies, inherited and environmental factors

Clinical features

- No fever (if fever present, refer to pneumonia)
- Difficulty in breathing (usually recurrent attacks) with chest tightness, with or without use of accessory muscles. Patients may not appear very distressed despite a severe attack
- Wheezing, rhonchi
- Cough - usually dry, may be intermittent, persistent, or acute, especially at night
- Severe forms: failure to complete sentences, darkening of lips, oral mucosa and extremities (cyanosis)

Differential diagnosis

- Heart failure
- Other causes of chronic cough
- Bronchiolitis
- Bronchiectasis

Investigations

➢ Diagnosis is mainly by clinical features

Specialised investigations

➢ Peak flow rate: the peak flow rate increases to about 200 ml following administration of a bronchodilator

➢ Spirometry (an increase in Forced Expiratory Volume (FEV) of >12% after bronchodilation)

➢ Sputum: for eosinophilia

If evidence of bacterial infection

➢ Chest X-ray

➢ Blood: complete blood count

General principles of management

- **Inhalation** route is always preferred as it delivers the medicines directly to the airways; the dose required is smaller, the side-effects are reduced
  - E.g. nebuliser solutions for acute severe asthma are given over 5-10 minutes, usually driven by oxygen in hospital
  - In children having acute attacks, use spacers to administer inhaler puffs
- **Oral** route may be used if inhalation is not possible but systemic side-effects occur more frequently, onset of action is slower and dose required is higher
- **Parenteral** route is used only in very severe cases when nebulisation is not adequate

5.1.1.1 Acute Asthma

Asthma attack is a substantial worsening of asthma symptoms. The severity and duration of attacks are variable and unpredictable. Most attacks are triggered by viral infections. Assess severity using the following table.

Not all features may be present. If the patient says they feel very unwell, listen to them!

Assessment of Severity

CHILDREN BELOW 12 YEARS	ADULTS AND CHILDREN >12 YRS
Mild to moderate	
• Able to talk in sentences • Peak flow is ≥ 50% of predicted or best • **Pulse (beats/minute)** Child > 5 years: ≤ 125 bpm Child < 5 years: ≤ 140 bpm • **Respiratory rate** Child > 5 years: ≤ 30 Child < 5 years: ≤ 40 • SpO_2 ≥ 92%	• Able to talk • **Pulse** < 110 bpm • Respiratory rate < 25 • Peak flow >50% of predicted or best • SpO_2 ≥ 92%
Severe	
• Cannot complete sentences in one breath or, too breathless to talk or feed • Peak flow < 50% of predicted or best • **Pulse (beats/minute)** Child > 5 years: > 125 bpm Child <5 years: > 140 bpm • **Respiratory rate** Child > 5 years: > 30 Child < 5 years: >40 • Use of accessory muscles for breathing (young children) • SpO_2 < 92%	• Cannot complete sentences in one breath • **Pulse** ≥ 110 bpm • **Respiratory rate** >25 • Peak flow <50% of predicted or best • SpO_2 ≥ 92%

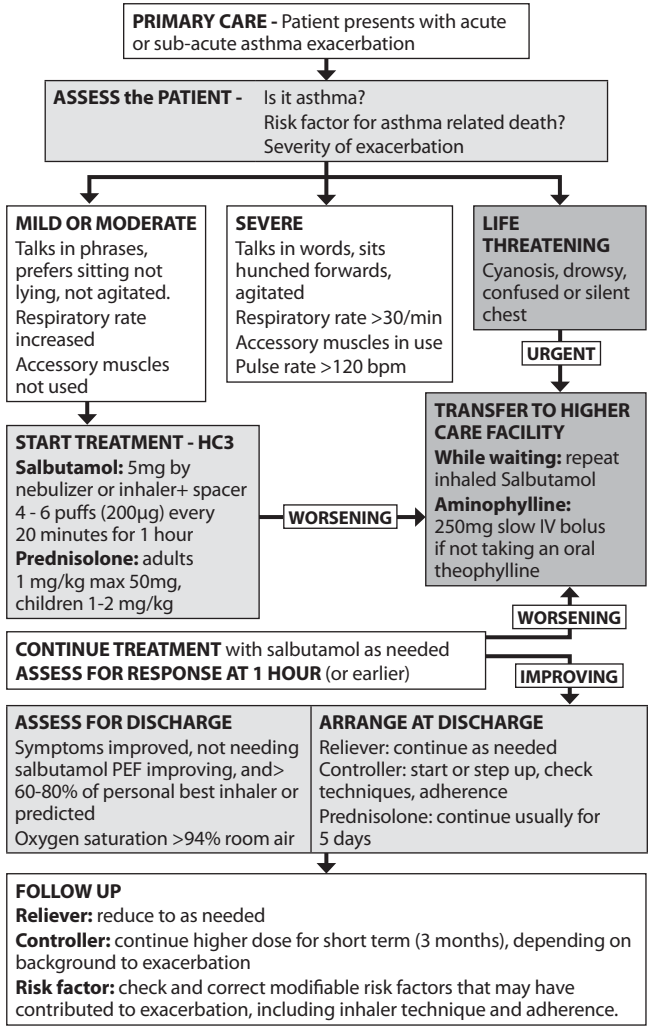
Life threatening (Adults and Children)
• Silent chest, feeble respiratory effort, cyanosis • Hypotension, bradycardia or exhaustion, agitation • Reduced level of consciousness • Peak flow < 33% of predicted or best • Arterial oxygen saturation < 92%

Management of asthma attacks

TREATMENT	LOC
Mild to moderate	**HC3**
▶ Treat as an out-patient ▶ Reassure patient; place him in a ½ sitting position ▶ Give **salbutamol**	**HC3**
– Inhaler 2-10 puffs via a large volume spacer – Or 5 mg (2.5 mg in children) nebulisation – Repeat every 20-30 min if necessary	
▶ **Prednisolone** 50 mg (1 mg/kg for children)	**HC3**
Monitor response for 30-60 min. If not improving or relapse in 3-4 hours ▶ Refer to higher level	
If improving, send home with ▶ **Prednisolone** 50 mg (1 mg/kg for children) once a day for 5 days (3 days for children) ▶ Institute or step up chronic treatment (see next section) ▶ Instruct the patients on self treatment and when to come back ▶ Review in 48 hours ◆ Do not give routine antibiotics unless there are clear signs of bacterial infection	**HC3**

Severe	HC4
Patients with severe asthma need to be referred to HC4 or hospital after initial treatment	
▶ Admit patient; place him in a ½ sitting position	
▶ Give **high flow oxygen** continuously, at least 5 litres/minute, to maintain the $SpO_2 \geq 94\%$ if available	HC4
▶ Give **salbutamol**	
– Inhaler 2-10 puffs via a large volume spacer	
– Or 5 mg (2.5 mg in children) nebulisation	
– Repeat every 20-30 min if necessary during the 1st hour	
▶ **Prednisolone** 50 mg (1 mg/kg for children) or	
▶ Or **hydrocortisone** 100 mg (children 4 mg/kg max 100 mg) IV every 6 hours until patient can take oral prednisolone	
▶ Monitor response after nebulisation	
If response poor	
▶ **Ipratropium bromide** nebuliser 500 micrograms (250 microgram in children below 12) every 20-30 min for the first 2 hours then every 4-6 hours	HC4
▶ Or **aminophylline** 250 mg slow IV bolus (child 5 mg/kg) if patient is **not** taking an oral theophylline	
Alternatively, if symptoms have improved, respiration and pulse settling, and peak flow >50%	
▶ Step up the usual treatment	
▶ And continue with **prednisolone** to complete 5 days of treatment	
▶ Review within 24 hours	
– Monitor symptoms and peak flow	
– Arrange self-management plan	

Life threatening	HC4
▶ Arrange for immediate hospital referral and admission ***First aid*** ▶ Admit patient; place him in a ½ sitting position ▶ Give **high flow oxygen** continuously, at least 5 litres/minute, to maintain the SpO_2 ≥ 94% if available ▶ Give **salbutamol** – Inhaler 2-10 puffs via a large volume spacer – Or 5 mg (2.5 mg in children) nebulisation – Repeat every 20 min for 1 hour ▶ **Hydrocortisone** 100 mg (children 4 mg/kg max 100 mg) IV stat or p**rednisolone** 50 mg (1 mg/kg for children) ▶ **Ipratropium bromide** nebuliser 500 micrograms (250 microgram in children below 12) every 20-30 minutes for the first 2 hours then every 4-6 hours ▶ Monitor response for 15-30 minutes	**HC4**
If response is poor ▶ **Aminophylline** 250 mg slow IV bolus (child 5 mg/kg) if patient is **not** taking an oral theophylline	**HC4**
Note ◆ The use of aminophylline and theophylline in the management of asthma exacerbations is discouraged because of their poor efficacy and poor safety profile	



Adapted with modification GINA Pocket Guide for Health Professionals 2016

5.1.1.2 Chronic Asthma

General principles of management

- Follow a stepped approach
  - Before initiating a new drug, check that diagnosis is correct, compliance and inhaler technique are correct and eliminate trigger factors for acute exacerbations
- Start at the step most appropriate to initial severity
- Rescue course
  - Give a 3-5 days "rescue course" of **prednisolone** at any step and at any time as required to control acute exacerbations of asthma at a dose of:
    Child < 1 year: 1-2 mg/kg daily; 1-5 years: up to 20 mg daily;
    5-15 years: Up to 40 mg daily; adult: 40-60 mg daily for up to 3-5 days.
- Stepping down
  - Review treatment every 3-6 months
  - If control is achieved, stepwise reduction may be possible
  - If treatment started recently at Step 4 (or contained corticosteroid tablets, see below), reduction may take place after a short interval; in other patients 1-3 months or longer of stability may be needed before stepwise reduction can be done

TREATMENT	LOC
STEP 1: Intermittent asthma • Intermittent symptoms (< once/week) • Night time symptoms < twice/month • Normal physical activity ***Occasional relief bronchodilator*** ▶ Inhaled short-acting beta$_2$ agonist e.g. **salbutamol inhaler** 1-2 puffs (100-200 micrograms) – Use with spacer for children	**HC3**

▶ Move to Step 2 if use of salbutamol needed more than twice a week or if there are night-time symptoms at least once a week	
STEP 2: Mild persistent asthma • Symptoms > once/week, but < once/day • Night time symptoms > twice/month • Symptoms may affect activity ***Regular inhaled preventer therapy*** ▶ **Salbutamol** inhaler 1-2 puffs prn ▶ Plus regular standard-dose inhaled corticosteroid, e.g. **beclomethasone** 100-400 micrograms every 12 hours (children: 100-200 micrograms every 12 hours) – Assess after 1 month and adjust the dose prn – Higher dose may be needed initially to gain control – Doubling of the regular dose may be useful to cover exacerbations	**HC3** **HC4**
STEP 3: Moderate persistent asthma • Daily symptoms • Symptoms affect activity • Night time symptoms > once/week • Daily use of salbutamol ***Children below 5 years: refer to specialist*** **Regular high-dose inhaled corticosteroids** ▶ **Salbutamol** inhaler 1-2 puffs prn up to 2-3 hourly Usually 4-12 hourly ▶ PLUS **beclomethasone** inhaler 400-1000 micrograms every 12 hours (In *child 5-12 years:* 100-400 micrograms every 12 hours)	**HC3** **HC4**

In adults, also consider 6-week trial with ▶ **Aminophylline** 200 mg every 12 hours or ▶ **Salbutamol** tablets 4 mg 8 every 8 hours	**HC4**
STEP 4: Severe persistent asthma • Daily symptoms • Frequent night time symptoms • Daily use of salbutamol ***Refer to specialist clinic especially children < 12 years*** **Regular corticosteroid tablets** ▶ **Salbutamol** (as in Step 3) plus ▶ Regular high-dose **beclomethasone** (as in Step 3) ▶ Plus regular **prednisolone** 10-20 mg daily after breakfast	**RR**
Note ◆ If inhaler not available, consider **salbutamol tablets** 4 mg every 8 hours *Child < 2 years:* 100 micrograms/kg per dose *Child 2-5 years:* 1-2 mg per dose	
Caution △ Do not give medicines such as morphine, propranolol, or other B-blockers to patients with asthma as they worsen respiratory problems △ Do not give sedatives to children with asthma, even if they are restless	

Prevention

- Avoid precipitating factors e.g.
  - Cigarette smoking
  - Acetylsalicylic acid
  - Known allergens such as dust, pollens, animal skins
  - Exposure to cold air
- Exercise can precipitate asthma in children, advise them to keep an inhaler handy during sports and play
- Effectively treat respiratory infections

5.1.2 Chronic Obstructive Pulmonary Disease (COPD)

ICD10 CODE: J42-44

Chronic obstructive pulmonary disease (COPD) is a lung disease characterized by chronic obstruction of lung airflow that interferes with normal breathing and is not fully reversible.

- The more familiar terms 'chronic bronchitis' and 'emphysema' are no longer used, but are now included within the COPD diagnosis.
- Such a diagnosis should be considered in any patient who has symptoms of cough, sputum production, or dyspnea (difficult or labored breathing), and/or a history of exposure to risk factors for the disease.

A COPD exacerbation is an acute worsening of the patient's respiratory symptoms needing a change in medications.

Causes and predisposing factors

- Tobacco smoking is the most common cause
- Indoor air pollution: Biomass fuel smoke (firewood, charcoal and cow dung) exposure in poorly ventilated kitchens
- Exposure to occupational dust and chemicals (cement, paint, saw dust, fumes) without adequate protection
- It may frequently follow TB disease (residual symptoms)

Clinical features

- Chronic cough in a current or previous smoker who is over 40 years
- Breathlessness: persistent, progressive and worse with exercise +/- tight chest and wheezing
- Chronic sputum (mucuos) production and 'bronchitis' for at least 3 months in 2 successive years
- On examination there may be a barrel chest (increased antero-posterior diameter)

- Rapid breathing, reduced chest expansion, with or without increased use of accessory muscles of respiration, rhonchi, cyanosis
- Decreased breath sounds, ankle swelling and other signs of right heart failure

Differential diagnosis

- Asthma
- Congestive Heart failure
- Pulmonary embolism
- Pulmonary TB

Investigation

- Spirometry: gold standard for diagnosis but if not available use all available tools (history of exposure to risk factors + clinical symptoms + any available investigations).
- History of exposure to risk factors
- Chest X-ray (Hyper-inflated lungs)
- Peak flometry
- Echocardiography – when one suspects right-sided heart failure secondary to COPD

Management

Treatment aims at:

- Removing risk factors and preventing further damage
- Relief of symptoms and prevention of the severity and frequency of COPD exacerbations
- Improving the patients exercise tolerance and maintaining good health

Inhalers are the preferred formulation for the treatment of COPD.

TREATMENT	LOC
▶ Explain to the patient that: – COPD is chronic lung damage and there is no cure – Treatment is to prevent exacerbations, further damage, and infections ***Non-pharmacological management*** ▶ Advise the patient that: – They **must stop smoking** – it is the only way to stop it from getting worse – Reduce exposure to charcoal and wood/dung cooking smoke. Keep cooking areas well-ventilated by opening windows and doors. Use alternative clean energy sources like Biogas, improved cooking stoves etc. – Use masks for respiratory protection or stop working in areas with occupational dust or pollution – Physical exercise to train lung capacity (pulmonary rehabilitation) under supervision – Get treatment quickly in case of *increased* breathlessness, cough or sputum ▶ **Physiotherapy** is beneficial to improve exercise tolerance	**HC2**
Step 1: Mild ▶ **Inhaled salbutamol** 2 puffs 2-4 times a day, may be used periodically for short periods. The main purpose of this treatment is to reduce or prevent symptoms. ***If inhalers not available consider:*** ▶ **Aminophylline** 200 mg twice daily	**HC3** **HC4**

Step 2: Moderate ▶ **Inhaled salbutamol** 2 puffs 2-4 times a day ▶ Plus inhaled steroid **beclomethasone** 100-400 micrograms 2-4 times a day	**HC4**
Step 3: Severe ▶ As in step 2 plus **ipratropium inhaler** 2 puff 2-4 times a day	**H**
Note ◆ If available, long acting bronchodilators **salmeterol and formeterol** can be used in moderate and severe COPD in combination with inhaled steroids	**RR**
COPD exacerbations • If more sputum, changed to more yellow/green coloured, and/or breathlessness, temp >38°C and or rapid breathing ("bronchitis"), then ▶ Treat with antibiotic e.g. **amoxicillin** 500 mg every 8 hours for 7-10 days or **doxycycline** 100 mg every 12 hours for 7-10 days ▶ Oral **Prednisolone** 40 mg once daily in the morning for 5 days. Do NOT use oral steroids for extended periods in patients with COPD ***Refer urgently to hospital if:*** – Rapid pulse (>100 beats per minute) or breathing (>30 breaths per minute) – Tongue or lips are "blue" (central cyanosis) – Confused – Failure to improve ▶ Give **oxygen** by nasal cannula (1-3 litres/min) if available, target SpO_2 88-92%	**HC2** **HC3**

Note

- Give oxygen with care (minimum flow required to reach the target SpO_2) because COPD patients are at risk of hypercapnia (CO_2 retention) which cause respiratory depression and coma

5.2 INFECTIOUS RESPIRATORY DISEASES

5.2.1 Bronchiolitis

ICD10 CODE: J21

Acute inflammatory obstructive disease of small airways (bronchioles) common in children less than 2 years.

Causes

- Mainly viral (often respiratory syncitial virus, RSV)
- Mycoplasma

Clinical features

- First 24-72 hours: rhinopharyngitis with dry cough
- Later tachypnoea, difficulty in breathing, wheezing (poorly responsive to bronchodilators)
- Cough (profuse, frothy, obstructive secretions)
- Mucoid nasal discharge
- Moderate or no fever
- Criteria for severity: child < 3 months, worsening of general condition, pallor, cyanosis, respiratory distress, anxiety, respiratory rate >60/minute, difficulty feeding, SpO2 < 92%

Differential diagnosis

- Asthma
- Pneumonia, whooping cough
- Foreign body inhalation
- Heart failure

Investigations

- Clinical diagnosis
- X-ray: Chest (to exclude pneumonia)
- Blood: Haemogram

Management

TREATMENT	LOC
Mild-moderate bronchiolitis ***Wheezing, 50-60 breaths/minute, no cyanosis, able to drink/feed*** ▶ Treat the symptoms (possibly as an out-patient) – Nasal irrigation with **normal saline** – Small, frequent feeds – Increased fluids and nutrition – Treat fever (**paracetamol**)	**HC3**
Severe bronchiolitis ***Wheezing, fast breathing > 60 breaths/min, cyanosis*** ▶ Admit and give supportive treatment as above ▶ Give humidified nasal **oxygen** (1-2 litres/min) ▶ **Salbutamol** inhaler 100 micrograms/puff: 2 puffs with spacer, every 30 minutes or nebulisation salbutamol 2.5 mg in 4 ml normal saline. – If symptoms improve, continue salbutamol every 6 hours – If symptoms non-responsive, stop the salbutamol ▶ Nebulise **Adrenaline** 1:1000, 1 ml diluted in 2-4 ml normal saline every 2-4 hours ▶ Give as much oral fluids as the child will take: e.g. **ORS.** Use NGT or IV line if child cannot take orally – Give basic total fluid requirement of 150 ml/kg in 24 hours plus extra to cover increased losses due to illness	**HC4**

Note
- Antibiotics are usually not needed for bronchiolitis since it is viral.
- Steroids are not recommended

Prevention
- Avoid exposure to cold and viral infections
- Proper handwashing after contact with patients

5.2.2 Acute Bronchitis ICD10 CODE: J20

Acute inflammatory disease of the bronchi.

Causes
- Mostly viral
- In older children, can be caused by *Mycoplasma pneumoniae*
- Secondary Bacterial infection: *Streptococcus pneumoniae, Haemophilus influenzae*

Predisposing factors
- Exposure to cold, dust, smoke
- Cigarette smoking

Clinical features
- Often starts with rhinopharyngitis, descend progressively to larynx, pharynx, tracheitis
- Irritating, productive cough sometimes with scanty mucoid, blood streaked sputum
- Chest tightness, sometimes with wheezing
- Fever may be present
- No tachypnoea or dyspnoea
- Secondary bacterial infection: fever > 38.5°C, dyspnoea, purulent expectorations

Differential diagnosis

- Bronchial asthma, emphysema
- Pneumonia, tuberculosis

Investigations

➢ Diagnosis based on clinical features
➢ Chest X-ray

Management

TREATMENT	LOC
▶ Most cases are viral and mild ▶ **Paracetamol** 1 g every 4-6 hours (max: 4 g daily) ▶ *Child:* 10 mg/kg (max: 500 mg) per dose ▶ Plenty of oral fluids ▶ Children: nasal irrigation with normal saline to clear the airway ▶ Local remedies for cough (honey, ginger, lemon) ***If there is suspicion of bacterial infection, especially if patient is in general poor conditions (malnutrition, measles, rickets, severe anaemia, elderly, cardiac disease)*** ▶ Give A**moxicillin** 500 mg every 8 hours *Child*: 40 mg/kg dispersible tablets every 12 hours ▶ Or **Doxycycline** 100 mg every 12 hours *Child >8 years:* 2 mg/kg per dose	**HC2**

Prevention

- Avoid predisposing factors above

5.2.3 Coryza (Common Cold) ICD10 CODE: J00

Acute inflammation of the upper respiratory tract; rhinitis (nasal mucosa) and rhinopharyngitis (nasal and pharyngitis).

Cause

- Viruses - several types, often rhinoviruses

Clinical features

- Onset usually sudden
- Tickling sensation in nose and sneezing
- Throat dry and sore
- Profuse nasal watery or purulent discharge, tearing

Complications

- Sinusitis
- Lower respiratory tract infection (pneumonia)
- Ear ache, deafness, otitis media
- Headache

Differential diagnosis

- Nasal allergy

Management

Common cold is a viral disease and so does **NOT** require any antibiotics. Antibiotics do not promote recovery or prevent complications, and cause patients unnecessary side effects.

TREATEMENT	LOC
No antibiotics, give only symptomatic treatment	**HC2**
▶ Increase fluid intake, preferably warm drinks	
▶ Give **paracetamol** for 2-3 days	
▶ Home remedies (steam, honey)	
▶ **Xylometazoline** 0.05% nose drops 2-3 drops into each nostril 3 times daily (max: 5 days)	**HC4**
For breastfeeding children	
▶ Continue breastfeeding	
▶ Clear the nose with **normal saline** to ease breathing or feeding	
▶ Keep the child warm	

Note
- Avoid cough syrups in children below 6 years

Prevention
- Avoid contact with infected persons
- Include adequate fresh fruits and vegetables in the diet

5.2.4 Acute Epiglottitis

ICD10 CODE: J05.1

An acute inflammation of the epiglottis, a rare but serious disease of young children. Airway obstruction is always severe, and intubation or tracheostomy is often needed. It is rare since routine childhood immunisation with Hib vaccine was introduced.

Cause
- Bacterial infection, commonly *Haemophilus influenzae*

Clinical features
- Rapid onset of high fever
- Typical: "tripod or sniffing" position, preferring to sit, leaning forward with an open mouth, appears anxious
- Sore throat, difficulty swallowing, drooling, respiratory distress
- Stridor and maybe cough
- Appears critically ill (weak, grunting, crying, drowsy, does not smile, anxious gaze, pallor, cyanosis)
- Asphyxia leading to quick death

Differential diagnosis
- Laryngeal cause of stridor e.g. laryngotracheobronchitis

Caution
△ Avoid tongue depression examination as this may cause complete airway blockage and sudden death
△ Do not force child to lie down as it may precipitate airway obstruction

Management

TREATMENT	LOC
▶ Admit and treat as an emergency – intubation or tracheostomy may often be needed ▶ Avoid examination or procedures that agitate child as this may worsen symptoms. Avoid **IM** medication ▶ Insert IV line and provide IV hydration ▶ **Ceftriaxone** 50 mg/kg once daily for 7-10 days	**H**

Prevention

- Hib vaccine is part of the pentavalent DPT/HepB/Hib vaccine used in routine immunisation of children

5.2.5 Influenza ("Flu") ICD10 CODE: J9-11

A specific acute respiratory tract illness occurring in epidemics and occasionally pandemics. Influenza virus strains can be transmitted to humans from animals (pigs, birds) and can occasionally mutate and spread from person to person (e.g. swine flu, or H1N1).

Cause

- Influenza viruses of several types and strains
- Spread by droplet inhalation

Clinical features

- Sudden onset
- Headache, pain in back and limbs
- Anorexia, sometimes nausea and vomiting
- Fever for 2-3 days with shivering
- Inflamed throat
- Harsh unproductive cough

Complications

- Secondary bacterial infection: bronchopneumonia
- Toxic cardiomyopathy and sudden death

Differential diagnosis

- Other respiratory viral infections

Investigations

- ➢ Isolation of virus
- ➢ Viral serology to identify virus

Management

TREATMENT	LOC
If no complications: treat symptoms	**HC2**
▶ **Paracetamol** 1 g every 4-6 hours prn (max: 4 g/day) *Child*: 10 mg/kg per dose	
For nasal congestion	
▶ Use steam inhalation prn	
▶ Or **xylometazoline** nose drops 0.05% 2-3 drops into each nostril 3 times daily (max: 5 days)	**HC4**
In the breastfeeding child	
▶ If blockage interferes with breastfeeding, clean/clear nose with normal saline	
▶ Keep child warm	
▶ Breastfeed more frequently	
For troublesome cough	
▶ Frequent warm drinks, home remedies (honey, ginger)	

Prevention

- Avoid contact with infected persons
- Inactivated Influenza vaccine yearly (for vulnerable populations)

5.2.6 Laryngitis

ICD10 CODE: J04

Inflammation of the larynx which may involve surrounding structures, e.g. pharynx and trachea

Cause

- Viruses: Para-influenza group, influenza – by far the most common cause. Usually acute (up to 3 weeks)
- Excessive use of the voice, allergic reactions, inhalation of irritating substances, e.g. cigarette smoke, gastroesophageal reflux. Often chronic symptoms (>3 weeks)

Clinical features

- Onset similar to any upper respiratory tract infection
- Fever usually mild
- Hoarseness

Differential diagnosis

- Diphtheria, whooping cough
- Laryngotracheobronchitis, epiglottitis
- Bacterial tracheitis
- Foreign body aspiration
- Asthma
- Airway compression by extrinsic mass (e.g. tumours, haemangioma, cysts)

Investigations

- Blood: Complete blood count
- X-ray: Chest
- Laryngeal swab for C&S

Management

TREATMENT	LOC
The cause is usually viral for which there is no specific treatment and **no need** for antibiotics ▶ Give **analgesics** ▶ Use steam inhalations 2-3 times daily ▶ Rest the voice ▶ For chronic laryngitis: identify and treat the cause	**HC2**

5.2.7 Acute Laryngotracheobronchitis (Croup)

ICD10 CODE: J05.0

An acute inflammation of larynx, trachea and bronchi primarily in children < 3 years, usually viral.

Cause

- Measles virus
- Influenza and Parainfluenza type 1 viruses
- Rarely - superinfection with bacteria e.g. *H. influenzae*

Note: Secondary bacterial infection is rare, therefore antibiotics are rarely needed

Clinical features

Early phase (mild croup)

- Barking cough, hoarse voice or cry
- Inspiratory stridor (abnormal high-pitched sound)
- Common cold

Late phase (severe croup)

- Severe dyspnoea and stridor at rest
- Cyanosis (blue colour of child - especially extremities and mouth)
- Asphyxia (suffocation)

Caution

△ Avoid throat examination. Gagging can cause acute obstruction

Management

TREATMENT	LOC
Mild croup	**HC2**
▶ Isolate patient, ensure plenty of rest	
▶ Keep well hydrated with **oral fluids**	
– Use oral rehydration solution	
▶ Give analgesics	
▶ Single dose steroid:	
– **Prednisolone** 1-2 mg/kg single dose	**HC3**
– or **Dexamethasone** 0.15 mg/kg single dose	**HC4**
If condition is severe	**H**
▶ Admit the patient	
▶ Ensure close supervision	
▶ Give humidified **oxygen** 30-40%	
▶ Keep well hydrated with **IV fluids**	
▶ Use **Darrow's solution** ½ strength in **glucose** 2.5%	
▶ Steroids: **hydrocortisone** slow IV or IM *Child <1 year:* 25 mg *Child 1-5 years:* 50 mg *Child 6-12 years:* 100 mg	
– Or **dexamethasone** 300 micrograms/kg IM	
▶ Repeat steroid dose after 6 hours if necessary	
▶ If not controlled, nebulise **adrenaline** 0.4 mg/kg (max 5 mg) diluted with normal saline, repeat after 30 min if necessary	
If severe respiratory distress develops	**RR**
▶ Carry out nasotracheal intubation or tracheostomy if necessary	
▶ Admit to ICU or HDU	

Suspect bacterial infection if child does not improve or appears critically ill ▶ Treat as epiglottitis (see section **5.2.4**)	
Note ◆ Avoid cough mixtures in children < 6 yrs	

Prevention
- Avoid contact with infected persons
- Isolate infected persons

5.2.8 Pertussis (Whooping Cough) ICD10 CODE: A37

An acute bacterial respiratory infection characterised by an inspiratory whoop following paroxysmal cough. It is highly contagious with an incubation period of 7-10 days. **It is a notifiable disease.**

Cause
- *Bordetella pertussis*, spread by droplet infection

Clinical features

Stage 1: Coryzal (catarrhal: 1-2 weeks)
- Most infectious stage
- Running nose, mild cough, slight fever

Stage 2: Paroxysmal (1-6 weeks)
- More severe and frequent repetitive cough ending in a whoop, vomiting, conjuctival haemorrhage
- Fever may be present; patient becomes increasingly tired
- In infants <6 months: paroxyms lead to apnoea, cyanosis (coughing bouts and whoops may be absent)

Stage 3: Convalescent
- Paroxysmal symptoms reduce over weeks or months
- Cough may persist

Complications may include

- **Respiratory:** pneumonia (new onset fever a symptom), atelectasis, emphysema, bronchiectasis, otitis media
- **Nervous system:** convulsions, coma, intracranial haemorrhage
- **Others:** malnutrition, dehydration, inguinal hernia, rectal prolapse

Differential diagnosis

- Chlamydial and bacterial respiratory tract infection
- Foreign body in the trachea

Investigations

- Clinical diagnosis
- Blood: complete blood count
- Chest X-ray

Management

TREATMENT	LOC
▶ Maintain nutrition and fluids ▶ Give **oxygen** and perform suction if the child is cyanotic ▶ For the unimmunised or partly immunised, give **DPT** (three doses) as per routine immunisation schedule ▶ Isolate the patient (avoid contact with other infants) until after 5 days of antibiotic treatment ▶ Treatment should be initiated within 3 weeks from onset of cough: **Erythromycin** 500 mg every 6 hours for 7 days *Child*: 10-15 mg/kg every 6 hours	**HC4**

Note

- Cough mixtures, sedatives, mucolytics, and antihistamines are USELESS in pertussis and should NOT be given

Prevention

- Educate parents on the importance of following the routine childhood immunisation schedule
- Ensure good nutrition
- Avoid overcrowding
- Booster doses of vaccine in exposed infants

5.2.9 Pneumonia

ICD10 CODE: J13-18

Acute infection and inflammation of the lungs alveoli.

There are two major types:

- *Bronchopneumonia*: involves both the lung parenchyma and the bronchi. Common in children and the elderly
- *Lobar pneumonia*: involves one or more lobes of the lung. Common in young people

Causes

Causative agents can be viral, bacterial or parasitic. Pathogens vary according to age, patient's condition and whether infection was acquired in the community or hospital (Gram negative are more common in hospital).

- Neonates: *group B streptococcus, Klebsiella, E.coli, Chlamydia and S. aureus*
- Children <5 years: *Pneumococcus*, *Haemophilus influenzae,* less frequently: *S. aureus, M. catarrhalis, M. Pneumoniae,* viruses (RSV, influenza, measles)
- Adults and children >5 years: most commonly *S.pneumoniae*, followed by atypical bacteria, e.g. *Mycloplasma pneumoniae*, viruses
- Immunosuppressed: Pneumocystis (in HIV infected)

Predisposing factors

- Malnutrition
- Old age
- Immunosuppression (HIV, cancer, alcohol dependence)

- Measles, pertussis
- Pre existing lung or heart diseases, diabetes

Investigations

If facilities are available

- ▶ Do a chest X-ray and look for complications, e.g.
  - – Pneumothorax, pyothorax
  - – Pneumonitis suggestive of pneumocystis jiroveci pneumonia (PCP)
  - – Pneumatocoeles (cavities filled with air) suggestive of staphylococcal pneumonia
- ➢ Sputum: For Gram stain, Ziehl-Neelsen (ZN) stain, culture for AFB
- ➢ Blood: Complete blood count

5.2.9.1 Pneumonia in an Infant (up to 2 months)

In infants, not all respiratory distress is due to infection. But as pneumonia may be rapidly fatal in this age group, suspected cases should be treated promptly and referred for parenteral treatment with antimicrobials. Consider all children < 2 months with pneumonia as SEVERE disease.

Clinical features

- Rapid breathing (≥60 breaths/minute)
- Severe chest indrawing, grunting respiration
- Inability to breastfeed
- Convulsions
- Drowsiness
- Stridor in a calm child, wheezing
- Fever may or may not be present
- Cyanosis and apnoeic attacks (SpO2 less than 90%)

Management

Infants with suspected pneumonia should be referred to hospital after pre-referral dose of antibiotics.

TREATMENT	LOC
▶ Admit ▶ Keep baby warm ▶ Prevent hypoglycaemia by breastfeeding/giving expressed breast milk/NGT ▶ If child is lethargic, do not give oral feeds. Use IV fluids with care (see section 1.1.4) ▶ Give oxygen to keep SpO_2 >94% ▶ **Ampicillin** 50 mg/kg IV every 6 hours ▶ Plus **gentamicin** 7.5 mg/kg IV once daily *Neonates < 7 days old:* 5 mg/kg IV once daily ▶ *In premature babies*, the doses may need to be reduced (**specialist only)** ***In severely ill infants*** ▶ **Ceftriaxone** 100 mg/kg IV once daily ***Alternative (only use if above not available)*** ▶ **Chloramphenicol** 25 mg/kg IV every 6 hours (contraindicated in premature babies and neonates < 7 days old) ▶ Continue treatment for at least 5 days, and for 3 days after the child is well ▶ If meningitis is suspected, continue for 21 days ▶ If septicaemia is suspected, continue for 10 days	**H**

5.2.9.2 Pneumonia in a Child of 2 months-5 years

Clinical features

- Fever, may be high, low grade or absent (in severe illness)

Pneumonia

- Cough
- Fast breathing (2-12 months: ≥ 50 bpm, 1-5 years: ≥ 40 bpm)
- Mild chest wall in-drawing

Severe pneumonia

- As above plus at least one of the following
- Central cyanosis (blue lips, oral mucosa, finger nails or oxygen saturation < 90% using a pulse oximeter)
- Inability to feed, vomiting everything
- Convulsions, lethargy, decreased level of consciousness
- Severe respiratory distress (severe chest indrawing, grunting, nasal flaring)
- Extrapulmonary features, e.g. confusion or disorientation, may predominate and may be the only signs of pneumonia in malnourished or immunosuppressed children

Management of pneumonia

TREATMENT	LOC
Non severe pneumonia	
▶ Give oral **amoxicillin** dispersible tabs (DT) 40 mg/kg every 12 hours for 5 days O	**HC2**
– *2-12 months* 250 mg (1 tab) every 12 hours for 5 days	
– *1-3 years* 500 mg (2 tabs) every 12 hours for 5 days	
– *3-5 years* 750 mg (3 tabs) every 12 hours for 5 days	
If wheezing present	
▶ **Salbutamol** inhaler 1-2 puffs every 4-6 hours until wheezing stops	**HC3**
▶ Reassess child for progress after 3 days	
Severe pneumonia	
▶ Refer to hospital after 1st dose of antibiotic	
▶ Admit	
▶ Give **Oxygen** if SpO_2 < 90% with nasal prongs and monitor through pulse oximetry	**HC4**
▶ Give **ampicillin** 50 mg/kg IV every 6 hours or **benzyl penicillin** 50,000 IU/kg IM or IV	**HC4**

▶ Plus **gentamicin** 7.5 mg/kg IM or IV once daily – Continue treatment for at least 5 days, up to 10 days ***If not better after 48 hours, use second line*** ▶ **Ceftriaxone** 80 mg/kg IM or IV once daily ▶ If staphylococcus is suspected (empyema, pneumatocele at X ray) , give **gentamicin** 7.5 mg/kg once daily plus **cloxacillin** 50 mg/kg IM or IV every 6 hours ***Once the patient improves*** ▶ Switch to oral **amoxicillin** 40 mg/kg every 12 hours for 5 days to complete a total of at least 5 days of antibiotics ***Alternative (if above not available/not working)*** ▶ **Chloramphenicol** 25 mg/kg IV every 6 hours	
Other treatments ▶ Give **Paracetamol** 10 mg/kg every 4-6 hours for fever ▶ If wheezing, give **salbutamol** 1-2 puffs every 4-6 hours ▶ Gentle suction of thick secretions from upper airway ▶ Daily maintenance fluids – careful to avoid overload especially in small and malnourished children (see section **1.1.4**) ▶ If convulsions, give **diazepam** 0.5 mg/kg rectally or 0.2 mg/kg IV	
If convulsions are continuous ▶ Give a long-acting anticonvulsant, e.g. **phenobarbital** 10-15 mg/kg IM as a loading dose. Depending on response, repeat this dose after 12 hours or switch to oral maintenance dose of 3-5 mg/kg every 8-12 hours	

– Monitor and record – Respiratory rate (every 2 hours) – Body temperature (every 6 hours) – Oxygen saturation (every 12 hours) – Improvement in appetite and playing – Use of accessory muscles of respiration – Ability to breastfeed, drink and eat	

5.2.9.3 Pneumonia in Children > 5 years and adults

Clinical features

Moderate

- Fever, chest pain, cough (with or without sputum), rapid breathing (> 30 bpm), no chest indrawing

Severe

- As above plus
- Chest indrawing
- Pulse >120/minute
- Temperature > 39.5 o C
- Low BP < 90/60 mmHg
- Oxygen saturation less than 90%

Note

- Extrapulmonary features, e.g. confusion or disorientation, may predominate and may be the only signs of pneumonia in elderly or immunosuppressed patients

Management

TREATMENT	LOC
Moderate pneumonia (ambulatory patients) ▶ **Amoxicillin** 500 mg-1 g every 8 hours for 5 days ▶ *Children:* 40 mg/kg every 12 hours for 5 days. Preferably use dispersible tablets in younger children	**HC2**

If penicillin allergy or poor response after 48 hours (possible atypical pneumonia), give: ▶ **Doxycycline** 100 mg every 12 hours for 7-10 days ▶ *Child > 8 years only:* 2 mg/kg per dose ▶ Or **Erythromycin** 500 mg every 6 hours for 5 days – 14 days in cases of atypical pneumonia *Child*: 10-15 mg/kg per dose ***Severe pneumonia (hospitalised patients)*** ▶ Give **oxygen** and monitor SpO_2 saturation with pulse oximeter ▶ **Benzylpenicillin** 2 MU IV or IM daily every 4-6 hours *Child*: 50,000-100,000 IU/kg per dose ***If not better in 48 hours:*** ▶ **Ceftriaxone** 1 g IV or IM every 24 hours *Child:* 50 mg/kg per dose (max: 1 g) ***If* S. Aureus *is suspected*** ▶ **Cloxacillin** 500 mg IV every 6 hours ***If other options are not available*** ▶ **Chloramphenicol** 1 g IV every 6 hours for 7 days *Child*: 25 mg/kg per dose (max: 750 mg)	**HC3**

5.2.9.4 Pneumonia by Specific Organisms

TREATMENT	LOC
Stapylococcus pneumonia This form is especially common following a recent influenza infection. It can cause empyema and pneumatocele. ***Adults and children >5 years:*** ▶ **Cloxacillin** 1-2 g IV or IM every 6 hours for 10-14 days *Child >5 years:* 50 mg/kg per dose (max: 2 g)	**H**

Child 2 months-5 years ▶ **Cloxacillin** 25-50 mg/kg IV or IM every 6 hours ▶ Plus **gentamicin** 7.5 mg/kg IV in 1-3 divided doses daily – Continue both medicines for at least 21 days	
Mycoplasma pneumoniae ▶ **Doxycycline** 100 mg every 12 hours for 7-10 days *Child >8 years:* 2 mg/kg per dose × Contraindicated in pregnancy ▶ Or **erythromycin** 500 mg every 6 hours for 5 days *Child:* 10-15 mg/kg per dose	**H**
Klebsiella pneumonia ▶ **Gentamicin** 5-7 mg/kg IV daily in divided doses ▶ Or **ciprofloxacin** 500 mg every 12 hours *Child*: **chloramphenicol** 25 mg/kg every 6 hours – **Give a 5-day course** – **A**mend therapy as guided by C&S results	**H**
Pneumococcal pneumonia ▶ **Benzylpenicillin** 50,000 IU/kg IV or IM every 6 hours for 2-3 days then switch to oral **Amoxicillin** 500 mg-1 g every 8 hours for 5 days *Children:* 40 mg/kg every 12 hours for 5 days. Preferably use dispersible tablets in younger children	**H**

5.2.9.5 Pneumocystis jirovecii Pneumonia

Refer to section 3.1.5.2

5.2.9.6 Lung Abscess

ICD10 CODE: J85.0-1

Localised inflammation and necrosis (destruction) of lung tissue leading to pus formation. It is most commonly caused by aspiration of oral secretions by patients who have impaired consciousness.

Cause

- Infection of lungs with pus forming organisms: e.g. *Klebsiella pneumoniae, Staphylococcus aureus*

Clinical features

- Onset is acute or gradual
- Malaise, loss of appetite, sweating with chills and fever
- Cough with purulent sputum, foul-smelling breath (halitosis)
- Chest pain indicates pleurisy
- Finger clubbing

Complications

- Pus in the pleural cavity (empyema)
- Coughing out blood (haemoptysis)
- Septic emboli to various parts of the body, e.g. brain (causing brain abscess)
- Bronchiectasis (pus in the bronchi)

Differential diagnosis

- Bronchogenic carcinoma
- Bronchiectasis
- Primary empyema communicating with a bronchus
- TB of the lungs
- Liver abscess communicating into the lung

Investigations

➢ Chest X-ray
– Early stages: Signs of consolidation
– Later stages: A cavity with a fluid level
➢ Sputum: For microscopy and culture and sensitivity

Management

TREATMENT	LOC
▶ **Benzylpenicillin** 1-2 MU IV or IM every 4-6 hours *Child*: 50,000-100,000 IU/kg per dose (max: 2 MU) ▶ Plus **metronidazole** 500 mg IV every 8-12 hours *Child*: 12.5 mg/kg per dose ***Once improvement occurs, change to oral medication and continue for 4-8 weeks*** ▶ **Metronidazole** 400 mg every 12 hours *Child:* 10 mg/kg per dose ▶ Plus **Amoxicillin** 500 mg-1 g 8 hourly *Child:* 25-50 mg/kg per dose for for 4-6 weeks ▶ Postural drainage/physiotherapy ▶ Surgical drainage may be necessary	**HC4**

Prevention

- Early detection and treatment of pneumonia

5.3 TUBERCULOSIS (TB) ICD10 CODE: A15-A19

5.3.1 Definition, Clinical Features and Diagnosis of TB

A chronic infection caused by *Mycobacterium tuberculosis* complex. It commonly affects lungs but can affect any organ (lymph nodes, bones, meninges, abdomen, kidney).

For more information on the management of TB see:

- Manual of the National TB/Leprosy Programme (NTLP) in Uganda 3rd Edition, 2016
- TB Control & Community-based DOTS as an Essential Component of District Health Service
- TB Desk Aide

Causes

- Mycobacterium tuberculosis complex (e.g. *M. tuberculosis, M. bovis, M. africanum* and *M. Microti*)
- Transmission by droplet inhalation (cough from a patient with open pulmonary TB); can also be through drinking unpasteurised milk, especially *M.bovis*

Clinical features

General symptoms

- Fevers especially in the evening, excessive night sweats
- Weight loss and loss of appetite

Pulmonary TB

- Chronic cough of >2 weeks (however, in HIV settings, cough of any duration)
- Chest pain, purulent sputum occasionally blood-stained, shortness of breath

Extrapulmonary TB

- Lymphnode TB: Localized enlargement of lymph nodes depending on the site affected (commonly neck)
- Pleural or pericardial effusion
- Abdominal TB: ascites and abdominal pain
- TB meningitis: subacute meningitis (headache, alteration of consciousness)
- Bone or joint TB: swelling and deformity

Complications

- Massive haemoptysis - coughing up >250 mL blood per episode
- Spontaneous pneumothorax and pleural effusion
- TB pericarditis, TB meningitis, TB peritonitis
- Bone TB: can be TB spine with gibbus, TB joints with deformity)
- Respiratory failure

TB Case Definitions

CASE DEFINITION	DESCRIPTION
Presumptive TB patient	Any patient who presents with symptoms and signs suggestive of TB (previously called a TB suspect)
Bacteriologically confirmed TB patient	Patient in whom biological specimen is positive by smear microscopy, culture, Xpert MTB/RIF. All such cases should be notified (registered in the unit TB register)
Clinically diagnosed TB patient	Patient who does not fulfil the criteria for bacteriological confirmation but has been diagnosed with active TB by a clinician or other medical practitioner on the basis of clinical symptoms and other investigations

Classification of TB Infection

CRITERIA	CLASSIFICATION
Site of the disease	**Pulmonary TB:** bacteriologically confirmed or clinically diagnosed case, affecting lung parechyma or tracheobronchial tree. Isolated TB pleural effusion and mediastinal lymphadenopathy without lung tissue involvement is considered extrapulmonary TB
	Extrapulmonary TB: any other case of TB. If the patient has pulmonary and extrapulmonary involvement, he/she will be classified as pulmonary

History of treatment	**New:** no previous TB treatment (or treatment less < 1 month)
	Relapse: patient who completed a previous course of treatment, was declared cured or treatment completed, and is now diagnosed with a recurrent episode of TB
	Treatment after failure: those who have previously been treated for TB and whose treatment failed at the end of their most recent course of treatment
	Treatment after loss to follow-up patients: have previously been treated for TB and were declared lost to follow-up at the end of their most recent course of treatment. (These were previously known as treatment after default patients)
	Other previously treated patients are those who have previously been treated for TB but whose Outcome after their most recent course of treatment is unknown or undocumented
HIV status	**Positive:** patients who tested HIV positive at time of diagnosis or already enrolled in HIV care
	Negative: patients who tested negative at the moment of diagnosis

	Unknown. If testing is then performed at any moment during treatment, patient should be re classified
Drug resistance (based on drug susceptibility Tests)	**Rifampicin resistant:** any case of rifampicin resistance (isolated or in combination with other resistance) **(RR-TB)**
	Monoresistant: resistant to only one first line anti-TB drug
	Poly drug resistant: resistant to more than one first line anti TB other than both rifampicin and isoniazid
	Multi drug resistant: resistant to rifampicin and isoniazid **(MDR –TB)**
	Extensive drug resistance: resistant to rifampicin, isoniazid and any fluoroquinolone and at least one of the 3 second line injectable drugs (capreomycin, kanamycin, amikacin) **(XDR-TB)**.

Differential diagnosis

- Histoplasma pneumonia, trypanosomiasis, brucellosis
- HIV/AIDS
- Malignancy
- COPD, asthma, bronchectasis, emphysema etc
- Fungal infection of the lungs e.g. Aspergillosis

Investigations for TB Infection

➢ **Sputum smear microscopy for AAFBs (ZN stain),**

– one spot and one early morning sample. If one is positive, it is diagnostic for pulmonary TB. This test is widely available in many facilities with a laboratory.

- Sputum samples for children can be collected by inducing sputum using sputum induction kits

➢ **GeneXpert MTB/Rif:** automated DNA test on body samples (sputum, lymphonodes tissue, pleural fluid, CSF etc) which can diagnose pulmonary TB and determine susceptibility to Rifampicin. It is superior to microscopy.

- Genexpert MTB/Rif **should be used as initial test** for TB diagnosis among all presumptive TB patients.
- In facilities with no GeneXpert machines on site, microscopy can be used for TB diagnosis except in priority (risk) groups like: HIV positive patients, children < 14 years, pregnant and breastfeeding mothers, health workers, contacts with drug resistant TB patients, re-treatment cases, patients from prisons or refugee camps, diabetics
- For these priority groups, take a sputum sample and send to a facility with a geneXpert machine through the sample referral system (hub system).

➢ **Other investigations**

- Can be used for sputum and geneXpert negative patients or in case of extrapulmonary TB according to clinical judgement (Chest and spine X ray, abdominal ultrasound, biopsies etc)

➢ **Sputum culture and Drug susceptibility test:** is a confirmatory test for TB and also provides resistance pattern to TB medicines. Do this test for:

- Patients with Rifampicin resistance reported with GeneXpert
- Also patients on first-line treatment who remain positive at 3 months and are reported Rifampicin sensitive on GeneXpert
- Patients suspected to be failing on first-line treatment

Note: All presumed and diagnosed TB patients should be offered an HIV test

5.3.1.1 Tuberculosis in Children

TB may present at any age in children though the risk is highest below the age of 2 years. When compared to adults, children are more prone to TB infection, TB disease, and severe forms of TB disease.

Risk factors

- Contact with infectious (pulmonary) case of TB
- Age < 5 years
- Immunosuppression (HIV, malnutrition, diabetes, etc).
- Age < 1 year and lack of BCG vaccination are risk factors for severe disease

Clinical features

- Suspect TB in all children with
  - Fever > 2 weeks
  - Cough >2 weeks
  - Poor weight gain for one month
  - Close (home) contact of pulmonary TB case.

Investigations

- Bacteriological confirmation of TB is more difficult in children. The diagnosis of TB in children is dependent on conducting a detailed clinical assessment combined with available tests
- Whenever possible, geneXpert should be performed
- TST is a good supportive test for TB diagnosis in children

Management

The principles and objectives of TB treatment are similar to those of adults. In addition, effective treatment of TB in children promotes growth and development.

5.3.1.2 Drug-Resistant TB

Drug resistance is said to occur when TB organisms continue to grow in the presence of one or more anti-TB medicines.

- Although several factors can contribute to the development of drug-resistant TB, inadequate anti-TB treatment is probably the most important. Inadequate anti-TB treatment leads to mutation in drug-susceptibility bacilli making them drug resistant.

Risk factors for drug-resistant TB are:

- Chronic cases (still sputum smear-positive after completing a supervised retreatment regimen)
- Contact with known drug-resistant tuberculosis
- Retreatments (relapses, treatment after failures, return after loss to follow-up)
- History of frequent interruption of drug treatment
- HIV-positive patient presumed to have TB
- Patients who remain sputum smear-positive at month 2 or 3 of first-line anti-TB treatment
- Health care workers
- Patients from prisons or other congregate settings

- Patients suspected to have DR-TB should be screened using rapid drug susceptibility testing (DST) of rifampicin (Xpert MTB/RIF)
  - All patients who are drug-resistant TB suspects should therefore have sputum/other specimens taken for culture and DST in vivo.
- Patients with drug-resistant TB should be treated at specialised centers with approved regimens.

DRUG RESISTANT TB IS A MAJOR PUBLIC HEALTH PROBLEM. INADEQUATE TB TREATMENT IS THE MAJOR CONTRIBUTING FACTOR!

5.3.1.3 Post-TB patient

A **post-TB patient** is one who was successfully treated for TB but presents with respiratory symptoms (chest pain, shortness of breath, cough).

- Re-do standard TB diagnostic evaluation (sputum geneXpert and Chest X ray)
- If negative, evaluate for post-TB lung disease e.g. bronchiectasias, COPD, pulmonary hypertension.
- In most cases these patients have residual lung damage on Chest X-ray from previous TB, BUT they do not need retreatment if bacteriologically negative
- Counsel the patient and give supportive treatment.

5.3.2 Management of TB

General principles

- The country has adopted community-based TB care. It is recommended that all TB medicines are taken under direct observation by a treatment supporter (DOT) .
- Anti-TB drugs are given in fixed dose combination (FDC) regimens according to the patient's TB classification
- Treatment is divided into 2 phases: an **initial (intensive) phase** of 2 months and a **continuation phase** of 4 months (longer in MDR-TB and severe forms of TB particularly TB meningitis and osteoarticular TB)
- TB treatment regimens are expressed in a standard format, e.g. **2RHZE/4RH** where:
  - Letters represent abbreviated drug names
  - Numbers show the duration in months
  - / shows the division between treatment phases
- Anti-TB drugs have side effects and they should be managed appropriately (see next section)
- TB treatment monitoring should be done by clinical, sputum and where possible radiological

- A conclusion of "treatment outcome" status should be done for every patient treated for TB

First line anti-TB medication

DRUG	ADULT DOSE	CHILDREN DOSE	CONTRAINDICATIONS (C) / INTERACTIONS (I)
Isoniazid (H) oral	5 mg/kg (max 300 mg)	10 mg/kg (range 7–15 mg/kg)	**C:** Liver disease, known hypersensitivity **I:** carbamazepine, phenytoin
Rifampicin (R) oral	10 mg/kg (max 600 mg)	15 mg/kg (range 10–20 mg/kg)	**C:** Liver disease, known hypersensitivity **I:** Oral contraceptives, nevirapine, warfarin, phenytoin, glibenclamide
Pyrazinamide (Z) oral	30-40 mg/kg (max 2500 mg)	35 mg/kg (range 30–40 mg/kg)	**C:** Liver disease, known hypersensitivity
Ethambutol (E) oral	15 mg/kg	20 mg/kg (range 15–25 mg/kg)	**C:** Pre existing optic neuritis, established kidney failure

Streptomycin (S)* IM	15 mg/kg	Not recommended	**C:** Impaired hearing, hypersensitivity, kidney failure **I:** other nephrotoxic drugs

*Streptomycin is being phased out and will be no longer used for treating susceptible TB. All previously treated TB patients requiring re-treatment should have a geneXpert test done to rule out rifampicin resistance.

Note

- Rifampicin interacts with oestrogen-containing contraceptives and reduces the protective efficacy of the contraceptives. Use high dose contraceptive or use an additional barrier method.

Important: The choice of regimen now depends on rifampicin sensitivity and not on the previous history of treatment:

- All patients without rifampicin resistance (either new or re-treatments) are treated with 1st line regimen.
- Patients with rifampicin resistance (either new or re-treatments) are treated with second line medication in a designated MDR-TB treatment facility.

Susceptible TB: 1st line treatment regimens

For patients without rifampicin resistance at gene Xpert (both new and re-treatment cases).

New cases not belonging to priority (risk) groups and in which diagnosis was done by sputum examination will also be treated with this regimen.

TYPE OF TB DISEASE	REGIMEN FOR SUSCEPTIBLE TB		LOC
	INTENSIVE PHASE	CONTINUATION PHASE	
All forms of TB in adults and children but excluding TB meningitis and Bone TB)	2RHZE	4RH	**HC3**
TB meningitis Bone (Osteoarticular) TB	2RHZE	10RH	**HC4**

Retreatment cases

	WHAT TO DO	RESULT
Patients previously treated for TB (Retreatment cases e.g. relapse, lost to follow up, treatment failure)	Do GeneXpert to screen for Rifampicin resistance	If GeneXpert reveals Rifampicin sensitivity treat as susceptible (see table above) If GeneXpert reveals Rifampicin resistance, refer to MDR treatment site If unable to obtain a sample or GeneXpert is negative refer to District or Regional Hospital for further evaluation

Rifampicin-resistant TB

Patients with rifampicin-resistant TB should undergo culture and Drug Sensitivity testing, and be treated with second line regimens according to national guidelines. Notify the relevant TB focal persons and organise referral to MDR-TB specialised centers for appropriate management.

Adjunctive treatment

TREATMENT	LOC
▶ **Vitamin B_6 (pyridoxine):** 25 mg per day; given concomitantly with **isoniazid** for the duration of therapy, to prevent peripheral neuropathy	HC3
▶ **Prednisolone** in TB patients in whom complications of fibrosis are anticipated because of severe inflammation such as TB meningitis. – **Prednisolone** is given in a dose of 1-2 mg/kg body weight (not more than 60 mg/day) as a single dose for 4 weeks, and then tapered off over 2 weeks	H

Monitoring of susceptible TB

LABORATORY MONITORING (FOR PULMONARY TB)
At the end of the initial 2 months: – Sputum smear-negative; start continuation phase – Sputum smear-positive; do GeneXpert – If Rifampicin-resistant, refer for MDR-TB treatment and – If Rifampicin-sensitive, continue with first-line treatment, explore adherence issues but repeat smear at 3 months – If positive, do DST – If smear negative continue with first-line treatment
At the beginning of 5 months: – Sputum smear-negative, continue with continuation treatment – Sputum smear-positive, diagnose **Treatment Failure** – Take sputum for GeneXpert to rule out Rifampicin Resistance – If Rifampicin Resistant, refer for DR treatment – If TB detected but not Rifampicin Resistant, restart first line regimen but explore adherence issues

During the 6th month:

- Sputum smear-negative, complete treatment and declare **cured** or **treatment completed**
- Sputum smear-positive, diagnose **treatment failure**
- Take sputum for GeneXpert to rule out rifampicin resistance
- If Rifampicin-resistant, refer for MDR-TB treatment
- If Rifampicin-sensitive, restart first-line treatment, explore adherence issues

CLINICAL MONITORING (FOR ALL TB CASES)

- Monitor well-being and weight gain
- Assess and reinfornce treatment adherence
- Assess and manage side effects

Note

- *Radiological monitoring*– this method should not be used as the sole monitoring tool

Management of treatment interruptions

Refer to NTLP TB treatment manual

Treatment outcomes

A conclusion should be made regarding treatment outcome of EVERY TB patient who has been started on anti-TB treatment.

OUTCOME	DESCRIPTION
Cure	A pulmonary TB patient with bacteriologically confirmed TB at the beginning of treatment who was smear- or culture-negative in the last month of treatment and on at least one previous occasion

Treatment completed	A TB patient who completed treatment without evidence of failure BUT with no record to show that sputum smear or culture results in the last month of treatment and on at least one previous occasion were negative, either because tests were not done or because results are unavailable
Lost to follow-up	A TB patient who did not start treatment, or completed more than 1 month of treatment and whose treatment was interrupted for 2 or more consecutive months
Died	A TB patient who dies for any reason before starting or during the course of treatment
Treatment failure	A TB patient whose sputum smear or culture is positive at month 5 or later during treatment
Not evaluated	A patient for whom no treatment outcome is assigned. This includes cases "transferred out" to another treatment unit as well as cases for whom the treatment outcome is unknown to the reporting unit
Treatment success	The sum of cured and treatment completed

5.3.2.1 Anti-TB Drugs Side Effects

Common side effects

DRUG	SIDE-EFFECTS
Isoniazid	Hepatitis, peripheral neuropathy
Rifampicin	Flu-like syndrome, dermatitis, hepatitis, reddish-brown colouration of urine
Pyrazinamide	Joint pains, hepatitis
Ethambutol	Impaired visual acuity and colour vision
Streptomycin	Headache, tinnitus, skin itching and rash

Management of side effects

SIDE-EFFECTS	DRUG(S) LIKELY TO CAUSE	MANAGEMENT
Low appetite, nausea, abdominal pain	Pyrazinamide, Rifampicin	Give drugs with small meal or just before going to bed
Joint pains	Pyrazinamide	Give an analgesic e.g. ibuprofen or Paracetamol
Burning sensation in the feet	Isoniazid	Pyridoxine 25-100 mg daily
Orange/red urine	Rifampicin	Reassure the patient that it is not harmful
Skin rash (hypersensitivity reaction)	Any anti-TB drug	Depending on degree, see guidelines below

Deafness (no wax on auroscopy) Dizziness, vertigo, and nystagmus	Streptomycin	Stop streptomycin. Use Ethambutol
Jaundice (other causes excluded)	Pyrazinamide, Rifampicin and Isoniazid	Stop anti-TB drugs see guidelines below
Mental confusion	Isoniazid, Rifampicin and Pyrazinamide	*1. If jaundiced,* suspect liver failure, stop drugs (see below) *2. If no jaundice,* suspect Isoniazid, increase dose of pyridoxine
Visual impairment (other causes excluded)	Ethambutol	Stop Ethambutol. Use streptomycin

Hypersensitivity reaction

Most anti-TB drugs can cause hypersensitisation between week 3 and week 8 of treatment in order of frequency: ethambutol, pyrazinamide, rifampicin and isoniazid.

If mild (simple itchy rash), give antihistamine (e.g. chlorpheniramine) and moisturizer and continue treatment.

Severe reactions are characterised by

- Fever, headache, vomiting
- Macular dark erythematous rash which can progress to a Steven Johnson-Toxic Epidermal Necrolysis syndrome (see section 22.7).

TREATMENT	LOC
▶ Stop all drugs immediately ▶ Manage supportively (see section 22.7) ▶ Refer for specialised management	H RR

Drug-induced hepatitis

Severe hepatic damage, presenting with jaundice, vomiting, severe malaise. In order of frequency, the implicated drugs are Isoniazid, Pyrazinamide, Rifampicin and Ethambutol.

TREATMENT	LOC
▶ Stop all drugs immediately ▶ Manage supportively (see section 22.7) ▶ When jaundice has resolved, re-introduce single drugs at 3-7 days interval, starting from the least likely involved ▶ If reaction very severe, do not try to restart pyrazinamide. If RH tolerated, do not try pyrazinamide ▶ Use alternative regimen avoiding the causative drug	H RR

5.3.2.2 Prevention and Infection Control of TB

Case diagnosis and management

- Isolation of sputum-positive cases
- Early detection of cases and initiation of appropriate TB treatment
- Treatment under directly observed treatment (DOT) and follow up to ensure adherence and cure

Contact tracing

- Tracing of contacts of pulmonary TB cases
- Routine screening of health workers for active TB

Preventive measures

- BCG vaccination at birth to prevent severe forms of TB
- Preventive therapy for categories at risk

General hygiene

- Avoidance of overcrowding
- Cough hygiene (cover cough with pieces of cloth, washing hands with soap, proper disposal of sputum)
- Avoid drinking unboiled milk
- Good nutrition
- Good housing condition with improved ventilation

5.3.2.3 Tuberculosis Preventive Therapy

Tuberculosis preventive therapy is recommended to prevent the development of active TB disease in an individual who has latent TB infection (LTBI).

Uganda NTLP National preventive guidelines recommend preventive therapy using a six month regimen of Isoniazid as monotherapy (Isoniazid preventive therapy, IPT) in the following cathegories: If

- Persons living with HIV/AIDS
- Child < 5 years, contacts of pulmonary TB patients

Do not use IPT in cases of active TB
Do not use IPT in contacts of MDR-TB

TREATMENT	LOC
▶ Exclude active TB – Assess for cough, fever, weight loss and nights sweats (Children: cough, fever, poor weight gain) – If any of the TB symptoms are present, do clinical evaluation for TB – If none is present, TB is unlikely, **then**: ▶ Give **isoniazid** for 6 months – Adults: 5 mg/kg/day (maximum 300 mg) – Children: 10 mg/kg/day (max. 300 mg per day) ▶ **Give Vitamin B_6 (pyridoxine):** 25 mg per day; given with isoniazid to prevent peripheral neuropathy	**HC3**
Note ◆ HIV positive children < 1 year should receive IPT only if they have history of contact with TB case and active TB has been excluded	

6. Gastrointestinal and Hepatic Diseases

6.1 GASTROINTESTINAL EMERGENCIES

6.1.1 Appendicitis (Acute) ICD10 CODE: K35-K37

Inflammation of the appendix.

Causes

- Blockage of the appendix duct with stool or particles, followed by infection by intestinal bacteria

Clinical features

- Constipation (common)
- Pain situated around the umbilicus
  - Crampy, keeps on increasing in severity
- After some hours, the pain is localised in the right iliac fossa and becomes continuous
- There may be nausea and vomiting
- Fever (low grade in initial stages)
- Tenderness and rigidity (guarding) in right iliac fossa
- Generalized abdominal pain and signs of peritonitis follows rupture when the contents are poured into the abdominal cavity

Differential diagnosis

- Salpingitis (in females), ovarian cyst
- Ectopic pregnancy
- Pyelonephritis, ureteritis (inflammation of the ureter)
- Intestinal obstruction

Investigations

➢ No special investigations - good history and physical examination are essential for diagnosis

- Complete blood count: look for leucocytosis
- Transabdominal ultrasound
- Abdominal X ray (to assess for perforation and intestinal occlusion)

Management

TREATMENT	LOC
▶ Emergency surgery ▶ If surgery is delayed, start antibiotic treatment while referring – **ceftriaxone** 2 g IV once daily Child: 80 mg/kg IV once daily – plus **metronidazole** 500 mg IV every 8 hours child 10 mg/kg IV every 8 hours ▶ Start antibiotic prophylaxis before the surgery and continue for a duration depending on the findings (< 24 hours for unperforated appendix, at least 5 days for perforated appendix)	H

6.1.2 Acute Pancreatitis

ICD10 CODE: K85

Acute inflammation of the pancreas.

Cause

- Excessive alcohol intake
- Gall stones, biliary tract disease (obstructive cancer or anatomical abnormalities)
- Infections, e.g. mumps, HIV, hepatitis A, ascaris
- Drugs, e.g. sulphonamides, furosemide, lamivudine, analgesics, organosphosphate poisoning
- Peptic/duodenal ulcers

Clinical features

- Acute abdominal pain usually in the epigastrium radiating to the back

- Pain worsened by eating or lying down and relieved by sitting up or leaning forward
- Nausea, vomiting, abdominal distension
- Fever, tachycardia, dehydration (may be severely ill with shock)
- Abdomen is very tender but in the absence of peritonitis there is no rigidity/rebound tenderness

Complications

- Pseudocysts
- Necrotizing pancreatitis with infection
- Peritonitis

Differential diagnosis

- Perforated peptic ulcer, peritonitis
- Acute cholecystitis, inflammation of the biliary tract
- Sickle-cell anaemia crisis

Investigations

- Blood: Serum analysis, complete blood count, random blood sugar
- Raised pancreatic amylase and lipase > 3 times normal
- Ultrasound: gallstones, pancreatic oedema, abdominal fluid
- Liver function tests: raised liver enzymes

Management

TREATMENT	LOC
Mild acute pancreatitis (No organ failure, no local or systematic complications, no signs of peritonitis, normal serum creatinine, normal haematocrit [not increased] ***Early aggressive fluid resuscitation and acid-base balance*** ▶ Prevent volume depletion (adequate fluids with **Ringer's Lactate**). Give 5-10 ml/kg/hour or 250-	**HC4**

500 ml of isotonic crystalloids in the first 12-24 hours or urine output of at least 0.5 ml/kg/hour

- Give **IV fluids** to correct metabolic and electrolyte disturbances and to prevent hypovolaemia and hypotension
- Monitor electrolytes
- Goal is to decrease haematocrit and BUN in 48 hours, evaluate every 4-6 hours

Pain control

- Opioids, paracetamol, epidural anaesthesia [avoid NSAIDs)
  - Rectal/IV **paracetamol** 500 mg 6-8 hourly
  - or **Pethidine** 25-100 mg SC or IM or 25-50 mg slow IV. Repeat prn every 4-6 hours
  - IV **morphine** 1-3 mg every 4 hours
  - Be aware of complications e.g. constipation, dysphagia, respiratory depression, confusion

Emesis

- Anti-emetics as appropriate
  - **Metoclopramide** 10 mg IV/IM every 8 hours
- Pass a nasogastric tube for suction when persistent vomiting or ileus occurs

Feeding and nutrition

- No feeding by mouth until signs and symptoms of acute inflammation subside (i.e. cessation of abdominal tenderness and pain, return of hunger and well-being)
- Provide energy with **dextrose** 50% 300-500 ml a day (add 50 ml to 500 ml Normal saline) to prevent muscle wasting
- Start early oral re-feeding on demand, start within 48-72 hours as soon as the patient is able and can tolerate feeds

▶ Start with clear liquids, then low fat semi-solid feeds then a normal diet – according to tolerance ▶ Monitor daily for vital signs, fluid intake, urinary output, and GI symptoms ▶ If oral feeding not possible, consider peripheral parenteral and central parenteral nutrition ***Glycaemic control (hyperglycaemia is common)*** ▶ Keep serum blood sugar between 6-9 mmol/l ▶ Avoid hypoglycemia ***Antibiotics*** ▶ Avoid inappropriate use of antibiotics and other medications e.g for prophylaxis ▶ In case of specific infection, e.g. biliary sepsis, pulmonary infection, or UTI, treat vigorously with appropriate antibiotic therapy ***Other measures*** ▶ Address the underlying cause as is appropriate ▶ Stop alcohol or drugs ▶ Mobilisation ▶ Evaluation for gallstones by ultrasound scans ▶ Manage complications e.g. acute peri-pancreatic fluid collections, acute necrosis, pseudocyst	
Moderately acute pancreatitis – Transient organ failure (< 48 hours) – Local or systematic complications without persistent organ failure	**RR**
Severe acute pancreatitis – Persistent organ failure (> 48 hours) – Either single or multiple organ failure	**RR**

Treatment as above plus ▶ Refer or consult with specialist at higher level ▶ HDU/ICU (monitoring and nursing) ▶ Volume resuscitation ▶ Pain management ▶ Nutrition/ re-feeding ▶ Glycaemic control ▶ Nasogastric tube ▶ Oxygen / mechanical ventilation ▶ Renal replacement ▶ Address the cause where possible ▶ Manage complications as appropriate e.g. acute peri-pancreatic fluid collection, acute necrosis, pseudocyst	
Note ◆ Look out for diabetes mellitus as a consequence of damage to the pancreas	

Prevention

- Reduce alcohol intake - moderate consumption
- Limit use of toxic drugs

6.1.3 Upper Gastrointestinal Bleeding

ICD10 CODE: K92.2

Bleeding from the upper gastrointestinal tract (oesophagus, stomach and duodenum). It can be a medical emergency.

Cause

- Gastro-oesophageal varices
- Peptic ulcer disease/severe gastritis/cancer
- Mallory Weiss tear (a tear in the oesophageal mucosa caused by forceful retching)

Clinical features

- Vomiting of fresh blood (haematemesis)
- Coffee brown emesis (degraded blood mixed with stomach content)
- Melena: passing of soft dark red smelly stool
- Black stools (in case of minor bleeding)

Complications

- Acute hypovolaemia (if acute and abundant): syncope, hypotension, tachycardia, sweating
- Chronic anaemia (if subacute/chronic loss)

Diagnosis

➢ Endoscopy

Management

TREATMENT	LOC
Supportive treatment ▶ Refer/admit to hospital ▶ IV line(s) and IV fluids (**Normal saline** or **Ringer's Lactate**), start with 500 ml in 30 minutes and adjust according to BP – Aim at systolic BP >90 mmHg and HR <105 bpm ▶ Blood grouping and crossmatching – Hb may not reflect the amount of acute loss, consider amount of bleeding and clinical status to decide for blood transfusion ▶ NGT and nothing by mouth (NPO) ▶ Urinary catheter ▶ Monitor vitals every 15-30 minutes ▶ Stop antihypertensives and diuretics ▶ Correct coagulopathy if present (e.g. in warfarin overdose, liver cirrhosis) with **vitamin K** 5 mg slow IV and fresh frozen plasma	**H**

PUD, gastritis ▶ **Ranitidine** 50 mg IV every 8 hours (switch to oral omeprazole when possible, test for H.pylori) ***Oesophageal varices*** ▶ Refer for endoscopic treatment and prophylaxis with beta blockers	

6.1.4 Peritonitis ICD10 code K65

Irritation (inflammation) of the peritoneum

Causes

Infection following:

- Perforation of the gut and leakage of its contents, e.g. burst appendix, perforated peptic ulcer
- Perforated bowel due to obstruction or injury
- Perforation of gall bladder, containing infected bile
- Perforation of the uterus
- Tuberculosis, abscess, typhoid ulcers
- Malignancy
- Post-operative peritonitis

Chemical causes

- Leakage of urine, blood, bile or stomach or pancreas content into the peritoneal cavity

Clinical features

- Severe and continuous pain
  - Generalised if the whole peritoneum is affected
- Abdominal swelling (distension)
- Fever, vomiting, tachycardia, hypoxia
- Hypovolemic shock, reduced urinary volume
- Tender rigid abdomen
- Rebound tenderness - pressure on the abdomen and sudden release causes sharper pain
- Absent bowel sounds

Investigations

- Abdominal X-ray and/or ultrasound
- Blood: Complete blood cell count, culture and sensitivity
- Renal function and electrolytes
- Liver function tests

Management

TREATMENT	LOC
▶ Refer to hospital ▶ Start initial treatment before referral ▶ Monitor temperature ▶ Monitor BP, pulse, Sp02, urine output, mentation ▶ Put up an **IV drip** with **normal saline** or **ringer's lactate** or any other crystalloid: 1 L every 1-2 hours until BP is normal, then 1 L every 4-6 hours when BP is normal ▶ Nil by mouth. Pass a nasogastric tube and start suction ▶ Ask patient to lie on their side in a comfortable position ▶ Give **oxygen** if patient is hypoxic ▶ Pain control (avoid NSAIDs) – **Pethidine** 50 mg IM or IV *Child*: 0.5-2 mg/kg – Or **Morphine** 5-15 mg IV or IM or SC *Child*: 2.5-5 mg IM IV SC ▶ Refer patient to hospital for further management, including possible exploratory laparotomy	**H**

In suspected bacterial infection and fever: (minimum 7-day course) ▶ **Ceftriaxone** 1-2 g IV once daily *Child:* 50 mg/kg per dose ▶ Plus **gentamicin** 7 mg/kg IV daily in divided doses *Child:* 2.5 mg/kg every 8 hours ▶ Plus **metronidazole** 500 mg by IV infusion every 8 hours; change when possible to 400 mg orally every 8 hours *Child:* 12.5 mg/kg IV per dose; change when possible to oral route ▶ Identify and control the source of infection ▶ Prevent and control complications through: proper nutrition, early ambulation, rehabilitation	

6.1.5 Diarrhoea ICD10 CODE: DEPENDING ON THE CAUSE

Occurrence of 3 or more loose watery stools in 24 hrs.
Acute diarrhoea: ≥ 3 loose, watery stools within 24 hours
Dysentery: bloody diarrhoea, visible blood and mucus
Persistent diarrhoea: episodes of diarrhoea lasting more than 14 days

Causes

- ***Viruses:*** Rotavirus, Norovirus , adenovirus, measles, hepatitis A virus , hepatitis E virus, Ebola
- ***Bacteria:*** Vibrio cholera, E.coli , Salmonella, shigella, campylobacter
- ***Protozoa:*** giardiasis, malaria, cryptosporia
- ***Heliminthes*** e.g. strongyloidiasis, schistosomiasis
- ***Infectious diseases,*** e.g. measles, malaria, and other fever-causing conditions
- Malnutrition e.g. kwashiorkor

- Drugs e.g. prolonged use of purgatives and broad-spectrum antibiotics
- Unhygienic feeding methods
- Malabsorption syndrome
- Lactose intolerance
- HIV associated-diarrhoeas
- Irritable bowel syndrome
- Metabolic: diabetes, thyroid disease
- Travellers' diarrhoea
- Inflammatory bowel disease (persitent diarrhoea usually bloody)

Clinical features

- Loose watery stools
- Abdominal cramps
- Dehydration - thirst, sunken eyes, loss of skin elasticity, low urine output
- Signs of malnutrition if diarrhoea persists for > 14 days
- Blood in stool (in dysentery)

Investigations

➢ Stool: Microscopy, C&S
➢ Other investigations may be necessary according to history and physical examination

Red flags

– Fever
– Extremes of age
– History of travel from a known endemic area
– Dysentery
– Shock, failure to feed, mental confusion

Management

TREATMENT	LOC
▶ Prevent or correct dehydration with **ORS** or **IV fluids** according to **treatment plans A, B** or **C** (see section **1.1.3**) ▶ Find and treat the cause if indicated – Avoid inappropriate use of antibiotics e.g. metronidazole, ciprofloxacin ▶ Routinely use **zinc** supplementation, at a dosage of 20 milligrams per day for children older than six months for 10–14 days ▶ Prevent or treat undernutrition and micronutrient deficiencies	**HC2**
Persistent or chronic diarrhoea: ▶ *Adults only:* As above plus **codeine phosphate** 30 mg every 8-12 hours as required ▶ *Child:* vitamin A – *6-11 months:* 100,000 IU; *1-6 years:* 200,000 IU	**HC4**

Prevention

- Vaccination: measles, rotavirus, polio, hepatitis A virus
- Notify in case of suspected epidemics e.g. cholera, hepatitis A or E virus infections, Ebola
- Encourage handwashing, use of clean drinking water, and proper waste disposal

6.2 GASTROINTESTINAL INFECTIONS

6.2.1 Amoebiasis

ICD10 CODE: A06

A common parasitic infection of the gastrointestinal system acquired through oral-faecal transmission.

Causes

- Protozoan *Entamoeba histolytica*

Clinical features

It may present as:

Amoebic dysentery

- Persistent mucoid/bloody diarrhoea
- Abdominal pain, tenesmus
- Chronic carriers are symptomless

Amoebic abscess (as a result of spread via the blood stream):

- *Liver abscess:* swelling/pain in the right sub-costal area, fever, chills, sweating, weight loss
- *Brain:* presenting as space-occupying lesion
- *Lungs:* cough and blood stained sputum
- *Amoeboma:* swelling anywhere in the abdomen, especially ascending colon
- *Anal ulceration:* may occur by direct extension from the intestinal infection

Differential diagnosis

- Bacillary dysentery
- Any other cause of bloody diarrhoea
- Cancer of the liver
- Other causes of swelling in the liver
- Carcinoma colon

Investigations

- Stool: Microscopy for cysts and motile organisms
- Ultrasound

Management

TREATMENT	LOC
▶ Correct any dehydration (section 1.1.3) ▶ **Metronidazole** 800 mg every 8 hours for 10 days *Child*: 10 mg/kg per dose ▶ Or **tinidazole** 2 g daily for 5 days *Child*: 50 mg/kg per dose	**HC2** **H**

Caution

△ **Metronidazole/tinidazole:** do not use in 1st trimester of pregnancy; avoid alcohol during treatment and for 48 hours thereafter

△ **Metronidazole:** Take after food

Prevention

- Educate the public on personal and food hygiene (washing hands before eating), proper faecal disposal
- Ensure proper management of carriers and patients
- Promote use of clean drinking water

6.2.2 Bacillary Dysentery (Shigellosis)

ICD10 CODE: A03.9

An acute bacterial disease involving the large and small intestine characterised by bloody mucoid diarrhoea. **Bacillary dysentery is a notifiable disease**.

Cause

- *Shigella dysenteriae, Shigella flexneri, Shigella sonnei,* all spread by faecal-oral route

Clinical features

- Mucoid bloody diarrhoea
- Fever
- Nausea, vomiting, abdominal cramps

- Tenesmus (sensation of desire to defecate without production of significant amounts of faeces)
- Toxaemia (sometimes)
- *S. flexneri* infection may be complicated with Reiter's syndrome – urethritis, conjutivitis and arthritis

Differential diagnosis

- Amoebic dysentery
- Other causes of bloody diarrhoea

Investigations

➢ Stool: For C&S, microscopy

Management

TREATMENT	LOC
▶ Correct any dehydration ▶ **Ciprofloxacin** 1 g single dose ▶ *Child >3 months:* 30 mg/kg twice daily for 3 days	**HC2**
In case of sepsis, toxemia, severe disease or pregnancy ▶ **Ceftriaxone** IV 1 g daily till able to take oral, then switch to oral **ciprofloxacin** 500 mg every 12 hours to complete 7 days	**HC3**

Prevention

- Provide health education to the public about:
  - Washing hands before eating food
  - Proper disposal of faeces
  - Boiling of all drinking water
  - Avoiding eating cold foods & roadside foods

6.2.3 Cholera

ICD10 CODE: A00.9

An acute water-secreting diarrhoeal infection involving the entire small bowel. It is very serious and spreads rapidly, and usually occurs as an epidemic. **Cholera is a notifiable disease.**

Cause

- *Vibrio cholerae*, spread by faecal-oral route

Clinical features

- Incubation period is between 1-3 days

Sub-clinical form

- Mild, uncomplicated diarrhoea

Acute form

- Abrupt severe painless watery diarrhoea (rice-water stools)
- Excessive vomiting and fever
- Muscular cramps, weakness
- Rapid onset severe dehydration with oliguria and collapse, decrease in consciousness

Differential diagnosis

- Acute bacillary dysentery (shigellosis)
- Viral enteritis
- Acute food poisoning
- Severe falciparum malaria ('algid malaria')

Investigations

- Stool culture (fresh stools or rectal swabs)
- Mobile vibrios under microscope

Management

Up to 90% of patients with cholera **only require prompt oral rehydration**. Only **severely dehydrated** patients need IV fluids and antimicrobials

TREATMENT	LOC
▶ Start rehydration with ORS at HC1/2 and refer for isolation	HC2
▶ Give oral (**ORS**) or IV fluids (**Ringer's lactate**) according to degree of dehydration (see section 1.1.3)	HC3
▶ Give **glucose** IV for hypoglycemia	
▶ Give maintenance fluid; at least 4-5 litres/day	
▶ **Doxycycline** 300 mg single dose (children 4 mg/kg single dose) Or **erythromycin** 25-50 mg/kg every 6 hours for 3 days in children under 12 years	
▶ Or **ciprofloxacin** 1 g single dose or 20 mg/kg 12 hourly for 3 days	

Caution

△ **Ciprofloxacin, doxycycline:** usually contraindicated in pregnancy and children < 8 years but single dose in cholera should not provoke adverse effect

△ Alternative: **erythromycin** 500 mg every 6 hours for 5 days

Prevention

Educate the patient/public to:

- Rehydrate with plenty of fluids
- Continue breastfeeding or weaning
- Personal and food hygiene, e.g. washing hands before preparing and eating food and after using the toilet
- Using and drinking clean safe water
- Proper human faeces disposal
- Prompt isolation, treatment, and reporting of cases

6.2.4 Giardiasis

ICD10 CODE: A07.1

A protozoan infection of the upper small intestine transmitted by faecal-oral route.

Cause

- *Giardia lamblia* (a flagellated protozoan)

Clinical features

- Often asymptomatic
- Prolonged diarrhoea, steatorrhoea
- Abdominal cramps, bloating
- Fatigue, weight loss
- Malabsorption of fats and fat-soluble vitamins
- Severe giardiasis may cause reactive arthritis, damage to duodenal, and jejunal mucosa

Differential diagnosis

- Other causes of prolonged diarrhoea
- Other causes of malabsorption

Investigations

➢ Stool: For cysts and trophozoites

Management

TREATMENT	LOC
▶ **Metronidazole** 2 g after food daily for 3 days *Child:* 30 mg/kg (max: 1.2 g) per dose	**HC2**
▶ Or **tinidazole** 2 g single dose *Child*: 50 mg/kg	**H**
Caution △ **Metronidazole, tinidazole**: Avoid in first trimester, avoid alcohol during treatment and for 48 hours after △ **Metronidazole**: Take after food	

Prevention

- Provide health education on
  - Personal and food hygiene e.g. washing hands before handling or eating food and after using toilets
  - Proper disposal of human faeces
  - Use of safe clean drinking water

6.3 GASTROINTESTINAL DISORDERS

6.3.1 Dysphagia

ICD10 CODE: R13.1

Dysphagia is difficulty in swallowing. It may be oropharyngeal dysphagia or oesophageal dysphagia

Causes

Oropharyngeal dysphagia

- *Neurological:* stroke, parkinson's, dementia, multiple sclerosis, Guillianbarre, myasthenia, cerebral palsy, tardive dyskinesia, brain tumours, trauma
- *Myopathy:* connective tissue diseases, sarcoidosis, dermatomyositis
- *Structural:* Zenker's diverticulum, webs, oropharyngeal tumours, osteophytes
- *Infections:* syphilis botulism, rabies, mucositis
- *Metabolic:* Cushing's, thyrotoxicosis, Wilson's disease
- *Iatrogenic:* chemotherapy, neuroleptics, post surgery, post radiation

Oesophageal dysphagia

- *Tumours:* cancer of the oesophagus
- *Oesophagiitis:* gastroesophageal reflux disease, candidiasis, pill oesophagitis (e.g. doxycycline), caustic soda injury
- *Extrinsic compression:* tumors, lymph nodes
- *Motility:* achalasia, scleroderma, oesophageal spasms

Clinical presentation

- Difficulty initiating a swallow, repetitive swallowing
- Nasal regurgitation
- Coughing, nasal speech, drooling
- Diminished cough reflex
- Choking (aspiration may occur without concurrent choking or coughing)
- Dysarthria and diplopia (may accompany neurologic conditions that cause oropharyngeal dysphagia)
- Halitosis in patients with a large, residue-containing Zenker's diverticulum or in patients with advanced achalasia or long-term obstruction with luminal accumulation of decomposing residue
- Recurrent pneumonia
- Other features due to causative problem

Investigations

- Medical history and physical examination
- Timed water swallow test (complemented by a food test)
- Endoscopy (mandatory)
- HIV serology, RBS, electrolytes

Management

TREATMENT	LOC
▶ Ensure rehydration with IV fluids ▶ Prevent malnutrition through appropriate energy replacement ▶ Treat cause if possible (e.g. **fluconazole** trial in case of suspected oral candidiasis among HIV patients) ▶ Consult and/or refer the patient	**HC3**

6.3.2 Dyspepsia

ICD10 CODE: K30

Upper abdominal discomfort arising from the upper gastrointestinal tract usually lasting more than 2–4 weeks.

Causes

- Peptic ulcer disease
- Gastroesophageal reflux disease (GERD)
- Functional dyspepsia
- Gastric or oesophageal cancer
- Oesophagitis (drugs, candida, and others)
- Gastroparesis or gastric outlet obstruction
- Other motility disorders

Clinical features

- Epigastric pain or discomfort, heartburn
- Bloating , early satiety and/or fullness after meals
- Repeated belching or regurgitation (often rumination)
- Nausea

Dyspepsia alarm features: requires endoscopy–REFER

- Dysphagia
- Odynophagia (among patients who are HIV negative)
- Weight loss
- Abdominal mass or cervical lymphadenopathy
- Evidence of upper GI bleeding
- Iron deficiency anaemia
- Recurrent vomiting
- Recent dyspeptic symptoms or new dyspepsia in individuals over the age of 40 years

Other indications for endoscopy

- History of long term smoking and alcohol misuse
- Persistent dyspepsia despite appropriate treatment (e.g Proton-pump inhibitors in GERD)
- Hepatobiliary disease

6.3.3 Gastroesophageal Reflux Disease (GERD/GORD)

ICD10 CODE: K21

Dyspepsia with mainly heart burn caused by regurgitation of gastric contents into the lower oesphagus (acid reflux).

Predisposing factors

- Hiatus hernia
- Increased intra-abdominal pressure
- Gastric ulcer

Clinical features

- Heartburn: a burning sensation in the chest. Usually brought about by bending or exertion or lying down
- Unpleasant sour taste (due to stomach acid reflux)
- Oesophagitis with pain and difficulty when swallowing
- Halitosis, bloating and belching
- Nausea, chronic pharyngitis

Complications

- Dysphagia
- Reflux asthma

Differential diagnosis

- Peptic ulcer, gastritis, pancreatitis

Investigations

- Gastroscopy
- Barium meal and follow through

Management

TREATMENT	LOC
▶ Modify diet: avoid precipitating causes and increase milk intake ▶ Give an antacid **Magnesium trisilicate compound** 1-2 tablets every 8 hours	**HC2**

If no response and no alarm signs ▶ **Omeprazole** 20 mg once daily for 4 weeks ***If not responding to 4 weeks of omeprazole, refer for further management***	**HC3**

6.3.4 Gastritis

ICD10 CODE: K29

Acute or chronic inflammation of the gastric mucosa.

Causes

Acute gastritis

- Non-steroidal anti-inflammatory drugs (NSAIDS), e.g. acetylsalicylic acid, diclofenac, ibuprofen
- Alcohol
- Regurgitation of bile into the stomach

Chronic gastritis

- Autoimmune gastric ulceration
- Bacterial infection (*Helicobacter pylori*)

Clinical features

- May be asymptomatic or have associated anorexia, nausea, epigastric pain, and heartburn

Differential diagnosis

- Pancreatitis, cholecystitis
- Peptic and duodenal ulcers, cancer of the stomach
- Epigastric hernia

Investigations

➢ Gastroscopy
➢ Stool for occult blood
➢ Barium meal for chronic gastritis

Management

TREATMENT	LOC
▶ Modify diet: Avoid precipitating causes and increase milk intake ▶ Give an antacid **Magnesium trisilicate compound** 2 tablets every 8 hours as required	**HC2**
If no response ▶ **Omeprazole** 20 mg in the evening for 4 weeks	**HC3**
If vomiting ▶ **Metoclopramide** 10 mg IM repeated when necessary up to 3 times daily ▶ Or **chlorpromazine 25 mg** deep IM or oral (if tolerated) repeated prn every 4 hours	**HC4**
Caution △ Acetylsalicylic acid and other NSAIDS are contraindicated in patients with gastritis	

Prevention

- Avoid spices, tobacco, alcohol, and carbonated drinks
- Encourage regular, small, and frequent meals
- Encourage milk intake

6.3.5 Peptic Ulcer Disease (PUD) ICD10 CODE: K27

Ulceration of gastro-duodenal mucosa. It tends to be chronic and recurrent if untreated.

Causes

- *Helicobacter pylori* infection

Hyperacidity due to

- Drugs (NSAIDS e.g. acetylsalicylic acid, corticosteroids)
- Irregular meals
- Stress

- Alcohol and smoking
- Caffeine-containing beverages

Clinical features

General

- Epigastric pain typically worse at night and when hungry (duodenal ulcer) alleviated by food, milk, or antacid medication
- Epigastric pain, worse with food (gastric ulcer)
- Vomiting, nausea, regurgitation
- Discomfort on palpation of the upper abdomen

Bleeding ulcer

- Haematemesis (coffee brown or red vomitus)
- Black stools (i.e. melena)
- Sudden weakness and dizziness
- Cold, clammy skin (when patient has lost a lot of blood)

Perforated ulcer

- Acute abdominal pain, signs of peritonitis such as rigid abdomen
- Ground coffee-brown vomitus (due to blood)
- Fever
- Shock (weak pulse, clammy skin, low blood pressure)

Differential diagnosis

- Pancreatitis, hepatitis
- Disease of aorta, myocardial infarction
- Lung disease (haemoptysis)

Investigations

➢ Positive stool antigen for *H. pylori*. Used for diagnosis and to confirm eradication.

– This test may give false negative if the patient has been taking antibiotics or omeprazole in the previous 2 weeks

SERUM ANTIBODY TEST IS NOT USEFUL FOR DIAGNOSIS AND FOLLOW UP

- Gastroscopy
- Biopsy of stomach wall
- Barium meal

Management and Prevention

TREATMENT	LOC
▶ Modify diet: avoid precipitating causes and increase milk intake ▶ Give an antacid – **Magnesium trisilicate compound** 2 tablets every 8 hours as required	HC3
Treatment for eradication of *H. pylori* (Triple therapy) ***Combination 1 (First line)*** ▶ **Amoxycillin** 1 g every 12 hours PLUS **metronidazole** 400 mg every 12 hours PLUS **omeprazole** 20 mg every 12 hours for two weeks ➢ Check eradication with a stool antigen test after 4 weeks	HC3
For bleeding and perforated ulcer ▶ Refer patient to hospital immediately for – IV fluids and blood if necessary – IV **ranitidine** 50 mg in 20 ml slowly every 8 hours	H
Note ◆ **Tinidazole** 500 mg every 12 hours can be used instead of **metronidazole** ◆ Confirm eradication with stool antigen test a month after completion of treatment; test should be negative	

6.3.6 Chronic Pancreatitis ICD10 CODE: K86.0-K86.1

Chronic pancreatitis is a disease of the pancreas in which recurrent episodes of inflammation lead to replacement of the pancreatic parenchyma with fibrotic connective tissue, formation of calculous and loss of duct architecture. This leads to progressive loss of pancreas function.

Causes

- Toxic/metabolic: alcohol, tobacco, hypercalcemia, hyperlipidemia, chronic renal failure
- Idiopathic: tropical
- Genetic, autoimmune
- Recurrent and severe acute pancreatitis
- Obstructive cancer or anatomical abnormalities

Clinical features

- Chronic pain: main symptom in chronic pancreatitis
- Diarrhoea
- Loss of weight
- Diabetes mellitus

Complications of chronic pancreatitis

- Pseudocysts
- Stenosis of the pancreatic duct
- Duodenal stenosis
- Vascular complications
- Compression of the bile ducts
- Malnutrition
- Increased risk of cancer of the pancreas

Investigations

- Blood: Serum analysis, complete blood count, random blood sugar
- Raised pancreatic amylase/lipase > 3 times normal

- Ultrasound: gallstones, pancreatic oedema, abdominal fluid
- Liver function tests: raised liver enzymes

Management

Chronic pancreatitis requires specialized management, refer.

TREATMENT	LOC
▶ Refer for specialist management ▶ Use WHO Pain Analgesic ladder – **Pethidine** 50-100 mg IM or **Tramadol** 50-100 mg oral or IM as required ▶ Avoid alcohol and fatty foods	**RR**

6.4 ANORECTAL DISORDERS

6.4.1 Constipation

ICD10 CODE: K59.0

A condition characterised by hardened faeces and difficulty emptying the bowels

Causes

- Dietary: lack of roughage, inadequate fluid intake
- In infants: concentrated feeds
- Lack of exercise, bedridden patient especially in elderly
- Pregnancy
- Certain drugs e.g. narcotic analgesics, antidepressants, diuretics, antipsychotics, iron
- Colon or anorectal disorders : stricture, cancer, fissure, proctitis , congenital bowel abnormalities, irritable bowel syndrome, volvulus, intussusception
- Metabolic : hypercalcemia, diabetes, hypothyroidism
- Neurological disorders: spinal cord lesions, stroke, Parkinsonism

Clinical features

- Abdominal discomfort
- Small hard stools passed irregularly under strain
- Can cause haemorrhoids and anal fissure

Alarm features

- Symptoms and signs of intestinal obstruction or acute abdomen
- Confusion/disorientation
- Abnormal vital signs
- Iron deficiency
- Rectal bleeding or haematochesia or rectal mass
- Haem postive stool
- Patients > 45 years with no previous history of colon cancer screening
- History of colon cancer in immediate family relatives
- Weight loss

Investigations

- ➢ Physical examination
  - – Abdominal mass and tenderness
  - – Anorectal examination (faecal impaction, stricture, rectal prolapse, rectal mass)
- ➢ Stool examination

Investigations for patients with alarm features

- ➢ Abdominal series (supine, upright, left lateral decubitus)
- ➢ Transabdominal ultrasound
- ➢ Endoscopy
- ➢ Complete blood count, renal function tests, serum calcium, thyroid function tests, blood sugar
- ➢ Barium enema +/- CT scan or X-ray

Management

TREATMENT	LOC
No alarm features or chronic constipation	**HC2**
▶ High dietary **fibre**	
▶ Adequate **fluid** intake	
▶ **Bisacodyl**: Adult 10 mg at night. Take until stool is passed	**HC3**
Child 5-12 years: 5 mg (suppository only)	**HC4**
– Contraindicated in acute abdomen as it aggravates the condition	
▶ Oral or rectal **lactulose** (osmotic agent). Provides faster relief than bisacodyl	**H**
If alarm features or severe chronic constipation are present	
▶ Refer to hospital for specialist management	

Prevention

- Diet rich in roughage - plenty of vegetables and fruit
- Plenty of oral fluids with meals
- Increased exercise

6.4.2 Haemorrhoids (Piles) and Anal Fissures

ICD10 CODE: K64/K60.0-K60.1-K60.2

Haemorrhoids are swellings in the upper anal canal and lower rectum due to engorgement of veins. May be internal or external. Anal fissure is a tear in the lining of the lower rectum.

Causes

- Constipation and straining in defecation
- Portal hypertension from any cause
- Compression of pelvic veins, e.g. abdominal tumours, pregnancy
- Sedentary life style

Clinical features

Haemorrhoids

- Painless rectal bleeding
- Visible swelling at the anus or prolapse of the swelling, especially at defecation
- Blood is usually not mixed with stool but instead coats the surface of the stool or toiletry
- Mucous discharge and irritation at anus

Anal fissure

- Pain in passing stool
- Bleeding at passing of stool

Differential diagnosis

- Schistosomiasis, amoeboma
- Rectal polyps, prolapsed rectum
- Anal tags (harmless growths that hang off the skin around the outside of the anus)
- Tumour of rectum
- Anal warts

Investigations

- Visual inspection and digital rectal examination
- Protoscopy, sigmoidoscopy, colonoscopy

Management

TREATMENT	LOC
▶ Establish the cause ▶ Increase fibre and fluid diet intake ▶ Correct any constipation ▶ Sitz bath (sitting for 10-15 minutes in lukewarm water with a spoon of salt) 2 or 3 times a day	**HC2**
▶ Insert a **bismuth subgallate compound** rectally every 12 hours for 5 days (e.g. Anusol, Sediproct cream or suppositories)	**HC4**

If signs of infection: ▶ Give **metronidazole** 400 mg every 8 hours for 5 days ▶ Give **analgesics** as required for the pain ***If there is no response:*** ▶ Refer to hospital for surgery	**HC2**

Prevention

- Maintain high residue (fibre) diet
- Ensure adequate fluid intake
- Regular exercise
- Refrain from straining and reading in the toilet

6.5 HEPATIC AND BILIARY DISEASES

6.5.1 Viral Hepatitis

A condition characterised by inflammation of the liver due to hepatitis viruses. They may cause acute hepatitis, symptomatic or not. The hepatitis B, D, C virus can cause chronic hepatitis. The hepatitis B virus can also give chronic carrier status.

Cause

- Hepatitis A and E: orofaecal transmission
- Hepatitis B: sexual, mother to child, transmission by infected body fluids /blood
- Hepatitis C virus: contact with infectious blood (possibly sexual and vertical)
- Hepatitis D: contact with infectious blood, sexual (possibly vertical)

6.5.1.1 Acute Hepatitis

ICD10 CODES: B15, B16, B17, B19

Clinical features

- Asymptomatic
- Classic form: fever, fatigue, malaise, abdominal discomfort (right upper quadrant), nausea, diarrhoea, anorexia, followed by jaundice, dark urine and more or less clay coloured stool
- Fulminant form: acute liver failure due to massive liver necrosis, often fatal. It is more common in HepB patients with secondary infection with D virus and pregnant women who get hepatitis E in their third trimester

Differential diagnosis

- Other causes of hepatitis, e.g. drugs, herbs, tumours, and autoimmune diseases
- Gastroenteritis, relapsing fever
- Pancreatitis
- Malaria, leptospirosis, yellow fever
- Haemorhagic fevers, e.g. Marburg and Ebola

Investigations

- Complete blood count
- Slide or RDT for malaria parasites
- Liver function tests
- Viral antigens and antibodies: Hepatitis B, Hepatitis C, and HIV serology

Management

TREATMENT	LOC
Classic form ▶ Supportive management ▶ Rest and hydration ▶ Diet: high in carbohydrates and vitamins and vegetable proteins. Avoid animal proteins e.g. meat	**HC4**

▶ Avoid any drug – they may aggravate symptoms Refer if patient has features of liver failure or decompensated liver disease	

Caution

△ Avoid drugs generally but especially sedatives and hepatotoxic drugs

△ Ensure effective infection control measures e.g. institute barrier nursing, personal hygiene

△ Patient isolation is not necessary unless there is high suspicion of viral haemorrhagic fevers

Prevention

- Hygiene and sanitation
- Immunization against hepatitis B (all children, health workers, household contacts of people with chronic hepatitis B, sex workers and other populations at risk)
- Safe transfusion practices
- Infection control in health facilities
- Screening of pregnant women
- Safe sexual practices (condom use)

6.5.1.2 Chronic Hepatitis

ICD10 CODE: B18

The hepatitis viruses B, C and D can give chronic infection with chronic low level inflammation of the liver and progressive damage which may progress to liver cirrhosis.

6.5.2 Chronic Hepatitis B Infection

ICD10 CODES: 18.0, 18.1, 19.1

Clinical features

Can be symptomatic or asymptomatic:

- Weakness and malaise, low grade fever
- Nausea, loss of appetite and vomiting
- Pain or tenderness over the right upper abdomen

- Jaundice, dark urine, severe pruritus
- Enlarged liver
- Complications: liver cirrhosis, hepatocarcinoma

Investigations

- Hepatitis B surface antigen positive for >6 months
- Hepatitis B core antibody: Negative IgM and Positive IgG to exclude acute hepatitis B infection
- Liver tests, repeated at 6 months
- HBeAg (can be positive or negative)
- HBV DNA if available
- HIV serology
- APRI (AST to Platelets Ratio Index): a marker for fibrosis

$$\text{APRI} = \frac{(\text{AST/ULN}) \times 100}{\text{Platelet count } (10^9/\text{L})}$$

(ULN: upper limit of normal, usually 40 IU/L)

- Alpha fetoprotein at 6 months
- Abdominal ultrasound at 4-6 months

Management

TREATMENT	LOC
General principles ▶ Screen for HIV: if positive, refer to HIV clinic for ART: coninfection is a risk factor for disease progression and some ARVs are active against Hepatitis B virus ▶ If HIV negative: refer to a regional hospital for specialist management ▶ Antiviral treatment is given to prevent complications and it is usually given for life ▶ Patients with chronic hepatitis B need periodic monitoring and follow up for life ▶ Periodic screening for hepatocarcinoma with alfa fetoprotein and abdominal ultrasound once a year	**RR**

Treat with antivirals if the patient has any one of these: – All persons with chronic HBV infections who have cirrhosis (whether compensated or not) based on clinical findings and/or APRI score >2, irrespective of liver enzyme levels, HbeAg status or hepatitis B viral load) – HIV co-infection (use a tenofovir based combination) – Patients with no cirrhosis (APRI score <2) but persistently elevated ALT on 3 occasion within 6-12 months and viral load >20,000 IU/L (if available) regardless of HbeAg status ▶ First line antivirals *Adults and children >12 years or >35 kg:* **tenofovir** 300 mg once a day *Child 2-11 years (>10 kg):* **Entecavir** 0.02 mg/kg	
The following patients should NOT be treated ▶ Patients without evidence of cirrhosis (APRI ≤2) and with persistently normal ALT level and HBV viral load < 2000 IU/ml (if available)	

Health education

- Mangement is lifelong because of the need to monitor hepatitis
- Bed rest
- Urge patient to avoid alcohol as it worsens disease
- Immunisation of household contacts
- Do not share items that the patient puts in mouth (e.g. toothbrushes, cutlery) and razor blades

6.5.2.1 Inactive Hepatitis B Carriers

ICD10 CODE: B18.1

Carriers are patients with chronic but inactive infection:

- HBsAg positive for more than 6 months plus
- Persistently normal liver function (at least 3 times in 12 months) and
- No evidence of viral replication (negative HBeAg and/or HBV DNA < 2000 IU/ml)

Patients classified as inactive carriers need to be monitored once a year with CBC, renal and liver tests, HBsAg, abdominal ultrasound. If possible, do HBV-DNA every 3 years.

They are not highly infectious but close contacts should be immunized and appropriate precautions should be followed.

6.5.2.2 Pregnant Mother HbsAg Positive

ICD10 CODE: B18.1

If a pregnant mother is found HBsAg positive:

- If also HIV positive,
  - Start ARVs.
  - Child should receive HepB vaccine at birth
- If she is HIV negative,
  - She should be referred for further testing (HBeAg, HBV DNA) to assess the risk of transmission to the baby and eventual need of antiretrovirals
  - Child should be immunized at birth
- Breastfeeding is safe

6.5.3 Chronic Hepatitis C Infection

ICD10 CODE: B18.2

Clinical features

- Can be symptomatic or asymptomatic

Investigation

- Anti hepatitis C antibody positive at 0 and 6 months
- Abdominal ultrasound
- Liver function tests, INR
- Renal function tests
- Blood glucose

Management

TREATMENT	LOC
▶ Refer to a regional hospital or higher for confirmatory investigations and management	RR

6.5.4 Liver Cirrhosis

ICD10 CODES: K74, K70.3

Cirrhosis is a chronic disease with necrosis of liver cells followed by fibrosis and nodule formation. *Decompensated cirrhosis* is defined by the presence of complications such as ascites, variceal bleeding, encephalopathy, or jaundice which result from the portal hypertension and liver insufficiency caused by cirrhosis.

Causes

- Infections e.g. viral hepatitis B and D, hepatitis C
- Intoxication with alcohol, drugs, or toxins e.g. methotrexate, isoniazid, methyldopa
- Infiltrative disorders, e.g. non-alcoholic fatty liver disease, Wilson's disease, haemochromatosis
- Iron overload (e.g. in over transfused SCD patients)
- Immunological, chronic autoimmune hepatitis

- Congestion with bile e.g. primary biliary cirrhosis (PBC)
- Congestion with blood e.g. chronic cardiac failure, Budd Chiari syndrome
- Idiopathic

Clinical features

- General symptoms: Fatigue, weight loss, features of malnutrition, nausea, vomiting and loss of appetite
- Initially enlarged liver which later decreases in size
- Distension of blood vessels on the abdomen
- Enlarged spleen
- Loss of libido

Cirrhosis is decompensated when the following are present:

- Jaundice
- Encephalopathy
- Ascites (fluid in abdominal cavity) with or without leg oedema
- Vomiting of blood from ruptured blood vessels in oesophagus (varices)

STAGE		CLINICAL	DEATH AT 1 YEAR
0	Fibrosis		1%
1	Compensated cirrhosis	No varices No ascites	1%
2		No ascites Varices present	3%
3	Decompensated cirrhosis	Ascites ± varices	20%
4		Bleeding ± ascites	57%
		Spontaneous bacterial peritonitis + sepsis	

		Renal failure Hepatocellular carcinoma Jaundice Hepatic encephalopathy	

Differential diagnosis

- Diffuse hepatic parenchymal disease
- Metastatic or multifocal cancer in the liver
- Hepatic vein obstruction
- Any cause of enlarged spleen
- Heart failure, renal disease

Investigations

➢ Blood: Hb, film, WBC, platelets, prothrombin time (INR), serology (hepatitis **B**, **C**, and **D**), HIV serology
➢ Stool and urine
➢ Abdominal ultrasound
➢ Liver: Liver function tests, alpha fetoprotein, and biopsy
– APRI score >2 is diagnostic
➢ Endoscopy (for varices)

Management

Refer to a regional hospital or higher for the attention of specialist

TREATMENT	LOC
General principles ▶ Treat cause and prevent progression – Stop alcohol – Appropriate nutrition – If chronic hepatitis B, start antiviral treatment – Specific treatment according to the cause – Avoid herbs and self medication	**RR**

– Use medicines only after prescription from a health worker ▶ Manage and prevent complications (see below) – Ascites – Encephalopathy – Bleeding varices	

6.5.4.1 Ascites

ICD10 CODES: 70.31, 70.11, 71.51

Pathological accumulation of fluid in the peritoneal cavity.

Clinical features

- Ascites not infected and not associated with hepatorenal syndrome

CLASSIFICATION	FEATURES
Grade 1 Ascites (mild)	Only detectable by ultrasound examination
Grade 2 Ascites (moderate)	Ascites causing moderate symmetrical distension of the abdomen
Grade 3 Ascites (severe)	Ascites causing marked abdominal distension

Clinical diagnosis

- Fluid thrill (fluid wave)
- Shifting dullness

Investigations

➢ Abdominal ultrasound scan
➢ Peritoneal tap (paracentesis)
➢ Analysis of fluid

Management

The main principles of management are: diet modification, daily monitoring, diuretics and drainage

TREATMENT	LOC
Diet ▶ Restrict dietary salt to a no-add or low salt diet ▶ Avoid protein malnutrition (associated with higher mortality), so consume plant proteins liberally and animal proteins occasionally (titrate to symptoms and signs of hepatic encephalopathy) ▶ Restrict water if oedema and hyponatremia are present ▶ Abstain from alcohol**, NSAIDS,** herbs ***Daily monitoring*** ▶ Daily weight, BP, pulse, stool for melaena, encephalopathy	**H**
Diuretics ▶ Use **spironolactone** 50-100 mg/day in the morning, to reach goal of weight loss: 300–500 g/day. If needed, doses to be increased every 7 days up to maximum of 400 mg/day of **spironolactone** ▶ **Furosemide** can be added at a starting dose of 20–40 mg/day and subsequently increased to 160 mg/day if needed. Best used if pedal oedema is present; monitor for hypotension ▶ For maintenance, it is best to titrate to the lowest diuretic dose. Most patients do well with **spironolactone** 50 mg/day if they have no ascites ***Drainage*** ▶ Indicated for severe ascites (Grade 3). Paracentesis is always followed by **spironolactone**	

How much should you tap? – **Small volume** (less than 5 L in 3–4 hours) or **large volume** (5–10 L) with infusion of a plasma expander (e.g. 8 g **albumin** per litre of ascites removed) – Monitor for hypotension or reduced urine output ▶ Refer if patient has or develops complicated ascites	

6.5.4.2 Spontaneous Bacterial Peritonitis (SBP)

ICD10 CODE: K65.2

SBP is an acute bacterial infection of ascitic fluid. It is a common and severe complication of advanced liver cirrhosis and it is associated with a poor prognosis.

Clinical features

Patients must be admitted to hospital and should be suspected of SBP infection when:

- Ascites increases in severity
- Presence of fever
- Abdominal pain, abdominal tenderness
- Worsening encephalopathy
- Complications: renal failure, bleeding varices, death

Investigations

➢ Diagnosis is confirmed by an ascitic tap and cell counts. A neutrophil count of > 250/mm3 in ascitic fluid confirms the diagnosis

Management

TREATMENT	LOC
▶ Treat with IV antibiotics for 5–10 days ▶ **IV ceftriaxone** 1-2 g daily – If needed, add **metronidazole** 500 mg IV every 8 hours	**H**

▶ Give **albumin infusion** 1 g/kg to prevent hepato-renal syndrome ▶ Consult or refer for specialist care as soon as possible	**RR**
Caution △ Avoid gentamicin and NSAIDs	

6.5.4.3 Hepatic Encephalopathy (HE)

ICD10 CODES: 70.41, 71.11, 72.11, 72.91

Hepatic encephalopathy is a syndrome of neuropsychiatric symptoms and signs, including coma, observed in patients with cirrhosis. It is probably due to the accumulation of toxins in the blood.

Clinical features

- Grade 0: Subclinical – personaity changes, construction apraxia (inability or difficulty to build, assemble, or draw objects)
- Grade I: Confusion, flap tremor
- Grade II: Drowsy
- Grade III: Stuporous
- Grade IV: Coma
- Encephalopathy may be aggravated by surgery, parencentsis, excessive diuretics, sedatives, and opioid analgesics
- Intracranial hypertension and sepsis are the main causes of death

Management

Management involves addressing the pathophysiological mechanisms related to brain, gut and liver

TREATMENT	LOC
▶ Identify and correct **precipitating factors** including renal impairment, gastrointestinal bleeding, infections, and electrolyte disturbances ▶ Empty the gut – Give **oral lactulose** 15-30 mL every 8 hours until the condition resolves (aim at 2-3 soft stools/day) – Lactulose can be administered through a nasogastric tube (grade 1 and 2) or as an enema in patients with acute HE (grade 3 and 4) ▶ Refer to a specialist	H
If referral delays ▶ Give an antibiotic with a local action on the gut: oral **metronidazole** 400–800 mg every 8 hours for 5 days ▶ Or oral **paromomycin** 1000 mg every 6 hours for 5 days	RR

6.5.4.4 Oesophageal Varices

ICD10 CODE: I85.1

Extremely dilated sub-mucosal veins in the lower third of the esophagus, due to portal hypertension caused by liver cirrhosis. They can cause severe upper gastrointestinal bleeding.

Management

TREATMENT	LOC
▶ Screen patients with liver cirrhosis with endoscopy to assess for presence of varices ▶ In case of varices, consider the use of beta blockers to prevent bleeding – **Propranolol** 20 mg every 12 hours, titrate to keep resting heart rate at 55-60 bpm – Avoid in refractery ascitis and SBP	H

▶ Endoscopic ligation sclerotherapy ▶ If acute bleeding, see section 6.1.3	NR

6.5.4.5 Hepatorenal Syndrome ICD10 CODE: K76.7

Hepatorenal syndrome (HRS) is the development of renal failure in patients with advanced chronic liver disease. It can be precipitated by infection (SBP) and large volume paracentesis without albumin replacement. It carries a very poor prognosis.

It is characterized by:
- Reduced urinary output (< 500 ml in 24 hours in adults)
- Abnormal renal function test (progressively raising creatinine)
- Normal urine sediment

Management

TREATMENT	LOC
▶ Correct hypovolemia ▶ Treat precipitating factors ▶ Refer for specialised management	RR

6.5.4.6 Hepatocellular Carcinoma ICD10 CODE: C22.0

Liver cancer usually in patients with risk factors such as Hepatitis B and C, aflatoxin, alcoholic liver disease and cirrhosis.

Clinical features
- Presents with right upper quadrant pain, hepatomegaly with or without splenomegaly
- Weight loss
- Jaundice, ascites, and lymphadenopathy

Differential diagnosis
- Liver metastasis
- Liver abscess, hydatid cyst

Investigations

- Abdominal ultrasound (sonogram)
- Alpha fetoprotein
- Liver tests
- Liver biopsy

Management

TREATMENT	LOC
▶ Refer to a regional hospital or higher	RR

6.5.5 Hepatic Schistosomiasis ICD10 CODE: B65.1

Most common cause of liver disease among communities where *Schistosoma mansoni* is endemic (see section 2).

Cause

- Inflammatory and fibrotic reaction to eggs laid by Schistosoma parasites and transported to the liver through the veins from the intestine

Clinical features

- Upper gastrointestinal bleeding due to varices or portal hypertensive gastropathy
- Splenomegaly and ruptured spleen
- Thrombocytopenia
- Portal vein thrombosis
- Bloody diarrhoea, anaemia and stunting

Investigations

- Liver ultrasound features: periportal fibrosis patterns and portal vein thickening as described by World Health Organization Niamey ultrasound protocol
- Screen for varices with endoscopy

Management

TREATMENT	LOC
▶ Refer to a specialist ▶ **Praziquantel** 40 mg/kg single dose if schistosoma eggs are detected ▶ Correct anaemia as appropriate ▶ Surveillance for oesophageal varices with endoscopy	**HC4**
▶ Primary and secondary prevention of bleeding oesophageal varices with **propranolol** (see section **6.5.4.4**), endoscopic band ligation	**HC4**
▶ Treat acute upper gastrointestinal bleeding (see section on **6.1.3**)	**RR**

6.5.6 Drug-Induced Liver Injury ICD10 CODE: K71

Drugs are an important and common cause of liver injury. Many medicines and herbs are known to cause liver damage. The drug-induced liver injury can range from asymptomatic elevation of liver enzymes to severe hepatic failure. Health workers must be vigilant in identifying drug-related liver injury because early detection can decrease the severity of hepatotoxicity if the drug is discontinued. Knowledge of the commonly implicated agents is essential in diagnosis.

Common causes

- Phenytoin, carbamazepine, anti-tuberculosis drugs, cotrimoxazole, diclofenac, paracetamol, antiretroviral drugs, ketoconazole

Clinical features

It is a diagnosis of exclusion:

- Any patient with liver enzyme elevation that cannot be attributed to infections, autoimmune disease or malignancy

- Patient exposed to a drug or herbal medication known to cause liver cell injury
- Patients may present with skin or mucosal drug reactions e.g. Stevens-Johnson syndrome or toxic epidermal necrolysis

Management

TREATMENT	LOC
▶ Stop all drugs or herbs ▶ Give supportive care: rehydration ▶ See section **1.3.5** for paracetamol poisoning ▶ Do not give the drug again (do not rechallenge!) ▶ Refer to a regional hospital or higher for attention of a specialist	**H**
Note ◆ Fill the reporting form for adverse drug reaction (appendix 2) and send to the nearest NDA pharmacovigilance centre	

6.5.7 Jaundice (Hyperbilirubinemia)

ICD10 CODE: R17

Yellowish discoloration of sclera and skin due to raised levels of bilirubin in the body. Bilirubin is a by-product of red cell breakdown, processed in the liver and excreted mainly in bile. Jaundice may be benign or life threatening.

Causes

- *Pre hepatic* – haemolysis e.g sepsis, sickle cell disease, pregnancy (HELLP syndrome), disseminated intravascular coagulation (DIC), vascular
- *Hepatic* – hepatitis, drugs, tumors, alcohol, toxins, herbs, autoimmune disease, pregnancy, cholangitis
- *Post hepatic* – gall stones, strictures, tumors, surgery, pancreatitis, biliary disease

Complications
- Renal failure , coagulopathy
- Sepsis

Investigations
- Liver function tests (AST, ALT, bilirubin), Coomb's tests, low haptoglobin, LDH
- Hepatitis A, B, C
- Malaria, sickle cell screen
- Ultrasound shows dilated bile ducts and gall bladder
- CBC, INR, RFTS, LDH, Endoscopic retrograde cholangiopancreatogram (ERCP)
- Liver biopsy

Management

TREATMENT	LOC
▶ Refer and/or consult as appropriate ▶ Treat the underlying cause ▶ Discontinue offfending factors ▶ Use phototherapy with UV light for newborn babies	H

6.5.8 Gallstones/Biliary Colic ICD10 CODES: K80

Small hard masses formed in the gallbladder or biliary tree.

Risk factors
- Age, gender, family history
- Obesity, diabetes, use of oral contraceptives, dyslipidemia

Clinical features
- Asymptomatic and often found by chance at an abdominal ultrasound
- Biliary colic: episodes of intense acute epigastric right hypocondrial pain (due to acute temporary blockage of a bile duct) lasting few minutes to few hours, often triggered

by a high-fat meal. It can occur sporadically. NO fever or jaundice are present.
- Cholecystitis or cholangitis due to blockage and infection of bile
- Pancreatitis due to blockage of the pancreatic duct

Differential diagnosis
- Peptic ulcer disease

Investigations
- Abdominal ultrasound
- Liver function tests

Management

TREATMENT	LOC
Asymptomatic ▶ Does not require any intervention ***Biliary colic*** ▶ **Diclofenac** 75 mg IM and/or ▶ **Pethidine** 50-100 mg IM ▶ Low-fat diet ▶ Refer for cholecystectomy after acute phase	**HC4**

6.5.9 Acute Cholecystitis/Cholangitis

ICD10 CODES: K81

Inflammation of the gall bladder and/or of the biliary tract. It often requires surgical management.

Causes
- Obstruction of gall bladder duct by gall stones (calculi)
- May occur after major trauma, burns, or surgery
- Occurs in HIV infected persons as acalculous cholecystitis

Clinical features
- Sudden onset of pain and tenderness in the right upper quadrant of the abdomen; worsens on deep breathing

- Nausea and vomiting
- Jaundice (in cholangitis)
- Fever (38-39°C) with chills

Severity of acute cholecystitis is classified into:

GRADE	DEFINITION
Grade I (mild acute cholecystitis)	Associated with no organ dysfunction and limited disease in the gallbladder, making cholecystectomy a low-risk procedure
Grade II (moderate acute cholecystitis)	Associated with no organ dysfunction, but with extensive disease in the gallbladder, resulting in difficulty in safely performing a cholecystectomy Usually characterized by: – An elevated white blood cell count – A palpable, tender mass in the right upper abdominal quadrant – Disease duration of more than 72 hours – Imaging studies indicating significant inflammatory changes in the gallbladder.
Grade III (severe acute cholecystitis)	Acute cholecystitis with organ dysfunction (shock)

Differential diagnosis

- Acute alcoholic hepatitis
- Intestinal obstruction

Investigations

➢ X-ray, abdominal ultrasound: findings are wall thickening ± stones pericholecystic fluid

- Blood: Haemogram, liver tests, pancreatitis. Findings are: fever, elevated white blood cells
- Enzymes and renal function tests

Management

TREATMENT	LOC
▶ Nil by mouth ▶ Relieve pain: **Pethidine** 50–100 mg IM every 6 hours ▶ Rehydrate with **IV fluids** and **electrolytes** e.g. **Ringer's lactate** ▶ **Ceftriaxone** 1-2 g daily	**HC4**
In cholecystitis: ▶ Refer to hospital within 2–3 days for surgery (cholecystectomy) ▶ In cholangitis, if not better refer for urgent surgical management	**RR**

7. Renal and Urinary Diseases

7.1 RENAL DISEASES

7.1.1 Acute Renal Failure

ICD10 CODE: N17

Acute impairment of renal function

Causes

- Compromised renal perfusion e.g. dehydration, heart failure, shock (acute)
- Obstructed urinary flow
- Damage to renal tissue by infectious and inflammatory dieases (e.g. glomerulonephritis), intoxications, nephrotoxic drugs

Clinical features

- Oliguria (urine flow <1 ml/kg/hour)
- Generalised oedema
- Hypertension, heart failure, dyspnoea
- Nausea and vomiting, anorexia
- Lethargy, convulsions

Differential diagnosis

- Other renal disorders
- Biventricular heart failure

Investigations

➢ Urine analysis: for blood, proteins, leucocytes, casts
➢ Urea, creatinine and electrolytes

Management

Management of acute kidney condition can be started at hospital level but the patient should be referred at higher level for more appropriate management:

TREATMENT	LOC
▶ Treat underlying conditions e.g. dehydration ▶ Monitor fluid input and output – Daily fluid requirements = 10 ml/kg + total of losses through urine, vomitus and diarrhoea ▶ Monitor BP twice daily ▶ Daily weighing ▶ Restrict salt intake (<2 g or half teaspoonful daily) ▶ Restrict potassium intake e.g. oranges, bananas, vegetables, meat, fizzy drinks ▶ Moderate protein intake ▶ Ensure adequate calories in diet ▶ Check urine and electrolytes frequently ▶ Treat any complications (e.g. infections, hypertension, convulsions), adjusting drug dosages according to the clinical response where appropriate ▶ If oliguria, **furosemide** IV according to response (high doses may be necessary)	**H**
If no response to above general measures, worsening kidney function or anuria (urine output less than 100 ml/24 hours) ▶ Refer for specialist management including possible dialysis as soon as possible and before the patient's condition becomes critical	**RR**
Caution △ Do not give any drugs which may make kidney damage worse e.g. use gentamicin with caution	

7.1.2 Chronic Kidney Disease (CKD) ICD10 CODE: N18

Chronic impairment of kidney function

Causes/risk factors

- Diabetes mellitus
- Hypertension/cardiovascular disease
- Age >50 years
- Kidney stones
- Drugs especially pain killers like diclofenac, ibuprofen and other NSAIDs
- Family history of kidney disease
- HIV/AIDS

Clinical features

- Most patients with CKD have no symptoms until the disease is advanced
- May present with features of predisposing risk factor
- Anaemia, lethargy, easy fatigue, appetite loss, nausea, vomiting, skin itching, bone pains
- May have body swelling
- May have loin pain

Differential diagnosis

- Other causes of chronic anaemia
- Heart failure
- Protein-energy malnutrition
- Chronic liver disease

Investigations

- Creatinine/Urea/electrolytes
- Urine dip stick for protein and blood
- Kidney ultrasound

How to screen for CKD in patient at risk

- Urine dipsticks (for protein and blood) and blood pressure measurement at least once a year in high risk patients

- In diabetics, urine microalbumin where possible or a spot urine for protein: creatinine ratio at least once a year
- Patients with detected abnormalities should have a serum creatinine test performed and GFR calculated as suggested above

Refer the following patients for specialist attention:

- Children
- Persistent proteinuria or haematuria beyond 3 months
- GFR <60 ml/min or creatinine >1.9 mg/dl
- Familial kidney disease, e.g. polycystic kidney disease

Management

Treatment of end stage renal disease is complex and expensive, and available only at national referral hospital.

Goals

- Establish diagnosis and treat reversible diseases
- Identify co-morbid conditions and manage further complications of CKD
- Slow progression of CKD by optimizing treatment
- Plan renal replacement therapy well before end stage kidney disease is reached

TREATMENT	LOC
Treatment to preserve kidney function in patients with CKD ▶ **Lifestyle modifications:** Weight loss, stop smoking, exercise, healthy balanced diet, lipid control, salt restriction ▶ **Blood pressure control:** Target 130/80 mmHg (lower in children). Use ACE inhibitors as first line antihypertensives for diabetics and patients with proteinuria, plus low salt diet ▶ **In diabetics:** BP control is paramount ▶ Optimal blood sugar control (HbA1C <7%)	**HC4**

▶ **Proteinuria:** Reduce using ACE inhibitors and/or ARBs; target < 1 g/day ▶ **Avoid nephrotoxic medicines,** e.g. NSAIDs, celecoxibs, aminoglycosides, contrast agents	
Prevention of complications ▶ **Anaemia:** due to multiple causes. Consider iron and folic supplements. Target Hb 11-12 gr/dL ▶ **Bone mineral disease:** consider adding calcium lactate or other calcium/vitamin D supplements	**RR**
Treatment of symptoms ▶ If fluid retention/oliguria, furosemide tablet according to response (high doses may be necessary) ▶ Dialysis for end stage cases	**NR**
Caution △ Start ACE inhibitors at low doses and monitor renal function carefully. DO NOT use in advanced chronic disease	

Prevention

- Screening of high risk patients
- Optimal treatment of risk factors
- Treatments to slow progression in initial phases
- Avoidance of nephrotoxic drugs

7.1.3 Use of Drugs in Renal Failure

- Be very careful when prescribing any medicine and check available prescribing information (e.g. *in Practical Guidelines for Dispensing 2015*) regarding use in renal failure/impairment
- Many medicines are excreted through the kidneys and accumulate when urinary output is reduced

- Some drugs are presented as sodium or potassium salts and contribute to accumulation of these electrolytes
- With life-threatening infections (e.g. meningitis), use normal or high doses of antibiotics initially, and then reduce doses once the condition has responded

Drugs which are usually safe

▶ Doxycycline
▶ Erythromycin
▶ Benzylpenicillin (max 6 g daily in severe impairment)
▶ Phenytoin
▶ Rifampicin

Drugs to use with care in reduced doses

△ ACE inhibitors (e.g. captopril)
△ Amoxicillin
△ Chloramphenicol (avoid in severe impairment)
△ Ciprofloxacin
△ Cotrimoxazole
△ Diazepam
△ Digoxin
△ Insulin
△ Isoniazid-containing medicines
△ Pethidine (increase dose interval, avoid in severe impairment)
△ Phenobarbital
△ Propranolol

Drugs to avoid using

× Acetylsalicylic acid (aspirin) and other NSAIDS e.g. ibuprofen, indomethacin
× Codeine
× Ethambutol
× Gentamicin
× Metformin
× Nalidixic acid

× Nitrofurantoin
× Streptomycin
× Tenofovir (TDF)

7.1.4 Glomerulonephritis ICD10 CODE: N00-N01

Acute inflammation of the renal glomeruli (small blood vessels in the kidney)

Cause

- Immune reactions often following an infection - usually 1-5 weeks after a streptococcal skin or throat infection

Clinical features

- Common in children >3 years and adolescents
- Haematuria (red, or tea-coloured urine)
- Oedema: Puffiness of the face/around the eyes, less commonly generalised body swelling
- Discomfort in the kidney area (abdominal or back pain)
- Anorexia
- General weakness (malaise)
- High blood pressure for age, commonly presenting as headaches, visual disturbances, vomiting, and occasionally pulmonary oedema with dyspnoea
- Convulsions (in hypertensive crisis)
- Oliguria (passing little urine) as renal failure sets in
- Evidence of primary streptococcal infection:
  - Usually as acute tonsillitis with cervical adenitis
  - Less often as skin sepsis

Differential diagnosis

- Kidney infections e.g. TB, pyelonephritis
- Kidney tumours
- Heart failure
- Malnutrition
- Allergic reactions

Investigations

- Urine: Protein, microscopy for RBCs and casts, WBCs
- Blood: Urea (uraemia) and creatinine levels, ASOT, electrolytes
- Ultrasound: Kidneys

Management

Inflammatory kidney disease with oedema, hypertension and oliguria should be referred to regional hospital for specialised management.

TREATMENT	LOC
▶ Monitor urine output, BP, daily weight ▶ Restrict fluid input (in oliguria) ▶ Restrict salt and regulate protein in the diet (in oliguria) ▶ Avoid or use with caution any drugs excreted by the kidney (see section 7.1.3) ▶ Treat any continuing hypertension (see section 4.1.6)	H
If post-streptococcal ▶ Treat primary streptococcal infection (10-day course): **phenoxymethylpenicillin** 500 mg every 6 hours *Child*: 10-20 mg/kg per dose ▶ Or **Amoxicillin** 500 mg every 8 hours for 10 days *Child*: 20 mg/kg per dose ***If allergic to penicillin*** ▶ **Erythromycin** 500 mg every 6 hours for 10 days *Child*: 15 mg/kg per dose ***For fluid overload (oedema)*** ▶ **Furosemide** 80 mg IV (slow bolus) *Child*:1 mg/kg every 8-12 hours	H

For high blood pressure ▶ **Nifedipine** 20 mg every 12 hours *Children: refer to specialist*	
Caution △ Ciprofloxacin, tetracycline, doxycyline, and cotrimoxazole are **unsuitable and should not be used** for treating primary streptococcal infection	

Prevention

- Treat throat and skin infections promptly and effectively
- Avoid overcrowding
- Adequate ventilation in dwellings

7.1.5 Nephrotic Syndrome

ICD10 CODE: N04

Disorder characterised by loss of protein in the urine due to damage of the kidney. It is common in children.

Causes

- Idiopathic/unknown (majority of cases)
- Congenital (rare)
- Secondary: Due to post-streptococcal acute glomerulonephritis, malaria, allergy, UTI, hepatitis B, HIV

Clinical features

- Generalised oedema
- Severe loss of protein in urine (proteinuria)
- Low protein (albumin) levels in the blood serum (hypoalbuminaemia)
- Hyperlipidaemia (high blood cholesterol)

Investigations

➢ As for Acute glomerulonephritis *plus*
➢ 24 hour urine protein quantification or Albumin creatinine ratio (ACR)
➢ Serum protein and cholesterol

Differential diagnosis

- Cardiac failure, liver disease
- Malnutrition with oedema e.g. kwashiorkor
- Malabsorption syndrome
- Allergic states causing generalised body swelling
- Chronic glomerulonephritis

Management

TREATMENT	LOC
▶ Restrict salt intake (<2 g daily, i.e. less than a half teaspoon/day) ▶ Restrict water/fluid intake – Both salt and water/fluid intake should be moderated until diuresis is induced and swelling is subsiding, which can take several weeks ▶ **Furosemide** 40-80 mg each morning to induce diuresis *Child*: 1-2 mg/kg per dose (but see notes below) ▶ **Prednisolone** 2 mg/kg daily (max: 60 mg) – Continue until no further proteinuria (around 6 weeks) – Gradually reduce the dose after the first 4 weeks, e.g. reduce by 0.5 mg/kg per day each week	H
When oedema has subsided and if still hypertensive ▶ Give appropriate treatment (see section 4.1.6)	
If clinical signs of/suspected streptococcal infection: ▶ Give **antibiotic** as in Acute glomerulonephritis	
If patient from area of endemic schistosomiasis ▶ **Praziquantel** 40 mg/kg single dose	
If no improvement after 4 weeks or patient relapses ▶ Refer for further management	RR

7.2 UROLOGICAL DISEASES

7.2.1 Acute Cystitis

ICD10 CODE: N30

An infection/inflammation involving the bladder, a part of the lower urinary tract. It is a common manifestation of uncomplicated UTI (Urinary Tract Infection) in non-pregnant women.

Uncomplicated cystitis is less common in men and needs to be differentiated from prostatitis and urethritis (sexually transmitted).

Cause

- Bacterial infection, usually gram negative (from intestinal flora) e.g. *Escherichia coli*

Clinical features

- Dysuria (pain and difficulty in passing urine)
- Urgency of passing urine, frequent passing of small amounts of urine
- Suprapubic pain and tenderness
- Pyuria/haematuria (pus/blood in the urine making it cloudy)
- Foul smelling urine
- There may be retention of urine in severe infection

Investigations

- ➢ Midstream urine: urine analysis for protein, blood, leucocytes, nitrates, sediment
- ➢ Culture and sensitivity (if resistant/repeated infections)

Diagnostic criteria

Symptoms ± leucocytes and/ or nitrates at urine analysis

Differential diagnosis

- Women: vaginitis
- Men: urethritis (in young sexually active patients), prostatitis (fever, chills, malaise, perineal pain, confusion, in older men)

Note: Asymptomatic bacteriuria or pyuria (leucocytes in urine) does not need treatment except in risk groups such as pregnant women, patients undergoing urological interventions and post kidney transplant patients

Management

TREATMENT	LOC
Uncomplicated UTI (cystitis) in non-pregnant women ▶ Ensure high fluid intake ***First line agents:*** ▶ **Nitrofurantoin** 100 mg every 12 hours (every 6 hours if severe) for 5-7 days *Child*: 3 mg/kg/day every 6 hours for 7 days ***Second line agents*** ▶ **Ciprofloxacin** 500 mg every 12 hours for 3-7 days (adults) *Children*: **amoxicillin** 125-250 mg 8 hourly for 7 days ***If poor response or recurrent infections*** ▶ Refer for investigation of culture and sensitivity and further management	**HC2**
Note ◆ For urinary tract infection in pregnancy, see section **16.2.6**	

Prevention

- Improved personal/genital hygiene
- Pass urine after coitus
- Drink plenty of fluids

7.2.2 Acute Pyelonephritis ICD10 CODE: N10

Upper urinary tract infection involving one or both kidneys (but not usually involving the glomeruli)

Cause

- Bacterial infection, e.g. *Escherichia coli*, usually due to ascending infection (faecal-perineal-urethral progression of bacteria)

Risk factors

- Bladder outlet obstruction
- Malformations of urinary tract
- Pregnancy
- HIV, old age, diabetes

Clinical features

- Loin pain, tenderness in one or both kidney areas (renal angle)
- Fever, rigors (generalised body tremors)
- Vomiting
- If associated cystitis: dysuria, urgency, frequency
- Diarrhoea and convulsions (common in children)
- In infants and elderly: may simply present as fever and poor feeding/disorientation without other signs

Differential diagnosis

- Appendicitis
- Infection of the fallopian tubes (salpingitis)
- Infection of the gall bladder (cholecystitis)

Investigations

➢ Urine: Microscopy for pus cells and organisms, C&S of mid-stream urine
– Specimen should reach the lab within 2 hours of collection or be refrigerated at 4°C for not >24 hours
➢ Blood: Full count, C&S, urea, electrolytes
➢ Ultrasound kidneys/prostate

Management

TREATMENT	LOC
▶ Ensure adequate intake of **fluid** (oral or IV) to irrigate bladder and dilute bacterial concentrations ▶ Give **paracetamol** 1 g every 6-8 hours for pain and fever	
If outpatient (only adults):	
▶ **Ciprofloxacin** 500 mg every 12 hours for 10-14 days (only adults)	**HC3**
In severe cases, all children or if no response to above in 48 hours:	
▶ **Ceftriaxone** 1 g IV once a day *Child*: 50-80 mg/kg IV once a day	**HC3**
Following initial response to parenteral therapy	
▶ Consider changing to:	
– **Ciprofloxacin** 750 mg every 12 hours to complete 10 days (adults only)	**HC3**
– Or **cefixime** 200 mg every 12 hours to complete 10 days of treatment *Child*: 16 mg/kg the first day then 8 mg/kg to complete 10 days	**H**
Alternative regimen	
▶ **Gentamicin** 5-7 mg/kg IV in one or divided doses with or without **ampicillin** 2 g IV every 6 hours *Child* : **gentamicin** 2.5 mg/kg every 8 hours (or 7.5 mg/kg once daily on outpatient basis) with or without **ampicillin** 25 mg/kg every 6 hours	**HC3**
▶ Consider referral if there is no response in 72 hours and for children with recurrent infections (to exclude urinary tract malformations)	

Prevention

- Ensure perianal hygiene
- Ensure regular complete emptying of the bladder and/or double voiding (additional attempt to empty bladder after initial urine flow ceases)

7.2.3 Prostatitis

ICD10 CODE: N41

Acute inflammation/infection of the prostate, a gland present in the male and located below the bladder, around the proximal urethra.

Cause

- Bacterial infection as for UTI

Clinical features

- Fever, chills
- Rectal, perineal and low back pain
- Urinary urgency, frequency and dysuria
- May cause acute urinary retention
- At rectal examination: tender enlarged prostate (avoid vigorous examination)

Investigations

- Haemogram
- Urine analysis and C&S

Management

TREATMENT	LOC
▶ IV fluids, antipyretics, bed rest ▶ Stool softeners ▶ **Ciprofloxacin** 500 mg 12 hourly for 4-6 weeks	**HC4**

7.2.4 Renal Colic

ICD10 CODE: N23

Acute severe pain in the loin (kidney area) as a result of obstruction of the ureters by a stone.

Causes

- Urinary stones
- Rarely clot or tumor

Clinical features

- Acute, severe, colicky loin pain often radiating to the iliac fossa, testes, or labia of the same side
- At times dysuria
- Nausea and vomiting

Differential diagnosis

- Lower UTI
- Acute upper UTI
- Other causes of acute abdominal pain

Investigations

- Urinalysis (for blood)
- Plain abdominal X-ray: for radio-opaque stones
- Ultrasound

Management

TREATMENT	LOC
▶ Oral or IV fluids to mantain hydration ▶ Antiemetics if necessary e.g. **metoclopramide** 10 mg IM or IV ▶ **Diclofenac** 75 mg IM single dose and/or ▶ **Pethidine** 50-100 mg IM single dose ***Refer if repeated episodes/unresolving episode.***	**HC4**

Prevention

- Ensure oral fluid intake of 3-4 L/day
- Reduce salt intake and animal protein

7.2.5 Benign Prostatic Hyperplasia

ICD10 CODE: N40

Enlargement of the prostate causing urinary symptoms. Common in men above 50 years.

Cause

- Benign growth of prostate size, age related

Clinical features

- *Obstructive symptoms:* weak urine stream, straining at micturition, hesitancy, intermittency, sensation of incomplete bladder emptying
- *Irritative symptoms:* frequent micturition especially during the night, urgency, urge incontinence
- *Complications:* acute urinary retention, frequent infections which may precipitate symptoms

Investigations

- Urine analysis (blood, leucocytes)
- Renal function
- Abdominal ultrasound

Management

TREATMENT	LOC
▶ Treat with antibiotics if infection present (see prostatitis or acute cystitis in previous section)	HC2
▶ Surgical management if severe symptoms	RR

7.2.6 Bladder Outlet Obstruction

Obstruction of urinary tract anywhere below the bladder, causing distension and incomplete emptying of the bladder. It can be acute (Acute Urinary Retention) or chronic.

Causes

- BPH/ prostate cancer
- Bladder tumors, stones
- Pelvic masses (rarely pregnancy)
- Rarely neurological causes
- Infections can precipitate acute retention
- Chronic obstruction can cause hydronephrosis and chronic kidney damage

Clinical features

- Acute: painful and tender pelvic mass, difficulty in passing urine
- Chronic: obstructive and irritative symptoms (see BPH), painless pelvic mass

Investigations

- Urine analysis, C&S
- Abdominal ultrasound
- Renal function tests
- Other specialised investigations (Cystourethrogram)

Management

TREATMENT	LOC
▶ Urethral catheter to relieve obstruction (≥ 18 F) ▶ Suprapubic catheter if urethral fails ▶ Treat infection if present	HC4
▶ Refer to specialist for assessment/care	RR

7.2.7 Urine Incontinence

ICD10 CODE: N39.3-4

Involuntary urine leakage

Causes and clinical features

- Pelvic floor muscles dysfunction (e.g. following pregnancy): stress incontinence (at strains like coughing, sneezing)
- Overactive bladder: urge incontinence (sudden compelling need to urinate, difficult to defer)
- Anatomical problems: continuous incontinence (VVF, ectopic ureter)
- Chronic bladder outlet obstruction: overflow incontinence

Investigations

- Careful history and examination
- Urine analysis
- Abdominal ultrasound

Management

TREATMENT	LOC
▶ Stress incontinence: pelvic floor exercises ▶ Other: specific according to the cause	HC2 H

8. Endocrine and Metabolic Diseases

8.1.1 Addison's Disease

ICD10 CODE: E27.1-4

A condition where the adrenal gland produces insufficient glucocorticoid hormones (adrenal insufficiency)

Causes

- More common: abrupt cessation of steroid treatment after long use
- Autoimmune (self destruction of the gland)
- TB of the adrenals, HIV/AIDS
- Surgical adrenal removal, cancer affecting adrenal glands, bleeding into the adrenals, necrosis of the adrenals

Clinical features

Acute

- Weakness and fatigability (getting tired easily)
- Shock, very low BP
- Hypoglycaemic attacks
- Mental changes, e.g., irritability and restlessness until coma
- Fever, hyponatremia (low Na), hyperkalemia (high K), acidosis

Chronic

- As above plus weight loss, hair loss
- Darkening of the skin and mouth
- Menstrual disturbance and infertility
- Symptoms are worse in situations of stress (e.g., infections)

Differential diagnosis

- HIV/AIDS, TB, cancer
- Depression
- Diabetes mellitus
- Hypothyroidism

Investigations

- Drug history
- Refer at higher level for hormone tests if no clear history of abrupt withdrawal of steroid treatment

Management

TREATMENT	LOC
Acute crisis ▶ **Hydrocortisone** 100 mg IV 6 hourly until stable, then switch to oral *Child 0-3 years:* 25 mg *Child 3-12 years:* 50 mg ▶ **IV fluids** and **dextrose** to maintain normal volume and blood sugar ▶ Treat complications/concomitant illnesses (e.g. infections)	**H**
Chronic case ▶ If history of abrupt steroid cessation, restart **prednisolone** treatment, and slowly decrease it by 2.5-5 mg per week ▶ Replacement treatment with **prednisolone** (5-7.5 mg/day) *Child:* 1-5 mg/day ▶ Use doses as in acute regimens in case of stress (e.g., surgery, disease, labour)	**H**

Prevention

- Avoid self medication with steroids (prednisolone, dexamethasone)

- Decrease steroids gradually if used for treatment durations longer than 2 weeks (see above)

8.1.2 Cushing's Syndrome ICD10 CODE: E24

Constellation of signs and symptoms caused by chronic glucocorticoid (steroid) excess, from excessive secretion or, more commonly, from chronic glucocorticoid therapy.

Causes

- Iatrogenic (steroid treatment)
- Cushing's Disease
- Adrenal adenoma, adrenal carcinoma

Clinical Features

- Central (truncal) obesity, moon face, buffalo hump
- Thinning of the skin, striae
- Poor wound healing, muscle weakness and atrophy
- Hirsutism and acne (females)
- Hypertension and hyperglycaemia

Differential diagnosis

- Ordinary obesity
- Alcoholism (alcohol-induced pseudo-Cushing's syndrome)

Investigations

➢ Drug history
➢ Refer to higher level for hormonal tests (dexamethasone suppression test) if no history of steroid overuse

Management

TREATMENT	LOC
Iatrogenic ▶ Slowly decrease steroid dose by 2.5-5 mg every 1 to 2 weeks	H

Non-iatrogenic	**RR**
▶ Refer non-iatrogenic Cushing's, or iatrogenic cases with complications to higher level of care	

8.1.3 Diabetes Mellitus

ICD10 CODE: E08-E13

Metabolic disease resulting from insulin insufficiency or ineffectiveness, due to decreased insulin secretion, or peripheral resistance to the action of insulin, or a combination of the two.

Causes

- *Type 1:* decreased insulin production due to autoimmune destruction of the pancreas. Usually starts at a young age
- *Type 2:* insulin resistance, usually combined with insufficient production of insulin as the disease progresses. Usually starts in adulthood
- *Secondary diabetes:* due to other identifiable causes, e.g., Cushing's syndrome, chronic pancreatitis, etc.

Risk factors

- Type 1: genetic factors, environmental factors (e.g., some viral infections)
- Type 2: family history, unhealthy diet, obesity, lack of exercise, smoking

Clinical features

- Excessive thirst, excessive fluid intake (polydipsia)
- Excessive urine production (polyuria)
- Tiredness
- Loss of weight (especially type 1)
- Increased appetite (polyphagia)
- Generalized itching
- Blurred vision

- Type 2 diabetes often only presents with minor aspecific symptoms, and it is diagnosed either by screening or when the patient presents with complications

Complications

- Acute coma due to diabetic ketoacidosis, or hyperosmolar hyperglycaemia (see next section), or hypoglycaemia (see section 1.1.6)
- Stroke, ischaemic heart disease, kidney failure
- Blindness, impotence, peripheral neuropathy
- Diabetic foot which may lead to amputations

Differential diagnosis

- Diabetes insipidus, HIV/AIDS, TB

Investigations

- ➢ Blood glucose (fasting, random, and/or 2 hours after 75 mg of glucose)
- ➢ Urine: for glucose, and ketones (in type 1)
- ➢ HbA1c – Glycated haemoglobin 1c

Diagnostic criteria

1	Fasting blood sugar >7.0 mmol/L (126 mg/dl)
2	Two-hour blood sugar after 75 mg of glucose >11.1 mmol/L (200 mg/dl)
3	HbA1c >6.5%
4	In a patient with classical symptoms of hyperglycaemia: Random Blood Sugar >11.1 mmol/L (200 mg/dl)

Caution

△ In the absence of unequivocal hyperglycaemia (very high levels of blood sugar), criteria 1-3 should be confirmed by repeated testing. One single slightly elevated blood sugar in the absence of symptoms IS NOT DIAGNOSTIC for diabetes

General Management

Goals of treatment

- Treatment of hyperglycaemia
- Treatment of associated risk factors
- Prevention and treatment of acute and chronic complications

TREATMENT	LOC
Life style modifications ▶ Diabetic diet (see section **19.1.3**) ▶ Weight loss if overweight ▶ Regular physical exercise ▶ Moderate, or no alcohol intake ▶ Smoking cessation	**HC2**
Management of risk factors ▶ Assess for other *risk factors* (hypertension, obesity, smoking, etc.), and manage accordingly ▶ *Hypertension:* target BP 120/80, first line medication are ACE inhibitors (renal protection effect), e.g., **enalapril** (see section **4.1.6**) ▶ *Dyslipidaemia:* consider statin treatment, e.g. **atorvastatin** 20-40 mg once daily or **simvastatin** 20-40 mg once daily in the evening, especially if: – Ischaemic heart disease or cerebrovascular disease already present – Age >40 years **Caution** △ Do not use beta blockers, e.g., atenolol in diabetes	**HC2** **HC4** **H**
Management of complications ▶ *Assess for complications* (renal disease, eye problems, diabetic foot, peripheral neuropathy, heart problem, stroke), and refer/ treat accordingly	**HC3**

▶ **Aspirin** 75-100 mg/daily in ischaemic heart disease, or stroke ▶ **Amitriptyline** 10-25 mg at night (max 100 mg in divided doses) for peripheral neuropathy ▶ **Atorvastatin** 20-40 mg once a day in ischaemic heart disease, or stroke	**HC3** **H**

Treatment targets

- Fasting blood sugar <7 mmol/l
- Postprandial sugar <10 mmol/l
- HbA1c <7% (7.5 % for elderly)

Elderly people are at higher risk of hypoglycaemia. Monitor carefully, and do not aim at very strict control of blood sugar.

Management of Type 1 Diabetes

Insulin SC: 0.6 -1.5 IU/kg/day **HC4**

Children <5 years: start with 0.5 IU/Kg/day, and refer to a paediatrician

TYPE OF INSULIN	USUAL PROTOCOL	ACTION		
		ONSET	PEAK	DURATION
Insulin short acting, regular soluble **(e.g. Actrapid)**	3 times daily, 30 minutes before meals	30 minutes	2–5 hours	5–8 hours
Insulin intermediate acting, NPH, **(e.g. Insulatard)**	Once or twice daily (evening ± morning)	1–3 hours	6–12 hours	16–24 hours

Insulin biphasic, mixture of regular and NPH **(e.g. Mixtard 30/70)**	Once or twice daily	30 minutes	2–12 hours	16–24 hours

Preferably, a combination of intermediate and short acting insulin should be used, in the following regimens e.g.,

- Pre-meals short acting insulin (e.g. **actrapid**), and evening intermediate acting insulin (e.g. **Insulatard**). The evening dose should be 40-50% of the daily dose (basal-bolus therapy)
  OR
- Twice daily premixed insulin **Mixtard**: usually 2/3 of total dose in the morning and 1/3 in the evening, 30 minutes before meals

Note

- Patients on insulin should measure their blood glucose level at least twice daily (before breakfast, and before dinner), and insulin doses adjusted accordingly
- More frequent pre- and post-meals measurements are required to adjust the doses especially with a basal-bolus therapy.

Caution

△ Oral antidiabetic medicines are NOT used in type 1. Metformin can be used but only under specialist advice

Management of Type 2 Diabetes

TREATMENT	LOC
First line ▶ Life style modifications – If sugar levels not very high, and patient is willing, try lifestyle modifications for 3 months, and reassess ***If lifestyle modifications not enough, and/or sugar level initially very high, start on:*** ▶ **Metformin** 1.5-2 g daily in divided doses at meals (start with 500 mg once a day for one week,then increase by 500 mg every week until target control is achieved) ***If treatment targets not achieved with lifestyle modifications and metformin, add a second line drug.*** ***If intolerance or contraindication to metformin, start directly with second line***	**HC2** **HC3**
Second line ▶ **Glibenclamide** 5 mg once daily with meals, initially *Elderly:* 2.5 mg daily (but see caution below) adjusted according to response up to a maximum of 10 mg in divided doses ▶ 0r **Glimepiride** 1-4 mg once daily before or with the first meal of the day – Start with lowest dose, and increase every 1-2 weeks according to response ***If control not achieved, add basal insulin (third line)***	**HC4** **H**

Third line ▶ **Insulin SC NPH (Insulatard)** 8 IU (or 0.3 IU/Kg) in the evening, increase by 2-4 IU every 3-7 days until fasting blood glucose is in range	**HC4**
If control still not achieved, consider a full insulin regimen. Stop glibenclamide/glimepiride, but maintain metformin if possible ▶ **Biphasic insulin (e.g. Mixtard 30/70)** twice a day, 2/3 total dose in the morning before breakfast, and 1/3 in the evening before supper – E.g., Starting dose: 10 IU SC morning, 5 IU SC evening, increase by 4-5 IU/weekly. Adjust morning dose as per pre-supper blood glucose, and evening dose as per pre-breakfast blood glucose OR ▶ Basal-bolus regimen: 0.4-0.6 IU/kg/day, half is given as basal insulin (e.g. **Insulatard**) in the evening, and half given as rapid insulin 30 minutes before meals – Adjust basal dose according to fasting blood sugar, and pre-meals insulin according to pre- and post-meals blood sugar levels	**HC4**
Caution △ Glibenclamide: Use with caution/lower doses in elderly patients because of risk of prolonged hypoglycaemia. Preferably use glimepiride if available. △ Metformin is contraindicated in advanced kidney disease △ Do not use oral anti-diabetics in acute complications, and in acutely sick patients: use insulin for initial management	

8.1.4 Diabetic Ketoacidosis (DKA) and Hyperosmolar Hyperglycaemic State (HHS)

ICD10 CODE: E10.1 AND E11.0

Acute metabolic complications of diabetes mellitus:
- DKA is characterized by ketosis, acidosis, and hyperglycaemia. It is more common in type 1 diabetes.
- HHS is characterized by hyperglycaemia, severe dehydration and hypovolemia, but no ketosis and acidosis. It is more common in type 2 diabetes.

Causes
- Newly diagnosed diabetes
- Poor control of diabetes mellitus
- Treatment interruptions
- Infections and trauma

Clinical features
DKA
- Acute onset (24 hours or less)
- May be preceded by the typical symptoms of excessive thirst, fluid intake, and passing of urine, weight loss, tiredness
- Abdominal pain, vomiting
- Alterated consciousness, coma
- Deep breathing (acidotic)
- Sweet, acetone smell on the breath (from ketosis)
- Cardiovascular collapse (hypotension)

HHS
- Slower onset
- More severe dehydration and fluid deficit
- No ketosis and acidosis (no/few ketones in urine)

Differential diagnosis

- Other causes of ketoacidosis/hyperglycaemia
- Other causes of acute abdominal pain
- Other causes of coma

Investigations

- Blood sugar
- Urine analysis (for ketones, positive)
- Full blood count
- Renal function and electrolytes (Na, K)

Management

TREATMENT	LOC
General measures ▶ Monitor BP, urine output, and blood sugar hourly ▶ Urinary catheter if uncoscious ▶ Treat infections if present (they can be a precipitating factor) ▶ **Enoxaparin** 4000 IU SC until patient is able to move (to prevent thromboembolism)	**HC4** **H**
▶ **Normal saline (NaCl 0.9%)** – 15-20 ml/kg in the first hour (500-1000 ml) *Children*: 10-20 ml/kg – Continue with 5-15 ml/kg/hour according to vital signs, urinary output, and clinical condition ▶ If blood sugar <14 mmol/L, switch to **dextrose** 5% if ketones still present, and/or clinical condition not yet normal (patient unable to eat)	**HC4**
▶ **Soluble insulin** 4-6 IU IM every hour until condition stabilises *Child >5 years:* 0.1 IU/kg/hour *Child <5 years:* 0.05 IU/Kg/hour – Continue insulin until ketosis resolves, and patient is able to eat	**HC4**

– Once clinical condition normalises (normal BP, consciousness, urine output, and able to eat), start Insulin SC regimen (see previous section) 1-2 hours before stopping the IM insulin	
Potassium (KCl) ***If potassium level not available*** ▶ Add **potassium chloride** 1 ampoule in every 1 litre of infusion as soon as the patient has started passing urine ***If potassium levels available:*** – K <3.5 mmol/L: add 40 mmol (2 ampoules) per 1 litre of fluid – K 3.5-5.5 mmol/L: add 20 mmol (1 ampoule) per 1 litre of infusion – K >5.5 mmol/L: do not add any potassium	**HC4**

Prevention
- Early detection
- Good control of diabetes
- Prompt treatment of infections
- General education

8.1.5 Goitre

ICD10 CODE: E04

Visible enlargement of thyroid gland. May be associated with abnormal thyroid function (hyper or hypothyroidism), or not.

Causes
- Iodine deficiency
- Grave's disease
- Thyroiditis
- Multinodular
- Physiological (pregnancy, puberty)

Clinical features

- Visible neck swelling
- (Rarely) difficulty in swallowing

Investigations

➢ Thyroid hormones
➢ Neck ultrasound

Management

TREATMENT	LOC
▶ Refer for thyroid hormones and specialist management – If hypo or hyperthyroidism, see next sections – If causing obstruction, surgery is indicated	RR

8.1.6 Hyperthyroidism

ICD10 CODE: E05

A condition resulting from an excess of thyroid hormones, usually due to excessive production.

Causes

- Grave's disease (autoimmune, common in females)
- Neonatal thyrotoxicosis
- Tumours of thyroid gland (adenomas, multinodular toxic goiter)
- Inflammation of the thyroid gland (thyroiditis)
- Iatrogenic causes (side effect of some medications)

Clinical features

- Weight loss with increased appetite
- Swelling in the neck (goitre)
- Palpitations, tachycardia
- Irritability, nervousness, inability to rest or sleep
- Irregular, scanty menstrual periods
- Profuse sweating, extreme discomfort in hot weather
- High blood pressure

- Protruding eyes (exophthalmos) in some forms
- Frequent defecation

Differential diagnosis

- Anxiety states
- Tumours of the adrenal gland (pheochromocytoma)
- Other causes of weight loss
- Other causes of protruding eyes

Investigations

➢ Blood levels of thyroid hormone (high T3, T4, low TSH)
➢ Thyroid ultrasound scan
➢ Biopsy of thyroid gland for cytology/histology

Management

The aim is to restore the euthyroid state

- Use pulse rate and thyroid hormones level to monitor progress

TREATMENT	LOC
▶ **Carbimazole** 15-40 mg (max 60 mg) in 2-3 divided doses for 1-2 months *Child:* 750 micrograms/kg/day in divided doses (max 30 mg) – Adjust dose according to thyroid hormone levels (under specialist management only)	H
To control excessive sympathetic symptoms (e.g. palpitations), add: ▶ **Propranolol** 40-80 mg every 12 hours for at least 1 month *Child:* 250-500 micrograms/kg 3-4 times daily	H

Once patient is euthyroid ▶ Stop propranolol, and progressively reduce carbimazole to daily maintenance dose of 5-15 mg. Continue **carbimazole** for at least 18 months ▶ Surgery may be required in certain cases, e.g., obstruction, intolerance, or lack of response to drug treatment ▶ Radioactive iodine may also be used especially in toxic multinodular goitre	**H**
Caution △ Patients treated with carbimazole should be advised to report any sore throat immediately because of the rare complication of agranulocytosis (low white cell count)	

8.1.7 Hypothyroidism

ICD10 CODE: E03

A condition resulting from thyroid hormone deficiency. It is 5 times more common in females than in males.

Causes

- Autoimmune disease
- Post-therapeutic, especially after radiotherapy, or surgical treatment for hyperthyroidism
- Secondary; due to enzyme defects (congenital)
- Iodine deficiency
- Iatrogenic (side effects of some medicines)

Clinical features

- Dull facial expression, puffiness, periorbital swelling
- Hoarse voice, slow speech
- Weight gain, drooping eyelids
- Hair sparse, coarse, and dry: skin dry, scaly, and thick
- Forgetfullness, other signs of mental impairment
- Gradual personality change

- Bradycardia, constipation (often), anaemia (often)
- Paraesthesia (numbness) of hands and feet

Differential diagnosis

- Myasthenia gravis
- Depression

Investigations

➢ Blood levels of thyroid hormone (low T3, T4, high TSH)

Management

TREATMENT	LOC
▶ **Levothyroxine** – Initial dose 50-100 micrograms once daily before breakfast *Elderly:* start with 50 micrograms – Gradually increase by 25-50 micrograms every 4 weeks to maintenance dose of 100-200 micrograms daily, according to hormonal levels – Once stable, check hormone levels every 6-12 months *Child*: refer for specialist management	**H**
Note ◆ In most cases, the treatment is for life	

Prevention

- Educate patients on the use of iodised salt

9. Mental, Neurological and Substance Use Disorders

9.1 NEUROLOGICAL DISORDERS

9.1.1 Epilepsy

ICD10 CODE: G40

A chronic condition characterised by recurrent unprovoked seizures. Seizures are caused by abnormal discharges in the brain and present in two different forms: convulsive and non-convulsive forms.

- Convulsive epilepsy has features such as sudden muscle contraction, causing the person to fall and lie rigidly, followed by the muscles alternating between relaxation and rigidity with or without loss of bowel or bladder control
- Non-convulsive epilepsy has features such as change in awareness, behaviour, emotions or senses (such as taste, smell, vision or hearing) similar to mental health conditions, so may be confused with them

Consider a diagnosis of epilepsy if person has had at least 2 convulsive seizures in the last calendar year on two different days.

Seizures during an acute event (e.g. meningitis, acute traumatic brain injury) are not epilepsy.

Causes

- Genetic, congenital malformation, birth asphyxia, brain tumour
- Brain infections, cysticercosis, trauma (acute or in the past)
- Metabolic disorders

In some cases, no specific causes can be identified.

Clinical features

- Depending on the type of epilepsy:

TYPE OF EPILEPSY	DESCRIPTION
Generalized epilepsy	***Seizure involves whole brain, cosciousness is lost at the onset***
Tonic Clonic (grand-mal) or convulsive epilepsy	• May commence with a warning sensation in the form of sound, light or abdominal pain (aura) • There may be a sharp cry followed by loss of consciousness and falling • Tonic contraction (rigidity) of muscles occurs followed by jerking movements (clonic phase) • There may be incontinence of urine or faeces, frothing, and tongue biting • A period of deep sleep follows
Absence seizures (petit mal)	• Mainly a disorder of children • The attack is characterized by a brief loss of consciousness (5-10 seconds) in which posture is retained but other activities cease • The child has a vacant stare • Previous activities are resumed at the end of the attack • Several attacks may occur in a single day
Atonic or tonic seizures (drop attacks)	• Sudden loss of muscular tone, of brief duration (15 seconds), with cosciousness maintained or • Sudden stiffening of muscle

TYPE OF EPILEPSY	DESCRIPTION
Myoclonus epilepsy	• Abnormal jerking movements occuring usually in the limbs but may involve the whole body
Focal Epilepsy	***Seizure activity starts in one area of the brain***
Simple	• Patient remains alert but has abnormal sensory, motor, psychic or autonomic manifestation e.g. jerking of a limb, déjà vu, nausea, strange taste or smell, signs of autonomic nerve dysfunction i.e. sweating, flushing, and gastric sensation, motor contraction or sensory change in a particular point of the body)
Complex	• Altered awareness and behaviour e.g. confusion, repetitive movements
Status epilepticus	• A convulsive state in which the convulsions last >30 minutes or several epileptic convulsions occur in succession without recovery of consciousness in between or convulsions not responsive to 2 doses of diazepam. It is a medical emergency.

Differential diagnosis

- Syncope, hypoglycaemia
- Hypocalcaemia
- Conversion disorder, hyperventilation and panic attacks

Investigations

➢ A complete medical assessment including psychiatric history

- Electroencephalogram (EEG)
  - Useful in petit mal and temporal lobe epilepsy
  - To be done at specialist level (RR and NR)
- Other investigations are guided by suspected cause

Management

General principles

- All suspected cases of non-convulsive epilepsy should be confirmed and treated by a specialist
- Convulsive epilepsy can be diagnosed at hospital/HC4 level but drug refills should be available at lower level
- One brief isolated seizure does not need further treatment but review at 3 months and re-assess. Treat patients with repeated episodes as per definition
- Treatment can effectively control epilepsy in most cases

Commonly used antiepileptics include:

- Generalized tonic-clonic seizures
  - *Children <2 years:* phenobarbital or carbamazepine
  - *Children >2 years:* carbamazepine or valproate
  - Avoid phenobarbital and phenytoin in children with intellectual disability and/or behavioural problems
- Absence seizures: Valproate or ethosuximide

Acute seizure and status epilepticus

TREATMENT	LOC
First aid for acute seizure ▶ Do not restrain or put anything in the mouth ▶ Protect person from injury: make sure they are in a safe place away from fire or other things that might injure them ▶ DO NOT leave patient alone. Seek help if possible ▶ After the crisis, check airway, breathing and circulation and, while uncoscious, put the person in recovery position (on their side)	**HC2**

▶ Most seizures resolve spontaneously. If lasting >3 minutes, give **diazepam** 10 mg IV or rectal – *Child*: 0.05 mg/kg rectally, 0.02 mg/kg IV	**HC3**
Status epilecticus ▶ **Dextrose** 50% 1 mL/kg adults and **Dextrose** 10% 5 mL/kg children ▶ **Diazepam** as above, repeated after 5-10 min	**HC3**
If not responsive, consider ▶ **Phenobarbital** 10-15 mg/kg slowly IV. Dilute the solution with 10 times its volume of water for injections and give VERY SLOWLY (at a rate ≤0.1 mg/minute) – Monitor BP and respiration, be ready to administer IV fluids if hypotension develops and ventilate with Ambu bag in case of respiratory depression ▶ Or **phenytoin** 15-18 mg/kg over 1 hour ▶ It is very caustic so use a good IV line. Extravasation will cause tissue damage	**HC4** **RR**
If not responsive ▶ Give another drug (if available) or add **phenytoin** 10 mg/kg in 30 minutes – Monitor for respiratory depression	

Chronic epilepsy

TREATMENT	LOC
General principles ▶ Start with monotherapy. The effective dose must be reached progressively and patient monitored for tolerance and side effects. Aim at the lowest dose able to control (prevent) the seizures	**HC4**

▶ If treatment is ineffective (less than 50% reduction in crisis) try another monotherapy (slowly reduce the current antiepileptic and introduce the new one) ▶ If high doses with side effects are required and seizures are anyway infrequent, less than complete control can be the goal ▶ Follow up monthly until stable, then every 3 months ▶ Warn patient that treatment interruptions can trigger seizures or even status epilepticus ▶ If no seizure for 2 years and no known cause like head trauma or infection, consider possibility of stopping treatment (over 2 months). Discuss with the patient ▶ If 2 monotherapy trials fail, refer to specialist	**RR**
Carbamazepine ***Effective in all generalized tonic-clonic seizures, focal seizures*** – Given twice daily, steady state reached in 8 days – *Adult*: starting dose of 100-200 mg daily and increased in 100 mg increments every 1-2 weeks to a maintenance dose of 400 to 1400 mg daily – *Child*: starting dose of 5 mg/kg/day and maintenance dose of 10-30 mg/kg/day in divided doses △ Side effects: skin rash, diplopia, blurred vision, ataxia (staggering gait), nausea	**HC3**

Phenobarbital ***Effective for tonic-clonic seizures and focal seizures but is sedative in adults and cause behavioural disturbances and hyperkinesia in children. It may be tried for atypical absences, atonic and tonic seizures*** – Given once a day in the evening to reduce drowsiness – *Adult*: starting dose of 1 mg/kg (60 mg) daily for 2 weeks, if not controlled increase to 2 mg/kg (120 mg) for 2 months, if not controlled increase to 3 mg/kg (180 mg) – *Child*: starting dose of 2 mg/kg/day for 2 weeks, if not controlled increase to 3 mg/kg for 2 months, if not controlled increase until maximum of 6 mg/kg/day – It takes 2-3 weeks for the drug to achieve steady blood levels so assess effect only after this period △ Side effects: drowsiness, lethargy, hyperactivity and irritability in children, skin rash, confusion in elderly, depression	**HC2**
Phenytoin ***Effective in all forms of epilepsy except absences.*** – *Adult*: starting dose of 150-200 mg daily as single dose or 2 divided doses and maintenance dose of 200-400 mg daily – *Child*: starting dose of 3-4 mg/kg and maintenance dose of 3-8 mg/kg/day (max 300 mg daily) – Increase slowly by 25-30 mg every 2 weeks △ Side effects: drowsiness, ataxia, slurred speech, blurred vision, twitching, confusion, gum hyperplasia, blood abnormalities, rash, hepatitis	**HC2**

Sodium valproate ***Effective in tonic clonic seizures, absences and myoclonic seizures. It may be tried for atypical absences, atonic and tonic seizures.*** – Given 2 times daily – *Adult*: starting dose of 600 mg daily and maintenance does of 400-2000 mg daily – Increase by 200 mg every 3 days until control is achieved – *Child*: starting dose of 15-20 mg/kg/day and a maintenance dose of 15-30 mg/kg/day – Increase by ¼ to ½ of initial dose every 3 days until control is achieved △ Side effects liver toxicity, blood disorders, gastrointestinal disorders, weight gain, transient hair loss. Monitor liver function and full flood count.	**RR** **HC4**
Ethosuximide ***Effective in absence seizures.*** – *Child >6 years:* initially 500 mg daily in 2 divided doses, increase if necessary by 250 mg every 5-7 days up to a usual daily dose of 1-1.5 g in 2 divided doses – *Child 1 month to 6 years:* Initially 250 mg single dose at night increased gradually every 5-7 days as required to usual dose of 20 to 40 mg/kg daily in 2 divided doses △ Side effects: gastrointestinal disorders, blood disorders, gum hyperplasia, drowsiness	**RR**

Note

- In children, look for presence of associated intellectual disability or behavioural problems. If present, consider carbamazepine or valproate. (avoid phenobarbital and phenytoin) and manage associated intellectual disability or behavioural problem
- All pregant women with epilepsy should be referred to specialist for appropriate management (most antiepileptic drugs have an increased risk of congenital malformations)

Health education

- Health education to patients, carers and community
- Advice on management of seizures and safety precautions
- In children, look for and manage presence of associated intellectual disability or behavioural problems

Prevention

- Good antenatal care and delivery
- Avoid causative factors

9.1.2 Nodding Disease

ICD10 CODE: G40.4

An unexplained neurologic condition characterized by episodes of repetitive dropping forward of the head, often accompanied by other seizure-like activity, such as convulsions or staring spells.

The condition predominantly affects children aged 5–15 years and has been reported in South Sudan from the states of Western and Central Equatoria, Northern Uganda and southern Tanzania.

Cause

- Not yet certain but consistent association with onchocerciasis has been found

- Other associated factors: malnutrition, pyridoxine deficiency

Clinical features

- Starts at age 5-7 years in previously normal child
- Early symptoms: problems in concentration and thinking
- Then "nodding" starts, which is a type of seizure (atonic seizures) often triggered by eating or cold temperatures
- Cognitive impairment appears
- Neurological deterioration, delayed puberty and growth retardation progresses until the child becomes mentally and physically disabled

Investigations

➢ No diagnostic investigations have been identified

Management

TREATMENT	LOC
▶ Supportive ▶ Antiepileptic drugs as above (**valproate** and **phenobarbital**)	**HC4**

9.1.3 Headache

ICD10 CODE: R51

Common complaint and cause of disability. Pain can be of varying intensity and affect different areas of the head.

Causes

- Facial and frontal headache: sinusitis, eye problems, oropharyngeal disorders
- Temporal headache: severe hypertension, stress, ear disorders, subarachnoid haemorrhage
- Top of the head: stress, tension
- Unilateral (one sided): migraine
- Whole head: malaria, meningitis, severe hypertension
- Back of the head (occipit and neck): meningitis, malaria, refractive eye problems, neck trauma or sprain, tension

Danger signs

SIGN OR SYMPTOM	POSSIBLE CAUSE
Recent trauma to the head	Intracranial bleeding Head injury
High fever	Malaria Meningitis Other infections
Acute onset, severe	Intracranial bleeding
Chronic worsening headache	Tumours, hypertension
Altered consciousness and/or focal neurological symptoms and/or seizure	Tumour, intracranial bleeding, intracranial infection

Management

TREATMENT	LOC
▶ Investigate and treat cause if found/possible ▶ If any danger signs, refer to hospital for further assessment ▶ Follow pain ladder for control of symptoms	HC2

9.1.3.1 Migraine

ICD10 CODE: G43

Periodic severe headache, usually unilateral, which may occur with or without an aura (neurological warning signs) and associated with nausea and/or vomiting

Causes

The cause is unknown but thought to be linked to:

- Familial factors
- Craniovascular disorders, which can be precipitated by: stress, anxiety, menstruation, flashing lights, hunger,

lack of sleep, oestrogens (in COC), perfumes, tyramine-containing foods e.g. red wine, cheese, chocolate

Clinical features

- Warning signs (aura): visual or sensory sympotms (flashing lights) preceeding the start of the headache
- Migraine with warning signs is called migraine with aura. They are not always present
- Moderate to severe episodic unilateral headache throbbing (pulsating)
- Nausea and vomiting, sensitivity to light and sound

Differential diagnosis

- Any cause of headache
- Conversion disorder (hysteria)

Investigations

➢ No specific investigations needed except if another cause is suspected

Management

TREATMENT	LOC
Treatment of acute episode ▶ **Paracetamol** 1 g every 6 hours ▶ Or **Ibuprofen** 400 mg every 6-8 hours ▶ Or **Acetylsalicilic acid** 300-900 mg every 4-6 hours (max 4 gr daily)	**HC2**
If severe and/or not responding to the above treatment ▶ **Diclofenac** 75 mg IM – Plus **metoclopramide** 10 mg IM /IV for the nausea and vomiting ▶ Or **ergotamine** 2 mg sublingual, then 1-2 mg hourly to a max of 6 mg in 24 hours ▶ Or **Sumatriptan** 50 mg, repeat after 2 hours if necessary, max 300 mg in 24 hours	**HC4** **RR**

Prophylaxis: in case of >3 attacks/month and/or functional impairment	
▶ **Amitriptyline** 10-75 mg nocte or	**HC3**
▶ **Propranolol** 40-80 mg every 12 hours	**HC4**

Prevention

- Avoid precipitating factors

9.1.4 Dementia

ICD10 CODE: F01, F03

A chronic slowly progressive organic mental disorder characterised by progressive loss of memory and cognitive function, with difficulty in carrying out every day activities.

Causes

- Primary degeneration of the brain
- Vascular disorders
- Infections e.g. syphilis, TB, HIV/AIDS, meningitis
- Metabolic disorders e.g. hypothyroidism
- Deficiencies of vitamin B12 and B1
- Brain trauma (chronic subdural haematoma, hydrocephalus)
- Toxic agents e.g. carbon monoxide, alcohol

Clinical features

- Impairment of short and long term memory
- Impaired judgment, poor abstract thinking
- Language disturbances (aphasia)
- Personality changes: may become apathetic or withdrawn, may have associated anxiety or depression because of failing memory, may become aggressive
- Wandering and incontinence in later stages

Differential diagnosis

- Normal aging
- Delirium, chronic psychosis, depression

Investigations

- Guided by history and clinical picture to establish cause
- Thorough physical, neurologic and mental state examination
- Laboratory: thyroid hormones, RPR and vitamin B12 levels, other tests as indicated

Management

TREATMENT	LOC
▶ Where possible, identify and treat the cause ▶ Psychosocial interventions: – education of family members about the illness and about following a regular routine programme – provision of regular orientation information – creation of an environment to support activities of daily living ▶ Assess for and treat other co-occurring health problems e.g depression, HIV	**HC2**
If restless and agitated ▶ **Haloperidol** 0.5-1 mg every 8 hours with higher dose at night if required – Adjust dose according to response and review regularly, monitor for and treat extrapyramidal side effects with **Benzhexol** 2 mg every 12 hours if necessary	**HC4**
Caution △ Avoid Diazepam: it can lead to falls and is often not effective	

Prevention

- Avoid and treat preventable causes

9.1.5 Parkinsonism

ICD10 CODE: G20, G21

A syndrome characterized by tremor, rigidity, bradykinesia (slow movement) and postural disturbances, due to primary degeneration or damage to particular areas of the brain (basal ganglia).

Causes

Primary Parkinsonism:

- Cause is unknown

Secondary Parkinsonism:

- Infections e.g. sleeping sickness, syphilis
- Poisoning e.g. manganese, carbon monoxide
- Drugs e.g. chlorpromazine, haloperidol
- Vascular disorders, intracranial tumour, trauma

Clinical features

- Non intentional tremor
- Muscle rigidity
- Slowness of voluntary movement
- Walking with short quick steps (shuffling gait)
- Vacant facial expression (mask face)
- Excessive salivation
- Urinary incontinence (sometimes occurs)
- Variable cognitive impairment

Differential diagnosis

- Essential tremor (isolated intentional tremor, benign)
- Thyrotoxicosis
- Dementia, depression

Investigations

➢ Good history and clinical examination

Management

TREATMENT	LOC
▶ **Levodopa-carbidopa** 100/25 mg ▶ Start with 1 tablet every 8 hours (specialist only management)	**RR**
Only for drug-induced parkinsonism ▶ **Benzhexol** 2-15 mg daily in 1-3 divided doses – Initially: 1 mg/day; increase by 2 mg increments at intervals of 3 to 5 days – Usual dose: 6 to 10 mg/day in 3 to 4 divided doses; doses of 12 to 15 mg/day may be required	**HC2**
Caution △ **Benzhexol** side effects: dry mouth, constipation, palpitations, urinary retenton, confusion and agitation (especially in the elderly) △ Do not give benzhexol routinely to patients on antipsychotic medicines in the absence of parkinson-like side effects △ Use lower doses in elderly	

9.1.6 Delirium (Acute Confusional State) ICD10

CODE: F05

A clinical syndrome usually with acute onset, which involves abnormalities in thought and perception and fluctuating level of consciousness. It is caused by impaired brain function resulting from diffuse physiological change.

Causes

- Infections e.g. malaria, trypanosomiasis, syphilis, meningitis, rabies, typhoid fever, HIV/AIDS
- Pneumonia and urinary tract infections in elderly
- Intoxication with or withdrawal from alcohol or other substances of dependence

- Some medicines e.g. anticonvulsants and neuropsychiatric medications
- Cerebral pathology e.g. head trauma, tumour
- Severe anaemia, dehydration
- Electrolyte imbalances, hyperglycemia

Clinical features

- Acute onset of mental confusion with associated disorientation, developing within hours or a few days. Attention, concentration and memory for recent events is impaired
- Reduced ability to think coherently: reasoning and problem solving are difficult or impossible
- Illusions and hallucinations are common
- Symptoms tend to fluctuate: patients feel better in the day and worse at night
- Some patients may present with reduced activity and/or movement (hypoactive delirium)

Differential diagnosis

- Acute psychosis

Investigations

➢ Guided by history and physical examination: aim at identifying the cause
NB: drug history is very important!
➢ CBC, blood glucose, RDT, renal function and electrolytes

Management

Due to the complexity of underlying conditions, patients with acute confusional state should be referred to hospital for appropriate management and investigation.

TREATMENT	LOC
▶ Identify and treat the cause such as substance and alcohol use disorders, diabetes, head injury or infections e.g. malaria, UTI, pneumonia in older people ***Supportive treatment*** ▶ Ensure hydration, control of fever, safe and quiet environment, constant monitoring ▶ Withhold any unnecessary medicines, keep the use of sedatives and antipsychotics to the minimum necessary	**H**
If patient is agitated and acutely disturbed ▶ **Haloperidol** 5 mg IM: repeat after 60 min if necessary – Continue with **haloperidol** 1.25-5 mg every 8 to 12 hours ▶ Or **chlorpromazine** 25-50 mg every 8-12 hours (IM or oral) ▶ **Trifluoperazine** 5-10 mg every 12 hours	**HC4** **HC2** **H**
If patient is extremely agitated ▶ **Diazepam** 5-10 mg slow IV or rectal – repeat after 10-15 minutes if necessary – then oral diazepam 5-15 mg at night	**HC3**

Prevention

- Early diagnosis and treatment of underlying cause

9.2 PSYCHIATRIC AND SUBSTANCE ABUSE DISORDERS

9.2.1 Anxiety

ICD10 CODE: F40-F48

Anxiety is a normal physiological response, which enables a person to take steps to deal with a threat. When anxiety is prolonged or interferes with normal functions of the individual, it constitutes the clinical condition of an anxiety disorder.

Causes

- Not fully understood: possibly external traumatic events may trigger anxiety in predisposed people
- Association with other mental conditions e.g. depression, alcohol and substance abuse

Types and clinical features

- *Generalized anxiety*: Unrealistic and excessive worry about almost everything
- *Panic attacks*: Episodes of sudden onset of intense apprehension or fear; anxiety symptoms usually peak within 10-15 minutes and resolve in a few minutes to one hour
- *Phobia*: An excessive fear of a known stimulus (object or situation) e.g. animals, water, confined space) causing the person to consciously avoid the object or situation
- *Obsessive-compulsive disorder*: Repeated disturbing thoughts associated with time-consuming actions to reduce the anxiety
- *Post-traumatic stress disorder*: Where a person who experienced a major life-threatening event begins to experience the same, either in dreams or in clear consciousness later in life and tries to avoid being reminded of it and have anxious feelings so intense that their lives are disrupted.

Each of the above clinical types will have one or more of the following manifestations:

- Sleep, mood and concentration problems
- Palpitations, dizziness, shortness of breath
- Shakiness or tremors, excessive sweatiness
- Easily frightened
- Other symptoms: urinary frequency, hesitancy, or urgency, diarrhoea

Differential diagnosis

- Consider organic conditions e.g. hyperthyroidism, hypoglycaemia, phaeochromocytoma

Management

TREATMENT	LOC
▶ Psychosocial interventions: counselling, psychotherapy	
For an acute episode or intense prolonged anxiety	
▶ Benzodiazepines e.g. **diazepam** 5 mg 1-2 times daily	**HC2**
– Increase if necessary to 15-30 mg daily in divided doses *Elderly*: Give half the above dose	
– Duration of therapy 1-2 weeks, tapering off to zero within 6 weeks	
If poor response: refer to specialist	
▶ **Fluoxetine** 20 mg once a day for long term management of the anxiety disorder	**HC4**
– Continue antidepressant for 4 to 6 weeks then evaluate the response	

Caution

△ Diazepam is addictive and abrupt cessation can cause withdrawal symptoms. Use for short periods and gradually reduce the dose. Avoid alcohol

TREATMENT	LOC
Notes ◆ Diazepam is NOT appropriate for treating depression, phobic or obsessional states, or chronic psychoses (see relevant sections for more information) ◆ Antidepressants: May be useful in managing panic disorders and other anxiety disorders which require long term treatment	

Prevention

- Good personality development
- Good stress management

9.2.2 Depression

ICD10 CODE: F32, F33

A common disorder characterised by low mood, loss of interest and enjoyment and reduced energy leading to diminished activity and in severe forms, difficult day-to-day functioning.

Causes

- Biological, genetic, and environmental factors

Clinical features

For at least two weeks, the person had at least two of the symptoms below:

- Low mood (most of the day, almost every day)
- Loss of interest or pleasure in activities that are normally pleasurable
- Associated lack of energy, body weakness or easily fatigued

During the 2 weeks, the person also has some of the symptoms below:

- Difficulty in concentrating, reduced attention
- Reduced self esteem and self confidence
- Poor sleep, poor appetite, reduced libido

- Bleak and pessimistic view of the future
- Feeling of guilt and unworthiness
- Multiple body pains or other medically unexplained somatic symptoms
- Ideas or acts of self harm or suicide (occurs in up to 65% of patients)
- Children and adolescents usually present with irritability, school phobia, truancy, poor academic performance, alcohol and drug abuse

Differential diagnosis

- Thyroid dysfunction (hypothyroidism)
- Adrenal dysfunction (Addison's disease)
- Parkinson's disease, stroke, dementia
- Anxiety disorder

Investigations

- Medical, social and personal history
- Check for bereavment or other major personal loss
- Find out if person has had an episode of mania in the past: if so consider treatment for bipolar disorder and consult a specialist
- Find out if they have psychotic features e.g. hallucinations (refer to section on Psychosis)
- Assess for co-occurring health conditions (e.g. HIV/AIDS), substance or alcohol abuse
- Assess risk of self harm/suicide

Management

TREATMENT	LOC
First line ▶ Psychological support may be adequate in mild cases: – Psychoeducation (counselling of patient and family)	**HC3**

TREATMENT	LOC
– Addressing current stressors (abuse, neglect...) – Re activating social networks – Structured physical activities – Regular follow up ▶ Manage concurrent physical medical problems ▶ Address co-existing mental problems e.g. substance abuse ▶ If available, consider psychotherapy (cognitive behavioural therapy, interpersonal psychotherapy, behavioural activation etc) ***If bereavement or another major personal loss*** ▶ Counselling and support ▶ Do not consider drugs or psychotherapy as first line	
If not responding to all above ▶ Consider antidepressant – DO NOT use in children <12 years – Adolescents: only under specialist supervision ▶ **Fluoxetine** 20 mg once daily in the morning – Start with 10 mg in elderly – If not better after 4-6 weeks, increase to 40 mg ▶ Or **Amitriptyline** 50 mg at bedtime – Increase by 25 mg every week aiming at 100-150 mg in divided doses or single bedtime dose by 4-6 weeks of treatment – Useful in case of associated anxiety – Avoid in adolescents, elderly, heart diseases, suicide risks	**HC4**

TREATMENT	LOC
If patient responding to medication ▶ Continue for at least 9-12 months ▶ Consider stopping if patient has been without depressive symptoms and able to carry out normal activities for at least 9 months – Counsel the patient about withdrawal symptoms (dizziness, tingling, anxiety, irritability, nausea, headache, sleep problems) – Counsel the patient about possibility of relapse and when to come back – Reduce slowly over at least 4 weeks even slower if withdrawal symptoms are significant – Monitor periodically for re-emergence of symptoms ***In case of pregnant woman, child, adolescent, patients not responding to treatment with antidepressant, psychotic features, history of mania*** ▶ Refer for specialist management	
Caution △ SSRI in bipolar depression can trigger a manic episode. If history of mania refer to specialist	

Prevention

- Stress management skills
- Promotion of useful social support networks

9.2.2.1 Postnatal Depression

Refer to section 16.6.2

9.2.2.2 Suicidal Behaviour/Self Harm

ICD10 CODES: T14.91, Z91.5

Suicidal behaviour is an emergency and requires immediate attention. It is an attempted conscious act of self-destruction, which the individual concerned views as the best solution. It is usually associated with feelings of hopelessness, helplessness and conflicts between survival and death.

Self-harm is a broader term referring to intentional poisoning or self-inflicted harm, which may or may not have an intent of fatal outcome.

Causes/risk factors

- Physical illness e.g. HIV/AIDS, head injury, malignancies, body disfigurement, chronic pain
- Psychiatric disorders e.g. depression, chronic psychosis, dementia, alcohol and substance use disorders, personality disorders, epilepsy

Risk is high in the following cases:

- Patient >45 years old
- Alcohol and substance use
- History of suicide attempts
- Family history of suicide
- History of recent loss or disappointment
- Current mental illness e.g. depression, psychosis
- Evidence of violent behaviour or previous psychiatric admission

Risk may be low if patient is

- <45 years old
- Married or in stable interpersonal relationships
- Employed
- In good physical health

Clinical features

Patients can present in one of the following situations:

- A current suicide attempt or self harm
- A situation of imminent risk of suicidal attempt or self harm:
  - Current thoughts or plans of suicide/self harm or history of thoughts or plans of suicide/self harm in the last 1 month, or acts of self harm/suicide attempts in the last 1 years plus
  - Person is agitated, violent, emotionally distressed or uncommunicative and socially isolated, hopeless
- A situation of no imminent risk but
  - Thoughts or plans of suicide/self harm in the last 1 month or acts of self/harm/suicide attempt in the last one year in person not acutely distressed

Investigations

- ➢ Complete medical, social and family history
- ➢ Ask the patient about suicidal or self harm thoughts/plans/acts and reasons for it
  - Asking about self harm or suicide does not increase the risk of those acts. On the contrary, it may help the patient to feel understood and considered. First try to establish a good relationship with the patient before asking
- ➢ Always assess risk of suicide and self harm in patient
  - With any other mental illness (depression, mania, psychosis, alcohol and substance abuse, dementia, behavioural or development disorders)
  - Chronic pain, severe emotional distress

Management

TREATMENT	LOC
If acute suicidal behaviour/act of self harm or imminent risk ▶ Admit the patient and treat any medical complications (bleeding, poisoning etc) ▶ Keep in a secure and supportive environment – Do not leave patient alone – Remove any means of self harm ▶ Continuous monitoring ▶ Offer/activate psychosocial support ▶ Consult mental health specialist ▶ Treat any medical and mental condition present	**HC4**
If no imminent risk ▶ Offer/activate psychosocial support ▶ Refer to mental health specialist for further assessment ▶ Establish regular follow up	**HC3**
Note ◆ Suicide is less frequent in children and adolescents, but there is increased risk if there is disturbed family background (e.g. death of parents, divorce), use of alcohol and other drugs of abuse, physical illness, psychiatric disorder	

Prevention

- Identify and manage risk factors
- Screening and early identification of patients at risk
- Ensure good psychosocial support
- Restrict access to means of self-harm
- Develop policies to reduce harmful use of alcohol

9.2.3 Bipolar Disorder (Mania) ICD10 CODE: F30, F31

A disorder of mood control characterized by episodes in which the person's mood and activity level are significantly disturbed: in some occasions, there is an elevation of mood and increased energy and activity (mania) and in other occasions, there is a lowering of mood and decreased energy and activity (depression). Characteristically, recovery is complete in between the episodes.

Causes

- Biological, genetic, environmental factors

Clinical features

Patient can present in an acute manic episode, in a depressive episode or in between the episodes.

Mania

- Elevated, expansive or irritable moods
- Speech is increased with flight of ideas (increased talkativeness)
- Increased self image, restlessness, over-activity
- Decreased need for sleep
- Delusions of grandeur, increased libido
- Increased appetite but weight loss occurs due to over-activity
- Auditory and visual hallucinations may be present

Depression

- As for depression described above, but with a history of manic episode

Differential diagnosis

- Organic mental states e.g. drug or alcohol intoxication, delirium
- Chronic Psychosis

Investigations

- Good medical, social and personal history
- Assess for acute state of mania
- If depressive symptoms, investigate for previous manic episodes
- Assess for other medical or mental conditions (alcohol or subtance abuse, dementia, suicide/self harm)

Management

Patients with suspected bipolar disorder should be referred for specialist assessment.

TREATMENT	LOC
Manic episode ***Multiple symptoms as above for > 1 week and severe enough to interfere with work/social activities and/or requiring hospitalization*** ▶ Discontinue antidepressant if any ▶ Provide counseling and education ▶ **Chlorpromazine** initially 100-200 mg every 8 hours, then adjust according to response – Daily doses of up to 300 mg may be given as a single dose at night – Gradually reduce the dose when symptoms of mania resolve and maintain on doses as indicated in section on Chronic psychosis ▶ Or **haloperidol** initially 5-10 mg every 12 hours then adjust according to response – Up to 30-40 mg daily may be required in severe or resistant cases ▶ Or **trifluoperazine** initially 5-10 mg every 12hours then adjust according to response – Up to 40 mg or more daily may be required in severe or resistant cases	**HC3** **HC4** **H**

If under specialist supervision: initiate a mood stabilizer	
▶ **Carbamazepine** initial dose 200 mg at night, increase slowly to 600-1000 mg/day in divided doses	**H**
▶ Or **Valproate** initial dose of 500 mg/day. Usual maintenance dose 1000-2000 mg	**RR**
If agitation/restlessness, add a benzodiazepine for short period (until symptoms improve)	
▶ **Diazepam** 5-10 mg evey 12 hours	**HC2**
Note	
◆ If extrapyramidal side-effects (muscle rigidity, dripping of saliva, tongue protrusion, tremors) are present while on antipsychotic drugs	
– Add an anticholinergic: **Benzhexol** initially 2 mg every 12 hours then reduce gradually to once daily and eventually give 2 mg only when required	**HC2**
Bipolar depression	
Depressive symptoms but with history of manic episode/diagnosis of bipolar disorder	
▶ Counsel about bipolar disorder	
▶ Begin treatment with a mood stabilizer (**carbamazepine** or **valproate**, see above)	**H**
▶ Psychoeducation and psychotherapy if available	**RR**
▶ If moderate/severe depression, consider treatment with antidepressant in addition to mood stabilizer BUT under specialist supervision (there is risk of triggering a manic episode)	

In between episodes
Indication for use of mood stabilizers to prevent both manic and depressive episodes
- 2 or more episodes (2 manic or 1 manic and 1 depressive)
- 1 severe manic episode involving significant risk and consequences

▶ **Valproate** (or carbamazepine) as above

Caution
△ Avoid mood stabilizers in pregnant women. Use low dose **haloperidol** if necessary
△ Use lower doses in elderly
▶ Refer adolescents for specialist management

Prevention
- Good psychosocial support

9.2.4 Psychosis

ICD10 CODE: F20-F29

A mental condition characterized by distortions of thinking and perception, as well as inappropriate or narrowed range of emotions.

Causes
- Not known, but there are associated biological, genetic and environmental factors

Clinical features
Any one or more of these may be diagnostic:
- Delusions (abnormal, fixed, false beliefs) or excessive and unwarranted suspicions (may be multiple, fragmented or bizarre)
- Disconnected ideas with vague or incoherent speech and inadequate in content
- Hallucinations: hearing voices or seeing things that are not witnessed by others

- Severe behaviour abnormalities: agitation or disorganised behaviour, excitement, inactivity or overactivity
- Disturbance of emotions such as marked apathy or disconnection between reported emotions and observed effect
- Mood is usually inappropriate
- Difficulty in forming and sustaining relationships
- Social withdrawal and neglect of usual responsibilities

Chronic psychosis or schizophrenia

- Symptoms of psychosis lasting for 3 or more months
- Accompanied by deterioration in social, general and occupational functioning

Differential diagnosis

- Alcohol and drug intoxication or withdrawal
- Organic delirium, dementia, mood disorders

Investigations

- Good social, personal and family history
- Laboratory investigations for infectious diseases e.g. HIV, syphilis

Management

TREATMENT	LOC
Acute psychosis	
▶ Counselling/psychoeducation of patient and carers	
Antipsychotic drugs	**HC2**
▶ **Chlorpromazine**: starting dose 75-150 mg daily and maintenance dose of 75-300 mg daily. Up to 1000 mg daily in divided does may be required for those with severe disturbance	
▶ Or **Haloperidol**: starting dose 5-10 mg daily (lower in elderly) and maintenance dose of 5-20 mg daily in divided doses	**HC4**

▶ Administer orally or IM for those with agitation ▶ Only use one antipsychotic at a time ▶ Gradually adjust doses depending on response ▶ Monitor for side effects e.g. extrapyramidal side effects ▶ Use therapeutic dose for 4-6 weeks to assess effect ▶ Psychological interventions (family therapy or social skills therapy) if available ▶ Ensure follow up ▶ For acute psychosis, continue treatment for at least 12 months. Discuss discontinuation with patient, carers and specialist	**RR**
If extrapyramidal side-effects ▶ Add an anticholinergic: **Benzhexol** initially 2 mg every 12 hours then reduce gradually to once daily and eventually give 2 mg only when required ***If no response*** ▶ Refer to specialist	**HC2**
Chronic psychosis ***Treat as above, but if adherence is a problem or the patient prefers, use:*** ▶ **Fluphenazine** decanoate 12.5-50 mg every 2-5 weeks deep IM into gluteal muscle ▶ Or **Haloperidol** injection (oily) 50-200 mg (300 mg) deep IM into gluteal muscle every 3-4 weeks	**HC4** **RR**

9.2.4.1 Postnatal Psychosis ICD10 CODE: F53

Postpartum psychosis is the most severe form of postpartum psychiatric illness.

Causes

- Not well known, but hormonal changes may have a role

Predisposing factors

- First child
- Previous episode of post natal psychosis
- Previous major psychiatric history
- Family history of mental illness
- Inadequate psychosocial support during pregnancy
- Infections in early puerperium

Clinical features

- Symptoms develop within the first 2 postpartum weeks (sometimes as early as 48-72 hours after delivery)
- The condition resembles a rapidly evolving manic or mixed episode with symptoms such as restlessness and insomnia, irritability, rapidly shifting depressed or elated mood and disorganized behavior
- The mother may have delusional beliefs that relate to the infant (e.g. the baby is defective or dying, the infant is Satan or God) or she may have auditory hallucinations that instruct her to harm herself or her infant
- The risk for infanticide and suicide is high

Differential diagnosis

- Depression with psychotic features
- Mania, chronic psychosis

Investigations

➢ Good history, physical and psychiatric assessment

Management

TREATMENT	LOC
▶ It is a psychiatric emergency: admit to hospital ▶ Treat any identifiable cause/precipitant e.g. infection ▶ **Haloperidol** 10 mg or **Chlorpromazine** 200 mg [Intramuscular Injection or tablets} every 8 or 12 hours. Monitor response to medication and adjust dosage accordingly ▶ If restless and agitated, add rectal or I.V **Diazepam** 5-10 mg slow infusion; repeat after 10 minutes if still agitated – Continue with **diazepam** tablet 5 mg every 12 hours until calm ▶ Refer to specialist	**H**

Notes

- Post-natal psychoses are no different from other similar psychoses, give concurrent psychosocial interventions and drug therapy

Prevention

- Proper antenatal screening, good psychosocial support
- Early detection and treatment
- Adherence to treatment for a current mental illness e.g depression, bipolar, chronic psychosis

9.2.5 Alcohol Use Disorders ICD10 CODE: F10

Conditions resulting from different patterns of alcohol consumption, including acute alcohol intoxication, harmful alcohol use, alcohol dependence syndrome and alcohol withdrawal state.

Causes

- Genetic
- Social and environmental factors including availability
- Stress, peer pressure
- Personality disorders

Clinical features

Acute intoxication

- Transient condition following intake of alcohol resulting in disturbances of consciousness, cognition, perception, affect or behaviour

Harmful alcohol use

- Pattern of alcohol consumption that is causing damage to the health, physical (e.g. liver disease) or mental (e.g. depressive disorder). Criteria:
  - More than 5 drinks in any given occasion in the last 12 months
  - More than 2 drinks a day
  - Drinking every day
- These patients consume more alcohol than recommended but they do not fulfil (yet) the criteria for alcohol dependence

Alcohol consumption during pregnancy is extremely harmful for the baby: it can cause foetal alcohol syndrome. Counsel against any consumption

Alcohol dependence

- A disorder characterised by the need to take large daily amounts of alcohol for adequate functioning. The use of alcohol takes on a much higher priority for the individual than other behaviours that once had greater value
- Complications: malnutrition, thiamine deficiency (causing Wernicke encephalopathy), liver disease, chronic pancreatitis, peptic ulcer, cardiomyopathy, neuropathy, head trauma etc

Alcohol withdrawal

- Symptoms occurring upon cessation of alcohol after its prolonged daily use (6 hours to 6 days after)
- Tremor in hands, sweating, vomiting, tachycardia, hypertension, agitation, anxiety, headache, seizure and confusion in severe cases

Diagnostic criteria for alcohol dependence:
If 3 or more of the features below are present:

- A strong desire to take alcohol
- Difficulties controlling alcohol use in terms of onset, termination or levels of use
- A physiological withdrawal state when alcohol use has ceased or been reduced (alcohol withdrawal syndrome)
- Evidence of tolerance: increased doses of alcohol are required to achieve effects originally produced by lower doses
- Progressive neglect of alternative pleasures or interests because of alcohol use
- Alcohol use persists despite clear evidence of harmful consequences e.g. liver damage, depression, cognitive impairment, loss of a job, friends, relationships

Differential diagnosis

- Abuse of other psychoactive substances
- Depression, chronic psychosis (often co-existing!)

Investigations

- Blood: complete blood count, liver enzymes
  - Shows elevated MCV and GGT levels
- Social investigations

Management

TREATMENT	LOC
Acute intoxication, withdrawal and Wernicke's encephalopathy See section 1.3.12	
Harmful alcohol consumption ▶ Counselling and advice ▶ Investigate and treat concurrent medical or psychiatric illness (dementia, depression anxiety, psychosis etc.) ▶ Follow up and refer if not better	**HC3**
Alcohol dependence ▶ Counselling and education of the patient ▶ Assess and manage concurrent medical and mental conditions ▶ Advise **thiamine** 100 mg daily ***If patient willing to stop, facilitate alcohol cessation*** ▶ Determine appropriate setting, refer for detoxification, treat withdrawal symptoms with **diazepam** ▶ Consider referral to self help groups ▶ Counsel the family, provide psychosocial interventions if available	**HC4** **RR**

Prevention

- Health education on dangers of alcohol abuse
- Reduce accessibility to alcohol

9.2.6 Substance Abuse

ICD10 CODE: F11-F19

Conditions resulting from different patterns of drug use including acute sedative overdose, acute stimulant intoxication, harmful or hazardous drug use, cannabis dependence, opioid dependence, stimulant dependence, benzodiazepine dependence and their corresponding withdrawal states.

- Harmful or hazardous use: causing damage to health (physical, mental or social functioning)
- Dependence: situation in which drug use takes on a much higher priority for a given individual than other behaviours that once had greater value.

Causes

- Social factors: peer pressure, idleness/unemployment, social pressures, poverty, cultural use, increased availability
- Psychological factors: other psychiatric disorders e.g. anxiety, depression, stress, adolescent development changes

Commonly abused drugs

- Tobacco (cigarettes, shisha, kuber, mirage, migagi)
- Cannabis (njaga, bhangi, marijuana)
- Khat (mairungi)
- Heroin (brown sugar)
- Cocaine
- Petrol fumes and organic solvents (e.g. thinners)
- Opioids: pethidine, morphine
- Amphetamines (e.g. speed)
- Mandrax® (methaqualone)
- Benzodiazepines
- Barbiturates (phenabarbitone)

Clinical features

Presenting features that may point to drug use disorders

- Change in behaviour e.g. excessive irritability
- Change in function e.g. decline in school/work performance
- Loss of interest
- Episodes of intoxication e.g. slurred speech, staggering gait
- Involvement in illegal activities e.g. rape, theft
- Change in appearance e.g. weight loss, red eyes, puffy face, untidy, scars from multiple needle pricks
- Financial difficulties e.g. stealing, unpaid debts
- Relationship problems e.g. increased conflicts, communication breakdown
- Find out if person uses illegal or prescribed drugs in a way that risks damage to their health

Investigations

➢ Ask about use of illicit or non-prescribed drugs

If yes, assess for features of dependence (3 or more of the following):

- A strong desire to take drugs
- Difficulties controlling drug use in terms of onset, termination or levels of use
- A physiological withdrawal state when drug use has ceased or been reduced (as shown by classic withdrawal symptoms)
- Evidence of tolerance: increased doses of the drug are required to achieve effects originally produced by lower doses
- Progressive neglect of alternative pleasures or interests because of drug use
- Drug use persists despite clear evidence of harmful consequences e.g. depression, loss of a job

➢ Investigate concurrent physical or mental illnesses

Management

TREATMENT	LOC
▶ Assess for and manage co-existing medical conditions e.g. HIV ▶ Treat presenting symptoms (acute intoxication or withdrawal) ▶ Assess for harmful use (substance abuse but not meeting criteria for dependence) or dependence ▶ Psychoeducation and counselling ▶ Refer to self help groups if possible	**HC2**
▶ Refer to specialist for further management (detoxification and substitution therapy)	**RR**

Prevention

- Health education on dangers of drug use
- Employment/recreational opportunities
- Encourage social and cultural values
- Attempt to reduce availability of drugs of abuse in communities

9.2.7 Childhood Behavioural Disorders

ICD10 CODE: F90-F98

A general term including more sepcific disorders such as attention deficit hyperactivity disorder (ADHD) and other behavioural disorders. Only children and adolescents with moderate to severe degree of psychological, social, educational or occupational impairment should be diagnosed as having behavioural dsorders. In some children the problem persists into adulthood.

Investigate if the child's behaviour is a reaction to trauma and/or fear (child is bullied or harmed at home or outside home). In this case, it is NOT a behavioural disorder!

Causes

- Genetic
- Depression
- Medical conditions, alcohol or drug use
- Reaction to fear or trauma

Clinical features

Attention Deficit Hyperactivity Disorder (ADHD)

- Impaired attention (breaking off from tasks and leaving activities unfinished) so severe as to affect normal functioning and learning
- Excessive restlessness, overactivity especially in situations requiring calm, talkativeness, fidgeting
- Of early onset (<6 years) and lasting >6 months

Other behavioural disorders

- Unusually frequent and severe tantrums, persistent severe disobedience
- Repetitive and persistent pattern of dissocial, aggressive or defiant conduct (bullying, cruelty to animals, destructiveness, fire setting etc), more severe than ordinary mischief, not only in response to severe family or social stressors, and lasting >6 months

Differential diagnosis

- Depression, psychosis
- Epilepsy, developmental disorders
- Medical conditions e.g hyperthyroidism

Management

TREATMENT	LOC
▶ Family psychoeducation and counselling ▶ Parent skill training ▶ Contact teachers, advise and plan for special needs education ▶ Psychosocial interventions if available	**HC4**

▶ Support to family ▶ Refer to specialist for further management ***For ADHD not improving with above interventions*** ▶ Consider **methylphenidate** under specialist supervision	**RR**

9.2.8 Childhood Developmental Disorders

ICD10 CODE: F80-F89

A broad spectrum of disorders with childhood onset, characterized by impairment or delay in functions related to central nervous system maturation, and with a steady course rather than remissions and relapses as in other mental illnesses. They include intellectual disability/mental retardation as well as pervasive developmental disorders such as autism.

Causes

- May not be known
- Nutritional deficiencies e.g iodine deficiencies
- Medical conditions
- Alcohol use during pregnancy
- Risk factors: maternal depression, infections in pregnancy

Clinical features

- Delay in development (using local developmental milestones or comparison with other children)

Intellectual disability

- Impairment of skills across multiple development areas (i.e. cognitive, language, motor and skills)
- Lower intellingence and decreased ability to adapt to daily demands of life

Pervasive developmental disorders including autism

- Impaired social behaviour, communication and language

- Oddities in communication (lack of social use of language skills, lack of flexibility of language used)
- Loss of previously acquired skills
- Narrow range of interests and activities that are both unique to the individual and carried out repetitively
- Originating in infancy or early childhood
- Some degree of intellectual disability may be present

Investigations

- Look for other priority mental, neurological or substance use disorder (depression, epilepsy, behavioural disorder)
- Consider if delay in development could be due to non-stimulating environment or maternal depression
- Assess for nutritional and other medical conditions e.g. sensory impairments (blindness, deafness etc.)

Management

TREATMENT	LOC
▶ Address medical issues including visual and hearing impairment, nutritional problems ▶ Family psychoeducation ▶ Parent skills training ▶ Contact teachers, advise and plan for special needs education ▶ Provide support to carers/family ▶ Link with community based rehabilitation services if available	**HC4**
▶ Protect and promote human rights of the child: THESE CHILDREN ARE VERY VULNERABLE TO ABUSE ▶ Refer to specialist for more comprehensive assessment and management	**RR**

10. Musculoskeletal and Joint Diseases

10.1 INFECTIONS

10.1.1 Pyogenic Arthritis (Septic Arthritis)

ICD10 CODE: M00

Acute infection of a single joint (usually a large joint), commonly affecting children.

Causes

- Usually haematologenous spread from a primary focus following bacteraemia (e.g. septic skin lesions, sinus infections, throat infections, abrasions, wounds, pressure sores, and osteomyelitis)
- Commonly involved in acute arthritis: *Staphylococcus aureus* and Gram negative bacilli, e.g., *Salmonella* spp, *Streptococcus* spp, *Gonococcus*
- In chronic septic arthritis: *Brucella,* tuberculosis

Clinical features

- Swollen and warm joint
- Severe pain, reduced or abolished movement, temporary loss of limb function (pseudoparalysis)
- Localised heat and tenderness
- Systemic symptoms: fever (neonates may not show fever but refuse to feed), general malaise
- Complications: irreversible joint damage if immediate treatment is not established

Differential diagnosis

- Inflammatory joint disease
- Intra-articular haemorrhage, e.g., haemophilia and other bleeding disorders
- Trauma
- Osteomyelitis of neighbouring bone

Investigations

➢ Blood: Full blood count, C&S, ESR (usually elevated)
➢ Joint fluid: Aspirate for C&S; in case of failure to get pus by aspiration, use arthrotomy (in theatre)
➢ Joint fluid: Gram stain

Management

TREATMENT	LOC
▶ Provide pain relief, e.g., **paracetamol,** or **ibuprofen** ▶ Immobilise the involved limb, try splinting ▶ REFER URGENTLY to HC4, or hospital	**HC2**
▶ Aspirate articular fluid for gram stain, and C&S if available (use local skin and subcutaneous anaesthesia if indicated) – Repeat daily until no further pus is obtained – Use **diazepam** 2.5 mg rectal for sedation in children ▶ Or open drainage in theatre	**HC4** **RR**
▶ Continue pain relief, use **paracetamol, ibuprofen** – Or **diclofenac** 50 mg every 8 hours *Child:* 0.3-2 mg/kg rectally every 6-8 hours (max 150 mg) – Or **indomethacin** 25-50 mg every 8 hours *Child:* 0.5-1 mg/kg every 12 hours	**HC4** **H**

Antibiotics: if possible, get guidance from gram stain, and culture and sensitivity results	**HC4**
If Gram positive at gram stain, or negative stain but immunocompetent adult patient: ▶ **Cloxacillin** 500-1 g IV every 6 hours *Child:* 50 mg/kg IV every 6 hours – Give IV for 2 weeks, then if better, switch to oral to complete 4 weeks ▶ Alternative/second line: **Chloramphenicol** 500 mg IV every 6 hours for at least 2 weeks *Child:* 12.5 mg every 6 hours ***If Gram negative at gram stain*** ▶ **Ceftriaxone** 1 g IV for 2-4 weeks ***Alternatives*** ▶ **Ciprofloxacin** 500 mg every 12 hours for 3 weeks ***In adults with negative stain and underlying conditions (suspect gram negative, e.g. Salmonella in Sickle Cell Disease), and all children with negative stain, or underlying conditions*** ▶ **Cloxacillin + ceftriaxone** ***If suspicion of gonococcal (e.g. in sexually active adolescents)*** ▶ **Ceftriaxone** 1 g IV daily for 1 week	

10.1.2 Osteomyelitis ICD10 CODE: M86

Infection of bone by pus-forming bacteria, mainly affecting older children and adults.

Causes

- Any type of bacterium but most commonly *S.aureus,* following infection elsewhere in the body
- Risk factor: sickle cell disease (causative agent mostly *S. Aureus, Salmonella* also common)

Clinical features

Acute osteomyelitis

- Onset is usually over several days
- Fever, usually high but may be absent, especially in neonates
- Pain (usually severe)
- Tenderness and increased "heat" at the site of infection, swelling of the surrounding tissues and joint
- Reduced or complete loss of use of the affected limb
- The patient is usually a child of 4 years or above with reduced immunity, but adults may also be affected
- History of injury may be given, and may be misleading, especially if there is no fever

Chronic osteomyelitis

- May present with pain, erythema, or swelling, sometimes in association with a draining sinus tract
- Deep or extensive ulcers that fail to heal after several weeks of appropriate ulcer care (e.g. in diabetic foot), and non-healing fractures, should raise suspicion of chronic osteomyelitis

Differential diagnosis

- Infection of joints
- Injury (trauma) to a limb, fracture (children)
- Bone cancer (osteosarcoma, around the knee)

- Pyomyositis (bacterial infection of muscle)
- Cellulitis
- Sickle-cell disease (thrombotic crisis)

Investigations

➢ X-ray shows
– Nothing abnormal in first 1-2 weeks
– Loss of bone density (rarefaction) at about 2 weeks
– May show a thin "white" line on the surface of the infected part of the bone (periosteal reaction)
– Later, may show a piece of dead bone (sequestrum)
➢ Blood: CBC, ESR, C&S: Type of bacterium may be detected

Management

Patients with suspected osteomyelitis need to be referred to hospital for appropriate management.

TREATMENT	LOC
▶ Immobilize the limb, splint ▶ Provide pain and fever relief with **paracetamol,** or **ibuprofen** ▶ Refer URGENTLY to hospital ▶ Admit and elevate affected limb ▶ **Cloxacillin** 500 mg IV every 6 hours for 2 weeks. Continue orally for at least 4 weeks (but up to 3 months) *Child:* 50 mg/kg every 6 hours ▶ See pyogenic arthritis for other antibiotic treatments ▶ Osteomyelitis in SCD: see section **11.1.3** ▶ Surgical intervention may be indicated in the following cases:	**HC3** **H** **RR**

▶ Drainage of subperiosteal and soft tissue abscesses, and intramedullary purulence – Debridement of contiguous foci of infection (which also require antimicrobial therapy) – Excision of sequestra (i.e. devitalized bone) – Failure to improve after 48-72 hours of antimicrobial therapy	
Chronic osteomyelitis ▶ Surgery and antibiotics	**RR**

10.1.3 Pyomyositis

ICD10 CODE: M60.0

Inflammation of muscle, which may lead to pus formation and deep-seated muscle abscess.

Causes

- Bacterial infection (commonly Staphylococcus aureus)

Clinical features

- Most commonly localised in one muscle; usually large striated muscle
- Fever, painful swelling of the involved muscle
- Affected area is hot, swollen, and tender
- Fluctuation when pus forms

Differential diagnosis

- Cellulitis, boil
- Osteomyelitis
- Peritonitis (in pyomyositis of abdominal muscles)

Investigations

➢ Blood: Full blood count
➢ Pus: culture and sensitivity
➢ Consider HIV infection

Management

TREATMENT	LOC
▶ Elevate and immobilise affected limb ▶ **Cloxacillin** 500 mg IV or oral every 6 hours for 5-10 days *Child:* 12.5-25 mg/kg per dose ▶ During the early stage, when the muscle is indurated, hot and swollen, antibiotic treatment may be sufficient to resolve the infection	**HC3**
When abscess has formed, ▶ Surgical drainage is the only effective treatment – Leave the wound open, pack and clean daily	**HC4**

10.1.4 Tuberculosis of the Spine (Pott's Disease)

ICD10 CODE: A18.01

Tuberculous spondylitis (Pott's disease) is the most common form of skeletal TB; it usually affects the lower thoracic and upper lumbar region. Infection begins with inflammation of the intervertebral joints and can spread to involve the adjacent vertebral body. Once two adjacent vertebrae are involved, infection can involve the adjoining intervertebral disc space, leading to vertebral collapse. Subsequent kyphosis can lead to cord compression and paraplegia.

Causes

- A chronic infection caused by Mycobacteria

Clinical features

- Most common in young adults
- Local pain, which increases in severity over weeks to months, sometimes in association with muscle spasm and rigidity
- Constitutional symptoms such as fever and weight loss are present in < 40% of cases
- With the progression and spreading of the disease, anterior

collapse of affected vertebrae leads to visible deformity (angular kyphosis or gibbus), and risk of cord compression:

- Weakness of legs (Pott's paraplegia)
  - Visceral dysfunction

Differential diagnosis

- Staphylococcal spondylitis
- Brucellosis
- Metastatic lesion

Investigations

- Adequate history and careful examination
- X-ray spine: disc space narrowing, paravertebral shadow, single/multiple vertebral involvement, destruction lesions of 2 or more vertebrae without new bone formation, destruction of vertebral end-plates
- Blood: raised ESR, WBC (within normal limits)

Management

TREATMENT	LOC
▶ Rest the spine	HC4
▶ Fit a spinal corset or plaster jacket for pain relief	
▶ TB treatment as per guidelines (see section 5.3 for more details)	
▶ Surgical intervention is warranted for patients in the following circumstances:	RR
– Patients with spinal disease and advanced neurological deficits	
– Patients with spinal disease and worsening neurological deficits, progressing while on appropriate therapy	
– Patients with spinal disease and kyphosis >40 degrees at the time of presentation	
– Patients with chest wall cold abscess	

10.2 INFLAMMATORY/DEGENERATIVE DISORDERS

10.2.1 Rheumatoid Arthritis ICD10 CODE: M05

Most common form of chronic inflammatory joint disease affecting mainly women. Attacks tend to be bilateral with symmetrical involvement that cause joint destruction.

Causes

- Unknown origin, probably autoimmune

Clinical features

- Stiffness and pain in the joints (usually >3, symmetrical, worse in the morning)
- Joints are swollen, warm, inflamed, and sensitive to touch
- Fingers are most affected (metacarpophalangeal, or proximal interpahalangeal), but all small and medium size joints can be affected (rarely hips and spine)
- Extra articular manifestations: mild fever, weakness, lethargy, anorexia, weight loss, rheumatoid nodules (20%) at extensor surface like forearm below joint
- It is a CHRONIC disease with flare-up, remission, and exacerbations
- In advanced cases, joint deformities may occur

Differential diagnosis

- Osteoarthritis, gout arthritis (in males)
- Reactive arthritis

Investigations

- Blood: Full blood count, ESR, rheumatoid factor, antinuclear factor
- X-ray of affected joints

Management

Goals of treatment

- Relief of symptoms
- Preservation of joint function
- Suppression of active disease, and slowing progression of disease (prevention of structure damage and deformity)
- Maintenance of patient's normal lifestyle

Symptomatic treatment can be started at lower level but appropriate management requires referral for specialist care.

TREATMENT	LOC
For pain and inflammation in acute flare	**HC2**
▶ Rest the affected joints ▶ Any NSAIDS e.g. **ibuprofen** 400 mg every 8 hours ▶ Or **diclofenac** 50 mg every 8 hours ▶ Or **indomethacin** 50 mg every 8 hours – Long term treatment is not advised because of toxicity, and because NSAIDS do not modify the progression of disease – Consider adding gastroprotection with **omeprazole** 20 mg once daily	
For severe acute inflammation	**HC3**
▶ **Prednisolone** 5–10 mg once daily in the morning – They slow disease progression, but should not be used for long periods due to side effects – Used for treating acute symptoms, and while waiting to start specific medicines	
Refer to specialist for Disease Modifying Anti-Rheumatic Drugs	**RR**
▶ Methotrexate ▶ Chloroquine	

Counselling and health education	
▶ Weight loss and appropriate exercise/ physiotherapy	

10.2.2 Gout Arhthritis

ICD10 CODE: M10

An inflammation disorder involving a joint(s) due to deposition of uric acid crystals; predominant in males.

Causes

- Altered urate metabolism with deposition of urate salts in the joint and other tissues in advanced cases

Clinical features

Acute gout

- Affected joint is hot, red, and swollen
- Mostly attacks the big toe at the metatarsophalangeal joint (podagra), may occasionally start in other joints
- Sudden severe pain (often at night)

Chronic gout

- Repetitive acute attacks are followed by progressive cartilage and bone erosion
- Deposition of tophi in soft tissue, e.g., ear cartilage, bursae, and tendon sheaths

Differential diagnosis

- Joint infection
- Rheumatoid arthritis
- Injury
- Pseudo gout (osteoarthritis)

Investigations

➢ Joint aspiration uric acid crystals viewed by a polarising microscope
➢ X-ray: Of the joint(s)
➢ Blood: Serum uric acid (usually elevated)

Management

TREATMENT	LOC
Acute attack ▶ Rest and immobilisation ▶ Start NSAIDS such as **ibuprofen** 400 mg every 8 hours ▶ or **Indomethacin** 50 mg every 8 hours ▶ Or **Diclofenac** 50 mg every 8 hours – Continue for the duration of the attack ***If NSAIDS contraindicated*** ▶ **Prednisolone** 40 mg once daily for 5 days ▶ Or **colchicine** 0.5-1 mg initially followed by 0.5 mg every 2-3 hours until relief of pain, or if vomiting and diarrhoea occurs (max dose 6 mg). Do NOT repeat the course within 3 days	**HC2** **HC4** **HC3 H**
Chronic gout ▶ Weight reduction ▶ Control diet: healthy diet, limit alcohol consumption, coffee is beneficial ▶ Avoid medicines which may increase uric acid: thiazide diuretics ***If more than 2 attacks per year, and/or complications (renal stones, chronic tophaceous gout), give:*** ▶ **Allopurinol** starting dose 100 mg , increase monthly by 100 mg. Average maintenance dose 300 mg, max 900 mg. Titrate to keep uric acid level <0.35 mmol/L ▶ Do not start during acute attack, but continue with it if already started ▶ Give prophylactic **colchicine** 0.5 mg every 12 hours for the first 3 months to prevent acute attacks	**H**

Note
- DO NOT use allopurinol to treat asymptomatic hyperuricemia

10.2.3 Osteoarthritis

ICD10 CODE: M15-M19

A degenerative joint disease with damage to articular cartilage usually caused by inorganic calcium deposit. It is the commonest form of joint disease. The pathological changes in osteoarthritis are irreversible.

Causes/risk factors
- Previous injury
- Overweight
- Age

Clinical features
- May involve any joint; most commonly the hip, spine, and knees, usually not symmetrical
- Restriction of movement, pain on moving the joint but tends to be absent at rest, limp in case of lower limbs
- Deformity, moderate tenderness
- Improvement with rest, deterioration with physical activity, and cold and wet weather conditions
- Joints are usually not swollen or warm but there may be some accumulation of (clear) articular fluid

Differential diagnosis
- Gout; gouty arthritis
- Rheumatoid arthritis

Investigations
- Normal blood count and ESR
- X-ray: Of the joint(s)

Management

Goals of treatment

- Pain relief
- Optimisation of function
- Minimise progression

TREATMENT	LOC
General measures	**HC2**
▶ Weight reduction	
▶ Encourage activity and regular exercise	
▶ Use of appropriate foot wear and walking aids	
▶ **Paracetamol** 1 g every 8 hours	**HC2**
In acute exacerbation, or severe pain	
▶ NSAID (**ibuprofen,** or **diclofenac**)	
– Limit use to brief periods	
▶ **Diclofenac** 1% gel if available	**HC4**
▶ Intra-articular steroids e.g. **triamcinolone** (specialist only), maximum 4 times/year	**RR**

11. Blood Diseases and Blood Transfusion Guidelines

11.1 BLOOD DISORDERS

11.1.1 Anaemia

ICD10 CODE: D50-D64

Conditions characterised by inadequate blood haemoglobin (Hb) levels. It is quite common in tropical settings, and often caused by multiple factors. Children and young women are particularly at risk.

Normal haemoglobin levels by age

CATEGORY	NORMAL VALUE	MILD ANAEMIA	MODERATE ANAEMIA	SEVERE ANAEMIA
Men >15 years	>13 g/dL	11-12.9 g/dL	8-10.9 g/dL	<8 g/dL
Women	>12 g/dL	11-11.9 g/dL	8-10.9 g/dL	<8 g/dL
Pregnant women	>11 g/dL	10-10.9 g/dL	7-9.9 g/dL	<7 g/dL
Child 12-14 years	>12 g/dL	11-11.9 g/dL	8-10.9 g/dL	< 8 g/dL
Child 5–11 years	>11.5 g/dL	11-11.5 g/dL	8-10.9 g/dL	<8 g/dL
Child 6 months–5 years	>11 g/dL	10-10.9 g/dL	7-9.9 g/dL	<7 g/dL

From WHO/NMH/NHD/MNM/11.1

Reference range in newborns and infants

AGE	NORMAL RANGE
Birth	>13.5 g/dL
2 weeks	>12.5 g/dL
1-6 months	> 9.5 g/dL

Adapted from Medscape Sept 2016 "haemoglobin concentration"

Causes

Decreased production of red blood cells

- Nutritional iron, and/or folic acid/vitamin B12 deficiency
- Depressed bone marrow function (leukaemia, aplasia)
- Infections (HIV, TB, visceral leishmaniasis)

Increased destruction of red blood cells (haemolysis)

- Malaria
- Drug side effects (dapsone, cotrimoxazole, AZT)
- Congenital disorder, e.g. sickle cell anaemia

Loss of red blood cells

- Acute and chronic blood loss (e.g. haemorrhage after trauma, hookworm infestation, pregnancy, abortion, heavy menstrual loss, schistosomiasis, massive or chronic GI bleeding)

Clinical features

Commonly

- Pallor of conjuctivae, mucous membranes, palms, soles
- Fatigue, dizziness, palpitations, headache, anorexia, sometimes weight loss, low exercise tolerance
- Signs of heart failure if severe: oedema in lower limbs, dyspnoea, tachycardia, heart murmurs
- If due to acute blood loss: postural hypotension, decreased cardiac out put, tachycardia, sweating, restlessness and thirst
- Look for signs of specific pathology, e.g., splenomegaly, malaria, nutrition deficiency, haemolytic jaundice, etc.

Investigations

- Complete blood count (CBC) with differentials, Mean Corpuscolar Volume (MCV), platelets, and a peripheral smear
- Evaluate Hb levels according to the patient's age
- Classify anaemia according to MCV
  - *Microcytic (small RBCs):* usually iron deficiency, thalassemias, sideroblastic anaemia
  - *Macrocytic:* vitamin B12 or folate deficiency, thyroid disease, chronic alcohol abuse, antifolate medications
  - *Normocytic:* acute loss, renal failure, bone marrow infiltration or suppression, chronic disease, haemolytic anaemias
- Other tests according to suspected cause: reticulocyte count, screen for sickle cell, stool for ova, parasites and occult blood, and blood slide/RDT for malaria parasites

Note

- Anaemia is not a final diagnosis: careful history, physical examination and laboratory tests are essential to determine the cause

Management

General principles

- Determine and treat the cause
- Consider need of blood transfusion according to:
  - Level of haemoglobin
  - Clinical condition (haemodynamic status of patient, presence of heart failure, ongoing blood loss)

11.1.1.1 Iron Deficiency Anaemia

ICD10 CODE: D50

Anaemia due to iron deficiency

Cause

- Poor nutritional intake
- Chronic blood loss, e.g., infestation with Ancylostoma, prolonged/excessive menstrual bleeding, chronic gastrointestinal bleeding (e.g., chronic use of NSAIDS, large bowel tumors)

Clinical features

- It usually develops slowly
- As per general anaemia symptoms plus:
  - Sore tongue, atrophy of lingual papillae
  - Erosions of the corners of the mouth
  - Brittle, fragile fingernails

Differential diagnosis

- Conditions that cause microcytic red cells

Investigations

- Blood: CBC, Hb, (haematocrit (Hct) rarely <28% unless iron deficiency is present)
- Low MCV and Mean Corpuscular Hb (MCH)- hypochromia
- Hypochromic microcytic (small size) red cells
- Investigate the cause of iron deficiency

Management

TREATMENT	LOC
▶ Identify, and treat cause of iron deficiency ▶ Adjust diet if poor diet is one of underlying causes ▶ *Adult*: Oral **ferrous sulphate** 200 mg (or **ferrous sulphate/folic acid** 200/0.4 mg) every 8 hours (equivalent to 180 mg elemental iron per day)	**HC2**

- *Child*: Oral ferrous sulphate 5 mg/kg (max 200 mg) every 8 hours (equivalent to around 5 mg/kg elemental iron per day)
  - Hb rises in 2-3 weeks and returns to normal after 2 months
  - Treat for 6 months to 1 year to replenish stores
- Give an antihelminthic
  - **Albendazole** 400 mg single dose

Refer to hospital in case of:

- Severe symptoms – for blood transfusion
- Gastrointestinal bleeding
- Malabsorption
- Intolerance to oral therapy
- Unclear cause – not improving

Note

- Side effects of oral iron: diarrhoea, abdominal discomfort, constipation, black stools. Warn patient not to worry
- Parenteral iron is rarely necessary, and can cause anaphylaxis. It should only be used by specialists

11.1.1.2 Megaloblastic Anaemia

ICD10 CODE: D51-52

Anaemia characterised by large red blood cells. Usually due to folate and/or vitamin B_{12} deficiency. Some medicines (hydroxyurea, zidovudine, stavudine can cause macrocytic anaemia without folate and/or vitamin B_{12} deficiency).

Cause

- Low dietary intake of folate/increased need (e.g., children, pregnancy)
- Low dietary intake of vitamin B12 (in exclusively vegetarian diets, without any animal proteins)
- Malabsorption of folate and vitamin B12 (severe gastritis, giardia infection, severe intestinal diseases)

- Medicines e.g., metformin, zidovudine, hydroxyurea, stavudine, phenytoin
- Other causes of macrocytosis: myelodysplasia, hypothyroidism, chronic alcohol use, multiple myeloma

Clinical features

- General anaemia signs
- Vitamin B12 deficiency: neuropsychiatric abnormalities e.g., impaired vibration and position sense, abnormal gait, weakness, decreased muscle strength, spastic motions, memory loss, disorientation, depression, and acute confusional state

Investigations

- Blood smear: macrocytosis
- Elevated MCH/MCV
- Pancytopenia in severe cases
- Full blood count: oval macrocytes, hypersegmentation of neutrophils, thrombocytopenia
- Decreased serum Vitamin B12 or red cell folate

Management

TREATMENT	LOC
General measures	
▶ Identify and treat underlying cause of anaemia	
▶ Dietary modifications to ensure adequate intake of folate and vitamin B_{12}, e.g., eat plenty of green leafy vegetables, and/or food of animal origin	
Folic acid and vitamin B_{12} supplementation	**HC2**
▶ **Folic acid:** 5 mg daily until haemoglobin levels return to normal	
▶ **Vitamin B_{12}:** 1 mg IM daily for 5 days; then weekly for a further 3 doses	**RR**
– Follow with 1 mg every second month for life in patients with pernicious anaemia	

Note

- **If vitamin B_{12} deficiency is suspected:** (low leucocytes and platelets, neuropsychiatric symptoms, vegan diet) DO NOT GIVE folic acid alone but refer for further testing and treatment. Giving folic acid alone in patients with B_{12} deficiency may precipitate permanent neurological deficit.
- Anaemia normally corrects within 1-2 months. White cell count and thrombocytopenia normalise within 7-10 days
- DO NOT use ferrous-folate combination tablets to treat folic deficiency because the quantity of folic acid is too low

11.1.1.3 Normocytic Anaemia

Anaemia characterised by normal-sized red blood cells

Cause

- Acute blood loss
- Haemolysis (destruction of red cells), e.g., auto-immune disorder, hypersplenism, haemoglobin abnormalities (sickle cell disease, thalassemia), drugs (sulphonamides, dapsone, primaquine)
- Decreased reticulocytosis (formation of new blood cells), e.g. chronic kidney disease

Clinical features

- General features of anaemia

Investigations

- Evidence of haemolysis
- Full blood count smear: spherocytes
- HIV serology

Management

TREATMENT	LOC
Generally ▶ Identify and treat cause of anaemia ***Medicine treatment*** ▶ DO NOT treat with iron, folic acid or vitamin B12 unless there is clear documented deficiency ▶ Treat all patients with folic acid 5 mg daily in haemolytic anaemia ▶ Refer to hospital for further management	**HC4**

Prevention/Health Education for Anaemia

Educate the public about:

- The life long effects of anaemia on health, and cognitive development
- Dietary measures: encourage exclusive breastfeeding for the first 6 months. Encourage the use of iron-containing weaning locally available foods (red meat, beans, peas, dark leafy vegetables)
- Hygiene: avoid walking barefeet to avoid hook worm infestation, use of pit latrines for faecal disposal, and practice good hand washing habits
- Medical: encourage periodic screening for children and pregnant mothers, and presumptive iron therapy for either groups in cases of anaemia (see IMCI and pregnancy guidelines, chapters **16** and **17**)
- Routine iron supplementation for all pregnant mothers
- Early treatment of malaria, helminthic infections, etc.

11.1.2 Bleeding Disorders ICD10 CODE: D65-D69

A bleeding disorder is suspected if a patient has unexplained bruising and bleeding (i.e. no history of trauma). Prolonged bleeding or oozing can also occur after injury or surgery (e.g., tooth extraction, small cut).

Causes

- Blood vessel defect
  - Acquired: age, side effects of steroids, NSAIDS (e.g. easy bruising)
  - Genetic e.g. hereditary telangiectasia
- Platelet defect
  - Decreased platelet number/function e.g., blood cancer, viruses, aplastic anaemia
  - Increased destruction e.g., in hypersplenism, autoimmune disease, massive blood transfusion
- Coagulation defect
  - Hereditary e.g., haemophilia A or B, von willebrand disease
  - Acquired e.g., anticoagulant treatment, liver disease, alcoholism
- Infections: meningococcal sepsis, haemorrhagic fevers (causing widespread endothelial damage and disseminated intravascular coagulation)

Clinical features

- Platelet disorder: mucosal bleeding (gingivitis, nose bleeds), superficial ecchymoses, excessive bleeding after minor injury, petechiae, heavy menstrual bleeding
- Coagulation disorder: large, deep haematomas or haemathrosis

Investigations

➢ Complete blood count, and platelet count (can be estimated using a peripheral smear if an auto-analyser is not available)

- Bleeding time (time required for bleeding to stop). It is normal with coagulation factor deficiencies (except Von Willebrand disease), and abnormal in thrombocytopenia and qualitative platelet defects
- Coagulation tests
  - Prothrombin time (PT): prolonged in factor VII, X, V, II deficiencies, liver disease, warfarin treatment
  - International normalised ratio (INR) to monitor anticoagulation therapy
  - Partial thromboplastin time (aPTT): prolonged in factor VIII, XII, XI, IX, X, V and I deficiencies
- Blood smear
- If acute, consider if haemorrhagic fevers are the cause

Management

Patients with acute bleeding disorders should be referred to hospital for appropriate investigations and treatment.

Patients with chronic bleeding disorders should be referred to a specialist.

TREATMENT	LOC
▶ Identify and treat root cause of bleeding disorder ▶ Give **phytomenadione (vitamin K)** injection to: *Newborn*: 1 mg for full-term baby; 500 mcg for a pre-term baby IM or IV. Repeat every 8 hours if necessary ▶ In patients on warfarin with acute bleeding, give **vitamin K 5** mg slow IV to reverse warfarin effect. If patient has severe or active bleeding, give **fresh frozen plasma** ▶ Discontinue any medications that will interfere with coagulation or platelet function, e.g., cephalosporins, dipyridazole, thiazide, alcohol, chloropromazine, sulfonamides, rifampicin,	**HC2** **HC4**

methyldopa, phenytoin, barbiturates, quinidine, isoniazid, NSAIDs, and aspirin ▶ If fresh frozen plasma or platelets are not available, transfuse **fresh, whole blood** to replace some of coagulation factors and replenish any significant blood losses	**H**
Referral criteria ▶ Refer patient to hospital if any of the following signs are present – If cause cannot be determined locally – Spontaneous bleeding – Bleeding into muscles or joints, GIT, or CNS – Bleeding patients who are on warafrin – Postpartum bleeding – Family history of bleeding	**RR**

Health education

- Advise the patient with chronic bleeding disorder to:
  - Prevent injury
  - Avoid injections and unnecessary surgery
  - Visit the clinic immediately if symptoms occur
  - Continue all medication as prescribed
- All haemophiliacs should have prophylactic treatment before traumatic procedures, e.g., tooth extractions, or surgery

11.1.3 Sickle Cell Disease ICD10: D57

Sickle cell disease (SCD) is a genetic haemoglobin disorder in which red blood cells which carry oxygen around the body change shape from a smooth doughnut shape into a crescent or half-moon shape. It is sometimes called Sickle Cell Anaemia (SCA).

Cause

- It is caused by a defect in beta chains where a given amino acid is replaced by another (Substitution of valine for glutamic acid) at position 6 of the chain. This change creates abnormal haemoglobin called HbS.

Clinical features

- Symptoms usually appear from age of 3 to 6 months: anaemia, dactylitis (swelling of fingers), lobar pneumonia, recurrent severe bacterial infections. This results from the reduction of the foetal haemoglobin F (HbF), and increase in HbS in the blood
- **Chronic anaemia:** Hb 6–9 g/dl with episodes of acute worsening, which can be due to
  - Aplastic crisis: sudden transient arrest of blood cells production in the bone marrow (low Hb and low reticulocyes), often due to ParvoB19 virus infection)
  - Splenic sequestration: pooling of large amounts of red blood cells in the spleen with painful and rapidly enlarging spleen, decreasing haemoglobin with high reticulocyte count
- **Acute vaso-occlusive phenomenon (occlusion of blood vessels) causing:**
  - *Painful crisis* (acute, intense) at the back, chest, limbs, abdomen. In children <2 years, pain and swelling of hands and feet.
  - *Stroke:* hemiplegia, altered consciousness, seizures

- *Acute chest syndrome:* fever, chest pain, difficulty in breathing, low oxygen level, cough, wheezing
- *Acute abdomen or mesenteric crisis ("intestinal crisis"):* abdominal pain and distension, reduced or absent bowel sounds, pallor, fever, Abdominal X-ray may show dilated bowel loops. Anaemia, high reticulocyte count, high CRP
- Renal infarction, bone infarction and necrosis, priapism

- **Chronic organ damage due to anaemia and vasocclusive phenomenon:**
  - Hyposplenia (spleen becomes so damaged that is not functional anymore or has to be removed because of splenic sequestration)
  - Pulmonary hypertension, asthma
  - Chronic renal and hepatic disease, gallbladder stones
  - Osteoporosis, retinopathy
  - Chronic leg ulcers
- Infections favoured by hyposplenism and low tissue perfusion
  - Osteomyelitis, pneumonia, septicaemia

Investigations

- Family history of sickle cell disease
- Full blood count & peripeharl film comment
- Screening tests for sickling (not fully reliable)
- Haemoglobin electrophoresis (confirms diagnosis)
- Chest radiography (for Acute Chest Syndrome)
- Abdominal ultrasound
- Urinalysis
- Liver and renal function tests

Management

Chronic management

TREATMENT	LOC
General measures ▶ Regular follow up and education of patients and families ▶ Always keep well-hydrated ▶ Give **folic acid** 5 mg daily for life ▶ Promptly assess, and treat any fever with antibiotics until source of fever is identified ▶ Ensure complete immunisation using the UNEPI programme, which includes the pneumococcal vaccine for all infants – Plus, if available, immunisation against meningococcus (to be given in regions within the meningococcal belt) and influenza	**HC2**
▶ Prophylactic **penicillin V** (up to 5 years of age) *Child 3 months-3 years*: penicillin V 125 mg every 12 hours *Child 3-5 years*: penicillin V 250 mg every 12 hours	**HC2**
▶ Malaria prophylaxis with monthly **sulphadoxine-pirimetamine (SP)** *Child 2-5 years:* ½ tab monthly *Child 5-10 years:* 1 tab monthly *Child 10-15 years:* 2 tabs monthly *Child >15 years:* 3 tablets monthly For those with sulphur allergy consider use of **erythromycin** 250 mg every 12 hours	**HC2**

Refer to a specialised treatment centre for specialised management, especially of uncontrolled symptoms ▶ **Hydroxyurea** starting dose 20 mg/kg ***Indications for hydroxyurea*** • Frequent crises: >5 crises in a year • Patients with abnormal Transcranial Doppler (TCD) Ultrasonography velocity >200 cm/s • Acute Chest Syndrome • Stroke	**RR**
Note: However, the decision to give a patient hydroxyurea should be done by a senior health worker after full laboratory investigation of the patient including: ▶ Complete blood count ▶ Renal function tests ▶ Liver function tests	

Management of acute complications

TREATMENT	LOC
Painful crisis – home management (mild to moderate pain) ▶ Oral hydration ▶ Warm compresses (not cold) ▶ **Paracetamol** 1 g every 8 hours *Child:* 10-15 mg/kg 6-8 hourly ▶ And/or **ibuprofen** 400-600 mg every 6-8 hours *Child:* 5-10 mg/kg 8 hourly ▶ And/or **diclofenac** 50 mg 8 hourly *Children* only >9 years and >35 kg: 2 mg/kg in 3 divided doses	**HC2** **HC4**

If pain not controlled, add: ▶ **Codeine** 30-60 mg every 6 hours (only in patients >12 years) ▶ Or **tramadol** 50-100 mg every 6-8 hours (only in patients >12 years) ▶ Or Oral **morphine** at 0.2-0.4 mg/kg every 4 hours and re-assess pain level (see section 13.1.2 for the WHO analgesic ladder) ***If pain still not controlled, refer to hospital***	**RR**
Painful crisis – hospital management (severe pain) ▶ IV fluids for rehydration ▶ Oxygen ▶ Assess for malaria and infection ▶ Injectable **diclofenac** *Child:* 1 mg/kg IM 8 hourly *Adult:* 50-75 mg IM 8 hourly ▶ **Morphine** oral (see section 13.1.2) *Child and Adult:* 0.3-0.6 mg/kg per dose and re-assess ▶ Or **Morphine** IV *Child:* 0.1-0.2 mg/kg per dose *Adult:* 5-10 mg dose and re-assess	**HC4** **HC4** **HC3** **H**
Note ◆ Use of laxative: **bisacodyl** 2.5 mg to 5 mg orally to prevent constipation due to morphine	

Acute anaemia (acute splenic sequestration, aplastic crisis) ▶ Transfuse (see section **11.1.1.1**) ▶ IV fluids if necessary ▶ Investigate and treat malaria, and infections ▶ Avoid splenectomy in acute sequestration (high mortality)	**HC4**
Acute Chest syndrome ▶ Restricted IV fluids use, always use calculated required amounts of IV fluids. NB: limit in cases of pulmonary oedema ▶ **Oxygen** therapy ▶ Pain management as above ▶ **Salbutamol** inhaler (2-4 puffs prn) or nebulisation 5 mg (2.5 mg for children <5 years) ▶ **Ceftriaxone** 1-2 g once daily for 7-10 days *Child*: 80-100 mg/kg once daily ▶ Plus **erythromicin** 500 mg every 6 hours for 7-10 days *Child:* 5-10 mg/kg every 6 hours ▶ Transfuse if no improvement, and/or Hb falls <9 g/dL	**HC4**
Stroke ▶ Oxygen to mantain SpO_2 >94% ▶ Tranfuse if Hb <9 g/dl ▶ IV fluids ▶ Refer for neuroimaging and advanced management	**RR**

Acute Abdomen/Mesenteric crisis ▶ IV fluids ▶ Nil by mouth ▶ NGT tube on free drainage ▶ Antibiotics ▶ **Ceftriaxone** 1-2 g once daily for 7-10 days ▶ *Child*: 80 mg/kg once daily ▶ Plus **metronidazole** 500 mg IV every 8 hours for 7-10 days ▶ *Child:* 10 mg/kg IV every 8 hours ▶ Red cell transfusion ➢ Plain abdominal X-ray to rule out obstruction or stool impaction ▶ Surgical review	**H**
Infections ▶ Prompt assessment and treatment of cause (osteomyelitis, pneumonia, cellulitis, etc.) ▶ Treat according to cause. If no localising focal symptoms, and no malaria, give: ▶ **Ceftriaxone** 1-2 g once daily for 7-10 days *Child*: 80 mg/kg once daily ***If osteomyelitis or septic arthritis*** ▶ Or **Cloxacillin** 500 mg 6 hourly IV or orally ▶ *Child*: 50 mg/kg 6 hourly for at least 21 days ▶ or **Ciprofloxacin** 500 mg 12 hourly for at least 21 days – In *child*: **Ceftriaxone** 50 mg/kg IV once a day for at least 21 days	**H**

Indications for blood transfusion	HC4
▶ Acute exacerbation of baseline anaemia: – Hyperhaemolysis – Hepatic sequestration – Splenic sequestration – Aplastic crisis ▶ Severe vaso-occlusive events: – Stroke – Acute chest syndrome – Severe infection – Multi-organ failure ▶ Preparation for procedures: – Surgery – Radiography with ionic contrast – General anaesthesia	

Prevention/health education

- Patient, family and community education
- Periodic comprehensive evaluations, and other disease-specific health maintenance services
- Timely and appropriate treatment of acute illness
- Genetic counseling (for couples planning to have children)
- Antenatal screening
- Early recognition/screening of children with low Hb
- Vaccination (pneumococcal vaccine, H-influenza vaccine, Hepatitis B vaccine evaluation)
- Antibiotic (oral **penicillin** twice a day), and antimalarial chemoprophylaxis

11.2 BLOOD AND BLOOD PRODUCTS

The Uganda Blood Transfusion Service (UBTS) collects blood and produces all blood products.

- **Whole blood (WB):** unseparated blood collected in an approved container and containing a preservative or anticoagulant solution
- **"Blood"** refers to any blood component in which the main constituent is red blood cells, e.g., whole blood (WB), red cell concentrate, or red cell suspension
- Unless otherwise specified, others are referred to as **blood components or products.** Blood components are prepared from WB, and contain negligible quantity of red cells, e.g., platelet concentrate, Fresh Frozen Plasma, Cryoprecipitate. *(Refer to the "National Blood Transfusion Guidelines for appropriate use of blood" for more details)*

UBTS ensures that all blood and blood products are produced in a way that ensures the health and safety of both patients and donors and minimises the risk of transmitting infection through blood.

11.2.1 General Principles of Good Clinical Practice in Transfusion Medicine

- Blood is a scarce and expensive resource, and carries risks of adverse reactions and transfusion-transmitted illnesses
- Use blood appropriately, that is, to treat conditions that can lead to significant morbidity or mortality, which cannot be prevented or effectively managed by other means
- Minimise transfusional needs by:
  - Early diagnosis and treatment of anaemia
  - Good anaesthetic and surgical management
  - Use of simple alternatives to transfusion when appropriate, e.g., IV fluids as first line treatment of hypovolemic shock

- Prescribe transfusion according to individual needs, using clinical signs and symptoms, and expected outcome, but NOT according to Hb level only

Do not use blood tranfusion to:
- Expand blood volume unless there has been blood loss of >30% of total volume
- Enhance wound healing
- "Top up" Hb for surgery
- Improve general well-being of the patient in patients with on-going fluid losses, e.g. surgical blood loss

- Blood should not be transfused unless it has been:
- Obtained from appropriately selected donors (voluntary non-remunerated donors)
- Screened for transfusion-transmissible infections, e.g., malaria, HIV, hepatitis B and C, and syphilis
- Tested for compatibility between the donor's red cells and the antibodies in the patient's plasma in accordance with national guidelines
- Guidelines and procedures for requesting, administering, and recording blood transfusion should be clearly spelled out, and strictly followed to avoid catastrophic mistakes
- Ensure the transfused patient is closely monitored and that there is immediate response if any adverse reactions occur

11.2.2 Blood and Blood Products: Characteristics and Indications

The following section will present only whole blood and red cell concentrate. Availability and use of other blood components is reserved for referral hospitals and is beyond the scope of this guideline.

11.2.2.1 Whole Blood

- Whole blood provides red cells, volume, stable coagulation factors (VII, XI), and others
- It does not have functional platelets and labile coagulation factors (V and VIII)
- It is also used as a raw material from which other blood components are prepared
- 1 unit is about 450 ml of blood; obtained from a single donation. It is available from HC4 level

Indications

- Red cell replacement in acute blood loss (haemorrhage) with significant hypovolaemia such as in trauma, surgery, invasive procedures, GIT haemorhage
- Patients in need of red cell transfusion where red cell concentrates or suspensions are not available (consider adding furosemide to avoid fluid overload)
- Only Specialist Use: exchange transfusion in neonates, using less than 5-day old blood units

Caution

△ Transfusion must be started within 30 minutes of removal from the refrigerator, and completed within 4 hours of starting

△ Storage is 2-6°C in approved blood bank refrigerator with temperature charts and alarm

△ WB is contraindicated in severe chronic anaemia and incipient cardiac failure (risk of volume overload)

△ Should not be warmed unless indicated (improvised warming method commonly used in health facilities is not necessary)

11.2.2.2 Red Cell Concentrate (packed red cells)

It contains red blood cells with hardly any plasma, fewer leucocytes, and no citrate. It is in a form of 150-200 ml/unit, obtained from a single donation. It is available from HC4 level.

Indications

- Red cell replacement in anaemic patients
- In acute blood loss, together with crystalloid solution

Caution

△ Transfusion must be started within 30 minutes of removal from the refrigerator, and completed within 4 hours of starting

△ Storage is 2-6°C in approved blood bank refrigerator with temperature charts and alarm

11.2.2.3 Indications for Blood Transfusion

The indication for blood transfusion depends on:

- The degree of anaemia
- The clinical conditions (high risk or presence of signs and symptoms of tissue hypoxia, cardiac decompensation, etc.)
- Presence and entity of ongoing blood loss (e.g., internal or external haemorrhage) or red cells destruction (malaria, haemolysis, sepsis, etc.)

Severe anaemia in children and infants

- Hb ≤4 g/dL (or haematocrit ≤12%), whatever the clinical condition of the patient
- Hb ≤6 g/dL (or haematocrit ≤13-18%), in case of life threatening complications, such as, clinical features of hypoxia and cardiac decompensation, acidosis (usually causes dyspnoea), impaired consciousness, hyperparasitaemia (>20%) or cerebral malaria, septicaemia, meningitis
- Transfuse 10-15 mL/kg of packed red cells (20 mL/kg of whole blood)

Severe anaemia in adults

- Consider blood transfusion only in anaemia which is likely to cause/ has already caused clinical signs of hypoxia
  - Symptomatic anaemia in adults with <8 g/dL
  - Haemoglobin <10 g/dL if angina pectoris or CNS symptoms
- ▶ Give the minimum number of transfusions necessary to relieve hypoxia: transfuse 1 unit in 2-4 hours (with furosemide 40 mg IM) and re-assess. If symptoms persist give another 1-2 units

Severe anaemia in pregnancy

Pregnancy <36 weeks

- Hb ≤5 g/dL irrespective of clinical condition
- Hb 5-7 g/dL in case of established or incipient heart failure, pneumonia or other serious infection, malaria, pre-existing heart disease

Pregnancy >36 weeks

- Hb ≤6 g/dL
- Hb 6-8 g/dL in case of
  - Established or incipient heart failure, pneumonia or other serious infection, malaria, pre-existing heart disease

Elective caesarean section

If history of APH, PPH, previous caesarean section

- Hb is 8-10 g/dL
  - Establish/confirm blood group, and save freshly taken serum for cross-matching
- Hb <8 g/dL
  - Have 2 units of blood cross-matched and made available

Pre-operative anaemia

- ≤8 g/dL in case of:
  - Inadequate compensation for the anaemia (symptomatic anaemia)

- Significant co-existing cardiorespiratory disease
- Major surgery or significant blood loss expected
- Pre-surgical correction has not been possible

Management of acute haemorrhage/hypovolemia

- IV fluids (crystalloids: Normal saline) is the first line in treatment of hypovolaemia during acute haemorrhage
- Whole blood or red blood cells are indicated when blood loss is >20- 30% of blood volume (>15-20 mL/kg)
- The need for blood must be determined by:
- Amount and speed of blood loss
- Patient's critical signs
- Initial response to IV fluid resuscitation
- Hb level is NOT a reliable indicator for blood need in acute haemorrhage

Sickle cell anaemia

- Blood transfusion is not necessary for asymptomatic sickle cell patient with steady Hb 6-8 g/dL
- Blood transfusion is indicated if:
- Acute severe anaemia (Hb <5 g/dL or 2 g/dL lower than usual level for the patient) in aplastic and sequestration crisis. Aim at Hb 7-8 g/dL
- Hb <6 g/dL in uncomplicated pregnancy
- Hb <8 g/dL if caesarean section
- Hb <9 g/dL in case of acute chest syndrome, and stroke
- Use packed cells: whole blood is indicated in acute hemorrhage only

Neonatal conditions

- Severe unconjugated hyperbilirubinaemia
- Severe anaemia of any cause (prematurity, sepsis, etc.)
- Transfusion in neonates should be managed at specialist level

11.2.3 Adverse Reactions to Transfusion

Any potentially adverse sign or symptom resulting from a blood transfusion.

Acute reaction

- Intravascular haemolysis (ABO incompatibility): severe, life threatening
- Bacterial contamination
- Anaphylactic reaction
- Circulatory overload
- Allergic (mild, mucocutanoeus)
- Febrile, non-haemolytic transfusion reaction

Delayed reaction

- Infusion of large volumes of blood and IV fluids may cause haemostatic defects or metabolic disturbances
- Transfusion-transmitted infections

General principles

- Acute reactions may occur in 1-2% of patients. Rapid recognition and management of these may save the patient's life
- Errors and failure to follow correct procedures are the most common causes of life threatening acute haemolytic reactions
- ALWAYS store blood used for the compatibility testing for 7 days at 2-8°C for possible investigation on transfusion reactions
- In a conscious patient with a severe haemolytic transfusion reaction, signs/symptoms may appear within minutes of infusing only 5-10 mL of blood
  - A nurse should observe the patient for the first 10 minutes after a new blood unit is started, and vital signs recorded

- In an unconscious or anaesthetised patient, hypotension and uncontrolled bleeding may be the only signs of a transfusion problem

If any reaction is noted

- Stop the transfusion, and remove the giving set. Prior to disconnecting, the unit must be closed to avoid reflux of patient blood into the donor blood
- Check the blood pack labels and patient's identity. If there is a discrepancy, consult the blood bank
- Get a post-transfusion sample, patient's urine sample, and the transfused unit. Re-grouping and testing are done on both patient and transfused samples
- Immediately report all suspected acute transfusion reactions to the hospital blood bank laboratory that works with the clinician
- For all category 2 and 3 reactions, record the following in the patient's notes: type of reaction, time reaction occurred from start of transfusion, volume, type, and pack numbers of blood products transfused
- The type of reaction should be diagnosed, and a quick and clear investigation should be started in the hospital blood bank laboratory
- Bacterial contamination of red cells or platelet concentrates is an under-recognised cause of acute haemolytic transfusion reactions
- Patients who receive regular transfusions are at particular risk of acute non-haemolytic febrile reactions. With experience, these can be recognized so that transfusions are not delayed or stopped unnecessarily

Infections are the most serious delayed complications of transfusions. Therefore, record all transfusions accurately in the patient's case notes, and consider transfusion in the differential diagnosis.

11.2.3.1 Acute Transfusion Reactions

Occurring within 24 hours of transfusion.

REACTION/CAUSES	MANAGEMENT
CATEGORY 1: MILD REACTION	
Signs and symptoms • Localised cutaneous reactions, e.g. urticaria, rash • Pruritus **Possible causes** • Hypersensitivity	▶ Slow the transfusion ▶ Give **antihistamine**, e.g. **promethazine** 25-50 mg by deep IM or slow IV ▶ *Child 1-5 years:* 5 mg by deep IM *Child 5-10 years:* 6.25-12.5 mg by deep IM ***If no clinical improvement within 30 minutes, or if condition worsens:*** ▶ Treat as category 2
CATEGORY 2: MODERATELY SEVERE REACTIONS	
Signs and symptoms • Flushing • Urticaria, pruritis • Rigors • Fever • Restlessness, palpitations • Tachycardia • Mild dyspnoea • Headache ***Possible causes*** • Hypersensitivity • Febrile non haemolytic reaction • Possible contamination with pyogens/bacteria	▶ **Stop** the transfusion ▶ Replace the infusion set and keep the IV line open with **sodium chloride** 0.9 % infusion ▶ Notify the medical officer in charge and the blood bank immediately ▶ Send blood unit with infusion set, freshly collected urine, and new blood samples (one clotted and one anticoagulated) from the vein opposite the infusion site, together with the appropriate request form to the blood bank for laboratory investigations.

REACTION/CAUSES	MANAGEMENT
	▶ Give **antihistamine** IM (see category 1 above) ▶ Give antipyretic: **Paracetamol** 15 mg/kg (*adult*: 1 g) ***If there are anaphylactic features (e.g. bronchospasm, stridor):*** ▶ Give **hydrocortisone** 4 mg/kg IV and **salbutamol** 2.5-5 mg nebulisation ▶ Collect urine for the next 24 hours for volume output and evidence of haemolysis ▶ If there is clinical improvement, restart transfusion slowly with a new blood unit and observe carefully
If no clinical improvement within 15 minutes of restarting, or condition worsens ▶ Treat as category 3	
CATEGORY 3: LIFE-THREATENING REACTIONS	
Signs and symptoms • Rigors • Fever • Anxiety, restlessness • Hypotension (fall of >20% in systolic BP) • Tachycardia (rise of >20% in heart rate) • Haemoglobinuria	▶ **Stop** the transfusion ▶ Give **sodium chloride** 0.9% IV infusion 20-30 mL/kg over 5 minutes to maintain systolic BP ▶ Raise patient's legs ▶ Maintain airway and give high flow oxygen by mask ▶ Give **adrenaline (epinephrine)** injection 1 mg/mL, 0.01 mg/kg slow IM

REACTION/CAUSES	MANAGEMENT
• Unexplained bleeding (DIC) • Pain in chest, or near infusion site, or in loin/back, headache • Respiratory distress, shortness of breath, dyspoea ***Possible causes*** • Acute intravscular haemolysis • Bacterial contamination and septic shock • Fluid overload • Anaphylaxis	▶ If there are anaphylactic features (e.g. bronchospasm, stridor): Give **hydrocortisone** 4 mg/kg IV and **salbutamol** 2.5-5 mg nebulization or **aminophylline** 6 mg/kg IV ▶ Give diuretic: **Furosemide** 1 mg/kg IV ▶ Notify the medical officer in charge and blood bank immediately ▶ Send blood unit with infusion set, freshly collected urine, and new blood samples (one clotted and one anticoagulated) from the vein opposite infusion site, with appropriate request form to blood bank for laboratory investigations ▶ Check fresh urine specimen for haemoglobinuria ▶ Start a 24–hour urine collection and fluid balance chart, and record all intake and output ▶ Maintain fluid balance ▶ If signs/symptoms of bacteraemia and no evidence of haemolysis, start braod spectrum antibiotics ▶ Refer for further management where necessary

12. Oncology

12.1 INTRODUCTION

Cancer is an unregulated growth of a previously normal set of body cells. Oncology is the study, diagnosis, and management of cancers or tumours. It is important to note that any organ or system as well as any individual can be affected by cancer. This section will outline major symptoms and signs of cancer, key population groups affected, ways to mitigate risk of cancer and provide an overview of common cancers in adults and children.

12.1.1 Special Groups at Increased Risk of Cancer

- HIV-positive patients
- Albinos
- Age group >65 years
- Women (breast and cervical)
- Smokers
- Alcoholics
- Consistent occupational exposure to toxins and/or radioactive material

Note: Routine screening is recommended for these groups

12.1.2 Early Signs and Symptoms

Cancer should be investigated in an individual with the following symptoms having occurred for >2 weeks:

- Sudden weight loss
- Painless or painful swelling, lump, or thickening
- Sores that fail to heal

- Hoarseness or cough
- Abnormal bleeding or discharge
- Persistent indigestion or difficulty in swallowing
- Change in normal bowel or bladder habits
- Chronic ulcers
- Chronic pain
- Change in a skin wart or mole

12.1.2.1 Urgent Signs and Symptoms

Urgent referral for a possible cancer malignancy might be necessary in patients with any of the following:

BODY PART	SIGNS AND SYMPTOMS
Haematological	Neutropenia, anaemia, infection, bleeding, hyperviscosity, leukocytosis $>50 \times 10^6$
Lung (excluding TB)	Coughing blood, superior vena cava obstruction
Upper GI Tract	Chronic GI bleeding and bowel habit changes, dysphagia, persistent vomiting, unexplained pain and weight loss, abdominal mass without dyspepsia, obstructive jaundice
Lower GI Tract	Bleeding and bowel habit changes, palpable rectal mass, unexplained iron deficiency anaemia
Breast	Discrete hard lump with fixation, eczematous skin and nipple changes, unilateral nipple discharge
Gynaecology	Postmenopausal bleeding, persistent intramenstrual bleeding, vulval lump and bleeding

BODY PART	SIGNS AND SYMPTOMS
Urology	Hard irregular prostate, urinary symptoms, macroscopic haematuria, swelling or mass in testes, or any abdominal mass along urological tract
Central Nervous System	Progressive neurological deficit, new onset seizures, headaches, mental changes, unilateral deafness, and signs of raised intracranial pressure (e.g., vomiting, drowsiness, posture-related headache, tinnitus, and other CNS symptoms)

12.2 PREVENTION OF CANCER

Approximately 40% of cancers are preventable through interventions such as tobacco control, environmental controls, promotion of healthy diets, and physical activity.

> Prevention offers the most cost-effective long-term strategy for control of cancer.

Health workers are responsible for educating the public on:

- Primary Prevention – sustained action to prevent a cancerous process from developing through risk factor reduction
- Secondary Prevention – active discovery and control of cancerous or pre-cancerous lesions

12.2.1 Primary Prevention

Primary prevention gives control to the individual in maintaining a healthy lifestyle and environment to mitigate cancer risk.

12.2.1.1 Control of Risk Factors

Smoking/Tobacco Use

- Tobacco use increases the risk of cancer of the lungs, oesophagus, larynx, mouth, throat, kidney, bladder, pancreas, stomach, and cervix
- Health workers must educate patients on the dangers of tobacco consumption and smoking; patients should be encouraged and supported to stop

Obesity and Lifestyle

- Being overweight or obese results in an increased risk of cancer, specifically oesophageal, colorectal, breast, endometrial, and kidney
- Heath workers must advise patients to maintain a healthy lifestyle, with regular physical activity and a healthy diet

Alcohol Use

- Abusive alcohol habits increase the risk of cancer of the oral cavity, oesophagus, larynx, liver, colorectal, and breast
- Health workers should educate patients of the dangers of excessive and regular alcohol consumption, while promoting healthier alcohol habits that limit consumption

Environmental Pollution

- Regular exposure to carcinogenic chemicals in the environment can occur through unsafe drinking water, air pollution, and food contaminated by aflatoxin or dioxin chemicals, occupational exposure to dangerous gases or dusts

- Environmental carcinogens (aflatoxins, asbestos, vehicle emissions, lead, ultraviolet light, and ionizing radiation) will lead to increased risk of developing cancer, e.g. lung cancer
- Health workers must educate patients on environmental dangers and provide suggestions to limit exposure such as:
  - Limiting indoor air pollution due to smoke from use of charcoal and firewood inside a poorly ventilated house
  - Avoiding fumes from cars
  - Avoiding exposure to garbage pollution (burning rubbish)
  - Employers should provide employees with a safe working environment with limited occupational hazards

Radiation

- Ultraviolet (UV) radiation, and in particular solar radiation, is carcinogenic to humans, causing all major types of skin cancer, such as basal cell carcinoma, squamous cell carcinoma and melanoma
  - People with albinism are at a much higher risk of skin cancer and health workers should encourage them to wear protective clothing and wide brimmed hats
- Ionizing radiation from radioactive isotopes (used in medical diagnostics and treatment) is also associated with leukaemia and other solid tissue tumours. Proper disposal of highly radioactive isotopes is mandatory to prevent hazardous exposures

Prevention of Infections

The following infections are associated with causing certain types of cancer:

- Viral Hepatitis B/C: cancer of the liver
- Human Papilloma Virus (HPV): cervical cancer
- Helicobacter Pylori: stomach cancer

- HIV/AIDS: aggressive lymphoma subtypes, Kaposi's sarcoma, anorectal cancer, cervical cancer, etc
- Schistosomiasis: increases risk of bladder cancer
- Liver Fluke: increases risk of cholangio-carcinoma

Preventative measures to control infection risk include vaccination, and prevention/treatment of infection and infestation:

- HPV Vaccination: immunize all girls from age 10 with 2 doses of HPV vaccine (see section **18.1**)
- Hepatitis B Vaccination: routinely offered in the national childhood schedule and populations at risk, in order to prevent infection with hepatitis B, the main risk factor for liver cancer (see section **18.2.1**)
- Treatment of HIV/AIDS, schistosomiasis, H. pylori, and hepatitis B&C and other infections is also a preventive measure

12.2.2 Secondary Prevention

Secondary prevention strategies relate to the discovery and control of cancerous or pre-cancerous lesions.

Early detection of cancer greatly increases the chances for successful treatment. It comprises of:

- Early diagnosis in symptomatic populations
- Screening in asymptomatic high risk populations

> Screening refers to the use of simple tests across a healthy population in order to identify individuals who have disease, but do not yet have symptoms.

Based on existing evidence, mass population screening is advocated for breast and cervical cancer. Other cancers that are commonly screened for include prostate and colon.

Screening for Breast Cancer

Screening for breast cancer involves:

- **Breast Self Examination (BSE):** a simple, quick examination done by the client herself, aimed at early detection of lumps. Regular and correct technique of breast examination is important and easy to teach and administer
- **Clinical Breast Examination (CBE):** performed by a trained and skilled health care provider from HC3
  - Take a detailed history and conduct a physical examination
  - All breast quadrants must be examined in detail plus the armpits for lymph nodes
  - Inspect the skin for changes and swellings, for tethering of the breast on the chest wall, palpate for lumps, check for nipple discharge
  - A suspicious lump or bloody nipple discharge MUST BE REFERRED for evaluation by mammography or ultrasonography as well as core needle biopsy
- **Mammography:** a low-dose x-ray of the breast. It is the test of choice for screening of early breast cancer but it is available only at national referral hospital level
- **Breast Ultrasound:** not used as a screening test, but is useful as an additional tool in characterizing palpable tumors and taking of image-directed biopsies. It may be used as a screening tool in lactating women, small-breasted women and in males.

Screening for Cervical Cancer

This aims to detect pre-cancerous lesions that are then treated to prevent progression to invasive cancer. The following methods are recommended:

- **Visual Inspection with Acetic Acid (VIA):** involves applying 3-5% freshly prepared acetic acid to the cervix and observing results after one minute.

- The VIA results are generally categorized into 3 subsets: suspicious for cancer, VIA negative and VIA positive
- It uses readily available equipment, does not require a laboratory and provides an immediate result.
- Positive cases can be treated with cryotherapy by adequately trained providers.

Consider the following if using VIA as a screening method:

- Women <25 years of age should be screened only if they are at high risk for disease: HIV positive, early sexual exposure, multiple partners, previous abnormal screening results, cervical intraepithelial neoplasia (CIN)
- VIA is not appropriate for women >50 years
- Screening is advised every 3-5 years in case of normal results, but after 1 years in case of abnormal results and treatment (cryotherapy) nd every year in HIV positive women.

- **Visual Inspection with Lugol's Iodine (VILI):** it involves looking at the cervix with the naked eye or low magnification after swabbing with Lugol's iodine. VILI has a sensitivity and specificity of about 92% and 85%, respectively. Test results are available immediately thereby decreasing loss to follow-up. Recommendations and timings of VIA outlined above also apply to VILI.
- **Cytology Testing by Pap Smear:** it is a microscopic examination of cells scraped from the opening of the cervix. The PAP smear is best taken around mid-cycle. It should be postponed in case of cervicitis until after treatment; otherwise, the pus cells obscure clarity of the smear and affect interpretation. It requires histocytology services so it is available only at referral facilities.

12.3 COMMON CANCERS

This section describes the signs and symptoms of common cancers in adults and children, and outline some of the investigations required. Health workers should suspect cancer if they observe any of these clinical features and refer patients to the cancer treatment centers (Uganda Cancer Institte and regional referral hospitals).

12.3.1 Common Cancers in Children

CLINICAL FEATURES	INVESTIGATIONS
Leukaemia • Anaemia • Bone pains • Haemorrhagic tendencies (epistaxis, gum bleeding) • Recurrent infections	➢ CBC, peripheral blood film ➢ Uric acid, lactate dehydrogenase ➢ Abdominal ultrasound scan
Burkitt's Lymphoma • Rapidly growing tumour • Usually a jaw or abdominal mass or tumour • May also present as a central nervous system tumour	➢ CBC ➢ Peripheral blood film ➢ Bone marrow, X-Ray ➢ Lumbar puncture ➢ LDH
Hodgkin's Disease • Lymph node enlargement • Splenomegaly, abdominal masses	➢ CBC ➢ Chest X-ray ➢ Lymph node biopsy

CLINICAL FEATURES	INVESTIGATIONS
Nephroblastoma (Wilms' tumour) • Average age 2 years: Embryonal tumour • Early childhood • Painless abdominal (loin) mass • Fast growing	➢ CBC ➢ U/E in normal IV urography shows displaced calices ➢ FNAC ➢ CXR for metastasis
Neuroblastoma • Embryonal tumour • Abdominal mass in loin region • Markedly elevated blood pressure • Fast-growing often crossing midline • Child is sick looking	➢ CBC ➢ IVU ➢ FNAC ➢ Ultra sound ➢ CXR for metastasis
Rhabdosarcoma, rhabdomyosarcoma • Tumour of muscle • Can occur anywhere but more commonly in pelvis, bladder, vagina • May present with a fungating mass (sarcoma botryoid) • May ulcerate and bleed	➢ Good physical examination ➢ Full Blood Count ➢ U/S ➢ CXR ➢ CT scan when available ➢ Biopsy FNAC
Retinoblastoma • Age usually <3 years, inherited through chromosome 13 • May be unilateral or bilateral • Yellowish whitish reflex in eye	➢ Skull X-Ray ➢ Urine catecholamines ➢ Fundoscopy ➢ CT scan head

CLINICAL FEATURES	INVESTIGATIONS
CNS Tumours • Headache, worse in the morning and eases during the day • Seizures or convulsions • Nausea or vomiting • Weakness or loss of feeling in arms or legs • Stumbling/lack of coordination in walking • Abnormal eye movements or changes/loss in vision • Drowsiness • Changes in personality, memory, speech	➢ X–Ray skull ➢ CT scan

12.3.2 Common Cancers in Adults

CLINICAL FEATURES	INVESTIGATIONS
Cancer of the oesophagus • Progressive dysphagia • Regurgitation • Weight loss • Iron deficiency anaemia	➢ FBC ➢ Barium Swallow ➢ Endoscopy; visualise and biopsy tumour ➢ CXR
Gastric Cancer • Anorexia, weight loss, vomiting • Anaemia • Haematemesis • Pain, epigastric mass • Melaena stool	➢ Haemogram ➢ Occult blood in stool ➢ Barium Meal ➢ Endoscopy; visualise and biopsy

CLINICAL FEATURES	INVESTIGATIONS
Colorectal & Anal Cancer • Change in bowel habits; constipation, diarrhoea • Blood in stool • Anaemia, weight loss • Tenesmus • Lower abdominal mass	➢ Haemogram ➢ Iron-deficiency anaemia ➢ Occult blood in stool ➢ Barium Enema (double contrast) ➢ Sigmoidoscopy ➢ Coloscopy; visualise and biopsy tumour
Breast Cancer • A painless lump • Nipple retraction • Skin changes such as darkening and dimpling appearing like orange skin • Nipple discharge that may be bloody • Ulceration • Uniform breast enlargement • Pain is usually a late symptom • Symptoms and signs of metastasis	➢ Mammography ➢ FNAC Biopsy ➢ Excisional biopsy (see section 12.2.2 above)

CLINICAL FEATURES	INVESTIGATIONS
Ovarian Cancer • No specific signs and symptoms, usually over 70% present as late stage • Abdominal discomfort e.g., pressure, poor appetite, nausea, vomiting, weight loss • Urinary frequency • Pelvic pressure • Mass/masses in abdomen; if mass >15 cm in 40-69 years, suspect ovarian cancer • Abdominal distension • Irregular vaginal bleeding • Low back pain, fatigue • Dyspareunia	➢ Pelvic ultrasound ➢ Liver ultrasound ➢ Ascitic tap for cytology, chemistry and microscopy to rule out Tuberculosis ➢ CXR
Melanoma Suspect where naevus shows: • A: Asymmetry • B: Border irregularity • C: Colour variegation • D: Diameter >6 mm • Ulceration • Regional lymph nodes	➢ Wide excision punch biopsy ➢ CXR ➢ Abdominal U/S

CLINICAL FEATURES	INVESTIGATIONS
Cervical Cancer ***Early stage:*** • Vaginal discharge, sometimes foul smelling • Irregular vaginal bleeding • Post-coital bleeding in women of any age • Post-menopausal bleeding (especially if not responding to appropriate treatment) ***Late stage:*** • Urinary frequency and urgency • Backache, lower abdominal pain ***Very late stage:*** • Severe back pain • Weight loss • Oliguria (due to ureteric obstruction or renal failure) • Urinary/ faecal incontinence • Oedema of lower limbs • Dyspnoea (due to anaemia, metastasis or pleural effusion)	➢ Biopsy ➢ Abdominal ultrasound/CT

CLINICAL FEATURES	INVESTIGATIONS
Non-Hodgkin's Lymphoma (NHL) • Progressive lymph node enlargement • Unexplained weight loss • Drenching night sweats • Persistent fever • Pallor (anaemia) • Lymphadenopathy (generalised) • Splenomegaly • Hepatomegaly	➢ Lymph node excision biopsy ➢ Fine needle aspirations (FNA) ➢ Full blood count ➢ Bone marrow aspirate ➢ LFTs, RFTs ➢ LDH ➢ Viral serology for HIV
Squamous cell cancer of skin • Non–healing ulcers • Bleeding • Pain • Lymph nodes	➢ Wide excision incisional biopsy ➢ X–Rays of bones ➢ CXR
Kaposi's Sarcoma (KS) • **Indolent KS:** nodular skin lesions, fungating nodules, bone involvement • **Lymphadenopathic KS:** lymph nodes, visceral involvement, GIT symptoms • **AIDS related KS:** skin nodules, mucous membranes, mouth palate and ENT lesions, lymphadenopathy, paraplegias, any organ can be impacted	➢ Biopsies ➢ Full blood count ➢ HIV screening ➢ CXR: pleural effusions ➢ Abdominal X–Ray

CLINICAL FEATURES	INVESTIGATIONS
Head and Neck cancers • Painless mass • Local ulceration with or without pain • Referred pain to teeth or ear • Dysphagia, loosening of teeth • Alteration of speech: difficulty pronouncing words, change in character, persistent hoarseness • Unilateral tonsillar enlargement in an adult • Persistent unilateral "sinusitis", nosebleed or obstruction • Unilateral hearing loss • Cranial nerve palsies	➢ Chest X-Rays and other relevant X-Rays ➢ CT scan ➢ Biopsy
Prostate Cancer • Urge to urinate often, especially at night • Difficulty in starting or stopping urine flow, inability to urinate • Weak, decreased or interrupted urine stream, a sense of incomplete emptying of bladder • Burning or pain during urination • Blood in the urine or semen • Painful ejaculation	➢ Digital Rectal Exam (DRE) ➢ Serum PSA ➢ Ultrasound guided biopsy

CLINICAL FEATURES	INVESTIGATIONS
Chronic Leukaemia • Classified into two: CLL and CML • Recurrent infections • Bleeding or easy bruisability • Unexplained weight loss • Drenching night sweats • Persistent fever • Waxing and waning lymph node enlargement (CLL) • Swelling and discomfort in the left flank due to massive splenomegaly (CML) ***The following clinical signs require full physical examination:*** • Pallor (anaemia) • Splenomegaly • Hepatomegaly • Bruising (purpura) • Lymphadenopathy	➢ FBC ➢ Peripheral blood film ➢ Bone Marrow Aspirate ➢ Biopsy ➢ CLL: blood film >500 monoclonal lymphocytes ➢ CML: leukocytosis, basophilia with immature granulocytes ➢ CXR ➢ LDH ➢ Viral serology for HIV, Hepatitis B&C ➢ Abdominal US scan ➢ CT scan ➢ Echo/ECG

13. Palliative Care

ICD10 CODE: Z51.5

Palliative care aims to improve the quality of life of patients (and their families) who are faced with life-threatening illness, through the prevention and relief of suffering. This is achieved through early identification, ongoing assessment, treatment of pain and other physical, psychosocial and spiritual problems.

13.1 PAIN

"Pain is what the patient says hurts"

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

The nature, location and cause of pain will differ in each case. Pain requires a holistic approach as it can be affected by spiritual, psychological, social, and cultural factors, which may need to be addressed after physical pain is controlled.

Causes of pain

Pain can be divided into two types of causative categories:

- **Acute Pain:** Caused by a specific action with a definite time period, e.g., postoperative, acute infection, or trauma
- **Chronic pain:** Ongoing pain with an indefinite time period, for example
  - Constant and usually increasing: cancer
  - Recurrent sickle-cell crisis, arthritis, HIV/AIDS
  - Drug side-effect or toxicity (e.g., peripheral neuropathy due to isoniazid, chemotherapy)

Risk factors and mitigators

These factors increase pain perception:

- Anxiety and depression, social abandonment
- Insomnia
- Lack of understanding of the problem

These factors decrease pain perception:

- Relaxation, sleep
- Relief of other symptoms
- Explanation/understanding, venting feelings

13.1.1 Clinical Features and Investigations

Types of Pain

There are 2 types of pain that health workers need to be aware of:

TYPE OF PAIN	FEATURES
Nociceptive Pain The pain pathways are intact. This kind of pain responds to the analgesic ladder	• **Somatic Pain** (from bones and muscles): described as aching/ throbbing • **Visceral Pain:** described as colicky pain (for hollow viscera), pressure, cramping and ache for solid viscera
Neuropathic Pain There is damage to nerves or the pathways. The pain responds only partially to the analgesic ladder and needs adjuvants of **amitriptyline** or **phenytoin**	• Described as burning, prickling, stinging, pins and needles, insects crawling under skin, numbness, hypersensitivity, shooting, or electric shock

Clinical Investigation

It is important for health workers to conduct a thorough investigation of a patient indicating they are in pain. The following points can be used to guide the investigation:

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

13.1.2 Nociceptive Pain Management

There are two goals of pain management:

- Diagnose and treat the disease causing the pain
- Achieve total pain relief with minimal side-effects and enable the patient to live as normal a life as possible

Pain can be treated through use of medicines and/or non-drug treatment

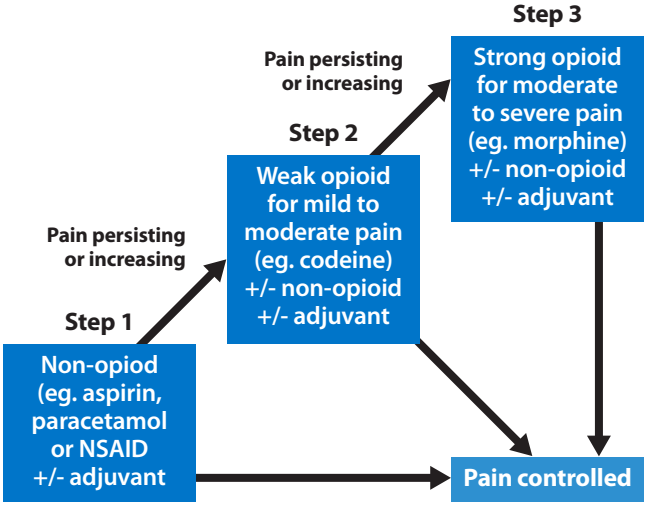
Non pharmacological treatment of pain

TREATMENT	LOC
▶ Lifestyle adjustment ▶ Patient counselling ▶ Massage with aromatherapy oils: may be useful for neuropathic pain and muscular pain ▶ Reflexology	HC2

▶ Application of heat or cold packs ▶ Relaxation ▶ Distraction (e.g., listening to radio or partaking in a non-invasive hobby) ▶ Non-pharmacological treatment of underlying cause (e.g., surgery or radiotherapy of cancer) ▶ Social and spiritual support	

Medicines-Based Treatment

The WHO Analgesic Ladder and the following tables describe the use of medicines to relieve pain based on the type and degree of pain.



13.1.2.1 Pain Management In Adults

ANALGESICS	COMMENTS
STEP 1: MILD PAIN (NON-OPIOID ± ADJUVANTS)	
▶ **Paracetamol** 1 g every 6 hours (500 mg in elderly) And/or ▶ **Ibuprofen** 400 mg every 6- 8 hours (max 2,400 mg/daily) or ▶ **Diclofenac** 50 mg every 8 hours	◆ Continue with step 1 analgesics when moving to step 2 and 3 ◆ Prolonged use of high doses of paracetamol may cause liver toxicity ◆ Do not use NSAIDS in renal impairment ◆ Caution when using NSAIDS for more than 10 days
STEP 2: MODERATE PAIN (WEAK OPIOID ± NON-OPIOID ± ADJUVANT)	
▶ **Morphine** 2.5-5 mg every 4 hours during day, double dose at night Or ▶ **Codeine** 30-60 mg every 6 hours (max 240 mg) Or ▶ **Tramadol** 50-100 mg every 6 hours (max 400 mg)	◆ Low dose morphine is considered step 2 analgesic and recomended first line if available ◆ Discontinue step 2 analgesics when starting step 3 ▶ Give **Bisacodyl** 10-15 mg nocte to prevent constipation except if diarrhoea is present – Add **liquid paraffin** 10 ml once a day if Bisacodyl is not enough

ANALGESICS	COMMENTS
STEP 3: SEVERE PAIN (STRONG OPIOID ± NON-OPIOID ± ADJUVANT	
▶ **Morphine** 7.5-10 mg every 4 hours during day and double dose at night – If breakthrough pain, give equivalent additional dose – Increase dose by 30-50% as required to control patient's pain – Give additional dose 30 minutes before an activity causing pain (e.g. wound dressing)	◆ Elderly and renal impairment may require dose adjustment ◆ Give **Bisacodyl** 10-15 mg nocte to prevent constipation except if diarrhoea is present – Add **liquid paraffin** 10 mL once a day if Bisacodyl not enough ▶ If **modified release tablets** are available, use the same 24-hour dose but given in 1 or 2 doses daily
Adjuvants ▶ **Amitriptyline** 12.5–25 mg nocte for neuropathic pain (max 50-75 mg if tolerated) ▶ **Clonazepam** 0.5-1 mg nocte for neuropathic pain (second line) ▶ **Dexamethasone** 4-8 mg once a day for swelling or oedema ▶ **Hyoscine** 20 mg every 6 hours for smooth muscle spasm ▶ **Diazepam** 5-20 mg nocte for painful skeletal muscle spasms	
Caution △ Do not use pethidine for chronic pain; accumulates with severe side-effects on the gut. Only use as one off-dose for acute severe pain if morphine not available △ Side effects of NSAIDS: gastritis, renal toxicity, bleeding, bronchospasm	

ANALGESICS	COMMENTS
△ Avoid amitriptyline in heart disease △ Side effects of opioids: see sections below	

13.1.2.3 Pain Management In Children

ANALGESICS	COMMENTS
STEP 1: MILD PAIN (NON-OPIOID ± ADJUVANTS)	
▶ **Paracetamol** 10-15 mg/kg every 6 hours And/or ▶ **Ibuprofen** 5-10 mg/kg every 6-8 hours (use only in children >3 months)	◆ Continue with step 1 analgesics when moving to step 2 ◆ Prolonged use of high doses of paracetamol may cause liver toxicity
STEP 2: MODERATE AND SEVERE PAIN (OPIOID ± NON-OPIOID ± ADJUVANT)	
▶ **Morphine** every 4 hours *1-6 months:* 0.01 mg/kg *6-12 months:* 0.2 mg/kg *1-2 years:* 0.2-0.4 mg/kg *2-12 years:* 0.2-0.5 mg/kg (max 10 mg) – Increase the dose slowly, until pain is controlled – Increase dose by max 50% every 24 hours	◆ Codeine and tramadol are not used in children ◆ Give **Bisacodyl** (suppository only) 5 mg nocte to prevent constipation except if diarrhoea is present

ANALGESICS	COMMENTS
Adjuvants	
▶ **Amitriptyline** nocte for neuropathic pain *Child 2-12 years:* 0.2-0.5 mg/kg (max 1 mg/kg or 25 mg) ▶ Or **Carbamazepine** 5-20 mg/kg in 2-3 divided doses, increase gradually to avoid side effects (second line) ▶ **Prednisolone** 1-2 mg/kg per day ▶ **Hyoscine** *1 month-2 years:* 0.5 mg/kg every 8 hours *2-5 years:* 5 mg every 8 hours *6-12 years:* 10 mg every 8 hours ▶ **Diazepam** for associated anxiety *Child 1-6 years:* 1 mg/day in 2-3 divided doses *Child 6-14 years:* 2-10 mg/day in 2-3 divided doses	

General principles in use of opioids

- Health professionals specially trained in palliative care should supervise management of chronic pain in advanced or incurable conditions (e.g., cancer, AIDS)
- Morphine is usually the drug of choice for severe pain. Liquid morphine is available, easy to dose, and is well absorbed from the oral mucosae and can be dripped in the mouth of adults and children
- In continuous pain, analgesics should be given:
  - By the clock (i.e. according to a regular dose schedule)
  - By the patient (i.e. self-administered)
  - By the mouth (i.e. as oral dose forms)
- Pain is better controlled using regular oral doses which control pain. If pain is not controlled, increase the 24-hour dose by 30-50%
  - Repeated injections are not indicated
- Consider extra doses when painful procedure is planned and for breakthrough pain. If using breakthrough doses regularly, then increase the regular dose!

- Side effects are minor and well-manageable if careful dosing and titration are done

Cautions on use of opioids

Opioids need to be effectively managed and administered, considering the associated cautions and side effects below.

△ Do not use opioids in severe respiratory depression and head injury

△ Use with care in the following conditions

– Advanced liver disease (but can be used in hepatocellular carcinoma when titrated as above)
– Acute asthma
– Acute abdominal pain (can use while awaiting diagnostic tests; never leave the patient in pain)
– Hypothyroidism
– Renal failure (reduce starting dose and/or reduce dose frequency)
– Elderly or severely wasted patient (reduce starting dose and/or reduce dose frequency)

△ Use with extreme care (i.e., start with small doses and use small incremental increases) in:

– Recurrent or concurrent intake of alcohol or other CNS depressants

Management of Side Effects of Opioids

SIDE EFFECT	MANAGE AS:
Respiratory depression – Rarely occurs if small oral doses are used and gradually titrated to response – Can occur when morphine used parenterally	▶ Reverse respiratory depression using **naloxone** 0.4-2 mg slow IV every 2-3 minutes according to response *Child*: 0.01 mg/kg slow IV; repeat 0.1 mg/kg if no response

Constipation	▶ Give **Bisacodyl** 10-15 mg nocte to prevent constipation except if diarrhoea is present *Child:* 5 mg rectally ▶ Add **liquid paraffin** 10 ml once a day if bisacodyl is not enough
Nausea or Vomiting	▶ Usually occurs in first 5 days and is self-limiting ▶ Vomiting later on may be due to another cause ▶ Give anti-emetic (e.g. **metoclopramide** 10 mg every 8 hours for 3–5 days) *Child 9-18 yrs:* 5 mg 8 hourly *Child 5-9 yrs:* 2.5 mg 8 hourly *Child 3-9 yrs:* 2-2.5 mg 8 hourly *Child 1-3 yrs:* 1 mg 8 hourly *Child <1 yr:* 100 micrograms per kg every 12 hours
Confusion or Drowsiness	▶ If excessive continuous drowsiness, titrate the opioid dose down slowly

Referral criteria

- If pain does not respond to above measures, refer to palliative care specialist
- Refer for radiotherapy at national referral hospital for severe bone pain not responding to above medications
- Refer for surgery if the cause of pain is amenable to surgery

13.1.3 Neuropathic Pain

Neuropathic pain occurs as a result of damage to nerve tissue. There are two clinical kinds of neuropathic pain, both elements may be combined:

- **Stabbing-type:** pain in a nerve distribution with minimal pain in between (e.g. trigeminal neuralgia) but can occur with any nerve. Responds to **Phenytoin**
- **Paraesthesia dysaesthesiae, or burning-type pain:** (e.g. post-herpetic neuralgia). Responds well to small doses of **Amitriptyline**

Management

TREATMENT	LOC
Trigeminal neuralgia or stabbing-type pain *Acute phase* ▶ **Carbamazepine** initially 100 mg every 12 hours – Increase gradually by 200 mg every 2-3 days according to response, max 1200 mg – Causes white cell depression	**HC3**
Burning type pain (post-herpetic neuralgia, diabetic neuropathy) ▶ **Amitriptyline** 12.5-25 mg at night or every 12 hours depending on response, max 50-75 mg	**HC3**

13.1.4 Back or Bone Pain

Includes pain in the lumbar region of the spine or bone pain anywhere within the body.

Causes

Potential causes of back or bone pain:

- Disc degeneration (often has a neuropathic element because of pressure on sciatic or other nerve)
- Osteoporosis (if collapse of vertebrae or fracture)

- Infection (e.g. TB, brucellosis, PID, retroperitoneal)
- Metastatic cancers, renal disease
- Strain
- Congenital abnormalities
- Spondylolisthesis

Clinical Features

Each situation will differ depending on the cause of the pain

- If an infection is present: throbbing and constant pain
- If sciatica, sciatic nerve roots will be involved

Investigations

➢ Try to establish the cause and type of pain
➢ X-ray: Spine and pelvis

Management of Back or Bone Pain

TREATMENT	LOC
Analgesics ▶ Analgesics (see section 13.1.2 above) – Give a Step 1 drug for 7 days or as long as required according to patient – **NSAIDs** are the Step 1 drug of choice in bone pain – May have to add a Step 2 or 3 drug, especially in metastatic disease ***For acute back pain:*** ▶ Rest the back on a firm but not hard surface ***For neuropathic element:*** ▶ Manage as for neuropathic pain above	**HC4**

13.2 OTHER CONDITIONS IN PALLIATIVE CARE

In palliative care, other conditions that are commonly encountered are summarised in the table below.

13.2.1 Breathlessness

ICD10 CODE: R06

Due to palliative care conditions or anxiety

Management

TREATMENT	LOC
Non-drug treatment	**HC2**
▶ Reassure patient; explore patient's fears and anxieties; anxiety worsens condition	
▶ Breathing exercises and relaxation techniques; teach patient how to slow down breathing by pursing their lips and breathe with diaphragm rather than chest	
▶ Pulmonary rehabilitation	
▶ Position patient in most comfortable position in bed	
▶ Ensure good ventilation (e.g. open windows, use fans, loosen tight clothing)	
▶ Conserve energy (e.g. encourage exertion to breathlessness)	
▶ Refer if symptoms persist, in airway obstruction, or need for pleurodesis	
Medicines	
▶ Oral **morphine** 2.5-5 mg every 4 hours	**HC3**
▶ **Oxygen** if patient is hypoxic	**HC4**
▶ Diazepam if patient is anxious	
– **Diazepam** 2.5-5 mg orally; once a day if breathlessness is associated with panic attacks	

13.2.2 Nausea and Vomiting

ICD10 CODE: R11

Can be due to disease or medicines

Management

TREATMENT	LOC
▶ Treat the cause ▶ Vomiting typically relieves nausea	
If due to gastric stasis or delayed bowel transit time ▶ Give **metoclopramide** 10–20 mg every 8 hours (30 minutes before meals; same dose SC or IV)	**HC4**
If due to metabolic disturbance (liver/renal failure, medicines e.g., chemotherapy) ▶ Give **haloperidol** 1.25 -2.5 mg nocte (PO or SC)	**HC4**
If due to raised intracranial pressure ▶ **Dexamethasone** 8-16 mg od	**H**
If due to visceral stretch or compression ▶ **Promethazine** 25 mg every 8 hours or ▶ **Hyoscine butylblomide** 20-40 mg 8 hourly	**HC3** **HC4**

13.2.3 Pressure Ulcer (Decubitus Ulcers)

ICD10 CODE: L89

Ulcer of the skin and/or subcutaneous tissue caused by ischaemia secondary to extrinsic pressure or shear

Management

TREATMENT	LOC
Non-drug treatment ▶ Debridement of necrotic tissue ▶ Clean with normal saline ▶ If able, encourage patients to raise themselves off the seat and shift their weight every 15-20 minutes or to take short walks	**HC3**

▶ Repositioning of those who cannot move themselves frequently, determined by need and skin status ▶ Inspect skin every time the patient's position is changed ▶ Maintain optimal hydration and hygiene of skin ▶ Avoid trauma, by not dragging patient ▶ Good nutrition for those with good prognosis to maintain normal serum albumin ▶ Educate patient caretakers on risk factors for developing pressure ulcers, how to inspect and care for skin, and inform health care professional ▶ May need skin grafting and flaps; refer to hospital	
Medicines ▶ **Give antibiotics** if there is evidence of surrounding cellulitis (see section 22.1.3) ▶ Control pain ▶ Control odour with topical **metronidazole** powder or gel until there is no foul smell ▶ If patient has sepsis, give parenteral antibiotics (see section 2.1.7 for treatment of sepsis)	

13.2.4 Fungating Wounds

Management

TREATMENT	LOC
▶ Treat underlying cause ▶ Clean the wound regularly every day with 0.9% **saline** (or dissolve 1 teaspoon of salt per pint of cooled boiled water) ▶ Apply clean dressings daily ▶ Protect the normal skin around the wound with barrier creams (petroleum jelly) ▶ Give analgesia for pain	**HC2**

▶ If malodour/exudate: apply **metronidazole** powder daily directly to the wound when changing dressing ▶ If cellulitis, give appropriate antibiotic	

13.2.5 Anorexia and Cachexia

ICD10 CODE: R63.0 AND R64

Anorexia is loss of desire to eat. Cachexia is a complex metabolic syndrome, characterized by profound loss of lean body mass, in terminal illnesses.

Causes

- Nausea and vomiting, constipation, gastrointestinal obstruction
- Sore mouth, mouth tumours, malodour
- Hypercalcaemia, hyponatraemia, uraemia, liver failure
- Medications
- Depression

Management

TREATMENT	LOC
▶ Treat underlying causes if possible. ▶ In cancer patients, give **corticosteroids** for one week only, under supervision of specialist – **Prednisolone** 15-40 mg once a day for 7 days – Or **dexamethasone** 2-6 mg in the morning for 7 days ***Non-medicine treatment*** ▶ Small amounts of food frequently ▶ Give energy-dense food, and limit fat intake ▶ Avoid extremes in taste and smell ▶ Pleasant environment, nice presentation of food	**HC4**

▶ Eating is a social habit and people eat better with others ▶ Nutritional counselling ▶ If prognosis <2 months, counsel patient and family to understand and adjust to reduced appetite as a normal disease process	

Caution

△ In established cancer and cachexia, aggressive parenteral and enteral nutritional supplementation is of minimal value

13.2.6 Hiccup

ICD10 CODE: R06.6

Repeated involuntary spasmodic diaphragmatic and inspiratory intercostal muscle contractions. Hiccups up to 48 hours are acute, those lasting more than 48 hours are persistent and more than 2 months are intractable.

Causes

- Gastric distension, GERD, gastritis, diaphragmatic irritation by supraphrenic metastasis, phrenic nerve irritation
- Metabolic: uraemia, hypokalaemia, hypocalcaemia, hyperglycaemia, hypocapnia
- Infection: oesophageal candidiasis
- Brain tumour, stroke, stress

Management

TREATMENT	LOC
▶ Most hiccups are short-lived and self-limiting ▶ Treat underlying cause	**HC2**

Non-medicine treatment ▶ Direct stimulation of the pharynx by swallowing dry bread or other dry food ▶ Stimulation of vagus nerve by ingesting crushed ice or valsalva manouvre ▶ Rapidly ingest 2 heaped teaspoons of sugar ▶ Indirect stimulation of the pharynx – C3-5 dermatome stimulation by tapping or rubbing the back of the neck ▶ Refer if hiccups persist or are intractable	
Medicines For persistent or intractable hiccups use:	
▶ **Metoclopramide** 10 mg 8 hourly (if the cause is gastric distension)	**HC4**
▶ Or **Haloperidol** 2–5 mg once a day	
▶ Or **chlorpromazine** 25 mg 6 hourly	**HC3**

13.2.7 Dry or Painful Mouth

ICD10 CODE: R68.2

Dry mouth, painful mouth and mouth ulcers are caused by infections, drugs, chemotherapy, trauma, dryness, radiotherapy, HIV and opportunistic infections.

TREATMENT	LOC
Non-medicine treatment ▶ Mouth wash with salted water (hourly), frequent sipping to keep mouth moist ▶ Brush teeth and tongue at least 3 times a day ▶ Suck fresh cold pineapple cubes once or twice daily ▶ Avoid sugary foods and drinks, eat soft food ▶ Apply vaseline to cracked lips ▶ Review medications (dry mouth can be a side effect, e.g. of amitriptyline)	**HC2**

Treat appropriate infection: ▶ Candidiasis with **fluconazole** 200 mg od for 7 days ▶ Herpes simplex with oral **acyclovir** 200 mg, 5 times a day for 5–10 days depending on severity ▶ Anaerobic gingivitis, halitosis, with **metronidazole** mouthwash (mix 50 mL of IV metronidazole with 450 mL of water, plus 50 mL of juice)	**HC3**
Severe mucositis or aphtous ulcers ▶ Consider steroids **dexamethasone** 8 mg once daily for 5 days ▶ Analgesic gel (Bonjela, Oracure) on ulcers	**HC4**
Painful mouth ▶ Oral liquid **morphine** as above (before swallowing, hold liquid morphine in the mouth for at least 30 seconds)	**HC3**

13.2.8 Other Symptoms

TREATMENT	LOC
Anxiety and muscle spasm ▶ **Diazepam** 5-10 mg once a day, titrated to three times a day	**HC2**
Excessive bronchial secretions ▶ **Hyoscine** 20 mg once a day titrated to 3 times a day according to response	**HC4**
Intractable cough ▶ **Morphine** as above (see section 13.1.2)	**HC3**

13.2.9 End of Life Care

Care in the last days of life.

Clinical Features

Clinical signs at of end of life include (should be considered in those with terminal conditions who have been gradually deteriorating):

- Patient becomes bedbound and is increasingly drowsy or in a semi-conscious state
- Minimal oral intake; patient not managing oral medication and only able to take sips of fluid
- The patient's condition is deteriorating rapidly (e.g. day by day or hour by hour)
- Breathing becomes irregular +/- noisy (death rattle)
- Changes in skin colour and/ or temperature
- Limited attention span

Investigations

- Exclude reversible problems (e.g. drug toxicity, infections, dehydration, biochemical abnormalities)
- Before ordering a test, always ask *"will this test change my management plan or the outcome for the patient?"*
- It is important to weigh the benefit versus the burden in assessing an intervention, and/or management plan based on the clinical features exhibited by the patient

Management

TREATMENT	LOC
General principles of medicine treatment ▶ Focus on giving medication that will improve the patient's quality of life ▶ Treat symptoms of discomfort as in sections above	**HC2**

▶ If the patient is unable to swallow choose an appropriate route to give necessary medications (e.g. via NG tube, parenteral or rectally) ▶ Subcutaneous (SC) is recommended when the enteral route is not possible. It is preferred over IV and IM access due to its reduced trauma and pharmacokinetics ▶ If repeated injections are anticipated or experienced, a butterfly needle can be inserted and used as a route for regular SC injections ▶ Consider prescribing medications pre-emptively (anticipatory) to combat developing symptoms ▶ Morphine concentrations can vary depending on the preparation used; remember that SC morphine has twice the potency of oral morphine	
Hydration and nutrition ▶ Patients should eat and drink as they wish, and take sips of water as long as they are able ▶ Families should be educated that it is normal for patients to lose their appetite, have a sense of thirst and stop feeding towards the end of life. They should not feed patients if they are no longer able to swallow as this may cause choking and distress ▶ IV fluids at this stage will not prolong life or prevent thirst. Over-hydration is discouraged as it may contribute to distressing respiratory secretions or generalised oedema; good regular mouthcare is the best way to keep the patient comfortable ▶ IV dextrose for calorie supplementation is unlikely to be of benefit	

▶ If there is a reduced level of consciousness, patients should not be fed due to the risk of aspiration. ▶ Artificial nutrition is generally discouraged at the end of life	
Supportive care ▶ Keep the patient clean and dry ▶ Regularly clean the mouth with a moist cloth wrapped round a spoon ▶ Prevent and manage pressure sores appropriately ▶ Manage any associated pain ▶ The end of life is an emotional time for all involved and requires health care professionals to be considerate and compassionate. Take time to listen to the concerns of the patient and their family; break bad news sensitively ▶ Encourage the family to be present, holding a hand or talking to the patient even if there is no visible response; the patient may be able to hear even if they cannot respond ▶ Consider spiritual support ▶ Consider the best place of death for the patient and their family; would discharging them to go home be best?	

14. Gynecological Conditions

14.1.1 Dysmenorrhoea

ICD10 CODE: N94.6

Abdominal pain that occurs just before or during menstruation. Symptoms begin about 12 hours before onset of menses and last for 1–3 days.

Primary dysmenorrhoea occurs more commonly among adolescents and young women. Symptoms usually begin 6–12 months after menarche and occur mainly with ovulatory cycles. Generally, severity of symptoms decreases with age, sexual activity and child birth.

Secondary dysmenorrhoea is usually due to a gynaecological condition such as infection or fibroids, and usually occurs in older women above 30 years.

Causes of primary dysmenorrheaoa

- Not known

Causes of secondary dysmenorrhoea

- Pelvic inflammatory disease
- Endometriosis
- Uterine fibroids

Clinical features

- Lower abdominal cramping
- Backache, headache
- Nausea, vomiting, diarrhoea, fainting, fever, fatigue, dizziness

Differential diagnosis

- Endometriosis
- Other causes of lower abdominal pain

Management

TREATMENT	LOC
Non-pharmacological	**HC2**
▶ Encourage the patient to rest or sleep	
▶ Encourage the patient to do some exercises	
▶ Advise the patient to apply a warm compress to the abdomen	
▶ Encourage the patient to wear loose fitting clothes	
▶ Advise the patient to have a diet low in fats and supplements such magnesium, vitamin B1, vitamin E and zinc	
Pharmacological	
▶ Give NSAIDs e.g. **ibuprofen** 200–400 mg every 8 hours as required	**HC2**
▶ Other medications include **paracetamol** 1 g every 6 hours (in case of mild pain); or **diclofenac** 50 mg every 8 hours for severe forms	**HC4**
▶ Review the patient after 5 days and if no response or if recurrent, refer for specialist management	
▶ In secondary dysmenorrhoea, treat cause e.g. PID with antibiotics	

14.1.2 Pelvic Inflammatory Disease (PID)

ICD10 CODE: N70-N73

Infection (usually ascending from the vagina) occurring in the uterus, ovary, or uterine tubes and leading to salpingitis, endometritis, pelvic peritonitis or formation of tubal ovarian abscess.

Risk factors

- Previous pelvic inflammatory disease infections
- Presence of bacterial vaginosis
- Multiple or new sexual partners

- History of STIs in the patient or her partner
- History of abortion
- Young age of less than 25 years
- Postpartum endometritis

Causes

- Often due to multiple pathogens: *Neisseria gonorrhoea, Chlamydia trachomatis, Mycoplasma, Gardnerella,* Bacteroids, Gram-negative bacilli, e.g. *Escherichia coli*

Clinical features

- Pain in lower abdomen (usually <2 weeks) PLUS
- Dysuria, fever
- Vaginal discharge: could be smelly and mixed with pus
- Painful sexual intercourse (dysperunia)
- Cervical motion tenderness: vaginal examination will produce tenderness when the cervix is moved
- Abnormal uterine bleeding

If severe

- Swellings may be felt if there is pus in the tubes or pelvic abscess
- Signs of peritonitis (rebound tenderness)

Complications of PID

- Infertility
- Ectopic pregnancy
- Chronic pelvic pain

DO NOT TREAT CHRONIC PELVIC PAIN WITH ANTIBIOTICS

Differential diagnosis

- Ectopic pregnancy, threated abortion
- Ovulation pain
- Acute appendicitis
- Complicated or twisted ovarian cyst
- Cancer of the cervix

Investigations

- Speculum examination
- Pregnancy test
- Pus swab: For C&S
- Ultrasound (if available) for detection of tubo ovarian masses , free fluid, peritonitis

Management

TREATMENT	LOC
Treatment is based on a combination of medicines that cover the multiple microorganisms involved. ***Outpatient treatment*** ▶ **Ceftriaxone** 250 mg IM (or **cefixime** 400 mg stat if ceftriaxone is not available) ▶ Plus **doxycycline** 100 mg orally every 12 hours for 14 days ▶ Plus **metronidazole** 400 mg twice daily orally for 14 days ▶ Treat sexual partners as for urethral discharge syndrome to avoid re-infection ▶ In pregnancy, use **erythromycin** 500 mg every 6 hours for 14 days instead of doxycycline	**HC3**
If severe or not improving after 7 days Refer for ultrasound scan and parenteral treatment ▶ **Ceftriaxone** 1 g IV daily plus **metronidazole** 500 mg IV every 8 hours until clinical improvement, then continue oral regimen as above	**HC4**

Notes

- All women with PID should be tested for HIV
- Abstain from sex or use barrier methods during the course of treatment
- Do not take alcohol when taking metronidazole

- Avoid sex during menstrual period and for 6 weeks after an abortion
- In IUD users with PID, the IUD need not be removed. However, if there is no clinical improvement within 48–72 hours of initiating treatment, providers should consider removing the IUD and help patient choose an alternative contraceptive method (see chapter **15**)

14.1.3 Abnormal Uterine Bleeding

ICD10 CODE: N39.9

Any vaginal bleeding which represents a variation from the normal pattern of regular menstruation.

Causes

- Hormonal abnormalities (ovulatory dysfunction)
- Abortion, ectopic pregnancy
- Uterine diseases (fibroids, polyps etc)
- Cancers (cervical, uterine, rarely vaginal)
- Infections (STIs)
- Others (coagulation disorders etc.)
- Iatrogenic (IUD, hormonal contraceptives)

Clinical features

- Abnormal menstrual pattern
- Continuous or subcontinuous bleeding
- It can be acute and heavy or light and subcontinuous

Investigations

- Pregnancy test to exclude abortion and pregnancy
- Haemoglobin level
- Vaginal examination (for cervical and vaginal abnormalities e.g. cervical cancer)
- Abdominal ultrasound

Management

Management is based on the possible cause.

CAUSE/ISSUE	TREATMENT	LOC
General measures	**Ferrous sulphate** or **Fefol 1** tablet once or twice a day	**HC2**
Positive pregnancy test	See section on abortion and ectopic pregnancy (chapter **16**)	**HC4**
Bleeding in postmenopausal woman	Refer for specialist assessment (possible endometrial pathology)	**RR**
Lesion (ulcer, growth) in vagina/on cervix	Refer for specialist assessment	**RR**
Suspect fibroid (bulky hard uterus)	Use analgesics, iron supplement, refer for ultrasound scan	**H**
Other signs of infection	Treat as PID and review	**HC3**
Women on family planning	See sections on FP methods and side effects (chapter **15**)	**HC2**

14.1.4 Menopause

ICD10 CODE: Z78.0

Menopause is the cessation of menstruation in a female and usually spontaneously occurs at the age of 45-55 years. Peri-menopause is the time around menopause and can last a few years until the menopause has set in.

Menopause can also be caused by surgical removal of ovaries.

Clinical features

- "Hot flushes" (sudden unanticipated, unpleasant wave of body heat; can range from mild to intense)
- Night sweats, palpitations, headaches, insomnia, tiredness
- Irregular menstruation till cessation
- Vaginal atrophy and dryness, loss of libido, painful intercourse
- Bladder irritability, incontinence, UTIs
- Weight gain (sometimes)
- Skin changes: dryness, thinning, loss of head hair, increase or loss of body hair)
- Mood swings, emotional changes (e.g. depression, irritability, short temperedness, weepiness)
- Lack of concentration, failing memory
- Osteoporosis, denture problem

Investigations

- Exclude pregnancy

Management

TREATMENT	LOC
Non-pharmacological	**HC2**
▶ Explain process of menopause to the patient and reassure her it is normal	
▶ Suggest lifestyle adjustment	
– Follow a healthy diet	
– Sleep and exercise enough	
– Wear loose light clothing	
– Avoid alcohol	
– Diet low in fats, high in fruit and vegetables	
– Food rich supplements such as magnesium, vitamin B1, vitamin E and zinc	
▶ **Calcium-rich** food (or supplements) such as milk and soya beans and vitamin D supplements	

▶ Screen for CVD (hypertension, heart disease) and urine incontinence ▶ For severe symptoms (severe hot flushes, depression) consider – **Fluoxetine** 20 mg daily ▶ NB: URGENTLY REFER ANY MENOPAUSAL WOMAN WITH VAGINAL BLEEDING FOR FURTHER ASSESSMENT	**HC4** **RR**

15. Family Planning (FP)

For further detailed information on Family Planning (FP) and Maternal Health, please refer to "Procedure Manual for Family Planning and Maternal Health Service Delivery MOH, 2016".

Family planning is a basic human right for an individual and couples to exercise control over their fertility, make informed decision on the number of children they want to have, plan pregnancies, and the space between pregnancies.

FP has health benefits for the mother and the children and economic benefits for the family and the country at large.

15.1 KEY STEPS TO BE FOLLOWED IN PROVISION OF FP SERVICES

ICD10 CODE: Z10.0

1. Provide information about FP including preconception care to different groups
2. Counsel clients at high risk of unwanted pregnancies to accept/use FP services
3. Counsel clients to make informed choice of FP methods, including dual methods
4. Obtain and record client history
5. Perform a physical assessment
6. Perform a pelvic examination
7. Screen for cervical cancer and HIV
8. Manage client according to chosen FP method

15.1.1 Provide Information about FP including Pre-Conception Care to Different Groups

The procedures used here are also used in the next step to recruit clients for FP and maternal health services in young child, antenatal, labour and delivery wards, outpatients, outreach, and postpartum clinics and in providing education on specific chosen FP methods.

The objective is to:

- Create awareness
- Disseminate correct information to influence people to change beliefs, attitudes and practices
- Recruit new clients and offer several FP methods

15.1.2 Counsel High-Risk Clients

Risk factors to look out for in clients include:

- Recent delivery/abortion
- >4 pregnancies
- >35 years old or <20 years old
- Complicating medical conditions (e.g. diabetes, heart disease)
- People living with HIV/AIDS
- Having children with birth interval <2 years
- Poor obstetric history, which is likely to recur in future pregnancies (e.g. postpartum haemorrhage, pre-eclampsia)

Identify eligible women (non-pregnant) while conducting clinics such as:

- Young child clinics and paediatric wards
- Maternity and postnatal clinics and wards
- Outpatient clinics
- Youths and Adolescent centers

- HIV/AIDS care centers/ ART clinics
- Sexual Reproductive Health clinics (e.g. Cervical cancer , Post abortion care, Adolescent/Youth clinics)
- Male clinics
- Gender based violence clinics/ corners

You can also identify the eligible women while:

- Conducting outreaches (Immunisation or Home visits)

Discuss with clients about reproductive choices and risk factors. Give special consideration to first time parents and adolescents in provision of appropriate information on sexuality, family planning and family planning services: types, benefits, availability and procedures.

15.1.3 Pre-Conception Care with Clients Who Desire to Conceive

Pre-conception care discussion topics for clients who desire to conceive include:

- Pregnancy planning and appropriate contraception
- Folic acid supplementation
- Good diet, risk assessment and management of pre existing conditions and risk factors
- Benefits of preconception care (e.g., prevention of unintended pregnancies, good maternal and foetal outcomes)
- Screening for hereditary diseases e.g. sickle cell disease
- Screening for STI including HIV and hepatitis

15.1.4 Discuss with PLW HIV Special Consideration for HIV Transmission

Key areas for discussion include:

- Prevention of HIV transmission to spouse and child
- Safer sexual practices and safe conception
- Education/counseling about perinatal transmission risk
- Initiation or modification of ART considering toxicity
- Evaluation of opportunistic infections and offering immunisation
- Some ARV drugs may interact and reduce the effect of hormonal contraceptives. It is always advisabe to use additional barrier methods (condoms), which also prevent STIs.

15.1.5 Educate and Counsel Clients to Make Informed Choice of FP Method

The primary objectives are:

1. To dispel any rumours and misconceptions about FP
2. To help the client make a voluntary informed choice

Procedure

- Prepare the room/materials needed, ensuring privacy
- Assess client's knowledge and experience of FP methods
- Explain about different FP methods available
  - Type
  - Mechanism of action and method of use
  - Advantages and disadvantages
  - Indications
  - Contraindications
  - Side-effects
  - Complications/warning signs
  - Check understanding
  - Help client choose appropriate method using family

planning medical eligibility criteria wheel (see summary of wheel in section **15.1.10** below)
- Explain next steps needed

15.1.6 Obtain and Record Client History

The primary objectives are:
- To obtain client's personal and social data and information on health status
- To identify abnormalities/problems requiring treatment or referral

For FP clients, it is important to pay particular attention to information outlined in the table below:

HISTORY	INFORMATION NEEDED
Social History	• Smoking? How many cigarettes per day? • Drinking? How much alcohol per day?
Family Health History	• Diabetes mellitus, high blood pressure, asthma, heart disease
Personal Medical History	• Excessive weight gain/loss (+/- 5 kg/year) • Severe headaches (relieved by analgesics?) • Growth on neck (enlarged thyroid) • Current or past diseases: asthma, cardiac disease, high BP, diabetes mellitus, mental illness, epilepsy, thrombophlebitis, varicose veins, unilateral pain in thighs or calves, chronic anaemia (e.g. sickle-cell anaemia), liver disease/jaundice in the last 6 months or during pregnancy

HISTORY	INFORMATION NEEDED
	• TB (on treatment?) • Allergies • Any medicines being taken and reason
Surgical History	• Any previous or planned operations • Where and when operation was performed, or is to be performed
Reproductive History	• Total pregnancies • Number and sex of live children • Number of abortions/ miscarriages • Number of children who died • Age of youngest child • Type of delivery for her children • Any problems in previous pregnancy or deliveries • Number of children desired • When does she wish to have next child • Whether breastfeeding
Menstrual History	• Age at onset of menstruation • Length of cycles • Periods regular or not? • Number of days and amount of blood loss • Bleeding after intercourse • Date and length of last normal period

HISTORY	INFORMATION NEEDED
Gynaecological History	• Vulval sores or warts • PID and STI? If yes, which one, was it treated and when? • Lower abdominal pain • Offensive vaginal odour/discharge • Pain during intercourse • Pain on urination • Bleeding between periods
Family Planning History	• How/where first learned about FP • Whether new to FP, or used FP before • If used before, which method used • Age when started using FP ***Last FP method used:*** • Duration of using each FP method used • Reasons for discontinuation of FP • Currently preferred method
Inform Client	• If chosen method seems suitable or contraindicated • Explain that physical assessment will confirm suitability of this method • Next steps needed

15.1.7 Perform a Physical Assessment

- Assess general health status
- Examine client from head to toe
  - Especially, look out for alopecia, acne, chloasma, hirsuitism, jaundice, anaemia, enlarged glands, goitre
  - Pay particular attention to breasts (e.g. lumps) and abdomen (enlarged organs, e.g., liver, uterus)

15.1.8 Perform a Pelvic Examination

The following areas need to be investigated:

- Inspect external genitalia
- Perform speculum examination
- Perform cancer cervix screening (VIA, VILI, Pap smear)
- Perform bimanual examination to determine size of uterus for comparison later
- Share findings with the client in simple language
- Explain next steps needed
- Advise on when to have next examination (e.g., routine, annual, follow-up, if problems)

15.1.9 Manage Client for Chosen FP Method

- Take and record client's BP and weight
- Take and record client's history
- Use the table at in the following section to quickly assess suitability of method considered
- Provide suitable method, and ensure client understands fully how the method works, and how any medicine for home use is to be taken
- Advise client on any potential problems with the chosen method and when to immediately return
- Discuss management of any serious side-effects and complications
- Arrange for client to return for routine follow-up, and for additional FP supplies

15.1.10 Summary of Medical Eligibilty for Contraceptives

The tables below contain a summarised version of the medical eligibility criteria for **initiating** a patient on contraceptive methods, based on the MOH (2016) and WHO (2015) Medical Eligibility Criteria for Contraceptive Use. It guides family planning providers in recommending safe and effective contraception methods for women with medical conditions or medially-relevant characteristics. For more detailed information, consult the above-named documents.

The tables below include recommendations on initiating use of common types of contraceptive methods:

1. Combined oral contraceptive pills (COC)
2. Progestogen only pills (POP)
3. Progestogen only injectable (POI) e.g. DMPA
4. Progestogen only implants (POIM)
5. Copper-bearing IUD (CuIUD)
6. LAM- Lactational amenorrhoea

Interpretation of eligibilty

Y- Use method

N- Do not use method

Drug Interactions

	CONTRACEPTIVES				
DRUG	COC	POP	POI	POIM	CUIUD
Abacavir	Y	Y	Y	Y	Y
Tenofovir	Y	Y	Y	Y	Y
Zidovudine	Y	Y	Y	Y	Y
Lamivudine	Y	Y	Y	Y	Y
Efavirenz	Y	Y	Y	Y	Y

DRUG	CONTRACEPTIVES				
	COC	POP	POI	POIM	CUIUD
Nevirapine	Y	Y	Y	Y	Y
Atazanavir/r	Y	Y	Y	Y	Y
Lopinavir/r	Y	Y	Y	Y	Y
Darunavir/r	Y	Y	Y	Y	Y
Raltegravir	Y	Y	Y	Y	Y
Dolutegravir	Y	Y	Y	Y	Y
Phenytoin	N	N	Y	Y	Y
Phenobarbital	N	N	Y	Y	Y
Carbamazepine	N	N	Y	Y	Y
Broad spectrum antibiotic	Y	Y	Y	Y	Y
Rifampicin	N	N	Y	Y	Y
Rifabutin	N	N	Y	Y	Y

Medical Conditions and Patient Characteristics

CONDITION	CONTRACEPTIVES				
	COC	POP	POI	POIM	CUIUD
REPRODUCTIVE TRACT INFECTIONS AND DISORDERS					
Unexplained vaginal bleeding	Y	Y	N	N	N
Severe dysmenorrhoea	Y	Y	Y	Y	Y
Trophoblastic disease	Y	Y	Y	Y	N
Uterine fibroids	Y	Y	Y	Y	Y
Cervical neoplasia	Y	Y	Y	Y	Y

CONDITION	CONTRACEPTIVES				
	COC	POP	POI	POIM	CUIUD
Cervical cancer	Y	Y	Y	Y	N
Current pelvic inflammatory disease	Y	Y	Y	Y	Y
Post abortion sepsis	Y	Y	Y	Y	N
Breast cancer	N	N	N	N	Y
LIVER DISEASES					
Acute hepatitis	N	Y	Y	Y	Y
Liver tumour	N	N	N	N	Y
VENOUS THROMBOEMBOLISM (VTE E.G DVT, PE)					
History of VTE	N	Y	Y	Y	Y
Acute VTE	N	N	N	N	Y
Major surgery with prolonged immobilisation	N	N	Y	Y	Y
CARDIOVASCULAR DISEASE					
Ischaemic heart disease	N	Y	N	Y	Y
Stroke	N	Y	N	Y	Y
Multiple risk factors e.g. dyslipidaemias	Y	Y	Y	Y	Y
HYPERTENSION, OBESITY AND DIABETES					
BP 140-159/90-99 or adequately controlled	N	Y	Y	Y	Y
BP ≥160/99 mmHg	N	Y	N	Y	Y
BMI ≥30 kg/m^2					

CONDITION	CONTRACEPTIVES				
	COC	POP	POI	POIM	CUIUD
Diabetes (current)	Y	Y	Y	Y	Y
Diabetes with neuro-, retinal or nephropathy	N	Y	N	Y	Y
Smoker Age ≥35	N	Y	Y	Y	Y
Smoker Age <35	Y	Y	Y	Y	Y
HEADACHE					
Non-migraine headache	Y	Y	Y	Y	Y
Migraine with aura (neurological symptom)	N	N	Y	Y	Y
HIV AND STIS					
HIV Clinical Stage 3 or 4	Y	Y	Y	Y	N
Gonorrhoea	Y	Y	Y	Y	Y
Chlamydia	Y	Y	Y	Y	Y
Other STIs and vaginalis	Y	Y	Y	Y	Y
Increased risk of STIs	Y	Y	Y	Y	Y
POSTPARTUM AND BREASTFEEDING					
<48 hours	N	Y	N	Y	Y
48 hours to <4 weeks	N	Y	N	Y	N
4 weeks to <6 weeks	N	Y	N	Y	Y

CONDITION	CONTRACEPTIVES				
	COC	POP	POI	POIM	CUIUD
6 weeks to <6 months (primary breastfeeding)	N	Y	Y	Y	Y
≥6 months	Y	Y	Y	Y	Y
Peurperal sepsis	Y	Y	Y	Y	N
AGE AND PREGNANCY HISTORY (PARITY)					
Adolescents (menarche to age < 18 years)	Y	Y	Y	Y	Y
Nulliparity	Y	Y	Y	Y	Y
Parous	Y	Y	Y	Y	Y
Pregnancy	NA	NA	NA	NA	NA

Notes on continuation

- If venous thromboembolism develops while on hormonal contraceptives, discontinue and choose another family planning method

Conditions where all methods can be used

CATEGORY	CONDITIONS
Reproductive	Benign breast disease or undiagnosed mass, benign ovarian tumours and cysts, dysmenorrhoea, endometriosis, history of gestational diabetes, history of high blood pressure during pregnancy, history of pelvic surgery including caeserean delivery, irregular, heavy prolonged menstrual bleeding (explained), past ectopic pregnancy, past pelvic inflammatory

	disease, post-abortion (no sepsis), postpartum ≥6 months
Medical	Depression, epilepsy, HIV asymptomatic (WHO clinical stage 1 or 2), iron-deficiency anaemia, sickle-cell disease, thalassaemia, malaria, mild cirrhosis, schistosomiasis, superficial venous disorders including varicose veins, thyroid disorders, tuberculosis (non-pelvic), uncomplicated heart disease, viral hepatitis (carrier or chronic), cholecystitis, gall stones
Others	Adolescents, breast cancer family history, venous thromboembolism (VTE) family history, high risk for HIV, surgery without prolonged immobilisation, taking antibiotics (except rifampicin or rifabutin)

Methods all couples (except a few) can safely use

Emergency contraceptive pill (for emergency use only)
Bilateral Tubal Ligation (BTL) and Vasectomy
Barrier methods (condoms, diaphragm)
Lactational amenorrhoea method (LAM)
Fertility awareness (FAM) and Standard days methods

15.2 OVERVIEW OF KEY CONTRACEPTIVE METHODS

The following sections contain an overview of mainstream contraceptive methods and how to manage side effects of each (in case they occur). Side effects are one of most common reasons why women stop using contraception, and the health worker should be able to counsel the patient and address her concerns appropriately.

15.2.1 Condom (Male) ICD10 CODE: Z30.018/Z30.49

For example *no-logo donation condoms, branded condoms.*

Indications

- Couples needing an immediately effective method
- Where this is preferred FP method by client
- Couples waiting to rule out suspected pregnancy
- Protection against exposure to STIs including HIV/AIDS
- Where back-up method is needed, e.g. when woman is starting or has forgotten to take oral contraceptives
- Couples where one or both partners have HIV/AIDS, even if using another FP method

Advantages

- Male plays role in FP
- Protects against unwanted pregnancy
- Also protects against STIs and HIV infection

Disadvantages

- Some men may have difficulty maintaining an erection with condom on
- May cause insensitivity of the penis
- Occasional hypersensitivity to latex or lubricants (may result in a severe allergic reaction)
- Requires correct use with every act of sex for greatest effectiveness

Management

INSTRUCTIONS	LOC
▶ Ensure client understands correct use, storage, and disposal of condom ▶ Supply at least 100 condoms to each client for three months, and if available, a water or silicone based lubricant	HC2

▶ Advise client to return for more before they are finished ▶ In case of hypersensitivity to latex or lubricants, avoid latex based condoms, and use the female condom or another FP method	

15.2.2 Condom (Female) ICD10 CODE: Z30.018/Z30.49

For example *Femidom, Care and FC2.*
A soft plastic pre-lubricated sheath with an inner and outer ring which is inserted into the vagina before sexual intercourse.

Indications

- As for condoms (male) above
- For women whose partners will not use male condom
- Where the man has allergy/sensitivity to latex condom

Advantages

- Woman-controlled (but requires partner's cooperation)
- Can be inserted hours before intercourse and so does not interrupt sexual spontaneity
- Not dependent on male erection and does not require immediate withdrawal after ejaculation
- Protects against STI and HIV infection
- No special storage required

Disadvantages and Side-Effects

- Requires special training and practice to use correctly
- Relatively new product with limited public awareness
- In some cases, hypersensitivity to polyurethane female condoms occurs
- Requires correct use with every act of sex for greatest effectiveness

Management

INSTRUCTIONS	LOC
▶ Ensure client understands correct use, storage, and disposal ▶ Supply at least 40 female condoms to each client per month ▶ Advise client to return for more before they are finished ▶ In case of hypersensitivity, avoid use and change to another FP method	HC2

15.2.3 Combined Oral Contraceptive Pill (COC)

ICD10 CODE: Z30.011/Z30.41

Contains an oestrogen plus a progestin, the types and quantities of which may vary in different preparations. Examples include *Pilplan, Microgynon*

Indications

- Women <35 years needing highly effective FP method
- Non-breastfeeding clients, or breastfeeding clients after 6 months postpartum
- Clients with dysmenorrhoea
- Clients with heavy periods or ovulation pain
- Clients concerned by irregular menstrual cycles

Contraindications

- Diastolic BP >100 mmHg
- Cardiac disease
- Thromboembolic disease (e.g. deep vein thrombosis)
- Active liver disease
- Within 2 weeks of childbirth
- When major surgery is planned within 4 weeks
- Unexplained abnormal vaginal bleeding
- Known/suspected cervical cancer

- Undiagnosed breast lumps or breast cancer
- Pregnancy (known or suspected)

Risk factors

If any 2 of the following, recommend progestogen-only or non-hormonal FP method

- Smoking (especially if >10 cigarettes/day)
- Age >35 years
- Diabetes

Advantages and other potential health benefits/uses

- Protects against:
  - Risk of unwanted pregnancy
  - Cancer of the ovary or lining of uterus
  - Symptomatic pelvic inflammatory disease
- Reduces:
  - Menstrual cramps and bleeding problems
  - Ovulation pain
  - Excess hair on body/face, acne
  - Symptoms of polycystic ovarian syndrome

Disadvantages and common side effects

- DOES NOT PROTECT AGAINST STIs
- Spotting, nausea, and vomiting within first few months
- Changes in bleeding patterns including: fewer days, irregular, lighter, infrequent, or no monthly bleeding
- May cause headaches, dizziness, weight gain
- Effectiveness dependent on regular daily dosage
- Mood changes
- Breast tenderness
- Suppresses lactation
- Medicine interactions reduce effectiveness including:
  - Medicines which increase hepatic enzyme activity, e.g., **rifampicin** (especially), **carbamazepine, griseofulvin, nevirapine, phenytoin, phenobarbital**

– Short courses of some broad spectrum antibiotics, e.g., **ampicillin, amoxicillin, doxycycline**

An additional FP method must be used during course of treatment with these medicines and for at least 7 days after completion.

Complications and warning signs

- Severe headaches, blurred vision
- Depression
- Acute severe abdominal pain
- Chest pain plus dyspnoea (pulmonary embolism)
- Swelling or pain in calf muscle (Deep vein thrombosis)

Management

INSTRUCTIONS	LOC
▶ Give 3 cycles of **COC** and explain carefully: – How to take the tablets – Strict compliance is essential – What to do if doses are missed or there are side-effects or warning signs ***If starting COC within 5 days of period*** ▶ Supply and show how to use back-up FP method ▶ Ask client to return when <7 tablets remain in last cycle	**HC2**

MANAGEMENT OF SIDE EFFECTS OF COCS
Nausea • Assess for pregnancy and malaria • Suggest taking COCs at bedtime or with food • Take pill at same time daily ***If symptoms continue:*** ▶ Consider locally available remedies (e.g. eating roasted grains, roasted cassava, boiled greens)

Breast Tenderness

- Assess for pregnancy
- Recommend that she wears a supportive bra
- Examine for cancer symptoms, such as breast infection, lumps, or nipple discharge

If breastfeeding, examine for breast infection

- If there is infection, use warm compresses. Refer for appropriate evaluation
- If the examination shows a suspicious lump or discharge, refer for appropriate evaluation
- Counsel her on non-hormonal FP methods
- Try hot or cold compresses
- ▶ Suggest **ibuprofen**, **paracetamol**, or other pain relievers

Mild Headaches

- Take proper history (explore when headaches occur, whether she can continue with her daily tasks, what medicines relieve her headaches)
- Take her blood pressure

If blood pressure is normal:

- ▶ Give pain relievers such as **ibuprofen** or **paracetamol**
- ▶ If headaches get worse or occur more often, refer for appropriate evaluation

Palpitations

- Rule out anaemia and check blood pressure and weight
- Reassure that this is common in COC users, and usually disappears in a few months
- Evaluate for other causes unrelated to the method, and refer if necessary

Chest Pain

- Evaluate for the cause and refer if necessary

15.2.4 Progestogen-Only Pill (POP)

ICD10 CODE: Z30.011/Z30.41

Pills that contain very low doses of a progestin like the natural hormone progesterone in a woman's body. Since these pills do not contain oestrogen, they are safe to use throughout breastfeeding, and by women who cannot use methods with oestrogen. Examples are *Microlut, Ovrette.*

Indications

- Breastfeeding clients after 6 weeks postpartum (non-breastfeeding clients can start POPs anytime after birth)
- Women who cannot take COC but prefer to use pills
- Women >40 years

Contraindications

- Breast or genital malignancy (known or suspected)
- Pregnancy (known or suspected)
- Breast cancer >5 years ago, and it has not recurred
- Severe liver disease, infection, or tumor
- Taking barbiturates, carbamazepine, oxcarbazepine, phenytoin, primidone, topiramate, rifampicin, rifabutin, or ritonavir or ritonavir-boosted protease inhibitors. Use a backup contraceptive method as these medications reduce the effectiveness of POPs
- Systemic lupus erythematosus with positive (or unknown) antiphospholipid antibodies
- Undiagnosed vaginal bleeding

Disadvantages and common side effects

- DOES NOT PROTECT AGAINST STIs
- Spotting, amenorrhoea
- Unpredictable irregular periods
- Not as effective as COC
- Medicine interactions: the effectiveness is reduced by medicines which increase hepatic enzyme activity

Management

INSTRUCTIONS	LOC
▶ Give 3 cycles of POP: Explain carefully how to take the tablets, and what to do if doses are missed, or if there are side-effects ▶ Supply and show how to use back-up FP method for first 14 days of first packet, e.g. condoms or abstinence from sex ▶ Ask client to return 11 weeks after starting POP ▶ Use the last pill packet to show when this will be	**HC2**

MANAGEMENT OF SIDE EFFECTS OF POPS
No Monthly Periods ***Assess for pregnancy*** • If not pregnant and/or breast-feeding, reassure that it is normal. Some women using POPs stop having monthly periods, but this is not harmful • If pregnant, reassure that the POPs will not affect her pregnancy, and refer her to ANC
Nausea/Dizziness • Nausea: suggest taking POPs at bedtime or with food • If symptoms continue, consider locally available remedies
Migraine/Headaches • Without Aura (e.g. hallucinations, hearing voices): able to continue using POPs voluntarily • With Aura: stop POPs and choose a method without hormones

Irregular Bleeding

- Assess for pregnancy/abortion
- Reassure that many women using POPs get irregular bleeding whether breast-feeding or not. It is not harmful and should lessen or stop after several months of use
- Counsel on how to reduce irregular bleeding, e.g. making up for missed pills after vomiting or diarrhoea

If bleeding continues:

- Give 400–800 mg **ibuprofen** every 8 hours after meals for 5 days when irregular bleeding starts
- Check for anaemia and treat accordingly

If irregular bleeding persists or starts after several months of normal or no monthly bleeding:

- Investigate other reasons (unrelated to POPs) and treat accordingly
- Change to another pill formulation for at least 3 months
- Or help client choose another method of family planning

Heavy or prolonged bleeding (twice as much as usual or longer than 8 days)

- Assess for pregnancy/abortion
- Reassure/comfort the patient

▶ Give 800 mg **ibuprofen** every 8 hours after meals for 5 days when irregular bleeding starts

▶ Or other non-steroidal anti-inflammatory drugs (NSAID)

▶ **Ferrous salt** tablets (60 mg iron) to prevent anaemia

▶ Educate on nutrition

If heavy bleeding persists:

- Investigate other reasons (unrelated to POPs) and treat accordingly
- Change to another pill formulation for at least 3 months
- Or help client choose another method of family planning

15.2.5 Injectable Progestogen-Only Contraceptive

ICD10 CODE: Z30.013/Z30.42

A slowly absorbed depot IM injection or subcutaneous injection, which provides contraceptive protection for 3 months (e.g. *Depo- Provera, Sayana Press*).

Indications

- Fertile women requiring long-term contraception
- Breastfeeding postpartum women
- Known/suspected HIV positive women who need an effective FP method
- Women with sickle-cell disease
- Women who cannot use COC due to oestrogen content
- Women who do not want more children but do not (yet) want voluntary surgical contraception
- Women awaiting surgical contraception

Contraindications

- As for POP above

Advantages and other health benefits/uses

- Do not require daily action (e.g. taking pills)
- Do not interfere with sex
- Private method: no one else can tell that a woman is using contraception
- Cause no monthly bleeding (for many women)
- May help women to gain weight
- Assists with spacing of births
- Injections can be stopped at anytime
- Protects against:
  - Risk of pregnancy (DMPA & NET-EN)
  - Cancer of the lining of the uterus (DMPA)
  - Uterine fibroids (DMPA)
  - Iron-deficiency anaemia (NET-EN)

Disadvantages and common side-effects

- DOES NOT PROTECT AGAINST STI
- Amenorrhoea
  - Often after 1st injection and after 9–12 months of use
- Can cause heavy prolonged vaginal bleeding during first 1-2 months after injection
- Weight gain
- Loss of libido
- Delayed return to fertility (Up to 10 months after stopping injection)

Complications and warning signs

- Headaches
- Heavy vaginal bleeding
- Severe abdominal pain
- Excessive weight gain

Management

INSTRUCTIONS	LOC
▶ **Medroxyprogesterone acetate depot (Depo Provera)** injection – Give 150 mg deep IM into deltoid or buttock muscle – Do **not** rub the area as this increases absorption and shortens depot effect ▶ **Medroxyprogesterone acetate depot (Sayana Press) injection** – Inject 104 mg in the fatty tissue (subcutaneous) at the front of the thigh, the back of the upper arm, or the abdomen – This can be administered at community level	**HC2**

If given after day 1–7 of menstrual cycle ▶ Advise client – To abstain from sex or use a back-up FP method, e.g., condoms, for the first 7 days after injection – To return for the next dose on a specific date 12 weeks after the injection (if client returns >2-4 weeks later than the date advised, rule out pregnancy before giving the next dose) – On likely side-effects – To return promptly if there are any warning signs	**HC2**

MANAGEMENT OF SIDE EFFECTS OF INJECTABLE POC

No Monthly Period

Assess for pregnancy:

- If pregnant, reassure that the injectable POC will not affect her pregnancy and refer to ANC
- If not pregnant, reassure her that this contraceptive may stop women having monthly periods, but it is not harmful. She can continue with the method or choose another

Irregular Bleeding

Assess for pregnancy/abortion:

- Reassure that many women using injectable POC have irregular bleeding. It is not harmful and should lessen or stop after a few months

If irregular bleeding continues, immediately:

▶ Give 400–800 mg ibuprofen every 8 hours when irregular bleeding starts

▶ Or 500 mg mefenamic acid every 12 hours after meals for 5 days

If irregular bleeding continues or starts after several months of normal or no monthly bleeding:

- Investigate other reasons (unrelated to the contraceptive) and treat accordingly
- Help client choose another FP method if necessary

Heavy Bleeding

If heavy bleeding is between 8–12 weeks of first injection:

- Assess for pregnancy/ abortion
- Reassure (as for irregular bleeding)
- Repeat **progestogen-only injection** and change return date to 3 months after the latest injection

Heavy bleeding after 2nd injection:

- Assess for pregnancy/abortion
- Reassure/comfort
- ▶ Give 1 **COC** pill daily for 21 days (1 cycle)

Heavy bleeding after 3rd or later injection:

- Assess for pregnancy/abortion
- Reassure/comfort
- ▶ Give 1 **COC** pill daily for 21 days (1 cycle) when irregular bleeding starts
- ▶ Or 50 µg **ethinyl estradiol** daily for 21 days
- ▶ And **ibuprofen** 800 mg every 8 hours
- ▶ Or 500 mg **mefenamic acid** every 12 hours after meals for 5 days
- ▶ **Ferrous salt** tablets (60 mg iron) to prevent anaemia

If bleeding persists:

- Investigate other reasons (unrelated to injectable **POC**) and treat accordingly
- Help client choose another FP method if necessary

Delayed Return to Fertility

- A woman should not be worried if she has not become pregnant even after stopping use for 12 months
- Reassure and counsel her about the fertile days; ovulation normally occurs 14 days before the next menstrual period (if woman's cycle is 28 days and has regular menstruation)

Weight Gain

- Rule out weight gain due to pregnancy
- Interview client on diet, exercises, and eating habits promoting weight gain; counsel as needed. Explain to client that all hormonal contraceptives may have a slight effect on weight
- If weight gain is more than 2 kg, instruct her on diet and exercises

Loss of Libido

- Take proper history
- Find out if she has stress, fatigue, anxiety, depression, and if she is on new medication. Explore if this is due to dry vagina and/or painful intercourse
- Explore lifestyle and suggest changes where needed. Advise on foreplay and if possible, involve spouse
- Help client choose another FP method if necessary

Headache

- Explore possible social, financial, health, or physical causes of headaches. Ask her to keep a record of the timing and number of headaches for the next 2 weeks and ask her to come for follow-up
- Evaluate cause of headache (Is blood pressure raised? Does she have sinus infection [purulent nasal discharge and tenderness in the area of sinuses]?)

- ▶ Give pain relievers such as **acetylsalicylic acid, ibuprofen,** or **paracetamol**
- Regardless of age, a woman who develops migraine headaches with aura or whose migraine headaches becomes worse while using monthly injections should stop using injectable. If migraine headaches are without aura, she can continue using the method if she wishes

15.2.6 Progestogen-Only Sub-Dermal Implant

ICD10 CODE: Z30.017/Z30.46

Flexible progestogen-releasing plastic rods surgically inserted under the skin of the woman's upper arm which provide contraceptive protection for 3–7 years depending on the type of implant (Implanon: 3 years; Jadelle: 5 years; Femplant: 4 years, Norplant: 5 years).

Indications

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

Contraindications

- As for Progesteron-Only Pills

Advantages and Health Benefits

- Highly effective (only 1-3% failure rate)
- No delay in return to fertility after removal
- Long-acting
- Low user-responsibility (no need for daily action)
- Protects against symptomatic pelvic inflammatory disease

Disadvantages and Common Side Effects

- DOES NOT PROTECT AGAINST STI
- Irregular bleeding, spotting, or heavy bleeding in first few months; amenorrhoea

- Possibility of local infection at insertion site
- Must be surgically inserted and removed by specially trained service provider
- May not be as effective in women >70kg
- Warning signs (require urgent return to clinic)
  - Heavy vaginal bleeding
  - Severe chest pain
  - Pus, bleeding, or pain at insertion site on arm

Management

INSTRUCTIONS	LOC
▶ Insert the implant subdermally under the skin of the upper arm following recommended procedures ▶ Carefully explain warning signs and need to return if they occur ▶ Advise client to return – After 2 weeks: To examine implant site – After 3 months: For first routine follow-up – Annually until implant removed: routine follow-up	**HC3**

MANAGEMENT OF SIDE EFFECTS OF IMPLANTS

No Monthly Periods

Assess for pregnancy:

- If pregnant, reassure that the implant will not affect her pregnancy and refer her to ANC
- If not pregnant, reassure that implants may stop women from having monthly periods, but this is not harmful. She can continue with the method

If irregular bleeding continues:

▶ Give 400–800 mg **ibuprofen** every 8 hours when irregular bleeding starts

- Or 500 mg **mefenamic acid** every 12 hours after meals for 5 days
- Check for anaemia and treat accordingly

If bleeding persists:

- Give 1 **COC** pill daily for 21 days (1 cycle)
- Or 50 μg **ethinyl estradiol** daily for 21 days
- Investigate other reasons (unrelated to implants) and treat accordingly
- Help client choose another method of family planning

Heavy or prolonged bleeding (twice as much as usual or longer than 8 days)

- Assess for pregnancy/abortion
- Reassure
- Give **ibuprofen** 800 mg every 8 hours when irregular bleeding starts
- Or 500 mg **mefenamic acid** every 12 hours after meals for 5 days
- Give 1 **COC** pill daily for 21 days (1 cycle)
- Give **ferrous salt** tablets (60 mg iron) to prevent anaemia
- Educate on nutrition

If bleeding persists:

- Investigate other reasons (unrelated to implants) and treat accordingly
- Help client choose another method of family planning

Weight Gain

- Manage the same as for Injectable POC

Loss of Libido

- Manage the same as for Injectable POC

Infection at the Insertion Site

- Do not remove the implant
- Clean the infected area with soap and water or antiseptic
- ▶ Give **oral antibiotics** for 7–10 days
- Ask the client to return after taking all antibiotics if the infection does not clear. If infection has not cleared, remove the implant or refer for removal
- Expulsion or partial expulsion often follows infection. Ask the client to return if she notices an implant coming out

Migraine Headaches

- If she has migraine headaches without aura, she can continue to use implant if she wishes
- If she has migraine aura, remove the implant. Help her choose a method without hormones

15.2.7 Emergency Contraception (Pill and IUD)

ICD10 CODE: Z30.012

Emergency Contraception can be used to prevent unwanted pregnancy after unprotected sex or contraceptive method failure. Methods available include Emergency Contraceptive Pills and IUDs. Emergency contraceptive methods do not cause abortion.

Regular Emergency Contraceptive Pill users should be counselled to use routine contraceptive method.

TYPE	FEATURES
Emergency Contraceptive Pill (ECP)	• The ECP contains a special dose of progestin (**Levonorgestrel** or LNG): may come as one pill (1.5 mg) or two pills (0.75 mg). Examples are: *Ulipristal Acetate (UPA), Postinor, NorLevo*

TYPE	FEATURES
	• The dose (1.5 mg) should be taken as soon as possible within 72 hours, but can be taken up to five days after unprotected sex, or in case of contraceptive method failure, e.g., condom burst, failure to take regular FP methods, or in cases of rape • ECPs are NOT regular contraceptive pills and should not be used as a family planning method
Emergency Contraceptive IUD	• This IUD should be inserted as soon as possible after penetrative sexual intercourse but within 5 days • It is important to monitor side-effects that may occur, as outlined below

Indications

- All women and adolescents at risk of becoming pregnant after unprotected sex

Advantages

- Prevents unplanned pregnancy after penetrative sexual intercourse
- Safe for all women and have no long-term side effects
- Do not cause infertility
- Able to have on hand in case of emergency
- Controlled by the woman

Disadvantages and side effects

- DOES NOT PROTECT AGAINST STI
- Potential misuse as a regular contraceptive method
- Minor, short-term side effects: nausea and vomiting, altered menstrual bleeding, headaches, abdominal pain breast tenderness, dizziness and fatigue

Management

INSTRUCTIONS	LOC
▶ Should be taken as soon as possible after unprotected sex where pregnancy is not desired ▶ Can prevent pregnancy if taken anytime within 5 days after unprotected sex (decreasing efficacy over this 5 day window) ▶ Safe and suitable for all women at risk of an unplanned pregnancy ▶ Women on ARVs have to take double dose (levonorgestrel 3 mg = e.g. Postinor 4 tablets)	**HC2**
Note ◆ Warn women against regular/frequent use of emergency contraceptive. Advise them to consider using other long-term methods	

15.2.8 Intrauterine Device (IUD) ICD10 CODE: Z30.014

Easily reversible long-term FP method effective for up to 10 years, which can be inserted as soon as 6 weeks postpartum:
- Non hormonal e.g. Copper T380A
- Hormonal: *Mirena* (progesterone loaded)

Indications
- Women desiring long-term contraception
- Breastfeeding mothers
- When hormonal FP methods are contraindicated

Contraindications
- Pregnancy (known or suspected)
- PID or history of this in last 3 months
- Undiagnosed abnormal uterine bleeding
- Women at risk of STIs (including HIV), e.g. women with or whose partners have multiple sexual partners

- Reduced immunity, e.g., diabetes mellitus, terminal AIDS
- Known or suspected cancer of pelvic organs
- Severe anaemia or heavy menstrual bleeding

Disadvantages and common side effects

- DOES NOT PROTECT AGAINST STIs
- 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
- Increased cramping pains during menstruation

Complications and warning signs

- Lower abdominal pain and PID
- Foul-smelling vaginal discharge
- Missed period
- Displaced IUD/missing strings
- Prolonged vaginal bleeding

Management

INSTRUCTIONS	LOC
▶ Insert the **IUD** closely following recommended procedures; explain each step to the client ▶ Carefully explain possible side-effects and what to do if they should arise ▶ Advise client – To abstain from sex for 7 days after insertion – To avoid vaginal douching – Not to have more than 1 sexual partner – To check each sanitary pad before disposal to ensure the IUD has not been expelled, in which case to use an alternative FP method and return to the clinic – How to check that the IUD is still in place after each menstruation	**HC3**

- To report to the clinic promptly if: Late period or pregnancy, abdominal pain during intercourse
- Exposure to STI, feeling unwell with chills/fever, shorter/longer/missing strings, feeling hard part of IUD in vagina or at cervix
- To use condoms if any risk of STIs including HIV

▶ Recommendation for a follow-up visit after 3-6 weeks to check-in on client

MANAGEMENT OF SIDE EFFECTS OF IUD

No Monthly Period

Assess for pregnancy:

- If pregnant, reassure that IUD will not affect her pregnancy and refer her to ANC
- If not pregnant, investigate other reasons for amenorrhea

Irregular Bleeding

Assess for pregnancy/abortion:

- Reassure that many women using IUD get irregular bleeding. It is not harmful and should lessen or stop after several months of use

If bleeding continues:

▶ Give 400-800 mg **ibuprofen** every 8 hours after meals for 5 days when irregular bleeding starts

▶ Check for anaemia and treat accordingly

If irregular bleeding persists:

▶ Investigate other reasons (unrelated to **IUD**) and treat accordingly

▶ Help client choose another FP method if necessary

Heavy Bleeding

Assess for pregnancy/abortion:

- Give **ibuprofen** 400-800 mg every 8 hours after meals for 5 days
- Or **tranexamic acid** 1500 mg every 8 hours for 3 days, then 1000 mg once daily for 2 days
- Give **ferrous salt** tablets (60 mg iron) to prevent anaemia
- Educate on nutrition

If bleeding persists:

- Investigate other reasons (unrelated to **IUD**) and treat accordingly
- Help client choose another FP method if necessary

15.2.9 Natural FP: Cervical Mucus Method (CMM) and Moon Beads

ICD10 CODE: Z30.02

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

- **Abstaining from sexual intercourse:** Avoiding vaginal sex completely (also called periodic abstinence)
- **Using barriers methods**, e.g., condoms, cervical caps

Guidance on correct use of the method is only available at centres with specially trained service providers.

Management

INSTRUCTIONS	LOC
▶ Ensure client understands how the method works ▶ Explain how to distinguish the different types of mucus	**HC2**

▶ Show client how to complete the CMM chart, can be used together with the **moon beads** ▶ Carry out a practice/trial period of at least 3 cycles ▶ Confirm that the chart is correctly filled ▶ Advise client to – Always use condoms as well as CMM if there is any risk of exposure to STIs/HIV – Return on a specific follow-up date after one menstrual cycle	

15.2.10 Natural FP: Lactational Amenorrhoea Method (LAM)

ICD10 CODE: Z30.02

LAM relies on the suppression of ovulation through exclusive breastfeeding as a means of contraception. Guidance on correct use of the method is only available at centres with trained service providers. LAM requires 3 conditions which must ALL be met:

- The mother's monthly bleeding has not returned
- The baby is fully or nearly fully breastfed; and is fed often, day and night
- The baby is less than 6 months old

Disadvantages

- DOES NOT PROTECT AGAINST STI
- Low couple years of protection

Management

INTRUCTIONS	LOC
▶ Ensure client understands how the method works ▶ Explain to client that: – She must breastfeed her child on demand on both breasts at least 10-12 times during day and	

night (including at least once nightly in the first months) ▶ Ensure client understands how the method works ▶ Explain to client that: – She must breastfeed her child on demand on both breasts at least 10-12 times during day and night (including at least once nightly in the first months) – Daytime feedings should be no >4 hours apart, and night-time feedings no >6 hours apart – She must not give the child any solid foods or other liquids apart from breast milk ▶ Advise the client that LAM will no longer be an effective FP method IF: – The baby does not feed regularly on demand – Menstruation resumes; she will then need to use another FP method ▶ Advise the client – To use condoms as well as LAM if there is any risk of exposure to STIs/HIV – To return after 3 months for a routine follow-up or earlier if she has any problem – If she wants to change to another FP method	**HC2**

15.2.11 Voluntary Surgical Contraception (VSC) for Men: Vasectomy

ICD10 CODE: Z30.2

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

Indications

- Fully aware, counselled clients who have voluntarily signed the consent form
- Males of couples
  - Who have definitely reached their desired family size and want no more children
  - Where the woman cannot risk another pregnancy due to age or health problems

Management

INSTRUCTIONS	LOC
▶ Ensure client understands how the method works and that it is permanent, not reversible, and highly effective ▶ Explain to client that: – Vasectomy is not castration and sexual ability/ activity is not affected – The procedure is not immediately effective and that the client will need to use a condom for at least 15 ejaculations after the operation (or 3 months) ▶ After the operation, advise client: – On wound care – To return for routine follow-up after 7 days or earlier if there is fever, excessive swelling, pus, or tenderness at the site of operation – To continue using condoms or other contraceptive devices for 3-months following the procedure – To use condoms if there is any risk of HIV/STIs	**HC4**

15.2.12 Voluntary Surgical Contraception (VSC) for Women: Tubal Ligation

ICD10 CODE: Z30.2

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

Indications

- As for vasectomy (above) but for females

Management

INSTRUCTIONS	LOC
▶ Ensure client understands how the method works and that it is permanent, irreversible, and highly and immediately effective ▶ Explain to client that: – There may be some discomfort/pain over the small wound for a few days ▶ Advise client: – On wound care – To use condoms if there is any risk of exposure to STIs/HIV – To return after 7 days for routine follow-up or earlier if there is fever, excessive swelling, pus, or tenderness at the site of operation	**HC4**

16. Obstetric Conditions

16.1 ANTENATAL CARE (ANC) ICD10 CODE: Z36

Antenatal care is a planned programme of medical care offered to pregnant women by a skilled birth attendant, from the time of conception to delivery, aimed at ensuring a safe and satisfying pregnancy and birth outcome.

The main objective of antenatal care is to give information on:

- Screening, prevention, and treatment of complications
- Emergency preparedness
- Birth planning
- Satisfying any unmet nutritional, social, emotional, and physical needs of the pregnant woman
- Provision of patient education, including successful care and nutrition of the newborn
- Identification of high-risk pregnancy
- Encouragement of male partner involvement in antenatal care

16.1.1 Goal-Oriented Antenatal Care Protocol

- Goals for ANC vary depending on the timing of the visit/ duration of pregnancy
- In normal (uncomplicated) pregnancies, aim for at least 4 routine visits as follows:

ANTENATAL VISIT	WEEK OF PREGNANCY
1st	≤20
2nd	20–28
3rd	28–36
4th	>36

- If a woman comes for first ANC later than the 1st trimester, combine and attend to the preceding goals
- At all visits: Address identified problems, check blood pressure, and measure the symphysio-fundal height (SFH) and foetal heart activity
- Encourage the woman to bring her partner or a family member to at least one visit
- Check for HIV sero-status; test if not tested or repeat test if the last test was over 3 months ago
- Encourage couple testing and disclosure with good counselling
- For all HIV sero-positive pregnant women, ensure that the mother is counselled and started on ART for life (Option B+)

16.1.2 First Antenatal Visit (between 10–20 weeks)

Goal

- Risk assessment
- Health education
- Plan for delivery

History taking

- Record name, age, marital status, occupation, education, ethnic origin, residence
- Enquire if patient has any problems, and obtain details

Social history

- Smoking, alcohol, drug use habits

Medical history

- Personal and Family history of HIV, diabetes, hypertension, TB, hereditary diseases, multiple pregnancy
- Surgical history
- Current illnesses and medication

Obstetric and gynaecological history

- Record for each previous pregnancy: Date, place, maturity, labour, delivery, weight, sex and fate of the infant, and any puerperal morbidity

Current pregnancy

- Record history of current pregnancy: date of (first day of) last menstrual period (LMP), date of conception
- Confirm period of gestation/present maturity (=number of weeks from LMP)
- Calculate estimated delivery date (EDD)
- Any problems encountered, for example, bleeding
- Contraceptive use
- Check for sexually transmitted infections

Physical exam

General physical examination

– BP, weight, breasts

Obstetric examination

- Symphysio-fundal height (SFH), lie, presentation, foetal heart sounds, presence of multiple gestation
- *Vaginal (vulval) examination* (only carry out if indicated; use a speculum) as follows:

– In early pregnancy: To confirm and date the pregnancy and detect any anatomical abnormalities
– In late pregnancy: To assess pelvic adequacy
– In labour: To confirm diagnosis and monitor
– Other times: To evaluate symptoms/ complaints

- *Abdominal examination*: To look for Caesarian scar, rule out multiple pregnancy

Investigations

Blood

➢ ABO and rhesus grouping, RPR (syphilis), Hb, HIV (partner testing), HBsAg

– If RPR positive, see section **3.2.7**

- If HBsAg positive, see section **6.5.2.2**
- If HIV positive, see section **16.2.2**
- If Rhesus negative, refer for delivery to regional hospital for anti-D immunoglobulin administration

Urine

➢ For albumin, glucose

Other tests

➢ As appropriate for the individual patient to assess maternal well-being, e.g., ultrasound, amniotic fluid, foetal heart/movements, blood slide/RDT for malaria parasites, sickling test in case of anaemia

◆ **Note: Calculate EDD**

- Add 7 days to the LMP and 9 months to the month of LMP, e.g. LMP =1/1/2012, EDD =8/10/2012
- Where the months total is >12, subtract 12 from this, e.g. LMP =5/5/2012, add 9 months =5+9 =14, subtract 12 months =14-12 =2, therefore EDD =12/2/2013
- OR subtract 3 from the month if the addition would be greater than 12, e.g. LMP =5/5/2012, subtract 3 from the month and add 1 year to the current year =5-3 =12/2/2013

Routine medications in pregnancy

Record all medications given on the ANC card.

MEDICINE	INDICATION AND DOSES	LOC
Folic acid 5 mg	▶ All pregnant women should take folic acid throughout the first trimester (ideally from before conception)	**HC2**

Tetanus toxoid	▶ Check on **tetanus toxoid (TT)** immunization status and vaccinate if required – see immunization (see section 18.2.3)	**HC2**
Mebendazole	***During the second trimester,*** ▶ De-worm with **mebendazole** 500 mg single dose	
Ferrous 200 mg + folic acid + 400 microgram	***Throughout pregnancy*** ▶ **Ferrous** (200mg) + **folic acid** (400 microgram) once daily to prevent iron and folate deficiency	**HC2**
Sulphadoxine/ Pyrimethamine (SP)	***Intermittent preventive treatment of malaria (IPTp):*** ▶ SP single dose (3 tabs) every month from 13 weeks to end of the pregnancy – **IPTp** can be given all the way up to term (with an interval of one month between doses). There are no restrictions after 36 WOA – Since most HIV positive pregnant women will be on Cotrimoxazole, there is NO NEED for IPTp	**HC2**
Caution △ Do not give SP if patient is allergic to sulphonamide		

Use of drugs in pregnancy

- Because any medication can cause a risk in pregnancy, and because not all risks are known, in general, it is safer to try and avoid drug use during pregnancy, delivery, and breastfeeding

- Always carefully weigh the desired benefits of any drug, against possible harm to the mother and baby especially for patients with underlying medical conditions that require medication throughout pregnancy
- Sometimes, it maybe necessary to adjust the dose and type of medications to maximise effectiveness, while minimising foetal risks. This should be accompanied by adequate counselling on medication usage
- Give information on the risks of taking medication without medical advice

Health promotion

- Address any problems
- Involve husband in ANC (partner HIV Testing)
- Draw up delivery plan
- Discuss future family planning (FP)
- Discuss symptoms of miscarriage, pregnancy-induced hypertension (PIH)
- Educate and counsel on PMTCT of HIV and malaria prevention, and use of Long-Lasting Insecticide-treated Nets (LLINs)
- Educate on danger signs
- Proper nutrition:
  - Eat more and greater variety of foods, have an extra meal each day
  - Advise against any taboos regarding nutritionally important foods
- Encourage adequate hygiene
- Start breastfeeding and breast care counselling
- Discuss sexual activity during pregnancy, protection for HIV
- Avoidance of smoking and alcohol

16.1.3 Second Antenatal Visit (between weeks 20–28)

Goals

Address problems

- Take action if abnormal laboratory results
- Ensure Tetanus Toxoid (TT) vaccination
- Exclude multiple pregnancy
- Assess for signs of pregnancy-induced hypertension (PIH)
- Check foetal growth
- Exclude anaemia. If anaemic, see section **16.2.1**
- Assess the degree of the patient's risk (normal or high)

History taking

- Interval history of symptoms and/or problems, e.g., vaginal bleeding (antepartum haemorrhage [APH]), drainage of liquor
- Date of first foetal movements

Examination

- As for 1st antenatal visit, plus
- Weight: Amount and pattern of weight change

Laboratory investigations

➢ Same as for 1st antenatal visit

Health promotion

- Same as for 1st antenatal visit, PLUS
- Advise/discuss with patients how to recognize and promptly report any problems so that prompt treatment may be given, e.g., vaginal bleeding (APH), draining of liquor, blurred vision, and labour pains
- Discuss lab results and the need to treat the partner as necessary
- Discuss voluntary counselling and testing (VCT) in relation to HIV, IPT, and ITN as found relevant

16.1.4 Third Antenatal Visit (between weeks 28–36)

Goals

- Check foetal growth
- Exclude anaemia
- Assess for signs of pregnancy-induced hypertension
- Review delivery plan
- History taking, laboratory investigations
- Same as for 2nd antenatal visit

Examination

- Same as for 2nd antenatal visit, **PLUS**
- Pallor: check palms and conjunctiva (for anaemia)

Health promotion

- As for 2nd antenatal visit, **PLUS**
- Discuss labour/early rupture of membranes (PROM)
- Review delivery plan

16.1.5 Fourth Antenatal Visit (after week 36)

Goals

- As for 3rd antenatal visit, **PLUS**
- Exclude abnormal presentation/lie

History taking, examination, lab investigations and health promotion

- As for 3rd antenatal visit, **PLUS**
- Lab test: Serology for syphilis

16.1.6 Management of Common Complaints during Pregnancy

COMPLAINT	ACTION	REMARKS
Low back ache, and frequency of passing urine	• Exclude urinary tract infection and local lesion. If none, reassure	Avoid unnecessary medication
Morning sickness (nausea & vomiting)	• Reassure; usually lasts only up to 3 months • Give general advice (frequent small dry meals, avoid spicy and fatty food, take ginger and lemon) • If severe with dehydration, admit for observation and rehydration (using IV RL or NS) • **Vitamin B6 (Pyridoxine)** 25 mg 2-3 times daily	Avoid anti-emetics in the first trimester. Anti-emetics may be necessary ONLY in severe forms (see section 16.3.1)
Swelling of the feet	• Check for anaemia, blood pressure, urine protein, and manage appropriately	Advise mother to elevate feet if findings are normal
Indigestion (flatulence & constipation)	• High roughage diet, increase fluids. • If severe, treat as constipation	Avoid strong laxatives & enemas

Excessive salivation (ptyalism)	• Reassure • Advise mother to use ginger	Avoid anticholinergic drugs
Food craving (pica)	• Ensure balanced diet	Discourage harmful materials, e.g. soil Soil craving is a sign of iron deficiency anaemia, give **ferrous + folic acid**
Generalised pruritus	• Reassure. • If severe, treat as skin allergy/ urticaria	Avoid steroids
Vulval pruritus with whitish non-foul smelling discharge Burning sensation on passing urine	• Treat as for abnormal vaginal discharge (most likely candida) • Use **Clotrimazole cream** or **pessaries** • In severe cases, use **fluconazole** 150 mg stat. • Avoid repeat doses or prolonged use	Avoid douching with antiseptics
Cramps	• Give **calcium lactate** 600 mg 8 hourly for 5 days	Avoid giving NSAIDS
Fatigue	• Reassure, bed rest	Avoid drugs

16.1.7 High Risk Pregnancy (HRP) ICD10 CODE: O09

This is a pregnancy with a higher than average risk of an adverse outcome for the mother or baby, e.g., abortion, intrauterine death, still birth, prematurity, other morbidity or mortality.

High risk criteria: if a woman has history of or current

- Extremes of reproductive age: <18 and >35 years
- Primigravida: Especially if too young (<18 years), short (<150cm), or old (>35 years)
- High parity: 5+ or short birth-to-pregnancy interval below 2 years
- Maternal Obesity (BMI >30)
- History of:
  - Large infants: 4 kg and over
  - Prematurity and Low birth weight (LBW) <2.5kg
  - Obstructed and difficult labours
  - Instrumental delivery
- Poor obstetric history, e.g., stillbirths, neonatal deaths, abortions, caesarean section
- History of reproductive tract surgery, e.g., VVF repair, repaired (ruptured uterus), surgery on the cervix, myomectomy
- Genetic or familial diseases, such as sickle cell disease
- Medical conditions: Diabetes, HIV, cardiac, renal, hypertension, rhesus, those with disabilities
- Obstetrical conditions, e.g. multiple pregnancy, malpresentations, APH, PPH, DVT, IUGR, PROM, post dates, CPD

Management

TREATMENT	LOC
Principles of management	**HC3**
▶ Early identification of high risk pregnant women and referral as appropriate	
▶ Preconception care and folic acid supplementation	
▶ Prophylaxis and antenatal counselling will prevent some HRPs	
▶ Early start of antenatal care	
▶ Close medical supervision during pregnancy	
▶ Special investigations to evaluate foetal development and maternal well-being	
▶ Birth preparedness plan	
▶ Timely intervention for therapy and delivery	**HC4**
▶ Skilled birth attendance	
▶ Early referral to higher level as appropriate	

Note: Skilled attendance at birth remains the most important component of comprehensive emergency obstetric and new-born care.

16.2 MANAGEMENT OF SELECTED CONDITIONS IN PREGNANCY

16.2.1 Anaemia in Pregnancy ICD10 CODE: 099.019

Anaemia is the most frequent and major complication of pregnancy. It may be defined as haemoglobin level below the normal (11.5 g/dL for pregnant women).

Causes

- Nutritional causes; iron deficiency, folic acid deficiency
- Infections and infestations; hookworm infestation, malaria, UTI, HIV/AIDS
- Haemorrhagic causes: bleeding in pregnancy, trauma
- Any other causes

Clinical features

Mother may give history of

- Gradual onset of exhaustion or weakness
- Swelling of the legs
- Dyspnoea, dizziness, and palpitations

On examination

- Pallor of the conjunctiva, tongue, palm, vagina, etc., of varying degree, depending on the severity of anaemia
- Glossitis and stomatitis
- Oedema of the legs
- In very severe cases: evidence of heart failure such as engorged neck veins, dyspnoea, hepatomegally, ascites, gallop rhythm, and oedema

Complications

- Untreated anaemia may increase the risk of premature labour, poor intrauterine foetal growth, weak uterine contractions, foetal hypoxia, postpartum haemorrhage, poor lactation, post-partum sepsis

Investigations

➢ Blood
– Hb (<11.5 g/dL is considered abnormal)
– Peripheral smear to determine the type of anaemia and presence of malaria parasites
– Sickling test to exclude sickle-cell disease
➢ Stool: ova and cysts of hookworm infestation

Management

TREATMENT	LOC
Prophylaxis ▶ All pregnant women should receive **ferrous** and **folic acid** daily from 12 weeks. Continue supplementation until 3 months after delivery.	**HC2**
If severe anaemia(Hb ≤7 g/dL) or patient has heart failure ▶ Refer patient to a well-equipped facility for further management	**HC4**
If Hb >7 g/dL ▶ Give combination of **ferrous** and **folic acid** 3 times daily ▶ Review the mother every 2 weeks (Hb should rise by 0.7-1 g/dL per week) ▶ Emphasise a realistic balanced diet rich in proteins, iron, and vitamins, e.g., red meat, liver, dark green vegetables ▶ Treat malaria presumptively with **SP** and follow up ▶ De-worm the patient with **mebendazole** 500 mg single dose in 2nd and 3rd trimesters ▶ Treat any other cause as found from investigations ▶ Advise child spacing with an interval of at least 2 years ***If not improving, refer to hospital***	**HC2**
If mother still anaemic at 36 weeks of gestation, or at time of delivery ▶ Refer to a well-equipped facility for further management (blood transfusion)	**HC4**

If patient has sickle-cell disease ▶ Refer to higher level for ANC and delivery	**HC4**

Prevention/Health Education

- Explain the possible causes of anaemia
- Advise on nutrition and diet: mother should increase consumption of foods rich in iron and vitamins
- Instruct patient to use medication as prescribed, and the dangers of not complying
- Advise on side effects of iron medicines (e.g. darkened stools)
- Instruct patient to come every 2 weeks for follow-up

16.2.2 Pregnancy and HIV Infection

All HIV services for pregnant mothers are offered in the MCH clinic. After delivery, mother and baby will remain in the MCH postnatal clinic until HIV status of the child is confirmed, then they will be transferred to the general ART clinic.

All pregnant mothers and partners should receive routine counselling and testing for HIV.

If mother tests negative:

- Counsel on HIV prevention
- Repeat test in third trimester/during labour and delivery

If mother tests positive or is already known positive but not yet on ART

- Enroll on HIV care (eMTCT).

If mother is already positive and already on ART:

- Continue on their existing regimen; may not be switched to **Option B+** regimens
- Perform viral load at first contact

- For more information on HIV, including clinical diagnosis, management, and psychosocial support, refer to specific HIV/AIDS guidelines (see chapter 3).

16.2.2.1 Care for HIV Positive Women (eMTCT)

ICD10 CODE: 098.719

Ensure the following care is provided during pregnancy, labour, delivery, and postpartum period for all HIV+ women

- Find out what she has told her partner (degree of disclosure), labour companion, and family support. Respect her choice and desired confidentiality

Key Interventions for eMTCT

- Routine HIV Counseling and Testing during ANC
- ART in pregnancy, labour and post-partum, and for life – Option B+

Management

TREATMENT	LOC
Recommended ARV for option B+ ▶ One Fixed Dose Combination (FDC) pill daily, containing **TDF + 3TC + EFV** started early in pregnancy *irrespective of the CD4 cell count,* and continued during labour and delivery, and for life ***Alternative regimens for women who may not tolerate the recommeneded option are:*** ▶ If TDF contraindicated: **AZT+3TC+EFV** ▶ If EFV contraindicated: **TDF + 3TC + LPV/r**	**HC2**
Prophylaxis for opportunistic infections ▶ **Cotrimoxazole** 960 mg 1 tablet daily during pregnancy and postpartum – Mothers on cotrimoxazole DO NOT NEED IPTp with SP for malaria	**HC2**

During labour: safe obstetric practices – Avoid episiotomy – Avoid artifical rupture of membranes – Avoid instrumental delivery (vacuum) – Avoid frequent vaginal examination – Do not milk umbilical cord before cutting – Actively manage third stage of labour	
Baby (see section 3.1.4.2) ▶ Give infants daily **Nevirapine (NVP)** for for 6 weeks (12 weeks for high risk infants) ▶ Give **Cotrimoxazole** beginning at 6 weeks, continue until final HIV status is confirmed negative – Offer DNA PCR test at 6 weeks, and again 6 weeks after cessation of breastfeeding	**HC3**
Notes ◆ TDF and EFV are now considered safe in pregnancy ◆ Those newly diagnosed during labour will receive **sdNVP** tablet and begin **HAART** for life after delivery	
Caution ◆ In case of low body weight, high creatinine, diabetes, hypertension, chronic renal disease, and concomitant nephrotoxic medications: perform renal investigation before giving TDF ◆ TDF is contraindicated in advanced chronic renal disease	

Benefits of Option B +

- Reduction of new HIV infection in children, by minimizing the risk of HIV transmission from infected pregnant and lactating women, to less than 5% in breastfeeding populations, and to less than 2% in non-breastfeeding populations

- Improved health, and reduced maternal mortality and morbidity of HIV-infected mothers through lifelong **ART**
- Reduction of the risk of HIV transmission to non-HIV-infected sexual partner in discordant relationship
- Reduction in the number of HIV/AIDS orphans
- Contribution to the achievement of the 90/90/90 goals by 2020
- Contributes to achievement of the Sustainable Development Goals by 2030

16.2.2.2 Counselling for HIV Positive Mothers

- Give psychosocial support
- Encourage mothers to enroll in Family Support Groups (FSG) for peer support
- Advise on the importance of good nutrition
  - Talk to family members to encourage the woman to eat enough and help her avoid hard physical work
  - Micronutrient supplementation during pregnancy and breastfeeding; iron + folic acid and multivitamins
- Advise her that she is more liable to infections, and to seek medical help as soon as possible
- Review the birth plan
  - Advise her to continue attending ANC
  - Advise her to deliver in a health facility where appropriate care can be provided for her and the baby
  - Advise her to go to the health facility as soon as labour starts or membranes rupture

During postpartum period

- Advise on the infectiousness of lochia and blood- stained sanitary pads, and how to dispose them off safely according to local facilities
- If not breastfeeding exclusively, advise her to use a family planning method immediately to prevent unwanted pregnancy

- Linkage of mother-baby pair and her family, for on-going care beyond peurperium
- Breast care: If not breastfeeding, advise that:
  - The breasts may be uncomfortable for a while
  - She should avoid expressing the breast to remove milk (the more you remove the more it forms)
  - She should support her breasts with a firm, well-fitting bra or cloth, and give her **paracetamol** for painful breasts
  - Advise her to seek care if breasts become painful, swollen, red; if she feels ill; or has fever

Counselling on infant feeding choice

- Begin infant feeding counselling before birth when the pregnant mother has been identified to be HIV positive.
- The decision on how she will feed the baby should be made before delivery. The mother should then be supported to implement the feeding option she has chosen
- All mothers are encouraged to breastfeed their babies exclusively for 6 months and then introduce complimentary feeding until 1 year
- The mother has to continue her ARVs all through breastfeeding
- The child should continue cotrimoxazole prophylaxis, until status confirmed negative with a PCR at 6 weeks after stopping breastfeeding
- If a mother chooses to feed the newborn on replacement feeding from the beginning, the choice of replacement feeds should fulfil the AFASS Criteria (Affordable, Feasible, Available, Sustainable and Safe).

16.2.3 Chronic Hypertension in Pregnancy

ICD 10 CODE: O10, O13

Blood pressure >140/90 present before the pregnancy or starting before 20 weeks.

Pregnant women with chronic hypertension should continue to follow the lifestyle modifications for controlling hypertension such as:

- No alcohol
- Regular moderate exercise, brisk walking for 30 minutes at least 3 times a week
- Smoking cessation.

Health worker should:

- Ask mother about foetal movements at each visit
- Aim for BP <140/90 mmHg
- Consider labour if BP is persistently ≥160/90 mmHg, pregnancy ≥37 weeks gestation, and if there is maternal or foetal compromise, e.g. poor SFH growth

Management

TREATMENT	LOC
Switch chronic antihypertensive medication to or start ▶ **Methyldopa** 250 mg 8 hourly, increase as necessary, max 500 mg 6 hourly **And/or** ▶ **Nifedipine** 20-40 mg every 12 hours ***If not controlled or any sign of pre eclampsia: refer to hospital***	**HC3**
Caution △ ACE inhibitors, ARBs are contraindicated in pregnancy △ Avoid beta blockers and diuretics	

16.2.4 Malaria in Pregnancy ICD10 CODE: B54

Malaria can contribute to pregnancy complications such as abortion, poor foetal mental development, premature labour, intrauterine growth retardation and foetal death, severe maternal anaemia due to haemolysis, and death.

Complications are more common in mothers of low gravidity (primi- and secundigravidae), HIV positivity, adolescent age, sickle-cell disease, and those from areas of low endemicity, e.g. in Kisoro and Kabale.

See section 2.5.2 for more information on features and diagnosis of malaria.

Management of Malaria in Pregnancy

APPROACH	MANAGEMENT	LOC
Prophylaxis All pregnant mothers except those with HIV on cotrimoxazole prophylaxis	▶ Intermittent Preventive Treatment (IPTp) with **Sulphadoxine/ pyrimethamine (SP)** once a month starting at 13 weeks until delivery	**HC2**
Treatment of Uncomplicated malaria in 1st trimester	▶ **Quinine** oral 600 mg 8 hourly for 7 days (if Quinine not available, ACT may be used)	**HC2**

Treatment of Uncomplicated malaria in 2nd and 3rd trimesters	***First line*** ▶ **Artemether/Lumefantrine** 80/480 mg 12 hourly for 3 days ***First line alternative*** ▶ **Dihydroartemisinin/ Piperaquine** 3 tablets (1080 mg) once daily for 3 days ***And if no response*** ▶ **Quinine,** oral 600 mg 8 hourly for 7 days	**HC2** **HC4** **HC3**
Severe malaria All trimesters and lactation	▶ IM/IV **Artesunate** 2.4 mg/kg at 0, 12 and 24 hours, then once a day until mother can tolerate oral medication. Complete treatment with 3 days of oral ACT ***First line alternative*** ▶ IM **artemether** 3.2 mg/kg loading dose then 1.6 mg/ Kg once daily until mother can tolerate oral medication. Complete treatment with 3 days of oral ACT ***If artesunate or arthemeter not available, use*** ▶ **Quinine** 10 mg/Kg IV every 8 hours in Dextrose 5%	**HC3** **HC3**
Caution △ Quinine is associated with an increased risk of hypoglycaemia in late pregnancy		

Prevention and control of malaria in pregnancy

- Use **insecticide-treated mosquito nets** (ITN) before, during, and after pregnancy.
- Give all pregnant women intermittent preventive treatment (IPTp) with **sulfadoxine pyrimethamine (SP)** – Except in allergy to sulphonamide
- Prompt diagnosis and effective treatment of malaria in pregnancy

Education messages to mothers and the community

- Malaria is transmitted by female anopheles mosquitoes
- Pregnant women and children are at particular risk of malaria
- If untreated, malaria can cause severe anaemia and death in pregnant women
- Malaria can lead to anaemia, miscarriage, stillbirth, mentally-retarded children, or low birth weight children, who are more prone to infant/childhood mortality compared to normal weight children
- It is better and cheaper to prevent than to treat malaria
- The individual, family, and the community can control malaria by taking appropriate actions
- Sleeping under an insecticide-treated mosquito net is the best way to prevent malaria
- It is very important to complete the course of treatment in order to achieve a cure
- Severe complicated malaria needs special management, therefore refer

16.2.5 Diabetes in Pregnancy ICD10 CODE: O24

Diabetes can be pre-existent or presenting during pregnancy: the latter is called gestational diabetes (GDM).

Risk factors (and indication for screening)

- BMI >35 kg/m^2
- Age >40 years
- GDM in previous pregnancy
- Family history (8 first degree relatives) of diabetes
- Previous unexplained third trimester death, macrosomic baby (weight >4 kg)
- Polyhydramnios
- Glycosuria
- Foetus large for gestational age

Diagnostic criteria for gestational diabetes

- Fasting blood sugar >5.6 mmol/L or
- Plasma glucose >7.8 mmol/L 2 hours after 75 g glucose tolerance test

Therapeutic targets

- Pre prandial blood glucose <5.3 mmol/L
- 1-hour postprandial glucose <7.8 mmol/L
- 2-hour postprandial glucose <6.4 mmol/L

Management

TREATMENT	LOC
▶ Stop smoking, moderate exercise, dietary advice (see section 19.1.3) ***If obese and mild diabetes consider*** ▶ **Metformin** 500 mg (start with one tablet a day, increase by 500 mg per week up to max 2 g per day in divided doses)	**HC3**

If not controlled: ▶ **Insulin** (see section 8.1.3)	**HC4**
Note △ Mothers with diabetes should be advised to deliver in hospital	

16.2.6 Urinary Tract Infections in Pregnancy

ICD10 CODE: O23

Urinary tract infections are common in pregnancy, and maybe associated with adverse consequences.

Clinical features

Uncomplicated cystitis

- Low abdominal pain
- Frequency and urgency of micturition
- Dysuria (pain at micturition)

Pyelonephritis

- Fever
- Renal angle tenderness
- Vomiting, tachycardia

Investigations

➢ Urine dipstick (for nitrate and/or leucocytes, also protein and blood may be present)
➢ Full blood count (raised in pyelonephritis)

Management

TREATMENT	LOC
For cystitis ▶ Encourage increased oral fluid intake ▶ **Nitrofurantoin** 100 mg twice a day for 5 days (avoid in 1st trimester and at term) ▶ Or **Amoxicillin** 500 mg every 8 hours for 5 days	**HC2**

For pyelonephritis ▶ Admit and hydrate ▶ **Ceftriaxone** 1 g IV daily for 48 hours or until fever subsides, then switch to ▶ **Cefixime** 200 mg every 12 hours for 10 days	**HC4** **H**
If ceftriaxone not available ▶ **Ampicillin** 500 mg IV every 6 hours + **gentamicin** 5-7 mg/kg in 2-3 divided doses IM (max 80 mg/dose) for 10-14 days	**HC3**

16.3 ANTENATAL COMPLICATIONS

16.3.1 Hyperemesis Gravidarum ICD10 CODE: O21

Excessive vomiting during pregnancy, associated with ketosis, dehydration and weight loss (>5% of pre-pregnancy weight).

Cause

- Not known but may be common in multiple and molar pregnancy

Clinical features

- May occur from the 4th week of pregnancy and can continue beyond the 12th week
- Defining symptoms are nausea and vomiting so severe that oral intake is compromised
- Patient may develop complications of excessive vomiting, such as vomiting blood and dehydration

Differential diagnosis

- Intestinal obstruction
- Other causes of vomiting
- Molar pregnancy

Investigations

- Blood: complete count, RDT for malaria parasites
- Urinalysis: to exclude urinary tract infection
- Ultrasound scan: to detect molar or multiple pregnancies

Management

TREATMENT	LOC
▶ IV fluids to correct dehydration (see section 1.1.3) and ketosis (give **Ringer's lactate** or **Normal saline** and **Glucose** 5%)	**HC3**
▶ **Promethazine** 25 mg IM or orally every 8 hours prn	
▶ **Vitamin B6 (Pyridoxine)** 1 tablet every 12 hours for 7 days	
▶ Or **Metoclopramide** 10 mg IM or IV or orally every 6-8 hours prn and	**HC4**
If not responding to the above	
▶ **Chlorpromazine** 25 mg IM or orally every 6 hours prn and refer	**HC3**

16.3.2 Vaginal Bleeding in Early Pregnancy/ Abortion

ICD10 CODE: O20

This is almost always abnormal, and patients may need to be admitted or referred. The most common causes of bleeding in the first six months (<26 weeks gestation) are abortion and ectopic pregnancy

Abortion (miscarriage) occurs when the foetus is lost before 28 weeks of pregnancy.

Cause

- Not known in the majority of patients
- May be intentional (induced abortion)
- May be spontaneous (often as a result of fever)
- If mother has more than 2 miscarriages, refer for assessment

Differential diagnosis

- Pregnancy outside the uterus (ectopic pregnancy)
- Other causes of bleeding from the vagina, e.g. cancer
- Other causes of lower abdominal pain, e.g. PID

Investigations

- Urine: Pregnancy test
- Ultrasound
- Blood: Complete count

Clinical features, terminology and management

- Depend on the stage of the abortion

See table below.

FEATURES	MANAGEMENT	LOC
Threatened abortion Little vaginal bleeding No or moderate lower abdominal pain Uterus is of expected size by date Cervix is closed Pregnancy may still continue	▶ Medical treatment is usually not necessary (hormones and tocolytics will not prevent a miscarriage) ▶ Observe for 4-6 hours ▶ **Paracetamol** 1 g every 6-8 hours prn for 5 days ***If bleeding stops:*** ▶ Avoid strenuous activity and abstain from sex for at least 14 days ▶ Follow up in 2 days in ANC clinic ***If bleeding persists, refer to HC3***	**HC2**
Inevitable abortion Process irreversible Products of conception not yet expelled but painful contractions (pain similar to labour pains) and bleeding Cervix proceeds to open	▶ Bed rest ▶ If there are signs of infection, give antibiotics ▶ Observe for continued bleeding ***If patient in shock*** ▶ Resuscitate with IV fluids (**Normal Saline**) ***If anaemic*** ▶ Refer to HC4 for replacement of blood lost ▶ Establish IV access before referral ▶ Give stat dose of antibiotics before referral ▶ Treat anaemia	**HC3** **HC4**

FEATURES	MANAGEMENT	LOC
Incomplete abortion Uterine contents not completely passed out Bleeding sometimes with clots from the vagina (may be severe) or Severe lower abdominal cramps Cervix open Products of conception (POC) may be felt in the cervical canal	***If evacuation of uterus is not immediately possible*** ▶ Give **oral misoprostol** 600 microgram sublingual stat (repeat once after 4 hours if necessary) ▶ If at HC2, refer to HC3 after misoprostol ▶ Use fingers to remove POC protruding through the cervix ▶ Evacuate the uterus by Manual Vacuum Aspiration (if pregnancy <16 weeks) or Dilation and Curettage ▶ Ensure follow up ***If signs of infection (fever, foul smelling blood)*** ▶ Give a stat dose of IV **Ceftriaxone** 2 g and IV **metronidazole** 500 mg ▶ **Amoxicillin** 500 mg orally every 6 hours for 7 days ▶ Plus **metronidazole** 400 mg orally every 8 hours for 7 days	**HC2** **HC3** **HC4**

FEATURES	MANAGEMENT	LOC
Complete abortion All uterine contents have been passed out Bleeding is decreasing Cervix closed Uterus empty and reduced in size	▶ Examine to make sure that all products have been passed ▶ Follow up for continuous bleeding (it should stop in a few days)	**HC3**
Septic abortion Incomplete abortion with infection (may follow induced abortion) Fever Offensive vaginal discharge Lower abdominal pain Tenderness on palpating the abdomen	▶ Give 7-day course of **antibiotics** as in incomplete abortion (above) ▶ Evacuate the uterus	**HC4**
Post-abortal Sepsis Patient has signs and symptoms of sepsis following an abortion, but there are no products of conception in the uterus	▶ Give IV antibiotics **ceftriaxone** 2 g + **metronidazole** 500 mg IV 8 hourly for 48 hours, until fever has disappeared, then switch to oral treatment as for septic abortion	**HC4**

FEATURES	MANAGEMENT	LOC
Missed abortion Foetus died Contents of the uterus not expelled May be dark blood drops (spotting) from the vagina Uterus smaller than expected by dates/not growing	▶ Refer to hospital for evacuation	**H**
Molar abortion Abnormal placenta, no foetus, vaginal bleeding, and passing of red material like ripe coffee berries/ white (translucent) grape like material; uterus much bigger than expected; mother feels no foetal movements even after five months	▶ Resuscitate and refer the patient ▶ Do not attempt to evacuate the uterus unless you have facilities for blood transfusion and oxytocin ▶ Refer to hospital for further management	**H**

16.3.3 Ectopic Pregnancy

ICD10 CODE: O00

Pregnancy outside the uterus, usually in the uterine tubes; could result in an emergency when the tube ruptures

Cause

- Partial blockage of the tube due to a previous infection
- Congenital malformation of the fallopian tubes
- Excessively long tubes

Risk factors

- History of prior ectopic pregnancy
- Prior abdominal or tubal surgery
- History of PID, endometriosis, history of infertility
- Cigarette smoking
- Multiple sexual partners

Clinical features

- There may be a period of amenorrhoea as in normal pregnancy
- Lower abdominal pain, often acute and followed by slight bleeding from the vagina
- If the tube ruptures, the patient may suddenly become anaemic and go into shock
- Abdomen may be very tender with rebound tenderness and guarding on palpation
- Abdomen may not be moving with normal breathing
- Tenderness of moving cervix during vaginal examination
- There may be features of free fluid in the abdomen

Differential diagnosis

- Other causes of acute abdominal pain and vaginal bleeding, e.g. twisted ovarian cyst
- Appendicitis, pelvic inflammatory disease
- Incomplete abortion

Investigations

- Usually diagnosed clinically
  - If the tube ruptures, there may be little time for investigations but ultrasound could be useful (if the patient is not in shock)
- Pregnancy test (to exclude other causes)
- Complete blood count, blood grouping and cross-matching

Management

TREATMENT	LOC
▶ Set up IV drip with **normal saline** and run very slowly just to maintain IV access	HC3
▶ Refer to hospital for surgery	H

Note

- DO NOT RUN A LOT OF FLUIDS BEFORE SURGERY, as this raises blood pressure, which may worsen the patient's bleeding, and worsen state of shock.

16.3.4 Premature Rupture of Membranes (PROM & PPROM)

ICD10 CODE: O42

PROM is a rupture of membranes before the start of labour. It can occur either:

- When foetus is mature/term at or after 37 weeks (PROM)
- Or when foetus is immature/preterm between 24-37 weeks of gestation. This is referred to as Pre-term PROM (PPROM).

In all cases of PPROM, prematurity and its attendant problems are the principal concerns for the foetus, while infection morbidity and its complications are the primary concerns for the mother.

Risk factors associated with PPROM

- Low socioeconomic status, tobacco use
- Low body mass index
- Prior history of PV bleeding during pregnancy
- History of preterm labour
- Urinary tract infection, chorioamnionitis
- Cervical cerclage, amniocentesis

Clinical features associated with PROM

- Leakage of fluid or vaginal discharge
- May be with or without vaginal bleeding
- Pelvic pressure but no contractions
- If ROM has been prolonged, the patient may present with fever, abdominal pain, and a foul smelling vaginal discharge

Investigation

➢ The typical odour of amniotic fluid is diagnostic

– Place a vaginal pad over the vulva; examine visually and by smell after 1 hour
– Use a high-level disinfected or sterile speculum for vagina examination: fluid may be seen coming from the cervix or forming a pool in the posterior fornix
– Ask patient to cough: this may cause a gush of fluid
– If membrane rupture is not recent or leakage is gradual, confirming the diagnosis may be difficult
– Abdominal US scan may show absence of or very low amounts of amniotic fluid
– If available, do Nitrazine test and Ferning test

Caution

△ Do **NOT** do digital vaginal examination - it does not help diagnosis and may cause infection

Management of PROM (>37 weeks)

- Over 90% of patients with PROM go into spontaneous labour within 24 hours
- Expectant management carries a risk of infection
- Induction of labour decreases the risk of infection without increasing the C/S delivery rate
- Expectant management also carries a risk of neonatal issues, e.g., infection, abruptio placenta, foetal distress, foetal restriction deformities, and death

MANAGEMENT	LOC
▶ Refer all patients to hospital and keep in hospital until delivery ***If the membranes have been ruptured for >18 hours and no signs of infection*** ▶ Give prophylactic antibiotics until delivery to help reduce neonatal group B streptococcus infection: **Ampicillin** 2 g IV every 6 hours or **benzylpenicillin** 2 MU IV every 6 hours ▶ Assess the cervix ▶ Refer to HC4 or above (with facilities for emergency obstetric management) for induction with **oxytocin** (see section **16.4.2**)	**HC4**

Management of PPROM (<37 weeks)

- The primary determinant of neonatal morbidity and mortality is gestational age at delivery, hence stressing the need for conservative management whenever possible for Pre-PROM
- All patients with Pre-PROM should receive antenatal steroids for foetal lung maturity
- All patients with PPROM should receive prophylactic antibiotics since there is a high risk of infection

- Administration of tocolytics for 48 hours may allow administration of steroids to accelerate lung maturity
- In general, prognosis is good after 34 weeks of gestation
- All patients with PPROM should be cared for in a facility where a Neonatal Intensive Care Unit (NICU) is available

TREATMENT	LOC
▶ Refer all patients to hospital, and keep in hospital until delivery ***If no signs of infection and pregnancy 24-34 weeks (if gestational age is accurate)*** ▶ Give **dexamethasone** 6 mg IM every 12 hours for a total of 4 doses (or betamethasone 12 mg IM, 2 doses 24 hours apart) ▶ Routine antibiotics: **Erythromycin** 250 mg every 8 hours plus **amoxicillin** 500 mg every 8 hours – Stop them after delivery if no signs of infection ▶ Deliver at 34 weeks ***If palpable contractions and blood- stained mucus*** ▶ Suspect preterm labour ▶ Hydrate with IV fluids before administering nifedipine ▶ Consider administration of tocolytics – Tocolytics: **Nifedipine** 10 mg sublingual tablet placed under the tongue every 15 minutes if necessary, up to a maximum of 40 mg in the first hour. Then 60-160 mg daily in 3-4 divided doses, adjusted to uterine activity, for max 48 hours	H
If vaginal bleeding with abdominal pain (intermittent or constant) ▶ Suspect and treat as abruptio placentae (see **16.3.6**)	

If signs of infection (fever, foul-smelling vaginal discharge) ▶ Give **antibiotics** as for Amnionitis (section 16.3.5) ▶ Deliver immediately	
Caution △ Do not use steroids in presence of infection	

16.3.5 Chorioamnionitis

ICD10 CODE: O41.1

Infection of the chorionic and amniotic membranes/fluid before delivery.

Risk factors

- Prolonged rupture of membranes
- Prolonged labour
- Untreated STI

Clinical features

- History of vaginal draining of liquor
- Fever >37.8°C
- Maternal tachycardia
- Foetal tachycardia
- Uterine tenderness
- Foul-smelling or purulent vaginal discharge
- Acute complications: postpartum haemorrhage, puerperal sepsis, renal failure
- Chronic complications: infertility due to salpingitis, and/or uterine sinechie

Investigations

➢ RDT or BS to rule out Malaria
➢ Urinalysis to rule out UTI
➢ Swab (vaginal discharge) for gram stain

Management

Care for mother and neonate includes early delivery and antibiotic administration. The risk of neonatal sepsis is increased.

TREATMENT	LOC
▶ Start antibiotics and refer to hospital – **Ampicillin** 2 g IV every 6 hours – Plus **gentamicin** 5 mg/kg IV every 24 hours ***For penicillin allergic patients, give*** ▶ **Clindamycin** 300-600 mg IV 12 hourly ***If patient delivers vaginally*** ▶ Continue parenteral antibiotics until woman is afebrile for 48 hours and no foul-smelling discharge ▶ If the mother comes back with complications, refer for further care ***If the woman has a Caesarean section*** ▶ Continue the above antibiotics, and add **metronidazole** 500 mg IV every 8 hours – Continue until 48 hours after fever has gone	**H**
Newborn ▶ Examine the neonate for suspected sepsis before discharge ▶ If newborn sepsis is suspected manage as in section **2.1.7.1** ▶ Advise the mother on how to recognize danger signs (see section **17.1.1**)	**H**

16.3.6 Antepartum Haemorrhage (APH) – Abruptio Placentae and Placenta Praevia

ICD10 CODE: O44-O46

Vaginal bleeding occurring after 28 weeks of pregnancy, and up to second stage of labour.

Causes

- Local causes from genital tract
- Placenta praevia: All or part of the placenta is found in the lower segment of the uterus
- Abruptio placentae: Premature separation of a normally placed placenta

Comparison of Clinical features

SIGN/SYMPTOM	PLACENTA PRAEVIA	ABRUPTIO PLACENTAE
Abdominal pain	Painless	Severe pain
Foetal movements	Foetal movements usually present	Loss of foetal movements common
Amount of vaginal bleeding	Significant bleeding from the vagina	Significant bleeding may be absent; only serous fluid in some cases (bleeding is behind the placenta)
Maternal general condition	Shock and anaemia if bleeding is heavy	Shock and anaemia, even when no frank bleeding

Uterine consistency	Uterus soft and not tender	Uterus hard and tender
Position of foetal presenting part	High presenting part (head) or malpresentation (the part in the lower uterus not head)	Foetal parts difficult to feel because of hard uterus
Foetal heart sounds	Foetal heart sounds usually heard	Foetal heart sounds often absent

Differential diagnosis

- Ruptured uterus especially in a patient with previous caesarean section or grand multipara
- Local causes, e.g. cervical cancer

Investigations

➢ Ultrasound: To find the site of the placenta and viability of the baby, this may not be conclusive for AP (take note of clinical signs and symptoms)

➢ Blood:

– Grouping, cross-matching
– Haemoglobin, fibrinogen levels
– Clotting time and bleeding time

Management

TREATMENT	LOC
▶ Any bleeding in late pregnancy needs immediate referral to hospital ▶ Give IV **normal saline** infusion ▶ Admit, inspect the vulva to ascertain colour and amount of bleeding but DO NOT perform a digital vaginal examination if you suspect placenta praevia	**H**

▶ Any bleeding in late pregnancy needs immediate referral to hospital ▶ Give IV **normal saline** infusion ▶ Admit, inspect the vulva to ascertain colour and amount of bleeding but DO NOT perform a digital vaginal examination if you suspect placenta praevia ▶ Correct anaemia and coagulation defects (transfuse **blood** and **fresh frozen plasma**) ▶ In case of confirmed Abruptio Placentae where the baby is dead, and facilities for theatre and blood transfusion are available, with no contraindication to vaginal delivery: – Rupture membranes and start **oxytocin** 10 IU in 500 mL of Normal saline to induce labour ▶ In case of Abruptio Placentae where the baby is alive – Deliver by emergency caesarean section (ensure you have enough blood) ▶ In case of placenta praevia – Give steroids (as for PPROM) if <34 weeks – Emergency cesarean section if bleeding is uncontrolled, mother's or baby's life in danger or pregnancy >37 weeks – If bleeding resolves, keep mother in hospital and deliver at >37 weeks	**H**

16.3.7 Pre-Eclampsia

ICD10 CODE: O14

Pre-eclampsia is a hypertensive condition of pregnancy usually diagnosed after 20 weeks of gestation and can present as late as 4-6 weeks postpartum.

It is characterised with hypertension, proteinuria with or without oedema and, may result into maternal fits if not managed appropriately.

It may also be superimposed on chronic hypertension.

It is classified as mild to severe pre-eclampsia.

TYPE OF ECLAMPSIA	DESCRIPTION
Mild to moderate pre-eclampsia	A diastolic BP of 90-109 mmHg and/ or systolic BP of 140-159 mmHg, with ≥1+ proteinuria; and no organ dysfunction
Severe pre-eclampsia	acute severe hypertension (160/110 mmHg) and ≥1+ proteinuria OR any degree of hypertension with evidence of organ dysfunction (e.g., renal dysfunction, raised liver enzymes, thrombocytopaenia)

Clinical features of severe pre-eclampsia

- Headache, blurring of vision of new onset
- Epigastric or right upper quadrant pain, vomiting
- Dyspnoea, weakness or general malaise
- Oedema (swelling of hands, face, legs and other parts of the body), excessive weight gain
- Systolic BP >160 mmHg and Diastolic BP >110 mmHg
- Urine protein ++, may be oliguria
- Pre-elampsia related hypertension usually resolves spontaneously after delivery and almost always within 12 weeks from delivery.

Differential diagnosis

- Other causes of oedema and hypertension, e.g. renal disease)

Investigations

- Urine: for protein
- Blood for:
  - LFT & RFT
  - Serum creatinine
  - Clotting time if platelet count is less than 100 X 10^9
  - Fibrinogen levels
- Ultrasound Scan for foetal Estimated Gestational Age and viability

Management

Any case of pre-eclampsia has to be referred to hospital, lower facilities can give emergency care (Magnesium sulphate, antihypertensive as available).

Goals of treatment are to:

- Prevent convulsions
- Control blood pressure
- Deliver the baby if indicated

TREATMENT	LOC
General measures ▶ Bed rest, preferably in hospital ▶ Lifestyle adjustment and diet ▶ Monitor BP, urine output, renal and liver function tests, platelet count, foetal condition ▶ Mother may be hypovolaemic; careful (slow) infusion of **IV fluids** may be necessary ▶ Consider delivery if risks to mother outweigh risks of prematurity to baby	**HC4**

Mild to moderate pre-eclampsia ▶ Based on BP response ▶ **Methyldopa**, oral, 250 mg every 8 hours as a starting dose, increase to 500 mg 6 hourly according to response, Max dose 2 g daily **AND/OR** ▶ **Nifedipine** 20-40 mg every 12 hours	**HC3**
Severe pre-eclampsia (hypertensive emergency) ***To prevent convulsions*** ▶ Give IV fluids (**Normal saline**) very slowly (1 L in 6-8 hours max) ▶ Give IV loading dose of **magnesium sulphate** injection (4 g of MgSO4) – Draw 8 mL of a 50% MgSO4 and add 12 mL of water for injection or Normal saline: this is equal to 4 g of 20% MgSO4 – Give the solution as a slow IV bolus over 20 minutes (the 20-20-20 rule) ▶ Then give 5 g MgSO4 (10 mL of MgSO4 50%, undiluted) in each buttock deep IM (total 10 g) with 1 mL of 2% lignocaine in the same syringe ▶ If unable to give IV loading dose, give only the 10 g deep IM	**HC3**
Antihypertensives *If BP is >95 mmHg diastolic or >160 mmHg systolic* ▶ Give **hydralazine** 5 mg IV bolus every 30 minutes until diastolic is BP is down to <100 mmHg – Alternative if hydralazine not available: **Nifedipine** 20-40 mg orally every 12 hours until delivery	**HC4** **HC3**

– Or **Labetalol** 20 mg IV over 2 minutes, double the dose every 30 minutes until diastolic is <100 mmHg (total dose not to exceed 160 mg/hour) ▶ Maintenance antihypertensive therapy is necessary after controlling the BP. Maintain the patient on **Nifedipine** 20 mg 12 hourly until delivery ▶ Monitor BP every 15 minutes until stable (when systolic BP <160 and Diastolic <100 mmHg	**RR**
Deliver baby ▶ Women with severe pre-eclampsia should be delivered urgently (vaginally or C/S) regardless of gestational age in the following situations: – Non-reassuring foetal heart – Ruptured membranes – Uncontrolled BP – Oligohydramnious – Features of IUGR – Oliguria of <500 mL/24 hours – Pulmonary Oedema – Headache that is persistent and severe **After delivery** ▶ Monitor BP every 15 minutes for 2 hours ▶ Continue to monitor vital signs (BP, urine protein, etc) very carefully for at least 48 hours ▶ Continue antihypertensive to mantain diastolic BP less than 90 mmHg ▶ Send home when BP is stable and no urine protein ▶ Continue antihypertensive according to clinical monitoring – Hypertension usually resolves with the birth of the baby but may persist (e.g. in case of undiagnosed pre existent hypertension)	**H**

Notes
- Do not use ergot-containing medicines
- Do not use diuretics or ACE inhibitors

16.3.8 Eclampsia

ICD10 CODE: O15

Occurrence of generalised tonic-clonic seizures after 20 weeks of pregnancy, associated with hypertension and proteinuria, without any other neurological cause of seizures.

Clinical features
- Patient may or may not have had previous clinical features of severe pre-eclampsia
- Headache that is usually frontal, blurring of vision, aura (flickering lights)
- Generalized tonic-clonic seizures
- Right upper quadrant abdominal pain with nausea
- BP raised >140/90 mmHg
- Oedema of legs and sometimes face and body
- Unconsciousness if condition not treated
- Amnesia and other mental changes

Differential diagnosis
- Other causes of fits, e.g. cerebral malaria, meningitis, epilepsy, poisoning

Investigations
- Urine for Protein
- CBC, LFT, RFT
- Malaria parasites
- Urea, electrolytes
- Clotting time if platelet count <$100x10^9$
- Fibrinogen levels

Principles of Management

Eclampsia is a medical emergency and should be referred to hospital urgently, after first aid measures as available.

Goals of treatment are:

- Controlling/preventing convulsions
- Controlling blood pressure
- Delivering the baby as soon as possible

TREATMENT	LOC
First aid ▶ Protect the airway by placing the patient on her left side – Prevent patient from hurting herself ▶ Place padded tongue blade between her teeth to prevent tongue bite, and secure it to prevent aspiration – DO NOT attempt this during a convulsion ▶ Do not restrict/restrain the patient while fitting ▶ Refer to hospital as soon as possible	**HC2**
Stop and control convulsions ▶ Give IV loading dose of **magnesium sulphate** injection (4 g of MgSO4) ▶ Draw 8 mL of a 50% MgSO4 and add 12 mL of water for injection or Normal saline: this is equal to 4 g of 20% MgSO4 ▶ Give the solution as slow IV bolus over 20 minutes (the 20-20-20 rule) ▶ Then give 5 g of **magnesium sulphate** (10 mL of MgSO4 50% solution, undiluted) in each buttock deep IM (total 10 g) with 1 mL of 2% lignocaine in the same syringe ▶ Give IV fluids (**Normal saline**) very slowly (1 L in 6-8 hours max)	**HC3**

▶ Monitor BP, pulse, and respiration every 30 minutes; pass indwelling Foley's catheter for continuous bladder drainage ▶ Monitor fluid balance	**HC3**
If the facility has capacity, continue with maintenance dose after 4 hours from the loading dose, ONLY IF: ▶ Urine output >100 mL in 4 hours ▶ Respiratory rate is >16 per minute ▶ Patellar reflexes (knee jerk) are present ***Signs of magnesium sulphate toxicity*** ▶ Respiratory depression, rate <16 breaths per minute ▶ Urine output <30 mL/hour ▶ Depressed patellar reflexes ***Antidote for magnesium sulphate*** ▶ Give **calcium gluconate** 1 g (10 mL of 10%) slow IV, not exceeding 5 mL per minute. Repeat prn until respiratoty rate gets back to normal (rate >16 breaths per minute) ***Maintenance dose*** ▶ **Magnesium sulphate** 5 g IM (10 mL of MgSO4 50% solution) every 4 hours in alternate buttocks for 24 hours from the time of loading dose or after the last convulsion; whichever comes first. Add 1 mL of lignocaine 2% in the same syringe	**H**
If there are further convulsions ▶ Repeat ½ of the loading dose of **magnesium sulphate** (2 g of 20% solution given IV, slowly)	

ONLY IF magnesium sulphate is not available use ▶ **Diazepam** 10 mg slow IV over 2 minutes loading dose, (repeat once if convulsions recur) ▶ Diazepam 40 mg in 500 mL of normal saline IV infusion to run slowly, keeping the patient sedated but rousable **Note** ◆ Notify the person who will resuscitate the newborn that a benzodiazepine and/or magnesium sulphate has been given to the mother	
Control blood pressure: if BP is >110 mmHg diastolic or >170 mmHg systolic ▶ Give **hydralazine** 5 mg IV bolus every 30 minutes until diastolic is BP is down to <100 mmHg ▶ Alternative, if hydralazine not available: **Nifedipine** 20 mg orally every 12 hours until delivery ▶ Or **Labetalol** 20 mg IV over 2 minutes, double the dose every 30 minutes until diastolic is <100 mmHg (total dose not to exceed 160 mg/hour) ▶ Maintenance antihypertensive therapy is necessary after controlling the BP. Maintain the patient on **Nifedipine retard** 20 mg 12 hourly until delivery ▶ Monitor BP every 15 minutes until stable (when systolic BP <170 and Diastolic <100 mmHg)	**H** **RR**
Deliver the baby by the safest and fastest means available within 6-12 hours ▶ Augment labour if mother is approaching second stage with nor contraindication to vaginal delivery and theatre is nearby	**H**

▶ Perform vacuum extraction if mother is in second stage and there is no contraindication ▶ Deliver by emergency caesarian section if facilities are available	
Post delivery care ▶ Monitor BP every 15 minutes for 2 hours ▶ Continue to monitor vital signs (BP, urine protein, etc) very carefully for at least 48 hours ▶ Continue antihypertensive to mantain BP diastolic <90 mmHg ▶ Send home when BP is stable and no urine protein ▶ Continue antihypertensive according to clinical monitoring **Note** ◆ Hypertension usually resolves with birth of the baby, but may persist (e.g. in case of undiagnosed pre existent hypertension)	

Prevention

- Regular attendance of good antenatal care with a skilled birth attendant, and checking of blood pressure and urine protein.

16.4 LABOUR, DELIVERY AND ACUTE COMPLICATIONS

16.4.1 Normal Labour and Delivery

ICD10 CODE: O80

Labour is a physiological process by which the uterus expels the foetus and other products of conception. Labour can last from between 6 to 18 hours; being longer for first pregnancies.

Normal labour is characterized by:

- Onset of regular uterine contractions at term
- Progressive cervical dilatation
- Expulsion of the foetus

FIRST STAGE OF LABOUR

- From onset of labour to full dilation of the cervix
- The presenting part descends well into the midpelvis

What to do

- Provide rapid counselling and testing for HIV if it was not done during prenatal period
- Make correct diagnosis of labour
- Open a partogram for the patient and monitor progress of labour
- Vaginal examinations every 2 to 4 hours. Expected rate of cervical dilatation is at least 1 cm/hour. Examine every hour once an 8 cm dilatation has been reached
- Observe change of shape of foetal head (moulding), foetal position, and caput. Descent is assessed by abdominal palpation noting how much of the head you can feel above the pelvis
- Check uterine contractions
- Hourly monitoring of mother's BP, temperature, pulse and respiration. Check ketones and proteins in urine, and Hb
- Check foetal heart rate (FHR) for 1 minute every 30 minutes. A normal FHR is 120 to 160 beats per minute; FHR >160 or <120 beats per minute indicates foetal distress
- Observe state of membranes and colour of amniotic fluid if membranes are ruptured

Hydration and nourishment

- Ensure oral or IV fluid intake especially in prolonged labour, to avoid dehydration and ketosis
- Give **normal saline** and **Dextrose** solution as required

Analgesia

- Provide appropriate analgesia if desired by the patient
- e.g. **morphine** 10 mg IM stat at 4-6 cm dilatation

2ND STAGE OF LABOUR

- From full dilatation to expulsion of the foetus
- Contractions become strong and frequent
- Patient bears down
- Perineum bulges and overlying skin becomes tense and shiny

What to do

- Ensure full dilatation of the cervix by vaginal examination
- Encourage the mother to bear down with contractions, and relax in between
- Protect the perineum from tearing by supporting with fingers at crowning
- Do an epsiotomy under local anaesthesia if required
- Allow the baby's head to rest when it is born and loose cord from around the neck if present. If cord is too tight, clamp it with two artery forceps and cut it.
- Support the head during delivery. Anterior shoulder is delivered first followed by posterior.
- Place the baby on mother's abdomen or arms. Dry the baby, wipe eyes
- If baby not crying, assess breathing. Rub the back 2-3 times. If not breathing resuscitate (see section **16.5.1**)

- After the baby is born, palpate mother's abdomen to exclude second baby
- Then give **Oxytocin** 10 IU IM to the mother
- Clamp the cord and cut it (1-3 minutes after birth)

3RD STAGE OF LABOUR

- From delivery of the baby to delivery of the placenta

What to do: Child

- Evaluate baby's condition using APGAR (Appearance, Pulse, Grimace, Activity, Respiration) score, and record in the baby's chart. Resuscitate if necessary
- Give 1 mg IM stat of **phytomenadione** (Vitamin K) to baby
- Clean the eyes with sterile warm water and apply **tetracycline eye ointment** to baby's eyes as prophylaxis against ophthalmia neonatorum
- Give identification tag to baby, wrap in warm towels and give to the mother to introduce breast feeding
- Weigh the baby and compare with chart
- Give a full physical examination to the baby
- Immunize the baby

What to do: Mother

- Examine fundal height and palpate uterus lightly to determine whether it has contracted well and to exclude undiagnosed twins
- Ensure **oxytocin** 10 IU IM was given
- Await strong contraction (2-3 minutes) and deliver the placenta by controlled cord traction. Deliver the placenta and examine it for completeness and normalcy. Weigh the placenta. If placenta is not delivered within 30 minutes, see Retained Placenta section **16.4.5**
- Massage lower abdomen lightly to stimulate contraction and expel clots

- Examine the perineum, vagina, and cervix for tears. Repair episiotomy and any tears immediately
- Observe for 1 to 2 hours. Monitor BP, temperature, and pulse rate hourly. Also do uterine palpation, vulva inspection and estimation of degree of blood loss
- Refer to postnatal ward

16.4.2 Induction of Labour

Induction of labour may be indicated for medical reasons, like, pre-eclampsia, diabetes, post-term pregnancy.

However, possible risks of induction are:
- Failed induction
- Hyperstimulation syndrome, requiring emergency caesarean section.

Induction is contraindicated in para 5 and above and in patients with a previous scar. In these cases there is indication for caesarean section.

TREATMENT	LOC
Cervix favourable in HIV and Hep B negative mothers ▶ Artifically rupture the membranes (with amniotic hook or Kocher clamp) followed 2 hours later by ▶ **Oxytocin** IV 2.5 IU in 500 mL of Normal saline. Start with 10 drops/minute ▶ Increase infusion rate by 10 drops every 30 minutes (max 60 minutes) until good contraction pattern is established (3-5 contractions in 10 minutes each lasting >40 secs), and maintain until delivery is complete	H

▶ If no good contraction pattern with 60 drops/minute, increase **oxytocin** concentration to 5 IU in 500 mL of Dextrose or Normal saline at 30 drops/minute, increase by 10 drops every 30 minutes until maximum of 60 drops/minute ▶ ONLY IN PRIMIGRAVIDA: if no good contraction pattern established, increase concentration of oxytocin to 10 IU in 500 mL and repeat as above (from 30 to 60 drops/minute) ▶ DO NOT USE 10 IU in 500 mL in MULTIGRAVIDA or WOMEN WITH PREVIOUS CAESAREAN SECTION ▶ Refer other cases or primigravida not responding to the higher concentration for surgical management ▶ NEVER LEAVE THE WOMAN ALONE	**H**
If >4 contractions in 10 minutes, or contraction longer than 60 secs or foetal distress: ▶ Stop rate of infusion ▶ Give **salbutamol** 5 mg in RL or NS 500 mL IV infusion at 10 drops/minute ▶ Monitor foetal heart rate ***Cervix not favourable*** ▶ Ripen cervix using either ▶ **Misoprostol** 25 micrograms inserted vaginally every 6 hours for 2 doses, if no response increase to 50 micrograms every 6 hours, max 200 micrograms in 24 hours – stop when in established labour ▶ Or **misoprostol** 20 micrograms orally (dissolve 1 200 microgram tablet in 200 mL of water and give 20 mL) every 2 hours until labour starts or max 24 hours	**H**

▶ Or **Foley catheter:** insert Foley catheter through internal cervical os under sterile technique, inflate bulb with 50 mL of water, and tape catheter under light traction, leave it until contraction begins or up to 12 hours ▶ If cervical ripening, proceed to cesarean section ▶ If cervix ripens but labour does no start, start oxytocin induction	

Caution

△ Do not start oxytocin within 8 hours of using misoprostol
△ Carefully control oxytocin infusion – do not give rapidly
△ Monitor uterine contractions and foetal heart rate closely
△ If foetal distress, do emergency cesarean section

16.4.3 Obstructed Labour

ICD10 CODE: O64-O66

Failure of labour to progress despite good uterine contractions.

Causes

- Cephalopelvic disproportion (CPD)
- Large baby
- Foetal abnormalities: hydrocephalus, conjoined twins
- Small or deformed pelvis
- Malpresentation: the presenting part of the foetus is not the head, e.g. breech presentation, shoulder presentation, face, etc
- Malposition: an abnormal position of the foetal head when this is the presenting part, e.g. occipito-posterior
- Any barrier that prevents the baby's descent down the birth canal

Clinical features

- Contractions are strong but no evidence of descent of the presenting part
- Malposition or malpresentation may be felt on abdominal examination
- In a first delivery, the pains will just stop spontaneously
- Foetal distress with meconium stained liqour
- Fever and dehydration with maternal exhaustion
- In late stages, the regular colicky strong pains may stop when the uterus is ruptured, and be replaced by a dull continuous pain
- Signs of shock if the uterus has ruptured
- Physical examination reveals signs of shock, tender uterus, formation of a Bandl's ring, vulva may be oedematous, vagina is hot and dry, there's usually a large caput

Management

TREATMENT	LOC
▶ Set up an **IV normal saline** line and rehydrate the patient to maintain plasma volume and treat dehydration and ketosis	**HC3**
▶ Start 5-day course of antibiotics: **Amoxicillin** 500 mg every 8 hours or **erythromycin** 500 mg every 6 hours	
▶ Plus **metronidazole** 400 mg every 8 hours	
▶ Refer urgently to HC4/Hospital for further management	**HC4 H**

Note

- Every woman with prolonged/obstructed labour should receive the management protocol for prevention of obstetric fistula (see section **16.6.4**)

Prevention

- Careful monitoring of labour using a partogram for early recognition
- Active management of labour

16.4.4 Ruptured Uterus

ICD10 CODE: O71.1

Partial or complete tearing of the uterus, common in:

- Multiparous women (i.e. have had >1 live babies)
- Women with previous caesarean section

Causes/predisposing factors

- Assisted deliveries/obstetric procedures
- Neglected obstructed labour
- Tearing of a poorly-healed uterine scar during labour
- Short interpregnancy interval of less than 18 months after Caeserean Section
- Previous history of uterine surgery, e.g. myomectomy
- Damage to uterus due to a blow, e.g. kick or accident
- Use of oxytocic herbs

Clinical features

- Cessation of regular uterine contractions (labour pains)
- Continuous abdominal pain
- Vaginal bleeding
- Anxiety, anaemia, and shock
- Abdomen is irregular in shape
- Foetal parts easily felt under the skin if the foetus is outside uterus and foetal heart is not heard

Differential diagnosis

- Abruptio placentae
- Placenta praevia
- Other causes of acute abdomen in late pregnancy
- Ruptured spleen
- Bowel obstruction

Investigations

➢ Blood: CBC, grouping and cross-matching

Management

Mothers with a suspicion of ruptured uterus should be referred immediately to hospital for blood transfusion and surgical management.

TREATMENT	LOC
▶ Set up IV **normal saline** infusion ▶ Give IV **ceftriaxone** 2 g and IV **metronidazole** 500 mg stat then ▶ Refer to hospital immediately for surgical management (cesarean section ± hysterectomy)	**HC3** **H**

Prevention

- Good ANC and education on early arrival to the facility for labour and delivery
- Skilled birth attendance at all deliveries
- Careful monitoring of labour using a partogram
- Minimise the use of oxytocin in multiparous women
- Do not attempt fundal pressure during labour
- DO NOT use misoprostol for induction of labor

16.4.5 Retained Placenta

ICD10 CODE: O73

Failure of delivery of placenta within 30 minutes of delivery of the baby.

Causes

- Poor management of 3rd stage of labour
- Failure of the uterus to contract
- Failure of the placenta to separate, e.g. if it is stuck in uterine muscle; placenta accreta
- Closing of the cervix before the placenta is expelled

Clinical features

- The umbilical cord protrudes from the vagina
- Bleeding may be present (in partial separation)
- Uterus may be poorly contracted and high in the abdomen
- May be signs of infection, e.g. fever, unpleasant bloody discharge if the placenta is retained for long

Differential diagnosis

- Retained second twin
- Ruptured uterus

Investigations

➢ Blood: Hb, grouping and cross-matching

Management

TREATMENT	LOC
If woman is bleeding, manage as PPH (section 16.4.6)	
If woman not bleeding ▶ Set up IV **normal saline** infusion ▶ Empty the bladder (voluntarily or catheterise) ▶ Encourage breastfeeding ▶ Repeat controlled cord contraction ***If placenta is not delivered in another 30 minutes*** ▶ Perform manual removal of placenta (use **diazepam** 10 mg IM/IV) ▶ Repeat **Oxytocin** 10 IU IM or slow IV injection after manual removal ▶ If no signs of infection and no obstructed labour Give **ceftriaxone** 2 g IV stat ▶ If signs of infection, give antibiotics as in amnionitis ▶ If obstructed labour, give antibiotic prophylaxis as indicated in section 16.4.3	HC3

If unable to remove placenta manually ▶ Give **ceftriaxone** 2 g IV stat ▶ Give **oxytocin** 20 IU in Normal saline 500 cc at 30 drops per minute during transfer ▶ Refer to HC4 or Hospital	**HC4 H**

16.4.6 Postpartum Haemorrhage (PPH)

ICD10 CODE: O72

Vaginal bleeding of more than 500 mL after vaginal delivery or >1000 mL after caesarean section.

- Primary PPH occurs in the first 24 hours after delivery
- Secondary PPH occurs between 24 hours and six weeks after delivery

PPH is an EMERGENCY. It can occur in any woman and needs prompt recognition and treatment.

Causes

- Tone: failure of uterus to contract, precipitated labour
- Tissues: such as retained placenta (in part or whole) or membranes which may lead to atony as well as infection in the uterus
- Tears (e.g. damage to/rupture of the perineum, vagina, cervix or uterus)
- Thrombotic disorders which may be due to DIC following abruptio placenta or severe APH

High risk patients

- History of previous PPH, multiple previous C/S, multiple pregnancy
- Placenta praevia, abruptio placenta
- Precipitated labour, prolonged labour, large baby
- Patients with hypertensive disorders

Clinical features

- Bleeding from the genital tract which may be a gush of blood or a small but persistent trickle of blood (>1 pad soaked in five minutes)
- The uterus may still be large, soft, and not contracted especially in primary PPH
  - If uterus is well contracted, look for tears on the perineum, vagina, cervix, or uterus
- Signs of shock may be present: tachycardia, low BP, cold and clammy skin
- In secondary PPH, there may be signs of infection, e.g., fever, abdominal tenderness

Investigations

- Hb and blood group should have been already done and recorded during ANC; if not, do them urgently
- Women at high risk of PPH should have blood cross-matched and at least 2 units booked
- If time allows (e.g. in secondary PPH), check blood for Hb, clotting

Management

The principles of management include two major components:

1. Resuscitation and management of obstetric haemorrhage and possibly hypovolemic shock
2. Identification and management of underlying causes

TREATMENT	LOC
First aid ▶ Check uterus to see if contracted ▶ Massage uterus (to expel clots) ▶ Give **oxytocin** 10 IU IM or IV slowly ▶ Empty the bladder ▶ Start IV fluids (**normal saline**), give according to patient BP	**HC3**

▶ If oxytocin not available, give **misoprostol** 800 micrograms sublingually or rectally (only one dose)	**HC3**
Check if placenta has been expelled, and is complete ▶ If yes, expel any clots in the birth canal ▶ If not, perform manual removal or refer ▶ Prophylatic antibiotic: **ampicillin** 2 g IV stat plus **metronidazole** 500 mg IV ▶ If signs of infection, give antibiotics as in puerperal fever	**HC4**
If uterus contracted and placenta expelled ▶ Check for local causes if bleeding continues – Inspect carefully the lower genital tract for perineal lacerations, haematomas, vaginal and cervical tears ***If bleeding not responding,*** ▶ Repeat **oxytocin** 10 IU IV/IM after 20 minutes ▶ Give **misoprostol** sublingual or rectally 800 micrograms (if not given before) ▶ Restore blood volume with IV fluids ▶ Refer for further management and blood transfusion if necessary ▶ Check for coagulation problems	**H**
Caution △ Even if bleeding persists, never give repeat misoprostol	

Prevention

- Ensure active management of 3rd stage of labour for all women in labour, and delivery by skilled staff
- Give **oxytocin 10 IU** IM within 1 minute of delivery of the baby, after ruling out presence of another baby

- Clamping and cutting the cord after cessation of cord pulsations (approx. 1-3 minutes after delivery of the baby – whichever comes first)
- Controlled cord traction during a contraction with counter-traction to deliver the placenta
- Massage the uterus immediately after delivery of the placenta to ensure the uterus is contracted
- Identify mothers at risk and manage accordingly
- Give 5 days' prophylactic antibiotics in prolonged or obstructed labour, or in presence of other risk factors, e.g. rupture of membranes, birth before arrival at health facility, instrument delivery:

16.4.7 Puerperal Fever/Sepsis ICD10 CODE: O85

Infection of the female internal genital tract within 6 weeks of childbirth. Signs and symptoms usually occur after 24 hours, although the disease may manifest earlier in settings of prolonged rupture of membranes and prolonged labour without prophylactic antibiotics.

Causes

- Ascending infection from contamination during delivery or abortion
- Bacteria include: *Staphylococcus aureus* and Gram-negative bacteria from the gut, e.g. *Escherichia coli*, Bacteroides, *Streptococcus pyogenes, clostridium spp, chlamydia, gonococci*
- In peurperal sepsis, multiple organisms are likely

Clinical features

- Persistent fever >38°C
- Chills and general malaise
- Pain in the lower abdomen
- Persistent bloody/pus discharge (lochia) from genital tract, which may have an unpleasant smell

- Tenderness on palpating the uterus
- Uterine sub-involution

Risk factors

- Anaemia, malnutrition in pregnancy
- Prolonged labour, prolonged rupture of membranes
- Frequent vaginal exams
- Traumatic delivery (instrumental deliveries, tears)
- Retained placenta

Differential diagnosis

- Other causes of fever after childbirth, e.g. malaria, UTI, DVT, wound sepsis, mastitis/breast abscess, RTI

Investigations

- Blood: CBC, C&S, BS for malaria parasites / RDT
- Lochia: swab for C&S
- Urine: For protein, sugar, microscopy, C&S

Management

Puerperal fever carries a high risk of sepsis with a high mortality, and needs immediate attention

TREATMENT	LOC
Parenteral antibiotic therapy	**HC3**
▶ **Ampicillin** 500 mg IV or IM every 6 hours	
▶ Plus **gentamicin** 5-7 mg/kg IV or IM daily in 2 divided doses (every 12 hours)	
▶ Plus **metronidazole** 500 mg IV every 8 hours for at least 3 doses	**HC4**
Alternative	
▶ Clindamycin 150 mg IV/IM every 6 hours + **gentamicin** as above	

Supportive/additional therapy ▶ Give IV fluids ▶ Give analgesics ▶ If anaemic, transfuse with blood ▶ Look for retained products and evacuate uterus if necessary	

Prevention

- Use of clean delivery kits and ensuring clean deliveries, proper hygiene
- Prophylactic antibiotic when indicated (prolonged labour and premature rupture of membranes, manual removal of placenta)

16.4.8 Care of Mother and Baby Immediately After Delivery

ICD10 CODE: Z39

Provide the following care for the **first two hours** after complete delivery of the placenta.

General measures

- Constant attention; **Never** leave mother and baby alone
- Request the mother or attendant to report any unusual changes in the mother and baby to the health worker
- Record any findings, treatment, and procedures in the Postpartum Record

For additional information on care of the HIV positive mother, refer to section **16.2.2** above.

16.4.8.1 Care of Mother Immediately After Delivery

TREATMENT	LOC
Monitoring of mother • Check every 15 minutes for 2 hours, then at 3 and 4 hours, then every 4 hours until discharge – Take the blood pressure – Rapid assessment for danger signs such as excessive PV bleeding, difficulty in breathing, severe headache – Feel if uterus is hard and round	**HC3**
Assess, classify, and treat • Raised diastolic blood pressure – >110 mmHg with proteinuria 3+ and signs/ sympotms of eclampsia: manage as severe eclampsia (section **16.3.8**) – If 90-110 mmHg with proteinuria: manage as pre eclampsia (section **16.3.7**) – If >90 mmHg with no proteinuria and no symptoms of eclampsia: monitor and treat as hypertension (section **16.6.1.2**) • Fever with chills or uterine tenderness or foul smelling discharge, treat as puerperal fever (section **16.4.7**) – If isolated raised temperature, monitor, hydrate and observe for 12 hours. Treat for pueperal fever if it persists (section **16.4.7**) • If bleeding perineal tear – Suture if trained or refer for further management • If bleeding (If pad soaked in <5 minutes or constant trickle of blood) and uterus not hard and around: – Treat as PPH (section **16.4.6**)	

• Anaemia: monitor for bleeding and look for conjunctival or palmar pallor, check Hb if indicated, manage as appropriate	
Care of mother • Encourage mother to pass urine, eat, and drink • Ask the companion to stay with her	

16.4.8.2 Care of Baby Immediately After Delivery

TREATMENT	LOC
Monitoring of baby • Check every 15 minutes – Breathing, warmth,pulse, SpO2 – Umbilical cord stump should be well ligatured	**HC3**
Care of baby ▶ Ensure the room is warm ▶ Wipe off blood or meconium with wet cloth – Do not remove vernix or bathe the baby within the first 24 hours ▶ Apply an eye antimicrobial e.g. **tetracycline** eye ointment – Leave in place and do not wash it away ▶ Apply **chlorhexidine digluconate gel** to the cord stump daily after every bath, until the cord falls off. Provide the gel to the mother and teach her how to use it while at home ▶ Give **vitamin K** 1 mg IM ▶ Keep baby warm with skin to skin contact ***If feet are cold or mother and baby are separated*** ▶ Cover baby with blanket; cover baby's toes and fingers as well as the head with warm clothing ▶ Reassess after 1 hour	

If breathing difficulty ▶ Examine the baby according to first newborn examination requirements, classify the condition, and treat accordingly (see next section and section **17.1**)	

Breastfeeding

Ensure the mother starts breastfeeding as soon as possible (preferably within the first hour)

- Offer mother help to position (attach) the baby correctly onto the breast to avoid cracked nipples
- Counsel and reassure mother

If unable to start breastfeeding:

- Plan for alternative feeding method
  - Ensure that alternative method is **A**ffordable, **F**easible, **A**cceptable, **S**ustainable and **S**afe
  - Do not give artificial feeds, sugar water or local feeds before baby has attempted to initiate natural breastfeeding
  - Consider referral to a higher level

Baby dead or stillborn

In case the baby dies or is stillborn

- Give supportive care to the mother
- Respect local customs; find out if the mother/family would like to look at or hold the stillborn baby
- Check, identity and give wrapped body to family for disposal/burial according to local customs
- Provide death certificate and complete required reporting formalities

TREATMENT	LOC
▶ Advise on postpartum care and hygiene ▶ Advise mother on breast care; wear a firm bra, do not express the breasts ▶ Give **paracetamol** if breasts are painful ▶ You may give lactation suppression drugs such as **bromocriptine** 2.5 mg once a day for 2 weeks ▶ Counsel on appropriate family planning	**HC3**

16.5 ESSENTIAL CARE OF THE NEWBORN

16.5.1 Newborn Resuscitation ICD10 CODE: P22

Start resuscitation within one minute of birth if baby is not breathing or is gasping for breath

- Observe universal hygiene precautions to prevent infection
- Prepare for resuscitation at each delivery even where there are no signs of foetal distress, just in case the baby requires it

Minimum preparation for every birth

Ensure that the following equipment is available and in good working order:

- Two warm cotton cloths and a small one to position the head
- Heat source to keep the baby warm
- Mucus extractor such as a **penguin sucker** (or bulb syringe)
- Ambu bag and new-born masks of varying sizes (0 and 1), pulse oximeter
- Clock or watch
- A birth attendant skilled in new-born resuscitation

MANAGEMENT	LOC
▶ Keep the baby warm by drying the baby using the first cotton cloth and change to the second dry cotton cloth. Rub the back 2-3 times – Clamp and cut the cord if necessary – Transfer the baby to a dry clean warm surface – Tell the mother that the baby is having difficulty starting to breathe and that you will help the baby ▶ Open the airway – Position the head so that it is slightly extended – Place a folded towel <2 cm thick under baby's shoulders – Suction if secretions in mouth or nose and if baby born through meconium stained amniotic fluid: suction 5 cm in the mouth, 3 cm in the nose while withdrawing, for max 10 seconds in total. – **Do not suction too deep into the throat as this may cause the heart to slow down or breathing to stop** ▶ If still not breathing, SELECT APPROPRIATE MASK SIZE TO COVER CHIN, MOUTH AND NOSE, AND VENTILATE – Form a seal with mask covering chin, mouth and nose – Squeeze bag 5 times – Observe chest	**HC3**
If not rising – Reposition head, check mask seal, squeeze bag harder ▶ Once good seal and chest rising, ventilate for one minute at 40 squeezes per minute then stop and look for breathing	

If breathing >30/minute and no severe chest in-drawing

- Stop ventilating
- Put baby skin-to-skin on mother's chest
- Observe every 15 minutes for breathing and warmth: take temperature, count breaths, observe for chest-in-drawing or grunting respiration. Monitor SpO_2
- Encourage mother to breastfeed within one hour
- DO NOT LEAVE THE BABY ALONE

If breathing <30/minute or severe chest in-drawing

- Continue ventilating
- Arrange for immediate referral
- Give oxygen if available
- Reassess every 1-2 minutes
- Continue to ventilate during referral

If not gasping or breathing at all after 20 minutes of ventilation

- Stop ventilation, the baby is dead

Notes

- Room air is sufficient in the absence of oxygen
- Cardiac massage is RARELY required; it is dangerous when done incorrectly. A slow heart rate almost always responds to good breathing assistance only
- Usually, there is no need for drugs if prompt and sufficient ventilation is provided

Harmful and ineffective resuscitation practices

△ Routine suction of new-born's mouth and nose as soon as the head is born

△ Stimulation of the new-born by slapping or flicking the soles of the feet

△ Postural drainage (putting the baby upside down) and slapping the back
△ Squeezing the back to remove secretions from airway
△ Routine giving of sodium bicarbonate to new-borns who are not breathing.
△ Intubation by an unskilled person

16.5.2 General Care of Newborn After Delivery

Provide the following care up to the time of discharge:

TYPE OF CARE AND MONITORING	NOTES
Keep baby with mother – In same bed or within easy reach – Under mosquito net	If baby is in a cot, ensure baby is dressed or well-wrapped: covered with blanket, head is covered and the feet and hands have socks
Ensure room is warm (>25°C) and has no cold breeze (draughts)	Do NOT put baby in direct sun or on any cold surface or directly in the line of a cold breeze
Advise/teach mother how to: – Keep the baby warm – Give cord care – Ensure hygiene	– If mother is unable to take care of baby, provide required care or teach her next of kin – Wash hands before and after handling baby – Do not bath baby for up 24 hours

TYPE OF CARE AND MONITORING	NOTES
Support exclusive breastfeeding on demand, day and night, whenever baby wants	***If breastfeeding difficult:*** – Help mother to position and attach the baby ***If breastfeeding not possible:*** – Advise on safe replacement feeding (AFASS)
Ask mother and companion to: – Watch the baby – Report breastfeeding or breathing problems, cold feet, bleeding from cord or other bleeding ***Check every baby at 4 and 8 hours then daily for:*** – Warm feet – Normal pink colour – Feeding – Breathing problems	***If feet cold-this is a sign of hypothermia:*** – Teach mother how to rewarm the baby; apply one to two layers of clothes more than adults, and use of hats/caps – Reassess in 1 hour; if no improvement, take temperature and manage accordingly ***If breathing problem*** – Assess and manage accordingly ***If cord tie loose/cord bleeding:*** – Retie cord – If bleeding persists, refer urgently

TYPE OF CARE AND MONITORING	NOTES
Check any baby with warning signs at 2, 4, 8, and 12 hours: – Listen for grunting – Look for chest in drawing – Count breaths/minute – Measure temperature – Observe breastfeeding	***Refer urgently if:*** – Breathing problem worsens or persists for >8 hours – Temperature <36.5°C persists or decreases – Not able to feed at 8 hours
Give prescribed treatments according to dosage schedule	If referring the baby, write treatments given, when, and why
Assess breastfeeding in every baby before planning discharge	Do not discharge if baby is not feeding well
Do not discharge baby < 24 hours old	
Advise mother: – When to seek care – When to return if danger signs appear (refusal to feed, excessive crying, bleeding from the cord stump, fever, bulging fontanel, abdominal distension, grunting respiration)	Do NOT plan early discharge if: – Baby small (LBW or preterm) – Not feeding well
Give BCG and polio 0 before discharge	Counsel mother on next routine check in 3-7 days and next immunization in 6 weeks

16.5.3 Extra Care of Small Babies or Twins in the First Days of Life

Provide the following care for small babies:
- Preterm up to 1 month early
- Low Birth Weight <2,500 g

Refer very small babies for specialized attention:
- Very preterm >1 month early
- Very Low Birth Weight <1,500 g

TYPE OF CARE AND MONITORING	NOTES
Ensure room is warm: Teach mother how to keep baby warm	Provide extra blanket for mother and baby if needed
Teach mother how to ensure hygiene for baby	Do not bathe the baby Clean prn with swabs or cloth
Give special support for breastfeeding and assess daily	If not breastfeeding well, teach mother alternative feeding methods
Assess small baby daily: – Measure temperature – Feeding progress, weight – Breathing – Jaundice (see sections 17.1.2 and 17.2.2)	– If breathing or breastfeeding problem or hypothermia, examine and manage accordingly – If maternal concern, examine and manage the baby accordingly;

TYPE OF CARE AND MONITORING	NOTES
	– If breastfeeding problem persists >3 days or weight loss >10% of birth weight and no other problems, refer for breastfeeding counselling and management
Keep mother and baby (or twins) longer before discharge. Plan the discharge when: – Breastfeeding well – Weight gain on 3 consecutive days – Body temperature normal for 3 consecutive days – Mother confident in caring for baby	– If mother & baby not able to stay, ensure daily (home) visits or send to hospital

16.5.4 Newborn Hygiene at Home

CATEGORY	CARE
Eye care	▶ Explain to mother to seek care if eyes drain pus, and not to apply anything into the eyes
Cord care	▶ Wash hands before and after cord care ▶ Put chlorhexidine gel daily (if not available put nothing) for 7 days – Keep stump loosely covered with clean clothes

	– Fold nappy below the stump – If stump soiled, wash with clean water and soap, dry completely with clean cloth – Do not bandage the stump or abdomen – Do not apply anything else to the stump – Avoid touching the stump unnecessarily ***If umbilicus red or draining pus or blood*** ▶ Examine the baby and manage accordingly
General baby care hygiene	▶ Wash the face, neck, and under arms daily ▶ Wash the buttocks when soiled and dry completely – Use cloth on baby's bottom to collect stool – Dispose as for sanitary towels/pads and wash hands ▶ Bathe when necessary using warm water – Ensure room is warm with no cold breezes – Dry completely, then dress and cover the baby
Note ◆ Small babies need specially careful attention ◆ Wash hands before and after baby care	

16.6 POSTPARTUM CONDITIONS

16.6.1 Postpartum Care

ICD10 CODE: Z39

The postpartum period, also known as the puerperium, begins with the delivery of the baby and placenta, up to six weeks after delivery.

Healthcare providers should be aware of the medical and psychological needs of the postpartum mother, and sensitive to cultural differences that surround childbirth, which may involve eating particular foods and restricting certain activities.

Postpartum care services

The mother and baby should be seen at 6 hours after birth and again before discharge if in a health facility (and anytime the mother reports concern about herself and her baby) or approximately 6 hours after delivery at home.

The routine follow up visits are at 6 days and 6 weeks, and have the following components:

- Counselling
- Assessment and management of observed or reported problems. Check for hypertension, anaemia, vaginal bleeding and discharge, uterine infection, puerperal fever, malaria, UTI, urine dribbling, pus or perineal pain, postpartum depression, breast problems, HIV and any other complaint

16.6.1.1 Postpartum Counselling

Provide the following counselling at all postpartum visits.

General counselling

- Breastfeeding/breast care
- Nutrition, ferrous and folic acid supplements, avoid alcohol and tobacco

- Self care and other good health practices, personal hygiene, handwashing, genital hygiene (care of the episiotomy or repaired tears)
- Pelvic floor exercises
- Sleeping under mosquito nets
- Postpartum checks (6 days and 6 weeks)
- Provide information on bonding by encouraging the mother to hold, touch, explore her baby as well as rooming-in (mother and baby sleeping in the same bed
- HIV testing
- Discuss with the couple the need for shared care of the newborn
- Help build confidence by providing reassurance that the woman is capable of caring for the newborn

Counselling on baby care

- Hygiene and care of the baby, (see previous sections)
- Danger signs for the baby
- Immunization schedule
- Let baby sleep on the back or side
- Ensure the baby is kept warm without overcovering
- Apply **chlorhexidine digluconate** gel to the cord stump daily after every bath until the cord falls off. Provide the gel to the mother, and teach her how to use it while at home
- Keep baby away from smoke and smokers
- Keep baby (especially if small) away from anyone who is ill
- Do not share supplies (for example, clothing, feeding utensils) with other babies

Complications and danger signs for the mother

- Danger signs (see next table)
- Readiness plan in case of an emergency
  - Advise her to have someone near for at least 24 hours after delivery to respond to any change in condition
  - Discuss emergency issues with her and partner/family: Where to go if danger signs appear, how to get there, costs involved, family/community support
  - Advise her to seek help from the community if needed
  - Advise her to bring any home-based maternal record to the health facility, even for an emergency visit

Reproductive health

- Discuss family planning and provide appropriate method if required (PPFP), benefits of LAM, dual protection, safe delivery-pregnancy interval of 2 years
- Advise mother to abstain from sexual activity for at least 6 weeks after birth
- Discuss return to fertility (ovulation can occur before the first Menstrual Period
- Perform cervical cancer screening at 6 weeks

Advise mother on danger signs as follows:

TYPE OF DANGER SIGN	ACTION TO TAKE
• Vaginal bleeding (>2 pads soaked in 30 minutes after delivery or bleeding increases instead of decreases after delivery) • Fever or convulsions • Fast or difficult breathing • Too weak to get out of bed • Severe abdominal pain • Severe headache/blurred vision • Pain in the calf (ankle) muscles	Go to health facility **immediately**

• Fever; abdominal pain; feels ill; breasts red, tender, swollen; sore nipple; urine dribbling or pain on urination; perineal pain or draining pus; foul-smelling lochia	Go to health facility **as soon as possible**

16.6.1.2 Postpartum Examination of the Mother Up to 6 Weeks

Ask, check record

- When and where did you deliver?
- How are you feeling?
- Any pain or fever or bleeding since delivery?
- Do you have any problem with passing urine?
- Ask if the woman has started having sex with her partner
- Have you decided on any contraception?
- How do your breasts feel?
- Do you have any other concerns?
- Check records fo any complications during delivery, any treatments she is receiving, HIV status?
- Ask about tobacco use and exposure to second-hand smoke

Look, listen feel

- Measure blood pressure and temperature
- Feel uterus. Is it hard and round?
- Look at vulva and perineum for tear, swelling or pus
- Look at pad for bleeding and lochia
  - Does it smell or is the bleeding profuse?
- Look for pallor

Use the table below to examine mother at any postpartum visit

Classify and treat as directed below

SIGNS	CLASSIFY AS	TREAT AND ADVISE
• Mother feeling well • Did not bleed >250 mL • Uterus well contracted and hard • No perineal swelling • Blood pressure, pulse and temperature normal • No pallor • No breast problem • No fever or pain or concern • No problem with urination	**Normal Postpartum**	• Make sure woman and family know what to watch for and when to seek care • Advise on postpartum care, hygiene, and nutrition • Reinforce counselling on safer sexual practices – Counsel on the importance of birth spacing and family planning • Dispense 3 months iron supply and counsel on compliance • Give any treatment or prophylaxis due, e.g. TT • Promote use of impregnated bednet for the mother and the baby • Advise on when to return to the health facility for the next visit • Advise to avoid use of tobacco, alcohol, drugs, and exposure to second-hand smoke

Respond to any observed or volunteered signs and problems

Check for hypertension

ASSESSMENT	SIGNS	CLASSIFY	TREAT AND ADVISE
Blood pressure • History of eclampsia or pre-eclampsia • Diastolic BP ≥90 mmHg, repeat after an hour	• Diastolic BP ≥110 mmHg	**Severe Hypertension**	• Assess and treat for pre-eclampsia (section 16.3.7). Refer to hospital • If not pre-eclampsia, give/continue appropriate antihypertensive as in non-pregnant women (section 4.1.6)
	• Diastolic BP ≥90 mmHg on 2 readings	**Moderate Hypertension**	• Assess for pre-eclampsia • If no pre-eclampsia, give/continue appropriate antihypertensive as in non-pregnant women (see section 4.1.6) • Review in one week
	• Diastolic BP <90 mmHg on 2 readings	**Blood Pressure Normal**	• No additional treatment

Check for anaemia

ASSESSMENT	SIGNS	CLASSIFY	TREAT AND ADVISE
Check for anaemia • Check record for bleeding in pregnancy, delivery or after delivery • Ask any heavy bleeding since delivery? • Do you tire easily? • Are you breathless during routine housework? • Measure Hb	• Hb <7 g/dL And/or • Severe palmar or conjuctival pallor Any pallor and any of: • RR >30 breaths per minute • Tires easily • Breathlessness at rest	**Severe Anaemia**	• Give double dose of **iron sulphate** 200 mg (or **Fefol**) : 1 tablet 2-3 times daily for 3 months • Refer urgently to hospital • Follow up in 2 weeks to check clinical progress and compliance with treatment
	• Hb 7-11 g/dL or • Palmar or conjuctival pallor	**Moderate Anaemia**	• Give double dose of **ferrous sulphate** 200 mg (or **Fefol**) 1 tablet twice daily for 3 months • Reassess in 4 weeks • If anaemia persists, refer to hospital

• Look for conjuctival and palmar pallor • Count breaths per minute	• Hb 7-11 g/dL or • Palmar or conjuctival pallor	**Moderate Anaemia**	• Give double dose of **ferrous sulphate** 200 mg (or **Fefol**) 1 tablet twice daily for 3 months • Reassess in 4 weeks • If anaemia persists, refer to hospital
	• Hb >11 g/dL • No pallor	**No Anaemia**	• Continue treatment with **ferrous sulphate** 200 mg (or **Fefol**) once daily to complete treatment duration of 3 months

Check for vaginal bleeding and possible uterine/urinary tract or febrile infection

ASSESSMENT	SIGNS	CLASSIFY	TREATMENT
• Heavy vaginal bleeding	• More than 1 pad soaked in 5 minutes	**Postpartum Bleeding**	• Give **oxytocin** 10 IU IM • Give appropriate IM/IV antibiotics • Refer urgently to hospital • See PPH section **16.4.6**
• Heavy/ light vaginal bleeding after 6 weeks	• Still bleeding 6 weeks after delivery	**Postpartum Bleeding**	• Refer urgently to hospital • See PPH section **16.4.6**

ASSESSMENT	SIGNS	CLASSIFY	TREATMENT
• Have you had fever? • Ask for presence of foul-smelling lochia, burning on urination or heavy bleeding • Feel lower abdomen and flanks and tenderness • Look for abnormal lochia, stiff neck and lethargy • Measure temperature	***Temperature >38°C and any of:*** • Very weak • Abdominal tenderness • Foul-smelling lochia • Profuse lochia • Uterus not well contracted • Lower abdominal pain • History of heavy vaginal bleeding	**Uterine Infection/ Puerperal Fever**	• Insert IV line and give fluids rapidly • Give appropriate IM/IV antibiotics • Refer urgently to hospital (See puerperal fever 16.4.7)

ASSESSMENT	SIGNS	CLASSIFY	TREATMENT
• Do RDT or blood slide for malaria parasites	***Fever >38 °C and any of:*** • Burning on urination • Flank pain	**Upper Urinary Tract Infection**	• Give appropriate IM/IV antibiotics • Refer urgently to hospital (See UTI in pregnancy 16.2.6)
	• Burning on urination	**Lower Urinary Tract Infection**	• Give appropriate oral antibiotic (See UTI in pregnancy 16.2.6) • Encourage her to drink more fluids • Follow up in 2 days
	• Fever >38°C and any of: – Stiff neck – Lethargy – RDT negative	**Very Severe Febrile Disease**	• Insert IV line and give fluids rapidly + glucose • Give appropriate IM/IV antibiotics (See puerperal fever 16.4.7) • Refer urgently to hospital
	• Fever >38°C • RDT or blood slide for malaria parasites positive	**Malaria**	• Give oral antimalarial (see section 16.2.4) • Follow up in 2 days • Refer if not better in 2 days

Check for dribbling of urine

ASSESSMENT	SIGNS	CLASSIFY	TREATMENT
Ask if dribbling urine	Continuous leaking of urine (and/or faeces)	**Suspect Obstetric Fistula**	• Refer for proper assessment and management (see section 16.6.4)
	Non continuous dribbling or leaking urine (urge, stress etc)	**Urinary Incontinence**	• Check perineal trauma • Assess for urinary tract infection and treat if appropriate • Recommend pelvic floor exercises • Refer if not improving

Check for perineal trauma/infection

ASSESSMENT	SIGNS	CLASSIFY	TREATMENT
Ask if there is pus or perineal pain	Excessive swelling of vulva or perineum	**Perineal Trauma**	Refer to hospital
	• Pus in perineum • Pain in perineum	**Perineal Infection or Pain**	• Remove sutures, if present • Clean wound • Counsel on care and hygiene • Give **paracetamol** for pain • Follow up in 2 days – If no improvement, refer to hospital

Check for vaginal discharge 4 weeks after delivery

ASSESSMENT	SIGNS	CLASSIFY	TREATMENT
If vaginal discharge 4 weeks after delivery, ask • Any itching of the vulva? • Has your partner had a urinary problem? • If partner is present in the clinic, ask him if he has: urethral discharge or pus, burning on passing urine • If partner could not be approached, explain importance of partner assessment and treatment to avoid reinfection	• Abnormal vaginal discharge, and partner has urethral discharge or burning on passing urine	**Possible Gonorrhoea and/or Chlamydia Infection** (see section 3.2.2)	• Give appropriate oral antibiotics to woman • Treat partner with appropriate oral antibiotics • Counsel on safer sex including use of condoms
	• Curd-like vaginal discharge and/or • Intense vulval itching	**Possible Candida Infection** (see section 2.2.1)	• Give **clotrimazole** pessaries 1 each evening for 6 days • Counsel on safer sex including use of condoms • If no improvement, refer the woman to hospital

ASSESSMENT	SIGNS	CLASSIFY	TREATMENT
• Separate the labia and look for abnormal vaginal discharge: amount, colour, odour and smell • If no discharge is seen, examine with a gloved finger and look at the discharge on the glove	• Abnormal vaginal discharge	**Possible Bacterial or Trichomonas Infection** (see section 3.2.2)	• Give **metronidazole** 2 g single dose to woman • Counsel on safer sex including use of condoms

Check for HIV infection

ASSESSMENT	SIGNS	CLASSIFY	TREATMENT
Do counseling and testing if never tested before	See chapter 3	**HIV Negative**	Counsel on safe sex and staying negative Encourage partner testing
		HIV Positive	Manage mother and baby as per eMTCT guidelines (see section 16.2.2)

Check for breast problems

ASSESSMENT	SIGNS	CLASSIFY	TREATMENT
Ask • How do your breasts feel? • Look at the nipple for fissure • Look at the breasts for: swelling, shininess, redness • Feel gently for painful part of the breast • Measure temperature • Observe a breastfeed if not yet done	• Nipple sore or fissured • Baby not well attached	**Nipple Soreness or Fissure**	• Encourage the mother to continue breastfeeding • Teach correct positioning and attachment • Reassess after 2 feeds (or 1 day). If not better, teach the mother how to express breast milk from the affected breast and feed baby by cup, and continue breastfeeding on the healthy side
	• Both or one breasts are swollen, shiny and patchy red • Temperature <38°C	**Breast Engorgement**	• Encourage the mother to continue breastfeeding • Teach correct positioning and attachment • Advise to feed more frequently

	• Baby not well attached • Not yet breastfeeding		• Reassess after 2 feeds (1 day) If not better, teach mother how to express enough breast milk before the feed to relieve discomfort
	• Painfulbreast swollen and red • Temperature >38°C • Feels ill	**Mastitis**	See section **16.6.3**

Check for any psychosocial problems

ASSESSMENT	SIGNS	CLASSIFY	TREAT
Ask if feeling unhappy or crying easily, low energy, sleep problems, lack of concetration, unable to do usual work or take care of the baby, negatve feeling towards the baby or herself, generalized body pains not otherwise explained	2 of the described signs/ symptoms, for more than 2 weeks	**Possible Postnatal Depression**	▶ See section 16.6.2
	Any of the described signs and symptoms, during the 1st week after delivery	**Possible Baby Blues**	▶ Counsel, reassure and review in 2 weeks ▶ If persisting see section 16.6.2
Ask if current or previous smoking, alochol, drug abuse, previous or current history of violence		**Possible Psychosocial Problem**	▶ Counselling and refer for specialist management

16.6.2 Postnatal Depression ICD10 CODE: F53

Condition characterized by persistent low mood developing during the puerperium period, usually 1 or 2 weeks following delivery. It needs specialized assessment and treatment.

Mild depressive symptoms (sadness, tearfulness, irritability, anxiety) develop commonly during the first week after the delivery but resolve within 2 weeks (**"baby blues"**): it usually needs ONLY counseling and support.

Risk factors

- Previous psychiatric history
- Recent stressful events
- Young age, first baby (primigravida) and associated fear of the responsibility for the new baby
- Poor marital relationship, poor social support

Clinical features

- Starts soon after delivery and may continue for a year or more
- Feelings of sadness with episodes of crying, anxiety, marked irritability, tension, confusion
- Guilty feeling of not loving baby enough
- Loss of positive feeling towards loved ones
- Refusal to breast feed baby
- Ideas to harm the baby

Postpartum psychosis

- Distortions of thinking and perception, as well as inappropriate or narrowed range of emotions (see section 9.2.4.1)

Management

TREATMENT	LOC
▶ Routine assessment for depressive symptoms during post natal visits or at least once at 6 weeks	HC3
▶ Counselling and reassurance at first contact and review after 2 weeks	
▶ If persisting, refer for specialized treatment	H
– Psychotherapy	
– Antidepressant (see section 9.2.2)	
▶ If suicidal thoghts, or any risk for mother and/or baby, refer urgently to hospital	

Prevention

- Postpartum counselling, support, and follow up
- Identification of patients at risk
- Male involvement and support

16.6.3 Mastitis/Breast Abscess ICD10 CODE: O91

Infection of the breast usually in a breastfeeding mother.

Causes

- Usually *Staphylococcus aureus* enters from the baby's mouth through a cracked nipple into an engorged breast. Less frequently Streptococci

Clinical features

- Pain in the breast, which is swollen, often shiny, and tender with enlarged veins
- Often in 2nd postpartum week
- Fever
- May proceed to become an abscess; a collection of pus within the breast tissue

– There may be localised erythema (shinny red skin)

- Firm lump, felt initially but may later become fluctuant
- May drain pus spontaneously

Complications

- Recurrent infection, scarring
- Loss of breast size, noticeable breast asymmetry
- Mammary duct fistula formation due to reccurrence

Differential diagnosis

- Breast engorgement (for mastitis)
- Breast lump/cancer (for abscess)

Investigations

- Breast milk: For C&S
- US scan to rule out breast abscess in patients with recurrent mastitis

Management

TREATMENT	LOC
▶ Stop breastfeeding on the affected breast but express milk and discard to avoid breast engorgement	HC2
▶ Give analagesics such as **paracetamol** 1 g every 8 hours for 3 days	
▶ Apply warm compresses to relieve pain in affected breast	HC3
▶ Continue breastfeeding on the normal breast	
▶ Give **cloxacillin** 500 mg 6 hourly for 10 days or	
– (If not available use **amoxicillin** 500 mg every 8 hours for 10 days)	
▶ If penicillin allergies: **erythromycin** 500 mg every 6 hours for 10 days	H
– Or **cephalexin** 500 mg PO every 6 hours for 10 days	

If not improving ▶ Refer to hospital for utrasound scan and further management ▶ If clinical or US scan features of breast abscess: incise and drain	

Prevention

- Proper attachment of baby on the breast
- Frequent emptying of the breast
- Ensure the baby is sucking on the areolar and not the nipple
- Manage breast engorgement if not breastfeeding, or lost baby (Refer to section on care of the mother and baby immediately after delivery)

16.6.4 Obstetric Fistula

ICD10 CODE: 071

Obstetric fistula is an abnormal communication between the birth canal, and either the bladder, ureters, or rectum. It is one of the major causes of maternal morbidity making the women with the condition suffer from constant urinary incontinence which can lead to skin infections, kidney disorder or death if left untreated.

Causes

- Obstructed labour (main cause): most fistula develops in 2 weeks after an obstructed labour, causing an often expansive crush injury to the vaginal tissues
- Sexual abuse and rape (Gender-based violence)
- Complication of unsafe abortion
- Surgical trauma usually following a caesarean section
- Gynaecological cancers and radiotheraphy

Predisposing factors

- Lack of access to maternity care
- Lack of/inadequate skilled care at birth
- Lack of facilities for ANC and childbirth
- Lack of knowledge to identify danger signs and promptly respond
- Poverty and lack of women empowerment
- Early marriage and childbirth
- Inadequate family planning access
- Harmful traditional practices such as Female Genital Mutilation

Clinical features

- Unncontrolled leakage of urine or faeces from vagina

Differential diagnosis

- Stress, urge or overflow incontinence
- Ureterovaginal fistula (UVF)

Investigations

- ➢ Speculum examination to visualise leakage; site, size and amount
- ➢ Confirm by dye test on pelvic examination/speculum examination, and/or examination under anaesthesia (EUA)

Management

A fundamental part of the management of obstetric fistula is the appropriate standard management of ALL women who have survived prolonged or obstructed labour, since it can prevent fistula formation and cure small ones.

Aims of management are to:

- Prevent fistula formation
- Close the fistula
- Make the woman continent and able to resume a full and active life

Principles of immediate care of women who have survived prolonged/obstructed labour, or who present immediately after delivery with obstetric fistula

TREATMENT	LOC
▶ Insert appropriate sized (Foley size 16-18) catheter and leave in situ	HC3
▶ Refer for follow-up care:	
– The vagina should be examined by speculum as soon as possible and necrotic tissue gently excised under aseptic conditions	HC4
– Repeat this until vagina is clean	
▶ The mother can be discharged with the catheter and advised on care and to come back for review and/or removal	
▶ Recommend increase in fluid intake up to 5 litres a day	
▶ Perineal Sitz or salt baths twice daily to help the perineum to heal	
▶ Treat any intercurrent infection and give prophylaxis against UTI:	
– **Nitrofurantoin** 100 mg 1 tablet in the evening	
▶ Remove the catheter:	
– After 2 weeks, only if no damage is shown to have occurred	
– After 4-6 weeks in case of small fistula	
▶ After removing the catheter, if there is no evidence of fistula, discharge with the following advice:	
– Avoid sexual intercourse for 3 months. Once it has resumed, it should be gentle and with consideration for the woman	
– Avoid pregnancy for about 6 months to one year	

– Advise on family planning/contraception and spacing of children, and the importance of good ANC during her next pregnancy – All future babies should be delivered in a unit equipped to undertake caesarean section	

Management of women who presents with an established obstetric fistula

These are women in whom the conservative management described above failed or they presented with an established fistula.

TREATMENT	LOC
▶ Refer to regional level for assessment and appropriate management ▶ Each woman who has been successfully repaired should receive a card with details of her history, a diagram of the injury and a summary of the operation done which should be presented to every health worker wherever she may go for care	**RR**
Note ◆ Fistula repair has to be performed by a trained doctor	

Prevention

- Provide skilled attendance at births and improve on emergency obstetric care at all levels
- Increase access to accurate and quality family planning information and services, especially for adolescents
- Establish appropriate and effective referral system at all levels (early referrals)
- ENSURE ALL WOMEN WHO HAVE SUFFERED OBSTRUCTED LABOUR ARE MANAGED ACCORDING TO THE STANDARD MANAGEMENT PROTOCOL FOR FISTULA PREVENTION

17. Childhood Illnesses

This chapter presents the management of sick infant and child up to age 5, following the WHO syndromic approach IMNCI.

Additional information about management of childhood illnesses can be found in specific sections:

TOPIC	REFERENCE SECTION
Care of the new born	See chapter **16**
Immunisable diseases and other infectious diseases	See chapter **1** INFECTIONS and BODY SYSTEM CHAPTERS
HIV care in children	See chapter **3** HIV/AIDS
Immunisation	See chapter **18** IMMUNISATION
Manutrition rehabilitation	See chapter **19** NUTRITION
Sickle cell disease	See chapter **11** BLOOD DISORDERS

IMNCI (Integrated Management of Newborn and Childhood Illnesses)

The following guidelines use a syndromic approach to the management of common childhood conditions at Primary Health Care Level and should be followed page-by-page.

The general approach used involves 5 main steps:
- Assess the child
- Classify the illness
- Identify and provide the required treatment
- Counsel the mother
- Provide FOLLOW UP support

There are 3 sections, based on age:
- Sick newborn (1st week of life)
- Sick infant (up to 2 months)
- Sick child (2 months to 5 years)

17.1 SICK NEWBORN

17.1.1 Newborn Examination/Danger Signs

Use the following procedures to examine all newborn babies after delivery, before discharge or if baby is seen as an outpatient for routine, FOLLOW UP, or sick newborn visit during first week of life.

Ask

If first visit

- How old is the baby? Where was the baby born?
- Who delivered the baby? Check infant record for risk factors
- What was birth weight? LBW? Preterm?Twin?
- Any problem at birth? Breech? Difficult birth? Was resuscitation done?

Ask the mother

- Has the baby had any convulsions?
- Does the baby have frequent heavy vomiting?
- How is the baby feeding? Any feeding problems?
- How many times has baby breastfed in last 24 hours?
- Is baby satisfied with feeds? Have you fed baby any other food or drinks?
- Has baby breastfed in previous hour?
- How do your breasts feel?
- Do you have any other concerns?

Look, listen, feel

- Assess breathing (baby must be calm)
  - Count breaths (normal: 30-60/min)
  - Assess for grunting/chest in-drawing
  - Check SpO_2 if available
- Look at the movements: normal and symmetrical?
- Look at the presenting part for swelling or bruises
- Check abdomen for pallor and distention
- Look for malformations
- Feel the tone: normal?
- Feel for warmth and check temperature
- Weigh the baby
- Observe a breastfeed: Is the baby able to attach? Suckling effectively? Well-positioned?
- Look for ulcers and white patches in the mouth (thrush)

If danger signs present, treat as below

SIGNS	CLASSIFY	TREAT
Any of the following • Respiratory rate > 60 or < 30 or grunting or gasping • Severe chest indrawing or cyanosis • Not feeding well • Convulsions • Abdominal overdistension • Heart rate constantly > 180 beats per minutes • Floppy or stiff body or no spontaneous movements • Temperature > 37.5 or < 35.5°C after warming • Umbilicus draining pus, redness/ swelling extended to skin • Skin pustules >10 or bullae or skin swelling and hardness • Bleeding from stump or cut • Pallor	**Possible Serious Illness** (see sections 2.1.7.1, neonatal sepsis, 2.1.5.1 meningitis, 2.1.8.1 tetanus)	▶ Give **ampicillin** 50 mg/kg IM every 12 hours plus **gentamicin** 5 mg/kg every 24 hours (4 mg/kg if preterm) ▶ Refer baby to hospital ▶ If referral not possible continue treatment for 7 days ▶ Keep baby warm ▶ Clean infected umbilicus and pustules and apply **Gentian Violet** ▶ If risk of staphylococcus infection, give **cloxacillin** 50 mg/Kg IV/IM every 6 hours and **gentamicin** 5-7 mg/Kg every 24 hours

If no danger signs present, classify and treat as below

SIGNS	CLASSIFY	MANAGE BY/ADVISE ON
• Feeding well (suckling effectively >8 times in 24 hours) • Weight >2,500 g or small baby but eating and gaining weight well • No danger signs • No special treatment needs	**Well Baby**	▶ Continue exclusive breastfeeding on demand ▶ Ensure warmth, cord care, hygiene, other baby care ▶ Routine visit at age 3-7 days ▶ Next immunization at 6 weeks ▶ When to return if danger signs ▶ Record on home-based record ***If first visit (baby not delivered in health facilities) give*** ▶ **Vitamin K** 1 mg IM ▶ **Tetracycline** eye ointment
• Receiving other foods/drinks or given pacifier • Breastfeeding <8 times/ 24 hours • Not well attached/ not suckling well	**Feeding Problem**	▶ Stop other food/drinks ▶ Feed more frequently, day and night. Reassure mother she has enough milk ▶ Ensure correct positioning/ attachment ▶ If thrush: teach how to treat at home (apply **gentian violet** paint 4 times daily for 7 days with clean hands, use a soft cloth)

SIGNS	CLASSIFY	MANAGE BY/ADVISE ON
• Thrush • Poor weight gain	**Feeding Problem**	▶ FOLLOW UP visit in 2 days, re-check weight ▶ If no improvement: Refer for breastfeeding counselling
• Preterm • Low birth weight (LBW) 1,500–2,500 g • Twin	**Small Baby**	▶ Provide as close to continuous Kangaroo mother care as possible to prevent hypothermia ▶ Give special support to breastfeed small baby/twins ▶ Teach mother how to care for a small baby ▶ Teach alternative feeding method (cup feeding) ▶ Assess daily (if admitted) or every 2 days (if outpatient) until feeding and growing well ▶ If twins, discharge them only when both are fit to go home
• Very Low Birth weight < 1,500 g • Very preterm (< 32 weeks)	**Very Small Baby**	▶ Refer urgently to hospital for special care ▶ Ensure extra warmth during referral
• Mother very ill/ receiving special treatments • Mother transferred	**Mother Unable to Take Care of Baby**	▶ Help mother to express breastmilk (to maintain lactation) ▶ Consider other feeding methods until mother can breastfeed ▶ Ensure warmth using other methods ▶ Cord care and hygiene ▶ Monitor daily

17.1.2 Assess for Special Treatment Needs, Local Infection, and Jaundice

Ask (check records)	Look Listen and feel
• Has the mother had (within 2 days of delivery) fever> 38°C and/or infection treated with antibiotic? • Did the mother have membrane ruptured > 18 hours before delivery? • Has the mother tested RPR positive? • Has the mother started TB treatment < 2 months ago? • Is the mother HIV positive? is she on ARVs? • Has anything been applied to the umbilicus?	• Eyes: Swollen and draining pus? • Umbilicus: Red and draining pus? • Skin: Many or severe pustules? Swelling, hardness or large bullae? • Jaundice: check face if baby < 24 hours, check palms and soles if > 24 hours • Movements: Less than normal? Limbs moving symmetrically? • Presenting part (head or buttocks): Swelling, bruising? • Any malformation?

Classify and treat as below

SIGNS	CLASSIFY	MANAGE BY/ADVISE ON
• Baby < 1 day old and membrane ruptured > 18 hours • Mother with fever and/or on antibiotics	**Risk of Bacterial Infection**	▶ Give **ampicillin** 50 mg/kg every 12 hours plus **gentamicin** 5 mg/kg (4 mg if pre-term) once daily for 5 days ▶ Assess baby daily
• Mother tested RPR positive	**Risk of Congenital Syphilis**	▶ Give baby single dose **benzathine penicillin** 50,000 IU/kg IM ▶ Ensure mother and partner are treated (see section 3.2.7) ▶ FOLLOW UP every 2 weeks
• Mother started TB treatment <2 months before delivery	**Risk of TB**	▶ Give baby prophylaxis with **isoniazid** 5 mg/kg daily for 6 months ▶ Vaccinate with BCG only after treatment completed ▶ Reassure breastfeeding is safe ▶ FOLLOW UP every 2 weeks

SIGNS	CLASSIFY	MANAGE BY/ADVISE ON
• Mother known HIV positive	**Risk of HIV**	▶ Give ARV prophylaxis as per national guidelines (see section 3.1.4.2) ▶ Counsel on infant feeding ▶ Special counselling if mother breastfeeding ▶ FOLLOW UP every 2 weeks
• Eyes swollen, draining pus	**Gonococcal Eye Infection** (Possible Chlamydia Coinfection) (Section 3.2.9.1)	▶ Give **ceftriaxone** 125 mg IM stat plus **azithromycin syrup** 20 mg/kg daily for 3 days ▶ Teach mother how to treat eye infection at home (clean eyes with clean wet cloth and apply **tetracycline** ointment 3 times day) ▶ Assess and treat mother and partner for possible gonorrhoea and chlamydia (see section 3.2.1–3.2.2) ▶ FOLLOW UP in 2 days ***If no improvement: Refer urgently to hospital***
• Red umbilicus	**Local Umbilical Infection**	▶ Teach mother how to treat at home (wash crust and pus with boiled cooled water, dry and apply **Gentian Violet** 0.5% 3 times a day) ▶ FOLLOW UP in 2 days ▶ If not improved, reclassify and treat or refer

SIGNS	CLASSIFY	MANAGE BY/ADVISE ON
• <10 pustules	**Local Skin Infection**	▶ Teach mother to how to treat infection at home (wash crust and pus with boiled cooled water, dry and apply **Gentian Violet** 0.5% 3 times a day) ▶ Reassess after 2 days ▶ If not improved, reclassify and treat or refer
• Yellow face (<24 hours old) or • Yellow palms and soles (>24 hours old)	**Severe Jaundice**	▶ Refer urgently to hospital – Encourage breastfeeding – If breastfeeding problem, give expressed milk by cup
• Bruises or swelling on buttocks • Swollen head - bump on one or both sides	**Birth Injury**	▶ Explain to parents that it does not hurt the baby and it will disappear in 1 or 2 weeks by itself ▶ DO NOT force the leg into a different position ▶ Gently handle the limb that is not moving, do not pull

SIGNS	CLASSIFY	MANAGE BY/ADVISE ON
• Abnormal position of legs after breech presentation • Asymmetrical arm movement or arm does not move		
• Club foot • Cleft palate or lip • Odd looking unusual appearance • Open tissue on the head/ abdomen/ back/ perineum or genitalia	**Malformation**	▲ Refer for special evaluation and treatment ▲ Help mother breastfeed or teach mother alternative method if not possible ▲ Cover open tissue with sterile gauze soaked in sterile saline solution before referral

17.2 SICK YOUNG INFANT AGE UP TO 2 MONTHS

- Ask the mother what the child's problems are
- Check if this is an initial or FOLLOW UP visit for this problem
  - If FOLLOW UP visit: Check up on previous treatments
  - If initial visit: Continue as below

Assess, classify and treat for the following:

- Severe disease and local bacterial infection
- Jaundice
- Diarrhoea and dehydration
- HIV
- Feeding and weight problems
- Any other problem
- Immunization status

Counsel the mother on

- Nutrition and breastfeeding of the child
- Her own health needs
- To return for FOLLOW UP as scheduled
- To return immediately at the clinic if the danger signs in the table below appear:

DANGER SIGN	RETURN
• Breastfeeding or drinking poorly • Becomes more ill • Develops fever • Fast or difficult breathing • Blood in stool	**Immediately**

17.2.1 Check for Very Severe Disease and Local Bacterial Infection

Ask	Look, listen, feel
• Ask if the infant is having difficulty in feeding? • Has the infant had any convulsions?	• Count the number of breaths per minute (INFANT MUST BE CALM) – Repeat the count if this is > 60 breaths per minute • Look for severe chest indrawing and nasal flaring • Look and listen for grunting • Look and feel for a bulging fontanel • Look for pus draining from the ear • Look at the umbilicus. Is it red or draining pus? – Does the redness extend to the skin? • Measure the body temperature (or feel for fever or low body temperature) • Look for skin pustules, if present, are they many or severe? • See if the young infant is lethargic or unconscious • Observe the young infant's movements – Are they less than normal? – Observe the young infant for any spasms (differentiate from convulsions) – Check if young infant has stiff neck or lock jaw – Feel the young infants abdomen for rigidity

Classify and treat possible infection as in the table below:

SIGNS	CLASSIFY AS	TREATMENT
Any of the following: • Not feeding well or • Convulsions or • Fast breathing (>60 breaths/min) or • Severe chest in drawing or • Fever (>37.5°C or feels hot) • Low body temp (<35.5°C or feels cold) • Movement when stimulated or no movements at all • Blood in stool	**Very Severe Disease**	▶ Give 1st dose of IM antibiotics: **ampicillin** 50 mg/kg plus gentamicin 5 mg/kg (if <7 days) or 7.5 mg/kg (if >7 days) ▶ Or if HC2, **Benzylpenicillin** 50,000 IU/Kg IM single pre referral dose ▶ Treat to prevent low blood sugar (breastfeed or give expressed breast milk or sugar water by cup or NGT) ▶ Advise mother how to keep infant warm on the way to hospital ▶ **Refer URGENTLY to Hospital** ***If referral not possible,*** ▶ Continue **ampicillin** (twice daily if < 7 days, thrice daily if > 7 days) ▶ **Gentamicin** once daily for at least 5 days

SIGNS	CLASSIFY AS	TREATMENT
Any of the following: • Umbilicus red or discharging pus • Skin pustules	**Local Bacterial Infection**	▶ Give appropriate oral antibiotic: **amoxicillin** 250 mg DT ¼ tab (if below 1 month, 4 kg) or ½ tab (if 1-2 months, 4-6 kg) every 12 hours for 5 days ▶ Teach mother to treat local infection at home (apply **Gentian Violet** paint twice daily for 5 days) ▶ Advise mother on home care for the young infant ▶ FOLLOW UP in 2 days: – If better: praise the mother, advise to complete treatment – If same or worse: refer to hospital
None of the signs of very severe disease or local bacterial infection	**Severe Disease or Local Infection Unikely**	▶ Continue assessment of other problems ▶ Advise mother to give home care
Notes ▶ Body temperatures are based on axillary measurement ▶ Rectal readings are approximately 0.5°C higher		

17.2.2 Check for Jaundice

If jaundice present, Ask	Look and feel
• When did the jaundice appear first?	• Look for jaundice (yellow eyes or skin) • Look at the young infant's palms and soles. Are they yellow?

Classify jaundice as in the following table

SIGNS	CLASSIFY AS	TREATMENT
• Any jaundice if age less than 24 hours or • yellow palms and soles at any age	**Severe Jaundice**	▶ Treat to prevent low blood sugar (breastfeed or give expressed breast milk or sugar water by cup or NGT) ▶ Refer urgently to hospital ▶ Advise mother to keep infant warm .

• Jaundice appearing after 24 hours of age and • Palms and soles not yellow	**Jaundice**	▶ Advise mother to give home care for the young infant ▶ Advise mother to return immediately if palms and soles appear yellow ▶ If the young infant is older than 14 days refer to hospital for assessment ▶ FOLLOW UP in one day: – If palms and soles are yellow, refer to hospital – If palms and soles are not yellow but jaundice has not decreased, advise FOLLOW UP in 1 day – If jaundice is decreasing, reassure mother and FOLLOW UP in 2 weeks – If still there in 2 weeks, refer to hospital
• No jaundice	**No Jaundice**	▶ Advise mother to give home care for the young infant ▶ Continue assessment for other problems

17.2.3 Check for Diarrhoea/Dehydration

Ask	If yes, Look and feel
• If child has diarrhoea • If yes, ask for how long it has been present	• Infant's movements – Does the infant move on his/her own? – Does the infant move when stimulated but then stops? – Does the infant not move at all? – Is the infant restless and irritable? – Check the eyes. Are they sunken? – Pinch the skin of the abdomen. Does it go back – Very slowly? (takes >2 seconds) – Slowly? (up to 2 seconds)

Classify and treat the dehydration and diarrhoea as in the table below

CLINICAL FEATURES	CLASSIFY AS	MANAGEMENT
For dehydration (see also section 1.1.3.1)		
Two of these signs: • Movement only when	**Severe Dehydration**	***If infant has no other severe classification:*** ▶ Give fluid for severe dehydration (Plan C) OR

CLINICAL FEATURES	CLASSIFY AS	MANAGEMENT
stimulated or no movement at all • Sunken eyes • Skin pinch goes back very slowly.		***If infant also has another severe classification:*** ▶ Refer URGENTLY to hospital with mother giving frequent sips of ORS on the way ▶ Advise the mother to continue breastfeeding
Two of these signs: • Restless, irritable • Sunken eyes • Skin pinch returns slowly (up to 2 seconds)	**Some Dehydration**	▶ Give Plan B (Give fluid and breast milk for some dehydration) ▶ Advise mother when to return immediately ▶ FOLLOW UP in 2 days: – If better, praise the mother and advice to continue breastfeeding – If not better, reassess and treat accordingly ***If infant also has another severe classification:*** ▶ Refer URGENTLY to hospital with mother giving frequent sips of ORS on the way ▶ Advise the mother to continue breastfeeding

CLINICAL FEATURES	CLASSIFY AS	MANAGEMENT
• Not enough signs to classify as some or severe dehydration	**No Dehydration**	▶ Give fluids to treat diarrhoea at home and continue breast feeding (Plan A) ▶ Advise mother when to return immediately ▶ FOLLOW UP in 2 days – If better, praise the mother and advice to continue breastfeeding – If not better, reassess and treat accordingly
	If diarrhoea of > 14 days	
• Diarrhoea lasting 14 days or more	**Severe Persistent Diarrhoea**	▶ Refer to hospital ▶ Treat dehydration before referral

Note

◆ What is diarrhoea in a young infant?

– A young infant has diarrhoea if the stools have changed from usual pattern and are many and watery (more water than faecal matter).

– The normally frequent or semi-solid stools of a breastfed baby are not diarrhoea.

17.2.4 Check for HIV Infection

Ask

- Has the mother and/or young infant had an HIV test?

IF YES:

- What is the mother's HIV status?
  - Serological test POSITIVE or NEGATIVE
- What is the young infant's HIV status?
  - Virological test POSITIVE or NEGATIVE
  - Serological test POSITIVE or NEGATIVE

If mother is HIV positive (or serological test of the child is positive) and NO positive virological test in child ASK:

- Is the young infant breastfeeding now?
- Was the young infant breastfeeding at the time of test or before it?
- Is the mother and young infant on PMTCT ARV prophylaxis?

IF NO test: Mother and young infant status unknown

➢ Perform serological HIV test for the mother (or serological test for the child if the mother is not present); if positive, perform virological test for the young infant

Classify and treat HIV status (see also section 3.1.4)

CLINICAL FEATURES	CLASSIFY AS	MANAGEMENT
• Positive virological testing in young infant	**Confirmed HIV Infection**	▶ Give **cotrimoxazole** prophylaxis from age 6 weeks. ▶ Give HIV care and ART ▶ Advise the mother on home care ▶ FOLLOW UP regularly as per national guidelines
• Mother HIV positive AND negative virological test in young infant breastfeeding or if only stopped less than 6 weeks ago. OR • Mother HIV positive**, young infant not yet tested OR • Positive serological test in infant	**HIV Exposed**	▶ Give **cotrimoxazole** prophylaxis from 6 weeks of age ▶ Start or continue PMTCT ARV prophylaxis as per national recommendations ▶ Do virological test at age 6 weeks or repeat 6 weeks after the child stops breastfeeding ▶ Advise the mother on home care ▶ FOLLOW UP regularly as per national guidelines
• Negative HIV test in mother • or young infant	**HIV Infection Unlikely**	▶ Treat, counsel and FOLLOW UP existing infections

17.2.5 Check for Feeding Problem or Low Weight-for-Age

17.2.5.1 All Young Infants Except HIV-exposed Infants Not Breastfed

If an infant has no indications to refer urgently to hospital: **Ask** • Is there any difficulty feeding? • Is the infant breastfed? – If yes, how many times in a 24-hour period? • Does the infant usually receive any other foods or drinks, including water? – If yes, how often? • What do you use to feed the infant?	**Look listen and feel** • Determine weight for age – Weigh the child and use the chart at the end of this chapter to determine if the child is low weight for its age in months • Look for ulcers or white patches in the mouth (thrush)
Assess breastfeeding • Has the infant breastfed in the previous hour? – If no, ask the mother to put the infant to the breast. – If yes, ask the mother if she can wait and tell you when the infant is willing to feed again	

- Observe breastfeeding for 4 minutes: is the infant able to attach properly to the breast? For good attachment, the following should be present:
  - Chin touching breast
  - Mouth wide open
  - Lower lip turned outwards
  - More areola visible above than below the mouth
- Is the infant able to suckle effectively? This means slow, deep sucks with occasional pauses
  - Clear a blocked nose if it interferes with breastfeeding

Classify and treat feeding problems

CLINICAL FEATURES	CLASSIFY AS	MANAGEMENT
Any of these signs • Not well attached to breast or • Not suckling effectively or • Less than 8 breastfeeds in 24 hours or	**Feeding Problem or Low Weight**	▶ If not well attached or not suckling effectively, teach correct positioning and attachment – If not able to attach well immediately, teach the mother to express breast milk and feed by a cup ▶ If breastfeeding less than 8 times in 24 hours, advise to increase frequency of feeding. Advise the mother to breastfeed as often and as long as the infant wants, day and night ▶ If not breastfeeding at all

CLINICAL FEATURES	CLASSIFY AS	MANAGEMENT
• Receives other foods or drinks or • Low weight for age or • Thrush (ulcers or white patches in mouth)		– Refer for breastfeeding counselling and possible relactation (except if mother not breasfeeding because HIV positive) – Advise about correctly preparing breast-milk substitutes and using a cup ▶ Advise the mother how to feed and keep the low weight infant warm at home ▶ If thrush, teach the mother to treat thrush at home (apply **gentian violet** paint 4 times daily for 7 days with clean hands, use a soft cloth) ▶ Advise mother to give home care for the young infant ▶ FOLLOW UP any feeding problem or thrush in 2 days and reassess. – Continue FOLLOW UP till satisfactory feeding. If loosing weight, refer. – If thrush is worse, check that treatment is given correctly. If better, complete 7-day treatment.

CLINICAL FEATURES	CLASSIFY AS	MANAGEMENT
		▶ FOLLOW UP low weight for age in 14 days: – If no longer low weight for age, praise the mother and encourage to continue. – If still low weight for age but feeding well, praise the mother and FOLLOW UP in 14 days – If low weight for age, still feeding problem or lost weight: refer to hospital
• Not low weight for age and no other signs of inadequate feeding	**No Feeding Problem**	▶ Advise mother on home care for young infant ▶ Praise mother for feeding the infant well

17.2.5.2 HIV-exposed Non Breastfeeding Infants

Ask	Look, listen and feel
• What milk are you giving? • How many times during the day and night? • How much is given at each feed? • How are you preparing the milk?	• Determine weight for age • Look for ulcers or white patches in the mouth (thrush)

• Let mother demonstrate or explain how a feed is prepared, and how it is given to the infant. • Are you giving any breast milk at all? • What foods and fluids in addition to replacement feeds is given? • How is the milk being given? Cup or bottle? • How are you cleaning the feeding utensils?	

Classify and treat feeding problems

CLINICAL FEATURES	CLASSIFY AS	MANAGEMENT
• Milk incorrectly or unhygienically prepared or • Giving inappropriate replacement feeds or • Giving insufficient replacement feeds • or • An HIV positive mother	**Feeding Problem or Low Weight**	▶ Counsel about feeding ▶ Explain the guidelines for safe replacement feeding ▶ Identify concerns of mother and family about feeding ▶ If mother is using a bottle, teach cup feeding ▶ Advise the mother how to feed and keep infant warm at home ▶ If thrush, teach the mother to treat thrush at home (apply **gentian violet** paint 4 times daily for 7 days with clean hands, use a soft cloth) ▶ Advise mother to give home care for the young infant ▶ FOLLOW UP any feeding problem or thrush in 2 days

mixing breast and other • feeds before 6 months or • Using a feeding bottle or.		– Continue FOLLOW UP till satisfactory feeding. If loosing weight, refer – If thrush is worse, check that treatment is given correctly. If better, complete 7-day treatment
• Low weight for age or • Thrush (ulcers or white • patches in mouth)		▶ FOLLOW UP low weight for age in 14 days – If no longer low weight for age, praise the mother and encourage to continue. – If still low weight for age but feeding well, praise the mother and FOLLOW UP in 14 days – If low weight for age, still feeding problem or lost weight: refer to hospital
• Not low weight for age and no other signs of inadequate feeding	**No Feeding Problem**	• Advise mother to give home care for the young infant • Praise the mother for feeding the infant well

17.2.6 Check Young Infant's Immunization Status

Check immunization card and classify

• Imunization not up to date according to national schedule (see chapter 18)	**Infant Not Immunized as per Schedule**	• Give all missed doses on this visit (Include sick infants unless being referred)
• Immunization upto date as per national schedule	**Infant Immunized as Per Schedule**	• Advise caretaker when to return for the next dose

17.2.7 Assess Other Problems

Assess any other presenting problems (e.g. eye problems, rashes) and manage accordingly.

17.2.8 Assess Mother's Health Needs

- Check for current health problems
- Check nutritional status and anaemia
- Check whether family planning help is required
- Check on tetanus immunization status

17.2.9 Summary of IMNCI Medicines Used for Young Infants

DRUG	DOSE	INDICATION	LOC
Ampicillin	50 mg/kg	Pre referral IM dose in very severe disease	**HC3**
Gentamicin	Age < 7 days 5 mg/Kg	Pre referral IM dose in very severe disease	**HC3**
	Age > 7 days 7.5 mg/kg		
Benzyl penicillin	50,000 IU/Kg IM	Pre referral IM dose in very severe disease if ampicillin/ gentamicin not available	**HC2**
Amoxicillin 250 mg dispersible tablets (DT)	**Birth-<1 month (< 4 kg):** ¼ tab every 12 hours for 5 days	In local bacterial infection	**HC1**
	1-2 month (4-6 kg): ½ tab every 12 hours for 5 days		

Gentian Violet 0.5%	Apply in the mouth 4 times a day for 7 days	In oral thrush	**HC2**
	Apply on skin twice daily for 5 days	Local bacterial infection (skin pustules or umbilical infection)	
Cotrimoxazole Tab 120 mg pediatric tablet	1 tab once daily	Prophylaxis in HIV infected or HIV exposed children till infection can be excluded	**HC2**

17.2.10 Counsel the Mother

Teach correct positioning and attachment for breast feeding

- Show mother how to hold the infant:
  - With the infant's head and body straight
  - Facing her breast with infant's nose opposite the nipple
  - With infant's body close to hers
  - Supporting the infant's whole body, not just the neck and shoulders
- Show her how to help the infant attach, she should:
  - Touch her infant's lips with her nipple
  - Wait until her infant's mouth opens wide
  - Move her infant quickly onto her breast aiming the infant's lower lip well below the nipple
- Look for signs of good attachment and effective suckling
  - If either is not good, try again

Advise mother on home care for the young infant

- **Food and fluids:** Breastfeed frequently on demand (as often and for as long as the infant wants) day and night, during sickness and health
- **Warmth:** Ensure the young infant is always warm

17.3 SICK CHILD AGE 2 MONTHS TO 5 YEARS

Assess, classify, and treat

- Ask the mother what the child's problems are
- Check if this is an initial or FOLLOW UP
  - If FOLLOW UP visit: Check up on previous problems, check that the treatment has been given correctly and assess any new problems
- If initial visit: Continue as below

In assessing a sick child, assess for the following:

- General danger signs: URGENT ATTENTION and ACTION REQUIRED.

Then check for:

- Cough or difficult breathing
- Diarrhoea and dehydration
- Fever
- Ear problems
- Malnutrition and feeding problems
- Anaemia
- HIV
- Immunization, deworming and vitamin A
- Any other problem

Then counsel the mother on

- Extra fluids for any sick child
- Nutrition and breastfeeding of the child
- How to give home treatments
- Her own health needs
- To return for FOLLOW UP as scheduled

– To return immediately if any danger sign appear

DANGER SIGN	RETURN
• Breastfeeding or drinking poorly • Becomes more ill • Develops fever • Fast or difficult breathing • Blood in stool	**Immediately**

17.3.1 Check for General Danger Signs

Ask	Look
• Is the child unable to drink or breastfeed • Is the child vomiting everything • Has the child had convulsions	• See if the child lethargic or unconscious • Is the child convulsing now

Classify and treat as below

CLINICAL FEATURE	CLASSIFY AS	MANAGEMENT
• Any general danger sign	**Very Severe Disease**	▶ Give diazepam if convulsing (rectal **diazepam** 0.5 mg/kg) ▶ Quickly complete the assessment ▶ Give any pre referral treatment immediately ▶ Treat to prevent low blood sugar (breastfeed or give expressed breast milk breastmilk substitute or sugar water by cup or NGT) ▶ Keep the child warmwREFER URGENTLY

17.3.2 Check for Cough or Difficult Breathing

Ask	Look Listen and feel
• If child has cough and/or difficulty in breathing **If yes, ask** • For how long child has had this?	***Ensure the child is calm, then*** • Count the number of breaths/minute • Look for chest indrawing • Look/listen for stridor (stridor is an abnormal harsh, high-pitched sound caused by obstructed airflow, usually more audible while inhaling) • Look and listen for wheezing • If pulse oximeter is available, determine oxygen saturation. Refer if < 90% ***If wheezing with either fast breathing or chest indrawing:*** ▶ Give a trial of rapid acting inhaled broncodilator (with spacer) for up to 3 times 15-20 min apart. Count the breaths and look for chest indrawing again, and then classify **Fast breathing:** • Child 2–12 months: ≥ 50 breaths per minute • Child 1–5 years: ≥ 40 breaths per minute

Classify and treat as below

CLINICAL FEATURES	CLASSIFY AS	MANAGEMENT
• Any general danger sign • Or stridor in calm child • SpO_2 < 90%	**Severe Pneumonia or Very Severe Disease**	▶ Give 1st dose of appropriate antibiotic : **ampicillin** 50 mg/Kg IM and **gentamicin** 7.5 mg/Kg IM – Or **Benzylpenicillin** 50,000 IU/Kg IM if at HC2 – Or **Amoxicillin** DT 40 mg/kg if parenteral antibiotics not available – Refer URGENTLY to HC4/HOSPITAL ***If referral not possible*** ▶ Continue **ampicillin** 6 hourly and **gentamicin** once daily for 5 days – If strong suspicion of meningitis, dose of **ampicillin** can be increased 4 times
• Chest indrawing • Fast breathing – Child 2-12 months: ≥ 50 breaths/minute	**Pneumonia**	▶ Give **amoxicillin** DT 40 mg/kg for 5 days as first line treatment ▶ If wheezing give an inhaled bronchodilator for 5 days (**salbutamol** inhaler every 3-4 hours as necessary) ▶ If coughing for more than 14 days or recurrent wheeze, refer for possible TB or asthma assessment ▶ If chest in drawing in HIV exposed/infected child, give first dose of **amoxicillin** DT 40 mg/kg and refer

CLINICAL FEATURES	CLASSIFY AS	MANAGEMENT
– Children 1-5 years: ≥ 40 breaths/ minute		▶ Soothe throat/relieve cough with safe remedy ▶ If coughing for more than 14 days or receurrent wheeze refer for possible TB or asthma assesment . ▶ Advise mother when to return immediately (danger signs) ▶ FOLLOW UP in 3 days and reassess – If better (slower breathing, no indrawing, less fever, eating better), praise the mother and advise to complete treatment – If not better or worse, refer urgently to hospital
No signs of severe disease or pneumonia	**Cough or Cold** (No pneumonia) Most likely viral so no antibiotics needed	▶ If wheezing give an inhaled bronchodilator (**salbutamol** inhaler every 3-4 hours as necessary) for 5 days ▶ Soothe throat/relieve cough with safe remedy ▶ If coughing for more than 14 days or recurrent wheezing, refer for possible TB or asthma assesment ▶ Advise mother when to return immediately (danger signs) ▶ If not improving, FOLLOW UP in 5 days
Note: ◆ Use age-appropriate spacers to administer salbutamol inhaler		

17.3.3 Child Has Diarrhoea

Ask	Look and feel
• Does the child have diarrhoea? • If yes, for how long child has had this • Using appropriate local terms, ask if there is blood in the stool	• Look at the child's general condition. Is the child: – Lethargic or unconscious? – Restless and irritable? • Look for sunken eyes • Offer the child fluid. Is the child: – Unable to drink or drinks poorly? – Thirsty, drinks eagerly? • Pinch the skin of the abdomen. Does it go back: – Very slowly? (>2 seconds) – Slowly?

Classify and treat as below

CLINICAL FEATURES	CLASSIFY AS	MANAGEMENT
Any 2 of these signs: • Lethargic or unconscious • Sunken eyes	**Severe Dehydration**	▶ If child has no other severe classification, give dehydration Plan C (see section 1.1.3) ▶ If child also has another severe classification: – Give pre-referral treatment and **refer urgently** with mother giving frequent sips of **ORS** on the way

CLINICAL FEATURES	CLASSIFY AS	MANAGEMENT
• Unable to drink or drinks poorly • Skin pinch returns very slowly (>2 seconds)		– Advise mother to continue breastfeeding ▶ If child is 2 years or older and there is cholera in your area: ▶ Give 1st dose of **erythromycin** 125 mg (if child < 2 years) or 250 mg (child 2-5 years) every 6 hours for 3 days ▶ Educate mother on hygiene and sanitation
Any 2 of these signs: • Restless, irritable • Sunken eyes Thirsty, drinks eagerly • Skin pinch returns slowly	**Some Dehydration**	▶ Give fluid, zinc supplements, and food if possible See Dehydration Plan B (see section 1.1.3) ▶ If child also has a severe classification: – Refer URGENTLY to hospital with mother – Giving frequent sips of ORS on the way – Advise the mother to continue breastfeeding ▶ Advise mother when to return immediately ▶ FOLLOW UP in 5 days – If better (diarrhoea stopped, less than 3 loose stools per day, praise mother and advise her on feeding) – If not better (> 3 loose stools per day), reasses, treat dehydration and refer

CLINICAL FEATURES	CLASSIFY AS	MANAGEMENT
		▶ Educate mother on hygiene and sanitation
• Not enough signs to classify as some or severe dehydration	**No Dehydration**	▶ Give fluid, **zinc** supplements, and food to treat diarrhoea at home (Plan A) (see section 1.1.3) ▶ Advise mother when to return immediately ▶ FOLLOW UP in 5 days – If better (diarrhoea stopped, less than 3 loose stools per day, praise mother and advise her on feeding) – If not better (> 3 loose stools per day), reasses, treat dehydration and refer ▶ Continue with breast feeding ▶ Educate mother on hygiene and sanitation
• Blood in stool	**Dysentery**	▶ Give **ciprofloxacin** 15 mg/kg for 3 days for Shigella ▶ FOLLOW UP in 3 days – If better (fewer stools, less blood in stool, less fever, less abdominal pain, better feeding) praise the mother, complete the ciprofloxacin and advise on feeding – If not better, refer

CLINICAL FEATURES	CLASSIFY AS	MANAGEMENT
If diarrhoea for 14 days or more:		
Dehydration present	**Severe Persistent Diarrhoea**	▶ Give **vitamin A** ▶ Treat dehydration before referral (unless child has another severe classification) ▶ Refer to hospital
No dehydration	**Persistent Diarrhoea**	▶ Advise mother on feeding child with PERSISTENT DIARRHOEA ▶ Give **vitamin A;** multivitamins and minerals (including zinc) for 14 days ▶ FOLLOW UP in 5 days – If better (diarrhoea stopped, less than 3 loose stools per day, praise mother and advise her on feeding) – If not better (> 3 loose stools per day), reasses, treat dehydration and refer – If symptoms are the same or worse, start treating dehydration if present and refer to hospital

Note:

- The current recommendation for treatment of diarrhoea is oral rehydration salts (ORS) and zinc salts (Zn sulphate, Zn gluconate or Zn acetate).
  - Give zinc for 10 days: *Child < 6 months*: 10 mg per day; *Child > 6 months*: 20 mg per day

17.3.4 Check for Fever

Ask	Look and feel
• If the child has fever – By history, feels hot, or temperature ≥37.5°C (see note 1 in table below) • If yes, ask for how long child has had this – If >7 days, ask if fever has been present every day – Ask if the child has had measles in the last 3 months • DO MALARIA TEST in all fever cases	• Look/feel for stiff neck • Look for runny nose • Look for any bacterial cause of fever: local tenderness, oral sores, refusal to use a limb, hot tender swelling, red tender skin or boils, lower abdominal pain or pain on passing urine in older children • Look for signs of measles: • Generalised rash • Cough, runny nose, or red eyes ***If child has measles now or had measles in last 3 months*** • Look for mouth ulcers – are they deep or extensive? • Look for pus draining from the eyes • Look for clouding of the cornea

Classify and treat as below

CLINICAL FEATURES	CLASSIFY AS	MANAGEMENT
• Any general danger sign • Stiff neck	**Very Severe Febrile Disease**	▶ Give 1st dose of **rectal artesunate** (10 mg/kg) or IM/IV **artesunate** (3 mg/kg if < 20 kg, 2.4 mg/kg if > 20 kg) (see section 2.5.2) ▶ Give 1st dose of **appropriate** antibiotic for serious bacterial infection: **ampicillin** 50 mg/Kg IM and **gentamicin** 7.5 mg/Kg IM or – **Benzylpenicillin** 50,000 IU/Kg IM if at HC2 ▶ Treat child to prevent low blood sugar (breastfeed or give expressed breast milk or breastmilk substitute or sugar water by cup or NGT) ▶ Give one dose of **paracetamol** 10 mg/kg for high fever (38.5°C) ▶ Refer urgently

CLINICAL FEATURES	CLASSIFY AS	MANAGEMENT
• Malaria test positive	**Malaria**	▶ Give 1st line malaria treatment (oral **ACT**, see section 2.5.2) ▶ Give one dose of **paracetamol** 10 mg/kg for high fever (38.5°C) ▶ If a bacterial infection is also identified, give appropriate antibiotic treatment ▶ Advise mother when to return immediately, counsel on use of insecticide treated mosquito nets and educate on environmental sanitation ▶ FOLLOW UP in 3 days if fever persists: – Do a full reassessment and look for other causes of fever – Check that the child has completed the full course of antimalarials (without vomiting any dose) – Do not repeat RDT if it was positive on the initial visit – If no danger sign, no other apparent cause of fever and antimalarial treatment was given correctly, refer for microscopy and/or second line antimalarial ▶ If fever every day for >7days, refer for assessment

CLINICAL FEATURES	CLASSIFY AS	MANAGEMENT
• Malaria test Negative	**Fever No Malaria**	▶ Give one dose of **paracetamol** 10 mg/Kg in child with high fever (38.5oC) ▶ If a bacterial infection is identified, give appropriate antibiotic treatment ▶ If no bacterial infection identified, reassure, give **paracetamol**, advise to come back in 3 days or in case of any problem ▶ Advise mother when to return immediately and counsel on use of insecticide treated mosquito net and educate on environmental sanitation. ▶ FOLLOW UP in 3 days if fever persists ▶ Reassess the child for danger signs and other possible causes of fever – Repeat the malaria test and treat if positive – If no apparent cause of fever, refer – If fever every day for >7days, refer for assessment

CLINICAL FEATURES	CLASSIFY AS	MANAGEMENT
If measles now or in last 3 months, classify as:		
• Any general danger sign • Clouding of cornea • Deep or extensive mouth ulcers	**Severe Complicated Measles**	▶ Give **vitamin A** ▶ Give 1st dose of appropriate antibiotic for severe bacterial infection: **ampicillin** 50 mg/Kg IM and **gentamicin** 7.5 mg/Kg IM or – **Benzylpenicillin** 50,000 IU/Kg IM if at HC2 ▶ If clouding of cornea or pus draining from eye: apply **tetracycline** eye ointment ▶ REFER URGENTLY to hospital
• Stridor • Difficulty in breathing • Diarrhoea • Acute malnutrition • Ear problem	**Complicated Measles**	▶ Refer to the relevant IMCI sections

CLINICAL FEATURES	CLASSIFY AS	MANAGEMENT
• Pus draining from eye • Mouth ulcers	**Measles + Eye Or Mouth Complications**	▶ Give **vitamin A** ▶ If pus draining from eye: Apply **tetracycline** eye ointment ▶ If mouth ulcers, apply **gentian violet** paint ▶ FOLLOW UP in 3 days ▶ If eyes still discharging pus and treatment has been given correctly, refer. If eyes only red or better, complete treatment ▶ If mouth ulcers/thrush are the same or better, continue treatment. If worse and/or child has problem swallowing, refer
• Measles now or in the last three months	**Measles**	▶ Give **Vitamin A** (see section 2.3.3)

Note:

- Body temperatures are based on axillary measurement. Rectal readings are approximately 0.5°C higher
- For doses of Vitamin A, Gentian violet and Tetracycline ointment see section 17.3.11.2

17.3.5 Check for Ear Problem

Ask	Look and feel
• Does the child have an ear problem? • If yes, • Does the child have ear pain? • Is there discharge: • If yes, ask for how long	• Look for pus draining from the ear • Feel for tender swelling behind the ear

Classify and treat as below

CLINICAL FEATURES	CLASSIFY AS	MANAGEMENT
• Tender swelling behind the ear	**Mastoiditis**	▶ Give 1st dose of **appropriate antibiotic ampicillin** 50 mg/Kg IM and **gentamicin** 7.5 mg/Kg IM or – **Benzylpenicillin** 50,000 IU/Kg IM – **Amoxicillin DT** 40 mg/kg if parenteral not available ▶ Give 1st dose of **paracetamol** 10 mg/kg for pain ▶ REFER URGENTLY
• Ear pain • Pus seen draining	**Acute Ear Infection**	▶ Give **amoxicillin** DT 40 mg/kg every 12 hours for 5 days ▶ Give **paracetamol** 10 mg/kg for pain ▶ Dry ear by wicking

CLINICAL FEATURES	CLASSIFY AS	MANAGEMENT
from ear, and discharge for <14 days		▶ FOLLOW UP in 5 days – If high fever and/or swelling behind the ear: refer urgently – If pain or discharge persists: continue antibiotics for 5 more days and reassess – If no pain and discharge, praise the mother, complete the 5-day treatment
• Pus seen draining from ear, and discharge reported for 14 days or longer	**Chronic Ear Infection**	▶ Dry ear by wicking 3 times a day (see section 21.1.4) ▶ After thorough drying by wicking, apply topical quinolone ear drops e.g. **ciprofloxacin** eye/ear 3 times a day for 14 days if available ▶ Oral antibiotics are not effective ▶ FOLLOW UP in 5 days – Check that the mother is wicking correctly and applying the drops. Encourage her to continue till resolution of symptoms. FOLLOW UP in 2 weeks.
• No ear pain or discharge	**No Ear Infection**	▶ No additional treatment needed

17.3.6 Check for Malnutrition and Feeding Problems

Ask	**Look and feel**
• If child ≤ 6 m, ask if the child has breasfeeding problem (how many times a day, etc) • If child ≥ 6 months, ask if child is able to finish his portions (appetite) • Ask about usual feeding habits • Which foods are available at home • What does the child eat • How many times a day • Does the child receive his/her own serving	• Look for signs of acute malnutrition like – Oedema on both feet – Determine weight for height/lenght (WFH/L) using WHO growth charts standards (see end of this chapter) – As an alternative, determine weight for age (WFA) using WHO growth chart standards – Measure MUAC (Mid Upper Arm Circumference) in children ≥ 6 months using MUAC tape ***If WFH/L is less than -3 z-scores or MUAC < 115 mm, then*** • Check for any medical complication present – Any general danger sign – Any severe classification – Pneumonia or chest indrawing ***If no medical complication presents,*** • Child ≥ 6 months: assess child appetite – offer RUTF (Ready to Use Therapeutic Food) and assess if child able to finish the portion or not • Child ≤ 6 month: assess breastfeeding

Classify and treat as directed below

CLINICAL FEATURES	CLASSIFY AS	MANAGEMENT
• Oedema of both feet OR • WFH/L less than -3 z scores or • MUAC less than 115 mm or • Visible severe wasting AND • Any one of the following: – Medical complication present OR – not able to finish RUTF OR – Breastfeeding problem	**Complicated Severe Acute Malnutrition**	▶ Give first dose appropriate antibiotic (**ampicillin** 50 mg/Kg IM and **gentamicin** 7.5 mg/Kg IM or – **Benzylpenicillin** 50,000 IU/Kg IM ▶ Treat the child to prevent low blood ▶ sugar (breastfeed or give expressed breast milk or sugar water by cup or NGT) ▶ Keep the child warm ▶ Refer URGENTLY to hospital
• WFH/L less than -3 z scores OR MUAC less than 115 mm	**Uncomplicated Severe Acute Malnutrition**	▶ Give oral antibiotics **amoxicillin** DT for 5 days (40 mg/kg twice a day) ▶ Give ready-to-use therapeutic food (RUTF) for

CLINICAL FEATURES	CLASSIFY AS	MANAGEMENT
• Or very low weight for age AND • Able to finish RUTF	**(SAM)** See section 19.2.2.2 for more details	a child aged 6 months or more ▶ Counsel the mother on how to feed the child ▶ Assess for possible TB infection ▶ Advise mother when to return immediately ▶ FOLLOW UP in 7 days – Reassess child and feeding. If no new problem, review again in 7 days. ▶ FOLLOW UP in 14 days – Reassess and reclassify and continue feeding. Keep checking every 14 days
• WFH/L between -3 and -2 z-scores • OR MUAC 115 up to 125 mm • Or low weight for age	**Moderate Acute Malnutrition (MAM)** See section 19.2.2.1 for more details	▶ Assess the child's feeding and counsel the mother on the feeding recommendations ▶ If feeding problem, counsel and FOLLOW UP in 7 days ▶ Assess for possible TB infection. ▶ Advise mother when to return immediately ▶ FOLLOW UP in 30 days – Reassess and reclassify.

CLINICAL FEATURES	CLASSIFY AS	MANAGEMENT
		– If better, praise the mother and counsel on nutrition. – If still moderate malnutrition, counsel and FOLLOW UP in one month – If worse, loosing weight, feeding problem: refer
• WFH/L - 2 z-scores or more • OR MUAC 125 mm or more	**No Acute Malnutrition**	▶ If child is < 2 years old, assess the child's feeding and counsel the mother on feeding according to the feeding recommendations ▶ If feeding problem, FOLLOW UP in 7 days – Reassess and counsel ▶ If you advise the mother to make significant changes in feeding, ask her to bring the child back again after 30 days to measure the weight

Note:

- WFH/L is Weight-for-Height or Weight-for-Length determined by using the WHO growth standards charts
- MUAC is Mid-Upper Arm Circumference measured using MUAC tape in all children ≥ 6 months
- RUTF is Ready-to-Use Therapeutic Food for conducting the appetite test and feeding children with severe acute malnutrition. For doses and more information see chapter 19.
- RUTF already contains all the necessary vitamins and minerals (folic acid, iron etc) so there is no need of additional supplements

17.3.7 Check for Anaemia

Ask	Look
• In appropriate local language, ask if presence of sickle cell anaemia in the family	• Look for palmar pallor. Is it • Severe palmar pallor? • Some palmar pallor?

Classify and treat as below

CLINICAL FEATURES	CLASSIFY AS	MANAGEMENT
• Severe palmar pallor	**Severe Anaemia**	▶ Refer URGENTLY to hospital
• Some palmar pallor	**Anaemia**	▶ Give **ferrous sulphate** ½ tab/day if 1-5 years, 1 ml of syrup/day if 2-12 months – If child has severe acute malnutrition and is receiving RUTF, DO NOT give iron because there is already adequate amount of iron in RUTF) ▶ Give **folic acid** 2.5 mg/daily in child with sickle cell anaemia

CLINICAL FEATURES	CLASSIFY AS	MANAGEMENT
		▶ Give **mebendazole** if child is 1 year or older and has not had a dose in the previous 6 months ▶ Advise mother when to return immediately ▶ FOLLOW UP in 14 days: – Review and give iron tablets every 2 weeks – If child still has palmar pallor after 2 months, refer – If better, continue iron treatment for 3 months after Hb has normalized
• No palmar pallor	**No Anaemia**	▶ If child is less than 2 years old, assess the child's feeding and counsel the mother according to the feeding recommendation ▶ If feeding problem, FOLLOW UP in 5 days

17.3.8 Check for HIV Infection

Ask

- Is the child already enrolled in HIV care?

If not, ask

- Has the mother or child had an HIV test?

If yes: decide HIV status	***If no, then test***
• Mother: POSITIVE or NEGATIVE • Child: – Virological test POSITIVE or NEGATIVE – Serological test POSITIVE or NEGATIVE	• Mother and child status unknown: TEST mother. • Mother HIV positive and child status unknown: TEST child – If below 18 months: do virological testing – If above 18 months, do serological testing

If mother is HIV positive and child is negative or unknown, ASK:

- Was the child breastfeeding at the time or 6 weeks before the test?
- Is the child breastfeeding now?
- If breastfeeding ASK: Is the mother and child on ARV prophylaxis?

Note

- For HIV testing algorithm and result interpretation in children, see section 3.1.2

CLINICAL FEATURES	CLASSIFY AS	MANAGEMENT
• Positive virological test in child OR • Positive serological test in a child 18 months or older	**Confirmed HIV Infection** (See Section 3.1.3)	▶ Initiate ART treatment and HIV care ▶ Give **cotrimoxazole** prophylaxis ▶ Assess the child's feeding and provide appropriate counselling to the mother. ▶ Advise the mother on home care ▶ Assess or refer for TB assessment and Isoniazid (INH) preventive therapy (see section 5.2.11.3) ▶ FOLLOW UP regularly as per national guidelines
• Mother HIV-positive AND negative virological test in a breastfeeding child or only stopped less than 6 weeks ago OR	**HIV Exposed** (See Section 3.1.4)	▶ Give **cotrimoxazole** prophylaxis till infection can be excluded by HIV testing after cessation of breastfeeding for at least 6 weeks ▶ Start or continue ARV prophylaxis as recommended ▶ Do virological test to confirm HIV status: if negative, repeat 6 weeks after cessation of breastfeeding

CLINICAL FEATURES	CLASSIFY AS	MANAGEMENT
• Mother HIV-positive, child not yet tested OR • Positive serological test in a child less than 18 months		▶ Assess the child's feeding and provide appropriate counselling to the mother ▶ Advise the mother on home care ▶ FOLLOW UP regularly as per national guidelines
• Negative HIV test in mother or child	**HIV Infection Unlikely**	▶ Treat, counsel and FOLLOW UP on existing infections

17.3.9 Check Immunization, Vitamin A, Deworming

Check immunization card and classify

• Imunization not up to date according to national schedule (see chapter 18)	**Child Not Immunized as Per Schedule**	• Give all missed doses on this visit • (Include sick child unless being referred) • Give **vitamin A** if not given in the last 6 months • Give **mebendazole** or **albendazole** (if age >1 year) if not given in the last 6 months
• Immunization up to date as per national schedule	**Child Immunized as Per Schedule**	• Praise the mother • Advise the caretaker when to return for the next dose

17.3.10 Assess Other Problems

Assess any other presenting problems (e.g. eye problems, rashes) and manage accordingly

17.3.11 Summary of Medicines Used

For each medicine

- Explain to the mother why the medicine is needed
- Calculate the correct dose for the child's weight or age
- Use a sterile needle and syringe for injections
- Accurately measure and administer the dose
- If referral is not possible, follow the instructions given

17.3.11.1 Medicines Used Only in Health Centers

DRUG	DOSE	INDICATION	LOC
Ampicillin	50 mg/kg	Pre referral IM dose in very severe disease or severe pneumonia	**HC3**
Gentamicin	7.5 mg/kg	Pre referral IM dose in very severe disease or severe pneumonia	**HC3**
Diazepam rectal (suppository or diluted IV ampoule)	0.5 mg/kg	Pre referral treatment of convulsions	**HC2**
Benzyl penicillin	50,000 IU/kg	Pre referral IM dose in very severe disease or severe pneumonia	**HC2**
Rectal artesunate	10 mg/kg (see section 2.5.2.2)	Pre referral dose for very severe febrile disease	**HC1**

DRUG	DOSE	INDICATION	LOC
Artesunate parenteral	3 mg/kg if < 20 kg, 2.4 mg/kg if > 20 kg	Pre referral IM dose for very severe febrile disease	**HC3**
Salbutamol inhaler	2 puff	For acute wheezing	**HC3**

17.3.11.2 Medicines for Home Use

Teach mother/caretaker how to give oral medicines at home

- Determine the correct medicine and dose for the child's weight or age

For each medicine

- Explain the reason for giving the medicine
- Show how to measure a dose
- Watch the mother practice this
  - Ask the mother to give the first dose to her child
  - Explain carefully how to give the medicine
- Include dose, frequency, and duration

> Stress the need to compete the full course of treatment even if the child gets better
>
> If child vomits the medicine within one hour from taking it, REPEAT the dose

- Collect, measure/count, pack, and label it separately
- Check the mother's understanding before she leaves

DRUG	DOSE	INDICATION	LOC
Amoxicillin DT 250 mg	Every 12 hours for 5 days *2-12 months:* 250 mg *1-3 years:* 500 mg *3-5 years:* 750 mg	Pneumonia Acute ear infection	**HC1**
Artemether/ lumefantrine 20/120 mg	Every 12 hours for 3 days *2-12 months:* 1 tab *1-3 years:* 1 tab *3-5 years:* 2 tab	Un-complicated malaria	**HC1**
Erythromicin	Every 6 hours for 3 days *Child < 2 years:* 125 mg *2-5 years:* 250 mg	Cholera	**HC3**
Ciprofloxacin	15 mg/kg every 12 hours for 3 days If tab 500 mg: *Child< 6 months:* ¼ tab *Child 6 months-5 years:* ½ tab	Dysentery	**HC2**

DRUG	DOSE	INDICATION	LOC
Folic acid	2.5 mg/daily	Anaemia in child with sickle cell anaemia	**HC2**
Iron ferrous sulphate (with or without folic acid)	Once daily for 14 days, tab 200 mg 1-5 years: ½ tablet Syrup 25 mg/ml *Child < 1 year:* 1 ml	Anaemia in non sicklers	**HC2**
Cotri-moxazole 120 mg paediatric tablet	*< 6 months:* 1 tablet *6 months-5 years:* 2 tab/day (or half adult tablet) Once a day	Prophylaxis in HIV positive and HIV exposed	**HC2**
Meben-dazole	*Child 1-2 years:* 250 mg single dose *Child > 2 years:* 500 mg single dose	Routine deworming every 6 months	**HC2**
Albendazole	*Child 1-2 years:* 200 mg single dose *Child > 2 years:* 400 mg single dose	Routine deworming every 6 months	**HC1**

DRUG	DOSE	INDICATION	LOC
Paracetamol	Every 6 hours (4 doses/24 hours) *2 month-3 years:* 125 mg *3-5 years:* 250 mg	Fever > 38.5 oC or (ear) pain	**HC1**
Vitamin A	*Up to 6 months:* 50,000 IU *6–12 months:* 100,000 IU *12 months – 5 years:* 200,000 IU	Routine every 6 months from age 6 months, 3 doses for persistent diarrhoea, measles at day 0, 1 and 4 weeks	**HC2**
ORS	As per plan A,B,C See section 1.1.3	Rehydration	**HC1**
Zinc	Daily for 10 days *Child 2-6 months:* 10 mg (1/2 tablet) *Child> 6 months:* 20 mg (1 tablet)	Treatment of diarrhoea	**HC1**
Nystatin syrup	1 ml 4 times daily for 7 days	Oral thrush	**HC2**

DRUG	DOSE	INDICATION	LOC
Tetracycline eye ointment	5 mm of ointment inside lower lid, 4 times daily till pus discharge resolves	Eye infection	**HC2**
Ciprofloxacin ear drops	1-2 drops 3 times daily	Chronic otitis	
Ready To Use Therapeutic Food RUTF)	See chapter 19	Severe malnutrition	**HC1**
ARVs	See section 3.1.3	HIV prophylaxis and treatment	**HC3**

17.3.11.3 Treatment of Local Infections at Home

Teach mother/ caretaker how to treat local infections

- Explain what the treatment is and why it is needed
- Describe the treatment steps as detailed below
- Watch the mother do the first treatment in the clinic (except cough/sore throat remedy)
- Explain how often to do the treatment and for how long
- Provide the required medication for home treatment
- Check that she understands completely before leaving the clinic

INFECTION	TREATMENT
Eye infection	▶ Clean both eyes 4 times daily: – Wash hands – Ask child to close eyes – Use clean cloth with clean water to gently remove pus – Use a different part of the cloth for each eye – Clean each eye from nose-side to ear-side to avoid passing the infection from one eye to the other ▶ Apply **tetracycline** eye ointment 1% to each eye 4 times daily after cleaning the eyes – Ask the child to look up – Squirt a small amount (5 mm length) on the inside of the lower eyelid – Wash hands again ▶ Continue application until the redness has disappeared × Do not put anything else into the eye
Ear infection	▶ Dry the ear at least 3 times daily – Roll clean absorbent cloth or soft gauze into a wick – Place this in the ear and remove when wet – Replace wick with a clean one – Repeat this process until the ear is dry ***In chronic ear infection:*** – Instill **ciprofloxacin** ear drops 3 times daily for 3 weeks × Do not put anything else into the ear

INFECTION	TREATMENT
Mouth ulcers	▶ Treat these twice daily ▶ Wash hands ▶ Wash child's mouth with clean soft cloth moistened with salt water and wrapped around the finger ▶ Paint the mouth with **gentian violet aqueous paint 0.5%** (if necessary, dilute 1% with an equal volume of water and provide this for the mother to use at home) ▶ Wash hands again ▶ Continue giving gentian violet for 48 hours after ulcers are cured ▶ Give **paracetamol** for pain relief
Oral thrush	▶ Treat for thrush four times daily for 7 days ▶ Wash hands ▶ Wash a clean soft cloth with water and use to wash the child's mouth ▶ Instill **nystatin** 1 ml every six hours ▶ Avoid feeding for 20 minutes after medication ▶ If breastfed, check mother's breasts for thrush and if present treat with nystatin ▶ Advice mother to wash breast after feeds ▶ If baby unable to breastfeed advise mother to feed baby with a cup and spoon . ▶ Give **paracetamol** of needed for pain
Sore throat or cough	▶ Use a safe remedy to soothe the throat and relieve cough: – Breastmilk (for exclusively breastfed infant) – Warm (lemon) tea with honey × Do not use remedies containing **codeine** or **antihistamines** (e.g. chlorphenamine, promethazine)

17.3.12 Counsel the Mother

17.3.12.1 Feeding Recommendation during Illness

For any sick child

- Breastfeed more often and for longer at each feed

If not exclusively breastfed

- Increase fluid intake, e.g. give soup, rice water, yoghurt drinks or clean water

For a child with diarrhoea

- Giving extra fluid can be lifesaving
- Give fluid according to Plan A or B, depending on the state of dehydration of the child

17.3.12.2 Assessing Appetite and Feeding

- Ask about the child's usual feeding habits during the current illness
- Compare the answers given with the feeding recommendations for the child's age

SITUATION	QUESTIONS
Breastfeeding	– Do you breastfeed the child? – How many times during the day? – How many times at night? – Do you give the child any other food or fluids?
Other food or fluids	– What food or fluids? – How many times daily? – What do you use to feed the child? – What foods are available in the home?

If severe or moderate malnutrition or any special concern about growth (e.g. HIV)	– What foods are available at home? – What foods does the child eat? – How large are the servings? – Does the child receive his/her own serving? – Who feeds the child and how?
During this illness	– Has the child's feeding changed? – If yes, how?
If HIV exposed child	– If mother and child on ARVs, and child breastfeeding, check on adherence – If child not breastfeeding, check type, quantity and preparation of substitute milk, including cleaning of utensils

17.3.12.3 Feeding Recommendations

These recommendations are for both sick and healthy children

AGE OF CHILD	FEEDING RECOMMENDATIONS
Birth up to 6 months	• Breastfeed as often as your child wants • Look for signs of hunger, such as beginning to fuss, sucking fingers, or moving lips • Breastfeed day and night whenever your baby wants, at least 8 times in 24 hours • Frequent feeding produces more milk • Do not give other foods or fluids • Breast milk is all your baby needs
6-9 months	• Breastfeed as often as your child wants • Also give thick porridge made with maize, cassava, millet, soya flour, or any mix of these. Add sugar and oil, and

AGE OF CHILD	FEEDING RECOMMENDATIONS
	mix with milk or pounded groundnuts or mixtures of well mashed foods, e.g. matooke, potatoes, cassava, posho (maize or millet), rice. Mix these with fish, beans, or pounded groundnuts. Add green vegetables • Give a nutritious snack, e.g. egg, banana, bread: 3 times/day if breastfed or 5 times/day if not • Including animal source foods and vitamin A-rich fruits and vegetables • Start by giving 2 to 3 tablespoons of food. Gradually increase to ½ cups (1 cup = 250 ml) • Give 2 to 3 meals each day • Offer 1 or 2 snacks each day between meals when the child seems hungry
9 to 12 months	• Breastfeed as often as your child wants • Also give a variety of mashed or finely chopped family food, including animal source foods and vitamin A-rich fruits and vegetables • Give 1/2 cup at each meal (1 cup = 250 ml) • Give 3 to 4 meals each day • Offer 1 or 2 snacks between meals. The child will eat if hungry • For snacks, give small chewable items that the child can hold. Let your child try to eat the snack, but provide help if needed

AGE OF CHILD	FEEDING RECOMMENDATIONS
12-24 months	• Breastfeed as often as your child wants • Also give a variety of mashed or finely chopped family food,including animal source foods and vitamin A-rich fruits and vegetables • Give 3/4 cup at each meal (1 cup = 250 ml) • Give 3 to 4 meals each day • Offer 1 to 2 snacks between meals • Continue to feed your child slowly, patiently. Encourage but do not force your child to eat • Breastfeed on demand, day and night • Give adequate servings of complementary foods as above except that you may also add meat to mashed foods
Age 2 years and over	• Give a variety of family foods to your child, including animal source foods and vitamin A-rich fruits and vegetables • Give at least 1 full cup (250 ml) at each meal • Give 3 to 4 meals each day • Offer 1 or 2 snacks between meals • If your child refuses a new food, offer ”tastes” several times. Show that you like the food • Be patient. Talk with your child during a meal, and keep eye contact

AGE OF CHILD	FEEDING RECOMMENDATIONS
	Note: • A good daily diet should be adequate in quantity and include an energy-rich food (for example, thick cereal with added oil); meat, fish, eggs, or pulses; and fruits and vegetables
Stopping breast feeding	STOPPING BREASTFEEDING means changing from all breast milk to no breast milk. This should happen gradually over one month. Plan in advance for a safe transition. **Help Mother Prepare:** • Mother should discuss and plan in advance with her family, if possible • Express milk and give by cup • Find a regular supply of formula or milk e.g full cream cow's milk • Learn how to prepare and store milk safely at home
	Help Mother Make Transition: • Teach mother to cup feed (See Counsel the mother in next section) • Clean all utensils with soap and water • Start giving only formula or cow's milk once baby feeds by cup **Stop Breastfeeding Completely:** • Express and discard enough breast milk to keep comfortable until lactation stops

AGE OF CHILD	FEEDING RECOMMENDATIONS
Child with persistent diarrhoea	***If still breastfeeding*** • Give more frequent and longer feeds day and night ***If taking other milk, replace*** • With increased breastfeeding • With fermented milk products, e.g. yoghurt OR • Half the milk with nutritious mashed foods ***If taking other foods*** • Follow feeding recommendations above for child's age

17.3.12.4 Counselling for Feeding Problems

If the child is not being fed as above

- Counsel the mother accordingly
- FOLLOW UP in 5-7 days

PROBLEM	COUNSELLING AND FOLLOW UP
Breastfeeding problems	• Assess breastfeeding • As required, show mother correct positioning and attachment
If child <6 months old and taking other milk or foods	• Build the mother's confidence that she can provide all the breast milk needed • Suggest giving more frequent, longer feeds day and night, and gradually reduce other milk or foods

PROBLEM	COUNSELLING AND FOLLOW UP
If mother is away from the child due to work, etc.	• Suggest she expresses breastmilk to leave for the baby
If other milk needs to be continued	• Breastfeed as much as possible, including at night • Make sure that any other milk used is an appropriate breastmilk substitute, e.g. cow's milk • Correctly and hygienically prepared given in adequate amounts • Finish any prepared milk within 1 hour
If the child is being given diluted milk or thin porridge	• Remind mother that thick foods rich in energy and nutrients are needed by infants and young children • Advise her not to dilute the milk • Advise her to make thicker porridge
If the mother is using a bottle to feed the child	• Recommend using a cup instead of a bottle • Show the mother how to feed the child with a cup: press cup on infant's lower lip and allow him to take the milk himself, do not pour the milk into infant's mouth)
If the child is not being fed actively	• Counsel the mother to – Sit with the child and encourage eating – Give the child an adequate serving in a separate bowl

PROBLEM	COUNSELLING AND FOLLOW UP
If the mother is not giving foods rich in vitamin A	• Encourage her to provide these regularly, e.g. eggs, green leafy vegetables, carrots, liver, mangoes, yellow sweet potatoes, and other dark orange fruit
If the child is 6 months and appropriate complementary foods have not been introduced	• Gradually introduce thick porridge mixed with available protein (e.g. milk); add sugar and fat • Gradually introduce mashed foods mixed with relish • Add green leafy vegetables and fat to this • Give nutritious snacks 3-5 times daily as in feeding recommendations above
If child eats solid food with insufficient nutrient density or variety	• Give a variety of mashed food mixtures made with local staples and mixed with animal or plant protein relish • Add green leafy vegetables and fat to this • Give nutritious snacks 3 - 5 times daily as in feeding recommendations above

17.3.12.5 Mother's Health

- Counsel mother about her own health
- If she is sick, provide care for her or refer for further management
- If she has a breast problem (e.g. engorgement, sore nipples, infection), provide care for her or refer for further help
- Advise her to eat well to keep up her own strength and health

- Check immunization status and give Tetanus Toxoid (TT) if needed
- Make sure each mother has access to:
  - Family planning services
  - Counselling on prevention of STIs, HIV/AIDS
  - Antenatal care (if pregnant)
- Give additional counselling if the mother is HIV-positive
- Reassure her that with regular FOLLOW UP much can be done to prevent serious illness, and maintain her and the child's health
- Emphasize good hygiene, and early treatment of illnesses

17.4 INTEGRATED COMMUNITY CASE MANAGEMENT

Integrated Community Case Management (iCCM) of malaria, pneumonia and diarrhoea is a recently adopted strategy for the treatment of common childhood illness at community level by trained Community Health Workers since 2010. It addresses a gap in delivery of curative services to children below 5 years allowing:

- prompt and accessible treatment of uncomplicated malaria, pneumonia and diarrhoea
- identification of danger signs (convulsions, chest in-drawing, unable to feed, vomiting everything, lethargy/ unconsciousness) and pre-referral treatment
- monitoring of newborns during the first week of life, counselling and referral if any problem identified.

Community health workers work in close collaboration with the health unit, to which they report and refer cases and from which they receive supplies and supervision.

Supplies provided to trained community health workers

ICCM commodities

- Respiratory timers and Amoxicillin dispersible tablets for diagnosis and treatment of pneumonia
- ORS sachets and Zinc tablets for treatment of diarrhoea
- RDTs and ACTs for diagnosis and treatment of uncomplicated malaria
- Rectal artesunate for pre referral treatment of complicated malaria.
- Examination gloves
- Dispensing envelopes
- Registers, referral notes and sick job aids

Other commodities for community health workers

- Other preventive treatments: used in prevention and treatment of common conditions and neglected topical diseases like albendazole, azithromycin syrup and tablets, ivermectin, tetracycline eye ointment, praziquantel, COC.

Treatments prescribed by VHTs

TREATMENT	INDICATION	DOSES
Amoxicillin DT 250 mg	Pneumonia (cough < 21 days + increased respiratory rate)	*2-11 months:* 1 tab every 12 hours for 5 days RED PACK *1-5 years:* 2 tab every 12 hours for 5 days GREEN PACK
Zinc Tablets and ORS	Diarrhoea < 14 days without blood	**Zinc** *2-6 months:* ½ tab once a day for 10 days *6 months to 5 years:* 1 tab once a day for 10 days **ORS** As much as the chid wants but at least ½ cup after each loose stool

TREATMENT	INDICATION	DOSES
ACT	Fever <7 days RDT positive	*4 months-2 years:* 1 tab every 12 hours for 3 days (YELLOW PACK) 2-5 years: 2 tab every 12 hours for 3 days (BLUE PACK)
Rectal Artesunate	Fever and danger signs, prereferral	*4-11 months:* 1 capsule *1-3 years:* 2 capsules *3-5 years:* 3 capsules

17.5 CHILD GROWTH WEIGHT STANDARDS CHARTS

The WHO Child Growth Standards charts are used to identify normal growth for children under 5 years, as well as growth problems or trends that suggest that a child is at risk of a problem.

Weight-for-Age

△ Used to show if a child is normal weight or underweight for their age. It should not be used to assess obesity and overweight.

△ Disadvantages

- If a child's age is unknown, it is of limited use
- It cannot distinguish between chronic malnutrition (stunting) and acute malnutrition
- Also, if a child has oedema of both feet, fluid retention increases the child's weight, masking what may actually be very low weight.

Weight for-Height/Length

△ Used to diagnose acute malnutrition

△ The cut-off for severe acute malnutrition is -3 z-scores

and below. These children are at a high risk of mortality, but respond quickly and safely to re-feeding using therapeutic foods following recommended guidelines.

△ The cut-off for moderate acute malnutrition is -2 to -3 z-scores below.

Mean Upper Arm circumference (MUAC)

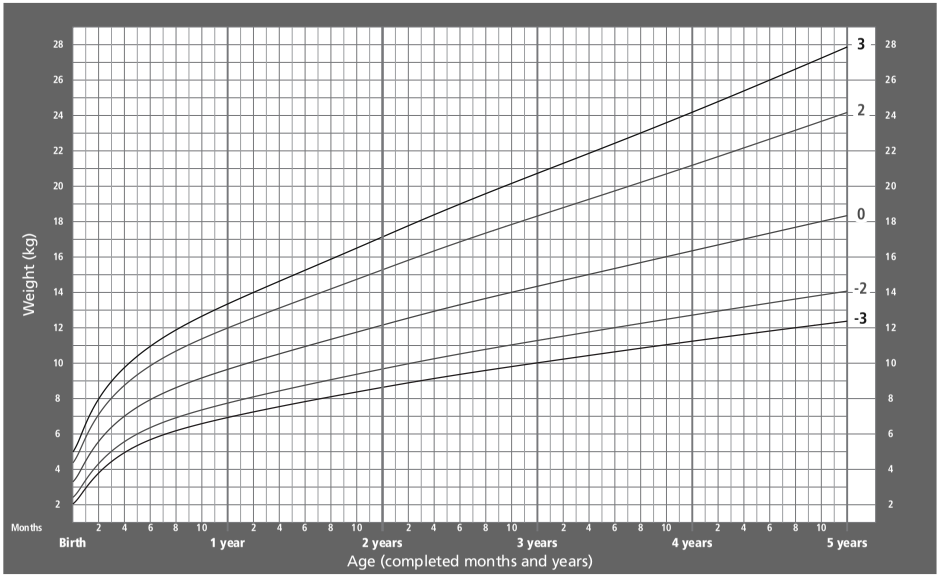
△ Used to diagnose acute malnutrition

△ The cut off for severe acute malnutrition is 115 mm (11.5 cm) and below.

Weight-for-age BOYS

Birth to 5 years (z-scores)

World Health Organization

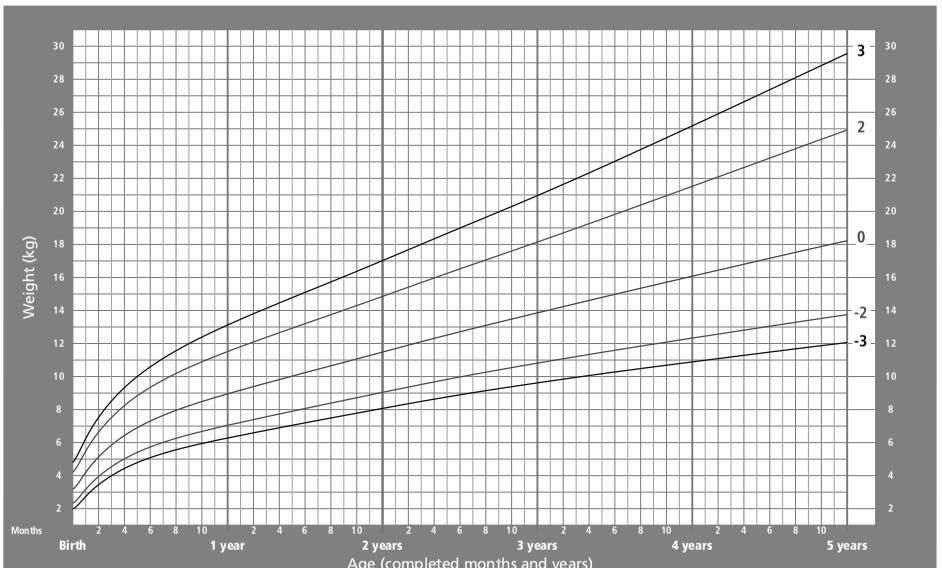


WHO Child Growth Standards

Weight-for-age GIRLS

Birth to 5 years (z-scores)

World Health Organization

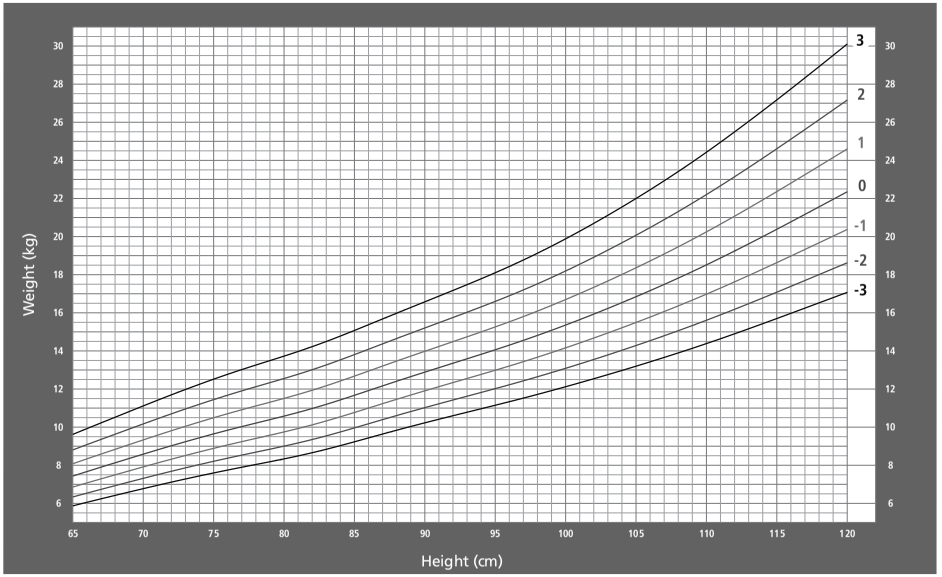


WHO Child Growth Standards

Weight-for-height BOYS

2 to 5 years (z-scores)

World Health Organization

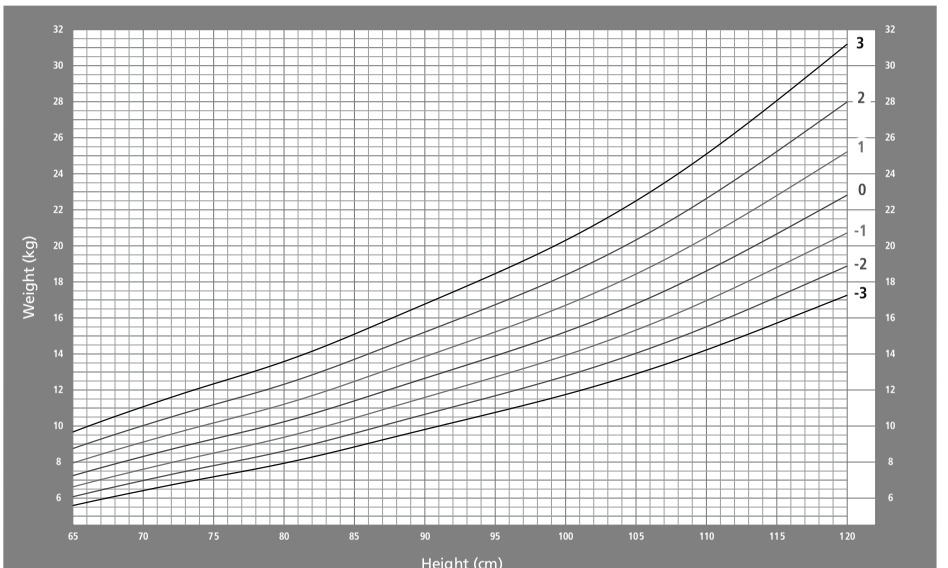


WHO Child Growth Standards

Weight-for-Height GIRLS

2 to 5 years (z-scores)

World Health Organization

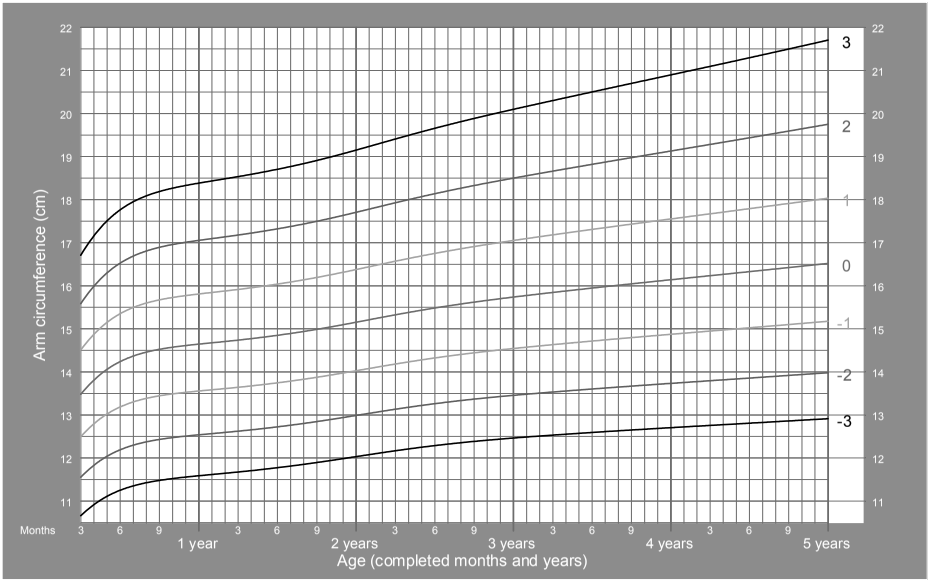


WHO Child Growth Standards

Arm circumference-for-age BOYS

World Health Organization

3 months to 5 years (z-scores)

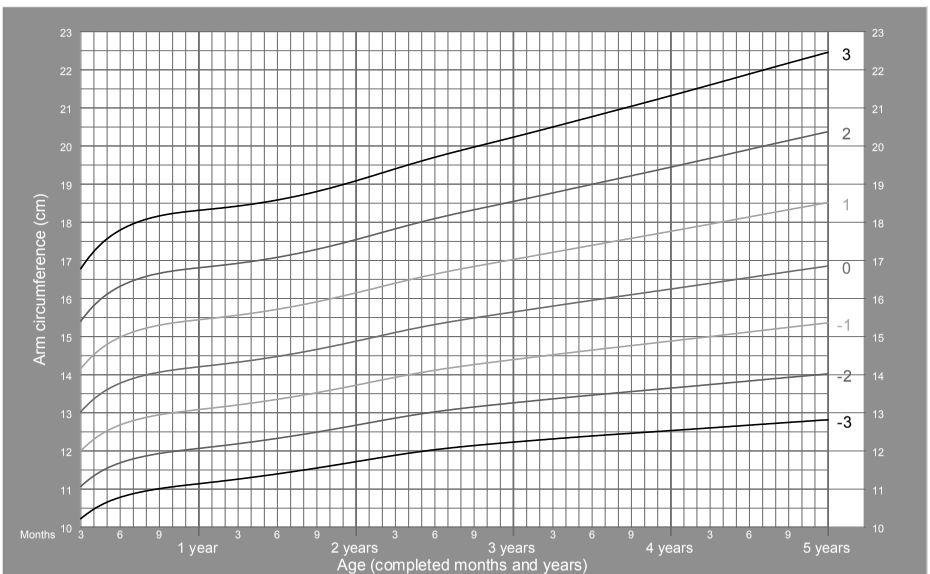


WHO Child Growth Standards

Arm circumference-for-age GIRLS

World Health Organization

3 months to 5 years (z-scores)



WHO Child Growth Standards

18. Immunization

18.1 ROUTINE CHILDHOOD VACCINATION

18.1.1 National Immunization Schedule

Adapted from the UNEPI/MOH Immunization Schedule, 2016.

VACCINE OR ANTIGEN	AGE	DOSE & MODE OF ADMINISTRATION	SITE OF ADMINISTRATION
BCG	At birth (or first contact)	*0-11 months:* 0.05 mL *Above 11 months:* 0.1 mL	Intradermally in Right Upper Arm
Oral Polio	**4 doses:** at birth, 6, 10, and 14 weeks	2 drops orally	Mouth
Injectable Polio Vaccine (IPV)	At 14 weeks	0.5 mL IM	Outer aspect of right thigh; 2.5 cm away from PCV site
DPT-HepB + Hib 1	**3 doses:** at 6, 10 and 14 weeks	0.5 mL IM	Outer aspect of left thigh
PCV	**3 doses:** at 6, 10 and 14 weeks	0.5 mL IM	Outer aspect of right thigh

Rota	**2 doses:** at 6 and 10 weeks	2 drops orally	Slow admin on inner aspect of cheek
9 months	Measles	0.5 mL SC	Left Upper Arm
All girls in primary 4 or 10 year old girls outside school	HPV	Give 2 doses IM 6 months apart	Left Upper Arm

General principles of routine childhood immunization

- The aim is to ensure that all target age groups complete their immunization schedule as above
- **Age for vaccinations:** Give each vaccine at the recommended age or if this is not possible, at first contact with the child after this age
- **BCG vaccination**
  - Give this as early as possible in life, preferably at birth
  - **Do NOT** give BCG vaccine to any child with clinical signs and symptoms of immunosuppression, e.g. AIDS
- Use each vaccine with **its corresponding pre-cooled diluent** from the same manufacturer
- **Polio 0 vaccination** (= 'zero dose'): This is a primer dose of oral polio vaccine (OPV), which should be given ideally at birth but otherwise in the first 2 weeks of life
- DPT-HepB-Hib vaccine
  - Is a combination of DPT vaccine + hepatitis B vaccine (HepB) + *haemophilus influenzae* type b (Hib) vaccine
  - Minimum interval between each of the doses is **4 weeks**

- **Measles vaccination**
  - Normally given at 9 months of age or first contact after this age
  - Can also be given to any unimmunised child of 6-9 months old who has been exposed to measles patients. Children vaccinated in this way must have the vaccination repeated at 9 months of age
- **Vaccination of sick children**
  - Admit and treat any child who is severely ill, and vaccinate at the time of discharge
  - Minor illness is not a contraindication to vaccination

Administration and storage of vaccines

Storage and transport

- At health units, vaccines should be stored between **+2°C to +8°C**
- At the district and central vaccine stores (static units) where freezers exist, polio and measles vaccines may be stored for prolonged periods at -20°C
- Do not freeze DPT-HepB-Hib, PCV, IPV, HPV and TT vaccines
- Never freeze the diluents for BCG and measles vaccines
- Use conditioned ice packs and sponge method for transport
- Carefully follow recommended procedures to maintain the cold chain for all vaccines, e.g.:
  - Ensure continuous supply of power/gas
  - Record fridge temperature twice daily (morning and evening, including weekends/public holidays)
  - Use sponge method during each immunization session

Reconstitution and administration

- Never use the diluents provided for vaccines to mix other injectable medicines
- Never use water for injection as a diluent for vaccine reconstitution

- Do not vaccinate in direct sunlight (always carry out immunization in a building or under a shade)
- Record every vaccination in the child register and on a tally sheet until child has completed all the antigens
- Use the child register and child health card for tracking drop outs
- A child who received any immunization dose during national immunization campaigns should still get the routine vaccination dose
- **Never use any vaccine:**
  - After its expiry date
  - When the vaccine vial monitor (VVM) has changed to discard point (stage 3 and 4)
  - If there has been contamination, or contamination is suspected in open vials
  - If the vial labels are lost
  - DPT-HepB-Hib, HebB, PCV, IPV, HPV, TT that have been frozen

Adhere to the WHO recommended Multi-Dose Vial Policy (MDVP) as below:

TYPE OF VACCINE	MDVP GUIDELINE
OPV and IPV	Do ***not use vaccine if:*** • Contaminated or has no label • The VVM at or beyond discard point (stage 3 & 4) • Vials have been opened for 4 weeks • Vials opened during outreach • Vaccines have not been stored under cold chain conditions

DPT-HepB-Hib, Hep B, TT,	***Do not use vaccine if:*** • Contaminated or has no label • The VVM is at or beyond discard point • Frozen • Vials have been opened for 4 weeks or more • Vials opened during out- reach • Vaccines have not been stored under cold chain conditions
BCG, PCV, and Measles	• Discard remaining doses in the opened vials of these vaccines after 6 hours of reconstitution or at the end of the immunization session, whichever comes first

Common side effects of vaccines and patient advice

VACCINE AND SIDE EFFECTS	PATIENT ADVICE
BCG • Pain at injection site	• The ulcer that forms at the injection site is a normal and expected reaction that heals by itself and leaves a permanent scar. It should not be covered with anything

VACCINE AND SIDE EFFECTS	PATIENT ADVICE
DPT-HepB-Hib, PCV • Mild reactions at injection site: swelling, pain, redness • Fever within 24 hours of the injection • Anaphylactic reactions • Seizures	• Do not apply anything to the injection site ▶ Take **paracetamol** if necessary. – If fever continues after 2 doses of **paracetamol,** report to health facility ▶ Wiping the child with a cool sponge or cloth (with water at room temperature) is also good for reducing fever • If seizures or severe rash/ difficulty in breathing occurs, return to health facilty immediately
Oral Polio and Rota • Short-lived gastrointestinal symptoms (pain, diarrhoea, irritation)	• Dispose of the child's faeces properly as the virus spreads through the oral-faecal route • Wash hands thoroughly after changing the baby's nappies
Injectable Polio • Pain, redness and swelling at injection site • Fever, headache, drowsiness, • Irritability in infants • Diarrhoea, nausea, vomiting	• Side effects usually mild and should not cause worry • Take paracetamol if necessary • If fever continues after 2 doses of **paracetamol**, report to health facility • Report any severe reaction to health worker immediately

VACCINE AND SIDE EFFECTS	PATIENT ADVICE
Measles • Pain, swelling, redness at injection site • Fever and skin rash 5-12 days after the vaccine	• Child may get a mild skin rash and fever after few days; do not worry • Do not apply anything to the injection site
HPV • Injection site reactions: pain, redness, itching, bruising or swelling • Headaches • General body aches, nausea	• Side effects usually mild and should not cause worry • Report to health worker immediately any severe reaction
Tetanus Toxoid (TT) • Irritation at injection site • Fever, malaise	• Side effects may occur within 1–2 days of immunization; they are usually mild and should not cause worry • Report to health worker immediately any severe reaction
Hep B Vaccine • Pain, redness and swelling at injection site • Fatigue • Fever	• If fever develops, give a single dose of **paracetamol**

18.2 OTHER VACCINATIONS

18.2.1 Hepatitis B Vaccination

- Since 2005, children are immunised against Hepatitis B in the routine childhood immunization using the DPT-HepB-Hib vaccine at 6, 10, and 14 weeks of age
- For adolescents and adults, it is recommended that the hepatitis B vaccination is given preferably after testing for hepatitis B infection (HBsAg and Anti-HBs). Patients with HIV and pregnant women should be handled on a case by case basis
- Vaccination is recommended for high risk groups, e.g:
  - Health workers in clinical settings and training
  - Intravenous drugs users
  - Persons who frequently receive blood transfusions
  - Recipients of solid organ transplantation
  - High-risk sexual behaviour
  - Partners and household contacts of HBsAg positive patients
  - Support staff in health facilities
- The schedule has three doses: at 0, 1 month after 1st dose, and 6 months after first dose (0, 1, 6 months)
- The storage temperature for the vaccine is 2°C to 8°C

▶ **Dose:** 0.5 mL given intramuscularly on the deltoid muscle (upper arm)

▶ Do NOT give vaccine on the buttocks because of low immune response (decreased protective antibody response) and risks of injury to the sciatic nerve

18.2.2 Yellow Fever Vaccination

The yellow fever vaccine is live attenuated, and it is reconstituted before use. Ideally, it should be used within an hour after reconstitution.

- Dose: 0.5 mL given intramuscularly on the upper arm as a single dose
- The storage temperature for the vaccine is 2°C to 8°C
- Immunity is life-long and international travel certificate is issued once and valid for life

18.2.3 Tetanus Prevention

- All children should be vaccinated against tetanus during routine childhood immunization using the DPT-HepB-Hib vaccine at 6, 10, and 14 weeks of age (see above)
- Neonatal tetanus is prevented by routinely immunising all pregnant women/women of child- bearing age (15–45 years) against tetanus with Tetanus Toxoid vaccine (see below)

18.2.3.1 Prophylaxis Against Neonatal Tetanus

- Ensure hygienic deliveries, including proper cutting and care of umbilical cords through the use of skilled birth attendants
- Immunise all pregnant women/women of child- bearing age (15 – 45 years) against tetanus with Tetanus Toxoid vaccine (TT)
- Give **TT vaccine** 0.5 mL IM into the upper arm as per the recommended schedule below:

Routine TT vaccine schedule and the period of protection

TT DOSE	WHEN GIVEN	DURATION AND LEVELS OF PROTECTION
TT1	At first contact with woman of childbearing age or as early as possible during pregnancy	None
TT2	At least 4 weeks after TT1	3 years; 80% protection

TT3	At least 6 months after TT2	5 years; 95% protection
TT4	At least 1 year after TT3	10 years; 99% protection
TT5	At least 1 year after TT4	30 years; 99% protection

18.2.3.2 Vaccination Against Adult Tetanus

- High risk groups such as farm workers, military personnel, miners, safe male circumcision clients, should be vaccinated as in the table above (if not fully immunized) and given regular boosters every 10 years
- Patients at risk of tetanus as a result of contaminated wounds, bites, burns, and victims of road traffic accidents be given **Antitetanus Immunoglobulin** (TIG) and then be vaccinated as indicated in the table below

TREATMENT	LOC
General measures ▶ Ensure adequate surgical toilet and proper care of wounds	**HC3**
Passive immunization: give to any patient at risk, except if fully immunized and having had a booster within the last 10 years ▶ Give **IM tetanus immunoglobulin human** (TIG): *Child <5 years:* 75 IU *Child 5-10 years:* 125 IU *Child >10 years/adult:* 250 IU ▶ Double the dose if heavy contamination suspected or if >24 hours since injury was sustained	**HC4**
Alternative - only if TIG not available: ▶ **Antitetanus serum** (tetanus antitoxin) 1,500 IU deep SC or IM	

Active immunization	**HC3**
Unimmunised or partially immunised patients: ▶ Give a full course of vaccination for those who are not immunized at all (3 doses 0.5 mL IM at intervals of 4 weeks) ***Fully immunized patients with booster >10 years before:*** ▶ Give one booster dose of TT 0.5 mL intramuscularly ***Fully immunised patients who have had a booster dose within the last 10 years*** ▶ A booster is NOT necessary	
Note ◆ Giving TIG or TT to a fully immunised person may cause an unpleasant reaction, e.g., redness, itching, swelling, and fever, but with a severe injury this is justified	

19. Nutrition

Nutrition is the intake of food, considered in relation to the body's dietary needs. Good nutrition – an adequate, well balanced diet combined with regular physical activity – is a cornerstone of good health.

Poor nutrition can lead to reduced immunity, increased susceptibility to disease, impaired physical and mental development, and reduced productivity.

Optimal nutrition means obtaining a balance of macronutrients (carbohydrates, proteins and fats) and micronutrients (vitamins and minerals).

Macronutrients provide energy for organ and tissue functions and growth, and micronutrients are needed in small amounts for chemical processes in the body such as metabolism, growth, and protection against infections.

In addition, plenty of water is needed to build cells and regulate body processes.

19.1 NUTRITION GUIDELINES IN SPECIAL POPULATIONS

19.1.1 Infant and Young Child Feeding (IYCF)

1. Counsel and support all mothers to initiate breastfeeding within an hour of delivery and exclusively breastfeed their infants for the first six months of life, unless medically contraindicated.
2. Teach mother correct positioning and attachment for breastfeeding, how to express and store breast milk hygienically, and how to feed the child by a cup.

3. Counsel and support parents to introduce adequate, safe, and appropriate complementary foods at 6 months of age, and to continue breast feeding until the child is 2 years.
4. A good diet should be adequate in quantity and include an energy-rich food (e.g. thick cereal with added oil, meat, fish, eggs, legumes, fruits and vegetables)
5. Pregnant women and lactating mothers should consume adequate nutritious foods
6. Recommend exclusive breastfeeding for infants of HIV-infected women for the first 6 months unless the replacement is acceptable, feasible, affordable, sustainable, and safe (AFASS).
7. Malnourished children should be provided with appropriate medical care, nutritional rehabilitation, and follow-up.
8. Encourage mothers of low birth weight infants who can suckle to breastfeed. Assist those who cannot breastfeed to express breast milk and feed the baby.
9. During illness, children should take increased fluids: breastfeed more often, increase amount of milk given, increase fluid intake (e.g. soups, yoghurt, and drinking water). Extra fluid in diarrhoea is especially life-saving
10. For more information on feeding recommendations in infants and young children, see IMCI section **17.3.12.3.**

19.1.2 Nutrition in HIV/AIDS

Good nutrition in HIV/AIDS is important as it helps to:

- Prevent malnutrition and wasting
- Delay the progress of HIV to AIDS
- Enhance the body's ability to fight opportunistic infections
- Achieve and maintain optimal body weight and strength

- Relieve complications, e.g., diarrhoea, nausea, vomiting, thrush
- Improve effectiveness and tolerance of medication
- Improve quality of life

Severe malnutrition is diagnosed when:

- BMI <16 kg/m^2
- Weight loss >10% in past 2 months
- MUAC <185 mm (<210 mm if pregnant or postpartum)
- Persistent diarrhoea or fever

Management

TREATMENT	LOC
If patient has other complications	**HC4**
▶ Admit patient and treat infections and rehydrate	
If patient has no other medical complications	**HC3**
▶ Treat as an outpatient	
▶ Promote weight gain with high-energy foods, protein, vitamins and minerals	
▶ If **ready-to-use therapeutic food** is available, give 3 sachets per day in adults, in addition to normal food	
– See next section for malnutrition in children	
▶ Supplement the patient's diet with **multivitamins** and **minerals,** 1-2 tablets per day	
▶ Follow up in 2 weeks, at 1 month, then every 2 months thereafter	

19.1.3 Nutrition in Diabetes

People with diabetes should follow normal nutritional guidelines for the general population, and can eat the same foods as the whole family since everyone benefits from healthy eating.

Healthy eating and exercise in diabetics help to:
- Maintain the blood glucose close to normal to prevent complications
- Control cholesterol levels
- Control blood pressure, and reduce the risk of complications such as heart disease and stroke

In addition, diabetics have to take care to balance their food with insulin and oral antidiabetic medications to help manage their blood glucose levels.

Healthy diet involves eating a variety of foods including vegetables, whole grains, fruits, non-fat dairy products, beans, lean meat, poultry, and fish. These are rich in vitamins, minerals and fibre. Avoid processed foods.

General advice
- Eat three meals a day. Avoid skipping meals, and space out breakfast, lunch, and evening meal over the day
- At each meal, include moderate amount (around 1/3 of the plate) of starchy carbohydrate foods, e.g., bread, pasta, chapatis, potatoes, yams, noodles, rice, and cereals. Eat more slowly absorbed (low glycaemic index) foods, e.g., pasta, rice, sweet potato and yam, porridge oats, bran, and natural muesli
- Reduce fat in the diet, especially saturated fats. Use unsaturated fats or oils e.g. olive oil, sunflower oil
- Eat more fruit and vegetables. Aim for at least five portions a day. Eat more beans and lentils.
- Limit sugar and sugary foods
- Reduce salt in the diet to 6 g or less per day
- Drink alcohol only in moderation: 1 drink (one beer or one small glass of wine or one shot of spirit) for women and 2 for men as a maximum amount daily. Alcohol has some cardioprotective effect. It should be consumed with food to prevent hypoglycaemia

- Don't use products marketed as *"diabetic foods, drinks or herbs"* (they are expensive and of no benefit)
- Routine supplementation with vitamins and minerals without underlying actual deficiency is not beneficial, patients should eat lots of fruits and vegetables
- Obese and overweight patients need to be encouraged to reduce weight using exercise and diet modifications

19.2 MALNUTRITION

ICD10 CODE: E40-43

19.2.1 Introduction on Malnutrition

Malnutrition is the cellular imbalance between the supply of nutrients and energy and the body's demand for them to ensure growth, maintenance, and specific functions. It includes both under- and over nutrition.

However, the term "malnutrition" commonly refers to **undernutrition**, and is used as such in these guidelines.

Although malnutrition can affect all ages, however, the early stages, including, foetus, infants and children, are most vulnerable to the effects of undernutrition during the period of their most rapid physical growth and development during the first two years of life.

Malnutrition is a significant contributor to morbidity and mortality among children under 5 years in Uganda. It also makes the prognosis of other diseases poor.

Note

- Previously, malnutrition was classified into two types: 1) Protein-Energy Malnutrition (PEM) due to lack of adequate protein and energy in the diet and 2) Micronutrient malnutrition-due to deficiencies in specific micronutrients (vitamins and minerals).

- These causal names are now avoided because protein and energy deficits are likely to be accompanied by deficiencies of other nutrients, and management of malnutrition takes this into consideration.

Causes/contributing factors to malnutrition

- Immediate causes: diet and disease
  - Inadequate quantity and quality of food
  - Lack of knowledge on appropriate foods provided to children, poor food preparation, food taboos
  - Infections: reduce appetite, increase energy and nutrient utilisation, and limit the ability to absorb or retain nutrients e.g. in diarrhoea, intestinal parasites
- **Root causes:** food insecurity, poor health services, poor environmental sanitation, natural disasters, excessive workload for women, poor weaning practices, culture, inadequate water supply, low literacy levels, low nutrition advocacy/education
- **Underlying causes:** poverty, corruption, poor governance, poor infrastructure.

Consequences of malnutrition

- Impaired growth, physical and mental and development
- Impaired body resistance/immune system
- Increased risk of adult chronic diseases
- Increased risk of mortality
- Increased risk for the cycle of inter-generational malnutrition
- Poor economic well-being for the individual and country

Differential diagnosis

- Nephrotic syndrome (nephritis)
- Liver disease
- Heart disease
- Malabsorption syndrome
- Malignancy (e.g., gastrointestinal tract cancer, liver cancer/hepatocellular carcinoma)

19.2.1.1 Classification of Malnutrition

TYPE	DEFINITION OR FEATURES
Acute	• Is an indicator of current nutritional status, reflecting recent weight changes or disruption in nutrient intake • Most appropriate indicator to use in an emergency setting (e.g. due to sudden/sharp period of food shortage) • Associated with loss of body fat and severe wasting • Children are thinner than their comparable age group of same height • Classified as Moderate or Severe based on anthropometry (measurement of the size, weight and proportions of the human body), biochemistry and clinical assessment
Chronic	• Is an indicator of the nutritional status overtime; chronically malnourished children are shorter (stunted) than their comparable age group

Clinical features of malnutrition

- **Marasmus:** severe wasting, old man's face, excess skin' hangs around the buttocks, ribs and zygoma bones are prominent, scapular blades and extremities (limbs), eyes are sunken
  - Apathetic or irritable, appetite is fairly good, skin is almost normal, hair demonstrates some changes but not as dramatic as in Kwashiorkor, organomegaly is rare (liver and spleen enlargement)
- ***Kwashiakor:*** pitting feet oedema, skin desquamation, hair changes, presence of bilateral pitting oedema (oedema of both feet), moon face

- Appears adequately nourished due to excess extra cellular fluid, but is very miserable, apathetic
- Skin changes (dermatosis, flacky paint dermatitis)
- Hair changes: Silky, straight, sparsely distributed; easily, painlessly pluckable
- Severe pallor of the conjunctiva, mucous membranes, palms, and soles, loss of skin turgor (dehydration)
- Organomegaly (liver, spleen) is common

• ***Marasmus-kwashiakor:*** most common form, presents with features of both Marasmus and Kwashiorkor

19.2.1.2 Assessing Malnutrition in Children 6 months to 5 years

The 4 key features used to diagnose acute malnutrition are:

- Weight-for-Height/Length (WFH/L) using WHO growth standards charts (see section **17.5**). It is the best indicator for diagnosing acute malnutrition.
- Mean Upper Arm Circumference (MUAC) in mm using a measuring tape (see section **17.5**)
- Oedema of both feet (kwashiorkor with or without severe wasting)
- Appetite test: ability to finish portion of ready-to-use therapeutic food (RUTF).

WEIGHT FOR AGE (WFA) reflects both long term (stunting) and short term (wasting) nutritional status, so it is not very useful for diagnosis of acute malnutrition. It can also miss out oedematous children, who are very malnourished but may have a near-normal weight because of fluid retention.

Diagnostic criteria

TYPE	CRITERIA
Moderate Acute Malnutrition	• WFH/L between -3 and -2 z-scores • Or MUAC 115 up to 125 mm • Or low weight for age
Severe Acute Malnutrition	***Without complications*** • Oedema of both feet (kwashiorkor with or without severe wasting) OR • WFH/L less than -3 z scores OR • MUAC less than 115 mm OR • Visible severe wasting AND • Able to finish RUTF ***With complications*** • Oedema of both feet OR • WFH/L less than -3 z scores OR • MUAC less than 115 mm OR • Visible severe wasting AND • Any one of the following: – Medical complication present OR – Not able to finish RUTF
Specific micronutrient deficiencies	• Vitamin A: xerophthalmia • Vitamin C: scurvy • Vitamin B_{12} and folic acid: megaloblastic anaemia (see section **11.1.1.2**) • Iron: iron-deficiency anaemia (see section **11.1.1.1**)

Investigations

Children with SAM should always be first assessed with a full clinical examination to confirm presence of any danger sign, medical complications, and tested for appetite.

➢ **Assess patient's history of:**
- Recent intake of food, loss of appetite, breastfeeding
- Usual diet before current illness (compare the answers to the Feeding Recommendations for the Child's age (section 17.3.12.3)
- Duration, frequency and type of diarrhoea and vomiting
- Family circumstances
- Cough >2 weeks and contact with TB
- Contact with measles
- Known or suspected HIV infection/exposure

➢ **Initial examination for danger signs and medical complications:**
- Shock: lethargy or unconscious, cold hands, slow capillary refill (<3 seconds), weak pulse, low blood pressure
- Signs of dehydration
- Severe palmar pallor
- Bilateral pitting oedema
- Eye signs of vitamin A deficiency: dry conjunctiva, corneal ulceration, keratomalacia, photophobia
- Local signs of infection: ear, throat, skin, pneumonia
- Signs of HIV (see WHO Clinical Staging section 3.1.1)
- Fever (≥37.5°C) or hypothermia (rectal temp <35.5°C)
- Mouth ulcers
- Skin changes of kwashiorkor: hypo- or hyperpigmentation, desquamation, ulcerations all over the body, exudative lesions (resembling burns) with secondary infection (including candida)

➢ **Laboratory tests**
- Blood glucose

- Complete blood count or Hb, malaria, HIV, electrolytes
- Stool microscopy for ova and cysts, occult blood, and parasites

➢ **Chest X-ray:** Look for evidence of tuberculosis or other chest abnormalities

➢ **Conduct an appetite test**

- Assess all children ≥6 months for appetite at the initial visit and at every follow up visit to the health facility

HOW TO DO APPETITE TEST
• Arrange a quiet corner where the child and mother can take their time to eat RUTF. Usually the child eats the RUTF portion within 30 minutes
Explain to the mother • The purpose of assessing the child's appetite • What RUTF is • How to give RUTF – Wash hands before giving RUTF – Sit with child and gently offer RUTF – Encourage child to eat without feeding by force – Offer plenty of water to drink from a cup during RUTF feeding
Offer appropriate amount of RUTF to child to eat: • After 30 minutes, check if the child was able to finish or not able to finish the amount of RUTF given and decide: – Child ABLE to finish at least one third of a packet of RUTF portion (92 g) or 3 teaspoons from a pot within 30 minutes – Child NOT ABLE to eat one-third of a packet of RUTF portion (92 g) or 3 teaspoons from a pot within 30 minutes

➢ **Determine WFH/L:** Measure the child's height and weight and plot the score on the appropriate chart (boy or

girl). Match the value to the z-score on the right y-axis to determine the child's z-score (see section 17.5)

➢ **Measure MUAC:** Using a MUAC tape, measure the circumference of the child's upper arm and plot the score on the appropriate chart (boy or girl, section 17.5). Please note: 1 cm=10 mm, so 11.5 cm = 115 mm.

19.2.2 Management of Acute Malnutrition in Children

General principles of management

- Admit all children with any danger sign, medical complications, pitting oedema or those who fail appetite tests for inpatient care and treatment for **complicated SAM.**
  - Keep them in a warm area separated from infectious children, or in a special nutrition area.
- Children with good appetite and no medical complications can be managed as outpatients for **uncomplicated SAM.**
- Adequate facilities and staff to ensure correct preparation of therapeutic foods, and to feed child regularly day and night, should be available.
- Accurate weighing machines and MUAC tapes should be available
- Proper records of feeds given and child's measurements should be kept so that progress can be monitored
- Explain to patient/care-giver to handle the child gently

19.2.2.1 Management of Moderate Acute Malnutrition

TREATMENT	LOC
▶ Assess the child's feeding and counsel the mother on the feeding recommendations ▶ If child has any feeding problem, counsel and follow up in 7 days (see section 17.3.12.4)	HC3

▶ Assess for possible TB infection ▶ Advise mother when to return immediately (danger signs)	
FOLLOW-UP CARE ***Follow-up in 30 days*** • Reassess child and re-classify – If better, praise mother and counsel on nutrition – If still moderate malnutrition, counsel and follow up in 1 month – If worse, loosing weight, or feeding problem: refer	

19.2.2.2 Management of Uncomplicated Severe Acute Malnutrition

TREATMENT	LOC
▶ Give oral antibiotics: **amoxicillin** DT 40 mg/kg twice a day 40 mg/kg for 5 days ▶ Give **ready-to-use therapeutic food (RUTF)** for a child aged ≥ 6 months (for doses, see next section) ▶ Counsel the mother on how to feed the child (see section 17.3.12.3–4) ▶ Assess for possible TB infection ▶ Advise mother when to return immediately (danger signs)	**HC3**
FOLLOW-UP CARE ***After 7 days*** • Reassess child and feeding. If no new problem, review again in 7 days ***After 14 days or during regular follow up:*** ▶ Do a full reassessment of the child: check WFH/L, MUAC, oedema of both feet and do another appetite test	

If the child has complicated SAM ▶ Refer URGENTLY to hospital ***If the child has uncomplicated SAM*** ▶ Counsel the mother and encourage her to continue with appropriate RUTF feeding. Ask mother to return again in 14 days ***If the child has moderate acute malnutrition:*** ▶ Advise the mother to continue RUTF. Counsel her to start other foods according to the age appropriate feeding recommendations (see section 17.3.12.3) ▶ Tell her to return in 14 days. Continue to see the child every 14 days until the child has no more acute malnutrition ***If the child has no acute malnutrition (WFH/L is -2 z-scores or more, or MUAC is 125 mm or more)*** ▶ Praise the mother, STOP RUTF and counsel her about age appropriate feeding recommendations	

19.2.2.3 Management of Complicated Severe Acute Malnutrition

In-patient care

- Refer child to hospital: prevent hypoglycaemia by giving small sips of sugar water, keep the child warm, first dose of antibiotics **(ampicillin + gentamicin)**
- Triage the children to fast-track seriously ill patients for assessment and care: treat shock, hypoglycaemia, and corneal ulceration, immediately
- General treatment involves 10 steps in two phases: initial stabilisation for 1 week and rehabilitation (for weeks 2-6) as in the table below

ISSUE	STABILISATION		REHABILITATION
	DAYS 1-2	DAYS 3-7	WEEKS 2-6
Hypoglycaemia			
Hypothermia			
Dehydration			
Electrolytes			
Infection			
Micronutrients		No iron	*With iron
Initiate feeding			
Catch-up feeding			
Sensory stimulation			
Prepare for follow-up			

Note

* Iron is given after 2 days on F-100; if patient is taking RUTF, do NOT give iron

Management of Complications in SAM

Hypoglycaemia (Blood sugar <3 mmol/L or <54 mg/dL)

- All severly malnourished children are at a risk of hypoglycaemia, and should be given a feed or 10% glucose or sucrose, immediately on admission
- Frequent 2 hour feeding is important

TREATMENT
Immediately on admission
▶ Give 50 ml of **glucose** or **sugar water** (one rounded teaspoon of sugar in 3 tablespoons of water) orally or by NGT, followed by first feed as soon as possible

If child is able to drink

- Give first feed of **F-75** therapeutic milk, if available, every 30 minutes for 2 hours, then continue with feeds every 2 hours for 24 hours
  - Then give feeds every 2 or 3 hours, day and night

If child is unconscious

- Treat with IV **10% glucose** at 5 ml/kg
- If IV access cannot be quickly established, give **10% glucose** or **sucrose solution** by NGT tube. To make 10% solution, dilute 1 part of 50% glucose with 4 parts of water OR 1 part of glucose 50% with 9 parts of glucose 5%
  - If IV glucose not available, give 1 teaspoon of sugar moistened with 1-2 drops of water sublingually, and repeat every 20 minutes to prevent relapse
  - Monitor children for early swallowing which delays absorption; if it happens, give another dose of sugar
  - Start on appropriate IV/IM antibiotics

Monitoring

If initial blood glucose was low, repeat measurement after 30 minutes

- If blood glucose falls to <3 mmol/L (<54 mg/dL), repeat the **10% glucose** or **oral sugar solution,** and ensure antibiotics have been given
  - If it is higher, change to 3 hourly feeds of F-75
- If rectal tempearture falls to <35.5°C, or if level of consciousness deteriorates, repeat the blood glucose measurement and treat accordingly

Prevention

- Feed every 2 hours, starting immediately (see below), or if child is dehydrated, rehydrate first. Continue feeding throught the night

- Encourage mothers to watch for any deterioration, help feed and keep the child warm
- Check on abdominal distension

Hypothermia (Axillary temperature <35°C and rectal temperature <35.5°C)

- Often associated with hypoglycaemia or serious infection

TREATMENT

- Feed child immediately as in hypoglycaemia above
- Warm the child: make sure the child is well covered, especially the head, with cloths, hats, and blankets
  - If available, use a heater but not pointing directly at the child. DO NOT use hot water bottles or flourescent lamps
- Encourage caretaker/mother to sleep next to her child and kangaroo technique for infants (skin-to-skin contact, direct heat/warmth transfer from mother to child)
- Keep the ward closed during the night and avoid wind drafts inside
- Give appropriate IV or IM antibiotics
- Change wet nappies, clothes and bedding to keep child and bed dry
- Quickly clean the patient with a warm wet towel and dry immediately. Avoid washing the baby directly in the first few weeks of admission

Monitoring

- Take child's rectal temperature every 2 hours until it rises to <36.5°C, If using a heater, take it every 30 minutes
- Cover the child at all times, especially at night. Keep head covered with hat to prevent heat loss
- Check for hypoglycaemia

Dehydration

- In both oedema and non-oedematous SAM, the margin of safety between dehydration and over-hydration is very narrow. Exercise care and caution to avoid over-hydration and risk of cardiac failure
  - Assume that all children with watery diarrhoea or reduced urine output have some dehydration

TREATMENT

- ▶ Do NOT use IV route for rehydration, except in cases of shock
- ▶ Rehydrate slowly, either orally or by NGT using **ReSoMal,** a specially prepared rehydration solution for malnutrition, The standard ORS has a high sodium and low potassium content, which is not suitable for SAM, except if profuse diarrhoea is present
- ▶ Give **ReSoMal** more slowly than you would when rehydrating a well-nourished child
  - Give 5 ml/kg every 30 minutes for the first 2 hours
  - Then give 5-10 ml/kg per hour for the next 4-10 hours, with **F-75 formula.** Exact amount depends on how much the child wants, the volume of stool loss and whether the child is vomiting

If ReSoMal not available:

- Give **half strength** standard ORS, with added potassium and glucose as per the ReSoMal recipe below, unless the child has cholera or profuse watery diarrhoea
- If rehydration still required at 10 hours, give starter **F-75** instead of **ReSoMal,** at the same times. Give the same volume of starter F-75 as of ReSoMal

If child is unconscious, in shock or severe dehydration

- ▶ Give IV fluid **Darrow's solution** or **Ringer's lactate** and 5% glucose (or if not available, ½ **saline** and 5% **glucose** at 15 mL/kg the first hour and reassess

- If improving, give 15 mL/kg in second hour
- If conscious, give NGT ReSoMal
- If not improving, treat for septic shock

Monitoring

- ONLY rehydrate until the weight deficit is corrected and then STOP, DO NOT give extra fluid to "prevent recurrence" (from specialist's notes)
- During rehydration, respiration and pulse rate should fall and urine passing should start
- Return of tears, moist mouth, improved skin tugor and less sunken eyes and fontanelle are a sign of rehydration. SAM children will not show these and so weight gain should be measured
- Monitor progress of rehydration every 30 minutes for 2 hours, then every hour for the next 4-10 hours

Be alert for signs of overhydration, which is dangerous and can lead to heart failure. Check for:

- Weight gain (make sure it is not quick or excessive)
- If increase in pulse rate by 25/minute, respiratory rate by 5/minute is present, stop **ReSoMal.** Reassess after 1 hour
- Urine frequency (if child urinated since last check)
- Enlarging liver size on palpation
- Frequency of stools and vomit

Prevention

- Same as in dehydration in well-nourished child, except that ReSoMal is used instead of standard ORS. Give 30-50 ml of **ReSoMal** (for child <2 years) and 100 ml (for child ≥2 years) after each watery stool.
- Small, frequent, unformed stools are common in SAM and should not be confused with profuse watery stools, and they do not require treatment

- ▶ Continue breastfeeding
- ▶ Initiate re-feeding with starter F-75
- ▶ Give **ReSoMal** between feeds to replace stool lossess. Give 50-100 ml after each watery stool

Recipe for ReSoMal using the standard WHO ORS

INGREDIENT	AMOUNT
Water	2 litres
WHO-ORS	One 1-litre packet
Sucrose	50 g
Electrolyte/mineral solution	40 ml

Electrolyte imbalance

- All SAM children have deficiencies of potassium and magnesium, which may take up to 2 weeks to correct
- Oedema is partly due to potassium deficiency and sodium retention
  - Do not treat oedema with diuretics
  - Giving high sodium doses could kill the child

TREATMENT

- ▶ Give extra **potassium** (3-4 mmol/kg per day)
- ▶ Give extra **magnesium** (0.4-0.6 mmol/kg per day)
- ▶ Add extra potassium and magnesium to the feeds. If not already pre-mixed, add 20 ml of the combined electrolyte/mineral solution to 1 litre of feed, or use pre-mixed sachets for SAM
- ▶ Use ReSoMal to rehydrate
- ▶ Prepare food without added salt

Infections

- In SAM, usual signs of bacterial infection, e.g. fever, are usually absent, yet multiple infections are common.

- Assume all SAM cases have an infection, and treat with antibiotics immediately. Hypoglycaemia and hypothermia are often signs of severe infection

TREATMENT

Broad spectrum antibiotics

- **Benzylpenicillin** 50,000 IU/kg IM or IV every 6 hours
- Or **ampicillin** 50 mg/kg every 6 hours for 2 days
- Then, oral **amoxicillin** 25-40 mg/kg every 8 hours for 5 days
  PLUS
- **Gentamicin** 7.5 mg/kg once a day for 7 days

Measles vaccination

- If child is ≥ 6 months and not vaccinated, or was vaccinated before 9 months of age. Delay vaccination if child is in shock

Other specific infections

- Treat other specific infections if diagnosed as appropriate, e.g., malaria, pneumonia, dysentery, soft-tissue infections, mengingitis, TB, HIV
- If parasitic worms are diagnosed, delay treatment until the rehabilitation phase. Give **albendazole** 200-400 mg single dose
  - In endemic areas, give **mebendazole** orally twice a day for 3 days to all SAM children 7 days after admission
  - If HIV diagnosed, start ART as soon as possible after stabilisation of metabolic compilcations

Monitoring

- If child is still anorexic after 7 days of antibiotic treatment, continue for a full 10-day course. If anorexia persists, reassess child fully

Micronutrient deficiencies

- All SAM children have vitamin and mineral deficiencies
- Anaemia is common, but DO NOT give iron initially, instead wait until the child has a good appetite and has started gaining weight, usually in the second week, because iron can make infections worse
- RUTF already contains adequate iron so do not add. F-100 does not contain iron, so iron supplements are needed
- **F-75, F-100** and **RUTF** already contain multivitamins (including vitamin A and folic acid) zinc and copper. Additional doses are not needed
- If there are no eye signs or history of measles, then do not give a high dose of vitamin A as therapeutic foods already contain adequate amounts

Management

TREATMENT
ONLY IF child has signs of vitamin A deficiency like corneal ulceration or history of measles ▶ Give **Vitamin A** on day 1, and repeat on days 2 and 14 *Child <6 months:* 50,000 IU *Child 6-12 months:* 100,000 IU *Child >12 months:* 200,000 IU Note: If a first dose was given in the referring centre, treat on days 1 and 14 only
Iron ▶ Give iron in the second week of nutritional rehabilitation – Do not give in the stabilization phase – Do not give in children receiving RUTF ▶ Start iron at 3 mg/kg per day after 2 days on F-100 catch-up formula

If child is not on any pre-mixed therapeutic foods, give the following micronutrients daily for at least 2 weeks

- **Folic acid** at 5 mg on day 1; then 1 mg daily
- **Multivitamin** syrup 5 ml
- **Zinc** 2 mg/kg per day
- **Copper** at 0.3 mg/kg per day

Initial Re-Feeding during Stabilisation Phase

In the initial phase, feeding should be gradual.

The essential features of initial feeding are:

- Frequent (every 2-3 hours) oral small feeds of low osmolality and low lactose. Never leave the child alone or forcefeed the child, as this can cause aspiration pneumonia
- Nasogastric tube feeding if the child is eating ≤ 80% of the amount offered at two consecutive feeds
- Calories at 100 kcal/kg per day (do not exceed)
- Protein at 1-1.5 g/kg per day
- Liquid at 130 ml/kg per day or 100 ml/kg per day if child has severe oedema
- Milk-based formulas, such as F-75 (with 75 kcal and 0.9 g protein/100 ml), will be satisfactory for most children
  - Starter **F-75** formula can be commercially supplied or locally prepared from basic ingredients
  - In children who get osmotic diarrhoea with commercial preparation, prepare a cereal based F75 as in the table overleaf

TREATMENT

- If child is breastfeeding, continue breastfeeding but add the prescribed amounts of the starter formula as in the table below:

Days	Frequency	Volume/ kg feed	Volume/ kg per day
1-2	2 hours	11 ml	130 ml
3-5	3 hours	16 ml	130 ml
≥6	4 hours	22 ml	130 ml

- Feed from a cup or bowl. Use a spoon, dropper or syringe to feed very weak children
- Teach the mother or caregiver to help with the feeding
- Night feeds are essential, since long periods without a feed may lead to hypoglycaemia and death
- If child is vomiting, during or after a feed, estimate amount vomited and offer that amount again. If child keeps vomiting, offer half the amount of feed twice as often (e.g. every 1 hour) until vomiting stops

Monitoring

Monitor and record:

- Amounts of feed offered and left over
- Vomiting
- Stool frequency and consistency
- Daily body weight

Recipe for refeeding formula F-75 and F-100

If pre-mixed formulas are not available, prepare as below

INGREDIENT	F-75 (STARTER) CEREAL-BASED*	F-100 (CATCH-UP)
Dried skimmed milk	25 g	80 g
Sugar	70 g	50 g
Cereal flour	35 g	—
Vegetable oil	27 g	60 g
Electrolyte/mineral solution mix	20 g	20 g
Water: make up to 1000 ml	1000 ml	1000 ml

Note

* Cook cereal-based formula for 4 minutes and add mineral/vitamin mix after cooking

Transition phase

This phase is designed to prepare the child for phase 2 or outpatient management (catch up growth).

Signs that a child is ready for transition:

- Return of appetite
- No episodes of hypoglycaemia (metabolically stable)
- Reduction in or disappearance of all oedema

Make a transition from starter formula to catch-up formula, gradually over 2–3 days. DO NOT switch at once.

Management

TREATMENT

- Make a gradual transition from starter **F-75** to catch-up formula **F-100** or **RUTF** over 2-3 days, as tolerated
- Give **RUTF** or a milk-based formula, e.g, **F-100** containing 100 kcal/100 mL and 2.9 g of protein per 100 ml. Replace starter **F-75** with an equal amount of catch-up **F-100** for 2 days.

If RUTF is available

- Start with small but regular meals of **RUTF** and encourage child to eat often (first, 8 meals per day, and later, 5-6 meals per day)
- If child cannot eat whole amount of RUTF per meal in the transition phase, top-up with F-75 to complete the feed, until child is able to eat a whole RUTF meal
- If child cannot take at least half of the RUTF in 12 hours, stop RUTF and give F-75. Try introducing RUTF again in 1-2 days until the child is able to take adequate amount
- If still breastfeeding, offer breast milk first before each RUTF feed

If RUTF is not available or child does not accept it, give F-100

- In the first 2 days, give **F-100** every 3-4 hours (the same amount of F-75 that they were being given). Do not increase volume for 2 days
- On the 3rd day, increase each successive feed by 10 ml until child finishes the meal
  - If the child does not finish the meal, offer the same amount for the next meal
  - Keep adding 10 ml until the child leaves a bit of most of his meals (i.e. point at which intake is likely to have reached 200 ml/kg per day)

- If child is being breasfed, encourage mother to breastfeed in between F-100 rations
- After a gradual transition, give:
  - Frequent feeds, unlimited amounts
  - 150-220 kcal/kg per day
  - 4-6 g of protein/kg per day

Caution

△ F-100 should never be given to take home. Transition to **RUTF**

Monitoring

- Monitor the child at least every 4 hours during transition
- Return child to stabilization phase if:
  - Child develops loss of appetite, cannot take 80% of the feeds, develops or increased oedema, medical conditions not improving, any signs of fluid overload, significant re-feeding diarrhoea

Avoid causing heart failure

- Early signs of congestive heart failure (e.g. rapid pulse, fast breathing, basal lung crepitations, enlarging liver, gallop heart rhythm, raised jugular venous pressure
- If pulse is increased by 25 beats/minute and breathing rate by 5 breaths/minute, and the increase is sustained for two successive 4-hourly readings, then:
  - Reduce volume fed to 100 ml/kg per day for 24 hours
- Then gradually increase as follows:
  - 115 ml/kg per day for next 24 hours
  - 130 ml/kg per day for the following 48 hours
- Then, increase each feed by 10 ml as described earlier

Recommended amounts for RUTF

CHILD'S WEIGHT (KG)	TRANSITION PHASE	REHABILITATION PHASE	
	PACKETS PER DAY (92 G, 500 KCAL)	PACKETS PER DAY (92 G, 500 KCAL)	PACKETS PER WEEK SUPPLY
4-4.9	1.5	2	14
5-6.9	2.1	2.5	18
7-8.4	2.5	3	21
8.5-9.4	2.8	3.5	25
9.5-10.4	3.1	4	28
10.5-11.9	3.6	4.5	32
>12kg	4.0	5	35

Patient instructions on how to give RUTF

- Wash hands before giving the RUTF
- Sit with child on the lap and gently offer RUTF
- Encourage child to eat RUTF without force-feeding
- Give small, regular meals of RUTF and encourage child to eat 5-6 meals a day
- If still breastfeeding, continue offering breast milk first before every RUTF feed
- Give only the RUTF for 2 weeks, if breastfeeding continue to breastfeed and gradually introduce foods recommended for the age (see section 17.3.12.3)
- When introducing recommended foods, ensure that the child completes his daily ration of RUTF before giving other foods
- Offer plenty of clean water, to drink from a cup, when the child is eating the RUTF

Catch-up growth or rehabilitation phase

Criteria for transfer from transition phase

- Good appetite (child takes >80% of daily ration of RUTF)
- Significantly reduced oedema or no oedema
- Resolved medical complications and completed parenteral antibiotics
- Clinically well and alert

After the transition phase

Children with complicated SAM can be transferred to outpatient care during rehabilitation phase. The child will require continuing care as an outpatient to complete rehabilitation and prevent relapse.

- Carefully assess the child and the available commuinty support
- Refer the child for rehabilitation in outpatient care or to a community feeding programme if possible, otherwise keep the child admitted

TREATMENT
If the child cannot be managed as outpatient (e.g. no easily accessible nutritional rehabilitation services where the child lives)
▶ Keep the child admitted until full discharge from nutritional program
▶ Continue with **RUTF** or **F-100,** but increase amount as the child gains weight
If the child can be managed as outpatient
▶ Discharge the mother with 2-week supply of **RUTF** according to the table above
▶ Counsel caregivers on outpatient treatment and link them to a community nutritional programme if available. Ensure that mother/caregiver:
– Brings back the child for weekly supplements
– Is available for child care

- Has received specific counselling on appropriate child feeding practices (types, amount, frequency) and basic hygiene
- Has resources to feed child (if not, give advice on available support)

Monitoring (by rate of weight gain)

- Weigh child every morning before feeding, and plot the weight
- Calculate and record weight gain every 3 days as g/kg per day

For example

Current weight of child = 6300 g
Weight 3 days ago = 6000 g
Weight gain in grams: 6300-6000 = 300 g
Average daily weight gain = 300 g ÷ 3 days = 100 g/day
Child's average weight: (6000 + 6300) ÷ 2 = 6150 g (6.15 kg)
Divide by child's average weight in kg:
100 g/day ÷ 6.15 kg = **16.3 g/kg per day**

If the weight gain is:

- Poor (<5 g/kg per day), child needs a full reassessment
- Moderate (5-10 g/kg per day), check if intake targets are being met or if infection has been overlooked
- Good (>10 g/kg/day): continue rehabilitation

Sensory stimulation

Provide:

- Tendor loving care
- A cheerful, stimulating environment
- Structured play therapy for 15-30 minutes/day
- Physical activity as soon as the child is well enough
- As much maternal involvement as possible (e.g., comforting, feeding, bathing, playing)
- Provide suitable toys and play activities for the child

19.2.2.4 Treatment of Associated Conditions

Eye problems

TREATMENT
If child has signs of vitamin A deficiency like corneal ulceration
▶ Give vitamin A on day 1, repeat on days 2 and 14 *Child <6 months:* 50,000 IU *Child 6-12 months:* 100,000 IU *Child >12 months:* 200,000 IU
If a first dose was given in the referring centre, treat on days 1 and 14 only
If eyes show corneal clouding or ulceration, give care below to prevent corneal rupture and lens extrusion
▶ Instil chloramphenicol or tetracycline eye drops 4 times a day, for 3-5 days
▶ Instil atropine eye drops, 1 drop 3 times a day for 3-5 days
▶ Cover with saline soaked pads
▶ Bandage the eyes

Skin lesions in kwashiorkor

Usually due to zinc deficiency. The child's skin quickly improves with zinc supplementation. In addition:

TREATMENT

- Bathe or soak affected areas for 10 minutes per day in **0.01% potassium permanganate** solution
- Apply barrier cream (**zinc** and **castor oil ointment** or **petroleum jelly)** to the raw areas, and gentian violet or nystatin cream to skin sores
- Avoid using nappies so that the perinuem can stay dry

Severe anaemia

TREATMENT

Severe anaemia

- Give blood transfusion in the first 24 hours ONLY IF:
  - Hb is <4 g/dL
  - Hb is 4-6 g/dl, and the child has respiratory distress
- Use smaller volumes and slower transfusion than for a well-nourished child. Give:
  - **Whole blood,** 10 ml/kg over 3 hours
  - **Furosemide,** 1 mg/kg at the start of the transfusion

If child has signs of heart failure

- Give 10 mL/kg of **packed cells,** as whole blood may worsen heart failure

Note

- Children with SAM and oedema may have redistribution of fluid leading to apparent low Hb, which does not require transfusion

Monitoring

- Monitor pulse and breathing rates, listen to lung fields, examine adbomen for liver size, check jugular venous pressure every 15 minutes during transfusion
  - If either breathing rate increases by 5 breaths/minute or heart rate increases by 25 beats/minute, transfuse more slowly
  - If there are basal lung crepitations or an enlarging liver, stop transfusion and give IV **furosemide** IV at 1 mg/kg

Persistent diarrhoea

TREATMENT

If Giardiasis suspected or confirmed by stool microscopy

- Give metronidazole 7.5 mg/kg every 8 hours for 7 days

If due to lactose intolerance (very rare)

Diagnosed if profuse watery diarrhoea only occurs after milk-based feeds are begun and stops when they are withdrawn or reduced

- Replace feeds with yoghurt or a lactose free infant formula
- Reintroduce milk feeds gradually in the rehabilitation phase

Osmotic diarrhoea

Suspect if diarrhoea worsens substantially with hyperosmolar F-75 and ceases when sugar and osmolality are reduced

- Use a **cereal-based** starter F-75, or if necessary, a commercially available isotonic starter
- Introduce catch-up F-100 or RUTF gradually

19.2.2.5 Discharge from Nutritional Programme

Discharge children with SAM from nutritional treatment ONLY IF:

- Weight-for-height or length is at least ≥-2 z score and they have no oedema for at least 2 weeks, or
- Mid-upper-arm circumference is ≥125 mm and they have no oedema for at least 2 weeks
- The indicator used at admission should be the same one used during follow-up. If only pitting oedema was used at diagnosis, then either WFH/L or MUAC can be used for follow-up

– Percentage weight gain should not be used as a criterion

Feeding after discharge from nutritional programme

Counsel the mother on feeding and other issues as in the table below

Feeding instructions

- Feed child at least 5 times a day with meals that contain high energy and high protein content (100 kcal and 2-3 g protein per 100 g of food)
- Give high energy snacks between meals (e.g., milk, banana, bread, biscuits)
- Assist and encourage child to complete each meal
- Give food separately to child so their intake can be checked
- Breastfeed as often as the child wants

Additional instructions

- How to continue any needed medications at home
- Danger signs to bring child back for immediate care
- When and where to go for planned follow-up: at 1 week, 2 weeks, 1 month, 3 months, and 6 months; then twice a year until when the child is 3 years old
- Where and when to take child for growth monitoring and promotion on monthly basis up to 2 years
- When to return for next immunisation, vitamin A, and deworming
- How to continue stimulating the child at home with play activities

Follow-up Plan

When child is discharged, make a follow-up plan until full recovery, with the appropriate clinic (e.g., OPD, nutrition clinic or local health worker/clinic).

- Weigh the child weekly after discharge
- If child fails to gain weight over 2 weeks, loses weight between 2 measurements, develops loss of appetite or oedema, refer child back to hospital for a full reassessment
- Monitor child periodically after discharge from the nutritional programme to prevent relapse: at 1 week, 2 weeks, 1 month, 3 months, and 6 months; then twice a year until when the child is 3 years old

19.2.3 SAM in Infants Less than 6 Months

SAM in infants <6 months is rare. An organic cause or failure to thrive should be considered and treated. Admit the infant with SAM if any of the following are present:

- General danger signs or serious condition
- Recent weight loss or failure to gain weight
- Ineffective breastfeeding (attachment, positioning, or suckling) directly observed for 15-20 minutes

- Any pitting bilateral oedema of feet
- Any medical problem needing more assessment
- Any social issue needing detailed assesssment or intensive support e.g depression of caretaker

Management

TREATMENT

Initial Phase

- ▶ Admit child
- ▶ Give parenteral **antibiotics** to treat possible sepsis and appropriate treatment for other medical complications
- ▶ Re-establish effective breastfeeding by mother or give infant formula, safely prepared and used
- ▶ In infants with SAM and oedema, give **infant formula (preferably)** or if not available, **F-75** or **diluted F-100** (use 1.5 litres instead of 1 litre)
- ▶ For infants with SAM and NO oedema, give expressed breast milk; if not possible, give commercial infant formula, F-75 or diluted F-100 in this order of preference
- ▶ Assess the physical and mental health of mothers or caretakers. Provide relevant treatment and support

Discharge

- Infants can be transferred to outpatient care if:
  - All clinical conditions, medical complications and oedema are resolved, or if child is clinically well and alert
  - Child is breastfeeding effectively or feeding well
  - Weight gain is satisfactory, e.g., above median WHO growth velocity standards or >5 g/kg per day for 3 successive days
- Before discharge, verify immunisation status, link mothers and caregivers with community follow-on support and ensure that child is breastfeeding well, has an adequate weight gain and has WFL ≥-2 Z scores

19.2.4 Obesity and Overweight ICD10 CODE: E66

Overweight and obesity are an abnormal or excessive fat accumulation that presents a risk to health. It is a risk factor for many diseases and is linked to many deaths. Body mass index (BMI) is a simple index of weight-for-height used to classify overweight and obesity in adults.

$$\text{BMI} = \frac{\text{Weight (in kilograms)}}{\text{Height (in metres) squared (m}^2\text{)}}$$

Interpretation of BMI values in adults

CLASSIFICATION	CRITERIA
Underweight	BMI <18
Healthy body weight	BMI 18 to 25
Overweight	BMI 25 to 30 or waist circumference >88 cm (F) or >102 (M)
Obesity	BMI >30 or waist circumference >88 cm (F) or >102 (M)

In children, age needs to be considered when defining overweight and obesity

CLASSIFICATION	CRITERIA
Underweight	BMI <18
Healthy body weight	BMI 18 to 25
Overweight	WFH >2 standard deviations above WHO Child Growth Standards median

Obesity	WFH >2 standard deviations above WHO Child Growth Standards median
For WHO Child Growth Standards Charts, see **17.5**	

Causes

- High energy (i.e. calorie) intake: eating too much, eating a lot of fatty food
- Low expenditure of energy: sedentary lifestyle, no exercise or limited activity
- Disease: hypothyroidism, diabetes mellitus, pituitary cancer

Raised BMI is a major risk factor for:

- Cardiovascular disease: heart disease and stroke
- Diabetes mellitus
- Musculoskeletal disorders: osteoarthritis
- Some cancers: endometrial, breast, ovarian, prostate, liver, kidney, gallbladder, kidney
- Obstructive sleep apnoea
- Fatty liver, gallstones

Clinical features

- Overweight
- Difficulty breathing
- Poor sleeping patterns
- Joint damage due to weight
- Low fertility
- Poor self-image, antisocial, depression
- In children, also increased risk of fractures, hypertension, cardiovascular disease, insulin resistance

Investigations

- Blood pressure
- Blood glucose
- Cholesterol

Management

TREATMENT	LOC
▶ Advise patient to reduce carbohydrate and fat intake and increase fruit, fibre and vegetable intake ▶ Refer patient to a nutritionist for individualised diet counselling, and to compile a diet plan ▶ Advise patient to control appetite, participate in hobbies, treat any depression ▶ Advise patient to increase physical activty and exercise daily. Advise to start slowly and build up gradually ▶ Warn the patient of their high risk of diabetes, heart disease, hypertension, stroke, and general poor health ▶ Encourage patient not to give up even when the weight loss process is slow	**HC2**

Prevention and health education

- Society and community choices: make healthier food the most accessible, available, and affordable food, and regular physical activity
- Individuals should:
  - Limit energy intake from total fats and sugars: reduce fatty meat, palm cooking oil (replace with sunflower, olive, corn oil)
  - Increase consumption of fruits and vegetables, as well as legumes, whole grains and nuts
  - Engage in regular physical activity (60 minutes a day for children and 150 minutes spread through the week for adults)
  - Stop other habits that increase risk of non-communicable diseases, e.g., tobacco smoking, alcohol abuse

20. Eye Conditions

20.1 INFECTIONS AND INFLAMMATORY EYE CONDITIONS

20.1.1 Notes on Use of Eye Preparations

- **Eye drops:** Apply 1 drop every 2 hours until the condition is controlled, then reduce frequency
- **Eye ointment:** If used alone, apply 3-4 times daily; if used with drops, apply at night only
- Continue treatment for 48 hours after healing

20.1.2 Conjunctivitis ("Red Eye") ICD10 CODE: H10

Inflammation of the conjunctiva of the eye.

Causes

- Infection: Bacterial or viral
- Trauma: Chemicals, foreign bodies
- Smoke, allergy

Clinical features

- Watery discharge (viral or chemicals)
- Pus discharge (bacteria)
- Cornea is clear and does not stain with fluorescein
- Visual acuity is normal
- Redness (usually both eyes but may start/be worse in one; usually reddest at outer edge of the eye)
- Swelling and itching (may be present)

Differential diagnosis

- Corneal ulcer (tends to be in one eye only, redness is greatest near the cornea, pain is often great)

Investigations

- Clinical features are diagnostic
- Pus swab for culture and sensitivity

Management

TREATMENT	LOC
Infective conjunctivitis ▶ Apply **chloramphenicol** or **gentamicin** eye drops 2 or 3 hourly for 2 days then reduce to 1 drop every 6 hours for 5 days ▶ Change treatment as indicated by results of culture and sensitivity where possible **Note** ▶ NB. Gonococcal conjunctivitis should be treated aggressively and in line with management of Sexually Transmitted Infections (See section 3.2.10) ***Allergic conjunctivitis*** ▶ Cold compresses and facial hygiene ▶ **Betamethasone** or **hydrocortisone** eye drops every 1-2 hours until inflammation is controlled then apply 2 times daily ▶ Limit use of steroid eye drops to short durations	**HC2**
Caution △ Do not use steroid preparations unless you are sure of the diagnosis as they may mask infections	

Prevention

- Personal hygiene; daily face washing
- Avoid irritants and allergens

20.1.3 Stye (Hordeolum) ICD10 CODE: H00

A localized infection of the hair follicle of the eyelids

Cause

- *Staphylococcus aureus*

Clinical features

- Itching in the early stages
- Swelling, pain and tenderness
- Pus formation
- May burst spontaneously

Differential diagnosis

- Other infections of the eyelids
- Blepharitis

Management

TREATMENT	LOC
▶ Usually, the stye will heal spontaneously ▶ Avoid rubbing eye as this might spread the infection ▶ Apply a warm/hot compress to the eye ▶ Apply **tetracycline** eye ointment 1% 2-4 times daily until 2 days after symptoms have disappeared ▶ Remove the eye lash when it is loose	**HC2**

Prevention

- Remove any loose eyelashes
- Good personal hygiene

20.1.4 Trachoma

ICD10 CODE: A71

A chronic infection of the outer eye caused by *Chlamydia trachomatis,* transmitted though direct personal contact, shared towels and cloths, and flies that have come into contacat with the eyes or nose of an infected person. It is a common cause of blindness.

Clinical features

- Early stages: reddening of eye, itching, follicles (grain-like growth) on conjunctiva
- If repeated untreated infections: scar formation on eyelids causing the upper eyelid to turn inwards (entropion) and the eyelashes to scratch the cornea
- Scarring of the cornea leading to blindness

Differential diagnosis

- Allergic conjunctivitis (chronic)
- Other chronic infections of the eye

Management

TREATMENT	LOC
Antibiotics	**HC3**
▶ **Tetracycline** eye ointment 1% twice daily for 4-6 weeks (until the infection/inflammation has disappeared)	
▶ Or **erythromycin** 500 mg every 6 hours for 14 days *Child:* 10-15 mg/kg per dose	
▶ Or **azithromycin** 1 g stat; child 20 mg/kg stat	
If there are any complications	
▶ Refer to specialist	
▶ Surgery for the entropion	**HC4**

Prevention

- Good personal hygiene, regular face washing
- Good hygiene during deliveries
- Education of public on trachoma, and environmental control

20.1.5 Keratitis

ICD10 CODE: H16

Inflammation of the cornea.

Causes

- Infection: Bacterial, viral, or fungal; leading to corneal ulceration
- Trauma: Chemical, foreign bodies

Clinical features

- Redness and tearing
- Fear of light
- Cornea is *not* clear and *will* stain with fluorescein in the case of corneal ulcer (pattern of staining depends on the causative agent, for example dendritic in viral keratitis)
- Visual acuity is usually reduced
- Condition is often unilateral
- The eye is painful

Investigations (where facilities are available)

- ➢ Full ocular examination
- ➢ Fluorescein stain to confirm diagnosis
- ➢ Pus swab for gram stain, culture and sensitivity
- ➢ Corneal scraping for microscopy, culture and sensitivity

Management

TREATMENT	LOC
▶ Admission is mandatory for young children, one-eyed patients, non-improvement after 72 hours of treatment, large ulcers (>4 mm diameter), associated occular complications such as hypopion or scleritis	H
Treat the specific cause	
▶ If bacterial, apply **gentamicin** eye drops alternately with **chloramphenicol** eye drops 1–2 hourly until infection is controlled	HC2
▶ If viral, **acyclovir** eye ointment 5 times daily for herpes simplex and viral keratitis	HC4
▶ If fungal, **natamycin ophthalmic** suspension 5%	RR
▶ Or **econazole** eye drops	
– Supportive treatment	
▶ **Atropine** eye drops to relieve pain	HC4
▶ **Vitamin A** capsules for children	
▶ Surgery may be necessary in some circumstances i.e. conjunctival flap and tarsorrhaphy	
▶ Debridement (chemical/ mechanical)	

Caution

△ DO NOT use topical corticosteroids in patients with infective keratitis

20.1.6 Uveitis

ICD10 CODE: H20

Inflammation of the uvea of the eye. It is classified as either anterior (involves iris and ciliary body) or posterior (involves choroid which is the posterior part of the uvea).

Causes

- Systemic diseases (TB, HIV, lymphoma, autoimmune disease, leprosy, toxoplasmosis)

- Cytomegalovirus (CMV)
- Post-trauma
- Idiopathic

Clinical features

- Anterior uveitis: Involves the iris and ciliary body, pain, photophobia, ciliary infection, poor vision, small and irregular pupil, cells and flare in the anterior chamber, and keratic precipitates
- Posterior uveitis: Involves choroid, poor vision, cells in the vitreous

Investigations

- Investigation of uveitis is broad and requires a high index of suspicion
- Diagnosis of uveitis requires expertise and can only be confirmed by slit lamp examinations

Management

TREATMENT	LOC
If at HC2 and HC3	**HC2**
▶ Do not give any medicine	
▶ Explain seriousness of the condition to the patient	
▶ Refer urgently to a qualified eye health worker	
Anterior uveitis	
▶ Topical **steroids eye drops**	**HC4**
▶ Periocular steroids may be used in severe anterior uveitis	
▶ **Atropine** eye drops to relieve pain	
▶ Refer bilateral cases, and where there is poor vision and associated ocular complications	**RR**

Posterior uveitis ▶ Treat the primary condition if any ▶ Topical, periocular and systemic **steroids** ▶ **Atropine/Cyclopegics** to relieve pain in anterior uveitis	

Prevention

- Wear protective goggles when hammering, sawing, chopping, grinding etc.
- Warn children playing with sticks about risk of eye injuries

20.1.7 Orbital Cellulitis

ICD10 CODE: H05.01

Orbital cellulitis is a sudden acute inflammation of the tissues around the eye.

Causes

- Children- most common cause is post sinus infection by *Haemophilus influenza*
- Adults- common causes are *Staphylococcus aureus, Streptococcus pneumonia* and beta-haemolytic streptococcus
- Risk factors
- Sinus infection, tooth extraction, orbital trauma

Clinical features

- Painful swelling of the eye
- Pain in the eye especially on eye movements
- Decreased vision
- Fever and headache

Differential diagnosis

- Infection - Cavernous sinus thrombosis
- Endocrine dysfunction - Dysthyroid exophthalmos
- Idiopathic inflammation - Orbital myositis, orbital pseudotumour, Wegener's granulomatosis
- Neoplasm with inflammation, e.g. Burkitt's lymphoma

Investigations

➢ Good history taking and examination

Management

TREATMENT	LOC
▶ This is an emergency and needs immediate referral to the ophthalmologist	H

Prevention

- Prompt treatment of sinus and dental infections
- Complete immunization schedule for children, more especially Hib vaccine (included in the pentavalent DPT/HepB/Hib vaccine)

20.1.8 Postoperative Endophthalmitis

ICD10 CODE: H44.0

Postoperative endophthalmitis is the severe inflammation involving both the anterior and posterior segments of the eye after intraocular surgery.

Cause

- Perioperative introduction of microbial organisms into the eye, followed by inflammation

Clinical features

- Decreased vision, and permanent loss of vision
- Bacterial endophthalmitis: pain, redness, lid swelling, and decreased visual acuity
- Fungal endophthalmitis: blurred vision, pain, and decreased visual acuity

Investigations

➢ Vitreal tapping for gram stain
➢ Culture and sensitivity

Management

TREATMENT	LOC
▶ It is a medical emergency and treatment should be instituted within an hour of presentation, especially in severe cases	H
▶ Refer to an ophthalmologist immediately	RR
▶ Admit patients with severe endophthalmitis and treat aggressively with topical, periocular and where possible intravitreal injections of:	
▶ Antibiotics: **vancomycin** or **ceftriaxone**	
– **Atropine** to relieve pain	

Prevention

- Apply povidone iodine 5% in the conjunctival sac for a minimum of 3 minutes prior to surgery and 10% povidone iodine painting of the periocular skin

20.1.9 Xerophthalmia

ICD10 CODE: E50

Dryness of the part of the eye ball exposed to air and light

Cause

- Vitamin A deficiency

Clinical features

- Starts with night blindness
- Followed by dryness of the conjunctiva and cornea
- Eventually the cornea melts away, the eye perforates, and total blindness occurs

Differential diagnosis

- Trachoma, corneal injury

Management

TREATMENT	LOC
▶ Give **vitamin A** on day 1, repeat on days 2 and 14 *Adult and child >1 year:* 200,000 IU *Child 6-12 months:* 100,000 IU *Child <6 months:* 50,000 IU	HC2
If eyes show corneal clouding or ulceration, give care below to prevent corneal rupture and lens extrusion ▶ Instil **chloramphenicol** or **tetracycline** eye drops 4 times a day, for 3-5 days ▶ Instil **atropine** eye drops, one drop 3 times a day for 3-5 days	HC4

Prevention

- Good balanced diet especially for children, women, and institutionalised persons, e.g., prisoners, long-term hospital in-patients, boarding school students, etc.
- Routine Vitamin A supplementation
  - *Child <5 years* with measles or malnutrition: 100,000 IU
  - All mothers after delivery: 200,000 IU
  - A child above one year: 200,000 IU every 6 months

20.2 DECREASED OR REDUCED VISION CONDITIONS

20.2.1 Cataract

ICD10 CODE: H27

Opacity of the lens inside the eye. It is the most common cause of blindness in Uganda.

Risk factors

- Old age
- Diabetes (high blood sugar)

- Certain drugs e.g. corticosteroids
- Eye injuries

Clinical features

- Reduced vision
- Pupil is not the normal black colour but is grey, white, brown, or reddish in colour
- Condition is not painful unless caused by trauma
- Eye is not red unless condition is caused by trauma

Management

TREATMENT	LOC
▶ Refer for cataract surgery	**HC4**

20.2.1.1 Paediatric Cataract

ICD10 CODE: H26.0

Cataract in children is unique as it may interfere with the normal development of vision resulting in lazy eye (amblyopia).

Causes

- Hereditary/genetic disorders
- Intrauterine infections (TORCHES)
- Drugs, trauma, metabolic diseases, e.g. Diabetes
- Unknown

Symptoms

- A white pupil
- Older children may complain of poor vision
- "Dancing eyes" (nystagmus), squints

Investigations

➢ If at HC2 or HC3, reassure patient and refer to hospital

Management

TREATMENT	LOC
▶ Condition is managed surgically under general anaesthesia ▶ Surgery can be done as early as one month of age ▶ Patching/occlusion therapy in case of lazy eyes (amblyopia) ▶ Aphakic children /those less than one year who are not implanted should be given aphakic glasses or contact lenses	**RR**

Prevention

- Wear protective goggles when hammering, sawing, chopping, grinding, etc.
- Caution children playing with sticks about risk of eye injuries

20.2.2 Glaucoma

ICD10 CODE: H40

Glaucoma is a group of disorders characterised by a loss of visual field associated with cupping of the optic disc and optic nerve damage. Although glaucoma is associated with raised intra-ocular pressure (IOP), it can also occur when this pressure is within the normal range.

Glaucoma is classified as either open-angle or angle-closure glaucoma. Primary open-angle glaucoma is the most common.

Risk factors for open-angle glaucoma

- Older age, black people, family history, genetics
- Vascular dys-regulation (migraine, vasospasm, abnormalities in ocular blood flow), low ocular perfusion pressure, diabetes

- Ocular factors: Raised intra-ocular pressure, myopia, central corneal thickness – thinner corneas associated with increased risk

Clinical features

Open angle glaucoma

- Mostly asymptomatic
- History of gradual loss of vision in affected eye or loss of visual field
- Often suspected after seeing cupping of optic disc on routine fundoscopy or finding elevated intra-ocular pressure on screening

Angle-closure glaucoma

- Sudden onset of severe eye pain and redness, associated with nausea, vomiting and headache
- Loss of vision in the affected eye
- Coloured halos or bright rings around lights
- Hazy-looking cornea
- Fixed, semi-dilated pupil
- Shallow anterior chamber
- Severely elevated IOP. When palpated with a finger, the affected eye feels hard, compared to the other eye
- If IOP rises more slowly, the patient may be asymptomatic with gradual loss of vision

Management

- Goal of treatment is to arrest/delay progress of the disease, not for visual improvement. Therapy is usually life long
- Angle-closure glaucoma is a medical emergency that requires urgent reduction of intra ocular pressure

Refer all suspects to specialist

TREATMENT	LOC
Open-angle glaucoma ▶ **Timolol 0.5%** eye drops given 1 drop 12 hourly ***Angle-closure glaucoma (acute)*** ▶ For urgent reduction of IOP, give **mannitol 20%** by slow IV infusion until IOP is reduced ▶ Reduce intracocular pressure with **acetazolamide** tablets 500 mg single dose followed by 250 mg every 6 hours ▶ Plus **timolol 0.5%** drops 1 drop 12 hourly	**RR**
Caution △ Avoid timolol eye drops in patients with asthma, heart block and uncontrolled heart failure	

20.2.3 Diabetic Retinopathy

ICD10 CODE: E10.31, E11.31

A disease in which small blood vessels are damaged due elevated blood sugar over a prolonged period of time.

Risk factors for Diabetic Retinopathy

- Longer duration and poor control of diabetes
- Hypertension, kidney diseases
- Pregnancy (associated with rapid disease progression)
- High Body mass index (BMI), sedentary lifestyle
- Smoking and alcohol use

Clinical features

- Patients can present either with a sudden painless loss of vision or gradual and progressive loss of vision. It may also be discovered on routine examination

Investigations

- Conduct a thorough eye examination
- Other investigations: fundus photography, optical coherence tomography, fluorescein angiography

Management

TREATMENT	LOC
Involves any or a combination of: ▶ pan retinal photocoagulation (PRP) ▶ Anti-Vascular Endothelial growth factor (VEGF) eye injections ▶ Posterior Vitrectomy ▶ Low vision rehabilitation	**RR**

Prevention

- Control of diabetes and other risk factors

20.2.4 Refractive Errors

ICD10 CODE: H52

This is the inability of images to be focused properly on the retina. The most common refractive errors are long sightedness, short sightedness, presbyopia and astigmatism.

Clinical features

REFRACTIVE ERROR	CAUSES	CLINICAL FEATURES
Hyperopia, long-sightedness or far-sightedness, also termed hypermetropia can be physiological (axial or refractive) or pathological (mal-development, anatomical or drug-induced) in nature.	• Axial etiology (length of the eye, small eyes) • Refractive etiology (power of the eye) • Trauma • Paralysis of accommodation	• Blurred vision, eye strain • Lazy eye • Squint/ • crossed eye • Headaches
Myopia, short-sightedness or near-sightedness It can be simple (length and power), pathological/degenerative (mal-development or anatomical) in nature, induced or pseudomyopia.	• Axial etiology (length of the eye, big eyeball) • Refractive etiology (power of the eye) • Ocular disease, e.g. keratoconnus • Trauma	• Blurred distance vision • Flashes & floaters (high myopia) • Asthenopia (eyestrain, headaches, etc.)

REFRACTIVE ERROR	CAUSES	CLINICAL FEATURES
Presbyopia It is an age-related visual impairment. It results from the gradual decrease in accommodation expected with age and can have multiple effects on quality of vision and quality of life.	• Age (35- 40 years) • Hyperopia (accommodative demand, especially if uncorrected) • Ocular disease/trauma (removal or injury to lens, ciliary body or zonules) • Systemic diseases (diabetes, etc) • Drug side-effect • Occupation (near vision demands)	• Blurred near vision • Difficulty seeing at usual near working distance • Asthenopia (fatigue, eye strain, headaches, etc.) • Drowsiness • Diplopia (double vision

Investigations

- History (blurred vision, asthenopia, etc.)
- Visual Acuity (distance, near and pinhole)
- Refraction
- Ocular motility, Binocular Vision and Accommodation
- Ocular health assessment (slit lamp, fundus assessment)

Management

TREATMENT	LOC
▶ Optical correction with spectacles or contact lenses ▶ Vision therapy/orthoptics (for pseudomyopia) ▶ For presbyopia: multifocal lenses ▶ Refractive Surgery	**HC4**

20.2.5 Low Vision

ICD10 CODE: H54

This is a loss of eyesight that makes everyday tasks difficult. A person with low vision finds it difficult or impossible to accomplish activities such as reading, watching television, driving a car or recognizing faces.

When vision cannot be improved with regular eyeglasses, medicine or surgery, people with low vision need rehabilitation to learn how to make the most of their remaining sight and keep their independence.

20.2.5.1 Vision Loss

ICD10 CODE: H54

Classification patterns of vision loss include:

CLASSIFICATION	FEATURES
Central vision	This is the detailed vision we use when we look directly at something. Age-related Macular degeneration (AMD) affects central vision. Diabetic retinopathy can affect central or peripheral vision
Peripheral vision	This is the less detailed vision we use to see everything around the edges. Glaucoma affects peripheral vision first. Strokes can affect one side of the peripheral vision
Contrast sensitivity	This is the ability to distinguish between objects of similar tones like milk in a white cup or to distinguish facial features. All eye problems can decrease contrast sensitivity
Depth perception	This is the ability to judge the position of objects. New vision loss in one eye can affect depth perception, such as the height of a step
Visual processing	The lens in our eye focuses light rays onto our retina. The retina converts these light rays into signals that are sent through the optic nerve to our brain, where they are interpreted as the images we see. A problem with any of these processes affects our vision in various ways

Causes of vision loss

- Congenital (e.g., prenatal or postnatal trauma, genetic or developmental abnormalities)
- Hereditary (e.g., retinitis pigmentosa or Stargardt's macular degeneration)
- Acquired conditions (e.g., ocular infection or disease, trauma, age-related changes, or systemic disease)

Clinical features

- Loss of the ability to read standard-sized print
- Difficulty performing work-related tasks or leisure activities
- Inability to recognise faces or familiar people

Investigations

- History, visual Acuity
- Refraction
- Ocular motility
- Binocular Vision Assessment
- Visual Field Assessment
- Ocular Health Assessment: external examination, Slit lamp exam, tonometry, fundoscopy with dilated pupil

Management

TREATMENT	LOC
▶ Low vision aids ▶ Mobility instruction and community based rehabilitation ▶ Co-management with optometrist, low vision worker, community rehabilitation worker ▶ Counselling services (psychiatric, psychological and social work) ▶ Occupational therapy	**HC4**

20.3 TRAUMA AND INJURIES TO THE EYE

A common cause of blindness in Uganda.

20.3.1 Foreign Body in the Eye

ICD10 CODE: T15

Presence of an external object or substance in the eye.

Causes

- Solids: dust, insects, metal or wood particles
- Liquids: Splashes of irritating fluids

Clinical features

- Severe pain, tears, or redness
- Foreign body (FB) may be visible

Differential diagnosis

- Other injury or trauma

Management

TREATMENT	LOC
▶ Make a thin 'finger' of moistened cotton wool, move eyelid out of the way, and gently remove FB	HC2
▶ If this fails, refer to an Eye Specialist	HC4
For irritating fluids in the eye	
▶ Wash the eye with plenty of clean water or normal saline	
If the cornea is damaged	
▶ Apply **tetracycline** eye ointment 1%, cover the eye, and refer to an Eye Specialist	

20.3.2 Ocular and Adnexa Injuries

An injury to the eye may result in vision loss. It is important to recognize serious eye injuries and give appropriate treatment or refer to a specialist immediately.

Cause

- Blunt injury from a blunt object like a ball or a fist
- A perforating injury from a sharp object, like, a knife, high velocity projectiles from explosives
- Exposure to chemicals
- Thermal injuries

20.3.2.1 Blunt Injuries

ICD10 CODE: S05.1

A blunt object striking the eye with great force may result in minor or severe injury to the eye.

Different structures of the eye maybe involved.

Clinical features

ANATOMINAL STRUCTURE INVOLVED	CLINICAL FEATURES
Lids, cornea, and the conjunctiva	Eyelid swelling and subcutaneous bleeding. The degree of swelling may be mild to severe. There may be corneal abrasions and conjunctival swelling and sub conjunctival haemorrhages
Anterior chamber, lens, vitreous or retina	Decreased visual acuity is an indication that the injury involved either the anterior chamber, lens, vitreous, or retina. All the above will result in poor vision and are potentially blinding conditions.

Orbital bones	A blunt injury may cause orbital bone fractures. The commonest is a fracture of the ethmoid bone. The patient may present with swelling of the eye and proptosis if there is haemorrhage in the orbit or a sunken or retracted eyeball depending on the site of the fracture. The patient may also complain of double vision (Diplopia

Management

TREATMENT	LOC
▶ Assess the visual acuity, and if this is normal and there are no signs/symptoms of orbital bone fracture give: – **Gentamicin** or **chloramphenicol** eye drops or **tetracycline** eye ointment – Pain reliever – **Paracetamol** – A cold compress maybe helpful in lid swelling	**HC2**
▶ If the visual acuity is poor, pad the eye, give a pan reliever and REFER URGENTLY THE PATIENT TO A SPECIALIST as this is an indication of injury to deeper structures	**HC4**

20.3.2.2 Penetrating Eye Injuries ICD10 CODE: S05.2-6

Penetrating eye injuries are common in children and adults and result from injury by a sharp object.

Management

TREATMENT	LOC
Eyelid Injuries ▶ A cut involving the lid margin needs to be repaired under magnification so that the margin is well approximated, otherwise, if not well repaired, it will heal with a coloboma effect – A cut involving the eye lids may injure the lacrimal system if located in the medial aspect of the lid	**HC4**
Corneal and Scleral Perforations All perforations of the cornea or sclera are serious injuries and may lead to blindness. ▶ Apply an eye shield to protect the eye, give a pain reliever and refer the patient immediately to an Ophthalmologist ▶ At the secondary or tertiary level the treatment of corneal/scleral lacerations is immediate repair with 10/0 sutures under an operating microscope, or if the laceration is extensive, an immediate evisceration of the eye should be performed	**HC2** **RR**

20.3.2.3 Chemical Injuries to the Eye ICD10 CODE: S05.8

Various chemicals may injure the eye when they come into contact with the eyes or face. The commonest are acidic or alkaline chemical products.

Acids and Alkaline products will cause serious injuries to the lids, cornea, and conjunctivae.

Management

TREATMENT	LOC
First Aid	
▶ On exposure to acid or chemical products, the eyes should be immediately irrigated with copious amounts of water as a first aid treatment	**HC2**
At health facility	
▶ On arrival at a medical centre, continue irrigation with normal saline to wash out the entire chemical	**HC4**
▶ After irrigation of the eye, apply **tetracycline eye ointment** and pad the eye, and refer to an ophthalmologist immediately	
▶ Tear gas, which is used in crowd dispersion can cause the eyes to sting and tear copiously. The individual should irrigate the eyes with plenty of water	
– Tear gas injury is usually short lived and does not usually require treatment	

20.4 OCULAR TUMOURS

20.4.1 Retinoblastoma

ICD10 CODE: C69.2

It is the most common primary cancer of the retina and affects young children mostly under 5 years. It is curable if detected and treated early.

Clinical features

- White pupil (leukocoria)
- Squint
- Redness and swelling of the eye
- Glowing in the dark or cat's eye reflex

Management

TREATMENT	LOC
▶ Ocular examination by midwives immediately after birth for early diagnosis	HC3
▶ Refer urgently (within 72 hours) all children suspected to have retinoblastoma to an ophthalmologist	RR

20.4.2 Squamous Cell Carcinoma of Conjunctiva

ICD10 CODE: C69.0

Squamous cell carcinoma (SCC) of the conjunctiva is a cancer on the surface of the eye that tends to occur in older people (average age of diagnosis is 60 years), and young adults (30-40 years) with HIV/AIDS.

Clinical features

- Eye irritation, discomfort or foreign body sensation
- Red eye
- Growth/tumour on eyeball that may exhibit the following features:
  - Leucoplakic (white), flesh-coloured or red patch

- Rounded, elevated growth with a gel-like appearance
- Large dilated blood vessels leading to the tumour
- In early disease, the tumour often appears in the bulbar conjunctiva nasally, temporally or at the limbus

NB: Squamous cell carcinoma should be suspected in cases of chronic conjunctivitis that lasts longer than 3 months.

Investigations

➢ Excision (total) biopsy for histopathological examination

Differential diagnosis

• Pterygium, solar keratosis, pinguecula

Management

TREATMENT	LOC
▶ Refer patient to ophalmologist and eventually to cancer treatment center	RR

21. Ear, Nose, & Throat Conditions

21.1 EAR CONDITIONS

21.1.1 Foreign Body in the Ear

ICD10 CODE: T16

Causes

Common foreign bodies (FB) include:

- Insects (flies, cockroaches, ants), seeds, beads, stones
- Children: Usually insert the FB themselves, or their peers may do it
- Adults: Usually insects, cotton buds
- Occasionally the FB may penetrate adjacent parts and lodge in the middle ear

Clinical features

- Blockage, FB may be seen
- Noise in the ear if it is a live FB like an insect
- Hearing loss

If attempts have been made to remove the FB:

- Bleeding/discharge from the ear

Management

TREATMENT	LOC
Smooth round FBs ▶ Syringe the ear with clean lukewarm water ▶ If FB cannot be removed by syringing, remove with a foreign body hook – General anaesthesia may be essential in children and sensitive adults – Do NOT use forceps to try to grasp round objects, as this will only push them further in the ear	**HC2**

Other FBs	**HC2**
▶ If there is an edge to grab, remove with Hartmann (crocodile) forceps	
Insects	
▶ Kill these by inserting clean cooking oil or water into the ear, then syringe out with warm water	
▶ Cockroaches are better removed by a crocodile forcep since they have hooks on their legs that make removal by syringing impossible	
Impacted seeds	
▶ Do NOT use syringing with water as the seed may swell and block the ear	
– Refer immediately to ENT specialist if you cannot remove with a hook	**HC4**
▶ Suction may be useful for certain FBs	

21.1.2 Wax in the Ear

ICD10 CODE: H61.2

An accumulation of wax in the external ear. Wax in the ear is normal and usually comes out naturally from time to time. It may accumulate to form a wax plug and cause a problem for the patient.

Causes

- Excessive and/or thick wax production
- Small, tortuous and/or hairy ear canal
- Use of ear pads

Clinical features

- Blocked ears
- Buzzing sound
- Sometimes mild pain

Management

TREATMENT	LOC
General measures ▶ Soften the wax by inserting drops of **Vegetable oil** or **Glycerine** or **Sodium bicarbonate** into the ear 3 times a day for a few days. After this the wax may fall out on its own ▶ Syringe the ear carefully with clean warm water when the wax is soft	**HC2**
Caution △ Advise the patient not to poke anything into the ear in an attempt to clean it, as this may damage the eardrums △ Do not syringe if (a) there is history of discharge and (b) if there is pain	

21.1.3 Otitis Externa

ICD10 CODE: H60

Infection of the external ear canal, which may be localised (furunculosis) or generalised (diffuse)

Causes

- Bacterial, fungal, viral infections

Clinical features

- Pain, tenderness on pulling the pinna (external ear)
- Itching (especially for fungal infections)
- Swelling
- Pus discharge

Differential diagnosis

- Foreign body
- Otitis media (especially with pus discharge)
- Traumatic injury

Investigations

- Good history and physical examination are important in making a diagnosis
- If there is a discharge: Pus swab for microscopy, C&S
  - If discharge is white or black, it is fungal
  - If discharge is yellow, it is bacterial

Management

TREATMENT	LOC
▶ Thoroughly clean external ear canal ▶ Apply antibiotic drops, e.g. **Chloramphenicol** ear drops 0.5% 2 drops into the ear every 8 hours for 14 days ▶ Give **analgesics** e.g. **Paracetamol**	**HC2**
If severe ▶ **Cloxacillin** 250-500 mg every 6 hours for 5-7 days ▶ *Child*: 12.5-25 mg/kg per dose	
If fungal infection is suspected ▶ Remove any crusting by syringing ▶ Apply **Clotrimazole solution** once a week for 4-8 weeks	**HC4**
▶ Or **fluconazole** 200 mg once a day for 10 days	**HC3**

21.1.4 Otitis Media (Suppurative) ICD10 CODE: H66

An acute or chronic infection of the middle ear occurring mostly in children <2years

Causes

- Bacterial infection, e.g., *Streptococcus pneumoniae, Haemophilus influenzae*
- Commonly follows an acute infection of the upper respiratory tract

Clinical features

- Acute onset of pain in the ear, redness of the ear drum
- Fever
- Pus discharge for <14 days
- Bulging of the eardrum

In chronic otitis media

- On and off pus discharge from one or both ears for >14 days
- No systemic symptoms

Differential diagnosis

- Foreign body in the ear
- Otitis externa and media with effusion
- Referred ear pain, e.g. from toothache

Investigations

➢ Good history and physical examination are important in making a diagnosis

➢ Pus swab for microscopy, C&S

Management

TREATMENT	LOC
Acute infection	**HC2**
▶ **Amoxicillin** 500 mg every 8 hours for 5 days *Child*: 15 mg/kg per dose	
▶ Or **erythromycin** 500 mg every 6 hours in penicillin allergy *Child*: 10-15 mg/kg per dose	**HC3**
▶ Give analgesics, e.g. **Paracetamol** as required	
▶ Review after 5 days	
Chronic infection	
▶ Systemic antibiotics are NOT recommended: they are not useful and can create resistance	
▶ Aural irrigation 2-3 times a day	
– 1 spoon of **hydrogen peroxide** in ½ glass of clean lukewarm water	

– Gently irrigate ear using a syringe without needle – Avoid directing the flow towards the tympanic membrane ▶ Dry by wicking 3 times daily for several weeks, until the ear stays dry ▶ Each time after drying, apply 2-4 drops of **ciprofloxacin** ear drops 0.5% into the ear ▶ Do NOT allow water to enter the ear	**HC3**
Note ◆ Refer if complications occur, e.g., meningitis, mastoid abscess (behind the ear), infection in adjacent areas, e.g., tonsils, nose	

Prevention

- Health education, e.g. advising patients on recognizing the discharge of otitis media (believed by some to be "milk in the ear")
- Early diagnosis and treatment of acute otitis media and upper respiratory tract infections
- Treat infections in adjacent area, e.g. tonsillitis

21.1.5 Glue Ear (Otitis Media with Effusion)

ICD10 CODE: H65

A non-suppurative otitis media

Causes

- Blockage of the Eustachian tube by: adenoids, infection in the tube, thick mucoid fluid and tumours of the postnasal space
- Unresolved acute otitis media
- Viral infection of the middle ear
- Allergy

Clinical features

- Hearing impairment (the main feature)
  - Often fluctuant, e.g. in children: "this child hears when s/he wants to and sometimes ignores you"
- Presence of non-purulent fluid in middle ear
- Buzzing noise in ears/head
- Retracted or bulging ear drum
- Loss of usual colour of ear drum (dull eardrum)

Management

TREATMENT	LOC
▶ Eliminate known or predisposing causes ▶ **Chlorphenamine** 4 mg every 12 hours for 10 days *Child 1-2 years:* 1 mg every 12 hours *Child 2-5 years:* 1 mg every 6 hours (max: 6 mg daily) *Child 6-12 years:* 2 mg every 6 hours (max: 12 mg daily) ▶ Plus **xylometazoline** nasal drops 0.1% or **ephedrine** 2 drops every 8 hours for 2 weeks *Child*: Use 0.05% drops ▶ Exercises: Chewing, blowing against closed nose tends to open the tube ***If effusion persists >6 weeks in spite of the above:*** ▶ Refer to ENT specialist	**HC4**

21.1.6 Mastoiditis

ICD10 CODE: H70.0

Inflammation of the mastoid bone behind the ear

Causes

- Usually a complication of suppurative otitis media

Clinical features

- Severe pain felt over the mastoid bone

- Swelling in post auricular area (pinna is pushed down and forward)
- Current or history of pus discharge from the ear
- Fever
- Mental confusion is a grave sign of intracranial spread of infection (Refer to ENT surgeon immediately)

Differential diagnosis

- Inflamed lymph node behind ear

Investigations

- Diagnosis mainly by clinical features
- X-ray: Useful in chronic mastoiditis
- Blood: Full blood count, shows leucocytosis
- Examine ear with otoscope

Management

TREATMENT	LOC
▶ Admit urgently; give emergency treatment ▶ **Ceftriaxone** 2-4 g by IV or deep IM once daily for 10-14 days *Child*: 50-80 mg/kg once daily – Divide IM doses over 1 g between 2 sites ▶ Plus **metronidazole** 400 mg every 8 hours for 10-14 days *Child*: 7.5 mg/kg per dose ▶ Surgical drainage may be necessary to remove pus if an abscess has formed ▶ Refer urgently for specialist care	**HC4** **RR**

21.2 NASAL CONDITIONS

21.2.1 Foreign Body in the Nose ICD10 CODE: T17.0

Usually occurs in children <5 years

Causes

- Seeds, e.g., bean, peas, ground nut
- Paper, foam rubber (e.g. mattress foam)
- Beads, stones, metal objects

Clinical features

- Usually inserted by the child, and therefore mostly found in the right-hand nasal cavity
- Foreign body noticed by child/parent
  - May be visible or felt
  - Sharp object may cause bleeding
- Unilateral foul-smelling discharge from the nose

Differential diagnosis

- Infection in the nose, sinuses, or adenoids

Investigations

- Usually not required (Clinical diagnosis is enough)
- X-rays may be helpful in case of metallic objects like wires or ball bearings

Management

TREATMENT	LOC
▶ Sit the child up or wrap in a blanket ***First aid*** ▶ Blow through the mouth while blocking the unaffected side of the nose **Other methods of removal** ***Paper or foam rubber*** ▶ Grasp firmly and remove with a fine forceps, e.g., Tilley's forceps	**HC2**

Other objects ▶ Carefully pass a blunt hook behind the object, and then gently pull it out ***If the above fails*** ▶ Refer to an ENT specialist	**HC2**

Prevention

- Caution children about placing objects in mouth, nose, and ears

21.2.2 Epistaxis (Nose Bleeding) ICD10 CODE: R04.0

Bleeding from the nostrils, which may be arterial or venous

Causes

- Local: nose-picking, trauma, nose infections, tumours
- General: hypertension, bleeding disorders, pertussis, Sickle-cell trait/disease, renal failure, often familial
- Can also be a symptom of serious disease, e.g., typhoid, malaria, viral fevers such as Ebola

Clinical features

- On examination, site of bleeding from nose may be seen
- Signs and symptoms of shock if bleeding is severe
- Signs and symptoms of predisposing cause

Differential diagnosis

- Clinical assessment to exclude any of above causes

Investigations

➢ Blood: Full blood count, platelet count

Management

TREATMENT	LOC
First aid ▶ Sit the patient up (if patient not in shock) and tilt head forward not backwards to avoid pooling of blood in posterior pharynx ▶ Instruct patient to pinch the nose between the finger and the thumb for 15 minutes, breathe through the mouth, and spit out any blood	**HC2**
If bleeding continues ▶ Impregnate a gauze strip with **Soft paraffin** or **Tetracycline** eye ointment and pack into the nose using forceps ▶ Leave gauze in place for 24-48 hours ***If bleeding still does not stop after this period*** ▶ Refer to hospital for further management	

Prevention

- Avoid picking the nose
- Treat/control predisposing conditions

21.2.3 Nasal Allergy

ICD10 CODE: J30

An abnormal reaction of the nasal tissues to certain allergens, which tends to start in childhood. Vasomotor rhinitis starts in the 20s and 30s.

Causes

Predisposing

- Hereditary: Family history of similar or allied complaints
- Infections may alter tissue permeability
- Psychological and emotional factors in vasomotor rhinitis

Precipitating

- Changes in humidity and temperature
- Dust mite, infections
- Certain foods; drugs, e.g. acetylsalicylic acid
- Alcohol, aerosols, fumes

Clinical features

- Often present in school age children
- Sometimes preceded or followed by eczema or asthma. Less common in persons >50 years old
- Paroxysmal sneezing
- Profuse watery nasal discharge
- Nasal obstruction, variable in intensity and may alternate from side to side
- Postnasal drip (mucus dripping to the back of the nose)

Investigation

- Careful history is most important
- Large turbinates on examining the nose

Differential diagnosis

- Nasal infection
- Foreign body
- Adenoids (in children)

Management

TREATMENT	LOC
▶ Avoid precipitating factors (most important) ▶ Reassure the patient ▶ Antihistamines, e.g. **Chlorphenamine** 4 mg every 12 hours for up to 21 days, then as required thereafter if it recurs ▶ Nasal decongestants, e.g. **Pseudoephedrine** or **xylometazoline** ▶ Surgery may be required if there is obstruction of the nose	**HC2**

Caution

△ Do NOT use vasoconstrictor nasal drops, e.g. **Pseudoephedrine** and **Xylometazoline** for >7 days or repeatedly, since they can cause rebound congestion and alter the nasal environment making structures hardened

21.2.4 Sinusitis (Acute)

ICD10 CODE: J01

Inflammation of air sinuses of the skull

Causes

- Allergy
- Foreign body in the nose
- Viruses, e.g. rhinovirus, often as a complication of URTI
- Dental focal infection
- Bacteria, e.g., *Streptococcus pneumoniae, Haemophilus influenzae, Streptococcus pyogenes*

Clinical features

- Rare in patients <5 years
- Pain over cheek and radiating to frontal region or teeth, increasing with straining or bending down
- Redness of nose, cheeks, or eyelids
- Tenderness to pressure over the floor of the frontal sinus immediately above the inner canthus
- Referred pain to the vertex, temple, or occiput
- Postnasal discharge
- A blocked nose
- Persistent coughing or pharyngeal irritation
- Hyposmia

Differential diagnosis

- Common cold, allergic rhinitis
- Foreign body in the nose
- Nasal polyps, adenoids

Investigations

- C&S of the discharge
- X-ray of sinuses

Management

TREATMENT	LOC
General measures ▶ Steam inhalation may help clear blocked nose ▶ Analgesics e.g. Paracetamol ▶ Nasal irrigation with normal saline ***If there are signs of bacterial infection (symptoms persisting > 1 week, unilateral facial pain, worsening of symptoms after an initial improvement)*** ▶ **Amoxicillin** 500 mg every 8 hours for 7-10 days ▶ *Child*: 15 mg/kg per dose ***If there is a dental focus of infection*** ▶ Extract the tooth ▶ Give antibiotics e.g. **Amoxicillin** plus **Metronidazole** (see Gingivitis, section 23.2.5) ***If there is a foreign body in the nose*** ▶ Refer to hospital for removal	**HC2**
Notes ◆ Do NOT use antibiotics **except** if there are clear features of bacterial sinusitis, e.g., persistent (> 1 week) purulent nasal discharge, sinus tenderness, facial or periorbital swelling, persistent fever	

21.2.5 Atrophic Rhinitis

ICD10 CODE: J31.0

Chronic infection of the nasal mucosa in which various components become thinner (atrophy) due to fibrosis of the terminal blood vessels

Cause

- Unknown but associated with: HIV/AIDS, poor socio-economic status, syphilis, rhinoscleroma (early stages)

Clinical features

- Tends to affect both nasal cavities
- Affects females more than males
- Foul stench not noticed by patient who cannot smell
- Crusts and bleeding points in the nose
- Epistaxis when crusts separate
- Sensation of obstruction in the nose
- Nasal airway very wide

Investigations

- C&S of smear of nasal material
- X-ray: To exclude sinusitis
- Differential diagnosis
- Atrophy from other causes

Management

TREATMENT	LOC
▶ Clean nasal cavities twice daily to remove crusts (most important) ▶ Syringe nose or douche it with warm **normal saline** ▶ Or **sodium bicarbonate** solution 5% (dissolve 1 teaspoon of powder in 100 ml cup of warm water) ▶ Then apply **tetracycline** eye ointment 1% inside the nose twice daily ▶ Give **amoxicillin** 500 mg every 8 hours for 14 days – For rhinoscleroma: Give 1 g every 8 hours for 6 weeks	**HC3**

If atrophic rhinitis not better or is worse after 2 weeks ▶ Refer to ENT specialist	**HC4**

Prevention
- Treat/eliminate known causes, such as syphilis

21.2.6 Adenoid Disease

ICD10 CODE: J35.02, J35.2

Enlargement/inflammation of nasopharyngeal tonsil. Common in small children.

Clinical features

May be due to enlargement, inflammation, or both
- Obstruction of the nose leading to mouth breathing, difficulty eating, snoring, jaw deformities
- Obstruction of Eustachian tube leading to hearing loss, which fluctuates due to fluid in middle ear ("Glue ear")
- Recurrent otitis
- Discharge from the nose
- Recurrent cough
- Physical and other developmental retardation, e.g. small size for age

Investigations
- ➢ Diagnosis is usually based on history
- ➢ X-ray for neck soft tissue: lateral view shows narrowing of the post-nasal space

Differential diagnosis
- Other causes of nasal obstruction and discharge, e.g., rhinitis, FB, deviated septum, sinusitis
- Dental and jaw diseases or abnormalities

Management

TREATMENT	LOC
Mild (If symptoms are not marked) ▶ Give conservative treatment with **chlorpheniramine** 1-2 mg daily (depending on age) for 7 days ▶ Topical nasal steroids if available	**HC2**
Moderate and Severe (If symptoms are marked or do not improve on treatment) ▶ Refer to ENT surgeon for surgery	**H**

21.3 THROAT CONDITIONS

21.3.1 Foreign Body (FB) in the Airway

ICD10 CODE: T17

Mostly occurs in children <5 years

Cause

- Types of FBs include seeds (groundnuts, beans, maize) plastics, rubber, metal wires, ball bearings
- Usually inhaled from the mouth
  - Child is chewing, laughing, or crying or there is a sudden disturbance, which opens the vocal cords so the object is inhaled

Clinical features

- Sudden onset of choking followed by stridor (noisy breathing) or
- Cough, difficulty in breathing, wheezing
- Hoarseness of voice if FB stuck at the vocal cords
- Symptoms start suddenly, some symptoms may be transient (may disappear after a short period), but complications may present few days later (sudden death, intractable pneumonia)

- Upper airway obstruction as shown by: flaring of the nostrils, recession of the chest inlet and/or below the ribs, rapid chest movements and reduced air entry (usually on the right side)

Investigations

➢ Once the history and examination are suggestive, investigations can be omitted to save time
➢ Chest x-ray may show lung collapse, hyperinflation, mediastinal shift, shift of heart shadow

Management

TREATMENT	LOC
Child	**HC2**
▶ If chocking, attempt to dislodge it by 3 cycles of 5 back slaps/5 chest compressions (for infants) or Heimlich manoeuvre (for children)	
△ Do not do blind finger sweeps. If foreign body visible in the mouth, remove it with a Magill forceps	
▶ If severe respiratory distress, refer to higher level for airway visualization. Give oxygen if necessary	**RR**
Adult	**HC2**
▶ Dislodge large FB, e.g. chunk of meat, from the pharynx by cycles of 5 back slaps and Heimlich manoeuvre (standing behind the patient with both arms around the upper abdomen and giving 5 thrusts)	
– If patient pregnant or very obese: Perform 6-10 chest thrusts with patient lying on the back	
▶ If still suspect of FB, refer for airway visualization	**RR**

Prevention

- Do not give groundnuts or other small hard food items to children <2 years

- If a child is found with objects in the mouth, leave the child alone to chew and swallow or gently persuade the child to spit out the object
  - Do not struggle with/force the child

21.3.2 Foreign Body in the Food Passage

ICD10 CODE: T18

Causes

- Types of FBs commonly involved include:
  - Fish or chicken bones, often lodging in the tonsils, behind the tongue, or in the pharynx, occasionally in the oesophagus
- Coins, especally in children. Coins are particularly likely to be ingested. Disc battery is particularly dangerous and requires immediate referral

Clinical features

- Difficulty and pain in swallowing
  - Patient winces as he attempts to swallow
- Drooling of saliva
- Patient may point to where foreign body is stuck with a finger (pointing sign)
- FB may be seen, e.g., in tonsil, pharynx

Differential diagnosis

- Infection in pharynx
- Trauma by foreign body
- Medication ulcer (e.g. doxycycline)

Investigations

- ➢ X-ray may reveal radio-opaque FB
  - Coins may appear on X-rays done for other reasons
- ➢ Many FBs are radiolucent
  - Look for a gas shadow if in the oesophagus

Management

The approach depends upon the type of object ingested, the location of the object, and the patient's clinical status.

If negative radiographs, no symptoms and the FB does not belong to a dangerous category (magnets, disc batteries, sharp long objects, superabsorbent polymer), expectant management is advised.

If patient is symptomatic and/or the object is dangerous, immediate referral for further management.

TREATMENT	LOC
First Aid ▶ Allow only clear fluids ▶ Do NOT try to dislodge/move the FB with solid food – This may push it into the wall of the oesophagus causing infection and sometimes death ▶ Give **IV infusion** if unable to swallow liquids or if oral fluid intake is poor	**HC4**
If FB is invisible on X-ray or symptoms persist >24 hours from time of ingestion ▶ Refer to hospital with ENT facility ***If FB is visible in the pharynx, tonsil, etc.*** ▶ Grasp and remove it with long forceps ***If patient tried to push FB with solid food:*** ▶ Give broad-spectrum antibiotic cover with **amoxicillin** 500 mg every 8 hours for 5 days	**RR**

Prevention

- Keep potential FBs out of children's reach
- Advise on care in eating, i.e., not taking in too large pieces of food, chewing thoroughly before swallowing
- Advise once a FB is stuck to avoid trying to "push" it down with solid food as this may sometimes be fatal

21.3.3 Pharyngitis (Sore Throat) ICD10 CODE: J02

Inflammation of the throat

Causes

- Most cases are viral
- Bacterial: commonly Group A haemolytic Streptococci, diphtheria in non-immunized children
- Gonorrhoea (usually from oral sex)
- May also follow ingestion of undiluted spirits
- *Candida albicans* in the immunosuppressed

Clinical features

- Abrupt onset
- Throat pain
- Pain on swallowing
- Mild fever, loss of appetite, general malaise
- In children: nausea, vomiting, and diarrhoea
- The presence of runny nose, hoarseness, cough, conjunctivitis, viral rash, diarrhea suggests viral infection
- The presence of tonsilar exudates, tender neck glands, high fever, and absence of cough suggest a bacterial pharyngotonsillitis (see next section)

Differential diagnosis

- Tonsillitis, epiglottitis, laryngitis
- Otitis media if there is referred pain

Investigations

- ➢ Throat examination with torch and tongue depressor
- ➢ Throat swab for microscopy, C&S
- ➢ Blood: Full blood count
- ➢ Serological test for haemolytic streptococci (ASOT)

Management

TREATMENT	LOC
Supportive care ***Most cases are viral and do not require antibiotics*** ▶ Keep the patient warm ▶ Give plenty of (warm) oral fluids e.g., tea ▶ Give analgesics, e.g. **Paracetamol** for 3 days ▶ Review the patient for progress ***For Streptococcal pharyngitis: see next section***	**HC2**
Notes ◆ If not properly treated, streptococcal pharyngitis may lead to acute rheumatic fever and retropharyngeal or peritonsillar abscess – Therefore ensure that the full 10-day courses of antibiotics are completed where applicable	

21.3.4 Pharyngo-Tonsillitis

ICD10 CODE: J03

Inflammation of the tonsils

Cause

- Streptococcal infection (most common)
- Viral infection (less common)

Clinical features

- Sudden onset, most common in children
- Sore throat
- Fever, shivering, headache, vomiting
- Tonsils enlarged and with exudate and cervical lymph nodes

Complications

- Local: peritonsillar cellulitis and abscess (quinsy),
- Systemic complications: bacterial endocarditis, glomerulonephritis, rheumatic fever (see section **4.1.9**)

Differential diagnosis

- Pharyngitis
- Submandibular lymphadenitis

Investigations

➢ Throat swab: For C&S

Management

TREATMENT	LOC
Bacterial pharyngotonsillitis	**HC2**
▶ **Phenoxymethylpenicillin** 500 mg every 6 hours for 10 days	
▶ *Child*: 10-20 mg/kg per dose	
▶ Or **Benzathine penicillin** 1.2 MU IM single dose	
▶ *Child*: <30 kg: 30,000 IU/kg	
If allergic to penicillin	
▶ **Erythromycin** 500 mg every 6 hours for 10 days	**HC3**
Child: 12.5 mg/kg per dose	
Viral pharyngotonsillitis	
▶ Treat symptomatically with analgesics and increased oral fluids	

21.3.5 Peritonsillar Abscess (Quinsy)

ICD10 CODE: J36

An abscess between the tonsil capsule and the lateral wall of the pharynx

Cause

- Follows (often mild) tonsillitis attack

Clinical features

- Severe throat pain
- Fever, headache, malaise, rigors may occur
- Inability to open the mouth; salivation and dribbling

- Bad mouth odour
- Thickened muffled (unclear) speech
- Ear pain
- Enlarged cervical lymph nodes
- Tonsil and soft palate reddish and oedematous
- Swelling pushing the uvula to opposite side
  - May be pointing (bulging collection of pus)

Differential diagnosis

- Tumour
- Tonsillitis
- Abscess in the pharynx

Investigations

➢ Carry out C&S on pus if present or after drainage

Management

TREATMENT	LOC
Early stages: Disease of adolescents and adults ▶ Conservative management ▶ Bed rest ▶ *Adult*: **Benzylpenicillin** 2 MU IV or IM every 6 hours for 48 hours then switch to **amoxicillin** 500 mg every 8 hours to complete a total of 7 days ***If not better in 48 hours*** ▶ **Ceftriaxone** 1 g IV once daily for 7 days *Child*: 50 mg/kg IV ▶ Plus **metronidazole** 500 mg IV every 8 hours *Child*: 10 mg/kg IV every 8 hours ***If unable to take oral fluids*** ▶ Set up an IV drip e.g. **Normal saline**	**HC4**

When swelling is marked ▶ Surgery (which should be done by a trained person) – Suction facility will be needed – Carry out incision and drainage at the most pointing area with the protected tip of no.11 surgical blade ▶ *6 weeks later:* Refer for tonsillectomy as this condition might recur	

Prevention

- Prompt and adequate treatment of tonsillitis

22. Skin Diseases

22.1 BACTERIAL SKIN INFECTIONS

22.1.1 Impetigo

ICD10 CODE: L01

A very superficial bacterial infection of the epidermis (upper/outer layer of skin)

Cause

- Streptococcus or staphylococcus infection, or both

Clinical features

- Common in children
- Lesions usually on face, head, and hands as bullae, or small brown crusts on an erythematous base
- In some cases, large flaccid bullae containing pus and serum are formed commonly in the axilla and groin

Differential diagnosis

- Pemphigus

Investigations

➢ Pus swab for Gram stain
➢ Culture and sensitivity (exudate from unroofed lesion)

Management

TREATMENT	LOC
Cleaning ▶ Clean affected area with **chlorhexidine** solution 0.05% ***Antiseptic: if infection mild and localised (<5 lesions)*** ▶ Apply **gentian violet aqueous paint** 0.5% every 12 hours for 3 days	**HC2**

▶ OR apply **silver sulphadiazine** 1% cream 12 hourly for 5 days ***Antiseptic: if infection mild and localised (<5 lesions)*** ▶ Apply **gentian violet aqueous paint** 0.5% every 12 hours for 3 days ▶ OR apply **silver sulphadiazine** 1% cream 12 hourly for 5 days ▶ Keep skin clean by frequent washing and drying ▶ Use soap and water to soften, and gently remove any superficial crusts ***Systemic antibacterial: if signs of regional or systemic spread, e.g., pyrexia, >5 lesions*** ▶ **Cloxacillin** 250–500 mg every 6 hours before food for 7 days *Child*: 12.5–25 mg/kg per dose ▶ Or in penicillin allergy, **erythromycin** 250-500 mg every 6 hours for 7 days *Child*: 7.5 mg/kg per dose	**HC3**
Note ◆ Impetigo is contagious until the lesions have dried up	

Prevention

- Proper hygiene with use of antiseptic soap

22.1.2 Boils (Furuncle)/Carbuncle ICD CODE: L02

A boil or furuncle is a deep-seated infection of the hair follicles with a walled-off collection of pus. A carbuncle is a cluster of interconnected furuncles.

Cause

- Bacterial infection with *Staphylococcus aureus*, leading to the collection of pus

Clinical features

- Common in people with poor general health, diabetes, or the debilitated
- Painful mass, warm, and tender
- Swelling becomes fluctuant, may point after 3 days

Differential diagnosis

- Acne
- Epidermal cyst

Investigations

➢ Pus swab for Gram staining and C&S
➢ If recurrent, check for diabetes mellitus and HIV infection

Management

TREATMENT	LOC
General measures	**HC2**
▶ Intermittent warm compresses to allow lesion to point	
▶ Incise and drain when ready, then cover with dressing (pack cavity)	
Antibiotics	
▶ May be useful if instituted early and in carbuncles, lesions on face and in immunocompromised patients	
▶ **Cloxacillin** 250-500 mg every 6 hours before food for 5 days *Child*: 12.5-25 mg/kg per dose	**HC3**
▶ OR in penicillin allergy patients, **erythromycin** 500 mg every 6 hours *Child*: 7.5 mg/kg per dose	

Prevention

- Personal hygiene with use of antiseptic soap

22.1.3 Cellulitis and Erysipelas ICD10 CODE: L03

Cellulitis is an acute inflammation of the skin involving the dermis and subcutaneous tissues, caused mainly by streptococci and staphylococci. Erysipelas has a raised demarcated border, where as the border is not distinct in cellulitis.

Causes

- Streptococcus and *S. Aureus* in adults
- *Haemophilus influenza* type b in children under 3 years
- Cellulitis is sometimes caused by other organisms

Predisposing factors

- Minor trauma
- Pre-existing lesion such as ulcer or erosion

Clinical features

- Erythema (reddening)
- Pain, tenderness
- Acute localised swelling and oedema
- In erysipelas, lesions are more superficial and have a defined raised margin
- Skin becomes tense and shiny in advanced stages
- Regional lymphadentiis may be present

Differential diagnosis

- Lymphoedema
- Acute osteomyelitis
- Deep vein thrombosis (DVT)
- Blunt trauma/fracture

Investigations

➢ Pus swab for Gram staining and culture and sensitivity

Management

TREATMENT	LOC
▶ Elevate the affected limb ▶ Give an analgesic e.g. **paracetamol** 1 g every 6-8 hours as required, *Child:* 10 mg/kg ▶ Antibiotics: **cloxacillin** 250-500 mg every 6 hours before food for 7 days *Child*: 12.5-25 mg/kg per dose ▶ OR in penicillin allergy, **erythromycin** 500 mg every 6 hours *Child*: 7.5 mg/kg per dose ***If severe*** ▶ IV **ceftriaxone** *Adult:* 1 g every 12 hours for 3 days *Child:* 50 mg/kg ▶ Then oral antibiotics to complete 1 week of antibiotics	**HC3**

22.2 VIRAL SKIN INFECTIONS

22.2.1 Herpes Simplex

ICD10 CODE: B00

A viral infection transmitted by direct contact, and characterised by a localised primary lesion, latency, and recurrence. Lesions can be oral (lips, oral mucosae) or genital.

Cause

- Herpes simplex virus types 1 and 2

Clinical features

TYPE OF HERPES	FEATURES
Herpes simplex: Primary infection	• May be asymptomatic • In some cases, there may be fever, malaise, gingivostomatitis, and vesicular lesions in the oropharynx • Generalised cutaneous eruptions • If genital infection, painful vescicular eruption in the genital area • Meningoencephalitis and chronic eczema may be a complication
Herpes simplex Reactivation of primary infection	• Recurrent Herpes labialis and genitalis • Severe in the immunosuppressed

Differential diagnosis

- Aphthous ulcer
- Other causes of genital sores, e.g. syphilis
- Other causes of meningoencephalitis

Investigations

➢ No routine investigation necessary. Diagnosis is clinical

Management

TREATMENT	LOC
Symptomatic treatment	**HC2**
▶ Clean lesions with antiseptic, e.g. **chlorhexidine** solution 0.05%	
▶ Or diluted **hydrogen peroxide** solution 6%	
▶ In severe or extensive infection, **acyclovir** 400 mg every 8 hours by mouth for 7 days *Child*: 100-200 mg 5 times a day for 5-7 days	**HC4**

Note
- Acyclovir only works if it is started within 48 hours of the first symptoms

Prevention
Provide health education on
- Personal hygiene
- Avoiding direct contact with infected people
- Use of gloves and condoms as applicable

22.2.2 Herpes Zoster (Shingles) ICD10 CODE: B02

An acute cutaneous infection involving primarily the dorsal root ganglia, usually of a single dermatome. It is characterised by a vesicular eruption in areas supplied by peripheral sensory nerves in the affected root ganglia.

Cause
- *Varicella zoster* virus, usually reactivated from the virus that entered the cutaneous nerves during an earlier episode of chicken pox and remained in a latent form. This usually occurs during low immunity.

– For chickenpox, see section **2.3.2**

Clinical features
- Pre-eruptive pain, itching or burning: generally localized to the dermatome, precedes the eruption by 4-5 days
- The above are followed by characteristic crops of very painful vesicles on the side supplied by affected nerve
- Mild chills, fever, malaise

Differential diagnosis
- Chicken pox
- Herpes simplex

Investigations

- Clinical diagnosis is sufficient
- Serology test for HIV, if sero-status not known

Management

TREATMENT	LOC
Symptomatic and supportive treatment	**HC2**
▶ Clean lesions with antiseptic, e.g. **chlorhexidine** solution 0.05%	
▶ Or diluted **hydrogen peroxide** solution 6%	
▶ Apply **calamine lotion** 2–3 times daily	
▶ **Analgesics** for neuropathic pain e.g. **amitriptyline** 25 mg nocte, or **carbamazepine** 200 mg nocte as necessary	
▶ **Oral aciclovir** 800 mg 5 times a day for 7 days can be given, especially if the disease is diagnosed very early or is disseminated	**HC4**
If the lesions involve the eye	
▶ Refer to an ophthalmologist (Eye Specialist)	

Prevention

- Protect high-risk individuals (e.g. the immuno-suppressed) from direct contact with the disease

22.3 FUNGAL SKIN INFECTIONS

22.3.1 Tineas

ICD10 CODE: B35

Superficial infection caused by dermatophytes or malassetia fungi, which invade dead tissue of the skin and its appendages (stratum corneum, nails and hair). They are not very infectious but are usually recurrent.

Causes

- *Trichophyton mentagrophytes* or *T. rubrum*

Clinical features

- Features (and name of the infection) depend on the body part affected as in table below

BODY PART AFFECTED	FEATURES
Tinea capitis	• Bald, scaly patches with hairs broken off when very short • The lesion may sometimes be inflamed with multiple pustules (pockets of pus) • Especially in children and immuno-suppressed
Tinea corporis (ringworm)	• Single or multiple plaques on the face, trunk or limbs • Well demarcated, scaly and raised border with relatively clear centre • Pruritus
Tinea (or pityriasis) versicolor	• A chronic fungal infection of large areas of skin • Well-defined round/oval patches • Pale or discolored spots on the skin, e.g., chest, back, face • Not scaly, but peels off when scratched • Rare in children, onset usually around puberty
Nails (Onycho-mycosis)	• Thickened, discolored nails, can be white, yellow, green, or black • Brittle nails that break easily

Tinea pedis (Athletes foot)	• White scaling usually between the 4th and 5th toes or between the 3rd and 4th toes on one foot only • Scales, vesicles, cracks • Burning or itching between toes and under foot especially when shoes and socks are removed • May be secondary infection

Differential diagnosis

- Seborrhoeic dermatitis, eczema, contact dermatitis
- Alopecia areata
- Jiggers, hookworm, candida
- Cellulitis, psoriasis
- Maceration from tight footwear

Investigations

➢ Scales from the active edge of the lesions are scraped off, placed in 10-20% potassium hydroxide (KOH) for 30 minutes, and examined microscopically for mycelia
➢ Culture of specimen on Sabouraud's agar

Management

TREATMENT	LOC
Tinea capitis ▶ Oral **griseofulvin** 10 mg/kg /day as single dose once daily after meals for 6 weeks ▶ Do NOT treat with topical antifungal agents; they cannot get to the site of infection	**HC3**

Tinea corporis (ringworm)	
▶ Apply **Whitfield's ointment** (**benzoic acid + salicylic acid**) 12 hourly until 2 weeks after lesions clear	**HC2**
▶ **Clotrimazole** 1% cream twice a day	**HC3**
▶ Or **miconazole** 2% cream 12 hourly for 2-3 weeks	
If topical treatment fails	
▶ **Griseofulvin** 10 mg/kg for 3 weeks	**HC3**
Pityriasis versicolor	
▶ Apply **clotrimazole** cream 12 hourly until lesions disappear	**HC3**
▶ Or **miconazole** 2% cream 12 hourly for 2-3 weeks	
If topical treatment fails	
▶ **Fluconazole** 300 mg once weekly for 2 weeks	**HC3**
Nails (Onychomycosis)	**HC3**
▶ Oral **griseofulvin** 10 mg/kg per day as single dose once daily after meals for 6-12 months	
Tinea pedis (Athletes foot)	
▶ Apply **clotrimazole** cream 12 hourly, continue for 14 days after the lesions have healed	**HC3**
▶ Or **miconazole** cream as above	
▶ Apply powder (not necessarily medicated) to the feet rather than to the shoes	
▶ For persistent or non-responsive infection, oral **griseofulvin** 10 mg/kg /day as single dose once daily after meals for 4-8 weeks	

Note on griseofulvin
- Double the dose in severe infections
- Take with fatty food
- Do NOT use for tinea versicolor (pityriasis)
- Advise female patient to not get pregnant while on treatment
- Men should avoid fathering children while on treatment

Prevention and health education
- Clean all contaminated objects, e.g., combs, brushes
- Avoid sharing contaminated combs, towels, clothes, etc.
- Advise patient on the need to persist with the long durations of treatment to completely clear infection
- Personal foot hygiene is important. Keep feet clean and dry. Wash socks daily
- If patient has repeat fungal infections, refer him/her for HIV counselling and testing

22.4 PARASITIC SKIN INFECTIONS

22.4.1 Scabies

ICD10 CODE: B86

Contagious skin disease associated with severe itch

Cause
- A parasitic mite, *Sarcopterus scabiei hominis*
- Transmitted by direct skin contact with infected person

Clinical features
- Intense itching, especially at night
- Wheals, papules, vesicles, and thread-like burrows
  - Common in flexural areas, i.e. wrists and inter-digital creases, axillae, nipples, buttocks, and genitalia
- Scratching spreads mites to other areas leading to widespread, intensely pruritic eruption

- Secondary infection is common

Differential diagnosis

- Papular urticaria, atopic or seborrhoeic dermatitis
- Drug eruptions
- Onchocerciasis

Investigations

➢ Microscopic identification of mites, their eggs or faeces obtained from the vesicles or mite burrows

Management

TREATMENT	LOC
General measures ▶ Close contacts and all family members in the household should be treated ▶ Wash and iron all linen which has touched the infected skin	**HC2**
Medicine treatment – Wash (scrub) the body well ▶ Apply **benzyl benzoate** lotion 25% to the whole body from the scalp to the soles of the feet but taking care to avoid contact with the eyes. Leave on for 24 hours, rinse and reapply. Repeat 2 times except in pregnant women ▶ Give an **antihistamine** to relieve itching: tablet **chorpheniramine** 4 mg every 8 hours for 3 days *Child:* 1- 2 mg per dose	**HC2**
If treatment ineffective or unsuitable ▶ **Ivermectin** 200 micrograms single dose (avoid in pregnancy, and in children <15 kg) ▶ For complete eradication of mites, repeat the dose after 7 days	**HC3**

If secondary infection is present ▶ Give an **antibiotic** as in Boils (see section 22.1.2)	

Prevention
- Personal hygiene (washing clothes and regular bathing)
- Avoid close contact with infected people

22.4.2 Pediculosis/Lice

ICD10 CODE: B85

Infestation by lice, usually in the hairy parts of the body. Usually found on the scalp, armpits, chest or pubic area.

Cause
- Pediculosis humanus (capitis, corporis, pubis)
- Usually transmitted directly by person-to-person contact but may also be transmitted indirectly via the clothing, towels, and bedding of infested persons

Clinical features
- Severe itching of affected areas, scratch marks
- Nits (white eggs) attached to hairs
- Direct observation of lice
- Continued scratching may lead to secondary bacterial infection and eczemas

Differential diagnosis
- Seborrhoeic dermatitis

Investigations
- Direct observation of lice/nits

Management

TREATMENT	LOC
▶ Shave the affected area ▶ Apply pediculocide to kill lice – Apply **benzyl benzoate lotion** 25% and leave on overnight	**HC2**

– *Child 2-12 years*: dilute the lotion with an equal part of water before application – *Child <2 years*: dilute 1 part of lotion with 3 parts of water, leave on for 12 hours. Apply ONLY once – Comb with a fine toothed comb if not shaved	**HC2**

Note

Head lice

- Do not use undiluted BBA in children <2 years. It is very irritant to the eyes
- If the head is not shaved, ensure that the BBA is massaged well into the scalp
- Soak all brushes and combs in BBA for at least 2 hours

Pubic lice

- Treat all sexual partners at the same time

Prevention

- Personal hygiene (washing clothes and regular bathing)
- Avoid close contact with infected people
- Treat the whole family
- Avoid sharing combs, towels, etc

22.4.3 Tungiasis (Jiggers) ICD10 CODE: B88.1

An infestation by the burrowing flea *Tunga penetrans*. Commonly affects the feet, hands, elbows, and sometimes buttocks.

Cause

- A burrowing sand flea, *Tunga penetrans*

Risk factors

- Travel to areas with *T. penetrans*
- Walking bare feet
- Living in same house with domestic animals such as pigs, dogs and rodents like rats

Clinical features

- Punctum or ulceration, often described as a white patch with a black dot on affected area
- There may be redness and swelling around affected site
- A serosanguineous exudate may ooze from the central opening, and eggs may be seen with the naked eye
- Lesions can be painful and very itchy

Complications

- Tissue necrosis, suppuration, gangrene
- Disability, disfigurement

Differential diagnosis

- Cercarial dermatitis, scabies
- Creeping eruption (ancylostoma species)
- Tick or flea bite, myiasis

Investigations

➢ Clinical features are diagnostic

Management

TREATMENT	LOC
Self-healing ▶ In many cases tungiasis will heal on its own as the burrowed flea dies within 2–5 weeks, and naturally sloughs off as the skin sheds ***Surgical removal*** ▶ Physical removal of the flea using sterile forceps, or needles, or safety pins ***Medicine treatment and suffocation of flea*** ▶ Apply **benzyl benzoate** 25% emulsion twice daily to the affected area for 6 days ▶ Immerse affected area in **potassium permanganate** 0.05% once a day for 10 minutes for 10 days	**HC2**

▶ Then follow with application of thick **petroleum jelly** or 20% salicylated petrolleum jelly vaseline) daily for 7 days ***If secondary bacterial infection*** ▶ Treat as per boils (see section 22.1.2)	
Note ◆ Take precautions to prevent secondary bacterial infections such as cellulitis, and tetanus	

Prevention
- Spray the ground with insecticide such as malathion
- Protect feet with socks and shoes
- Dry laundry on a line instead of the ground
- Do not share housing with animals. Animals such as goats, pigs, cows can all be infested with jiggers
- Keep floors clean and dust free
- Health education

22.5 INFLAMMATORY AND ALLERGIC SKIN CONDITIONS

22.5.1 Acne

ICD10 CODE: L70

Acne is a common chronic skin disease involving blockage and/or inflammation of hair follicles and sebaceous glands. It commonly occurs in puberty and adolescence and is associated with hormonal changes.

Causes

Acne develops as a result of the following four factors:
- Release of inflammatory mediators into the skin
- Follicular hyperkeratinization with subsequent plugging of the follicles

- *Propionibacterium acnes* follicular colonization
- Excess sebum production

Clinical features

- Typically affects face, and upper part of chest and back
- Inflammatory papules, pustules and nodules
- Infected parts may be painful
- Cysts and scars in severe cases
- May worsen during menstruation

Differential diagnosis

- Carbuncles

Investigations

➢ Clinical features are largely diagnostic

Management

TREATMENT	LOC
General measures ▶ Reassure patient. Inform him or her that diet plays no role in acne ▶ Drink water regularly ▶ Clean face twice daily with mild soap and water ▶ Do not use strong soap ▶ Commercial facial wash cleansers can decrease skin oiliness ▶ Do not use oil, cream or petroleum jelly ▶ Do not touch or press the foci ▶ Sunshine is helpful, but avoid sunburn ▶ If acne is getting worse or pustular, refer to a dermatologist	**HC2**
Topical medicine treatment ▶ **Benzoyl peroxide** 2.5% to 10%, applied at night for not more than 4 months	**HC4**

Systemic antibacterials	
▶ Only use if acne is severe and creams are unavailable	
▶ Duration of treatment depends on response. May last 6 months to one year	
▶ **Doxycycline** 100 mg once daily for 6-12 months. Review treatment monthly to ascertain response	**HC2**
▶ OR **erythromycin** 500 mg every 6 hours for 1 month, during pregnancy or breastfeeding	**HC3**
▶ Refer to dermatologist if no response occurs	
Oral contraceptives	
▶ **Combined oral contraceptive** (see Family Planning, section **15.2.3**)	**HC4**

22.5.2 Urticaria/Papular Urticaria ICD10 CODE: L50

An acute, sub-acute or chronic inflammation of the skin, caused by endogenous or exogenous agents. Urticaria is an itchy skin rash.

Causes

- Endogenous: familial, also associated with other allergic diseases
- Exogenous: agents include sunlight, chemicals, certain foods, insect bites

Clinical features

- Inflammation of skin: transient itching hives and wheals
- Papular urticaria: vesicles, redness, oedema, oozing in site of insect bites

Differential diagnosis

- Fungal and bacterial infections of the skin
- Helminth infestations

Investigations

- No satisfactory investigations for skin allergy
- Blood: haemogram to demonstrate eosinophilia
- Stool: microscopy to exclude worms

Management

TREATMENT	LOC
▶ Establish the cause and treat accordingly. Identify what the patient is allergic to. ▶ Give an **analgesic** e.g. **paracetamol** for any pain or discomfort as necessary ▶ Avoid acetylsalicylic acid ▶ Give an antihistamine to relieve itching; **chlorphenamine** 4 mg every 8 hours *Child*: 1-2 mg per dose ▶ Or **promethazine** 25 mg at night. Increase to every 12 hours if necessary *Child:* 1 mg/kg daily in 1-2 divided doses	**HC2**
If severe/unresponsive ▶ **Prednisolone** 1 mg/kg orally once a day for 3-5 days	**HC3**

Prevention

- Avoid contact with known allergens
- Treat helminth infections

22.5.3 Eczema (Dermatitis) ICD10 CODE: L20, L23

Acute or chronic superficial inflammation of the skin

Cause

- Allergic dermatitis: reaction to food, chemicals, plants, jewellery or other substances
- Atopic dermatitis: unknown cause

Clinical features

- Vesicles (acute stage)
- Itchy rash with dry rough scaly skin
- Oozing due to secondary bacterial infection, causing regional lymphadenopathy and fever

Differential diagnosis

- Seborrhoeic dermatitis
- Tinea corporis

Management

TREATMENT	LOC
▶ Remove/avoid cause if known ▶ Apply **betamethasone cream** 0.1% every 12 hours for 2 weeks on affected parts, EXCEPT the face and genital areas	**HC4**
▶ If face or genitalia affected, apply **hydrocortisone cream** 1% every 12 hours for 2 weeks	**HC2**
▶ Give an antihistamine to relieve itching; **chlorphenamine** 4 mg every 8 hours *Child*: 1-2 mg per dose ▶ OR **promethazine** 25 mg at night; increase frequency to every 12 hours if necessary *Child:* 1 mg/kg daily in 1-2 divided doses	
If secondary bacterial infection ▶ Give a systemic antibiotic as in impetigo (section 22.1.1)	

Prevention

- Avoid contact with allergens

22.5.4 Psoriasis

ICD10 CODE: L40

A chronic recurrent skin disease characterised by scaling, reddened papules or plaques on the scalp, back of the elbows and front of the knees. Psoriasis can have extra cutaneous manifestation (e.g. arthritis)

The lesions tend to appear at sites of trauma (Koebner's reaction).

Cause

- Unknown, but usually genetically transmitted
- About 30% of cases have a family history

Clinical features

- Usually in patients 25-40 years old
- Gradual onset of distinct, red scaling papules which coalesce to form plaques
- Adherent, silvery white scales, which reveal bleeding points when removed (Ausiptz sign)
- Worsening psoriasis may lead to total erythroderma
- Extra articular feature, e.g., pitting or thickening of nail plate with accumulation of debris under the nail plate

Differential diagnosis

- Fungal infection, lichen planus
- Mycosis fungoides
- Seborrhoeic dermatitis
- Medicine-induced eruptions

Investigations

- Diagnosis is largely clinical
- Blood: Serum uric acid, rheumatoid factor, and anti-nuclear factor and histology to rule out other diseases like rheumatoid arthritis, SLE, skin malignancies etc.

Management

TREATMENT	LOC
▶ Remove scales, then apply medicine as below ***Mild cases (lesions <20% of the body)*** ▶ Give topical steroids, e.g. **betamethasone cream** applied on the lesions once in the morning ▶ Apply crude **coal tar** ointment 1% at night for 2 weeks ***Severe cases (lesions >20% of the body surface area)*** ▶ Refer for specialist management	**HC4** **RR**
Caution △ Drugs that precipitate/exacerbate psoriasis include lithium, beta-blokers, antimalarials and systemic steroids	

22.6 SKIN ULCERS AND CHRONIC WOUNDS

22.6.1 Leg Ulcers

ICD10 CODE: L97

Chronic ulcerative skin lesion caused by various aetiologies and often triggered by a minor trauma

Cause/risk factors

- Vascular, e.g. venous/arterial insufficiency
- Bacterial: leprosy, Buruli ulcer (by Mycobacterium ulcerans) etc
- Parasites: guinea worm, leishmaniasis
- Diabetes, sickle cell disease, malnutrition

Clinical features

- Often in lower third of the leg

- Ulcerated lesion with necrotic tissue, slough, discharge, oedema around the lesion, scarring
- Features of cellulitis due to secondary infection may be present
- Features of underlying disease

Investigations

➢ Swab for C&S
➢ X-ray
➢ Blood glucose

Management

TREATMENT	LOC
▶ Clean the wound	HC2
– If exudating/dirty lesions: use **chlorhexidine** solution 0.05% or **hydrogen peroxide** solution 6% or **povidone iodine** 2%	HC3
– If clean wound: use clean water or normal saline	
▶ Remove necrotic tissue	
▶ Elevate and rest the leg	
▶ Perform daily dressing	
– Apply **silver sulphadiazine** or **povidone iodine** if the wound is dirty and exudative	
– Otherwise use gauze moistened with normal saline	
▶ Analgesics for pain if needed	
If sign of cellulitis	
▶ Treat as per guidelines (see section **22.1.3**)	

Prevention

- Ensure personal hygiene
- Ensure good nutrition
- Avoid trauma

22.7 DRUG-INDUCED SKIN REACTIONS

22.7.1 Steven-Johnson Syndrome (SJS) and Toxic Epidermal Necrolysis (TEN) ICD10 CODE: L51

A life threatening hypersensitivity reaction that affects the skin and the mucous membranes: SJS affects up to 10% of the body surface area, while TEN affects >30%. If it is between 10 and 30%, it is SJS/TEN overlap.

Causes

Most well-known causes are:

- Certain medications such as: HIV medication (nevirapine), Anti-TB medications, anticonvulsants, e.g., carbamazepine, lamotrigine, sulpha-containg drugs (e.g., co-trimoxazole, allopurinol)
- Infections, especially in immunocompromised persons

Clinical features

- Dark macular skin rash, progressing to confluence with epidermal necrosis and large flaccid blisters which rupture, leaving large areas of denuded skin
- Usually sparing the scalp but involving mucosa (genitalia, mouth, anal area, eyes) with multiple erosions
- General sysmptoms: fever, malaise
- Complications: dehydration, electrolyte imbalances, hypoalbuminemia, secondary infection and sepsis

Investigations

- Diagnosis is usually clinical
- History of medicines taken
- Serology for HIV, if status unknown
- RFTs, pus swab, C&S if indicated

Management

TREATMENT	LOC
▶ Remove offending medicine or agent, possibly stop all medications ▶ Refer all patients to hospital ▶ Patients are managed supportively (as in Burns, section 1.2.3) – Intravenous rehydration – Care for the skin – Maintain good hygiene – Adequate nutrition ▶ If eyes are involved, consult eye specialist ▶ Treat if there is secondary bacterial infection ▶ There is no strong evidence to support the use of corticosteroids, which also increase risk of infection and catabolism	H

Prevention

- Take thorough medicine history
- Avoid unnecessary medications

23. Oral and Dental Conditions

23.1 DENTAL DISORDERS

23.1.1. Halitosis/Bad Breath ICD 10 CODE: R19.6

Unpleasant odour from the oral cavity

Causes

- Poor brushing techniques
- Gum disease due to infections in the mouth
- Tobacco smoking and chewing
- Systemic conditions or illnesses, such as liver disease, kidney disease, lung disease etc.
- Decayed teeth
- Diet

Management

TREATMENT	LOC
▶ Treat underlying condition ▶ Drink plenty of water every day to encourage saliva production ▶ Use of sugar free gum ▶ Dietary changes, like use of raw carrots, as recommended by your dentist or nutritionist ▶ Advise on brushing teeth thoroughly at least twice daily ▶ See also section 23.2.1 below	HC2

23.1.2. Dentin Hypersensitivity ICD10 CODE: K03.9

This condition is due to wearing off of the enamel, making it thinner leading to exposure of the dentin

Causes

- Gum recession due to age or improper tooth brushing
- Acidic beverages that cause enamel erosion and dentin exposure
- Tooth grinding
- Chipped or fractured tooth may also expose the dentine
- Eating disorders, e.g. bulimia nervosa and anorexia nervosa (exposure to vomitus)

Clinical features

- Sensitivity to hot, cold, sweet or very acidic foods and drinks, and breathing in cold air

Management

TREATMENT	LOC
▶ Topical application of fluoride in form of toothpaste	HC2
▶ In severe conditions, refer for root canal therapy	HC4
▶ Professional cleaning of teeth	

23.1.3. Malocclusion ICD10 CODE: M26.4

Malocclusion is any deviation from the normal relation of the teeth in the same arch to each other, and to the teeth in the opposite arch

Causes

- Aetiology is usually multifactorial
- Discrepancies in the craniofacial skeleton, dentition, or both

Cases that require treatment

The main indications for orthodontic treatment are aesthetics and function.

- Crossbites (as associated occlusal interferences may predispose to Temporomandibular Pain Dysfunction Syndrome)
- Deep traumatic overbite with palatal impingement of the mandibular incisors
- Large overjets (increased risk of trauma), severe crowding (as this reduces periodontal support for teeth)
- While severe malocclusion can have a psychologically debilitating effect, it is often influenced by social and cultural factors

Management

TREATMENT	LOC
Mild case	**RR**
▶ Removable appliance orthodontic therapy in the mixed dentition, by a dentist	
Moderate to severe case	**RR**
▶ Fixed appliance orthodontic therapy in adolescents and adults, by an orthodontist	
▶ Cases with discrepancies in the craniofacial skeleton may require orthognathic surgery by an oral and maxillofacial surgeon	

23.1.4. Fluorosis (Mottling) ICD10 CODE: K003

Brown discolouration of teeth

Cause

- Occurs due to long term excess of fluoride. Endemic in areas of high fluoride water content occurring naturally in the water

Clinical features

- Varies from white opacities to severe pitting and discolouration due to incorporation of the excess fluoride in the enamel structure

Management

TREATMENT	LOC
▶ Tooth coloured (composite) fillings, veneers	RR

Prevention

- Monitoring of fluoride levels in drinking water
- Use of fluoride-free toothpastes in endemic areas

23.1.5. False Teeth ("Ebinyo")

Traditional beliefs in many Ugandan communities attribute diarrhoea, fever, and vomiting in children to the developing dentition with the belief that if the offending teeth or "ebinyo" are not removed, the child will die.

Facts on ebinyo

- The practice of extraction of ebinyo/false teeth is based on the belief that rubbing of herbs on the gum (in the region of the canine), or the removal of the primary and/or permanent canine tooth buds will lead to the relief of childhood fevers and diarrhoea

- The procedure is done as early as 1 month and up to 3 years of age. Most studies report a peak age of 4-18 months
- Whereas infant illnesses may be attributed to the teething period, they are in fact a result of the poor health conditions in which these children are raised
- The term ebinyo encompasses both the child's ailment, as well as the treatment offered by traditional healers

Consequences of traditional treatment of ebinyo

- The procedure is aimed at removal of the primary canine, but damage to the surrounding tissues occurs
- The incisions in the mouth and the herbs can lead to oral sepsis, bacteraemia, anaemia, and death
- If initial cause of diarrhoea, fever, and vomiting is not addressed, dehydration and death can occur
- Depending on the extent of damage, malocclusion can result because the permanent canine maybe missing, impacted, or malformed

Management

TREATMENT	LOC
▶ Counsel the parent/caretaker ▶ Treat the condition causing the symptoms	HC2

Prevention

- Oral health education
- Sensitise community on dangers of "ebinyo" beliefs
- Appropriate treatment of childhood illnesses
- Provision of proper nutrition to children

23.2 ORO-DENTAL INFECTIONS

23.2.1. Prevention of Dental Caries and Other Conditions Due to Poor Oral Hygeine

- Advise patient to reduce sugary foods and soft drinks, and to have adequate fresh fruit and vegetables in their diet
- Advise patient to brush their teeth at least twice a day (morning and evening) or preferably after every meal (wait at least 30 minutes if you have consumed acidic food like lemon, oranges, grapes)
- Dental flossing at least once a day
- Tooth strengthening and protection by rinsing with fluoride rinses and applying sealants to susceptible sites on teeth
- Prevention and early management of dental caries
- Advise patient to have a dental check-up every six months
- Good nutrition

23.2.2. Dental Caries

ICD10 CODE: K02

Sugar-dependent disease resulting into cavities or holes in the teeth.

Causes

- Poor oral hygiene results in bacteria accumulation in a plaque on the tooth surface. Acid produced as a by-product of metabolism of dietary carbohydrate by the plaque bacteria causes demineralization and disintegration of the tooth surface forming a cavity

Clinical features

- Localized toothache
- Cavitations in the teeth
- Tooth sensitivity to hot and cold stimuli

- Susceptible sites include pits and fissures of the posterior teeth, interproximal surfaces, and teeth in malocclusion

Differential diagnosis

- Dental abscess
- Referred pain from ENT infections, commonly sinusitis

Management

TREATMENT	LOC
▶ **Paracetamol** 1 g every 8 hours *Child:* 10-15 mg/kg every 8 hours ▶ Or **ibuprofen** 400 mg every 8 hours *Child:* 7-13 mg/kg every 8 hours	**HC2**
▶ Refer to specialist for filling or extraction	**HC4**

23.2.2.1 Nursing Caries

These are anterior caries in the pre-school child, due to prolonged and improper feeding habits.

Causes

- Frequent and prolonged consumption of fluid containing fermentable carbohydrates from a bottle, feeder cup, or on-demand nightly breast feeding after 15 months of age

Clinical features

- Rapid progression of decay commencing labially and quickly encircling the teeth
- Teeth are affected in order of eruption
- Lower incisors are rarely affected as they are protected by the tongue during suckling and directly cleansed by secretions from sublingual and submandibular salivary glands

Management

TREATMENT	LOC
▶ Discontinue night feeding ▶ Gently brush teeth with a toothpaste approved for children (avoid swallowing) ▶ Build-up of the teeth should be done using composites to restore shape and function ▶ Disc affected teeth interproximally to create self-cleansing areas ▶ Regular fluoride applications	**HC2** **HC4**

Prevention

▶ Educate care taker to avoid frequent on-demand liquids at night including breastfeeding, after 15 months

23.2.2.2 Rampant and Radiation Caries

Rapid carious attack involving several teeth including those surfaces that are usually caries-free (e.g. the smooth surface of a tooth)

Causes

- Frequent ingestion of sugary foods and drinks in individuals with reduced saliva flow
- Prolonged and frequent intake of sugar-based syrup medications
- Untreated nursing caries
- Radiation caries: Radiation for head and neck cancer may result in fibrosis of salivary glands and subsequent reduction in saliva flow. Patients often resort to sucking sweets to alleviate their dry mouth, which further exacerbates the problem

Management

TREATMENT	LOC
▶ Removal of causative factors as mentioned above ▶ Education, fluoride treatment, tooth restoration, endodontic therapy, extractions	HC4

23.2.3. Pulpitis

ICD10 CODE: K04.0

Inflammation of the pulp of a tooth

Causes

- Commonly presents as a complication of dental caries
- Thermal, chemical, or traumatic insult to the pulp

Clinical features

- Pulsatile pain that lasts for several hours and worsens at night
- Thermal sensitivity
- Tooth is very tender to percussion

Differential diagnosis

- Referred pain of ENT origin, e.g. sinusitis
- Pain due to temporomandibular joint pain dysfunction syndrome, or erupting mandibular wisdom teeth
- Dentine sensitivity due to thermal, tactile, or osmotic stimulus

Management

TREATMENT	LOC
▶ Give an analgesic for pain relief	HC2
▶ **Paracetamol** 1 g every 8 hours *Child:* 10-15 mg/kg every 8 hours	
▶ Or **ibuprofen** 400 mg every 8 hours *Child:* 7-13 mg/kg every 8 hours	
▶ Refer to dentist pulpotomy, endodontic (root canal) treatment, or extraction	HC4

23.2.4. Acute Periapical Abscess or Dental Abscess

ICD10 CODE: K04.6-7

Infection with pus formation at the root of a tooth as a sequel to pulpitis caused by dental caries or trauma

Causes

- Mixed bacterial flora but mainly *Staphylococcus spp*

Clinical features

- Severe pain that disturbs sleep
- Facial swelling may be localized in the gum or extend to adjacent tissues
- Abscesses of the mandibular incisors or molars may discharge extra orally
- Affected tooth is mobile and tender to percussion
- Fever and headache may be present if infection has spread

Differential diagnosis

- Gingivitis
- Swelling due to trauma
- Pain due to sinusitis, temporomandibular joint pain dysfunction syndrome, or erupting wisdom teeth
- Dentine sensitivity due to thermal, tactile, or osmotic stimulus

Management

TREATMENT	LOC
Infections localized to a tooth and its surroundings (swelling limited to the gum and no signs of infection extending to anatomical structures, or general signs of infection) ▶ Pain relief (**paracetamol** and/or **ibuprofen**) ▶ Root canal therapy if possible or extraction of tooth	**HC4**

– NO NEED of antibiotics since they cannot reach the site of infection	
If infection is spreading to local adjacent structures (painful gingival and buccal swelling) or systemic signs and symptoms (fever) are present: ▶ Surgical treatment ▶ Then **amoxicillin** 500 mg every 8 hours *Child:* **amoxicillin** dispersible tablets 25 mg/kg (max 250 mg) every 8 hours ▶ Plus **metronidazole** 400 mg every 8 hours *Child:* 10-12.5 mg/kg (max 200 mg per dose) ▶ **Paracetamol** 1 g every 8 hours *Child:* 10-15 mg/kg every 8 hours ▶ Or **Ibuprofen** 400 mg every 8 hours *Child:* 7-13 mg/kg every 8 hours	

23.2.4.1 Post Extraction Bleeding

Bleeding socket can be primary (occurring within first 24 hours post extraction) or secondary (occurring beyond 24 hours post extraction)

Causes

- Disturbing the blood clot by the patient through rinsing or inadequate compression on the gauze
- Bony/tooth remnants
- Physical exercise following extraction
- Bleeding disorder of patient
- Medication (e.g. aspirin or anticoagulants)

Clinical features

- Active bleeding from the socket
- The socket may or may not have a blood clot
- If patient has lost significant amount of blood; decreased pulse rate, hypotension, dehydration may be present

- Traumatic area of surrounding bone of the socket
- Features of infection or trauma in secondary bleeding

Management

TREATMENT	LOC
General measures ▶ Restore airway, breathing and circulation if necessary ▶ Check blood pressure and pulse ▶ Clear any clot present and examine the socket to identify source of bleeding ▶ If the bleeding is from soft tissue (which is common) remove any foreign body like bone spicule if found, smoothen any sharp edges ▶ Suture the wound only if necessary ▶ Check and repack the socket with gauze – Tell patient to bite on gauze pack for 30 minutes, not to rinse or eat hot foods on that day; at least for 12 hours, and avoid touching the wound	**HC4**
Medicines ▶ **Lignocaine** 2% with adrenaline 1:80,000 IU (specialist use only) ▶ **Paracetamol** 1 g every 8 hours ▶ Or **diclofenac** 50 mg every 8 hours ▶ **Tranexamic acid** 500 mg every 8 hours for first 24 hours if bleeding is persistent ▶ IV fluids (0.9% **sodium chloride** or **Ringer's lactate**) if dehydrated ▶ Consider **blood transfusion** if Hb decreases to <7 g/dL in an otherwise healthy patient before extraction ***If bleeding continues after 24 hours*** ▶ Consult a haematologist or physician for further management	

23.2.5. Gingivitis

ICD10 CODE: K05.0

Inflammation of the gum, usually as a result of plaque accumulation.

Clinical features

- Gingival redness and swelling
- Increased tendency of the gingiva to bleed on gentle probing, during tooth brushing or even on touch

Management

TREATMENT	LOC
▶ Dental check up ▶ Scaling and polishing ▶ See following sections for specific types of gingivitis	**HC4**

Prevention

- Proper oral hygiene

23.2.5.1 Chronic Gingivitis

ICD 10 CODE: K05.1

Inflammatory infiltrate in response to the accumulation of undisturbed dental plaque next to the gingival margin

Causes

- Mixed anaerobic and aerobic oral flora, e.g., *Streptococcus viridans*, facultative *streptococci*; fusiform bacteria, spirochaetes, viruses, fungi
- Chemicals
- Poor oral hygiene with increase in plaque accumulation

Clinical features

- Swelling and erythema of the gingival margins which bleed on brushing
- Plaque and calculus (tartar) deposits adjacent to the gingival margins

Management

TREATMENT	LOC
General measures Rinse mouth with **mouthwash** 3 times a day ▶ Warm **salt solution** (5 ml spoonful of salt in 200 ml warm water) ▶ Or **hydrogen peroxide** solution 6%, (add 15 ml to a 200 ml cup of warm water) ▶ Or **chlorhexidine** solution 0.2%	**HC2**
Medicine ▶ **Paracetamol** 1 g every 8 hours *Child:* 10-15 mg/kg every 8 hours ▶ Or **Ibuprofen** 400 mg every 8 hours *Child:* 7-13 mg/kg every 8 hours ***If systemic signs and symptoms present, give a 5-day course of an antibiotic:*** ▶ **Metronidazole** 400 mg every 8 hours *Child:* 10-12.5 mg/kg (max 200 mg per dose) every 8 hours ▶ Or **Amoxicillin** 500 mg every 8 hours *Child*: **Amoxicillin Dispersible** tablets 25 mg/kg every 8 hours ▶ Refer to a dentist for scaling, root planing and polishing, to remove plaque and calculus deposits	**HC2**
Caution △ Avoid **metronidazole** in 1st trimester of pregnancy	

23.2.6. Acute Necrotizing Ulcerative Gingivitis (ANUG)/Periodontitis/Stomatitis

ICD10 CODE: A69.0-1

Also known as Vincent's gingivitis or Vincent's gingivostomatitis. They are infections characterized by oral ulcerations and necrosis.

Gingivitis only affects the gums, periodontitis involves the surrounding tissue and attaching the teeth.

In stomatitis, there is widespread involvement of mucosa and bone loss, until the most severe form known as noma or cancrum oris, leading to extensive destruction of facial tissues and bones.

Inadequately treated ANUG will lapse into a less symptomatic form known as chronic ulcerative gingivitis.

Causes

- Fusospirochaetal complex together with gram negative anaerobic organisms

Predisposing factors

- Associated with poor oral hygiene, stress and smoking
- Uncontrolled diabetes mellitus, and debilitated patients with poor hygiene
- Malnutrition
- HIV infection

Clinical features

- Swelling and erythema of the gingival margins, which bleed easily when touched, causing difficulty drinking and eating
- Painful papillary yellowish-white ulcers
- Necrosis and sloughing of gum margins
- Loss of gingiva and support bone around teeth
- Foul smelling breath

- Patient complains of metallic taste and the sensation of their teeth being wedged apart
- Fever, malaise, and regional lymphadenitis may be present
- Extensive destruction of the face and jaws in the severe form of Cancrum Oris or noma (in malnourished patients)

Differential diagnosis

- Dental abscess
- Swelling due to trauma
- Acute stomatitis
- Oral thrush
- Chemical oral ulcers

Management

TREATMENT	LOC
General measures	**HC2**
▶ Rinse mouth with **mouthwash** 3 times a day	
▶ Warm **salt solution** (5 ml spoonful of salt in 200 ml warm water)	
▶ Or **hydrogen peroxid**e solution 6%, (add 15 ml to a 200 ml cup of warm water)	
▶ Or **chlorhexidine** solution 0.2%	
▶ Surgical debridement	
▶ Manage underlying condition	
▶ **Metronidazole** 400 mg every 8 hours *Child:* 10-12.5 mg/kg (max 200 mg per dose) every 8 hours	
▶ Refer to dental specialist	**HC4**

23.2.7. Periodontitis

ICD10 CODE: K05.2-3

Periodontitis occurs when inflammation or infection of the gums (gingivitis) occurs and is not treated. Infection and inflammation spreads from the gums (gingiva) to the ligaments and bone that support the teeth. Loss of support causes the teeth to become loose and eventually fall out.

Causes

- Mixed microbial flora commonly *B. gingivalis, B. forsythus, B. intermedius, Wolinella sp,* and *Fusobacter*

Clinical features

- Bleeding of gums on probing and brushing
- Foul smelling breath
- Presence of periodontal pockets due to apical migration of the junctional epithelium beyond the enamel-cemental junction of the tooth
- Tooth sensitivity to thermal changes
- Presence of sub-gingival calculus with increased tooth mobility

Management

TREATMENT	LOC
▶ Give instructions on oral hygiene	HC2
▶ Oral rinses with mouthwash consisting of **chlorhexidine** solution 0.2% 3 times a day	
▶ Refer to a dentist for scaling, root planing, and polishing, to remove plaque and calculus deposits	HC4

23.2.7.1 Juvenile Periodontitis ICD10 CODE: K05.4

This condition occurs in the presence of good plaque control and may be related to an immune deficiency

Causes

- *Actinobacillus (Haemophilus) actinomycetemcomitans* is the main pathogen together with *Capnocytophaga sp, Eikenella corrodens,* and *Bacteroides intermedius* organisms

Clinical features

- Progressive periodontal destruction; classically in the permanent incisor and first molar regions in the presence of good oral hygiene
- The gingiva around the affected tooth may appear entirely normal, but deep pockets are detected on probing
- Early tooth loss

Management

TREATMENT	LOC
▶ Give instructions on oral hygiene	HC2
▶ Oral rinses with mouthwash consisting of **chlorhexidine** solution 0.2% 3 times a day	
▶ Refer to a dentist for scaling, root planing, and polishing to remove plaque and calculus deposits	HC4

23.2.8. Periodontal Abscess ICD10 CODE: K05.21

Localised collection of pus within a periodontal pocket

Causes

- Entry of virulent organisms into an existing pocket
- Impact of a foreign body, e.g. a fishbone into healthy periodontal membrane

Clinical features

- Localised, red and tender swelling of gum
- Need to differentiate it from a dental abscess

DENTAL ABSCESS-PERIAPICAL ABSCESS	PERIODONTAL ABSCESS
Associated tooth is non-vital	Associated tooth is vital
Tooth is tender to vertical percussion	Tooth is tender to lateral movements

Management

TREATMENT	LOC
▶ Incision and drainage under a local anaesthetic ▶ Debridement of the pocket with a scaler ***Give an analgesic for 5-7 days*** ▶ **Paracetamol** 1 g every 8 hours *Child:* 10-15 mg/kg every 8 hours ▶ Or **ibuprofen** 400 mg every 8 hours *Child:* 7-13 mg/kg every 8 hours ▶ Or **diclofenac** 50 mg every 8 hours ***Give antibiotics for 5 days*** ▶ **Amoxicillin** 500 mg every 8 hours ▶ Plus **Metronidazole** 400 mg every 8 hours	**HC4**

23.2.9. Stomatitis

ICD10 CODE: K12

Inflammation of the epithelial lining of the oral mucosa

Causes

- Nutritional deficiency, e.g. vitamin A
- Hormonal changes
- Infections: *Spirochaetes, Bacilli, Candida, Measles virus, Herpes simplex virus*

Clinical features

- Inflammation of the tongue and lining of mouth - tongue is red, raw, and painful
- Ulcers on the gum, palate, lips
- Thrush (in babies and HIV/debilitated patients)
- Swelling and bleeding of gums

Differential diagnosis

- Allergic reactions, erythema multiforme, pemphigus
- Lead poisoning
- Lichen planus

Investigations

- Swab mouth for microscopy, and culture and sensitivity of bacteria and fungi (though normal oral flora may give false positives)
- Blood: For Rapid Plasma Reagin (RPR) test, HIV serology

Management

TREATMENT	LOC
▶ Rinse mouth 3 times a day with **Salt** solution (dissolve 1 teaspoon of salt in a cup of warm water) ▶ Or **Hydrogen peroxide** solution 6% (add 15 ml to a cup/200 ml of warm water) ▶ Or **chlorhexidine** mouth wash 0.2% ▶ **Paracetamol** 1 g every 8 hours *Child:* 10-15 mg/kg every 8 hours ▶ Or a topical analgesic ▶ Continue treatment until healing takes place	**HC2**

23.2.9.1 Denture Stomatitis

Redness of the palate under a denture with petechial and whitish areas

Causes

- 90% of cases due to *Candida albicans*, 9% other *Candida* species, and 1% *Klebsiella*
- Poor denture hygiene
- Night-time wear of dentures
- Trauma
- Increased intake of sugary foods

Clinical features

- Mild inflammation and redness under denture
- Petechial and whitish areas in severe cases
- Burning sensation but no pain or tenderness

Differential diagnosis

- Acrylic allergy

Investigations

➢ Exclude diabetes, i.e. blood glucose

Management

TREATMENT	LOC
▶ Remove dentures at night ▶ Improve denture hygiene by soaking in hypochlorite cleanser (10 drops of household bleach in a denture cup or container filled with tap water) and brushing fitting surface with a soft brush ▶ Replace ill-fitting dentures ▶ Reduce sugar intake ▶ **Nystatin** suspension 100,000 IU/ml 6 hourly	**HC2**

23.2.10. Aphthous Ulceration ICD10 CODE: K12.0

Aphthous ulcers or recurrent aphthous stomatitis (RAS) are painful recurrent mucous membrane ulcerations. Usually affect the non-keratinized oral mucous membrane

Clinical features

There are 3 types of aphthous ulcers

TYPE	FEATURES
Minor aphthous ulcers	• Small round/oval ulcers (2-4 mm) • Surrounded by erythematous ulcers • Occur in groups of only a few ulcers (i.e., 1-6) at a time • Mainly on the non-keratinized mobile mucosa of the lips, cheeks, floor of the mouth, sulci, or ventrum of the tongue • Heal spontaneously in 7-10 days • Leave little or no evidence of scarring
Major aphthous ulcers	• Painful ulcers on non-keratinized oral mucous membrane • Large (1-3 cm) edged ulcers • Several may be present simultaneously • Marked tissue destruction, sometimes constantly present • Healing is prolonged often with scarring
Herpetiform ulcers	• Occur in a group of small (1-5 mm) multiple ulcers and heal within 7-10 days

Management

Goal of treatment: to offer symptomatic treatment for pain and discomfort, especially when ulcers are causing problems with eating.

TREATMENT	LOC
▶ Salt mouth wash for cleansing ▶ **Prednisolone** 20 mg every 8 hours for 3 days; then taper dose to 10 mg every 8 hours for 2 days; then 5 mg every 8 hours for 2 days ▶ Or topical **triamcinolone** paste applied twice a day ▶ **Paracetamol** 1 g every 8 hours for 3 days ▶ Refer to specialist if ulcers persist for more than 3 weeks apart from the treatment	HC4
Note ◆ **Oral gel** containing an anti-inflammatory agent combined with analgesic and antiseptic is ideal treatment	

23.2.11. Pericoronitis

ICD10 CODE: K05.30

Inflammation of the operculum covering an erupting tooth occurs more commonly in association with the mandibular wisdom teeth.

Causes

- Usually associated with partially erupted and/or impacted third molars
- Associated trauma from a tooth in the opposing arch is usually present

Clinical features

- Pain, trismus, swelling
- Halitosis
- The operculum is swollen, red, and often ulcerated
- Fever and regional lymphadenitis may be present

Management

TREATMENT	LOC
Surgery ▶ Operculectomy done under local anaesthesia ▶ Extraction of the third molar associated with the condition ▶ Grinding or extraction of the opposing tooth ▶ Apply caustic agents (**trichloracetic acid** and **glycerine**) ***Treat with analgesic and antibiotic for 5-7 days*** ▶ **Paracetamol** 500 mg every 8 hours *Child:* 10-15 mg/kg every 8 hours – Or **ibuprofen** 400 mg every 8 hours *Child:* 7-13 mg/kg every 8 hours – Or **diclofenac** 50 mg every 8 hours ▶ **Amoxicillin** 500 mg every 8 hours *Child:* 25 mg/kg every 8 hours – Add **metronidazole** 400 mg every 8 hours if necessary *Child:*10-12.5 mg/kg per dose	**HC4**

23.2.12. Osteomyelitis of the Jaw ICD10 CODE: M27.2

Inflammation of the medullary portion of the jaw bone which extends to involve the periosteum of the affected area. Infection in the bone ends up with pus formation in the medullary cavity or beneath the periosteum, and obstructs the blood supply. The infected bone becomes necrotic following ischaemia.

Clinical features

Initial stage

- Malaise and fever; there is no swelling
- Enlargement of regional lymphnodes

- Teeth in affected area become painful and loose, thus causing difficulty in chewing

Later stage

- Bone undergoes necrosis and area becomes very painful and swollen
- Pus ruptures through the periosteum into the muscular and subcutaneous fascia. Eventually it is discharged on to the skin surface through a sinus

Investigations

- X-ray- Orthopantomograph (OPG) will show characteristic features (e.g. widening of periodontal spaces, changes in bone trabeculation, areas of radiolucency and sequestra formation in chronic stage)
- Culture and sensitivity of pus

Management

TREATMENT	LOC
▶ Incision and adequate drainage of confirmed pus accumulation which is accessible ▶ **Amoxicillin** 500 mg every 8 hours for 7-10 days ▶ Or **cloxacillin** 500 mg every 6 hours ▶ Plus **metronidazole** 400 mg every 8 hours	**H**
Surgery ▶ Removal of the sequestrum by surgical intervention	**RR**
Notes ◆ Change medication according to the results of culture and sensitivity testing ◆ Refer to regional referral hospital in case of long-standing pus discharge and sinuses from the jaws	

23.3 HIV/AIDS ASSOCAITED CONDITIONS

23.3.1. Oral Candidiasis

ICD10 CODE: B37.0

Cause

- Caused primarily by *Candida albicans*

Clinical features

- Common in immunosuppressed, infants, and after prolonged antibiotic treatment
- In advanced HIV it can present as intractable oral and oesophageal candidiasis. Angular cheilitis is also common

Management

TREATMENT	LOC
Oral candidiasis ▶ **Nystatin tablets** 500,000-1,000,000 IU every 6 hours for 10 days (chewed then swallowed) *Child <5 years*: **Nystatin oral suspension** 100,000 IU every 6 hours for 10 days *Child 5-12years:* 200,000 IU per dose every 6 hours for 10 days	**HC2**
Oropharyngeal candidiasis ▶ **Fluconazole** loading dose 400 mg, then 150-200 mg daily for 14-21 days *Child*: loading dose 6 mg/kg, then 3 mg/kg daily	**HC3**

23.3.2. Herpes Infections ICD10 CODE: B00

Infections caused by virus herpes (simplex and zoster)

Causes

- Both simplex and zoster infections can affect the face and oral cavity

Clinical features

- Herpes simplex: cluster of painful vesicles around the mouth (cold sores or fever blisters). Can be recurrent
- Herpes zoster: multiple small vesicles (2-3 mm) that ulcerate and coalesce to form larger ulcers on the oral mucosa
  - Commonly on the vermillion border, gingiva, dorsal tongue, and hard palate
  - Always present as a unilateral lesion and never cross the midline
  - Pre-eruption pain followed by the development of painful vesicles on the skin or oral mucosa that rupture to give rise to ulcers or encrusting skin wounds in the distribution outlined above.
  - Post herpetic neuralgia may continue for years

Management

TREATMENT	LOC
Herpes simplex	**HC2**
▶ Reassure, it will resolve in most cases	
▶ For severe forms consider **acyclovir** 400 mg every 8 hours for 5-7 days	
Herpes Zoster	
▶ **Acyclovir** 800 mg 5 times daily for 5 days	**HC4**
▶ May require antibiotic therapy if the area becomes secondarily infected	
▶ Analgesics, topical anaesthetic (e.g. **lidocaine**)	

23.3.3. Kaposi's Sarcoma

ICD10 CODE: C46

A malignancy of vascular endothelium that, until the advent of AIDS, was seen only occasionally in Jews and immune suppressed patients

Clinical features

- Painless purplish swelling on the skin
- In the mouth, the palate is the most frequent site

Investigation

➢ Biopsy to confirm histology

Management

TREATMENT	LOC
▶ Refer for chemotherapy	RR

23.3.4. Hairy Leukoplakia

Benign lesion, usually asymptomatic, associated with HIV immunosuppression, and linked to Epstein Barr Virus infection

Clinical features

- Adherent white, corrugated plaque, usually found bilaterally on the borders of the tongue

Management

TREATMENT	LOC
▶ **Podophyllin resin** 25%: Apply to lesion once weekly if necessary ▶ Manage HIV infection as per national guidelines	RR

23.4 ORAL TRAUMA

Injury to the oral or dental tissues as a result of trauma.

23.4.1 Traumatic lesions I

ICD10 CODE: S00.5

TYPE OF LESION	FEATURES
Fibroepithelial polyp Over-vigorous response to low grade recurrent trauma resulting in fibrous hyperplasia	• Well-localized sessile or pedunculated lump, usually located on the palate or lateral surface of the tongue
Mucocele Saliva extravasation into the tissues from damage to minor salivary gland ducts. They are commonly seen in the lower labial and ventral lingual mucosa	• History of trauma and characteristic appearance
Ranula A mucocele that occurs from the sublingual gland	• Blue, transparent sublingual swelling

Management

TREATMENT	LOC
Fibroepithelial polyp ▶ Excision biopsy and histological confirmation ***Mucocele*** ▶ Surgical removal (recurrence may occur if there is regular trauma) ***Ranula*** ▶ Excision of the sublingual gland	**RR**

23.4.2 Traumatic lesions II

These simple lesions are often confused for more severe conditions like lichen planus, oral candidiasis, pemphigus, erythema multiforme.

TYPE OF TRAUMA	FEATURES
Burns Most common after ingestion of hot foods, and particularly seen on the palate or tongue. Chemical burns are usually due to analgesics positioned next to a painful tooth or chemicals used in restorative dentistry	• Burns in the palate located in characteristic sites related to eating, restored or painful tooth
Sharp teeth and restorations Trauma from sharp teeth or restorations is often worsened in patients with physical or intellectual disability	• Lesion is site specific and is related to a sharp edge
Ulceration due to local anaesthetic Ulceration due to biting the area of anaesthetised mucosa	• Ulcer confined to the area of anaesthetised mucosa

TREATMENT	LOC
Burns ▶ Reassurance that healing will occur without scarring ▶ Topical anaesthetic **lidocaine** 2% may help ***Sharp teeth and restorations*** ▶ Smooth the edge and/or apply a restorative material to the tooth	**RR**

Sharp teeth and restorations ▶ Smooth the edge and/or apply a restorative material to the tooth ***Ulceration due to local anaesthetic*** ▶ Reassurance ▶ May require antibiotic therapy if the area becomes secondarily infected – **Amoxicillin** 500 mg every 8 hours for 5-7 days if necessary	

23.4.3 Traumatic lesions III

Trauma due to physical injury, e.g., a fall, sports, road traffic accident

Management

TREATMENT	LOC
General measures ▶ Give tetanus booster if needed (see section 18.2.3) ▶ Check for facial fractures and/or lacerations ▶ If evidence of head injury (amnesia, loss of consciousness, neurological signs), transfer patient to hospital immediately (see Trauma and Head injuries, section 1.2.5) ▶ Intra-oral check: for soft-tissue lacerations, dento-alveolar fractures, and damage to teeth ▶ Check for the whereabouts of tooth fragments, which are commonly embedded in the lip ▶ Examine traumatized teeth for mobility ▶ Check occlusion, especially if any teeth have been displaced	**HC2** **HC3**

▶ Refer for radiographs of affected teeth to check for root fracture ▶ Avulsed permanent teeth should be re-planted immediately. Prognosis is good with immediate treatment, therefore refer the patient to a dentist as soon as possible ▶ Suture soft tissue lacerations in 3/0 resorbable suture ▶ Refer to an oral surgeon for reduction and immobilization of mobile teeth and alveolar fragments	**HC4**
Medicines ▶ Wash mouth with warm **salt** solution (dissolve a 5 ml spoonful of salt in 200 ml of warm water) ▶ Or **hydrogen peroxide** solution 6% (add 15 ml to a cup 200 ml of warm water) ▶ Repeat mouth wash 3 times daily ▶ **Paracetamol** 1 g every 8 hours ▶ Or **ibuprofen** 400 mg every 8 hours ***Give prophylactic antibiotics if indicated*** ▶ **Amoxicillin** 500 mg every 8 hours for 5-7 days ▶ Refer to a dentist for orthodontics, endodontic (root canal) treatment, or protection of pulp	**HC2**

Prevention

- Early orthodontic treatment in children with large overjets that are susceptible to trauma
- Provision of a mouth guard (made of vacuum formed thermoplastic vinyl) for sports
- Be alert for evidence of child abuse and notify relevant authorities if any.

23.5 ORAL TUMOURS

23.5.1. Burkitt's Lymphoma ICD10 CODE: C83.7

Burkitt's lymphoma (or "Burkitt's tumour" or "Malignant lymphoma, Burkitt's type") is a cancer of the lymphatic system (in particular, B lymphocytes). It is a non-Hodgkin's lymphoma and recognised as the fastest growing human tumour. Of all cancers involving the same class of blood cell, 2% of cases are Burkitt's lymphoma.

Causes

- Associated with Epstein-Barr virus (EBV)

Risk factors

- HIV/AIDS
- Chronic malaria
- Low socio-economic status

Clinical features

- Often presents as a tooth ache in the maxilla
- Teeth are mobile
- Extractions do not relieve the swelling
- Peak incidence at 4-7 years of age and more common among boys

Classification

Burkitt's lymphoma is divided into 3 main clinical variants:

- **Endemic variant:** occurs in malaria endemic areas. Chronic malaria is believed to reduce resistance to Epstein-Barr virus (EBV), which is usually linked with the disease. The disease characteristically involves the jaw or other facial bone, distal ileum, caecum, ovaries, kidney, or the breast.
- **Sporadic type:** (also known as "non-African") is usually found outside of Africa

- **Immunodeficiency-associated Burkitt's lymphoma:** usually associated with HIV infection or in post-transplant patients taking immunosuppressive drugs. Burkitt's lymphoma can be the initial manifestation of AIDS.

Differential diagnosis

- Other cancer diseases

Investigations

➢ Biopsy of the mass

Management

TREATMENT	LOC
▶ Refer to cancer treatment specialist centres for appropriate management ▶ Treatment options include: chemotherapy, immunotherapy, bone marrow transplants, surgery, radiotherapy	RR

24. Surgery, Radiology and Anaesthesia

24.1 SURGERY

24.1.1 Intestinal Obstruction ICD10 CODE: K56

Interruption of the normal flow of intestinal content, due to mechanical obstruction (at small or large bowel level), or due to functional paralysis.

Causes

- Small bowel mechanical obstruction: tumours, adhesions from previous surgeries or infections
- Large bowel obstructions: tumours, volvolus, adhesions, inflammatory strictures (e.g. diverticulosis, etc.)

Clinical features

- Small bowel obstruction: cramping abdominal pain, nausea, vomiting, abdominal distention. Due to the accumulation of fuids 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 or left lateral decubitus, for air-fluid level), see section 24.2 for details

Differential diagnosis

- Paralytic ileus (diffuse functional paralysis of small and large bowel due to drugs, biochemical abnormalities, abdominal infections etc)

Management

TREATMENT	LOC
Pre-operative management ▶ **IV fluids (normal saline, Ringer's Lactate)** – 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 decompression** – Pass NGT and connect with a drainage bag to empty the stomach in small bowel obstruction or when clinically indicated – Nil by mouth ▶ Give appropriate antibiotics – **Ceftriaxone** 2 g IV once a day – Plus **metronidazole** 500 mg IV every 8 hours ▶ If the patient is in severe colicky pain, administer **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	**H**
Intra-operative fluid therapy – Blood loss, fluid aspirated from the gut and other fluid losses must be replaced – Maintenance fluid should be given: 5 ml/kg/hour	

Post-operative fluid therapy – Replace all fluid losses – 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	
Post-operative antibiotics and analgesics ▶ Continue with analgesics in the postoperative period. (Tramadol, pethidine, diclofenac, paracetamol; morphine may be used) ▶ Continue with antibiotic treatment where clinically indicated (**metronidazole + ceftriaxone +/- gentamycin)**	
In selective cases, non-operative treatment of intestinal obstruction (in particular small bowel obstructions) can be tried ▶ Indicated in appendicular mass, acute pyosalpingitis (PID), some patients with adheisions, pseudo obstruction, plastic peritonitis of TB, acute pancreatitis ▶ 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 ▶ If no improvement after 72 hours or the NG content becomes fecolent, operate the patient	**RR**

24.1.2 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 organs, even with relatively limited amounts: see specific chapters)

Severe bleeding in a body cavity/space is an emergency condition with unstable vital signs (e.g., ruptured spleen, ruptured tubal pregnancy)

Management

TREATMENT	LOC
▶ Invasive surgical intervention to control bleeding is life saving ▶ Do not delay operation in attempt to stabilise the patient as this may not be achieved ▶ Prompt resuscitation ▶ Establish IV line and give fluids rapidly ▶ Draw blood for grouping and cross matching for volume replacement after surgical haemostasis ▶ Surgical intervention – Rapid sequence induction of general anaesthesia – Use drugs with minimal or no cardiac depression – Laparotomy to achieve surgical haemostasis	**H**

24.1.3 Management of Medical Conditions in Surgical Patient

Principle

The medical condition must be stabilised as much as possible before surgery.

Pre-operative management

- Establish whether condition is stable or unstable
- If unstable, control or correct the condition

Operative and post-operative management

- Anaesthesia technique based on condition and nature of surgery
- Maintain the stable condition

TREATMENT	LOC
Hypertension – Diastolic of 90 mmHg and systolic of 140 mmHg are acceptable – If hypertension not adequately controlled, there is risk of vasoconstriction, hypovolaemia, exaggerated vasoactive response to stress leading to hypo or hypertension, hypertensive complications during anaesthesia ▶ Control hypertension pre-operatively ▶ Patient should take antihypertensive medicines on schedule even on the day of operation ▶ General anaesthesia technique is preferred ▶ Ensure adequate depth of anaesthesia and analgesia	**HC4**

TREATMENT	LOC
Anaemia Condition of reduced oxygen carrying capacity; patient prone to hypoxia – Heart failure may occur – Hypotension or hypoxia can cause cardiac arrest ▶ Correct anaemia to acceptable level depending on urgency of surgery (see section of anaemia 11.2.2) ▶ Regional anaesthesia is the preferred method ▶ If general anaesthesia is used, avoid myocardial depressant, e.g. thiopental ▶ Use small doses of anaesthetics ▶ Use high oxygen concentration – Intubate and ventilate except for very short procedures – Replace blood very carefully – Extubate patient when fully awake – Give oxygen in the post-operative period ***For sickle cell anaemia, the above also applies, as well as avoiding use of tourniquet***	**HC4**
Asthma ▶ Avoid drugs and other factors likely to trigger bronchospasms, e.g. thiopental ▶ Regional anaesthesia is the preferred method	**HC4**
Diabetes ▶ Achieve blood glucose control using standard treatment pre-operatively ▶ If diabetic ketoacidosis: – Delay surgery even in emergency for 8-12 hours – Correct and control all associated disturbances ▶ Hyperglycaemia under general anaesthesia is safer than hypoglycaemia	**HC4**

TREATMENT	LOC
▶ Patient should be operated early in the morning and MUST be first on theatre list ▶ Regional anaesthesia is the method of choice where applicable ***Minor surgery*** ▶ Stop usual antidiabetic dose on the morning of surgery ▶ Start infusion of 5% glucose infusion rate of 2 ml/minute in theatre ▶ Monitor blood sugar ▶ Usual medication is resumed as soon as the patient is able to take orally ***Major surgery*** ▶ Control on sliding scale of insulin ▶ Infusion of 5% **glucose** started on the morning of surgery, or **glucose** insulin potassium infusion ▶ Monitor blood sugar ≤200 mg/dl	

24.1.4 Newborn with Surgical Emergencies

Babies may be born at lower health facilities with congenital defects that require emergency surgical intervention at tertiary levels:

- The common surgical emergencies in neonates include: gastroschisis (defect of abdominal wall with intestine sticking outside the body), tracheoesophageal fistula, imperforate anus, and spina bifida
- If diagnosed in lower level health facilities (HCII, HCIII, HCIV, District Hospital), apply general principles of supportive management of the newborn

– The aim should be to avoid hypothermia, minimise risk of infection, ensure adequate hydration, and minimise risk of aspiration and hypoglycaemia

Management

TREATMENT	LOC
▶ Use sterile or clean gauze if available to properly cover the defects which are externally visible. For gastroschisis, moisten the gauze using warm saline and use it to properly wrap the exposed intestines	HC2
▶ Properly cover the newborn using a clean thick linen to avoid hypothermia	
▶ Insert IV cannula gauge 24 and administer prophylactic antibiotics preferably IV antibiotics (**ampicillin + gentamicin**)	HC3
▶ Keep the baby well hydrated (see IV fluids in neonates section 1.1.4)	
▶ If vomiting or signs of intestinal obstruction, pass a neonatal feeding tube Fr. G 6 or Fr. G. 8 (if available) and aspirate all the stomach contents	
▶ If tracheoesophageal fistula is suspected, insert the tube as above and ensure that the baby is kept in a propped-up position	
▶ Urgently refer the neonate to the nearest regional or national referral hospital for further advanced treatment and care	RR

24.1.5 Surgical Antibiotic Prophylaxis

This is the pre-operative administration of antibiotics to reduce the risk of surgical site infection.

General principles

- The need of prophylaxis depends on the nature of the expected wound
  - Wounds that are expected to be clean (no inflammation, and respiratory, genital, urinary and alimentary tract not entered) generally DO NOT require prophylaxis except where the consequences of surgical site infection could be severe (e.g. joint replacements)
  - Prophylaxis is indicated in cases of clean-contaminated wounds (entering respiratory, genital, urinary and alimentary tracts but no unusual contamination)
  - Treatment with a course of antibiotics is indicated in procedures with contaminated wounds (fresh open accidental wounds, operations with major breaks in sterile techniques), dirty or infected wounds (old traumatic wounds with retained necrotic tissue, clinical infection, perforated viscera)
- Prophylaxis is given <60 minutes before the first incision
- Refer to institution-specific protocols for details

Prophylaxis is not recommended for most uncomplicated clean procedures

One single dose prior to the procedure is usually sufficient

Routine post-operative antimicrobial administration is NOT recommended for most surgeries as it causes wastage of limited resources, causes unnecessary side effects to the patient and can lead to antimicrobial resistance.

24.2 DIAGNOSTIC IMAGING

24.2.1 Diagnostic Imaging: A Clinical Perspective

Medical imaging is an essential part of the diagnosis of many diseases.

A diagnostic imaging procedure is indicated when the management of a patient depends on the findings of the procedure. Therefore, before any diagnostic imaging procedure is requested, the question of *how the results will influence patient management and care* should always be asked.

- Prior to requesting a procedure, it is useful to determine if the required information is already available from recent procedures, and if the relevant clinical, laboratory, diagnostic imaging, and treatment information is provided.
- When indicated and available, alternative diagnostic imaging procedures which do not use ionising radiation, e.g. ultrasound, should be chosen first, especially in children.

Questions to be answered to prevent unnecessary use of procedure and radiation

- Has this procedure been done already?
- Does the patient need it?
- Does the patient need it NOW?
- Is this the best procedure?
- Are all the investigations I am requesting necessary?
- Have you provided appropriate clinical information and questions that the procedure should answer?

No procedure should ever be requested in lieu of a thorough clinical assessment or as a means of satisfying a difficult patient.

Basic Diagnostic Imaging Modalities

- Plain Radiography (Hospital)
- Ultrasound scan (HC4 and Hospital)
  - Ultrasound is non-invasive and does not use ionising radiation. Therefore, when indicated, it is the most appropriate imaging modality for children and pregnant women.

Other imaging modalities (at RR and NR)

- Computed tomography
- Fluoroscopy
- Magnetic Resonance Imaging
- Nuclear Medicine
- Mammography

In the following table, a summary of the clinical indication, the suggested investigation modality and the possible findings are presented, as a guide to request the correct investigation based on the clinical suspicion.

Note

- CT scan is the investigation of choice for intracranial pathological processes (severe head trauma, stroke, etc.) but it is only available at referral facilities.

SYSTEM/ BODY AREA	INDICATIONS	MODALITY	INFORMATION PROVIDED
Musculo-skeletal	• Suspected lesion of bony skull, spine and extremities • Monitoring progress of pathologic conditions (osteomyelitis etc.)	***Plain X-rays*** 2 views taken at right angles, include the joint above and below in case of a fracture	• Fractures • Dislocations • Foreign bodies (metallic) • Bone lesions/destruction • Osteomyelitis
Chest/ pulmonary	• Cough for >2 weeks not responding to treatment • Haemoptysis • Blunt chest trauma • Acute respiratory insufficiency/ problems, asthma • Foreign bodies (metallic, coins)	Chest X-ray	• Chest infections e.g. bronchopneumonia, lobar pneumonia, interstitial pneumonia • Pleurisy (pleural effusion) • TB (Lung infiltrates especially in upper lobe, pleural effusion, cavities, mediastinal/hilar lymph nodes)

SYSTEM/ BODY AREA	INDICATIONS	MODALITY	INFORMATION PROVIDED
Chest/ pulmonary (continued)			• Trauma complications (pneumothorax, fractured ribs, lung contusion, haemothorax) • Lung masses • Other lung/bronchial disorders (COPD)
Cardio-vascular	• Palpitation • Exertion dyspnoea • Difficulty in breathing • Peripheral oedema	Chest X-ray	• Heart enlargement (cardiomegaly or pericardial effusion), poorly defined cardiac borders • Pulmonary oedema (Kerley B lines) • Pleural effusion

SYSTEM/ BODY AREA	INDICATIONS	MODALITY	INFORMATION PROVIDED
Paranasal sinuses	• Acute uncomplicated sinusitis • Chronic headache • Nasal congestion • Nasal discharge	X-rays of the Paranasal sinuses	• Air-fluid levels, opacification, polyps, mucosal thickening indicating sinusitis
Postnasal space	• Snoring and difficulty in breathing in small children	X-ray of the postnasal space	• Hypertrophied adenoids • Compromised airways
Obstetric 1st trimester	• First-Trimester • PV bleeding • Low abdominal pain • Not sure of date • Embryo viability • Suspected ectopic pregnancy	Obstetric ultrasound scan	• Intrauterine or extra-uterine pregnancy, ectopic pregnancy, cardiac activity, number of embryo/foetus, gestation age

SYSTEM/ BODY AREA	INDICATIONS	MODALITY	INFORMATION PROVIDED
Obstetric 2nd and 3rd trimesters	• 2nd and 3rd trimester • Fundo-height greater or less than WOA • PV bleeding • Loss of foetal movements • Foetal anomalies	Obstetric ultrasound scan	• Foetal presentation, amniotic fluid volume, cardiac activity, placental position, foetal biometry, and foetal number, plus an anatomic survey. • Umbilical cord around the neck
Gynaecology	• Low abdominal pain • Abnormal PV bleeding or discharges • Amenorrhoea and irregular periods • Pelvic mass(es) • Infertility	Pelvic ultrasound Transvaginal ultrasound	• Uterine Masses (fibroids, polyps) • Ovarian masses/cysts • Pelvic inflammatory disease (fluid in the pouch of Douglas) • Polycystic ovaries

SYSTEM/ BODY AREA	INDICATIONS	MODALITY	INFORMATION PROVIDED
Abdomen	• Suspected small bowel obstruction (SBO)	Plain abdominal X-ray (supine and non-dependent (either upright or left lateral decubitus) Ultrasound X-Ray	• Dilated small bowel, presence of > two air-fluid levels, air-fluid levels wider than 2.5 cm, and air-fluid levels differing >2 cm in height from one another within the same small bowel loop • Lumen of the fluid-filled small bowel loops dilated to >3 cm, length of the segment is >10 cm, peristalsis of the dilated segment is increased, as shown by the to-and-fro or whirling motion of the bowel contents • Examining the area of transition from the dilated to normal bowel may identify causes of conditions e.g. bezoars, intussusception, Crohn's disease, hernias and tumours

SYSTEM/ BODY AREA	INDICATIONS	MODALITY	INFORMATION PROVIDED
	• Or suspected large bowel obstruction	Ultrasound	• Colon dilated >6 cm and the cecum is not >9 cm in diameter. (Normal colonic caliber 3-8 cm, with the largest diameter in the cecum). – The colon is dilated proximal to the site of obstruction with a paucity or absence of gas distal to the obstruction. – Air-fluid levels are often seen in the dilated colon on the upright or decubitus radiographs. This suggests that the cause of obstruction is more acute since the colonic fluid has not been present long enough to be absorbed

SYSTEM/ BODY AREA	INDICATIONS	MODALITY	INFORMATION PROVIDED
Abdomen	• Suspected perforation	Abdominal X-Ray (erect or or left lateral decubitus)	• Gut perforation: Free air below the hemidiaphgram on the CXR indicate pneumoperitoneum
	• Liver or gall bladder disease	Ultrasound	• Gallstones, cholecystitis • Hepatomegaly or cirrhosis (fibrotic liver) • Liver masses (tumours)
	• Intra-abdominal bleeding • Abdominal trauma	Ultrasound	• Fluids (blood) in peritoneum • Liver/spleen rupture/ haematoma • Aortic aneurysm • Renal trauma/haematoma
Urology	• Urological diseases	Ultrasound	• Kidney stones • Kidney diseases (cancer, chronic pyelonephritis, hydronephrosis) • Prostate enlargement

24.3 ANAESTHESIA

Main objectives of anaesthesia during surgery are to:

- Relieve pain
- Support physiological functions
- Provide favourable conditions for the operation

24.3.1 General Considerations

ISSUE	RECOMMENDATIONS
Equipment	• Available and in a state of readiness at all times • Appropriate in quality and quantity • Compatible with safety
Staff	• Qualified anaesthesia provider • An assistant for the anaesthesia provider • Adequate assistance in positioning the patient • Adequate technical assistance to ensure proper functioning and servicing of all equipment
Before anaesthesia	• Read the notes/medical records of the patient • Assess the patient very carefully • The drugs, equipment, instruments and materials to be used must be known • Properly prepare workplace and patient

ISSUE	RECOMMENDATIONS
During anaesthersia	• Anaesthesia is administered (induction and maintenance) • The patient must be monitored meticulously to: – Ensure his/her well-being – Detect dangerous signs as soon as they arise and appropriately treat them • Expertise in resuscitation is obligatory. If in trouble, ask for help • Keep an accurate and legible record of the anaesthetic and all measured vital signs on the anaesthetic chart/form
After anaesthesia	• The patient: – Recovers from effects of anaesthesia – Has stable vital signs – Is returned to the ward in the fully conscious state • Follow-up patient for next 24 hours

Types of Anaesthesia

Anaesthesia may be produced in a number of ways

General anaesthesia

- Basic elements: Loss of consciousness, analgesia, prevention of undesirable reflexes, and muscle relaxation

Regional or local anaesthesia

- Sensation of pain is blocked without loss of consciousness. The conduction of stimulus from a painful site to the brain can be interrupted at one of the many points:
  - Surface anaesthesia
  - Infiltration anaesthesia
  - Intravenous regional anaesthesia
  - Nerve block/plexus block

- Epidural anaesthesia
- Spinal anaesthesia

24.3.2 General Anaesthesia

PREPARATION IN THE OPERATING THEATRE

Should be in a constant state of preparedness for anaesthesia

The following should be available, checked, and ready

- Oxygen source
- Operating table that is adjustable and with its accessories
- Anaesthesia machine with accessories
- Self inflating bag for inflating the lungs with oxygen
- Appropriate range of face masks
- Suction machine with range of suction catheters
- Appropriate range of oropharyngeal airways, endotracheal tubes, and other airways, e.g., laryngeal mask airway
- Laryngoscope with suitable range of blades
- Magill's forceps
- Intravenous infusion equipment, appropriate range of cannulae and fluids (solutions)
- Equipment for regional anaesthesia
- Adequate lighting
- Safe disposal of items contaminated with body fluids, sharps, and waste glass
- Refrigeration for storage of fluids, drugs, and blood
- Anaesthetic drugs: General and local anaesthetic agents
- Muscle relaxants
- Appropriate range of sizes of syringes
- Monitors: stethoscope, sphygmomanometer, pulse oximeter

- Appropriate protection of staff against biological contaminants. This includes: caps, gowns, gloves, masks, footwear and eye shields (personal protective equipment)
- Drugs necessary for management of conditions, which may complicate or co-exist with anaesthesia

PRE-OPERATIVE MANAGEMENT

The aim is to make the patient as fit as possible before surgical operation

Assessment of the patient

- Identify the patient and establish rapport
- A standard history is obtained and an examination done
- Emphasis is on the cardio-respiratory systems
- Investigations appropriately interpreted e.g., Hb
- Health status/condition of the patient
- Classify physical status of the patient according to A.S.A. (ASA classification 1-5 with or without E)
- Make a plan for anaesthesia based on the information obtained

Preparation of the patient

- Explain the procedure to the patient and ensure that he/she has understood
- Ensure informed consent form is signed
- Weight of every patient should be taken
- Check site and side of the operation
- Check period of fasting
- Remove: Ornaments/prostheses/dentures that may injure the patient and make-up that may interfere with monitoring
- Any other necessary preparation based on patient's condition and nature of the operation (condition of deficits/imbalances should be corrected, control chronic conditions)

– Ability of the patient to withstand the stresses and adverse effects of anaesthesia and the surgical procedure will depend on how well prepared he/she is

24.3.2.1 General Anaesthetic Agents

Intravenous agents

Most anaesthetic agents are included in the specialist essential medicines list meaning that use is restricted to specialised health workers.

MEDICINE	CHARACTERISTICS AND USE
Thiopentone • Solution: 2.5% or 25 mg/ml • Route: IV • Dose: 3 to 5 mg/kg body weight	• **Indications:** Induction of anaesthesia, anticonvulsant • **Contraindication:** Airway obstruction, shock, hypersensitivity to barbiturates, severe heart disease • **Side effects:** Drowsiness, depression of cardio respiratory system(in clinical doses) • **Complications:** Hypotension, apnoea (dose dependent), tissue necrosis in case of extravasation of the solution

MEDICINE	CHARACTERISTICS AND USE
Ketamine • Solution:50 mg/ml, 10 mg/ml • Route: IV or IM • Dose: – IV 1-2 mg/kg – IM. 5-7 mg/kg	• **Indication:** Induction of anaesthesia, maintenance of anaesthesia (infusion), analgesia • **Contraindication:** Hypertension, epilepsy, raised intracranial pressure, e.g. head injury • **Side effects:** Emergency delirium, hallucinations, increased salivation, increased muscle tone • Prevent salivation by atropine premedication, treat emergency delirium by giving diazepam
Propofol • Solution/emulsion: 1% or 10 mg/ml • Route: IV • Dose: 1-2.5 mg/kg titrated at a rate of 4 ml per second	• **Indications:** Induction of anaesthesia, maintenance of anaesthesia • **Contraindication:** Hypersensitivity, hypotension • **Side effects:** Pain at site of injection

Inhalational anaesthetic agents

Halothane is included in the general essential medicines list but should only be used by health workers confident with the use of this anaesthetic.

MEDICINE	CHARACTERISTICS AND USE
Halothane	• A volatile liquid at room temperature • **Indications** – Induction of anaesthesia (in children, patients with airway obstruction) – Maintenance of anaesthesia

	• Precaution: Always use at least 30% oxygen with halothane • It is safe to avoid use of adrenaline to prevent high incidence of arrhythmias • Adverse effects which may occur include: – Atony of the gravid uterus – Post-operative shivering – Severe cardiopulmonary depression

24.3.2.2 Muscle Relaxants

They are used to provide muscle relaxation to facilitate a procedure, and used in a patient who is unconscious, e.g. general anaesthesia, or sedated.

- Precaution before using a muscle relaxant: always have means of supporting the airway and respiration

MEDICINE	CHARACTERISTICS AND USE
Short acting muscle relaxant ***Suxamethonium*** • Solution: 50 mg/ml • Action: Fast onset and short duration • Route: IV or IM • Dose: 1-2 mg/kg	• **Indication:** Muscle relaxation for short procedures, e.g., tracheal intubation, reduction of fracture • **Contraindications:** Airway obstruction, hyperkalaemia, e.g., tetanus, burns >3 days old

MEDICINE	CHARACTERISTICS AND USE
Intermediate acting muscle relaxants ***Atracurium*** • Solution: 10 mg/ml • Action: Duration is 20–40 minutes • Route: IV • Dose: 300-600 micrograms/kg	• **Indication:** Muscle relaxation for operation of intermediate duration
Long acting muscle relaxants ***Pancuronium*** • Solution: 2 mg/ml • Action: Slow onset and long duration (45 minutes) • Route: IV • Dose: 4-6 mg initially, thereafter 2 mg or 80–100 microgram/kg	• **Indication:** Muscle relaxants for long procedure, e.g. laparotomy

24.3.3 Local Anaesthetic Agents

These are not specialist medicines.

MEDICINE	CHARACTERISTICS AND USE
Lignocaine	***Solution concentrations of lignocaine commonly used:*** • Topical: Larynx pharynx 20-40 mg/ml or 100 mg/ml • Infiltration: 2.5-5 mg/ml with or without adrenaline 1:2,000,000 • Nerve block: 10-20 mg/ml with or without adrenaline 1:2,000,000 • Spinal: 50 mg/ml hyperbaric solution ***Action: Fast onset*** • Plain lignocaine: 40-60 minutes • Lignocaine with adrenaline: 60-90 minutes ***Dose*** • Plain lignocaine: 3 mg/kg body weight • Lignocaine with adrenaline 6-7 mg/kg body weight • It is important to calculate the volume of lignocaine that could be used safely

MEDICINE	CHARACTERISTICS AND USE
	Lignocaine toxicity, signs and symptoms: • CNS stimulation followed by depression • Stimulation: Restlessness, tremor, convulsions • Depression: Semi-consciousness, coma ***Management*** ▶ Give sufficient/titrate IV diazepam to control convulsions ▶ **Thiopentone** may be used, e.g. 50 mg ▶ Give **oxygen** ▶ Support airway, breathing, and circulation as indicated ▶ Admit the patient to ward to continue treatment and observation as needed
Bupivacaine Solution: 5 mg/ml	• **Action:** Slow onset but long duration 4-6 hours or longer • **Dose:** 2 mg/kg body weight • **Indication:** All regional anaesthesia except IV regional anaesthesia • Use hyperbaric bupivacaine solution for spinal anaesthesia

24.3.4 Selection of Type of Anaesthesia for the Patient

Consider the following factors:

- Patient factors: medical state, time of last meal, mental state, wish of patient if applicable
- Surgical factors: nature of surgery, site of operation, estimated duration of surgery, position in which the surgery is to be performed
- Anaesthetic factors: availability of drugs, experience and competence of the anaesthetic provider

24.3.4.1 Techniques of General Anaesthesia

Requirements for all

Take and record baseline vital signs

Establish intravenous line and commence infusion

GENERAL ANAESTHESIA WITH SPONTANEOUS RESPIRATION

Induce anaesthesia by:

- Intravenous route (adults) or
- Inhalation route (children, patient with difficult airway)

Maintenance

- Secure a clear airway using an oropharyngeal airway
- The mask is placed on the face
- Titrate concentration of inhalation against response of the patient
- Monitor, record every 5 minutes or more frequently, BP, pulse, respiration, colour, oximetry

Indication

- This technique may be used for operations on limbs, perineum, superficial wall of chest, and abdomen
- Suitable for operations lasting less than 30 minutes

GENERAL ANAESTHESIA WITH CONTROLLED VENTILATION

Induce anaesthesia:

- Intravenous/inhalation (see above)
- Tracheal intubation
  - When spontaneously breathing for anticipated difficult airway (for children)
    or
  - Under relaxation by suxamethonium and laryngoscopy
  - Confirm correct tube placement by presence of breath sounds on both chest sides
  - Connect the breathing/delivery system to the endotracheal tube

Maintenance

- Titrate concentration of inhalation agent against response of the patient
  - A selected, long acting muscle relaxant is given
  - Intermittent positive pressure ventilation is done
  - Monitor vital signs (as above)
- At the end of the operation when the patient shows signs of respiratory effort, give
  - IV. **Neostigmine** 0.03 to 0.07 mg/kg to reverse the effects of the long acting muscle relaxant

Indication

- All operations that require a protected airway and controlled ventilation, e.g, intraabdominal, intrathoracic, and intracranial operations

RAPID SEQUENCE INDUCTION OF GENERAL ANAESTHESIA

(Also called crash induction) For patients with "full stomach" and at risk of regurgitation, e.g., emergency surgery, distended abdomen

Crash induction steps

- Establish an intravenous line and commence infusions
- Preoxygenation for >3 minutes
- Induce with selected intravenous anaesthetic agent
- Assistant applies cricoid pressure
- IV **suxamethonium** is given
- Laryngoscopy is done
- Trachea is intubated and correct tube placement confirmed
- The cuff of the endotracheal tube is inflated, then cricoid pressure released
- The position of the tube is fixed by strapping and an airway is inserted
- Then connect to breathing circuit/system to maintain anaesthesia

24.3.4.2 Techniques for Regional Anaesthesia

- Detailed knowledge of anatomy, technique, and possible complications is important for correct injection placement
- Preoperative assessment and preparation of the patient should be done
- Patient refusal and local sepsis are the only absolute contraindications
- Select the appropriate technique for operation

PROCEDURE

- Discuss the procedure with the patient
- Identify the injection site using appropriate landmarks
- Observe aseptic conditions
- Use small bore needle, which causes less pain during injection
- Select concentration and volume of drug according to the technique
- Aspirate before injection to avoid accidental intravascular injection
- Inject slowly and allow 5-10 minutes for onset of drug action
- Confirm desired block effect before surgery commences
- The patient must be monitored throughout the procedure

Note

- Supplemental agents should be available for analgesia or anaesthesia if technique is inadequate
- Resuscitative equipment, drugs, and oxygen must be at hand before administration of any anaesthetic

Appendix 1

Standard Infection Control Precautions

Transmission of infections in health care facilities can be prevented and controlled through the application of basic infection control precautions which can be grouped into:

- **Standard precautions:** basic infection control measures which must be applied to all patients at all times, regardless of diagnosis or infectious status. They are designed to reduce the risk of transmission of micro-organisms from both recognized and non-recognized sources.
- **Additional (transmission-based) precautions:** measures that are used for patients known or suspected to be infected or colonized with highly transmissible or epidemiological important pathogens for which additional precautions are needed to interrupt transmission in health care facilities.

For more details please refer to Uganda National Infection Prevention and Control Guidelines December 2013.

Standard Precautions

Hygiene

Personal hygiene

Personal Hygiene involves the general cleanliness and care of the whole body: short and clean nails, short or pinned up hair, appropriate clean clothing (uniforms), no jewels on the hands, closed shoes.

Hand washing

Hand washing is a major component of standard precautions and one of the most effective methods to prevent transmission of pathogens associated with health care.

WASH YOUR HANDS
THOROUGHLY WITH SOAP
AND WATER OR USE A
SUITABLE DISINFECTANT

- Before and after any direct patient contact and between patients
- When any skin area is contaminated with body fluids
- Before handling an invasive device or doing any procedures (even if gloves will be worn!)
- After removing gloves
- During patient care, when moving from contaminated to a clean body site of the patient
- After contact with inanimate objects in the immediate vicinity of the patient.

- Hand wash (40-60 sec) with water and soap, rub all surfacs, dry with a single use towel or
- Hand rub (wtih an alcohol based rub) for 20-30 sec, apply enough product to cover all areas of the hands and rub hands until dry

Respiratory hygiene and cough etiquette

- Patients with respiratory symptoms should cover their mouth and nose with tissue or mask while coughing/ sneezing, dispose of used tissues and masks and perform hand hygiene after contact with respiratory secretions
- Patients with respiratory symptoms should be placed 1 metre away from others in waiting areas and hand hygiene, tissues and masks made available in common areas

Instrument hygiene (decontamination)

Decontamination is the combination of processes, including cleaning, disinfection and/or sterilisation used to render a re-useable medical device safe for further episodes of use. The level of decontamination depends on the situation involved and the type and use of equipment.

- Cleaning is the single most important step in making a medical device ready for re-use: by removing organic material and reducing the number of micro-organisms present, it is an essential prerequisite of equipment decontamination to ensure effective disinfection or sterilization can be subsequently carried out. It utilizes detergents.
- Disinfection 'is a process used to reduce the number of viable micro-organisms, which may not necessarily inactivate some viruses and bacterial spores. Disinfection will not achieve the same reduction in microbial contamination levels as sterilization. It can be carried out by heat (boiling) or by chemical disinfectants.
- Sterilization is a process used to render the object free from viable micro-organisms, including spores and viruses. Moist Heat via clean steam (autoclaving) is the method of choice. Chemical disinfection may only be used when autoclaving is not possible.

Facility hygiene

A clean environment forms the basis of sound infection prevention and control practices. This is because there is an important link between cleaning of health care facilities and persistence of nosocomial pathogens.

- The purpose of cleaning the environment is to remove visible dirt, reduce the level of microorganisms and to minimize the dissemination of infectious agents in the facility, thereby providing an aesthetically pleasing, sanitary and relatively contamination –free environment for patients, staff and visitors

Linen and laundry

- Ensure proper handling of linen/laundry
  - Collect clothing/sheets stained with blood/body-fluids while wearing gloves or using a plastic bag and keep separate from other laundry – never touch them directly
  - Disinfect with hypochlorite if contaminated with body fluids
  - Wash with soap and boil for 20 minutes

Personal Protective equipment (PPE)

Personal Protective Equipment is specialised clothing or equipment worn to protect someone against a hazard or infection. PPE is indicated when health worker-patient interaction indicates that exposure to blood or body fluids is anticipated. They provide a physical barrier between micro-organism and the person.

Gloves

- Wear clean protective gloves when handling
  - body fluids/secretions, mucous membranes, nonintact skin
  - contaminated waste,soiled bedding or linen
  - instruments, and for
  - when cleaning body fluid spills
- Change between tasks and procedures on the same patients after contact with potentially infectious material
- Remove after use, before touching any other surface, and wash hands immediately
- Wear sterile or high-level disinfected gloves when performing sterile procedures

Other PPE

- Wear a surgical or procedure mask and eye protection (googles or glasses) or a face shield when performing activities which are likely to generate splashes or sprays of blood, body fluids, secretions or excretions
- Wear a gown to protect skin and prevent soiling of clothing in activities as above

- Use a waterproof bandage to cover wounds
- Wear protective boots and gloves and where possible, wear a water-proof apron when working in a heavily contaminated area, e.g. toilets
- Avoid mouth-to-mouth resuscitation and pipetting by mouth where possible
- In surgical procedures, use a needle holder and appropriate sized needle, wear double gloves and eye shield

Safe handling of sharps

- Ensure safe sharps handling and disposal
- Avoid accidental pricks and cuts with contaminated sharp instruments (e.g. needles) by careful handling and proper disposal
- Use "hands-free" technique for passing sharp instruments
- Keep a puncture-resistant container nearby
- Use safe injection practices:
  - Use a sterile needle and syringe for every injection
  - Do not recap, bend, or break needles after use
- Drop all used disposable needles, plastic syringes, and blades directly into the sharps container without recapping or passing to another person
- Empty or send for incineration when container is ¾ full

Safe waste disposal

- Separate hazardous (potentially dangerous) from non-hazardous (routine) waste
  - Hazardous waste includes: infectious waste (e.g. soiled bandages), anatomical waste (placenta), sharps, chemical and pharmaceutical waste
- Use adequate personal protective equipment when handling hazardous waste (boots, gown, water proof apron, gloves, face protection)
- Practice safe waste disposal as per guidelines (incineration, burying)

Additional Precautions

These are necessary for patients who are known or suspected to be infected or colonized with specific pathogens that are transmitted by airborn, droplet or contact route of transmission.

Airborn precautions

Airborn precautions are designed to prevent transmission of particles < 5 micron in size (e.g. some viruses like measles or chickenpox, *M. tubeculosis*)

- Placement of a patient in a well ventilated room with door closed and discharge of air outdoors
- Use of appropriate respirators (masks with high filtration power) when entering the room
- Limitation of contacts (visitors)
- Use of surgical mask for the patient if leaving the room
- Adherence to cough etiquette by the patient
- In particular settings, negative air pressure an be created

Droplet precautions

They are designed to prevent transmission of pathogens transmitted by droplets, released by talking, sneezing and coughing: *H. Influenza, N.meningitis,* some viruses, pertussis, influenza etc.

- Place patient in well ventilated room or at least 1 metre distance from other patients
- Wear a mask if within 1 metre from the patient
- Patient to wear a mask when moving.

– Closed door and negatve air pressure are not necessary

Contact precautions

These precautions are designed to reduce the transmission of organism from an infected or colonized patient through direct or indirect contact. It applies to microorganisms like HIV, hepatitis B, multi-drug resistant bacteria like MRSA,

herpes simplex, varicella and haemorrhagic fevers viruses, skin staphylococcal infections, scabies, lice, other wound infections.

- Appropriate barrier method must be used
- Isolate patient, use dedicated equipment if possible
- Wear gloves before entering the room, change gloves after contact with potentially infected material
- Remove gloves as soon as leaving the room and wash hands with an antimicrobial
- Wear a gown if necessary
- Minimize patient's movements outside the room

In case of blood borne pathogens (HIV, hepatitis B)

- Use particular precautions in taking blood samples
- Decontaminate any body fluid/blood spillage with 0.5/1% hypochlorite solutions

Patients suspected of having hemorrhagic fevers require the strictest infection control procedures (see WHO, 2016. *Clinical management of patients with viral hemorrhagic fever.* http://www.who.int/csr/resources/publications/clinical-management-patients/en/)

Post-Exposure Prophylaxis

Accidental exposure to blood during medical procedures (needle or other sharp injury, splashes of blood on mucosae) carries the risk of transmission of HIV and/or hepatitis B.

Immunization against hepatitis B is recommended in health workers as an effective protection measure.

Steps for post exposure prophylaxis are described in section **3.1.6.1**

Appendix 2

Pharmacovigilance and Adverse Drug Reaction Reporting

Pharmacovigilance is defined as the science and activities relating to the detection, assessment, understanding and prevention of adverse effects or any other drug-related problem.

The aims of pharmacovigilance are to enhance patient care and patient safety in relation to the use of medicines; and to support public health programmes by providing reliable, balanced information for the effective assessment of the risk-benefit profile of medicines.

Any medicine may cause unwanted or unexpected adverse reactions, some of which may be life threatening, for example anaphylactic shock or liver failure.

Why Should You Report?

Rapid detection and recording of adverse drug reactions (ADR) is of vital importance so that unrecognised hazards are identified promptly and appropriate regulatory action is taken to ensure medicines are used safely and future events are prevented.

What Should Be Reported

Suspected adverse events to any medicine, vaccines and herbal products should be reported (including self-medication medicines).

Report all adverse drug reactions such as:

- ADRs to to any medicine (whether new or old)
- Serious reactions and interactions
- ADRs which are not clearly stated in the package insert
- Unusual or interesting adverse drug reactions
- All adverse reactions or poisonings to traditional or herbal remedies

Report Product Quality Problems such as:

- Suspected contamination
- Questionable stability
- Defective components
- Poor packaging or labelling
- Therapeutic failures
- Non-adherence (may be due to product characteristic)

Report medication errors such as:

- Prescribing errors
- Dispensing errors
- Medicine preparation error
- Administration errors
- Monitoring error

Who should report?

- All health workers
- Patients
- Any member of the public
- Medical representatives
- Pharmaceutical Companies, Distributors, Wholesalers and Retailers

Where and How to Report

Health workers are urged to immediately report suspected ADRs directly to the National Drug Authority Pharmacovigilance Centre using the ADR forms (see example

at the end of this section). The forms can also be obtained from the regional pharmacovigilance centres. Encourage your patients to report suspected ADRs to you.

ADRs can also be reported directly online using the following links:

- www.nda.or.ug
- https://primaryreporting.who-umc.org/Reporting/Reporter?OrganizationID=UG
- All regional referral hospitals have pharmacovigilance coordinators
- NDA regional offices

The following NDA offices can also be contacted for further information:

NDA Head Office
Plot 46/48 Lumumba Avenue Kampala
Tel. 0414255665/0414347391/0414344052
Email: ndaug@nda.or.ug

National Drug Authority
South-Western Regional Office
House No. 29, Mbaguta Estates Kamukuzi
Tel. 0485-421088
MBARARA – UGANDA

Eastern Regional Office
South Bukedi Cooperative Building
Plot No. 6 Busia Road
Tel/Fax 045-45185
TORORO – UGANDA

Northern Region Office
Erute Road
Tel./Fax 0473-420652
LIRA – UGANDA

South-Eastern Regional Office
Stanley Road, Jinja Municipality
Tel. 0465-440688
JINJA – UGANDA

Central Regional Office
Premier Complex Building
Tel. 0312-261548
NAKAWA - KAMPALA

Western Regional Office
Main Road
Tel. 0465-440688
HOIMA - UGANDA

What Will Happen When I Report?

When NDA receives your report, they will assess the likelihood that the suspected adverse reaction is actually due to the medicine, using the WHO causality assessment criteria for deciding on the contribution of the medicine towards the adverse event.

Depending on the outcome of the causality assessment, NDA will give feedback in any of the following ways: medicine alerts, media statements, patient information leaflets, newsletters and personal feedback to reporters.

Prevention of Adverse Drug Reactions (ADRs)

- Never use any medicine without a clear indication
- If a patient is pregnant, do not use a medicine unless it is absolutely necessary
- Ask the patient if they have any allergies, hypersensitivity or previous reactions to the medicine or to similar medicines

- Reduce doses when necessary, for example, in the young, the elderly, and if liver or renal disease is present
- Always prescribe as few medicines as possible
- Carefully explain dose regimes to patients, especially those on multiple medicines, the elderly, and anyone likely to misunderstand. Check for understanding before patient goes away.
- Age and liver or kidney disease may affect the way medicines behave in the body so that smaller than usual amounts are needed
- Ask if patient is taking other medicines including self medication medicines, health supplements, herbal products as interactions can occur
- If possible, always use medicines with which you are familiar
- Look out for ADRs when using new or unfamiliar drugs
- Warn patients about likely adverse effects and advise them on what to do if they occur
- Give patients on certain prolonged treatments, for example anticoagulants, corticosteroids, and insulin, a small card which they can carry with them giving information about the treatment

Note: Please attach additional pages to the ADR reporting form if necessary. Even if you do not know some details in the form, do not be put off reporting the suspected adverse event.

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MINISTRY OF HEALTH

SUSPECTED ADVERSE DRUG REACTION REPORTING FORM

A. PATIENT DETAILS

Patient name	Patient Number	Sex: M/F*
Age at time of onset(yrs)*	Health Facility	Last Menstrual Period
Weight (kg)	District	Trimester (if pregnant)

B. SUSPECTED DRUG (S) DETAILS

Generic Name*	Brand Name	Dose ,Route Frequency	Date* started	Date stopped	Prescribed for	Expiry date	Batch No

C. SUSPECTED REACTIONS

Please describe the reaction as observed and any treatment given to manage the reaction

Outcome
Recovered ☐ Recovering ☐ Continuing ☐ Died due to reaction ☐

Date reaction started*	Date reaction stopped	Date of notification

SERIOUSNESS OF THE REACTION

Patient died ☐ Life Threatening ☐ Inpatient Hospitalization ☐ Involved disability ☐ Life Threatening ☐
Congenital abnormality ☐

D. CONCOMITANT DRUG

Please give information on the drug(s) the patient has been taking together with the suspected drug including those taken for chronic diseases (include self medication and herbal preparations)

Generic Name	Brand	Dosage	Date started	Date stopped	Indication(prescribed or OTC)

Relevant laboratory tests including dates	Additional relevant information (medical history, allergies, failure of efficacy)

E. REPORTER'S DETAILS

Name/designation*	Telephone and Email Address	Date of reporting	Health facility

* Mandatory field

Appendix 3

Essential Medicines List 2016

Structure of EML 2016

The Essential Medicines List comprises of all medicines recommended in the UCG 2016 that were selected based on efficacy, safety and cost-effectiveness. The medicines are arranged according to the therapeutic category.

The specialist medicines in each category are those for which specialised medical care, training, and/or specialised diagnostic and monitoring is needed. These are mostly restricted to Regional and National Referral Hospitals where the required expertise is available.

Medicine names

The relevant International Non-proprietary Name (INN) or generic names are used throughout the list. Short forms of medicine names are used for only well-known abbreviations such AZT for zidovudine.

Level of use (L)

Each item has a designation representing the lowest level of use. The item can be prescribed and dispensed at this level and all the levels above. This designation is in line with the diagnostic and clinical skills expected to be available at that level.

Below are the levels used:

NR	National referral hospital
RR	Regional referral hospital
H	Hospital

HC4	Health centre 4
HC3	Health centre 3
HC2	Health centre 2
HC1	Health centre 1 (Community, VHT)

VEN classification (C)

In the context of limited resources, it is very important to learn to prioritise medicines: this is reflected by the Vital, Essential, Necessary (VEN) classification. Medicines are classified into 3 categories, according to the health impact:

- **V:** vital medicines are potentially life-saving medicines, and unavailability would cause serious harm and side effects. They must be available ALWAYS, (e.g. insulin, metformin, most antibiotics, first line antimalarials, some anti-epileptics, parenteral diuretics).
- **E:** essential medicines are important, they are used to treat common illnesses, maybe less severe but significant. They are not absolutely needed for the provision of basic health care (e.g. antihelmintics, pain killers).
- **N:** necessary (or some times called non-essential) medicines are used for minor or self-limiting illnesses, or may have a limited efficacy, or a higher cost compared to the benefit.

Column labels

Columns in the list are labelled as below:

DS	dosage form
STR	strength
L	Level of use
C	VEN classification

ESSENTIAL MEDICINES LIST 2016

MEDICINE	DS	STR	L	C
1. ANAESTHETICS				
1.1 General anaesthetics and oxygen				
1.1.1 Inhalational medicines				
Halothane	Liquid for inhalation	100%	HC4	V
Isoflurane	Liquid for inhalation	≥99.9%	H	V
Medical air	Medical gas	99.99%	HC4	N
Oxygen	Medical gas	99.8%	HC4	V
	Specialist medicines			
Desflurane	*Liquid for inhalation*	*100%*	*NR*	*E*
Nitrous oxide	*Medical gas*	*99.999%*	*H*	*E*
Sevoflurane	*Liquid for inhalation*	*100%*	*NR*	*V*
1.1.2 Injectable medicines				
Propofol	Injection	10 mg/ml	H	V
Thiopental sodium	Powder for injection	500 mg	HC4	V
Ketamine	Injection	50 mg/ml	HC4	V
	Specialist medicines			
Etomidate	*Injection*	*2 mg/ml*	*RR*	*E*

MEDICINE	DS	STR	L	C
1.2 Local anaesthetics				
Lignocaine	Injection	2%	HC2	V
Lignocaine (preservative free)	Injection	5%	HC4	V
Lignocaine	Gel	2%	HC3	N
Lignocaine	Ointment	5%	HC4	N
Lignocaine	Spray	5%	HC4	N
Bupivacaine (with dextrose)	Injection	4 ml; 0.50% in dextrose 8.0%	HC4	V
	Specialist medicines			
Lignocaine + epinephrine (adrenaline)	*Injection (dental cartridge)*	*2% + 1:80 000*	*HC4*	*V*
Lignocaine	*Injection (epidural)*	*2%*	*RR*	*V*
Lignocaine + adrenaline	*Injection*	*1% + 1:2,000,000*	*NR*	*N*
Bupivacaine (with preservative)	*Injection*	*0.50%*	*RR*	*E*
1.3 Preoperative and peri-operative medication				
Atropine	Injection	1 mg/ml	HC4	E
Diazepam	Rectal tube	2 mg/ml	HC4	V
Diazepam	Injection	5 mg/ml	HC4	V
Ephedrine	Injection	30 mg/ml	HC4	V
	Specialist medicines			
Droperidol	*Injection*	*2.5 mg/ml*	*H*	*N*
Fentanyl	*Injection*	*50 µg/ml*	*H*	*V*

MEDICINE	DS	STR	L	C
Glycopyrrolate	*Injection*	*200 µg/ml*	*RR*	*V*
Lorazepam	*Injection*	*4 mg/ml*	*H*	*E*
Midazolam	*Injection*	*2 mg/ml*	*RR*	*V*
Phenylephrine	*Injection*	*10 mg/ml*	*H*	*V*
Remifentanil	*Powder for injection*	*1 mg*	*NR*	*V*
2. MEDICINES FOR PAIN AND PALLIATIVE CARE				
2.1 Non-opioids and non-steroidal anti-inflammatory drugs (NSAIDS)				
Diclofenac	Tablet	50 mg	HC4	E
Diclofenac	Injection	25 mg/ml	HC4	V
Ibuprofen	Tablet	200 mg	HC3	E
Paracetamol	Tablet	500 mg	HC1	E
Paracetamol	Suppository	125 mg	HC2	E
Specialist medicines				
Mefenamic acid	*Tablet*	*500 mg*	*HC4*	*N*
2.2 Opioid analgesics				
Codeine	Tablet	30 mg	HC4	E
Morphine	Oral solution	10 mg/5ml	HC3	E
Morphine (concentrated)	Oral solution	20 mg/ml	NR	V
Morphine	Injection	10 mg/ml	HC4	V
Pethidine	Injection	50 mg/ml	HC4	V
Tramadol	Capsule	50 mg	RR	N
Tramadol	Injection	50 mg/ml	RR	N

MEDICINE	DS	STR	L	C
2.3 Medicines for other common symptoms in palliative care				
Aciclovir	Tablet	200 mg	HC4	E
Amitriptyline	Tablet	25 mg	HC3	V
Bisacodyl	Tablet	5 mg	HC3	E
Carbamazepine	Tablet	100 mg	HC3	V
Chlorpromazine	Tablet	25 mg	HC2	E
Clonazepam	Tablet	2 mg	RR	E
Dexamethasone	Tablet	4 mg	HC4	E
Diazepam	Tablet	5 mg	HC3	V
Fluconazole	Capsule	200 mg	HC4	E
Fluconazole	Suspension	50 mg/ml	HC4	E
Haloperidol	Tablet	5 mg	HC4	E
Haloperidol	Injection	5 mg/ml	HC4	N
Hyoscine	Tablet	20 mg	HC4	E
Hyoscine	Injection	20 mg/ml	H	E
Liquid paraffin	Oral emulsion	100 ml	HC4	N
Metoclopramide	Injection	5 mg/ml	HC4	E
Naloxone	Injection	0.4 mg/ml	HC4	V
Phenytoin	Tablet	100 mg	HC2	V
Prednisolone	Tablet	5 mg	HC3	E
Promethazine	Tablet	25 mg	HC3	E
Metronidazole	Powder	0.75%	H	N
Metronidazole	Gel	0.75%	H	N

MEDICINE	DS	STR	L	C
3. ANTI-ALLERGICS AND MEDICINES USED IN ANAPHYLAXIS				
Chlorphenamine maleate	Tablet	4 mg	HC2	E
Dexamethasone	Tablet	0.5 mg	H	N
Dexamethasone	Injection	4 mg/ml	HC4	E
Epinephrine (adrenaline)	Injection	1 mg/ml	HC2	V
Hydrocortisone sodium succinate	Powder for injection	100 mg	HC3	V
Prednisolone	Tablet	5 mg	HC2	E
Promethazine	Tablet	25 mg	HC2	E
Promethazine	Injection	25 mg/ml	HC4	E
Cetirizine	Tablet	10 mg	H	N
4. ANTIDOTES AND OTHER SUBSTANCES USED IN POISONING				
4.1 Non-specific antidotes				
Charcoal (activated)	Tablet	250 mg	HC2	E
4.2 Specific antidotes				
Acetylcysteine	Injection	200 mg/ml	H	E
Atropine	Injection	1 mg/ml	HC4	V
Calcium gluconate	Injection	10%	HC3	V
Naloxone	Injection	400 µg/ml	H	E
Phytomenadione (Vitamin K1)	Injection	10 mg	HC4	E

MEDICINE	DS	STR	L	C
	Specialist medicines			
Calcium folinate (folinic acid)	*Injection*	*3 mg/ml*	*RR*	*E*
Desferrioxamine (Desferroxamine) mesilate	*Powder for injection*	*500 mg*	*NR*	*N*
Dimercaprol	*Injection*	*50 mg/ml*	*NR*	*N*
Methionine	*Tablet*	*250 mg*	*H*	*N*
Methylthioninium chloride (methylene blue)	*Injection*	*10 mg/ml*	*H*	*N*
Penicillamine	*Tablet*	*250 mg*	*NR*	*N*
Pralidoxime mesylate	*Powder for injection*	*1 g*	*RR*	*E*
Benztropine	*Injection*	*1 mg/ml*	*H*	*E*
Flumazenil	*Injection*	*0.1 mg/ml*	*H*	*N*
Sodium thiosulphate	*Injection*	*250 mg/ml*	*NR*	*N*
Protamine	*Injection*	*10 mg/ml*	*H*	*E*
5. ANTIEPILEPTICS/ANTICONVULSANTS				
Carbamazepine	Tablet	200 mg	HC3	V
Carbamazepine	Tablet (chewable)	100 mg	HC3	V
Diazepam	Injection	5 mg/ml	HC4	V
Diazepam	Suppository	2.5 mg	HC2	V
Diazepam	Rectal tube	2 mg/ml	HC2	V
Ethosuximide	Capsules	250 mg	RR	E

MEDICINE	DS	STR	L	C
Magnesium sulphate	Injection	500 mg/ml	HC3	V
Phenobarbital	Tablet	30 mg	HC2	V
Phenobarbital	Injection	200 mg/ml	HC4	V
Phenytoin	Injection	50 mg/ml	RR	V
Phenytoin	Tablet	100 mg	HC2	V
Sodium valproate	Tablet (EC)	500 mg	RR	E
Sodium valproate	Tablet (crushable)	100 mg	HC4	E
	Specialist medicines			
Lamotrigine	*Tablet*	*25 mg*	*RR*	*E*
6. ANTI-INFECTIVE MEDICINES				
6.1 Antihelminthics				
6.1.1 Intestinal antihelminthics				
Albendazole	Tablet	400 mg	HC1	V
Ivermectin	Tablet	6 mg	HC3	E
Mebendazole	Tablet	100 mg	HC2	E
Praziquantel	tablet	600 mg	HC3	E
Niclosamide	Tablet	500 mg	HC4	N
6.1.2 Antifilarials				
Albendazole	Tablet	400 mg	HC1	V
Ivermectin	Tablet	6 mg	HC3	E
6.1.3 Antischistosomals and other antitrematode medicines				
Ivermectin	Tablet	6 mg	HC3	E
Praziquantel	Tablet	600 mg	HC4	E

MEDICINE	DS	STR	L	C
	Specialist medicines			
Diethylcarbamazine citrate	*Tablet*	*50 mg*	*H*	*N*
6.2 Antibacterials				
6.2.1 Beta-lactam medicines				
Amoxicillin	Capsule	250 mg	HC2	V
Amoxicillin	Dispersible tablet	250 mg	HC1	V
Amoxicillin/ Clavulanic acid	Tablet	250/125 mg	RR	E
Ampicillin	Powder for injection	500 mg	HC3	V
Benzathine penicillin	Powder for injection	2.4 MU	HC3	E
Benzylpenicillin	Powder for injection	600 mg	HC2	V
Cefalexin	capsules	250 mg	H	E
Cefixime	Tablet	200 mg	H	N
Ceftriaxone	Powder for injection	1 g	HC3	V
Cloxacillin	Capsules	250 mg	HC3	E
Cloxacillin	Powder for injection	500 mg	HC3	E
Phenoxymethyl-penicillin	Tablet	250 mg	HC2	N
Procaine benzylpenicillin forte	Powder for injection	4 MU	H	N

MEDICINE	DS	STR	L	C
	Specialist Medicines			
Meropenem	*Powder for injection*	*500 mg*	*RR*	*V*
Imipenem/cilastatin	*Powder for injection*	*500 mg*	*RR*	*E*
Piperacilln/ Tazobactam	*Powder for injection*	*2 g/250 mg*	*RR*	*E*
6.2.2 Other antibacterial medicines				
Azithromycin	Tablet	250 mg	H	N
Azithromycin	Oral suspension	200 mg/5ml	HC2	E
Chloramphenicol	Powder for injection	1 g	HC4	E
Chloramphenicol	Capsule	250 mg	H	N
Ciprofloxacin	Tablet	500 mg	HC2	V
Cotrimoxazole	Tablet	120 mg	HC2	V
Cotrimoxazole	Tablet	480 mg	HC2	V
Cotrimoxazole	Tablet	960 mg	HC2	E
Dapsone	Tablet	100 mg	HC2	V
Doxycycline	Tablet	100 mg	HC2	V
Erythromycin	Tablet (scored)	250 mg	HC3	V
Gentamicin	Injection	40 mg/ml	HC3	V
Metronidazole	IV infusion	5 mg/ml	HC4	V
Metronidazole	Tablet	200 mg	HC2	V
Nitrofurantoin	Tablet	100 mg	HC2	E
Vancomycin	Injection	500 mg	RR	E

MEDICINE	DS	STR	L	C
Clindamycin	Injection	150 mg/ml	H	E
	Specialist medicines			
Ciprofloxacin	*Solution for IV infusion*	*2 mg/ml*	*RR*	*E*
Paromomycin sulphate	*Capsule*	*250 mg*	*RR*	*N*
6.2.3 Antileprosy medicines				
Prednisolone	Tablet	5 mg	HC3	E
Rifampicin + clofazimine + dapsone	Tablet (blister)	600 mg + 300 mg + 100 mg	HC3	V
Rifampicin + clofazimine + dapsone	Tablet (blister)	450 mg + 150 mg + 50 mg	HC3	V
Rifampicin + dapsone	Tablet (blister)	600 mg + 100 mg	HC3	V
Rifampicin + dapsone	Tablet (blister)	450 mg + 50 mg	HC3	V
Rifampicin	Tablet	150 mg	HC3	V
Dapsone	Tablet	50 mg	HC3	V
Clofazimine	Tablet	50 mg	HC3	V
6.2.4 Antituberculosis medicines				
Ethambutol	Tablet	400 mg	HC3	E
Ethambutol	Tablet	100 mg	HC3	E
Isoniazid	Tablet	300 mg	HC3	V
Isoniazid	Tablet (Dispersible)	100 mg	HC3	V

MEDICINE	DS	STR	L	C
Pyrazinamide	Tablet	400 mg	HC3	E
Rifampicin + isoniazid	Tablet (Dispersible)	60 mg + 30 mg	HC3	V
Rifampicin + isoniazid	Tablet	150 mg + 75 mg	HC3	V
Rifampicin + isoniazid	Tablet	300 mg + 150 mg	HC3	V
Rifampicin + isoniazid + pyrazinamide	Tablet	60 mg + 30 mg + 150 mg	HC3	V
Rifampicin + isoniazid + ethambutol	Tablet	150 mg + 75 mg + 275 mg	HC3	V
Rifampicin + isoniazid + pyrazinamide + ethambutol	Tablet	150 mg + 75 mg + 400 mg + 275 mg	HC3	V
Rifabutin	Capsule	150 mg	HC3	E
	Specialist medicines			
Amikacin	*Powder for injection*	*1 g*	*H*	*V*
Kanamycin	*Powder for injection*	*1 g*	*H*	*V*
Capreomycin	*Powder for injection*	*1 g*	*H*	*V*
Bedaquiline	*Tablet*	*100 mg*	*H*	*V*
Cycloserine	*Capsule*	*250 mg*	*H*	*V*

MEDICINE	DS	STR	L	C
Ethionamide	*Tablet*	*250 mg, 125 mg*	*H*	*V*
Levofloxacin	*Tablet*	*250 mg*	*H*	*V*
Moxifloxacin	*Tablet*	*400 mg*	*H*	*V*
Linezolid	*Tablet*	*600 mg*	*H*	*V*
P-Aminosalicylic acid	*Granules*	*4 g*	*H*	*V*
Prothionamide	*Tablet*	*250 mg*	*H*	*V*
Amoxicillin + Clavulanic Acid	*Tablet*	*875/125 mg*	*H*	*V*
Clofazimine	*Capsule*	*100 mg*	*H*	*V*
6.3 Antifungal medicines				
Clotrimazole	Pessary	100 mg	HC2	V
Fluconazole	Tablet	200 mg	HC3	V
Griseofulvin	Tablet	500 mg	HC3	E
Nystatin	Pessary	100,000 IU	HC2	N
Nystatin	Oral suspension	100,000 IU/ml	HC2	E
Nystatin	Tablet	500,000 IU	HC3	N
Specialist medicines				
Amphotericin B	*Powder for injection*	*50 mg*	*H*	*V*
Fluconazole	*Oral Suspension*	*50 mg/5 ml (35 ml)*	*HC4*	*E*
Fluconazole	*Injection*	*2 mg/ml (100 ml)*	*H*	*V*

MEDICINE	DS	STR	L	C
Flucytosine	*Injection*	*10 mg/ml*	*RR*	*N*
Ketoconazole	*Tablet*	*200 mg*	*H*	*N*
6.4 Antiviral medicines				
6.4.1 Antiherpes medicines				
Aciclovir	Tablet	200 mg	HC4	E
6.4.2 Antiretrovirals				
6.4.2.1 Nucleoside/Nucleotide reverse transcriptase inhibitors				
Abacavir sulfate	Tablet	300 mg	HC3	V
Abacavir	Tablet (dispersible)	60 mg	HC3	V
Lamivudine	Tablet	150 mg	HC3	V
Tenofovir	Tablet	300 mg	HC3	V
Zidovudine	Tablet	300 mg	HC3	V
6.4.2.2 Non-nucleoside reverse transcriptase inhibitors				
Efavirenz	Tablet	600 mg	HC3	V
Efavirenz	Capsule	200 mg	HC3	V
Nevirapine	Suspension	10 mg/ml	HC3	V
Nevirapine	Tablet	50 mg	HC3	V
Nevirapine	Tablet	200 mg	HC3	V
Etravirine	Tablet	100 mg	H	E
Etravirine	Tablet	25 mg	H	E
6.4.2.3 Protease inhibitors				
Atazanavir + (ritonavir)	Tablet	300 mg + (100 mg)	HC3	V

MEDICINE	DS	STR	L	C
Darunavir + (Ritonavir)	Tablet	75 mg + (100 mg)	H	E
Darunavir (+Ritonavir)	Tablet	600 mg + (100 mg)	H	E
Ritonavir	Tablet	25 mg	H	V
Lopinavir (+ Ritonavir)	Pellets/Capsule	40 mg + 10 mg/ml	HC3	V
Lopinavir (+ ritonavir)	Tablet	100 mg + 25 mg	HC3	V
Lopinavir (+ Ritonavir)	Tablet	200 mg + 50 mg	HC3	V
Ritonavir	Tablet	100 mg	H	E
Saquinavir (+Ritonavir)	Tablet	500 mg + 100 mg	H	E
FIXED DOSE COMBINATIONS				
Abacavir + Lamivudine	Tablet (dispersible)	120 mg + 60 mg	HC3	V
Abacavir + lamivudine	Tablet	600 mg + 300 mg	HC3	V
Tenofovir + lamivudine	Tablet	300 mg + 300 mg	HC3	V
Zidovudine + Lamivudine	Tablet	300 mg + 150 mg	HC3	V
Zidovudine + Lamivudine	Tablet	60 mg + 30 mg	HC3	V
Tenofovir + Lamivudine + Efavirenz	Tablet	300 mg + 300 mg + 600 mg	HC2	V

MEDICINE	DS	STR	L	C
Zidovudine + Lamivudine + Nevirapine	Tablet	300 mg + 150 mg + 200 mg	HC3	V
Zidovudine + Lamivudine + Nevirapine	Tablet	60 mg + 30 mg + 50 mg	HC3	V
6.4.2.4 Integrase inhibitors				
Raltegravir	Tablet (chewable)	100 mg	HC4	E
Raltegravir	tablet	400 mg	HC4	E
Dolutegravir	Tablet	50 mg	HC3	V
6.4.3 Antihepatitis medicines				
6.4.3.1 Medicines for Hepatitis B				
6.4.3.1.1 Nucleoside/ Nucleotide reverse transcriptase inhibitors				
Tenofovir disoproxil fumarate	Tablet	300 mg	HC4	V
Entecavir	Oral liquid	0.05 mg/ml	RR	V
6.4.3.1.2 Other antivirals				
	Specialist medicines			
Oseltamivir phosphate	*Capsule*	*75 mg*	*RR*	*N*
Oseltamivir phosphate	*Capsule*	*45 mg*	*RR*	*N*
Oseltamivir phosphate	*Capsule*	*30 mg*	*RR*	*N*

MEDICINE	DS	STR	L	C
6.5 Antiprotozoal medicines				
6.5.1 Antiamoebic medicines and antigiardiasis medicines				
Metronidazole	Tablet	200 mg	HC2	V
Tinidazole	Tablet	500 mg	H	N
6.5.2 Antileishmaniasis medicines				
	Specialist medicines			
Sodium stibogluconate	*Injection*	*100 mg/ml*	*RR*	*E*
Liposomal Amphotericin B	*Powder for injection*	*50 mg*	*RR*	*E*
6.5.3 Antimalarial medicines				
6.5.3.1 For curative treatment				
Artemether	Injection	80 mg/ml	HC3	E
Artemether + lumefantrine	Tablet	20 mg + 120 mg	HC1	V
Artesunate	Injection	60 mg/ml	HC3	V
Artesunate	Suppository	50 mg	HC1	V
Artesunate	Suppository	200 mg	HC1	V
Artesunate + Amodiaquine	Tablet	50 mg + 153 mg	HC2	E
Dihydroartemisinin + piperaquine	Tablet	40 mg + 320 mg	HC4	E
Quinine	Injection	300 mg/ml	HC3	E
Quinine	Tablet	300 mg	HC2	E

MEDICINE	DS	STR	L	C
6.5.3.2 For prophylaxis				
Chloroquine	Tablet	150 mg	HC4	E
Sulphadoxine + pyrimethamine	Tablet	500 mg + 25 mg	HC2	V
Mefloquine	Tablet	250 mg	RR	N
6.5.4 Antipneumocystosis and antitoxoplasmosis medicines				
Cotrimoxazole	Tablet	480 mg	HC4	V
Cotrimoxazole	Tablet	960 mg	HC3	V
Dapsone	Tablet	100 mg	H	N
Prednisolone	Tablet	5 mg	HC4	V
	Specialist medicines			
Pyrimethamine	*Tablet*	*25 mg*	*H*	*E*
Sulfadiazine	*Tablet*	*500 mg*	*H*	*E*
Clindamycin	*Capsule*	*150 mg*	*H*	*N*
Clindamycin	*Injection*	*150 mg/ml*	*H*	*E*
Pentamidine isethionate	*Powder for injection*	*300 mg*	*RR*	*E*
6.5.5 Antitrypanosomal medicines (African trypanosomiasis)				
6.5.5.1 African trypanosomiasis				
	Specialist medicines			
Nifurtimox	*Tablet*	*120 mg*	*RR*	*E*
Melarsoprol	*Injection*	*36 mg/ml*	*RR*	*E*
Pentamidine isethionate	*Powder for injection*	*200 mg*	*RR*	*E*

MEDICINE	DS	STR	L	C
Suramin sodium	*Powder for injection*	*1 g*	*RR*	*E*
Eflornithine	*Injection*	*200 mg*	*RR*	*E*
7. ANTIMIGRAINE MEDICINES				
7.1 For treatment of acute attacks				
Acetylsalicylic acid	Tablet	300 mg	HC2	N
Diclofenac	Injection	25 mg/ml	HC4	V
Ergotamine	Tablet	1 mg	RR	E
Ibuprofen	Tablet	200 mg	HC3	E
Paracetamol	Tablet	500 mg	HC1	E
	Specialist medicines			
Sumatriptan	*Tablet*	*50 mg*	*RR*	*N*
7.2 For prophylaxis				
Amitriptyline	Tablet	25 mg	HC3	V
Propranolol	Tablet	20 mg	HC4	N
Pizotifen	Tablet	0.5 mg	RR	N
8. ANTINEOPLASTIC AND IMMUNOSUPPRESSIVE MEDICINES				
8.1 Immunosuppressive medicines				
	Specialist medicines			
Azathioprine	*Powder for injection*	*100 mg*	*NR*	*E*
Azathioprine	*Tablet*	*50 mg*	*NR*	*V*
Cyclosporin	*Tablet*	*25 mg*	*NR*	*N*
Cyclosporin	*Capsules*	*100 mg*	*NR*	*N*

MEDICINE	DS	STR	L	C
Cyclosporin	*Concentrate for IV inf*	*50 mg/ml*	*NR*	*N*
8.2 Cytotoxic and adjuvant medicines				
	Specialist medicines			
Anastrozole	*Tablet*	*1 mg*	*RR*	*V*
Bicalutamide	*Tablet*	*50 mg*	*RR*	*N*
Bleomycin	*Powder for injection*	*15 IU*	*RR*	*V*
Calcium folinate (folinic acid)	*Tablet*	*15 mg*	*RR*	*N*
Capecitabine	*Tablet*	*500 mg*	*RR*	*N*
Calcium folinate (folinic acid)	*Injection*	*10 mg/ml*	*NR*	*E*
Carboplatin	*Injection*	*10 mg/ml*	*RR*	*E*
Chlorambucil	*Tablet*	*2 mg*	*RR*	*E*
Cisplatin	*Injection*	*1 mg/ml*	*NR*	*V*
Cyclophosphamide	*Powder for injection*	*1 g*	*NR*	*V*
Cyclophosphamide	*Capsule*	*100 mg*	*NR*	*N*
Cytarabine	*Injection*	*20 mg/ml*	*NR*	*V*
Dacarbazine	*Powder for injection*	*200 mg*	*NR*	*V*
Dactinomycin	*Powder for injection*	*500 µg*	*NR*	*V*
Daunorubicin	*Powder for injection*	*20 mg*	*NR*	*V*
Docetaxel	*Infusion*	*40 mg/ml*	*RR*	*V*

MEDICINE	DS	STR	L	C
Doxorubicin (adriamycin)	*Powder for injection*	*50 mg*	*NR*	*V*
Etoposide	*Injection*	*20 mg/ml*	*NR*	*V*
Filgrastim	*Injection*	*300 µg/ml*		
Fluorouracil	*Injection*	*50 mg/ml*	*NR*	*V*
Gemcitabine	*Powder for injection*	*1 g*	*NR*	*V*
Goserelin	*Injection*	*10.8 mg*	*RR*	*V*
Goserelin	*Injection*	*3.6 mg*	*RR*	*V*
Goserelin	*Implant*	*3.6 mg*	*RR*	*V*
Hydroxycarbamide (hydroxyurea)	*Capsule*	*500 mg*	*RR*	*E*
Ifosfamide-Mesna	*Powder for injection*	*1 g*	*NR*	*V*
L-asparaginase	*Injection*	*10,000 IU*	*NR*	*V*
Irinotecan	*Infusion*	*20 mg/ml*	*NR*	*V*
Mercaptopurine	*Tablet*	*50 mg*	*NR*	*V*
Mustine	*Powder for injection*	*10 mg*	*NR*	*E*
Oxaliplatin	*Injection*	*5 mg/ml*	*NR*	*E*
Paclitaxel	*Powder for injection*	*100 mg*	*NR*	*V*
Procarbazine	*Capsule*	*50 mg*	*NR*	*V*
Rituximab	*Concentrate for IV inf*	*10 mg/ml*	*NR*	*E*
Stilboestrol	*Tablet*	*5 mg*	*RR*	*E*

MEDICINE	DS	STR	L	C
Thalidomide	*Capsule*	*100 mg*		
Thalidomide	*Capsule*	*50 mg*	*NR*	*N*
Temozolamide	*Capsule*	*250 mg*	*NR*	*V*
Thioguanine	*Tablet*	*40 mg*	*NR*	*E*
Vinblastine sulfate	*Powder for injection*	*2 mg*	*NR*	*E*
Vinblastine sulfate	*Powder for injection*	*10 mg*	*NR*	*E*
Vincristine	*Injection*	*1 mg/ml*	*RR*	*V*
8.3 Hormones and antihormones				
Betamethasone	Injection	4 mg/ml	HC4	E
Hydrocortisone sodium succinate	Powder for injection	100 mg	HC4	V
Prednisolone	Tablet	5 mg	HC4	E
	Specialist medicines			
Dexamethasone	Tablet	4 mg	HC4	E
Dexamethasone	Injection	4 mg/ml	H	E
Tamoxifen	Tablet	20 mg	NR	E
9. ANTIPARKINSONISM MEDICINES				
	Specialist medicines			
Levodopa-carbidopa	*Tablet*	*100 mg + 25 mg*	*RR*	*E*

MEDICINE	DS	STR	L	C
10. MEDICINES AFFECTING THE BLOOD				
10.1 Antianaemia medicines				
Ferrous sulphate	Tablet	200 mg	HC2	N
Ferrous sulphate + folic acid	Tablet	200 mg + 500 µg	HC2	V
Folic acid	Tablet	5 mg	HC2	E
Hydroxocobalamin (vitamin B12)	Injection	1 mg/ml	RR	E
10.2 Medicines affecting coagulation				
Enoxaparin	Injection	100 mg/ml	H	N
Heparin	Injection	5000 IU/ml	H	V
Phytomenadione (vitamin K1)	Injection	1 mg/ml	HC3	V
Phytomenadione (vitamin K1)	Injection	10 mg/ml	HC4	E
Warfarin	Tablet	5 mg	H	V
	Specialist medicines			
Streptokinase	*Powder for injection*	*250,000 IU*	*RR*	*V*
Tranexamic acid	*Tablet*	*500 mg*	*H*	*N*
10.3 Other medicines for haemoglobinopathies				
Hydroxycarbamide (hydroxyurea)	Capsule	500 mg	RR	E

MEDICINE	DS	STR	L	C
11. BLOOD PRODUCTS OF HUMAN ORIGIN AND PLASMA SUBSTITUTES				
11.1 Blood and blood components				
Fresh-frozen plasma			RR	E
Packed red cells			HC4	V
Whole blood			HC4	V
Platelets			RR	E
11.1.1 Blood coagulation factors				
	Specialist medicines			
Factor VIII concentrate	*Dried powder for injection*	*1,500 IU*	*NR*	*N*
Factor IX (coagulation factors II, VII, IX, X) complex concentrate	*Dried powder for injection*	*1,000 IU*	*RR*	*N*
11.2 Plasma substitutes				
Dextran 70	IV infusion	6%	HC4	N
Polygeline solution	IV infusion	3.5%	HC4	N
	Specialist medicines			
Albumin, human	*IV infusion*	*25%*	*H*	*E*
12. CARDIOVASCULAR MEDICINES				
12.1 Antianginal medicines				
Atenolol	Tablet	50 mg	H	V
Glyceryl trinitrate *acute attacks	Tablet (sublingual)	500 µg	H	V

MEDICINE	DS	STR	L	C
Acetylsalicylic acid *acute attacks	Tablet	300 mg	HC2	V
	Specialist medicines			
Isosorbide dinitrate	*Tablet*	*30 mg*	*RR*	*N*
12.2 Antiarrhythmic medicines				
Adenosine	Injection	3 mg/ml	RR	E
Atenolol	Tablet	50 mg	H	N
Propranolol	Tablet	40 mg	HC4	E
	Specialist medicines			
Amiodarone	*Tablet*	*200 mg*	*NR*	*N*
Amiodarone	*Sterile concentrate*	*50 mg/ml*	*NR*	*E*
Lignocaine	*Injection*	*20 mg/ml*	*RR*	*E*
Procainamide	*Tablet*	*250 mg*	*RR*	*N*
12.3 Antihypertensive medicines				
Atenolol	Tablet	50 mg	H	N
Bendroflu-methiazide	Tablet	5 mg	HC3	E
Captopril	Tablet	25 mg	HC4	E
Enalapril	Tablet	5 mg	HC4	N
Hydralazine	Tablet	50 mg	HC4	E
Hydralazine	Powder for injection	20 mg	HC4	V
Losartan	Tablet	50 mg	H	N
Methyldopa	Tablet	250 mg	HC3	E
Nifedipine	Tablet	20 mg	HC3	E

MEDICINE	DS	STR	L	C
Propranolol	Tablet	40 mg	HC4	E
	Specialist medicines			
Amlodipine	*Tablet*	*10 mg*	*RR*	*E*
Candesartan cilexetil	*Tablet*	*8 mg*	*NR*	*N*
Labetalol	*Injection*	*5 mg/ml*	*RR*	*V*
12.4 Medicines used in heart failure				
Digoxin	Tablet	62.5 µg	HC4	E
Digoxin	Tablet	250 µg	HC4	E
Digoxin	Injection	250 µg/ml	H	N
Enalapril	Tablet	5 mg	HC4	V
Captopril	Tablet	25 mg	H	E
Carvedilol	Tablet	6.25 mg	H	E
Lisinopril	Tablet	10 mg	H	E
	Specialist medicines			
Bisoprolol	*Tablet*		*RR*	*N*
Dobutamine	*Concentrate for IV inf*	*12.5 mg/ml*	*NR*	*V*
Epinephrine (adrenaline)	*Injection*	*1 mg/ml*	*HC4*	*V*
Norepinephrine (noradrenaline)	*Injection*	*2 mg/ml*	*RR*	*V*
12.5 Antithrombotic medicines				
12.5.1 Anti-platelet medicines				
Acetylsalicylic acid	Tablet	75 mg	HC3	E

MEDICINE	DS	STR	L	C
	Specialist medicines			
Clopidogrel	*Tablet*	*75 mg*	*NR*	*N*
12.6 Lipid-lowering agents				
Atorvastatin	Tablet	40 mg	H	N
13. DERMATOLOGICAL MEDICINES (topical)				
13.1 Antifungal medicines				
Benzoic acid + salicylic acid	Ointment	6% + 3%	HC2	N
Clotrimazole	Cream	1%	HC3	E
Miconazole	Cream	2%	H	N
13.2 Anti-infective medicines				
Chlorhexidine	Cream	5%	HC4	N
Chlorhexidine	Cutaneous solution	2%	HC2	N
Framycetin	Impregnated gauze	1%	HC3	N
Iodine	Tincture	2%	HC2 (HC1)	N
Methylrosanilinium chloride (gentian violet)	Paint	0.50%	HC2	E
Potassium permanganate	Aqueous solution	0.01% (1:10,000)	HC4	N
Silver sulphadiazine	Cream	1%	HC2	N
13.3 Anti-inflammatory and antipruritic medicines				
Betamethasone	Cream/ointment	0.10%	HC4	N
Calamine	Lotion	15%	HC2	E

MEDICINE	DS	STR	L	C
Diclofenac	Gel	1%	RR	N
Hydrocortisone	Cream/ointment	1%	HC3	N
13.4 Medicines affecting skin differentiation and proliferation				
Benzoylperoxide	Lotion/ Cream	5%	HC4	N
Coal tar	Solution	5%	HC4	N
Podophyllum resin	Solution	15%	HC4	E
13.5 Scabicides and pediculicides				
Benzyl benzoate	Application	25%	HC2	N
Ivermectin	Tablet	6 mg	HC3	E
13.6 Medicines for tungiasis (Jiggers)				
Benzyl benzoate	Lotion	25%	HC2	N
Potassium permanganate	Aqueous solution	0.05%	HC2	N
14. DIAGNOSTIC AGENTS				
14.1 Ophthalmic medicines				
Fluorescein sodium	Eye drops	1%	HC4	V
Physostigmine	Eye drops	0.25%	RR	N
Rose Bengal	Eye drops	1%	HC4	N
14.2 Radiocontrast media (only specialist treatment)				
	Specialist medicines			
Barium sulphate	*Powder in water*	*75%*	*RR*	*N*
Iopramide 370, non-ionic	*Injection*	*100 ml*	*RR*	*N*
Iopramide 370, non-ionic	*Injection*	*50 ml*	*RR*	*N*

MEDICINE	DS	STR	L	C
Iohexol 350, non-ionic	*Injection*	*50 ml*	*RR*	*N*
Iohexol 350, non-ionic	*Injection*	*100 ml*	*RR*	*N*
15. DISINFECTANTS AND ANTISEPTICS				
15.1 Antiseptics				
Cetrimide + chlorhexidine	Solution	0.15% + 0.015%	HC2	N
Chlorhexidine	Solution	0.05%	HC2	N
Chlorhexidine gluconate	Solution	20%	HC2	N
Chlorhexidine gluconate	Mouthwash	0.20%	HC2	N
Hydrogen peroxide	Solution	6%	HC2	N
Povidone iodine	Solution	10% (equiv. 1% iodine)	HC3	N
Povidone iodine	Solution	2%	HC3	N
Surgical spirit (ethanol)	Solution	70%	HC4	N
15.2 Disinfectants				
Alcohol hand rub	Solution	70%	HC2 (HC1)	E
Calcium or sodium hypochlorite	Solution	5%	HC2 (HC1)	E
Glutaraldehyde	Solution	2%	H	N

MEDICINE	DS	STR	L	C
16. DIURETICS				
Bendroflu-methiazide	Tablet	5 mg	HC3	E
Furosemide	Injection	10 mg/ml	HC4	V
Furosemide	Tablet	40 mg	HC4	E
Spironolactone	Tablet	50 mg	H	N
	Specialist medicines			
Mannitol	*IV infusion*	*20%*	*RR*	*E*
17. GASTROINTESTINAL MEDICINES				
17.1 Antacids and antiulcer medicines				
Magnesium trisilicate compound, BP	Tablet	370 mg	HC2	E
Omeprazole	Tablet	20 mg	HC3	V
Ranitidine	Injection	25 mg/ml	H	E
	Specialist medicines			
Rabeprazole	*Injection*	*20 mg*	*NR*	*N*
17.2 Antiemetic medicines				
Metoclopramide	Tablet	10 mg	HC4	E
Metoclopramide	Injection	5 mg/ml	HC4	E
Chlorpromazine	Tablet	25 mg	HC3	N
Chlorpromazine	Injection	25 mg/ml	HC3	E
Promethazine	Tablet	25 mg	HC2	E
Promethazine	Injection	25 mg/ml	HC4	V

MEDICINE	DS	STR	L	C
	Specialist medicines			
Domperidone	*Tablet*	*10 mg*	*H*	*N*
Domperidone	*Suspension*	*5 mg/5ml*	*H*	*N*
Ondansetron	*Tablet*	*4 mg*	*RR*	*E*
Ondansetron	*Injection*	*2 mg/ml*	*RR*	*E*
Granisetron	*Injection*	*1 mg/ml*	*RR*	*N*
17.3 Anti-inflammatory and anti-haemorrhoids medicines				
Bismuth subgallate compound BP	Suppository	320 mg	HC4	N
17.4 Laxatives				
Bisacodyl	Paediatric suppository	5 mg	HC3	N
Bisacodyl	Tablet	5 mg	HC3	E
Lactulose	Solution	3.1-3.7 g/5 mL	H	N
Liquid paraffin	Oral emulsion		H	N
17.5 Medicines used in diarrhoea				
17.5.1 Oral rehydration				
Oral rehydration salts	Oral powder for solution	WHO formula	HC1	V
17.5.2 Medicines for diarrhoea				
Zinc sulphate	Tablet (dispersible)	20 mg	HC1	V
Codeine	Tablet	30 mg	HC4	N

MEDICINE	DS	STR	L	C
17.6 Antispasmodics				
	Specialist medicines			
Hyoscine	*Injection*	*20 mg/ml*	*RR*	*N*
Propantheline	*Tablet*	*15 mg*	*H*	*N*
18. HORMONES, OTHER ENDOCRINE MEDICINES AND CONTRACEPTIVES				
18.1 Adrenal hormones and synthetic substitutes				
Dexamethasone	Tablet	0.5 mg	H	N
Dexamethasone	Injection	4 mg/ml	HC4	E
Hydrocortisone sodium succinate	Powder for injection	100 mg	H	V
Prednisolone	Tablet	5 mg	H	V
	Specialist medicines			
ACTH (corticotrophin)	*Powder for injection*	*40 IU*	*RR*	*N*
Cortisone acetate	*Tablet*	*25 mg*	*RR*	*N*
Methyl-prednisolone	*Powder for injection*	*500 mg*	*RR*	*N*
Triamcinolone	*Injection*	*40 mg/ml*	*RR*	*N*
18.2 Androgens				
	Specialist medicines			
Methyltestosterone	*Tablet*	*5 mg*	*RR*	*N*
Testosterone enantate	*Injection (oily)*	*250 mg/ml*	*RR*	*N*

MEDICINE	DS	STR	L	C
18.3 Contraceptives				
18.3.1 Oral hormonal contraceptives				
Ethinylestradiol	Tablet	50 µg	HC2	E
Ethinylestradiol + levonorgestrel	Tablet	30 µg + 150 µg	HC2	E
Ethinylestradiol + levonorgestrel	Tablet	50 µg + 250 µg	HC2	E
Ethinylestradiol + norethisterone	Tablet	50 µg + 1 mg	HC2	E
Ethinylestradiol + norgestrel	Tablet	30 µg + 300 µg	HC2 (HC1)	V
Levonorgestrel	Tablet	750 µg	HC2 (HC1)	V
Norgestrel	Tablet	0.075 mg	HC2	V
18.3.2 Injectable hormonal contraceptives				
Medroxyprogesterone acetate (DMPA-IM)	Injection (aqueous suspension)	150 mg/ml	HC2	V
Medroxyprogesterone acetate (Depot) (DMPA-SC)	Subcutaneous injection	104 mg/ml	HC2	V
18.3.3 Intrauterine devices				
Copper containing device	Copper T380A	–	HC3	V
	Specialist medicines			
Levonorgestrel-releasing intrauterine system	*IUD*	*52 mg*	*HC3*	*N*

MEDICINE	DS	STR	L	C
18.3.4 Barrier methods				
Condoms (male)	Latex		HC2	V
Condoms (female)	Polyurethane or nitrile		HC2	V
18.3.5 Implantable contraceptives				
Etonogestrel	Implant (1 radiopaque rod)	68 mg	HC3	V
Levonorgestrel	Implant (2 silicone rods)	150 mg	HC3	E
18.3.6 Others				
Moon beads	Beads	–	HC2	N
18.4 Oestrogens				
	Specialist medicines			
Stilboestrol	*Tablet*	*5 mg*	*RR*	*N*
18.5 Insulins and medicines used for diabetes				
Biphasic isophane insulin (soluble + isophane insulin	Injection	30% + 70% in 100 IU/ml	HC4	V
Insulin isophane	Injection	100 IU/ml	HC4	V
Soluble insulin	Injection	100 IU/ml	HC4	V
Glibenclamide	Tablet	5 mg	HC4	E
Glimepiride	Tablet	2 mg	H	E
Metformin	Tablet	500 mg	HC3	V
Pioglitazone	Tablet	30 mg	RR	N

MEDICINE	DS	STR	L	C
18.6 Ovulation inducers				
	Specialist medicines			
Clomifene	*Tablet*	*50 mg*	*RR*	*N*
18.7 Progestogens				
	Specialist medicines			
Norethisterone	*Tablet*	*5 mg*	*RR*	*E*
18.8 Thyroid hormones and antithyroid medicines				
Carbimazole	Tablet	5 mg	H	V
Levothyroxine (thyroxine)	Tablet	100 µg	H	V
	Specialist medicines			
Iodine (I) + potassium iodide (Lugol's)	*Oral solution*	*5% + 10%, 130 mg total iodine/ml*	*RR*	*E*
19. IMMUNOLOGICALS				
19.1 Diagnostic agents				
Tuberculin purified protein derivative (PPD)	Injection	100 IU/ml	HC4	N
19.2 Sera and immunoglobulins				
Anti-D immunoglobulin, human	Injection	250 µg/ml	RR	E
Anti-Tetanus immunoglobulin, human (TIG)	Injection	500 IU	HC4	V

MEDICINE	DS	STR	L	C
Anti-Rabies immunoglobulin, human (RIG)	Injection	150 IU/ml	H	V
Rabies vaccine, human diploid	Injection	Purified VERO cell culture ≥2.5 IU/ 0.5 ml	H	V
Antitetanus serum (tetanus antitoxin)	HC4	1500 IU	HC4	N
Antivenom sera polyvalent (East and Central Africa)	Injection	Mixture of 11 *Bitis, Naja, Echis* and *Dendroaspis spp* in 10 ml vial	H	E
	Specialist medicines			
Normal immuno-globulin, human	*Injection*	*16%*	*NR*	*N*
Antiscorpion serum	*Injection*	*Mixture of* Androctonus, Leiurus *and* Buthus spp *in 10 ml vial*	*RR*	*N*
19.3 Vaccines				
BCG vaccine (freeze dried)	Injection	1.5 mg vial with 1.5 ml diluents	HC2	V

MEDICINE	DS	STR	L	C
Diphtheria-pertussis-tetanus (DPT)	Suspension for injection	*Diphtheria, Tetanus Toxoid; Borditella Pertussis* (20-dose vial (10 ml)	HC2	V
Diphtheria-pertussis-tetanus-hepatitis B-*haemophilus influenzae* B (DPT HepB-Hib)	Injection	2-dose vial	HC2	V
Measles vaccine, live attenuated	Powder for injection	10 x 0.5 ml dose vial + diluent	HC2	V
Pneumococcal polysaccharide conjugate vaccine (adsorbed)	Injection	0.5 ml/dose in 2 dose vial	HC2	V
Poliomyelitis vaccine, live attenuated	Oral solution	20-dose vial (2 ml)	HC2	V
Poliomyelitis vaccine, inactivated	Injection	0.5 ml	HC2	V
Rotavirus vaccine, live attenuated	Oral suspension	1.5 ml prefilled oral syringe	HC2	V
Tetanus toxoid	Injection	≥40 IU/ 0.5 ml	HC2	V

MEDICINE	DS	STR	L	C
Anthrax vaccine	Injection	0.125 ml antigens)/ 0.5 ml dose	RR	V
Hepatitis B vaccine	Intradermal injection	Single-dose vial	HC4	V
Human papilloma virus vaccine (type 16 + type 18 capsid protein)	Injection	40 µg/ml + 40 µ/ml	HC2	V
Meningococcal vaccine conjugate (A+C)	Injection	0.5 ml-vial	HC4	E
Yellow fever vaccine, live	Injection	1,000 LD50 units/0.5 ml	H	E
20. MUSCLE RELAXANTS (PERIPHERALLY-ACTING) AND CHOLINESTERASE INHIBITORS				
Suxamethonium	Injection	50 mg/ml	HC4	V
Atracurium besilate	Injection	10 mg/ml	H	V
Rocuronium bromide	Injection	10 mg/ml	H	E
Specialist medicines				
Cisatracurium	*Injection*	*2 mg/ml*	*H*	*N*
Neostigmine	*Injection*	*2.5 mg/ml*	*HC4*	*E*
Pancuronium bromide	*Injection*	*2 mg/ml*	*HC4*	*V*
Vecuronium bromide	*Powder for injection*	*10 mg*	*NR*	*V*

MEDICINE	DS	STR	L	C
21. OPHTHALMOLOGICAL PREPARATIONS				
21.1 Anti-infective agents				
Chloramphenicol	Eye drops/ Ointment	0.50%	HC2	E
Ciprofloxacin	Eye/ear drops	0.30%	HC3	N
Gentamicin	Eye/ear drops)	0.30%	HC2	E
Povidone-iodine	Eye drops	5%	RR	E
Povidone-iodine	Eye drops	10%	RR	N
Tetracycline	Eye ointment	1%	HC2	V
Tobramycin	Eye drops	0.3%	RR	E
21.2 Anti-infective and anti-inflammatory agents				
Dexamethasone + tobramycin	Topical	0.1% + 0.3%	RR	E
Hydrocortisone + oxytetracycline + polymyxin B	Eye drops	1.5% + 0.5% + 10,000 IU/ ml	HC4	N
Neomycin + Betamethasone	Eye drops	0.5%+0.1%	RR	E
21.3 Anti-inflammatory medicines				
Betamethasone	Eye drops	0.10%	HC2	E
Dexamethasone	Eye drops	0.10%	RR	E
Hydrocortisone	Eye drops	1%	HC4	N
Prednisolone	Eye drops	0.50%	HC4	E
Sodium chromoglycate	Eye drops	2%	RR	N

MEDICINE	DS	STR	L	C
21.4 Antifungal medicines				
Econazole	Eye drops	2%	RR	N
Natamycin	Ophthalmic suspension	5%	RR	E
21.5 Antiviral medicines				
Aciclovir	Eye ointment	3%	HC4	E
21.6 Local anaesthetics				
Bupivacaine	Injection	0.50%	H	E
Hyaluronidase	Injection (powder for reconstitu-tion)	1,500 IU	RR	E
Tetracaine (amethocaine)	Eye drops	0.50%	H	E
Tetracaine (amethocaine)	Eye drops	1%	HC4	N
21.7 Miotics and antiglaucoma medicines				
Acetazolamide	Tablet	250 mg	RR	E
Diethyl-carbamazine	Tablet	100 mg	RR	N
Pilocarpine	Eye drops	2%	RR	N
Pilocarpine	Eye drops	4%	RR	N
Pilocarpine, intracameral	Injection	0.50%	RR	E
Sodium hyaluronate	Intraocular liquid	12 mg/ml	RR	N
Timolol maleate	Eye drops	0.25%	RR	N
Timolol maleate	Eye drops	0.50%	RR	N

MEDICINE	DS	STR	L	C
Tryptan blue	Ophthalmic solution	0.06%	RR	N
21.8 Mydriatics				
Atropine	Eye drops	1%	HC4	N
Cyclopentolate	Eye drops	1%	HC4	N
Phenylephrine	Eye drops	10%	HC4	N
21.9 Anti-metabolites				
Fluorouracil	Injection	50 mg/ml	RR	N
Mitomycin	Powder for injection	20 mg	RR	N
21.10 Lubricants				
Hydroxyethylcellulose (artifical tears)	Eye drops	0.44%	RR	E
21.11 Astringents				
Zinc sulphate	Eye Drops	0.20%	RR	N
22. OXYTOCICS AND ANTI-OXYTOCICS				
22.1 Oxytocics				
Misoprostol	Tablet	200 µg	HC2	V
Oxytocin	Injection	10 IU/ml	HC3	V
22.2 Anti-oxytocics (tocolytics)				
Nifedipine	Tablet (sub-lingual)	10 mg	HC3	E
23. PERITONEAL AND HAEMODIALYSIS SOLUTIONS				
Liquid concentrate for haemodialysis	Liquid	32 mEq/L bicarbonate + 5 mEq/L acetate	RR	V

MEDICINE	DS	STR	L	C
Peritoneal dialysis solution	Solution	2.5% (glucose)	RR	E
Peritoneal dialysis solution	Solution	4.25% (glucose)	RR	E
	Specialist medicines			
Peritoneal dialysis solution	*Solution*	*1.5% (glucose)*	*RR*	*V*
Liquid concentrate for haemodialysis (bicarbonate + acetate)	*Liquid*	*33 mEq/l + 4 mEq/l*	*RR*	*V*
24. MEDICINES FOR MENTAL AND BEHAVIOURAL DISORDERS				
24.1 Medicines used in psychotic disorders				
Benzhexol	Tablet	2 mg	HC2	V
Chlorpromazine	Tablet	25 mg	HC2	N
Chlorpromazine	Tablet	100 mg	HC2	V
Chlorpromazine	Injection	25 mg/ml	HC4	V
Diazepam	Injection	5 mg/ml	HC4	V
Diazepam	Rectal	2 mg/ml	HC3	V
Fluphenazine decanoate	Injection (oily)	25 mg/ml	HC4	E
Haloperidol	Tablet	5 mg	HC4	E
Haloperidol	Tablet	10 mg	HC4	V
Haloperidol	Injection	5 mg/ml	HC4	V
Trifluoperazine	Tablet	5 mg	H	E

MEDICINE	DS	STR	L	C
	Specialist medicines			
Haloperidol decanoate	*Injection (oily)*	*100 mg/ml*	*RR*	*V*
Quetiapine	*Tablet*	*100 mg*	*NR*	*E*
Methylphenidate	*Tablet*	*5 mg*	*RR*	*E*
Olanzapine	*Tablet*	*10 mg*	*RR*	*N*
Risperidone	*Tablet*	*2 mg*	*RR*	*E*
Zuclopenthixol decanoate	*Injection (oily)*	*200 mg/ml*	*NR*	*N*
24.2 Medicines used in mood disorders				
24.2.1 Medicines used in depressive disorders				
Amitriptyline	Tablet	25 mg	HC3	V
Imipramine	Tablet	25 mg	HC4	N
Fluoxetine	Capsule	20 mg	HC4	V
24.2.2 Medicines used in bipolar disorders				
	Specialist medicines			
Carbamazepine	*Tablet*	*200 mg*	*H*	*V*
Lithium carbonate	*Tablet*	*400 mg*	*NR*	*E*
Lamotrigine	*Tablet*	*100 mg*	*NR*	*N*
Valproate	*Tablet*	*500 mg*	*RR*	*E*
24.3 Medicines for anxiety disorders				
Diazepam	Tablet	5 mg	HC2	V
Fluoxetine	Capsule	20 mg	HC4	V
	Specialist medicines			
Alprazolam	*Tablet*	*0.5 mg*	*RR*	*N*
Clonazepam	*Tablet*	*2 mg*	*RR*	*E*

MEDICINE	DS	STR	L	C
24.4 Medicines used for obsessive compulsive disorder				
24.5 Medicines for disorders due to psychoactive substance use				
	Specialist medicines			
Naltrexone	*Tablet*	*50 mg*	*RR*	*E*
Buprenorphine	*Tablet*	*400 µg*	*NR*	*E*
Clonidine	*Tablet*	*100 µg*	*NR*	*E*
Nicotine replacement therapy	*Patch*	*7 mg/24 hrs*	*NR*	*N*
Nicotine replacement therapy	*Gum*	*2 mg*	*NR*	*N*
25. MEDICINES ACTING ON THE RESPIRATORY TRACT				
25.1 Antiasthmatic and medicines for chronic obstructive pulmonary disease				
Salbutamol	Nebuliser solution	5 mg/ml	HC4	V
Salbutamol	Aerosol inhalation	100 µg/ metered inhalation	HC3	V
Salbutamol	Injection	0.5 mg/ml	H	N
Salbutamol	Tablet	4 mg	HC3	N
Aminophylline	Injection	25 mg/ml	HC4	N
Aminophylline	Tablet	100 mg	HC4	N
Beclomethasone	Aerosol inhalation	50 µg/ metered dose inhalation	HC4	E

MEDICINE	DS	STR	L	C
Epinephrine (adrenaline)	Injection	1 mg/ml	HC4	V
Formeterol	Aerosol inhalation	12 µg/ meterd dose inhalation	RR	N
Hydrocortisone sodium succinate	Powder for injection	100 mg	HC4	V
Ipratropium bromide	Nebuliser solution	250 µg/ml	HC4	V
Ipratropium bromide	Aerosol inhalation	20 µg/ metered dose inhalation	H	E
Prednisolone	Tablet	5 mg	HC3	V

26. SOLUTIONS CORRECTING WATER, ELECTROLYTE AND ACID-BASE DISTURBANCES				
26.1 Oral				
Oral rehydration salts	Powder for 1 Litre	WHO formula	HC2 (HC1)	V
ReSoMal	Powder for 1 Litre	WHO formula	H	E
26.2 Parenteral				
Calcium chloride (dihydrate)	Injection	10%	RR	N

MEDICINE	DS	STR	L	C
Calcium gluconate	Injection	10%	RR	E
Darrow's solution	Injection	½ strength in 5% glucose	HC3	V
Glucose (Dextrose)	IV infusion	5%	HC3	V
Glucose (Dextrose)	IV infusion	50%	HC3	V
Potassium chloride	Sterile concentrate	150 mg/ml	H	V
Sodium bicarbonate	IV injection	8.4%	RR	E
Sodium chloride (Normal saline)	IV infusion	0.9%	HC3	V
Sodium lactate compound (Hartmann's/ Ringer's lactate solution)	IV infusion	BP formula	HC3	E
26.3 Miscellaneous				
Water for injection	Injection	10 ml	HC2	V
27. VITAMINS AND MINERALS				
Calcium lactate	Tablet	300 mg	HC3	N
Multivitamin	Syrup	100 ml	HC2 (HC1)	N
Multivitamin	Tablet	BPC 73	HC2 (HC1)	N
Potassium chloride	Tablet	600 mg	H	E
Pyridoxine (vitamin B_6)	Tablet	25 mg	HC3	E
Retinol (vitamin A)	Capsule	100,000 IU	HC2	E

MEDICINE	DS	STR	L	C
Retinol (vitamin A)	Capsule	200,000 IU	HC2	V
Thiamine	Tablet	100 mg	HC4	E
Thiamine	Injection	100 mg/ml	H	E
Vitamin B compound (B3+B2+B1)	Tablet	15 mg + 1 mg + 1 mg	RR	V
Vitamin B compound (strong) (B5+B6+B2+B1)	Tablet	20 mg + 2 mg + 2 mg + 5 mg	HC4	N
	Specialist medicines			
Ergocalciferol (vitamin D2)	*Tablet*	*250 µg (10,000 IU)*	*NR*	*E*
Hydroxocobalamin (vitamin B12)	*Injection*	*1 mg/ml*	*H*	*E*
28. EAR, NOSE AND THROAT MEDICINES				
28.1 Ear preparations				
Betamethasone	Eye/ear drops	0.10%	HC3	E
Chloramphenicol	Ear drops	0.5%	HC2	E
Ciprofloxacin	Ear drops	0.3%	HC3	N
Clotrimazole	Solution	1%	HC4	N
Gentamicin	Ear drops	0.30%	HC4	V
28.2 Nasal preparations				
Beclomethasone	Nasal spray (aqueous suspension)	50 µg/ metered spray	H	N
Ephedrine	Nasal drops	1%	H	E

MEDICINE	DS	STR	L	C
Lignocaine + epinephrine (adrenaline)	Nasal drops	2% + 1:100,000	RR	N
Xylometazoline	Paediatric nasal drops	0.05%	H	E
Xylometazoline	Nasal drops	0.10%	H	E
28.3 Oropharyngeal preparations				
Chlorhexidine	Solution	0.2%	HC2	N
Hydrogen peroxide	Solution	6%	HC2	N
Miconazole	Oral gel	24 mg/ml (20 mg/g)	HC4	N
Povidone-iodine	Mouthwash	1%	HC3	N
Triamcinolone acetonide	Oral paste	0.10%	RR	N
29. SPECIFIC MEDICINES FOR NEONATAL CARE				
29.1 Medicines administered to the neonate				
Chlorhexidine digluconate	Gel	7.1% (equivalent to 4% chlrohexidine)	HC2 (HC1)	V
Tetracycline	Eye ointment	1%	HC2	V
Vitamin K	Injection	1 mg/ml	HC3	V
29.2 Medicines administered to the mother				
Dexamethasone	Injection	4 mg/ml	HC4	V
30. MEDICINES FOR DISEASES OF JOINTS				
30.1 Medicines used to treat gout				
Allopurinol	Tablet	100 mg	H	E

MEDICINE	DS	STR	L	C
Colchicine	Tablet	500 µg	H	E
30.2 Disease-modifying agents used in rheumatoid disorders (DMARDS)				
Chloroquine sulphate or phosphate	Tablet	150 mg	RR	E
	Specialist medicines			
Methotrexate	*Tablet*	*2.5 mg*	*RR*	*E*
Methotrexate	*Injection*	*50 mg/ml*	*NR*	*E*
31. MEDICINES FOR NEUROSURGICAL USE				
31.1 For cerebral metabolism/perfusion				
	Specialist medicines			
Cerebrolysin	*Injection*	*5 ml*	*NR*	*E*
Piracetam	*Tablet*	*800 mg*	*NR*	*E*
Piracetam	*Injection*	*125 mg/ml*	*NR*	*E*
32. NUTRITION				
Formula 75	Powder	75 kCal + 0.9g protein/ 100ml	H	V
Formula 100	Powder	100 kCal + 2.9g protein/ 100ml	H	E

MEDICINE	DS	STR	L	C
Ready to use therapeutic-feeds (RUTF)	Paste	30% full fat milk, 28% sugar, 15% vegetable oil, 15% peanut butter, 1.6% mineral vitamin mix	HC2 (HC1)	E
Combined mineral vitamin mix	Powder	Ka, Mg + other essential minerals	HC4	E
		Specialist medicines		
Amino acids (paediatric)	*Injection*	*10%*	*NR*	*N*
Fat emulsion	*Injection (emulsion)*	*20%*	*NR*	*N*
Starch emulsion	*Injection (emulsion)*	*80% oil in water*	*NR*	*N*

Appendix 4

National Laboratory Test Menu

The test menu was developed by Ministry of Health/Uganda National Health Laboratory Services (UNHLS). It is a list of tests that are available at the specified level of health care. The laboratory system of Uganda is designed to support the minimum health care package for each level of care, with complexity of tests increasing with the level of care.

The laboratory test menu has been included in UCG 2016, in order to guide clinicians about the laboratory services available at each level of health care, and where to refer a patient in need of a particular test.

The National Laboratory Test Menu	
HEALTH CENTER II	
Serology	Pregnancy Test
Hepatitis B Test	Syphilis Test
HIV testing	**Biochemistry**
Malaria Test	Rapid Blood Sugar

ADDITIONAL TESTS FOR HEALTH CENTER III	
Haematology	Urobilinogen
Haemoglobin estimation	Glucose
Blood film comments	Ketones (Acetoacetic acid)
Bleeding Time	Specific Gravity
Clotting Time	pH
Differential count	Blood

Sickle cell test	Protein (Albumin)
Sickle cell screening test	Nitrite
Plasmin Inhibitor	Leukocytes in urine
Erythrocyte sedimentation rate	**Microbiology**
Blood Transfusion	AFB test
ABO grouping	Stool analysis
Rh grouping	Urinalysis
Serology	**Parasitology**
Cryptoccocal Antigen test	Malaria test
Brucella agglutinin test	Filaria test
Rheumatoid factor	Leishmania test
TB LAM Rapid Test	Trypanosoma test
Typhoid test	Skin Snip Test
Helicobacter pylori IgG	**Immunology /Molecular**
Hepatitis B rapid test	CD4,CD3,CD8 Counts and Ratios
Hepatitis C rapid test	CD3/CD8 %
Biochemistry	**Referral Tests**
Rapid Blood Sugar	DNA PCR –EID (Emerging Infectious Diseases)
Urine Chemistry	RNA PCR -VL
Bilirubin	

ADDITIONAL TESTS FOR HC IV	
Haematology	Indirect bilirubin

Full blood count	Total protein
Coagulation Tests	**RFTs**
Thrombin clotting time (TT)	Urea
Prothrombin time (PT)	Creatinine
Blood Transfusion	**Electrolytes**
Compatibility testing	Sodium
Serology	Potassium
Infectious Disease	Chloride
HBcAg IgG	**Microbiology**
HBeAg IgG	**Swab analysis**
Biochemistry	High Vaginal Swab (HVS) analysis
LFTS	**Pus Swab**
SGOT (AST)	Wound swab analysis
SGPT (ALT)	CSF Analysis
ALP	**Immunology /Molecular**
Direct bilirubin	Gene Xpert
Total Bilirubin	

ADDITIONAL TESTS FOR GENERAL DISTRICT HOSPITALS	
Haematology	Free T4
Blood Film comment	Total T4
Coagulation Tests	Total T3
Thrombin time in the presence of Protamine Sulphate	TSH (Thyroid Stimulating Hormone)

Activated partial Thromboplastin Time (APTT)	**Fertility Hormones**
Fibrinogen test (Modified Clauss Assay)	Follicle Stimulating Hormone (FSH)
Plasmin Inhibitor	Luteinizing Hormone (LH)
Lupus erythromatosous	Cortisol
Platelet function tests	Progesterone
Thin film test	Testosterone
Blood Transfusion	Oestrogen
Blood Transfusion Services	**Tumour Markers**
Direct Coombs test	Alpha fetoprotein
Indirect Coombs test	**Pancreatic function tests**
Immediate Spin Cross Match (ISCM)	Amylase
Serology	Uric Acid
Anti Streptolysin O-Test (ASOT)	Lipase
Toxoplasma IgG and IgM	**Metabolic Profile**
TB Lam	Iron
Infectious Disease	Lactic acid/Lactate
Toxo IgG/IgM	**CSF Chemistry**
CMV IgG/IgM	Protein
Biochemistry	Glucose
LFTs	Globulins
Albumin	**Microbiology**

GGT	**Bacteriology**
RFTs	Semen analysis
Creatinine Clearance	Occult blood Test
Lipid profile	**Swab analysis**
Triglycerides	Throat analysis
Total Cholesterol	*Eye Swab analysis*
Low Density Lipoproteins (LDL) LDLc	*Nasal swab analysis*
High Density Lipoproteins (HDL) HDLc	*Ear swab*
Cardiac Profile	**Histology/Cytology**
Creatine Kinase (CK-MB) test	PAP Smear
CK- NAC (Total)	HPV Test
Lactate dehydrogenase (LDH	*Biopsy Tissue*
Troponins (C,T,I)	**Mycology**
Thyroid Function Tests	KOH
Free T3	Lactophenol cotton blue

ADDITIONAL TESTS FOR REGIONAL REFERRAL HOSPITALS	
Haematology	Iron
Reticulocyte test	Ferritin
Reticulocyte count	Transferrin
Reticulocyte count(RET#)	G6PD

Immature RBC haemoglobin (RBC – HE)	**Tumour Markers**
Plasmin Inhibitor	Prostate antigen (PSA)
Erythrocyte sedimentation rate	CA 19-9 Ag
D.DIMER	CA 15-3 Ag
CRP test	CA 72-4 Ag
Peripheral Film Comment	**Fertility Hormones**
Lupus erythromatous test	β-Hcg
Blood Transfusion	**Microbiology**
Blood Transfusion Services	**Bacteriology**
Du test	Semen analysis
Weak D Typing	**Swab analysis**
Serology	Blood culture
Measles IgM test	Gastric Aspirate
Rubella IgG and IgM Test	Nasopharyngeal/ oropharyngeal swab
Biochemistry	Cervical/Endo-cervical swab
Extended Electrolytes	Urethral/Rectal Swab
Lithium	Catheter Tips
Calcium	Bacterial identification tests
Magnesium	Bacterial susceptibility testing
Cardiac Profile	Lymph Node Aspirate
hs-CRP	Corneal scraping
ASO (RHD)	**Mycology**

NT Pro BNP	Mycology Culture and sensitivity
Myoglobin	Fungal Identification Tests
Bone profile	**Parasitology**
Calcium	Boleria test
Phosphates	Skin Snip test
Blood gases ABG	**Immunology/Molecular**
HCO3	**Molecular**
PO2	Gene Xpert
PCO2	Viral load for HIV Virus
Metabolic Tests	Viral load for HEPATITIS B Virus
Glycosylated Haemoglobin	TB DNA PCR
Lactic acid	LPA
Vitamin B12	

ADDITIONAL TESTS FOR MULAGO/ BUTABIKA NATIONAL REFERRAL HOSPITAL (NRH)	
Haematology	**Extended Electrolytes**
Reticulocyte test	Bicarbonate
Low Fluorescence Ratio (LFR)	Phosphate
Medium Fluorescence Ratio (MFR)	**Cardiac Profile**
High Fluorescence Ratio (HFR)	hs-CRP

Reticulocyte haemoglobin (RET-HE)	ASO (RHD)
Immature RBC haemoglobin (RBC – HE)	Troponins (C,T,I)
Body fluid analysis	NT Pro BNP
Mono Nuclear cell count(MN)	Myoglobin
Polymorph nuclear cell count (PMN)	**Arterial Blood gases (ABG)**
MN%	Ca2+ (Free & Bound)
PMN%	PH
Total Cell count (TC-BF#)	Hb
PROGENITOR CELL# (HPC)	HCT
Sickle cell test	HCO3
HB electrophoresis test (Sickle cell)	**Metabolic Tests**
HB – F	Folate
HB – S	**Thyroid Function Tests**
HB-A2	TSH
HBA	Anti -TSH-IgG
Immunotyping (light and heavy chains)	PTHH
Platelet function tests	**Fertility Hormones**
Thin film report	β-hCG
Clot retraction test	Oestrone (E1)
Thromboerythrogram	Oestradiol (E2)
Coagulation Tests	Oestriol (E3)

Fibrinogen Antigen Assay by RIA	DHEA
Repitlase Time	DHEA-S
Batroxobin	Prolactin
Factor Assays(II)	**Tumour Markers**
Factor Assays(V)	CEA (Carcino Embryonic Antigen)
Factor Assays(VII)	B- h CG
Factor Assays(VIII)	A-FP (alpha fetoprotein)
Factor Assays(IX)	NSE (Neuro Specific Enolase)
Factor Assays(X)	S-100
One- stage Intrinsic Assay of prekallikren(PKK), and High Molecular Weight Kininogen (HMWK)	Cyfra 21-1
Plasmin Inhibitor	Enolase
D.DIMER	**Microbiology**
CRP test	**Swab analysis**
Peripheral Film Comment	*Gastric Aspirate*
Lupus erythromatous test	*Nasopharyngeal/ oropharyngeal swab*
ANT THROMBIN(AT)	*Cervical /Endo-cervical swab*
Anti-Thrombin Liquid (AT)	*Urethral /Rectal Swab*
ANTI Xa	*Catheter Tips*
Plasmin Inhibitor(PI)	*Lymph Node Aspirate*
Blood Transfusion	*Corneal scraping*
Blood Transfusion services	Skin/Nail/Hair Scrapping

Du test	Special staining identification tests
Anti-body typing	**Mycology**
Immediate Spin Cross Match (ISCM)	Toluidine Blue-O for pneumocystis jiroveci
Weak D Typing	Mycology Culture and sensitivity
Serology	Fungal Identification Tests
Infectious Disease	Fungal susceptibility tests
Rubella IgG/IgM	Lactophenol cotton blue
Measles IgG/IgM	Mycology Grocotts' silver stain
Mumps IgG/IgM	Toluidine Blue-O for pneumocystis jiroveci
HSV 1 IgG/IgM	KOH
HSV 2 IgG/IgM	Histology / Cytology
HZV IgG/IgM	PAS
Biochemistry	Biopsy Tissue
RFTs	Cytological test
Inulin Clearance	Histological test
Cystatin C	

ADDITIONAL TESTS FOR SPECIALISED LABS (NTRL, UBTS, UCI and UHI)	
Haematology (UHI)	Barbiturates
Inhibitor Screening	Benzodiazepines

Clotting factor inhibitor screening based on APTT	Cannabinoides
Ristocetin cofactor Activity/von willebrand factor Activity (VWF:RCo or VWF: Act)	Cocaine
Von willebrand factor Antigen(VWF:Ag)	Ethanol
Von willebrand factor Collagen binding assay (VWF:CB)	Methadone
Factor VIII binding Assay(VWD Normanday)	Methaqualone
VWF Multimer Analysis	Opiates
Bethesda assay	Phencyclidine
F VIII inhibitor test	Propoxyphene
F IX inhibitor test	Tricyclic antidepressants
F XIII activity assay	Lysergic Acid Diethylamide
Lupus anti-coagulant(LAC) and Phospholipid anti-body(APA) tests	**ImmunoHistoChemistry**
Dilute Russell's Viper Venom Time (DRVVT)	A Foeto protein
ANTI THROMBIN III (AT3)	A1 anti chymotrypsin
PROTEIN S	A1 anti trypsin
PROTEIN C	ACE mono
Other Specialized Tests	ACE mono
Protein S(PS)	ACTH

Free Protein S (Free PS)	Actine muscle
Protein S Activity	Actine muscle lisse
Plasminogen (PLG)	Actine muscle spé
Activated Protein C Resistance –Factor test (APCR-V)	Adenovirus
Heparin-UHF (HepXa)	ALK Poumon
Fibrinogen Clauss (Fib-C)	ALK1
α2-Antiplasmin (APL)	Androgen Receptor
PFDP (P-FDP)	Annexin
Hepatocomplex (HPX)	Arginase-1
Chromogenic VIII High (F-VIII Chr H)	B Catenin
Proclot SP (P-ClotSP)	B HCG
Pro-IL Complex (PCX)	BCA 225
Silica Clotting Time (SCT-S, SCT Screen)	BCL2
Homocysteine (HCY, HCYh)	bcl-2
Bone marrow report	BCL6
Blood Transfusion services (NBTS)	BerEP4
Blood Transfusion services	BG8
Serological Testing (Ab, Ag, PCR)	BOB.1
IgG Phenotyping: Fya, Fyb, Jka, JKb, S, s, Cellano	BRAF V600E

IgM Rh-Kell C, c, E, e, K - Vertical	CDX2
High Titer	CD1a,2,3,4,5,7,8,10,13,14,15, 16,20..68
Direct Anti globulin Test(DAT)	CA125
Antibody screen, commonly known as Antibody detection test (ADT)	CA19.9
Group and screen	Cadherin 17
Anti globulin cross match	Calcitonin
Platelet Compatibility Test	Calcitonin
Serological Testing (CMIA, Ab, Ag, PCR)	Caldesmon
Serology	Calponin
Infectious Disease	Calretinin
Helicobacter pylori IgG/IgM	Caveolin-1
HBsAg IgG	CD1a, 2,3,4,5,7,8,10,13,14,15 ,16,20..68
HBcAg IgG	FITC Albumin
HBeAg IgG	FITC C1Q
Toxo IgG/IgM	FITC C3
CMV IgG/IgM	FITC C4
HCV IgG/IgM	FITC Fibrinogen
Rubella IgG/IgM	FITC IgA
Measles IgG/IgM	FITC IgG

Mumps IgG/IgM	FITC IgM
HSV 1 IgG/IgM	FITC Kappa
HSV 2 IgG/IgM	FITC Lambda
HZV IgG/IgM	CK 34BE12
HIV combi	CK AE1
HIV confirmatory	***SPECIFIC PROTEINS***
Anti HBS	ASLO
Anti HAV	APOA1
Anti HAV-IgM	APO B
Other Hormones	C3c
G.H (Gonadotrophic Hormone)	C4
IGF-4	CRP
ACTH	hs CRP
Aldosterone	HbA1c
Cortisol	Cystatin
GnRH (Gonadotropin Realesing Hormone)	Ferritin
Vasopressin	Haptoglobin
Insulin	IgA
Biochemistry (UHI)	IgG
Lipid profile	IgM
vLDLc	Acid Glycoprotein
Cardiac Profile	Antitrypsin
Digitoxin	Microglobulin a1
Digoxin	Microglobulin a2

Pro-BNP	Microglobulin *B2*
PCT	Albumin Urine
IL-6	Myoglobin
Anti-CCP	RF
IgE	Transferrin
Bone Profile	Soluble Transferrin
PTH (Parathyroid Hormone)	Kappa
Vitamin D3	Free Kappa
B-Crosslaps	Lambda
Total P1NP	Free Lambda
N-MID-Oesteocalcin	Antithrombin
Thyroid Function Tests	D-Dimer
TG	**Protein Electrophoresis**
T-Uptake	Serum Protein
Anti-TG	Enzyme
Anti-TPO	Haemoglobin
Fertility Hormones	HbA1C
s-Fit-1	Rheumatology Studies
SHBG (Sex Hormone Binding Protein)	R.F
PlGF	C3
G.H	C4
IGF-1	CRP
ACTH	DsDNA
C-Peptide	Anti – CCP
Cortisol	ANA (antinuclear antibodies)

GnRH	ANCA (anti neutrophil cytoplasmic antibodies)
Insulin	CDT(for Alcohol abuse)
Tumour Markers	**NTRL**
FPSA	Tuberculosis Culture
B- h CG-free	Identification of Mycobacteria tuberculosis complex (MTC)
Cyfra-21-1	Drug susceptibility testing (DST) methods
Drug Abuse	Xpert MTB/RIF test
Amphetamines	

Appendix 5

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