Ministry of Health

Republic of Uganda

UGANDA CLINICAL GUIDELINES

2012

National Guidelines

for

Management of Common Conditions

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Copies may be obtained from the:

Commissioner for Quality Assurance

Ministry of Health, Plot 6 Lourdel Road, PO Box 7272, Kampala, Uganda

Tel (dir): (+256) 41 345322

Fax: (+256) 41 231572

E-mail: dghs@health.go.ug

Website: www.health.go.ug

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Note

Every effort has been made to ensure that the information in this book is accurate, complete, and conforms to 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 which may arise from its use.

ABBREVIATIONS

ACE	Angiontensin converting enzyme
ACT	Artemisinin combined treatment
ANC	Antenatal care
APH	Ante-partum haemorrhage
ARB	Adrenagic receptor blocker
ASOT	Antistreptolysin O titre
ATV/r	Atazanavir/ritonavir
BF	Breastfeed(ing)
BP	Blood pressure
Bpm	Beats/breaths per minute (depending on context)
C&S	Culture and sensitivity
C/S	Caesarean section
CCB	Calcium channel blocker
CCF	Congestive cardiac failure
CNS	Central nervous system
COPD	Chronic obstructive pulmonary disease
CPD	Cephalo-pelvic disproportion
CSF	Cerebro-spinal fluid
CT	Computed tomography
CVP	Central venous pressure

DIC	Disseminated intravascular coagulation
DOTS	Direct observed Treatment Service
DVT	Deep venous thrombosis
ECG	Electrocardiogram
ECT	Electroconvulsive Therapy
EMHSLU	Essential Medicine and Health Supplies List for Uganda
ESR	Erythrocyte sedimentation rate
FB	Foreign body
FFP	Fresh frozen plasma
FP	Family planning
GIT	Gastro-intestinal tract
HAART	Highly active antiretroviral therapy
Hb	Haemoglobin
HCT	Hematocrit
HCW	Health care worker
HGB	Heamoglobin
HIV	Human immunodeficiency virus
HSD	Health sub-district
IM	Intramuscular
IMCI	Integrated Management of Childhood Illness

IMPAC	Integrated Management of Pregnancy & Childbirth
INR	International normalised ratio
IPT	Intermittent preventive treatment (of malaria)
IU	International units
IUD	Intra uterine device
IUGR	Intrauterine growth retardation
IV	Intravenous(ly)
IVP	Intravenous pyelogram
LBW	Low birth weight
LP	Lumbar puncture
LPV/r	Lopinavir/ritonavir
LRTI	Lower respiratory tract infection
max	Maximum
MPs	Malaria parasites
MU	Mega unit = 1,000,000 IU
NF	National formulary
NGT	Nasogastric tube
NND	Neonatal death
OP	Out-patient
PEM	Protein energy malnutrition

PET	Pre-eclampsic toxaemia
PIH	Pregnancy-induced hypertension
PMTCT	Prevention of mother-to-child transmission of HIV
PPF	Procaine penicillin fortified injection
PPH	Postpartum haemorrhage
prn	As required
PROM	Premature (early) rupture of membranes
PSBI	Possible serious bacterial infection
PT	Prothrobin time
RBC	Red blood cells
RDP	Random donor platelets
RH	Rhesus
RPR	Rapid plasma reagin
RTA	Road traffic accident
RTI	Respiratory tract infection
SB	Stillbirth
SC	Subcutaneous(ly)
SD	Standard deviation
SP	Sulfadoxine pyrimethamine
Stat	Immediately
STI	Sexually transmitted infections

SURE	Securing Ugandans' Right to Essential Medicines
TB	Tuberculosis
TIG	Tetanus immunoglobulin human
TL	Tubal ligation
TTV	Tetanus toxoid vaccination
UCG	Uganda Cinical Guidelines
UHSPS	Uganda Health Sector Programme Support
URTI	Upper respiratory tract infection
US	Ultrasound
USAID	United States Agency for International Development
UTI	Urinary tract infection
VCT	Voluntary counselling and testing (for HIV infection)
VP	Jugular venous pressure
WB	Whole blood
WBC	White blood cells
WFA	Weight for age

UNITS OF MEASUREMENT

1 kg	=	1 kilogram	=	1,000g		
1 g	=	1 gram	=	1,000mg	=	0.001kg
1 mg	=	1 milligram	=	1,000µg	=	0.001g
1 µg	=	1 microgram	=	0.001mg		
1 L	=	1 litre	=	1,000mL		
1 mL	=	1 millilitre	=	0.001L		

FOREWORD

The Uganda Clinical Guidelines (UCG) has evolved out of the National Standard Treatment Guidelines 1993. It is designed to provide updated, practical, and useful information for both upper and lower level health facilities on the diagnosis and management of common conditions present in Uganda.

The guidelines also established a strong foundation for the appropriate and cost-effective use of essential medicines.

Inadequate annual budgetary provisions for medicines and medical supplies, together with continuing medicine supply management deficiencies, mean that required essential medicines for public sector health facilities may sometimes be in short supply or even out-of-stock.

Compounding this problem is the frequent misuse of the limited medicines by health professionals and patients. Thus, patients may suffer from inadequate, inappropriate, or complete lack of treatment.

In some cases, the patient may be given a prescription for medicines to be bought at a private pharmacy or drug shop at an unaffordable high cost.

These issues are of great concern to the Ministry of Health and its partners in the sector.

Consequently, sustained and intensive efforts are being made to address these problems with the aim of ensuring

the regular availability of and equitable access to required essential medicines and their appropriate use by health professionals, patients, and the public in general.

Appropriate use of medicines means that patients receive medicines that satisfy their clinical needs, are in doses that meet their own individual requirements and serve an adequate period of time, and are at the lowest cost to them and the community.

The UCG should be a vital tool in the day-to-day work of health professionals by providing:

- Information on the essential elements of clinical diagnosis,
- Guidance on required basic investigations,
- Details of cost-effective treatment and relevant alternatives, and
- Guidance on when to refer and admit patients.

It should, however, also prove equally useful to all other health practitioners working in both the private-not-for-profit and private commercial health sectors. These health practioners are strongly encouraged by the Ministry of Health to take care with their diagnoses and make the most appropriate use of medicines available.

Although the UCG provides details of recommended treatment regimes, as always **clinical judgment and experience** will still be required to adjust treatments to meet the particular needs of specific individuals.

The UCG is meant to be used together with the **Essential Medicine and Health Supplies List for Uganda (EMHSLU) 2012**, which provides guidance on the appropriate selection of medicines for each level of health care/facility. The general medicines list from the EMHSLU 2012 is included at the end of this book for reference (see Appendix 6).

In the near future, these documents will be joined by a **practical guide for dispensers**, which will provide detailed information on all the medicines included in the EMHSLU. The correct utilisation of the information provided by these three publications will facilitate the appropriate selection and utilisation of essential medicines, thereby minimising waste and maximising potential health benefits.

I would like to thank the Uganda Medicines and Therapeutics Advisory Committee (UMTAC) for carrying out a quick review of the UCG 2010.

Therapeutics is a dynamic area. It is therefore important that national guidelines like the UCG are subjected to constant review and are regularly updated to take account of currently accepted therapeutic practices. Thus, your continuing feedback on the usefulness, relevance, and accuracy of UCG information is vital in making any decisions on future modifications and improvements.

It is the strong hope and expectation of the Ministry of Health that familiarisation with and daily use of these guidelines by our health professionals will greatly improve

diagnosis and prescribing practices. These coupled with improvements in the medicines supply system and dispensing practices will ensure that our patients receive the best service possible.

Dr. Christine Ondoa

Hon. Minister of Health

Ministry of Health

PREFACE

The UCG has evolved directly from the National Standard Treatment Guidelines 1993, which were the first such guidelines published in Uganda. Before then, individual guidelines existed for the management of a limited number of specific conditions.

This edition of UCG continues to emphasise current information on diagnosis and management of common conditions in Uganda. This information has been included in response to numerous comments and suggestions received from clinical staff in the field, and its inclusion significantly extends and enhances the usefulness of the publication to clinicians in their day-to-day work.

The content of the UCG has been updated and also expanded through the inclusion of additional conditions. Furthermore, the medicine included in the UCG corresponds to the medicine included in the EMHSLU.

Readers are strongly recommended to familiarise themselves with the content and layout of the UCG to locate the different types of information and maximise the guide's potential usefulness in daily clinical practice.

The UCG does not constitute a full clinical text, but it does provide in an easily accessible form all the key points which would need to be considered when making decisions on how to manage the various conditions. The treatments recommended in the UCG are regarded as nationally recognised standard treatments and in many cases they are the same as or directly derived from those recommended in current evidence-based WHO guidelines.

This version of the UCG not only improves the comprehensiveness and completeness of the content but also improves the presentation of the information for easy use. This has been done through improved formatting and design, for example by selective use of different bullets, use of italic and bold text, and by re-arranging the information into more logical sections. The booklet has maintained its portable size to make it available for consultation in any circumstance and location.

Clinical guidelines such as the UCG are subject to rapid information and technological change due to the dynamic nature of therapeutic practice. Thus, in order to maintain the relevance and practical usefulness of the UCG, it is vital that feedback be obtained from users of the guidelines based on actual practice and experience in the field.

In order to facilitate this process, an amendment form is included at the back of the UCG to propose changes to the publication.

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

The objective of these combined efforts is to ensure that the patient always receives good service and optimum treatment. Further, the revisions aim to restore and maintain the public sector health service's credibility and reputation.

Dr. Jane Ruth Aceng

Director General of Health Services

Ministry of Health

INTRODUCTION TO UGANDA CLINICAL GUIDELINES 2012

This new edition and fully updated publication replaces the 2010 UCG and is being circulated free of charge 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.

For now, the main features of the UCG will be explained so that you can begin using it immediately and routinely in your daily clinical work.

1 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 or cure of their complaint, thereby making the most appropriate use of scarce diagnostic and clinical resources, including medicines.

2 Why is the UCG necessary?

Support supervision experience and data gathered over the years throughout the districts clearly shows that too often patient management is far from ideal. Diseases are misdiagnosed or missed completely, incorrect or incomplete treatment regimes are prescribed, and the patient is inadequately counselled on how to adhere to

correct treatment and how to prevent similar problems in the future. By providing all the required information in an easily accessible form, it is hoped that regular use of the UCG will address these problems and greatly improve the quality of patient care provided.

3 How can I quickly get to know the UCG?

Follow these steps:

3.1 Read the "Table of contents", which gives a quick summary of what is in the UCG. Also, become used to the Roman page numbering system in the introductory sections.

3.2 Read the "Foreword" by the Honourable Minister of Health, which mentions problems facing effective provision of health care and describes the place of UCG and other medicines and therapeutic information documents to solve these problems.

3.3 Read the "Preface", which gives further background on UCG development and intended use.

3.4 Read the "Presentation of Information", which explains how information in the UCG is arranged and gives important notes on dose expressions.

3.5 Turn to the "Index" and skim through these pages to get an idea of the range of conditions and medicines covered in the UCG.

3.6 Pick any condition in the index and turn to that page to read an individual section (monograph) of how the UCG handles that condition. Most other sections follow the same pattern. Practice quickly locating other conditions.

4 How can I use the UCG to improve the quality of care for my patients?

Follow these steps:

4.1 Carefully read "How to diagnose & treat in primary care", which gives the recommended approach to correctly managing patients and conducting effective consultations in the primary care setting. Check this against the approach you currently use. Are you adequately covering all the required steps? Can you find ways of improving your approach by making some simple but important changes?

4.2 Get used to the idea of the 'golden minute' to make the best use of the short contact time you have with each patient.

4.3 Ask yourself the questions in the section "How to make time for quality care". Are there any ways you can rearrange your health centre to increase its capacity and efficiency?

4.4 Carefully read "Prescribing Guidelines". Remind yourself of the essential elements of good prescribing. See how you can improve the way you prescribe. Ask yourself the following questions:

a) Do I use the Prescribing Checklist before writing any prescription?
b) Am I overprescribing placebos?
c) Are all my prescriptions clear, correct, and complete?
d) Am I looking out for and reporting adverse medicine reactions?
e) Am I correctly prescribing for my paediatric patients?

f) Am I considering medicine reactions when prescribing?
g) Am I giving the patient adequate counselling to ensure adherence to prescribed therapy?

4.5 Read "Chronic Care" and check if you are managing these patients in the most effective way. Identify ways in which you can improve their care.

5 How can I use the UCG to improve the care of individual patients?

Follow these steps:

5.1 Keep the UCG with you for easy access as you carry out your clinical duties.

5.2 Refer to the UCG regularly and frequently throughout each working day.

5.3 Encourage your prescriber colleagues to do the same.

5.4 Familiarise yourself with management of all the most common conditions by carefully reading through the relevant monographs.

5.5 Approach management of each patient/condition in a systematic way. Try not to miss out important steps:

a) Ask about relevant symptoms
b) Look for key physical signs
c) Carry out physical examinations and diagnostic tests when considering the differential diagnosis
d) Ensure correct selection of medicines and doses
e) Adequately counsel the patient
f) Make necessary follow-up arrangements

5.6 Make notes to remind yourself of key points not to miss using blank pages at the back of UCG.

6 How can I ensure that the UCG remains useful and up-to-date?

Guidelines like the UCG are very dynamic and need to be regularly updated and improved based on clinical experience in the field. This UCG should have a lifespan of about 3 years and then be replaced with a new edition.

In order to ensure this is even more useful and relevant to your work, we need to have feedback from you on suggested improvements, amendments, additions, etc. Use the amendment form at the back.

7 How can I get more copies of the UCG?

If any of your prescribing colleagues do not have a copy of UCG, contact the MoH Quality Assurance Department to obtain additional copies.

Effective use of the UCG depends on the reliable availability and accessibility of the essential medicines required for treating the various conditions. The Ministry of Health is therefore continually striving to improve financing, procurement of medicines, and medical supply management systems to ensure better health service delivery. Please report any problems with medicines supply and availability through your HSD in-charges to the office of the District Health Officer for prompt follow-up.

Hopefully you will value and enjoy using the UCG. Regular and systematic use will lead to significant improvements in management of common conditions, your job satisfaction as well as improved satisfaction of our clients (the patients) in the quality of the clinical services provided.

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Special thanks go to the following members who worked tirelessly on the revision of the UCG 2003 and produced the 2010 edition:

Prof. Emmauel M. Kaijuka: Commissioner Health Services, Head, Department of Quality Assurance, MOH

Dr. Henry Mwebesa: Former Assistant Commissioner, Department of Quality Assurance, MOH

Dr. Ezra Gashishiri: Principal Medical Officer, Department of Quality Assurance, MOH

Dr. Martin Ssendyona: Senior Medical Officer, Department of Quality Assurance, MOH

Dr. James Walugembe: Deputy Director, Butabika Hospital

Dr. Olive Sentumbwe: National Programme Officer, WHO Uganda

Dr. Fredrick Katumba: Principal Medical Officer, Reproductive Health, MOH

Dr. Francis Adatu: Programme Manager, National TB and Leprosy Control Pogramme, MOH

Dr. D Basangwa: Medical Officer, Butabika Hospital

Dr. Winyi R Kaboyo: Head, Veterinary Public Health Division, MOH

Dr. Kagimu Magidi: Department of Medicine, Mulago Hospital, Makerere University

Dr. FS Kambuggu: Consultant Physician, Skin Clinic, Mulago Hospital

Dr. Dorothy Kyeune Byabazaire: Acting Executive Director, Uganda Blood Transfusion Service

Prof E Katabira: Associate Dean (Research), Faculty of Medicine, Makerere University

Dr. F K Kato: Senior Medical Officer, Malaria Control Programme, MOH

Prof M Kawuma: Department of Ophthalmology, Mulago Hospital

Dr. S Kikambu: Head of Department of Surgery, Makerere University

Dr. D Kyazze: Senior Medical Officer, MOH

Dr. P Mugyenyi: Programme Manager, UNEPI

Dr. E K Naddumba: Senior Orthopaedic Consultant, Department of Orthopaedics, Mulago Hospital

Dr. D Okello: Physician and Lecturer, Makerere University

Dr. M Okot-Nwang: Consultant Physician, Department of Medicine, Mulago Hospital

Dr. Elizabeth Namagala: Senior Medical Officer, STD/AIDS Control Programme, MOH

Dr. Mpanga Lydia: Infectious Disease Institute, Mulago Hospital

Dr. E Habyara: Senior Consultant, Jinja Hospital

Dr. Lwabi: Senior Consultant, Uganda Heart Institute, Mulago Hospital

Dr. Isaac Ezati: Senior Consultant, Deputy Director, Mulago Hospital

Dr. Sekansanvu: Mulago Hospital

Dr. Aisha Bataringaya Sekala: Orthondontist, Department of Dentistry, College of Sciences, Makerere University

Dr. Chales Sali: Principal Dental Surgeon, MOH

Dr. Friday Agaba: Principal Dental Surgeon, MOH

Dr. Mijumbi: Senior Consultant, Department of Anaesthesia, Mulago Hospital

Dr. Iga Matovu: Senior Consultant, Department of Radiology, Mulago Hospital

Dr. Charles Mugisha: Consultant Nutritionist, Mulago Hospital

Dr. A Odit: Senior Consultant, Department of Paediatrics, Mulago Hospital

Dr. Luzze: TB, Mulago Hospital

Dr. Jack GM Jagwe: Senior Consultant Physician

Mr. Martin Oteba: Assistant Commissioner Pharmacetical Division, MOH

Mr. Frans Bosman: Medicines Management Advisor, MOH

Mr. Seru Morries: Pharmacist, Pharmaceutical Division, MOH

Dr. E Turitwenka: Consultant ENT Surgeon, Mulago Hospital

Mr. Paul Bamwose: ICT Officer, MOH

Ms. Sarah Muledhu: Secretary, Department of Quality Assurance, MOH

The following UMTAC members and other specialists contributed to the revision of the UCG 2010 and update of the essential medicines list attached in Appendix 6:

Dr. Seraphine Adibaku: Programme Manager, National Malaria Control Programme, Ministry of Health (MOH)

Dr. Francis Adatu: Programme Manager, National Tuberculosis and Leprosy Programme, MOH

Dr. Zainab Akol: Programme Manager, AIDS Control Programme, MOH

Dr. Sarah Byakika: Assistant Commissioner Health Services, Department of Quality Assurance, MOH

Ms Helen Ndagire Byomire: Head, Drug Information and Pharmacology, National Drug Authority

Mr. Anthony Ddamba: Head, Marketing and Sales, National Medical Stores (NMS)

Dr. Lawrence Ekwaro: Senior Consultant Surgeon, Regional Referral Hospital Jinja

Dr. Amone Jackson: Assistant Commissioner Health Services, Integrated Curative, MOH

Mr. Atanasius Kakwemeire: Supply Chain Technical Advisor, Catholic Relief Services

Prof. Elly Katabira: Senior Consultant, Makerere University College of Health Sciences

Dr. Francis Lakor: Dental Surgeon, National Referral Hospital Mulago

Mr. Joseph Mwoga: Programme Officer, World Health Organization (WHO)

Dr. Elizabeth Namagala: Programme Officer, AIDS Control Programme, MOH

Dr. Jesca Nsungwa: Assistant Commissioner Health Services (Child Health), MOH

Mr. Wilson Nyegenye: Logistics Advisor, Central Public Health Laboratory, MOH

Dr. Amos Odiit: Senior Consultant Paediatrician, National Referral Hospital Mulago

Dr. Justin Okello: Orthopaedic Surgeon, National Referral Hospital Mulago

Mr. Martin Oteba: Assistant Commissioner Health Services, Pharmacy Division, MOH

Dr. Fred Sebisubi: Principle Pharmacist, Pharmacy Division, MOH

Dr. Miriam Sentongo: Senior Medical Officer, Reproductive Health Division, MOH

Dr. Olive Sentumbwe (**Chair of UMTAC**): Family Health and Population, WHO

Dr. Rachel Seruyange: Programme Manager, Uganda National Expanded Programme on Immunisation, MOH

Dr. Birna Trap: Chief of Party, Securing Ugandans' Right to Essential Medicines (SURE) Program

Prof. Paul Waako: Head, Pharmacology and Therapeutics, Makerere University

Dr. Catherine Abbo: Lecturer and Psychiatrist, National Referral Hospital Mulago

Dr. Anne Ampaire: Ophthalmologist, National Referral Hospital Mulago

Mr. Peter Awongo: Central Public Health Laboratories, MOH

Ms. Eleanor Babirye: Quality Assurance Assistant, NMS

Ms. Samalie Namukose Bananuka: Nutritionist, AIDS Control Programme, MOH

Dr. Dorothy Kyeyune Byabaire: Haematologist, Uganda Blood Transfusion Services

Dr. Ricky Byaruhanga: Ear, Nose, Throat Specialist, Lecturer, Makerere University

Dr. Henry Ddungu: Physician, Cancer Institute, National Referral Hospital Mulago

Dr. Steven Dhikusooka: Dental Surgeon, Atutur Hospital

Dr. George Ekwaro: Research and Development Officer, NMS

Dr. Godfrey Esiru: Programme Officer, PMTCT, MOH

Mr. Gaspard Guma: Advisor, Central Public Health Laboratories, MOH

Dr. Mark Kasumba: Anaesthesiologist, National Referral Hospital Mulago

Dr. James Kayima: Physician, Cardiovascular Diseases Specialists, National Referral Hospital Mulago

Ms. Evelyn Kwagala: Programme Assistant, Centers for Disease Control

Dr. Peter Kyambadde: MOH

Mr. William Lali: Laboratory Quality Officer, Central Public Health Laboratory, MOH

Dr. Julius Muron: Consultant Psychiatrist, Butabika Hospital

Dr. Edrisa Mutebi: Head of Endocrinology Unit, National Referral Hospital Mulago

Dr. Christina Mwangi: Laboratory Systems Policy Advisor, Centers for Disease Control

Mr. Benjamin Mwesige: Pharmacist, Uganda Cancer Institut

Ms. Agnes Nabasirye: Program Assistant, Centers for Disease Control

Ms. Lydia Kyobe Nabbumba: Nurse, In-charge, Luwero Health Centre (HC) IV

Ms. Catherine Nabwami: Nurse, Buwama HC III

Dr. Hasifa Naluyiga: Paediatrician, National Referral Hospital Mulago

Dr. Namugoza: Department of Obstetrics and Gynaecology, MOH

Ms. Grace Nantege: Laboratory Quality Assurance Assistant, NMS

Dr. Chiratidzo Ellen Ndhlovu: Senior Lecturer in Medicine, Chair National Drugs and Therapeutics Policy Advisory Committee, University of Zimbabwe College of Health Sciences

Dr. Christopher Ndolerire: Ear, Nose, and Throat Specialist, Makerere University

Mr. Thomas Obua Ocwa: Senior Pharmacist, Pharmacy Division, MOH

Dr. Peter Okui: Senior Medical Officer, Malaria Control Programme, MOH

Ms. Grace Otekat: Principle Laboratory Technologist, Uganda Blood Transfusion Services

Mr. Fred Semakula: Dental Surgeon, National Referral Hospital Mulago

Mr. Gordon Sematiko: Executive Secretary/Registrar, National Drug Authority

Mr. William Ssekitto: Stores Assistant, Reproductive Health Uganda, MOH

Mr. Tom Tenywa: National STD/I Laboratory Advisor, AIDS Control Programme, MOH

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Mr. Morries Seru: Pharmacy Division, MOH

Mr. Lawrence Were: SURE Program/Pharmacy Division, MOH

Dr. Isaac Kadowa: Quality Assurance, MOH

Dr. Henry Kajumbula: Technical Advisor, Central Public Health Laboratories, MOH

Ms. Dorthe Konradsen: SURE Program

PRESENTATION OF INFORMATION

Note: Words in the text which are underlined are defined in the Glossary at the back of the UCG.

General arrangement of sections

Conditions have been arranged into sections by body system, except for 1. Infections, 2 Parasitic Diseases, 5. Injuries and Trauma, 15. HIV and STIs, 18. Miscellaneous Conditions, 19. Poisoning, 23. Childhood Illness, and 24. Family Planning.

Within each section, conditions are generally arranged alphabetically or in an order describing the natural occurrence and where possible followed by an individual monograph in a standard format. In the following, the format of the monographs are further described. Note that deviations to this format occur when condition or practices cannot be summarised using this format.

1. Title/description

Each condition is given a title and, where relevant, an alternate familiar name (in parentheses) by which it may be also be known, e.g. Human trypanosomiasis (Sleeping sickness), Haemorrhoids (Piles).

This is followed by a brief description of the condition, e.g. "A chronic disease transmitted to human beings by several species of tsetse fly".

2. Cause

Listed here are the pathological organisms, circumstances, or reasons for transmission of the disease or occurrence of the condition. Any pre-disposing factors will also be given in this part of the monograph.

3. Clinical features

Listed here are the main signs and symptoms that characterise the disease or condition with an indication of patient groups that may be more susceptible, e.g. children and the elderly.

Where relevant, complications which may result from having the condition (usually in a serious or chronic form) are also given.

4. Differential diagnosis

This part gives any other conditions that may produce similar signs and symptoms and thus should be considered and excluded when making an initial diagnosis.

5. Investigations

This section indicates the most important diagnostic tests and investigations needed for a definitive diagnosis. Available tests may be limited at lower levels of the health system. This section is generally not included when condition is clinically diagnosed.

6. Management

The therapeutic and other patient management measures necessary to deal satisfactorily with the particular condition are given in a logical sequence of steps. These measures may or may not involve prescribing specifically-indicated medication

6.1 Alternative drugs and multi-drug treatments

If more than one drug may be used to treat a given condition, the medicines are listed as “alternatives” or indicated by the word “or”. The first listed drug is the recommended 1st line drug, the second listed is the 2nd line and so on.

Where multiple drugs are necessary to treat a given condition, these are indicated by the word "plus" before each drug.

6.2 Dose regimes

Note:

> Unless otherwise indicated, **all** dose regimes are for **adults** and are by **oral** route

Where medication is necessary, the individual dose regimes are stated in a standard format as follows:
Generic name (in bold letters): This is the official recommended name as listed in the Essential Medicine and Health Supplies List for Uganda (EMHSLU) 2012. This name should be used in all prescribing, dispensing, medicines administration, and medication record procedures.
In addition to the name, the **strength** of a particular medication may be stated, e.g. adrenaline injection 1 in 1,000, tetracycline eye ointment 1%, glucose infusion 5%
Dose: This is the size of each individual dose of the medicine. It is usually expressed as a quantity of the particular medicine by weight (e.g. 100mg, 250mg, 500 micrograms), number of units (e.g. 20,000 international units (IU), 2 mega unit (MU)), or volume of liquid of particular strength (e.g. IV infusions).
Paediatric doses: (for patients of 12 years or less) Where applicable, these are specifically indicated in units of body weight (e.g. 5mg/kg) so that a precise dose may be accurately determined to suit individual patients. In other

cases, a fixed dose may be related to a particular age range (e.g. <5yrs: 125mg; 5-12 yrs: 250mg).
Where weighing is not possible but the age is known, age/weight charts may be used to estimate the weight of the child.
Where weighing is not possible and specific paediatric doses are not indicated, suitable paediatric doses may be approximated in terms of the normal adult dose as follows:

<5yrs:	¼ of adult dose
5-8yrs:	½ of adult dose
9-12yrs:	¾ of adult dose

Route of administration: The oral route is to be used unless otherwise indicated. Approved abbreviations are used for parenteral routes.
Dose frequency: In most cases, this is expressed in the number of hours (interval) between doses (e.g. 8-hourly, every 4-6 hours).
For many medicines, intervals are more appropriate than number of times per day. This is because the dose interval may vary, which may have adverse effects on blood levels of the medicine and consequent therapeutic effectiveness of the medicine.
Duration of treatment: Where applicable, the recommended period for which treatment should be continued is indicated as a number of days, weeks, etc. Where the duration is not stated, treatment should be continued for as long as necessary to obtain the desired therapeutic outcome, e.g. until the patient is cured or the condition is resolved.

Special instructions: These give further information on the correct administration of the medication and, where relevant, should be written on any related prescription. Special instructions include taking medicine after food, applied sparingly, given slowly over a four hour period, etc.

6.3 Level of management

The appropriate health service facility level to treat a condition is indicated by the code (in bold letters) on the right margin as follows:

HC Health centre of the level indicated by HC1, HC2, HC3, HC4

H Hospital

RR Regional Referral Hospital

NR National Referral Hospital

Note: Although the actual medicine recommended may be available at a lower level than indicated, the management of the condition requires the capacity, and available skills of the higher level shown.

7. Prevention

Practical measures to prevent or avoid development of a particular condition are given.

These should be clearly communicated to the patient during counselling as a vital and routine part of patient management.

Reference Materials

TB Treatment Desk Aid, Second Edition

NTLP Manual, Second Edition, 2010

PMI Uganda Malaria Treatment, 2010

Uganda ART Treatment Guidelines June, 2009

WHO Priority Medicines for Mothers and Children, 2011

STI Desk Charts Combo Final, 2010

Uganda STI Guidelines Manual Final, 2010

Uganda Misoprostol Treatment Guidelines, 2010

National Antiretroviral Treatment Guidelines

Guideline for Appropriate Use of Blood in Uganda, Blood Transfusion Service, Ministry of Health, 2008

Rabies Post-Exposure Treatment Guidelines, Veterinary Public Health Unit, Ministry of Health, Uganda, 2001

Syndromic Management of Common Sexually Transmitted Diseases, STD/AIDS Control Programme, Ministry of Health

HOW TO DIAGNOSE & TREAT IN PRIMARY CARE

Introduction

Most health workers have been taught how to do a full history and examination suitable for hospital wards, but they have not been taught how to properly do a primary care consultation and may have developed inappropriate short cuts and bad habits on the job.

In order to arrive at a reasonable diagnosis, the basic principles are the same whether a health worker is at a health centre or at a hospital.

Start by taking a history of the illness and enquire specifically about the main complaint and other complaints. Establish their duration. These complaints are usually not very many. Write them down and attach the duration; you may re-arrange them when writing your notes, e.g. fever, cough, chest pain, and difficulty in breathing, in sequence or occurrence. Explore each complaint (symptom) in relation to what you know about diseases affecting the system most likely to be affected. Always follow the history with a proper physical examination and relevant diagnostic tests. Guessing and assuming can easily lead to pitfalls in making a reasonable diagnosis.

"Listen to the patient; he is telling you the diagnosis," Sir William Osler, a distinguished physician of the 19th century, once said. It is mandatory that a patient is provided with a copy of summary of clinical notes and prescription after consultation.

Generally, important symptoms can be asked about, signs checked for, diagnosis made, illness explained, and treatment provided in five to ten minutes.

THE SEVEN STEPS IN A PRIMARY CARE CONSULTATION

1. Greet the patient.
2. Observe the patient as he/she walks into your room for degree or state of illness.
3. Ask about the main complaint or complaints. Usually they are not very many. Establish duration of each complaint. Then explore each complaint (symptom) by asking relevant but not leading questions. Always recall residual knowledge about diseases for the potential affected system.
4. Physical examination involves looking (inspection), feeling (palpation), percussion, and listening (auscultation).
5. Write down your findings. Remember as you take the history and carry out the examination, you may begin to have a clue about the diagnosis. Making this probable diagnosis is dependent on the index of suspicion, previous experience and knowledge acquired from textbooks. Think about other possible diagnoses and come down to the most probable diagnosis. At this point, think about diagnostic tests.
    a. Tests to confirm your diagnosis.
    b. Tests to exclude other likely diagnoses
6. Explain the diagnosis and treatment to the patient, including:

a. What you think is wrong
b. The dose of the prescribed treatment, and how often and for how long to take it
c. When to come back urgently
d. The date of the follow up appointment if needed

7. Give specific preventive messages

1. Greet the patient

Greet/welcome the patient. Offer a seat to help the patient feel relaxed and able to tell you properly about their symptoms. Check the patient's name, age, and home address. Ensure the privacy of the patient; use curtains. Protect yourself from possible temptations and complaints by always examining women in the presence of a female nurse.

2. Look for danger signs

In primary care, start the examination as soon as the patient enters the room. In all patients, look out for any danger signs requiring urgent attention and referral, e.g.

- Severe breathing distress
- Lethargy or unconsciousness
- Severe pain
- Severe breathing distress, cyanosis, anaemia

If any general or specific danger signs are present

- Urgently assess the patient
- Give pre-referral treatment
- Arrange for urgent referral to hospital

3. Ask about symptoms

Ask why they have come and in young children, also ask the mother about general danger signs:

- Not able to drink or breastfeed
- Vomiting everything
- Convulsions (has now or had previously)

While asking about symptoms, you will hear a story which you may recognise having heard or read about before.

To hear more details of the story, ask him/her

i. Tell me more about your symptoms
ii. What type of symptoms (e.g. type of pain) do you have? For how long? In which places? Have you had it before?
iii. What other symptoms do you have?
   - Ask about other symptoms related to the presenting symptoms, e.g. if diarrhoea, ask also about vomiting
iv. Is there anything else you are worried about?
v. Ask about key symptoms to check if other body systems are affected, e.g. cough or difficult breathing
vi. Have you already taken any treatment? If so name it or obtain the previous prescription/treatment or forms.
vii. If relevant, ask about allergy and past medical, social, or family history

By the end of these questions, the story or pattern of symptoms may already suggest one or another illness (the beginning of a differential diagnosis). Ask about symptoms related to these illnesses.

Then ask about key symptoms from each body system. For example, if the patient has diarrhoea, also ask about cough, difficult breathing, fever, and skin rashes.

When you suspect particular conditions, you will need to ask specific questions such as:

- The date of the last period (for women 15-45 years)
- Social history, for example if chest problems, ask about cigarette smoking, and if abdominal and mental problems ask about how much alcohol they drink
- Allergy (always ask about this before giving an antibiotic like penicillin)
- Family history, e.g. of diabetes, hypertension, contacts with TB, spouse with HIV/AIDS

As you listen to the answers, observe speech, appearance, and behaviour. These may express peculiar ideas which suggest hallucinations or delusions or the patient may appear miserable, “low”, or depressed. If so, ask more questions to help you decide if they have a mental problem.

Notes on the questions relating to symptoms
General approach to questioning the patient:
The first part of the consultation is the 'golden minute', so called because the information gathered is so valuable for good diagnosis.

Encourage patients to express themselves freely using eye contact, a nod of the head, and/or words like "yes" or "OK".

Ask open questions like, "What kind of pain is it?" and "For how long?" to encourage the patient to volunteer information on the type, duration, and distribution of the presenting symptoms.

Open questions allow the patient to answer in their own way. During this early part of the consultation, it is best to avoid asking closed questions which require "yes" or "no" responses as patients may not answer these accurately.

Question a) Ask this question to encourage the patient to talk freely about their symptoms and concerns

Question b) This question gives the patient an opportunity to express their own ideas about the cause of their illness and any fears they may have, for example HIV, cancer, or witchcraft

Question c) You need to ask about any treatment taken for the presenting problem. For example, a child with fever may have already been given artemether and lumefantrine tablets before coming to the health centre

Question d) You often need to ask about the past medical history of similar or other significant illnesses. In each case, ask what medicines they were given. Be specific to ask about previous admissions to any health units or having had an operation and medicines given.

4. Look, listen, and feel for signs

In all patients you can quickly check for anaemia, jaundice, and malnutrition.

During history taking, you will have got some ideas about the system involved and the most probable diagnosis among the possible diagnoses (that is the differential diagnoses). Remember, some diseases affect various systems. For example rheumatic fever affects joint, the cardiovascular system, and rarely the nervous system.

Carefully examine the affected system and always compare the two sides. One-sided conditions are more likely to be due to disease.

As you examine any system, always look for the specific danger signs for that system. If any danger sign is present, urgent pre-referral treatment and referral to hospital is needed.

5. Decide on the most likely diagnosis

The story you hear may be familiar, guiding you to additional questions to ask and signs to look for, which will provide you with a diagnosis if they are present. You may have heard of, seen, or read about this pattern of symptoms and signs before.

Certain signs and symptoms can occur in more than one disease. In order to make the correct diagnosis, you will

need to think first of the alternative diagnoses – the differential diagnosis. You may need to ask more questions and look for signs for each of the alternative diagnoses.

Use the UCG condition index to locate these conditions and identify the symptoms to ask about and signs to check. Then decide which of the possible diseases best fits the pattern of signs and symptoms you have identified in the patient.

If the relevant laboratory test is available, you can use this to confirm a diagnosis. Test results may also provide a baseline to see if the patient gets better or worse.

However, in cases of doubt or severe illness, the patient should be referred to a doctor for further management.

The UCG includes the Integrated Management of Childhood Illness (IMCI) charts to help you classify (diagnose) and manage the main childhood illnesses. It also includes the new Integrated Management of Pregnancy & Childbirth (IMPAC) charts to guide you in classification and management of problems in these areas.

As well as a diagnosis, the signs and symptoms will help you decide on the prognosis (the likely course of the disease). This will assist you to decide what to do: for example refer, treat, and give symptomatic treatment, and provide follow-up if needed.

6. Explain to the patient

The patient or the carer of a child needs to clearly understand the illness and its treatment if the patient is to take any prescribed treatment properly and be able to

watch out for symptoms and signs of any deterioration. Do not regard patients as passive recipients of advice or information. Instead, depend on the active participation of patients and relatives in treatment and follow-up - they are the home carers.

For all patients, explain

a) What you think is wrong
b) The dose, frequency, and duration of the treatment
c) When to come back urgently
d) The date of any follow-up appointment or further investigation (if needed), and
e) Counsel as appropriate

Remember: With wide spread health education and Internet, some patients are knowledgeable about their diseases.

Notes on explanations

a) For example, if a child has a high fever and cough, explain that this may be malaria but could also be pneumonia
b) Explain and write down on a piece of paper:
   - The name of each medicine
   - What it is for
   - The size of each dose (for example, number of tablets)
   - The number of times the dose should be taken daily
   - The number of days the medicine should be taken.

c) Describe signs of deterioration. For example, in a child general signs such as not breastfeeding or drinking and difficult or fast breathing (may indicate a respiratory infections). Also advise the patient on symptoms and signs to look out for in case of an alternative diagnosis or in case the treatment is not effective.

d) Generally, if an illness is serious enough to need treatment with drugs like antibiotics, give the patient a follow-up appointment to check if the condition is improving. This is especially important in young children. With serious conditions like pneumonia, arrange for follow-up in two days. For less serious conditions, tell the patient to return if they do not improve, get worse, or new symptoms appear. Ensure the patient feels he/she will not be bothering you unnecessarily by returning for follow-up.

e) Counsel the patient if you suspect the problem is related to serious underlying disease, such as HIV/AIDS or cancer. Counselling involves a two-way conversation, allowing the patient to express feelings, explore options available, and decide on the best course of action, like having an HIV test and using condoms.

7. Give specific preventive messages related to the illness

When patients have been properly assessed, given treatment, and an explanation, they will be willing to listen to specific advice on prevention.

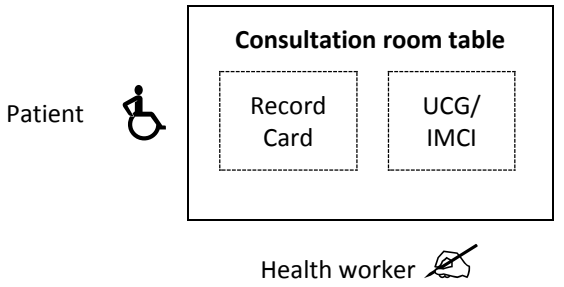
Where relevant, guidance on preventive measures is provided in this book, and messages can be based on these. Such messages will be most effective if given after similar information has been given in the community or in waiting-room group health education sessions.

Examples:

a) Patients with malaria: Advise on importance of sleeping under insecticide-treated bednets
b) Women between 15-45 years: Ask if they are pregnant,
   - If yes, offer antenatal care
   - If no, ask if they want information on family planning
   - Women may also be due for a tetanus vaccination
c) Young children: Check if child is due for vaccination, vitamin A, de-worming, or advice on feeding

COMMUNICATION SKILLS IN THE CONSULTATION ROOM

Rather than sitting across the table from the patient, arrange for the patient and yourself to sit at either side of one corner. This position means there is no barrier to communication, and you will more easily be able to observe signs.



With young children, leave the child on the mother's lap. Ask the mother to undress them so you can look at the breathing, count the breathing rate and pulse, or examine the abdomen. In this way the child is more likely to feel secure and not cry, which makes the examination much easier. Leave unpopular actions, like looking in the ears, to the end of the examination.

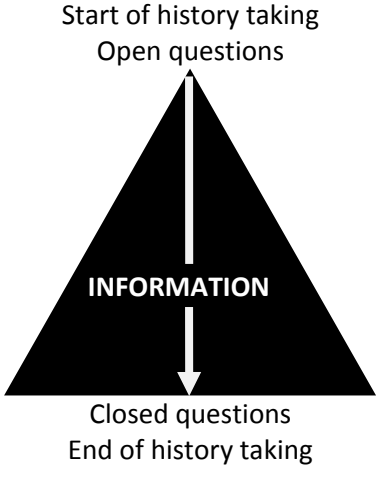
Good communication skills are essential for making a correct diagnosis and for explanation or counselling on the illness, its treatment, and prevention of future illness.

Open questions are those with no fixed answer, and the patient can therefore answer the question in his/her own way. Always start taking a history by using open questions and only move onto more closed questions later. If the patient appears to be getting into irrelevant details, you could advise gently and encourage her/him to focus on relevant areas.

Closed questions are phrased very specifically and require a "yes" or "no" answer. If they are used at the beginning of an interview patients tend to answer quickly without

thinking, and say what they think you want to hear. Only use specific closed questions later in the consultation if the patient has not already mentioned something. For example, in a patient with diarrhoea, ask "Is there blood in the stool?"

Leading questions are phrased in such a way that leads the patient to give a particular answer. Therefore, avoid them as they can result in misleading information.
For example, if you ask a leading question, such as, "You have been coughing for more than three weeks?" the patient may answer quickly without proper consideration and not give the correct "yes" or "no" answer.



"THE GOLDEN MINUTE"

This first period of contact with the patient (which may be less than half a minute) is the key first stage of any primary care consultation and includes

- Asking the patient about the presenting complaint. When asking about the presenting complaint (i.e. the symptom), he/she may tell you some of the other key symptoms such as "hot body" (fever) or insects crawling under the skin (numbness).
- Listening to the patient's interpretation of this allows the patient to express any fears about the cause of the illness

When asking about the presenting problem, give the patient time to tell you about the symptoms they have. Do not interrupt to ask questions about specific symptoms yet – but encourage them to tell you more about the presenting and other problems they have. Often, when given the chance, the patient will tell you the symptoms you need to know about, for example the duration of the symptom and the characteristics, such as whether a chest pain is sharp or tight. They may tell you some of the other key symptoms such as "hot body" (fever).

It is also important for the patient that you hear and know about their interpretation of the cause of the illness and their fears about what is going to happen. This helps them "get off their chest" the ideas about the cause of the symptoms (such as HIV, cancer, witchcraft, etc.) which they may have been discussing with family and friends before coming to the health centre. This is so that they

know you will take these interpretations into account in your assessment.

Also, later you can explain your diagnosis and treatment in the light of the patient's own level of understanding, and you may be able to reassure them about (false) interpretations of the cause.

HOW TO MAKE TIME FOR QUALITY CARE

Time is needed for diagnosis and explanation of treatment and prevention. Yet, often in a health centre, there is only one consultation room with only one health worker consulting.

In a hospital OPD, there may be fewer rooms/staff compared with the numbers of patients. Yet, there may be underused rooms and staff.

The solution is to increase the use of staff and rooms so that more consultation rooms are used and patients are spread between these, thus making more time for quality care.

Ask yourself and your colleagues

- How many rooms are used for consultations?
- Could other rooms be used for consultations?
- How many health workers are available?
- What are they currently doing?
- Could any more be doing consultations?

If possible, rearrange your health centre to increase consultation capacity. Obtain and move in required tables

and chairs, and start to use additional rooms for consultations.

EVIDENCE BASED GUIDELINES

The UCG has included the latest evidence-based WHO clinical guidelines which utilise a syndromic approach to patient management and cover:

- Sexually Transmitted Infections
- Integrated Management of Childhood Illness (IMCI)
- Integrated Management of Adolescent Illness

Use the IMCI charts for all under fives and pregnant women, respectively, to help you improve the quality of diagnosis, treatment, and explanation (counselling). They show clearly when referral is necessary if symptoms and signs are in the severe classification.

Always look in the top row of a chart first to check if there are signs and symptoms of a severe disease. If these are not enough for this classification, next look in the second/middle row of the chart. If not enough for this classification, finally look in the bottom row of the chart. In this way, you will not miss a severe illness needing urgent treatment and referral.

EXAMPLE OF USE OF IMCI CHARTS

Child with cough or difficult breathing

Finding chest in-drawing is a sign for severe pneumonia or other severe diseases, such as heart disease. All severe diseases found in the top row of the chart need pre-referral treatment (for example, first doses of antimalarial and antibiotic) before urgent referral to hospital. Other patients who are not very ill, but still ill enough to need treatment (typically with antibiotics) are in the middle row, such as those classified as pneumonia by assessing fast breathing. Other classifications of illness (without signs of a significant illness) are in the bottom row.

For example, a child with cough and a normal breathing rate and no other signs in the top or middle rows may have a simple cough or cold and not require antibiotic treatment. However, these patients still need advice on symptoms of deterioration and on symptomatic home treatment.

QUALITY CARE

Get into the habit of routinely referring to the UCG. Also make full use of the IMCI laminated desk aide which is easy to glance at during a consultation.

Think about the quality of your clinical work

- What has been done well in the consultation?
- What could be done better next time?
- Were any important points missed?
- How could I better refer to the UCG/IMCI desk aide next time?

- I need to look at the reference in UCG of the presenting disease for updating

CHRONIC CARE

Using good communication skills, you may find out from the patients that certain symptoms have either been present for many weeks or "on and off" for a long time.

Sometimes patients will tell you about a chronic problem, such as having "blood pressure". Some patients may use this expression to actually mean "headache". Other patients may have had treatment in the past but stopped either when they felt better or when the medicine was finished.

Firstly, ask more questions to find out what they really mean. Also, if already diagnosed for the chronic condition, find out when and where this was and what treatment was given.

Chronic diseases are those where the patient has to continue with follow-up and treatment for many months or years.

With chronic diseases, it is important for health workers to establish a system of making booked appointments with the patient for regular follow-up consultations to review the status of a chronic disease.

At such review consultations

- Determine whether the patient's condition is improving, stable, or deteriorating (better, the same, or worse)

- Assess whether patients are taking prescribed treatments properly (the right medicines, in the right doses, at the right time)
- Confirm that patients are following any other management measures which were prescribed like change of diet or lifestyle (for example, stopping smoking and using condoms)
- Use the contact opportunity to further motivate them in managing their condition correctly

Many of the important causes of illness and death in adults and adolescents are chronic diseases. In children, apart from malnutrition, chronic diseases are less common.

Common chronic diseases include

- HIV/AIDS
- Tuberculosis (TB)
- Osteoarthritis (knee, lumbar and cervical spine) plus rheumatic disease, parkinsonism, migraine, thyroid diseases
- Mental health problems, for example depression and schizophrenia
- Epilepsy
- Hypertension (high blood pressure)
- Diabetes
- Cancers

All these diseases share the need for long-term care, which is mostly at home and with regular planned visits to the health centres and hospitals. Admission to hospital may be required:

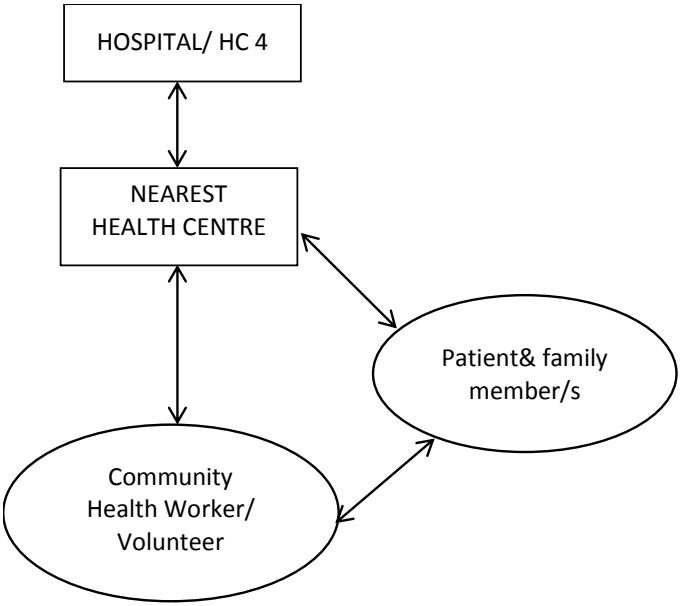
- For new cases for assessment and starting of treatment
- If the condition relapses and until patients are well enough to continue with care in the community (by the health centre together with the CHW)

Some chronic diseases like hypertension and some mental illnesses continue for life, while others get better with time. For people living with HIV, early diagnosis and treatment of infections can gain many years of active and productive life.

With HIV/AIDS and cancer patients much pain, can be relieved with correct management.

If pain does not respond to simple analgesics like paracetamol and non-steroidal anti-inflammatory drugs (NSAIDs), refer to management of severe pain and palliative care for specialized management of pain with oral morphine. With TB, though the condition is curable, treatment needs to be taken for many months to ensure complete cure.

THE CHRONIC CARE SYSTEM



ROLES IN CHRONIC CARE

Hospital/HC4

The doctor/clinical officer will

1. See referred cases
2. Assess, diagnose and commence treatment
3. Educate/counsel the patient

4. Decide if the problem is complex or not yet stable
   - *If yes*: give a follow up appointment at the hospital
   - *If no*: refer to the health centre for continuing care
   - Record diagnosis and treatment on a patient card and/or bottom part of the discharge letter and send to the health centre with the patient
5. If there is a relapse or other problem: Reassess the patient, revise the treatment plan, and send back details on the revised chronic treatment card or referral letter

Health centre

The clinical officer or nurse will

1. Identify and treat patients with suspected chronic conditions including those with another (acute) illness
2. Give follow-up care:
   - Ask about side-effects
   - Check for other problems
   - Resupply drugs
3. Inform the local Community Health Worker or volunteer who can, if the patient agrees, visit and support the family carer, for example for persons with HIV/AIDS
4. If there is a relapse or other serious problem: Refer the patient back to the hospital for reassessment of the condition and revision of treatment plan

Community Health Worker/volunteer will

1. Visit, educate, and support patient care by family carers and motivate for adherence to recommended treatment
2. Reinforce education messages on illness and prevention
3. Refer patients who have problems with adherence to treatment or who become more ill to the health centre
4. Link with community groups where relevant, for example for provision of HIV/AIDS care

Family member/s will

1. Support and care for the patient in the home
2. Encourage/assist the patient to follow recommended therapy
3. Monitor the patient's condition and return with the patient to the health centre if this should get worse

PRESCRIBING GUIDELINES

1. Ten-point prescribing checklist

Carefully consider the following key questions before writing any prescription:

1.1. Does the diagnosed condition require drug treatment?

- Not all patients or conditions need a prescription for medicines (self limiting)
- Non-medicine treatments and/or giving simple advice may be more suitable in certain situations

1.2. Is the prescribed treatment likely to have optimum therapeutic effect?
Good therapeutics depends on:
- Accurate diagnosis of the condition
- Knowledge of the relevant available medicines
- Selection from these of the most appropriate medicine and dose-form
- Correctly and completely prescribing the selected medicines stating clearly for each:
  - The dose size
  - The dose frequency
  - The duration of treatment
- Ensuring that the patient understands fully the purpose of each medicine and how to use it each prescribed medicine

1.3. 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

Use the oral route whenever possible

- Always resist patient demands for you to prescribe injections or other expensive dose forms, for example, capsules and oral liquids where these are not clearly indicated or appropriate.
Injections in particular are associated with several major risks, including:
  - Incorrect route of administration

- Poor injection technique, for example, using wrong type/size of needle, wrong location, wrong depth of insertion difficulty in finding a vein (for IV route)

Avoid injections unless absolutely necessary

- Always explain that these routes of administration may not represent the best form of treatment or even a bad form of treatment

1.4. Am I dealing with a potentially life- threatening situation?
In critical situations, always prescribe the most effective medicine available irrespective of cost or limited availability

1.5. Have I used the correct name for each medicine?
To avoid any possible confusion and to reduce prescribing costs:
- Always prescribe medicines by the full generic name and not a brand name, for example diazepam (not Valium®), paracetamol (not Panadol®)
- Avoid using medicine name abbreviations unless officially defined and approved

1.6. Can I justify using a combination of medicine?
Do not prescribe combination of medicines unless they have a proven significant therapeutic advantage over corresponding single ingredient preparations

1.7. Have I taken into account all relevant patient criteria?

When prescribing any medicine, always take into consideration important patient criteria such as:

- Age
- Sex
- 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
  - These may cause unwanted medicine interactions or adverse effects
- The effect of other diseases present
  - These may significantly affect the action of particular medicines or the considered medicines may affect the other diseases negatively
- Pregnancy
  - Only use medicines in pregnancy if the expected benefit to the mother is greater than any risk to the foetus and avoid all medicines if possible during the 1st trimester (the first three months of pregnancy).
- Breastfeeding
  - Only use medicines which are essential for treatment of the mother. For many medicines, there is insufficient information available to provide guidance on breastfeeding.
- The likely degree of compliance with treatment

- Simpler, shorter dosage regimes increase the chance of the patient correctly following prescribed therapy

1.8. Is the prescribed medication likely to clearly benefit the patient?

- In all cases consider carefully the expected benefit of a prescribed medication against potential risks

1.9. Am I prescribing unnecessary symptomatic treatment?

- Do not overuse symptomatic treatments for treating minor self-limiting conditions for which simple home remedies may often be appropriate and effective

1.10. Do I really need to prescribe more than one medicine?

- Do not practice multiple prescribing (polypharmacy), especially when the diagnosis is uncertain. It is a tremendous waste of resources and puts the patient at increased risk without corresponding clear benefit.

2. Prescribing placebos

2.1 Avoid placebos whenever possible. Instead, spend some time reassuring and educating the patient

2.2 If it is absolutely necessary to prescribe a placebo, always choose a safe, cheap medicine, which is not essential for treating other important conditions, for example vitamin B compound tablets

- Never prescribe injections as placebos
- Never prescribe sedatives or tranquillizers as placebos, for example diazepam or phenobarbital

3. Prescription writing

No incomplete, inaccurate, illegible, or unclear prescription should be dispensed - all such prescriptions should be returned to the prescriber for clarification, completion, or correction before dispensing can proceed.

To avoid such problems and associated delays, follow the guidance below in writing your prescriptions:

All prescriptions should clearly indicate name and address (if available) of the prescriber

3.1 Write all prescriptions legibly in ink
- Poor writing may lead to errors in interpretation by the dispenser, which may have harmful and possibly disastrous consequences for the patient

3.2 Write the full name, age, gender, and address of the patient, and sign and date the prescription form

3.3 Write the name of the medicine or preparation using its full generic name. Unofficial abbreviations, trade names, and obsolete names should not be used

3.4 State the strength of the preparation required where relevant:

NB: A prescription form is a legal document.

For solid dose-forms
- 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 0.1mg or 100mcg
- If decimal figures are used, always write a zero in front of the decimal point where there is no other figure, for example 0.5mL and not .5mL

3.5 Always state dose regimen **in full**

- Dose size
- Dose frequency
- Duration of treatment
- For example, **doxycyline** 100mg every 12 hours for 7 days
  The quantity to be dispensed is calculated from the regimen.

3.6 Avoid use of the instructions like “prn” or “to be used/taken as required” - state instead a suitable dose frequency. In the few cases where “as required” is appropriate, always state the actual quantity of the medicine to be supplied.

3.7 For oral liquids

- State doses in terms of:
  5mL spoonfuls for linctuses, elixirs, syrups, and paediatric preparations or 10mL spoonfuls for adult mixtures
- Doses other than 5mL or 10mL or multiples of these will be diluted to the nearest equivalent 5mL or 10mL quantity before dispensing
- Total volumes of liquid preparations prescribed are usually selected from 50, 100, 200, 300, or 500mL

3.8 For solid or semi-solid preparations

- Total quantities prescribed are usually selected from 25, 50, 100, 200, 300, or 500g, except where the product is supplied ready-packed in a particular pack size, for example, tetracycline eye ointment (3.5g)

3.9 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”

4. In-patient prescriptions

4.1 Write these prescriptions, records of dispensing, and administration of in-patient medicines on in-patient treatment cards

4.2 Only use one card per patient at any one time

4.3 If medicine is to be given “as required”, clearly state a suitable dose frequency, or times of administration

4.4 For all medicines prescribed, always state the route of administration

4.5 When any changes or cancellations are made to a prescription card or if treatment is to be stopped, clearly sign and date the card in the right place

4.6 If the timing of a medicine dosage is critical, ensure that you make suitable arrangements for the medicine to be given at the specific required time(s)

5. Guide to quantities of medicines to be supplied

5.1 Oral liquids

- Adult mixtures (10mL dose):
  200mL (20 doses) or 300mL (30 doses)

- Elixirs, linctuses, and paediatric mixtures (5mL dose): 50mL (10 doses), 100mL (20 doses), or 150mL (30 doses)

5.2 Preparations used in body cavities, for example ear drops and nasal drops: 10mL

5.3 External preparations:

Part of body	Semi-solids (g)	Liquids (mL)
Face	5-15	100
Both hands	25-50	200
Scalp	50-100	200
Both arms and legs	100-200	200
Whole body	200	500
Groin and genitalia	10-25	100

Semi-solids: Cream, ointment, paste, gel
NB. Paints: Normally 10-25mL is supplied

6. Controlled medicine prescriptions

These medicines are covered by the provisions of the National Drug Policy and Authority Statute 1993, which should be consulted for details of the appropriate legal requirements as required.
Medicines covered by the Act and used in the UCG 2012 or appear on EMHSLU 2012 include:

- Morphine injection
- Morphine oral solution
- Morphine tablet SR (slow release)
- Papaveretum + hyoscine injection

- Pethidine injection
- Pethidine tablet

These are all medicines of potential abuse which 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, signed, and dated and with the prescriber's address
- The name and address of the patient must be stated
- The total amount of the item to be supplied must be stated in words and figures

It is an offence for a prescriber to issue and for a pharmacy to dispense prescriptions for controlled medicines unless the requirements of the law are fully complied with.

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 as part of their work.

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 under the Act as complying with regulations.

7. Adverse drug reactions (ADRs)

Nearly all medicines may produce unwanted or unexpected adverse effects, some of which may be life threatening, for example anaphylactic shock or liver failure.

Immediately report any serious or unexpected adverse effect suspected to be due to a medicine to the District Health Officers (DHOs) for onward transmission to the National Drug Authority (NDA).

The 10-point guide for prevention of adverse drug reactions (ADRs)

1. Never use any medicine without a clear indication
2. Only use medicines in pregnancy if absolutely essential
3. Check if the patient has had any previous reactions to the medicine or to similar medicines
4. Reduce doses when necessary, for example, in the young, the elderly, and if liver or renal disease is present
5. Always prescribe the minimum necessary medicines
6. Carefully explain dose regimes to patients, especially those on multiple medicines, the elderly, and anyone likely to misunderstand
7. If possible, always use medicines with which you are familiar

8. Look out for ADRs when using new or unfamiliar drugs
9. Warn patients about likely adverse effects and advise them on what to do if they occur
10. 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

8. Paediatric prescribing

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.

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

However, as a guide to prescribing by weight when a weighing scale is not available, the two following graphs are provided showing weights of children from 1-24 months and 2-15 years, respectively.

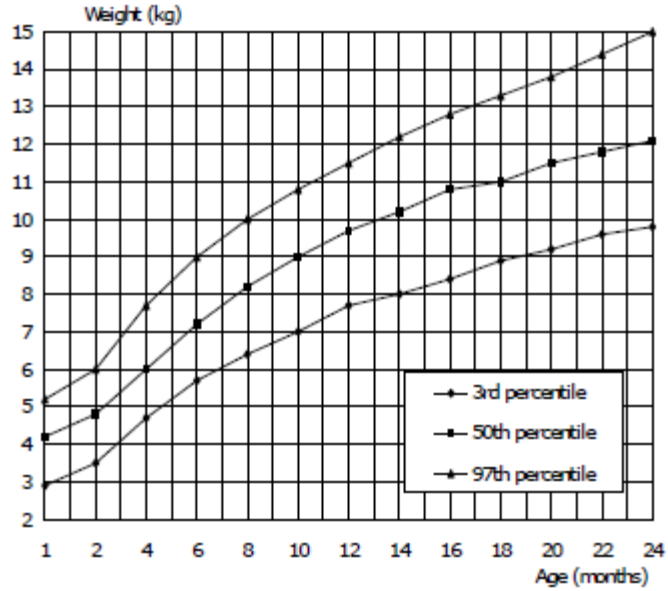
Three lines are shown on each graph:

- The middle (50th percentile) line shows weights for average children
- The lower (3rd percentile) line shows weights for children who are very small for their age

- The upper (97th percentile) line shows weights for children who are very large for their age

These graphs can therefore be used to estimate the weight of a child of known age after assessment of whether the child appears average, small or large size for that age

Weights of children aged 1-24 months

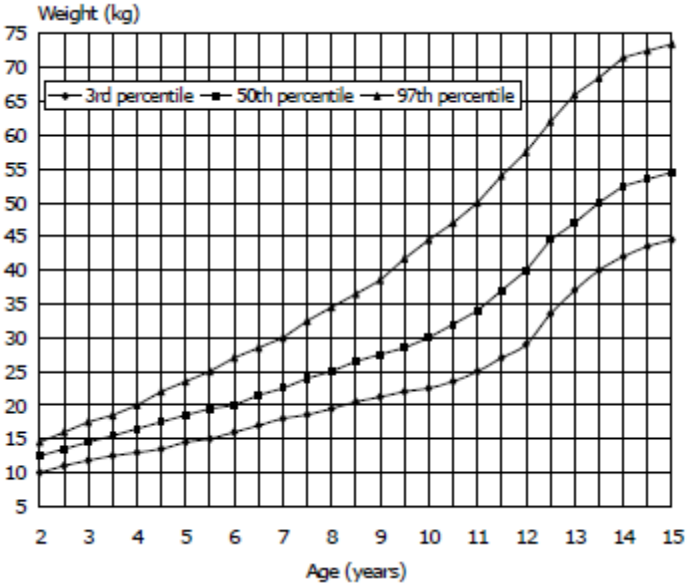


Example:
Prescribing for an eight-month (8) old baby who is fatter than usual (larger than average weight for age):

- Follow the X-axis (age) of the graph to the 8 month mark

- Follow the vertical from there to a point somewhere between the middle (50th percentile) and top (97th percentile) lines on the graph
- From there follow a horizontal line left to cut the y-axis (weight)
- The estimated weight of the child is around 10kg

Weights of children aged 2-15 years



Example:
Prescribing for a thin, eight-and-a-half (8 ½) year old (less than average weight for age)

- Follow the X-axis (age) of the graph to mid way between the 8 and 9 year marks

- Follow the vertical from there until it meets the lower (3rd percentile) line on the graph
- From there follow a horizontal line left to cut the Y-axis (weight)
- The estimated weight of the child is around 20kg

9. Medicines interactions

Before prescribing any medicine, take care to avoid problems of interactions with other medicines by obtaining details of any other medication being taken by the patient, 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.

10. Patient Counselling

This vital part of patient management is sadly often neglected with potentially serious consequences for the expected therapeutic outcome of the prescribed treatment.

In cases where the required medicines are not available or medicine treatment is not required or appropriate, it is particularly important to advise the patient on the next

steps to take or on alternative forms of therapy, for example adjustment of diet or increased exercise.
Although counselling the patient may take time, if done systematically, it should only take a few minutes and could make the difference between therapeutic success and failure.
Include the following key components when counselling the patient

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

- The medicine name
- The function of the medicine
- The dose regime (dose size, dose 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)

c) 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 future
d) Ensure the patient fully understands the information and advice provided - ask him/her to repeat key points to you
e) Ensure the patient is satisfied with the proposed treatment and has an opportunity to raise any problems or queries with you.

1. INFECTIONS

1.1 BRUCELLOSIS

(Undulant fever, malta fever, abortus fever).

A bacterial infection of acute or insidious 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).

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)
- Osteomyelitis of the vertebrae (uncommon but characteristic)

Differential diagnosis

- Typhoid fever
- Malaria
- Trypanosomiasis (sleeping sickness)
- Tuberculosis
- Other causes of prolonged fever

Investigations

- Blood: For compliment fixation test or agglutination test (where possible)

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

Management HC 4

Adult and child >8 years:

- **Doxycycline** 100mg every 12 hours for 6 weeks
  Child <8 years: 2mg/kg per dose
- Plus **gentamicin** 5-7mg/kg IV daily for 2 weeks
  Child <8 years: 7.5mg/kg daily in 1-3 divided doses
- Or **ciprofloxacin** 500mg twice daily for 2 weeks
  Child < 8years: do not use
- **Cotrimoxazole** 480mg every 12 hours for 6 weeks
- Plus **gentamicin** 7.5mg/kg IV in 1-3 divided doses daily for 2 weeks

Caution

Treatment duration must be adhered to at all times.
Ciprofloxacin is contraindicated in children below 12 years of age.

- ✕ **Doxycyline**, **gentamicin**: Contraindicated in pregnancy

Prevention

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

1.2 CANDIDIASIS

An infection usually confined to the mucous membranes and external layers of the skin. Usually associated with immunosuppressive illnesses, such as HIV/AIDS, diabetes, cancer and its treatment, prolonged antibiotic use, and steroids.

Causes

- Candida albicans, transmitted by direct contact

Clinical features

It may present as

- Oral thrush
- Intertrigo
- Vulvo vaginitis
- Paronychia (nail infection)
- GIT candidiasis may present with pain on swallowing, vomiting, diarrhoea, epigastrium, and retrosternal pain

Investigations

- Diagnosis is mainly clinical
- Smear examination with KOH preparations

Management

Oral candidiasis

- All ages: Apply **gentian violet 0.5%** paint twice daily for 5 days **HC2**
- Or **nystatin tablets** 500,000-1,000,000 IU every 6 hours for 10 days (chewed then swallowed) **HC3**
  Child <5yrs: **Nystatin oral suspension** 100,000 IU every 6 hours for 10 days **HC2**
  Child 5-12yrs: 200,000 IU per dose every 6 hours for 10 days **HC2**

Vaginal candidiasis

- Avoid sexual activity while on treatment
- **Apply gentian violet 1% paint** onto the vagina once daily for 3 days **HC2**
- Or insert one **nystatin pessary** 100,000 IU each night for 10 days **HC3**
- Or **ketoconazole** 400mg every 12 hours for 5 days **HC3**

Paronychia

▶ **Griseofulvin** 500mg daily for 6 months or until the nail appears normal **HC3**

Intertrigo

▶ **Griseofulvin** 500mg daily for 2-4 weeks **HC3**

✕ Prevent pregnancy while in treatment with **griseofulvin** and for one month after end of treatment

Prevention

- Early detection and treatment
- Vaginal candidiasis: Avoid unprotected sex

1.3 CHICKENPOX

A highly contagious childhood disease.

Cause

- Varicella virus by droplet infection

Clinical features

- Mild fevers occur 10-20 days after exposure
- Characteristic vesicular rash appears in crops with faint erythematou macules, rapidly developing into papules and vesicles, which rupture easily and become septic
- Lesions of different ages (crops) exist together
- Complications may include septicaemia, pneumonia, fulminating haemorrhagic varicella, and meningoencephalitis

Differential diagnosis

- Impetigo
- Multiple insect bites
- Other viral infections with fever and skin rash

Investigations

➢ Virus isolation possible but not necessary

Management

- ▶ Apply **calamine** lotion every 12 hours **HC1**
- ▶ Plus **chlorphenamine** 4mg every 12 hours for 3 days plus an **analgesic** for the pain i.e. **paracetamol** 1g 3-4 times per day
  Child <5: 1mg every 12 hours for 3 days
- ▶ **Chlorphenamine** 2mg every 12 hours HC2
- ▶ Plus **paracetamol** 10mg/kg every 4-6 hours

Prevention

- Avoid contact between infected persons and immunosuppressed persons

1.4 LEPROSY

A chronic infectious disease caused by Mycobacterium leprae - an acid-fast bacillus. It mainly affects the skin and peripheral nerves and can affect all ages and both sexes. It is transmitted from one person to another via the respiratory tract or skin.

Clinical features

- Presents with one or more skin patches (which are usually less pigmented than surrounding normal skin) with definite loss of sensation
- Sometimes cases present with skin nodules or smooth, shiny diffuse thickening of the skin without loss of sensation
- Damage to peripheral nerves as evidenced by thickening and impairment of function

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 and neurofibromatosis
- Other causes of peripheral nerve damage, e.g. diabetes mellitus

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)

Note: Skin biopsies (which may also aid diagnosis) are **not** recommended as a routine procedure.

Management HC3

Recommended treatment is multi-drug therapy (MDT), which is presented in the form of various blister packs for PB leprosy and MB leprosy with special packs for children.

PB Leprosy

An adult PB blister pack (1 month treatment) comprises:

- **Rifampicin** 300mg capsules every 12 hours
- **Dapsone** 100mg tab x 28

The total course is 6 packs (i.e. 6 months) taken as follows:

Once monthly (on day 1):

- **Rifampicin** 600mg (2 caps)
- Plus **dapsone** 100mg (1 tab)

Once daily (on days 2-28):

- **Dapsone** 100mg (1 tab)

MB Leprosy

An adult MB blister pack (1 month treatment) comprises:

- **Rifampicin** 300mg cap x 2

- **Clofazimine** 100mg cap x 3
- **Clofazimine** 50mg cap x 27
- **Dapsone** 100mg tab x 28

Taken as follows:

Once monthly (on day 1)

- **Rifampicin** 600mg (2 caps)
- Plus **clofazimine** 300mg (3 caps)
- Plus **dapsone** 100mg (1 tab)

Once daily (on days 2-28):

- **Clofazimine** 50mg (1 cap)
- Plus **dapsone** 100mg (1 tab)

Treatment should continue for **a full 12 months** and whenever possible up to smear negativity.

MB Leprosy Treatment Dose Table			
Drug/Frequency	**0-4 years**	**5-14 years**	**≥ 15 years**
Dapsone / daily	25mg	50mg	100mg
Clofazimine / daily	50mg*	50mg*	50mg
Clofazimine / monthly	100mg	200mg	300mg
Rifampicin / monthly	150mg	300mg	600mg

* Alternate days 2 times per week

Note:

- Treatment should continue for a full 12 months
- In MB Leprosy, never use rifampicin alone or in combination with **dapsone** without a third bactericidal drug because of the high prevalence of primary or secondary **dapsone** resistance, and the subsequent high risk of developing rifampicin resist*ance*

Prevention

- Early reporting of cases and effective treatment
- BCG vaccination may be helpful

1.5 MEASLES

An acute, highly communicable viral infection characterized by a generalised skin rash, fever, and inflammation of mucus membrane.

Cause

- Measles virus spread by droplet infection and direct contact

Clinical features

- Catarrhal stage
- Fever, runny nose, barking cough
- Misery, anorexia, vomiting, and conjunctivitis
- Koplik's spots (diagnostic)
- Generalised maculopapular skin rash (later)
- Desquamation stage (later)
- Diarrhoea (common)
- Skin lesions peel off
- Rash fades
- Temperature falls

Complications

- Secondary bacterial RTI, e.g. bronchopneumonia
- Laryngotracheobronchitis
- Protein Energy Malnutrition (PEM), especially following diarrhoea
- TB
- Cancrum oris (from mouth sepsis)
- Otitis media

- Corneal ulceration and panophthalmitis - leads to blindness
- Demyelinating encephalitis
- Thrombocytopaenic purpura
- Bronchiectasis - because of long term blockage of small bronchi

Differential diagnosis

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

Investigations

- Clinical diagnosis is sufficient though virus isolation is possible
- Investigate complications

Management (symptomatic) HC2

- Apply **tetracycline** eye ointment 1% every 12 hours for 5 days
- Increase fluid intake
- Give **vitamin A** 200,000 IU
  1st dose: At diagnosis
  2nd dose: The next day
  3rd dose: 2-4 weeks later

Prevention

- Measles vaccination
- Avoid contact between infected persons and uninfected

1.6 MENINGITIS

Meningitis is acute inflammation of the meninges.

Causative organisms

- *Streptococcus pneumoniae*
- Haemophilus influenzae serotype b - mainly in young children
- Neisseria meningitidis
- Cryptococcus neoformans (in the immune-suppressed)
- Mycobacterium tuberculosis
- Enteric bacilli

Clinical features

- Rapid onset of fever
- Severe headache and neck stiffness or pain
- Photophobia
- Haemorrhagic rash
- *N.meningitidis* infection
- Convulsions
- Cranial neuropathy
- Altered mental state, confusion, coma

Differential diagnosis

- Viral *meningoencephalitis*
- Rare Haemorrhagic fevers, for example Ebola and Marburg diseases
- Brain abscess
- Space-occupying lesions in the brain
- Drug reaction

Investigations

- CSF: For white cell count and type, protein, sugar, Indian-ink staining, gram stain, culture, and sensitivity
- Blood: For serological studies and haemogram

- Chest X-ray and ultrasound to look for possible primary site

Management

Note: Because of the potential severity of the disease, carry out any required lumbar puncture promptly and initiate "appropriate" antibiotic therapy while awaiting lab results.

Treatment depends on whether

a) Causative organisms are not yet identified
b) Causative organisms are identified

Causative organisms not yet identified

(initial appropriate therapy)

- **Ceftriaxone** 2g IV or IM daily in 1-2 divided doses for up to 14 days **HC4**
  Child: 50-100mg/kg daily dose given as above
- Change to cheaper effective antibiotic if and when C&S results become available

If ceftriaxone not available, and at HC3 level

- Use **chloramphenicol** 1g IV every 6 hours for up to 14 days (use **IM** if IV not possible) **HC3**
  Child: 25mg/kg per dose

Once clinical improvement occurs

- Change to 500-750mg orally every 6 hours to complete the course child: 25mg/kg per dose

Causative organisms identified

i) Meningitis due to Crypotococcus neoformans (cryptococcal meningitis)

Caused by a fungus and common in immunosuppressed patients; very difficult to treat. Send patients to a hospital for treatment with **amphotericin B infusion** and **fluconazole**

ii) Meningitis due to Streptococcus pneumonia
(10-14 day course)

- **Benzylpenicillin** 3-4 MU IV or IM every 4 hours **HC3**
  Child: 100,000 IU/kg per dose
- Or **ceftriaxone** 2g IV or IM daily in 1-2 divided doses **HC4**
  Child: 50-100mg/kg daily dose as above

Notes

- Severe cases may need up to 21 days treatment
- Patients with S. pneumoniae strains resistant to the above drugs require specialist management

iii) Meningitis due to Haemophilus influenzae
(7-10 day course)

- **Ceftriaxone** 2g IV or IM every 12 hours **HC4**
  Child: 50-100mg/kg per dose
  Use this drug if available

Only if the isolate is reported to be susceptible to the particular drug

- Change to **chloramphenicol** 1g IV every 6 hours **HC4**
  Child: 25mg/kg per dose
- Or **ampicillin** 2-3g IV every 4-6 hours **HC4**
  Child: 50mg/kg per dose

(iv) Meningitis due to Neisseria meningitidis:
(up to 14 day course)

- **Chloramphenicol** 1g IV every 6 hours **HC3**
  Child: 25mg/kg IV per dose
  Use **IM** if IV not possible

Once clinical improvement occurs

- Change to 500-750mg orally every 6 hours to complete the course
  Child: 25mg/kg per dose.

Note: Consider prophylaxis of patients and close contacts (especially children <5 years):

Adults and children

Ciprofloxacin 500mg single dose

✕ contraindicated in pregnancy

v) Meningitis due to *Listeria monocytogenes*

(at least 3 weeks course)

Common cause of meningitis in neonates and immunosuppressed adults

- **Benzylpenicillin** 3MU IV or IM every 4 hours **HC3**
- Or **ampicillin** 3g IV every 6 hours **HC3**

Notes

- Both medicines are equally effective
- Therapy may need to be prolonged for up to 6 weeks in some patients

vi) TB meningitis (due to Mycobacterium TB)

See section on Tuberculosis

Treatment is in two phases (doses in table over) **HC3**

a) Intensive phase

2 months daily course of **isoniazid**, **rifampicin, pyrazinamide** and **ethambutol**

b) Continuation phase

Children with TB menigitis treat with **2RHZE/10RH** 10 months daily course of **rifampicin** and **isoniazid** on children

Treatment of TB meningitis: Medicine doses (mg) for different body weight ranges (kg)

Medicine	5-10	11-20	21-30	31-50	>50kg
Isoniazid	100	100	200	300	300
Rifampicin	150	150	300	450	600

Pyrazinamide	500	500	1,000	1,500	2,000
Ethambutol	100-200	200-400	600	800	1,200

Notes:

△ **Ethambutol**: Use and watch for visual difficulties due to the risk of optic neuritis in children <5 years

Prevention

- Avoid overcrowding
- Improve sanitation

1.6.1. Neonatal meningitis

Note

◆ Organisms causing this are similar to those causing neonatal septicaemia and pneumonia, i.e. *S.pneumoniae*, group A & B streptococci, and enteric Gram-negative bacilli. Management is thus similar to that recommended for neonatal pneumonia.

Causative organism unknown

(7-10 day course)

► **Ampicillin** 50mg/kg every 8 hours
Neonates <7 days: every 12 hours **HC3**

► Plus **gentamicin** 2.5/kg IV every 12 hours

Note

◆ Meningitis due to Listeria monocytogenes is especially common in the 1st week of life, thus ampicillin should be included in the regime

Meningitis due to group B streptococci

Note

◆ 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.

- **Benzylpenicillin** 50,000-75,000 IU/kg IV every 4-6 hours **HC3**
  Neonates <7 days: 50,000 IU/kg IV every 8 hours
- Plus **gentamicin** 2.5mg/kg IV every 12 hours
- Continue treatment for a total of 3 weeks

1.7 SYSTEMIC MYCOSES

Chronic infections caused by inhalation of fungal organisms (spores) found in dust/soil in endemic areas. Start in the lungs, causing usually mild or no symptoms but may spread to other parts of the body.

Causes

Fungal organisms

- Aspergillus fumigatus
- Blastomyces dermatidis
- Coccidiodes immitis
- Cryptococcus neoformans

Clinical features

- Allergic reactions with wheezing, cough, chest pain, fever, abscess, headache, and muscle pain
- Pneumonia
- Meningitis
- Sinusitis
- Osteomyelitis
- Empyema
- Lymphadenopathy
- Ulcerated papules
- Subcutaneous nodules

Differential diagnosis

- Tuberculosis
- Trypanosomiasis
- Lymphoma
- HIV/AIDS

Investigations

- Blood: Full haemogram
- X-ray: Chest
- CSF: Using Indian ink stain
- Isolate causative organism from sputum, bone marrow, urine, blood, or CSF or from lymph node, liver, or lung biopsy

Management

- Refer to hospital

1.8 PLAGUE

Severe acute bacterial infection with high fatality rate transmitted by infected rodent fleas.

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

Bubonic plague

- Involves lymph nodes (usually femoral and inguinal)
- Rapidly rising temperature with rigors
- Headache

Pneumonic plague

- Very infectious and highly fatal
  - 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

Septicaemic plague

- A 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: Examine to demonstrate presence of the bacilli

Management

(14-day course):

- **Doxycycline** 100mg every 12 hours for 7 days **HC2**
  Child >8 years: 2mg/kg per dose
  ✕ Contraindicated in pregnancy

Alternatives:

- **Chloramphenicol** 500mg orally or IV every 6 hours for 7-10 days **HC2**
  Child: 25mg/kg per dose
  ✕ Contraindicated in pregnancy
- Or **gentamicin** 1.7mg/kg (adult and child) IV or IM every 8 hours for 7 days
  ✕ Contraindicated in pregnancy
- Or **streptomycin** 1g every 12 hours for 7-10 days

Child: 15mg/kg per dose

✖ Contraindicated in pregnancy

Prevention

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

1.9 POLIOMYELITIS

An acute viral infection characterised by acute onset of flaccid paralysis of skeletal muscles. It is transmitted primarily by person to person through the faecal-oral route.

Cause

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

Clinical features

- Majority of cases are asymptomatic
- Only 1% result in flaccid paralysis
- Minor illness of fever, malaise, headache, and vomiting
- May progress to severe muscle pain
- Paralysis is characteristically asymmetric
- Paralysis of respiratory muscles is life threatening (bulbar polio)
- Aseptic meningitis may occur as a complication
- Strain and intramuscular injections precipitate and may worsen paralysis

Differential diagnosis

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

Investigations

- Isolation of the virus from stool samples
- Viral culture

Management

Acute stage

Poliomyelitis in this stage without paralysis is difficult to diagnose

- 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
- After recovery (if partially/not immunised) complete the recommended immunization schedule

Chronic stage **HC2**

- Encourage active use of the limb to restore muscle function

Prevention

- Isolate for nursing and treatment
- Caretaker should wash hands each time after touching the child
- Proper disposal of children's faeces
- Immunization

1.10 RHEUMATIC FEVER

A systemic connective tissue disease which follows a streptococcal upper respiratory tract infection. It involves the heart, joints, skin, subcutaneous tissue, and CNS.
The first attack usually occurs between ages of 3-15.

Causes

- Hypersensitivity reaction to group A streptococcal throat infection

Clinical features

- Arthritis (migrating polyathritis accompanied by fever)
- Acute rheumatic carditis, signs of cardiac failure, murmurs and pericarditis
- Subcutaneous nodules
- Chorea (involuntary movements of limbs)

Differential diagnosis

- Any form of arthralgia (joint pains)
- Pyrexia with cardiac failure

Investigations

- Throat swab for haemolytic streptococcus
- Blood: Haemogram (raised ESR)
- Chest X-ray
- ECG if available
- Endocardiography (cardiac catheterisation)
- Echocardiography
- Antistreptolysin O titre (ASOT)

Management HC2

- **Phenoxymethylpenicillin** 250mg every 6 hours for 7 days
  Child: 125mg per dose
- Plus **acetylsalicylic acid** 600-900mg every 8 hours for 5 days
  Child: 300-600mg per dose
- Plus **magnesium trisilicate compound** 2-4 tablets every 8 hours until the inflammation subsides
  - Taken 30 minutes after the acetylsalicylic acid tablets

Prevention

- Early diagnosis and treatment of group A Streptococcus throat infection

- Avoid overcrowding
- Good nutrition
- Good housing

1.11 SEPTICAEMIA

(Before sensitivity results are known).

Cause

Blood infection due to various bacteria which may be associated with infection in specific sites (for example, lungs, urinary tract, GI tract) or there may be no specific focus.

Organisms commonly involved

Staphylococcus aureus, Klebsiella, Pseudomonas, Staphylococcus epidermidis, fungal (Candida spp), Coliforms and Salmonella spp, Pneumococci, Proteus spp

Clinical features

- Fever
- Hypotension
- Prostration (extreme tiredness)
- Sometimes anaemia
- Toxic shock is a complication
- Occurs more commonly in the immunosuppressed

Differential diagnosis

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

Investigations

- Look for possible source of infection
- Blood: WBC count, C&S

Management HC 4

- ▶ Give a starting dose of **antibiotics**
  Adult
- ▶ **Gentamicin** 5-7mg/kg IV every 24 hours or 1.5-2mg/kg IV or IM every 8 hours
  ✕ Contraindicated in pregnancy
- ▶ Plus either **cloxacillin** 2g IV every 4-6 hours
- ▶ Or **chloramphenicol** 750mg IV every 6 hours
  Child
- ▶ **Gentamicin** 3.5-4mg/kg IV every 8 hours (*neonate:* every 8-12 hours)
- ▶ Plus either: **Ceftriaxone** 50mg/kg every 8 hours (<7 days old: every 12 hours)
- ▶ Or **cloxacillin** 50mg/kg IV every 4-6 hours
- ▶ Or **benzylpenicillin** 50,000 IU/kg IV every 4-6 hours
- ▶ Refer to hospital

Prevention of sepsis

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

1.12 TETANUS

Bacterial disease characterised by intermittent spasms (twitching) of voluntary muscles.

Cause

- The exotoxin of Clostridium tetani
- Tetanus spores enter the body through deep penetrating skin wounds, the umbilical cord of the newborn, ear infection, or wounds produced during delivery and septic abortions

Clinical features

- Stiff jaw (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

Differential diagnosis

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

Management HC4

General measures

- ▶ Nurse patient intensively in a quiet isolated area
- ▶ Maintain close observation and attention to airway (Intubate if necessary), temperature, and spasms
- ▶ Insert nasogastric tube (NGT) for nutrition, hydration, and medicine administration
- ▶ (Neonate) have a mucous extractor or other suction available for use as required
- ▶ Maintain fluid balance/adequate hydration - initially IV if required, later by NGT
- ▶ Prevent aspiration of fluid into the lungs
- ▶ Maintain adequate nutrition - in the neonate use expressed breast milk via NGT
- ▶ Avoid IM injections as much as possible - use alternative routes (for example NGT, rectal) where possible
- ▶ Change from parenteral to oral medication as soon as possible, and keep patient handling to a minimum to avoid provoking spasms
- ▶ Clean wounds and remove necrotic tissue

In neonate thoroughly clean umbilical area

Specific treatment

- Give antibiotic: **Benzylpenicillin** 1-2 MU every 6 hours for 10 days
  Child: 50,000-100,000 IU/kg per dose
  Neonate: 100,000 IU/kg every 12 hours
- Control spasms: **chlorpromazine** 100mg (*child*: 12.5mg-25mg) alternating with **diazepam** 2-3mg (*child*: 0.5-1mg/kg) by NGT every 4-6 hours (see chart below).
  - Continue for as long as spasms/rigidity lasts
- **Metronidazole** 400mg 8 hourly for five days

Example of 6 hourly alternating regimen

	06h-09h	09h-12h	12h-15h	15h-18h	18h-21h	21h-24h	24h-03h	03h-06h
CP								
DZ								

CP = chlorpromazine **DZ** = diazepam h = hours

☐ = drug to be given ■ = drug not to be given

- Neutralise toxin: Give **tetanus immunoglobulin human (TIG)** 150 IU/kg IM into multiple sites
- Or (only if TIG is not available) **tetanus antitoxin (anti-tetanus serum)**: Give 20,000 IU as IV single dose (after test dose of 1,500 IU SC)
  Child: 10,000 IU given IM or IV

Prevent future tetanus (**see Tetanus prevention**):

- *Neonate/child:* After recovery ensure full course of immunization with DPT vaccine

1.13 TETANUS PREVENTION

Childhood immunization

- Immunise all children against tetanus during routine childhood immunization
  - See Immunization Schedule

Prophylaxis against neonatal tetanus

- Immunise all pregnant women/women of child-bearing age (15-45yrs) against tetanus
- Give **tetanus toxoid** vaccine (TT) 0.5mL IM into the upper arm or upper outer thigh as follows:

Vaccine	Recommended timing
TT1 (1st dose)	At first contact with the woman, e.g. at the 1st antenatal visit , Or as early as possible during pregnancy
TT2 (2nd dose)	At least 4 weeks after TT1
TT3 (3rd dose)	At least 6 months after TT2 Or as early as possible during a subsequent pregnancy
TT4 (4th dose)	At least 1 year after TT3 Or as early as possible during a subsequent pregnancy
TT5 (5^{th} dose)	At least 1 year after TT4 Or as early as possible during a subsequent pregnancy

- Ensure hygienic deliveries including proper cutting and care of umbilical cords

Notes to table

1. Refer to Immunization Schedule, for general information on administration, storage, and handling of vaccines
2. Store TT at +2°C to +8°C. **Do not** freeze TT.

Prophylaxis in patients at risk of tetanus as a result of contaminated wounds, bites, and burns

General measures

- Ensure adequate surgical toilet and proper care of wounds

Passive immunization

- Give **IM tetanus immunoglobulin human** (TIG):
  Child <5 years: 75 IU
  Child 5-10 years: 125 IU
  Child >10 years/adult: 250 IU

Note: Double the dose if heavy contamination suspected or if >24 hours since injury was sustained

- Or (only if TIG not available) **Tetanus antitoxin** (antitetanus serum) 1,500 IU deep SC or IM

Active immunization

Unimmunised or never fully immunised patients:

- Give a full course of vaccination: Three doses of **TT** 0.5mL deep SC or IM at intervals of 4 weeks

Fully immunised patients but last booster >10 years ago:

- Give one booster dose of TT 0.5mL deep SC or IM

Note

- Fully immunised patients who have had a booster dose within the last 10 years do not need treatment with tetanus antitoxin (anti-tetanus serum) or antitetanus immunoglobulin, human, or tetanus toxoid vaccination

- Giving TIG or TT to a fully immunised person may cause an unpleasant reaction, e.g. redness, itching, swelling, or fever, but with a severe injury this is justified

1.14 TYPHOID FEVER (ENTERIC FEVER)

Bacterial infection characterised by fever and spread through contaminated food and water. Following treatment, about 10% of patients relapse, and up to 3% become chronic carriers of the infection.

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
- Temperature rises in steps
- Relative bradycardia is common
- Delirium and stupor (common)
- Tender splenomegaly (common)
- Complications may include perforation of the gut

Investigations

- Stool: culture
- Blood: culture
- Widal's agglutination reaction
  - Check weekly for rising antibody titres

NB. A single positive screening does not indicate presence of infection.

Management

- ▶ **Chloramphenicol** 1g IM, IV or oral every 6 hours for 10-14 days **HC3**
  Child: 25mg/kg per dose
- ▶ Or **ciprofloxacin** 500-750mg every 12 hours for 5-14 days (contraindicated in pregnancy)
  Child: 10-15mg/kg per dose **HC2**
- ▶ Or **Cotrimoxazole** 960mg every 12 hours for 3 days
  Child: 24mg/kg dose **HC2**

Chronic carriers (treat for 4-6 weeks)

- ▶ **ciprofloxacin** 500-750mg every 12 hours
  Child: 10-15mg/kg per dose
- ✕ contraindicated in pregnancy **HC2**
- ▶ Or **amoxicillin** 250mg every 8 hours
  Child: 25mg/kg per dose (max: 250mg) **HC2**

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

1.15 TYPHUS FEVER

Infection caused by *Rickettsia*.

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

- Louse borne typhus presents with headaches; fever; chills; severe weakness; general pains; macular rash that appears on the 5th day on the rest of the body except the face, palms, and soles; toxaemia (usually pronounced)
- Murine typhus has a similar picture but is less severe

Differential diagnosis

- Any cause of fever for example, malaria, HIV, UTI, or typhoid

Investigations

➢ Blood: For Weil-Felix reaction

Management

7-10 day course or for 48 hours after resolution of fever

▶ **Doxycycline** 100mg every 12 hours **HC2**
Child >8yrs: 2mg/kg per dose
✕ Contraindicated in pregnancy

▶ Or **chloramphenicol** 500mg orally or IV every 6 hours
Child: 15mg/kg per dose **HC3**

Prevention

- Personal hygiene
- Destruction of lice and rodents

2. PARASITIC DISEASES

2.1 ASCARIASIS (ROUNDWORM)

A worm infestation of the small intestines generally associated with few or no symptoms.

Cause

- *Ascaris lumbricoides* (roundworm): Spread by ingesting eggs from contaminated soil and uncooked food

Clinical features

- 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

Differential diagnosis

- Other causes of cough
- Other causes of obstruction and nutritional deficiency

Investigations

➢ Stool examination for Ascaris ova

Management HC1

► **Mebendazole** 500mg single dose
Child <2 years: 250mg

► Or **albendazole** 400mg single dose

Prevention

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

2.2 DRACUNCULIASIS (GUINEA WORM)

An infestation of the subcutaneous and deeper tissue with the guinea worm.

Cause

Dracunculus medinensis, transmitted to man by drinking water containing cyclops (water flea 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 HC2

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:

- **Cotrimoxazole** 960mg every 12 hours for 5 days **HC2**
  Child: 480 (24mg/kg) every 12 hours
- Or amoxycilin 500mg every 8 hours for 5 days
  Child: 250mg every 8 hours for 5 days

Prevention

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

2.3 ECHINOCOCCOSIS (HYDATID DISEASE)

Tissue infestation by larvae of *Echinococcus granulosus.*

Clinical features

- Liver cysts may be asymptomatic but may also give abdominal pain or 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
- Ultra sound
- X-ray: Chest - for pulmonary cysts
- Serological tests
- Needle aspiration under Ultra-sound Sonography

(US) or CT-scan guidance for protoscolites

Management **HC4**

▶ Surgical excision

Prior to surgery or in cases not amenable to surgery

▶ **Mebendazole** 1.5g every 8 hours for 6 months

✕ Contraindicated in pregnancy

2.4 ENTEROBIASIS (THREADWORM)

A common helminth infection affecting mainly children.

Cause

- Enterobias vermicularis
- Transmitted by faecal-oral route

Clinical features

- Intense itching at the anal orifice where the female usually lays the ova

Differential diagnosis

- Trichuriasis
- Other causes of anal itch

Investigations

➢ Stool for adult worms and ova

➢ Cellotape test

Management **HC1**

▶ **Mebendazole** 500mg single dose child <2yrs: 250mg

▶ Or **albendazole** 400mg single dose

Prevention

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

2.5 HOOKWORM

A chronic parasitic infestation of the intestines.

Cause

Necator americanus and *Ancylostoma duodenale*

- By penetration of the skin by larvae from the soil

Clinical features

- Dermatitis (ground itch)
- Cough and inflammation of the trachea (tracheitis) common during larvae migration phase
- Iron-deficiency anaemia
- Reduced blood proteins in heavy infestations

Differential diagnosis

- Strongyloidiasis
- Loeffler's Syndrome
- Other causes of iron-deficiency anaemia

Investigations

➢ Stool examination for ova

Management HC1

► **Mebendazole** 500mg single dose
Child <2years: 250mg

Prevention

- Avoid walking barefoot
- Ensure proper faecal disposal
- Deworm children every 3-6 months

2.6 LEISHMANIASIS

A chronic systemic infectious disease.

Cause

- Flagellated protozoa *Leishmania donovani* (Visceral Leishmaniasis or Kala-azar)
- Transmitted through the bite of infected sand fly (phlebotomus)

Clinical features

Visceral Leishmaniasis (Kala-azar)

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

Cutaneous and Mucosal Leishmaniasis (Oriental sore)

- Starts as papule; enlarges and becomes 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 on appropriate media to isolate the parasites
- Serological tests, e.g. indirect fluorescent antibodies
- Leishmanin skin test (negative in Kala-azar)

Management

Cutaneous Leishmaniasis (all patients)

Frequently heals spontaneously but if severe or persistent, treat as for Visceral Leishmaniasis below

Visceral Leishmaniasis (Kala-azar) (all patients)

- **Pentamidine isethionate** 4mg/kg daily deep IM 3 times/week for 5-25 weeks or longer **R**
  Or **sodium stibogluconate** injection 10% 20mg/kg daily IM for minimum of 20 days (skin lesions are treated for 10 days) **R**

Note

- Continue treatment until no parasites detected in 2 consecutive splenic aspirates taken 14 days apart
- **Sodium stibogluconate**: Patients who relapse after a 1st course of treatment should be immediately re-treated with the same daily dose

Prevention

- Case detection and prompt treatment
- Residual insecticide spraying
- Elimination of breeding places (environmental management)

2.7 MALARIA

Malaria is an acute febrile illness. It is caused by infection with malaria parasites of the genus Plasmodium and is normally transmitted from person to person by female mosquitoes of the genus *Anopheles.*

There are four species of malaria parasites which infect humans namely: *Plasmodium falciparum; Plasmodium vivax; Plasmodium ovale;* and *Plasmodium malariae*. Of these, *P. falciparum* is the most virulent malaria parasite in the world and also the most common malaria parasite in Uganda.

The effect of the presence of malaria parasites in the body varies from person to person. There may be no symptoms (asymptomatic infection), mild illness (uncomplicated

malaria), or severe illness (severe malaria). If uncomplicated malaria is not recognised early and treated promptly, it is likely to deteriorate to severe malaria. A patient with severe malaria is in immediate danger of death and, therefore, severe malaria is a medical emergency.

2.7.1. Uncomplicated malaria

Clinical features of Uncomplicated Malaria

Fever is the most characteristic symptom of malaria. The fever in malaria is intermittent: it comes and goes many times. Three phases can be distinguished in a typical attack of malaria:

- **The cold stage** is when the patient feels cold and shivers.
- **The hot stage** is when the patient feels hot.
- **The sweating stage** is associated with sweating and relief of symptoms.

When people are frequently exposed to malaria, they develop partial immunity. In such people (with partial immunity), the above classical stages of a malaria attack may not be observed. Also, in people who have had partial treatment with antimalarial medicines, those classical stages may not be pronounced.

Common symptoms of uncomplicated malaria in children

Children under 5 years	Older children
a. Fever (raised temperature detected by thermometer or touch) or a history of fever b. Loss of appetite	a. Fever (raised temperature detected by thermometer or touch) or a history of fever b. Loss of appetite c. Weakness

c. Weakness d. Lethargy e. Vomiting	d. Lethargy e. Nausea f. Vomiting g. Headache h. Joint and muscle pains

Physical examination

Always take the temperature, weigh the patient, and carry out a general examination. Common signs of uncomplicated malaria are listed in box below.

Common signs of uncomplicated malaria

a. Raised body temperature (above 37.5^{o}C as taken from the axilla)
b. Mild anaemia (mild pallor of palms and mucous membranes); occurs commonly in children
c. Dehydration (dry mouth, coated tongue, and sunken eyes). In adults, sunken eyes are usually a sign of severe dehydration.
d. Enlarged spleen (in acute malaria it may be minimally enlarged, soft and mildly tender)

2.7.2. Complicated malaria

Caused by *P. falciparum* infection

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

- Change of behaviour, confusion, or drowsiness
- Altered level of consciousness or coma
- Convulsions
- Hypoglycemia

- Acidosis
- Difficulty in breathing
  - Pulmonary oedema or respiratory distress syndrome
- Acute renal failure
  Severe anaemia
  - Haematocrit <20%, Hb <6g/dL
  - Dizziness, tiredness, pallor
- Shock
- Haemoglobinuria
- Oliguria with very dark urine (coca-cola or coffee-colour)
- Jaundice
- Bleeding tendency
- Prostration
- Hyperparasitaemia (≥100,000 parasites/µL, MPs +++ or above)
- Hyperpyrexia ≥400C
- Severe vomiting
- Threatening abortion
  - Such as uterine contractions and vaginal bleeding

Danger signs of severe illness

a. Convulsions or fits within the last two days or at present
b. Not able to drink or breastfeed
c. Vomiting everything
d. Altered mental state (lethargy, drowsiness, unconsciousness, or confusion)
e. Prostration or extreme weakness (unable to stand or sit without support)
f. Severe respiratory distress or difficulty in breathing

g. Severe anaemia (severe pallor of palms and mucous membranes)
h. Severe dehydration (sunken eyes, coated tongue, lethargy, inability to drink)

Differential diagnosis

- Respiratory tract infection
- Urinary tract infection
- Meningitis
- Otitis media
- Tonsillitis
- Abscess
- Skin sepsis
- Measles or other infections with rashes

If there are no danger signs and no other diseases, a patient with fever is considered to be a case of uncomplicated malaria and treated accordingly.

Parasitological diagnosis of malaria

Parasitological diagnosis of malaria requires examination of blood smear for the presence of malaria parasites. Blood is examined by using a microscope or by Rapid Diagnostic Tests (RDTs).

Microscopic examination of a blood smear for malaria parasites

The 'gold standard' of malaria diagnosis is the examination of blood smear for malaria parasites.

Where laboratory facilities exist, blood examination for malaria parasites must be done for the following groups of patients:

- Patients who present with clinical features of severe malaria
- Patients who have taken antimalarial treatment for 2 days and symptoms persist
- Children aged less than 4 months with symptoms of uncomplicated malaria
- Pregnant women with symptoms of uncomplicated malaria

Note

- Thick blood film: Detection and quantification of parasites
- Thin blood film: Species identification
- Other investigations guided by history and physical examination

Management

The Uganda National Malaria Treatment Policy

i. Treatment of uncomplicated malaria: • The recommended first line medicine is **Artemether/ Lumefantrine**. Any other **ACT** that has been recommended by WHO and MOH and registered with the National Drugs Authority (NDA) will be the alternative first line. • The recommended second line medicine is oral **quinine** for all patients.
ii. Treatment of severe and complicated malaria: • Parenteral **quinine** is the recommended treatment for the management of severe malaria for all patients. Parenteral **Artesunate** or **artemether** are the alternatives. Rectal artesunate shall be used as pre-referral treatment for severe malaria.
iii. Intermittent preventive treatment (IPT) of malaria in

pregnancy:

- **Sulfadoxine/Pyrimethamine (SP)** is the recommended medicine for IPT.

iv. Treatment of uncomplicated malaria for special groups

Pregnant women

- ACTs are contraindicated during the first trimester; Quinine should be used instead.
  Artemether/Lumefantrine or other Artemisinin Combined Treatment (**ACTs**) can be used after the first trimester.

Children below 4 months of age:

- Artemether/Lumefantrine or other ACTs are not recommended for children below 4 months of age or 5kg body weight. Such children should be treated with **quinine**.

Dosage of Coartemether tablets (Artemether 20mg & Lumefantrine 120mg)

Weight (kg)	Age	Day 1	Day 2	Day 3
5 – 14	4 months to 3 years	1 tablet twice a day/12 hourly	1 tablet twice a day/12 hourly	1 tablet twice a day/12 hourly
15-24	3 years to 7 years	2 tablets twice a day/12 hourly	2 tablets twice a day/12 hourly	2 tablets twice a day/12 hourly
25 – 34	7 years to	3 tablets twice a	3 tablets twice a	2 tablets twice a

	12 years	day/12 hourly	day/12 hourly	day/12 hourly
>35	12 years and above	4 tablets twice a day/ 12 hourly	4 tablets twice a day/ 12 hourly	4 tablets twice a day/ 12 hourly

The WHO recommended dosage for artesunate (AS) and amodiaquine (AQ) is shown in the following tables:

Dosage of artesunate tablets

Age	Artesunate		
	Day1	Day 2	Day 3
5-11 months	15mg (=½ tab)	15mg (=½ tab)	15mg (=½ tab)
1-6 years	50mg (=1 tab)	50mg (=1 tab)	50mg (=1 tab)
7- 13 years	100mg (=2 tabs)	100mg (=2 tabs)	100mg (=2 tabs)
>13yrs	200mg (=4 tabs)	200mg (=4 tabs)	200mg (=4 tabs)

Dosage of amodiaquine

Age	Amodiaquine		
	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	153mg (=1 tab)	153mg (=1 tab)	153mg (=1tab)

7- 13 years	306mg (=2 tabs)	306mg (=2 tabs)	306 mg (=2 tabs)
>13yrs	612mg (=4 tabs)	612mg (=4 tabs)	612mg (=4 tabs)

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

Age	Weight	Dose (to be given every 8 hours for 7 days)
3 months to 1 year	5-10kg	75mg (=¼ tab)
1 year to 5 years	10-18kg	150mg (=½ tab)
5 years to 7 years	18-24kg	225mg (=¾ tab)
7 years to 10 years	24-30kg	300mg (=1 tab)
10 years to 13 years	30-40kg	375mg (1 ¼ tab)
13 years to 15 years	40-50kg	450mg (=1 ½ tab)
15 years and over	over 50kg	600mg (=2 tabs)

Treatment with IV quinine

This is used for treatment of severe malaria

- **IV line**: Establish an IV infusion line
- **Fluids**: Correct dehydration by assessing and administering fluid requirements according to body weight
- **Antipyretic**: Reduce body temperature if >38.5^{o}C:
  - ► **Paracetamol** 1g max = 4g/day
    Child: 10mg/kg every 6 hours
  - ► Tepid sponging or fanning
- Anticonvulsant: Treat detectable causes (e.g. hypoglycaemia, hyperpyrexia). Then if necessary, give

an anticonvulsant, e.g. **diazepam** 200 micrograms (0.2mg)/ kg (max: 10mg) rectally, IV or (in adults) **IM**

- IV antimalarial

At a health unit **without** admission and IV drug administration facilities

- Give a pre-referral dose of **quinine** 10mg/kg **IM** diluted to a strength of 100mg/mL and administered as described in the notes below (maximum loading dose 1200mg
- Refer for further management

At a health unit **with** admission and IV drug administration facilities

- Give rectal **artesunate** or **quinine** 10mg/kg
  - Give IV infusion in 5-10mL/kg of **glucose 5%** and run over a 4 hour period

  NB. Do **not** give a 20mg/kg loading dose of quinine
- Continue with doses of 10mg/kg every 8 hours until patient improves and can take oral medication
- Then change to **oral quinine** 10mg/kg every 8 hours (see notes below) and continue quinine treatment for at least 72 hours

After 72 hours

- Either continue with **quinine** to complete a full 7 days **quinine** treatment (from start of IV quinine)) or give an alternative to oral quinine, such as **sulfadoxine/ pyrimethamine** (SP)

IM quinine (dose dilution)

For pre-referral doses or if it is not possible to give quinine IV

- Dilute to a concentration of 100mg/mL

- Give the dose IM (10mg/kg every 8 hours)
  For example, for an ampoule of 600mg/2mL, add 4mL of water for injection to get 600mg in 6mL (=100mg/mL)

If the diluted volume for the required dose is >3ml:

- Give half the volume into the anterior right thigh and the other half into the anterior left thigh
- Repeat the procedure every 8 hours until the patient can take oral medication then change to oral quinine

2.7.3. Management of complications of severe malaria

- *Hypoglycaemia*: Give glucose 50%
  0.5-1mL/kg as an IV bolus diluted with an equal volume of water for injections
  - Give glucose dose by NGT if IV route not possible
  - 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 50mL IV
  - Monitor plasma pH
- *Pulmonary oedema*
  - Regulate the IV infusion
  - Prop up the patient
  - Give **oxygen**
  - Give **furosemide**
- *Acute renal failure*
  Urine output: <17mL/hour (adult) or <0.3mL/kg/hour (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** 40mg IM or slow IV (*child*: 1mg/kg)
If this fails: Arrange for peritoneal or haemodialysis

- *Severe anaemia*
  - Do blood grouping and cross-matching
  - Transfuse patient with **packed cells** 10-15mL/kg or **whole blood** 20mL/kg especially if the anaemia is also causing heart failure
  - Repeat Hb/PCV before discharge and preferably on day 28 days after discharge
- *Shock*: If systolic BP <80mm Hg (adult) or <50mm Hg (*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
  - Review fluid balance and urinary outputs
  - Look for evidence of haemorrhage or Septicaemia and treat accordingly
- *Haemoglobinuria* (intravascular haemolysis):
  - Investigate and treat the cause
  - Discontinue any suspect medicine
  - Steroids may be of value
- *Bleeding tendency*: Transfuse patient with **whole fresh blood** to provide lacking clotting factors
- *Convulsions*: Give **diazepam** 200 micrograms (0.2mg)/kg (max: 10mg) rectally, IV, or (in adults) IM
  - If they still persist: Give **phenobarbital** 200mg IM (*child*: 10-15mg/kg) then 2.5mg/kg once or twice daily if still necessary
- *Coma*: 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 bedsores

- *Hyperpyrexia*: Give paracetamol 1g every 6 hours (*child*: 10mg/kg) + tepid sponging + fanning

Criteria for referral to regional/tertiary hospital

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

2.7.4. 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.*

In 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 the mother and foetus.

- **SP single dose** (3 tabs) in 2nd and 3rd trimesters
  - Give first dose between weeks 16-24
  - Give second dose between weeks 28-36

In HIV+ patients: Give **IPT** on three occasions between weeks 16-36 with at least 4 weeks between doses

- 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

Sickle-cell disease patients

- **Chloroquine** 300mg base weekly
  Child: 5mg(base)/kg weekly

Non-immune visitors/tourists

- **Mefloquine** 250mg once weekly
  Child: 5mg/kg weekly

Alternative for non-immune visitors

- **Chloroquine** 300mg base weekly
  Child: 5mg(base)/kg weekly
- Plus **proguanil** 200mg daily
  Child: 3mg/kg daily

2.7.5. 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 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 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 insecticides or with biological methods (e.g. larvae-eating fish)

- Give public health education on the above measures

2.8 ONCHOCERCIASIS

Chronic filarial disease.

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

- Fibrous nodules usually in pelvic girdle and lower extremities (due to adult worms)
- Intense pruritic rash, altered pigmentation, oedema and atrophy (due to microfilariae)
- Loss of elasticity leading to hanging groin and sometimes hernia

Eye

- Visual disturbances and blindness

Differential diagnosis

- Other causes of skin depigmentation e.g. yaws, burns, vitiligo
- Other causes of fibrous nodules in the skin e.g. neurofibromatosis

Investigations

- Skin snip after sunshine to show microfilariae in fresh preparations
- Excision of nodules for adult worms

- Pressure of microfilariae in the anterior chamber of the eye

Management of onchocerciasis and other filariasis

- **Ivermectin** 150 micrograms/kg once yearly **HC3**
  - See also dose table below
  - Not recommended in children <5yrs or nursing mothers
  - No food or alcohol to be taken within 2 hours of a dose

Ivermectin dose based on height

Height (cm)	Dose
> 158	12mg
141-158	9mg
120-140	6mg
90-119	3mg
< 90	Do not use

2.9 PEDICULOSIS

Infestation by lice.

Cause

- Pediculosis humanus capitis (head lice), Pediculosis humanus corporis (body lice), Phthirus pubis (pubic lice)
- 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
- Secondary bacterial infection

Differential diagnosis

- Scabies

Management HC2

- ▶ Preferably shave the affected area
- ▶ Paint the affected body surface with **benzyl benzoate application (BBA)** 25%
- ▶ Repeat after 24 hours
- ▶ Treat all household contacts at the same time

Note:

Head lice

- ◆ Do not use 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
- ◆ Health education on improving personal hygiene by regular bathing, washing of clothes

2.10 SCHISTOSOMIASIS (BILHARZIASIS)

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

Causes

- Schistosoma haematobium (urinary tract)
- S. mansoni (gut)
- S. japonicum (gut)
- The larvae form (cercariae) of *Schistosoma* penetrate the skin from contaminated water

Clinical features

S. haematobium (urinary tract)

- Painless blood stained urine at the end of urination - terminal haematuria
- Frequency of urinating (cystitis and fibrosis)
- Hydronephrosis, pyonephrosis, hypertension, uraemia

S. mansoni (GIT)

- Abdominal pain, frequent stool with bloodstained mucus
- Palpable liver (hepatomegally), signs of portal hypertension and haematemesis
- It can also be a carrier for Salmonella

S. japonicum

- Not common in Uganda

Differential diagnosis

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

Investigations

- History of staying in an endemic area
- Urine examination (for *S. haematobium ova*)
- Stool examination (for *S. mansoni ova*)
- Rectal snip (for *S. mansoni* and *S. japonicum)*
- Bladder X-ray for calcification
- IVP or ultrasound for urinary tract and liver.

Complications (not routine)

- Cystoscopy

Management

▶ **Praziquantel** 40mg/kg single dose **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

2.11 STRONGYLOIDIASIS

Strongyloides stercoralis infestation of the human intestine.

Clinical features

- Skin symptoms: Itchy eruption at the site of larval penetration
- Intestinal symptoms may occur, e.g. abdominal pain, diarrhoea, and weight loss
- Lung symptoms due to filariform 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

Differential diagnosis

- Other worm infestations

Investigations

- Stool examination for motile larvae and adult worms - several specimens should be examined
- Blood for serological tests (not routine)

Management

- **Mebendazole** 500mg single dose **HC2**
  Child <2yrs: 250mg
- Or **albendazole** 400mg single dose **HC2**
- Or **ivermectin** 150micrograms/kg single dose **HC3**
  Child: see dose table in 2.8 Onchocerciasis)

Prevention

- Avoid walking barefoot

- Ensure proper faecal disposal
- Deworm children regularly every 3-6 months

2.12 TAENIASIS (TAPEWORM INFESTATION)

Causes/types

Taenia saginata (from undercooked beef), *Taenia solium* (from undercooked pork), *Diphyllobothrium latum* (from undercooked fish)

Clinical features

T. saginata

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

T.solium

- Usually asymptomatic, but live segments may be passed
- Heavy larvae infestation causes cysticercosis (muscle pains, weakness, or fever)
- CNS involvement may cause meningo- encephalitis or epilepsy

D. latum

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

Investigations

➢ Stool: For eggs, proglottids, and rarely scolex

Management

▶ **Mebendazole** 500mg single dose **HC2**
Child <2yrs: 250mg
▶ Or **albendazole** 400mg single dose **HC2**
▶ Or **niclosamide** 2g single dose **HC4**

Child <2yrs: 500mg
Child 2-6yrs: 1g
Child >6yrs: 2g

- The tablet(s) should be chewed at breakfast
- Give a purgative 2 hours after the dose, e.g. **bisacodyl** 10mg (*child*: 5mg)

Prevention

- Avoid uncooked or undercooked pork, beef, or fish

2.13 TRICHURIASIS (WHIPWORM INFESTATION)

Infestation of the human caecum and upper colon by *Trichuris trichiura* (whipworms).

Clinical features

- May be symptomless
- Heavy infestation may cause bloody, mucoid stools, and diarrhoea
- Complications include anaemia and prolapse of the rectum

Differential diagnosis

- Other worm infestations
- Other causes of bloody mucoid stools

Investigations

- Stool examination
- Sigmoidoscopy

Management HC2

- **Mebendazole** 500mg single dose
  Child <2yrs: 250mg
- Or **albendazole** 400mg single dose

Prevention

- Ensure personal hygiene
- Ensure proper faecal disposal

- Deworm children regularly every 3-6 months

2.14 HUMAN AFRICAN TRYPANOSOMIASIS (SLEEPING SICKNESS)

A disease transmitted to humans by several species of tsetse fly belonging to the genus *Glossina.*

Cause

- Two types of trypanosomes (a protozoa) spread through the bite of tsetse fly
  - Trypanosoma rhodesiense (mostly in the Central and Eastern regions)
  - Trypanosoma gambiense (mostly in West Nile region)

Clinical features

- May be history of tsetse fly bite
- May be swelling at site of bite after 7-14 days
- Headache not responding to common analgesics
- Fever
- Lymphadenopathy (generalised)
- Weight loss
- At later stage: sleepiness (T. gambiense)
- Coma and death if not treated

Differential diagnosis

- Malaria
- TB
- Meningitis
- AIDS

Investigations

- Blood: Slides for trypanosomes
- CSF: For trypanosomes

- Aspirate from chancre or lymph node: For trypanosomes

Management

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

Management of early stage

CSF is normal

- Lymphocytes 5 cells/cubic millimetre
- Total protein <37mg/dL (by dye-binding protein assay) or <25mg/dL (by Double Standard & Centrifuge Method)
- Absence of trypanosomes (by Double Standard and Centrifuge Method)

Treatment for early stage **RR**

T. rhodesiense:

- **Suramin** IV

T. gambiense:

- **Suramin** IV
  In onchocerciasis-free areas
- Or **pentamidine** 4% or 10% IM
  In onchocerciasis-endemic areas or if the drug has not been used locally for prophylaxis

Treatment schedule for early stage

T. rhodesiense or T. gambiense (adult 50kg and over)

Day	Suramin IV	Pentamidine 4% IM	Pentamidine 10% IM
0	250mg (test dose)	200mg (5mL)	200mg (2mL)
1	-	200mg	200mg
2	500mg	200mg	200mg

3	Do LP If no trypanosomes, give five 1g doses as follows:	200mg	200mg
4	1g	200mg	200mg
5	-	200mg	200mg
6	-	200mg	200mg
10	1g	-	-
16	1g	-	-
22	1g	-	-
28	1g	-	-

Management of late stage **RR**

CSF is abnormal

See table below for detailed dose regime

T. rhodesiense

- Day 0 and 2: **Suramin** IV

Then from day 4

- **Melasorprol** 3.6% IV
- Plus oral **corticosteroids**

T. gambiense

- Preferably (if available) day 0 and day 2 start with **suramin** IV
  Or (in onchocerciasis-endemic areas):
  Pentamidine IM (day 0, 1 and 2 - as in Table above)

Then from day 4

- **Melarsoprol** 3.6% IV
- Plus oral **corticosteroids**

Note

✕ **Suramin**: Do not use this drug 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
- Use **pentamidine** instead

◆ **Corticosteroids**: Should be given to patients with late trypanosomiasis on melarsoprol who may have hypoadrenalism - the steroids may also reduce any drug reactions

Prevention

- Trapping of tsetse flies
- Clearing of bushes around homes and paths
- Early detection and treatment of cases
- Provision of latrines so that people do not go into the bush where they are likely to come into contact with tsetse flies

✕ **Cortisone**:
- Do not give this after day 24, even though the melarsoprol treatment is not yet complete
- If **prednisolone** is used instead of this, the anti-inflammatory action is similar but the correction of the hypoadrenalism will be much less marked

Treatment schedule for late stage

T. rhodesiense or T. gambiense (adult 50kg and over)

Day	Suramin IV or Melarsoprol 3.6% IV	Cortisone oral
0	Suramin 250mg (test dose)	-
1	-	-
2	Suramin 500mg	-

3	Do LP If trypanosomes present on day 4, continue with:	-
4	Melasorprol 0.5mL	50mg
5	Melarsoprol 1mL	50mg
6	Melarsoprol 1.5mL	50mg
7-10	-	50mg
11-13	-	37.5mg
14	Melarsoprol 2mL	37.5mg
15	Melarsoprol 2.5mL	37.5mg
16	Melarsoprol 3mL	37.5mg
17	-	37.5mg
18-22	-	25mg
23	Melarsoprol 3.5mL	25mg
24	Melarsoprol 4mL	25mg
25-30	-	-
31-33	Melarsoprol 5mL	-

Child doses: Calculate using body weight as follows:

- **Suramin**: 20mg/kg
- **Pentamidine**: 4mg/kg
- **Melarsoprol**: Weight (kg)/60 x adult dose

3. RESPIRATORY DISEASES

3.1 ASTHMA

A chronic inflammatory disease of the airways involving many cells which leads to muscle spasm, mucus plugging, and oedema. It results in recurrent wheezing, cough, breathlessness, and chest tightness.
Acute attacks may be caused by URTI (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)
- Difficult breathing with chest tightness and may be use of accessory muscles. May not appear very distressed in severe attack
- Wheezing, rhonchi
- Cough - usually dry, may be intermittent, persistent, or acute

Differential diagnosis

- Heart failure
- Other causes of chronic cough
- Bronchiolitis
- Bronchiectasis

Investigations

➢ Diagnosis is mainly by clinical features

Specialized investigations

➢ Lung function: Peak flow rate

- Sputum: For eosinophilia, Gram stain for bacteria (when available)

If evidence of bacterial infection

- X-ray: Chest
- Blood: Haemogram

3.1.1. Management of acute asthma attacks

- Regard each emergency consultation as being for acute severe asthma unless shown otherwise
- Failure to respond adequately at any time requires immediate referral to hospital

a) Adults and children >12

Uncontrolled asthma

Clinical features

- Speech normal
- Pulse <110 bpm
- Respiration <25 breaths/minute
- Peak flow >50% of predicted or best

Management

- Treat as an out-patient **HC3**
- Give **salbutamol** 5mg by nebuliser or inhaler 2 puffs (200µg) every 10 minutes for a 30-60 minutes
- Monitor response 30 minutes after the dose

If peak flow 50-75% of predicted or best or patient says s/he feels better, give

- **Prednisolone** 30-60mg as single dose, or in 2-3 divided doses - and step up the usual treatment

Alternatively, if peak flow >75% of predicted or best

- Step up the usual treatment
- Review within 48 hours
  - Monitor symptoms & peak flow
  - Arrange self-management plan

- Adjust treatment according to guidelines for chronic asthma

Acute severe asthma

Clinical features

- Cannot complete sentences
- Pulse ≥110 bpm
- Respiration ≥ 25 breaths/minute
- Peak flow <50% of predicted or best

Management

- Seriously consider hospital treatment if >1 of the above features are present
- **Oxygen** 40-60%
- Give **salbutamol** 5mg by nebuliser or inhaler 2 puffs (200µg) every 2-5 minutes for 20 puffs
- **Prednisolone** 30-60mg single dose
- Or **hydrocortisone** 200mg IV bolus stat
- Monitor response 30 minutes after nebulisation

If any signs of acute asthma persist

- Refer for admission to hospital
- While waiting for ambulance, repeat the **salbutamol** 5mg by nebuliser or give **aminophylline** 250mg slow IV bolus
  - But **not** if taking an oral theophylline

Alternatively, if symptoms have improved, respiration and pulse are settling, and peak flow >50%

- Step up the usual treatment
- And continue with **prednisolone**
- Review within 24 hours
  - Monitor symptoms and peak flow
  - Arrange self-management plan
  - Adjust treatment according to guidelines for chronic

asthma

Life-threatening asthma

- Silent chest
- Cyanosis
- Bradycardia or exhaustion
- Peak flow <33% of predicted or best

Management

▶ Arrange for immediate hospital referral and admission

While waiting for the ambulance

▶ Immediately give **prednisolone** 30-60mg single dose or **hydrocortisone** 200mg IV bolus stat

▶ **Oxygen** 40-60%

▶ **Salbutamol** 500 micrograms SC

▶ Or **aminophylline** 250mg slow IV bolus - but **not** if taking an oral theophylline

▶ Stay with the patient until the ambulance arrives

Notes

- Patients with severe or life-threatening asthma may not be distressed and may not have all the clinical features listed; alert the clinician if any features are present.
- If the patient says they feel very unwell, listen to them!
  - ✕ Do not give bolus **aminophylline** to any patient already taking an oral **theophylline**, e.g. **aminophylline**

b) Children <12

Acute mild asthma attack

Clinical features

- Mild dyspnoea
- Diffuse wheezes
- Adequate air exchange

- Peak flow meter reading is ≥ 80% of normal

Acute severe asthma

- Too breathless to talk or feed
- Respiration
  Child<5 years: >50 bpm
  Child ≥5years: 40 bpm
  Pulse
  Child<5 years: >140 bpm
  Child ≥5years: 120 bpm
- Use of accessory muscles of breathing (young children)
- Peak flow ≤ 50% of predicted or best (older children)

Life-threatening asthma

- Cyanosis
- Silent chest or poor respiratory effort
- Fatigue or exhaustion
- Peak flow <33% of predicted or best (older children)

Management

Mild-moderate acute episode

- ▶ Treat as an out-patient **HC3**
- ▶ **Salbutamol** tablets
  Child <2years: 100 micrograms/kg
  Child 2-6years: 1-2mg
  Child 6-12yrs: 2mg
  - Only use tablets when inhaler or nebuliser solution are not available **HC3**
- ▶ Or **salbutamol inhaler** 100 micrograms (1 puff)every 30 seconds **HC4**
  - Repeat prn up to 10 puffs until symptoms relieved (preferably give doses using a large volume spacer and face mask in the very young if available)
- ▶ Or **salbutamol** nebuliser solution 2.5mg by nebuliser

- If initial response is poor, repeat after 15 minutes
- Review after every 3-4 hours and continue if necessary with the above dose every 3-4 hours

▶ Review after 3-4 hours

If response is favourable, i.e.

- Respiratory rate ↓
- Use of accessory muscles ↓
- Improved "behaviour" pattern

▶ Repeat **salbutamol** doses above every 3-4 hours (consider doubling the dose of any inhaled corticosteroid if the patient was taking this prior to the attack)

If **salbutamol** still required every 3-4 hours after 12 hours of treatment

▶ Give 1-3 day course of **prednisolone**
Child <1 year: 1-2mg/kg/day
Child 1-4 years: Up to 20mg daily
Child 5-15 years: Up to 40mg daily

If unresponsive or relapse within 3-4 hours:

▶ Refer immediately to hospital
▶ Increase frequency of **salbutamol** doses: Give as often as required
▶ Start **prednisolone** (doses as above)
▶ Give high-flow **oxygen** via face-mask or nasal cannula

3.1.2. Management of chronic asthma

- Follow a stepped approach
  - Start at the step most appropriate to initial severity
- Rescue course
  - Give a 1-3 days "rescue course" of **prednisolone** at any step and at any time as required to control acute exacerbations of the asthma at a dose of:

Child <1 year: 1-2mg/kg daily 1-5 years: up to 20mg daily
5-15 years: Up to 40mg daily adult: 40-60mg daily for up to 3 days, then taper off during the next 4 days

- Stepping down
  - Review treatment every 3-6 months
  - If control of asthma 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
- Always check **compliance** and **inhaler technique** before stepping up

a) Adults and children >5

Step 1: Occasional relief bronchodilator

- Inhaled short-acting beta$_2$ agonist e.g. **salbutamol** inhaler 1-2 puffs (100-200 micrograms) when necessary up to **once daily**
  - Move to Step 2 if more than this is needed or there are night-time symptoms
- Or **salbutamol** tablets: 2-4mg as above
  - Only use if inhaler not available as less effective

Step 2: 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
  - Higher dose may be needed initially to gain control

- Doubling of the regular dose may be useful to cover exacerbations

Step 3: Regular high-dose inhaled corticosteroids

- ▶ **Salbutamol** inhaler 1-2 puffs prn up to 2-3 hourly
  - Usually 4-12 hourly
- ▶ plus **beclomethasone** (inhaler) 0.4-1mg every 12 hours

Step 4: Regular corticosteroid tablets

- ▶ **Salbutamol** (as in Step 3)
- ▶ Plus regular high-dose **beclomethasone** (as in Step 3)
- ▶ Plus regular **prednisolone** 10-20mg daily after breakfast

b) Children <5

- If available, use a large-volume spacer for inhaler doses
  - ✕ Avoid oral corticosteroids in children below 12 years

Step 1: Occasional relief bronchodilator

- ▶ Short-acting beta$_2$ agonist (not more than once daily), e.g. **salbutamol inhaler** 1-2 puffs (100-200 micrograms)
  - This is the preferred route as it is more effective and has less side-effects
- ▶ Or **salbutamol tablets**:
  Child <2: 100 micrograms/kg 2-5years: 1-2mg
- ▶ Move to Step 2 if more than this is needed or there are night-time symptoms

Step 2: Regular inhaled preventer therapy

- ▶ **Salbutamol** prn (doses as in Step 1)
- ▶ Plus regular standard paediatric dose inhaled corticosteroid, e.g. **beclomethasone inhaler** 50-100 micrograms (1-2 puffs) 2-4 times daily
  - Initial dose depends on age, weight and severity of asthma

- Assess effect after 1 month and adjust the dose prn;

If control not adequate, consider doubling the dose for 1 month

Step 3: Increased-dose inhaled corticosteroids

- **Salbutamol** prn (doses as in Step 1)
- Plus regular high paediatric dose inhaled corticosteroid, e.g. **beclomethasone inhaler** 100-200 micrograms (2-4 puffs) 2-4 times daily
- Consider a short "rescue" course of oral **prednisolone**

Step 4: Regular higher-dose inhaled corticosteroids + regular bronchodilator

- **Salbutamol** prn (doses as in Step 1)
- Plus regular higher-dose inhaled corticosteroid, e.g. **beclomethasone** up to 2mg daily in divided doses
- Consider
  - A short "rescue course" of oral **prednisolone**
  - Nebulised **salbutamol**
    Child >18 months: 2.5mg up to 4 times daily (increase to 5mg/dose if necessary)

If there is suspicion of infection (fever, purulent yellow sputum), add 7-10 day course of an antibiotic

- **Amoxicillin** 500mg every 8 hours
  Child: 15mg/kg per dose
- Or **cotrimoxazole** 480mg every 12 hours
  Child: 24mg/kg per dose

Alternative in severe infection

- **Benzylpenicillin** 1-2 MU IV or IM every 6 hours for 5 days
  Child: 50,000 IU/kg per dose

Caution

- ✕ Do not give drugs such as morphine, propranolol, or

other B-blockers to patients with (family history of) asthma as they cause worsening of 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

3.2 BRONCHIOLITIS

Acute inflammatory obstructive disease of small airways (bronchioles) common in children <1 year.

Causes

- Mainly viral
- Mycoplasma

Clinical features

- Disease of infants, sudden onset
- Fever
- Cough
- Difficulty in breathing, wheezing
- Mucoid nasal discharge

Differential diagnosis

- Asthma
- Pneumonia
- Foreign body inhalation

- Heart failure
- Whooping cough

Investigations

- By clinical features
- X-ray: Chest
- Blood: Haemogram

Management

Bronchiolitis is viral but if there is suspicion of secondary bacterial infection, then an antibiotic can be given

Mild-moderate

- Wheezing, 50-60 breaths/minute, no cyanosis

- Treat the symptoms (possibly as an out-patient)
- PPF 20,000 IU/kg IM once daily for 5 days **HC3**

Severe

Wheezing, fast breathing >60 breaths/minute, cyanosis

- Admit
- Give nasal **oxygen**
- **Benzylpenicillin** 50,000-100,000 IU/kg IV or IM every 6 hours for 5 days **HC4**
- Or **chloramphenicol** 25mg/kg IV or IM every 6 hours for 5 days
- **Salbutamol** 1mg every 8 hours until wheezing controlled
  - May not be useful in non-recurrent wheezing and in the very young
- Give as much oral fluids as the child will take: e.g. **ORS**
  - Give basic total fluid requirement of 150mL/kg/24hrs plus extra to cover increased losses due to illness (see also Dehydration)

Prevention

- Avoid exposure to cold and viral infections

3.3 ACUTE BRONCHITIS

Acute inflammatory disease of the bronchi.

Causes

Bacterial

- Streptococcus pneumoniae
- Haemophilus influenzae

Predisposing factors

- Viral infections of the respiratory tract
- Whooping cough
- Dust, smoke
- Exposure to cold
- Cigarette smoking

Clinical features

- Irritating, productive cough sometimes with scanty mucoid, blood streaked sputum
- Chest tightness sometimes with wheezing
- Fever may be present

Differential diagnosis

- Bronchial asthma
- Emphysema
- Pneumonia
- Tuberculosis

Investigations

- Diagnosis based on clinical features
- Chest X-ray
- Pulmonary function tests

Management

Most cases are viral and mild

- **Paracetamol** 1g every 4-6 hours (max: 4g daily)
  Child: 10mg/kg (max: 500mg) per dose

▶ Plenty of oral fluids **HC2**

If there is suspicion of bacterial infection or if a WBC count shows leucocytosis, give 5-day course of

▶ **Doxycycline** 100mg every 12 hours
Child >8years: 2mg/kg per dose
✕ Contraindicated in pregnancy

▶ Or **cotrimoxazole** 960mg every 12 hours
Child: 24mg/kg per dose

▶ Or **amoxicillin** 500mg every 8 hours
Child: 15mg/kg per dose

Prevention

- Avoid predisposing factors above

3.4 CORYZA (COMMON COLD)

Acute inflammation of the upper respiratory tract.

Cause

- Viruses - several types, often rhinoviruses

Clinical features

- Onset usually sudden
- Tickling sensation in nose and sneezing
- Throat dry and sore
- Profuse nasal watery discharge
- Thick purulent nasal discharge - suggests secondary infection

Complications

- Sinusitis
- Lower respiratory tract infection (pneumonia)
- Deafness, otitis media
- Headache
- Earache

Differential diagnosis

- Nasal allergy

Management HC2

Common cold is a viral disease and so does **not** require any antibiotics. Give only symptomatic treatment

- ▶ Increase fluid intake, preferably warm drinks
- ▶ Give analgesics

For breastfeeding children

- ▶ Continue breastfeeding
- ▶ Clear the nose to ease breathing or feeding
- ▶ Keep the child warm

Prevention

- Avoid contact with infected persons
- Include adequate fresh fruits and vegetables in the diet

3.5 ACUTE EPIGLOTTITIS

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.

Cause

Bacterial infection, almost always *Haemophilus influenzae*

Clinical features

- Fever
- Sore throat
- Stridor and cough
- Asphyxia leading to quick death

Differential diagnosis

- Laryngeal causes of stridor e.g. laryngotracheobronchitis

Caution

△ Avoid tongue depression examination as this may cause complete airway blockage and sudden death

Management HC 4

- ▶ Admit and treat as an emergency – intubation or tracheostomy may often be needed
- ▶ Give **chloramphenicol** 25mg/kg IM or IV every 6 hours for 5 days

3.6 INFLUENZA ("FLU")

A specific acute respiratory tract illness occurring in epidemics and occasionally pandemics.

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

Due to secondary bacterial infection

- Tracheitis
- Bronchitis
- Bronchiolitis
- Bronchopneumonia

Others

- Depression

- Toxic cardiomyopathy and sudden death

Differential diagnosis

- Other respiratory viral infections

Investigations

- Isolation of virus
- Viral serology to identify virus

Management **HC2**

If no complications: treat symptoms

- **Paracetamol** 1g every 4-6 hours prn (max daily: 4g)
  Child: 10mg/kg per dose

For nasal congestion

- Use steam inhalation prn **HC2**
- Or **xylometazoline** nose drops 0.05% 2-3 drops into each nostril 3 times daily (max: 7 days) **HC4**

In the breastfeeding child

- If blockage interferes with breastfeeding: - clean/clear nose with physiological saline
- Keep child warm
- Breast-feed more frequently

For troublesome cough

- Frequent warm drinks
- Check for secondary bacterial infections and manage or refer

Prevention

- Avoid contact with infected persons

3.7 LARYNGITIS

An acute non-suppurative infection 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
- Bacteria: Mycoplasma pneumoniae
- Excessive use of the voice, allergic reactions, inhalation of irritating substances, e.g. cigarette smoke

Clinical features

- Onset similar to any upper respiratory tract infection
- Fever usually mild
- Stridor common
- Airway obstruction with difficulty in breathing
- Suprasternal and intercostal recession on inspiration
- Hypoxia, restlessness, anxiety, cyanosis

Differential diagnosis

- Diphtheria
- Whooping cough
- Laryngotracheobronchitis
- Foreign body aspiration
- Epiglottitis
- Bacterial tracheitis
- Asthma
- Airway compression by extrinsic mass, e.g. Haemangioma, tumours, cysts

Investigations

- Blood: Haemogram
- X-ray: Chest
- Laryngeal swab for C&S

Management HC2

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

If definite signs of bacterial infection: (all 5-day courses)

- ▶ **Doxycycline** 100mg daily
  - ✕ contraindicated in pregnancy
- ▶ Or **cotrimoxazole** 960mg every 12 hours
- ▶ Or **amoxicillin** 500mg every 8 hours

3.8 ACUTE LARYNGOTRACHEOBRONCHITIS

An acute inflammation of larynx, trachea and bronchi primarily in children <3yrs. Also known as croup.

> **Note**: Secondary bacterial infection is rare, therefore antibiotics are rarely needed

Cause

- Measles virus
- Influenza and Parainfluenza type 1 viruses
- Rarely - superinfection with bacteria
  For example: *Haemophilus influenzae*

Clinical features

Early phase (mild croup)

- Symptoms of cough - may be paroxysmal
- Common cold

Late phase (severe croup)

- Severe dyspnoea and stridor (noisy breathing)
- Cyanosis (blue colouration of the baby - especially extremities and mouth)
- Asphyxia (suffocation)

Management

△ Avoid throat examination

- Gagging can cause acute obstruction

Mild croup **HC2**

- ▶ Isolate patient, ensure plenty of rest
- ▶ Keep well hydrated with **oral fluids**
  - Use oral rehydration solution
- ▶ Give analgesics
  - ✕ Do not give antibiotics

If condition is severe **HC4**

- ▶ Admit the patient
- ▶ Ensure close supervision
- ▶ **Chloramphenicol** 25mg/kg IV or IM every 6 hours for 5 days
- ▶ Give humidified **oxygen** 30-40%
- ▶ Keep well hydrated with **IV fluids**
  Use **Darrow's solution** ½ strength in **glucose** 2.5%
- ▶ Consider use of steroids: **hydrocortisone** slow IV or IM
  Child <1yr: 25mg; 1-5yrs: 50mg; 6-12 years: 100mg
- ▶ Or **dexamethasone** 300 micrograms/kg IM
- ▶ Repeat steroid dose after 6 hours if necessary

If severe respiratory distress develops

- Carry out nasotracheal intubation or tracheostomy if necessary

Prevention

- Avoid contact with infected persons
- Isolate infected persons
- Immunise against measles

3.9 LUNG ABSCESS/ASPIRATION PNEUMONIA

Localised inflammation and necrosis (destruction) of lung tissue leading to pus formation.

Cause

- Aspiration of infected material from upper airway

- Infection of lungs with pus forming organisms: e.g. *Klebsiella pneumoniae, Staphylococcus aureus*
- Septic pulmonary emboli
- Secondary infection of pulmonary infact
- Direct extension of liver abscess through the diaphragm
- Complicating bronchogenic carcinoma

Predisposing factors to aspiration

- Altered consciousness from various causes: e.g. alcoholism, epilepsy, general anaesthesia, excessive sedation, cerebrovascular accident
- Bronchial obstruction
- Intestinal obstruction

Clinical features

- Onset is acute or chronic
- Malaise, loss of appetite
- Cough with purulent sputum, foul smelling breath
- Sweating with chills and fever
- 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

- X-ray: Chest
  - Early stages: Signs of consolidation
  - Later stages: A cavity with a fluid level
- Sputum: For microscopy and culture

Management HC4

- **Benzylpenicillin** 1-2 MU IV or IM every 4-6 hours
  Child: 50,000-100,000 IU/kg per dose (max: 2MU)
- Plus **metronidazole** 500mg IV every 8-12 hours for
  Child: 12.5mg/kg per dose

Once improvement occurs, change to oral medication to complete a 10-14 day course

- **Metronidazole** 400mg every 12 hours
  Child: 10mg/kg per dose
- Plus **phenoxymethylpenicillin** 500-750mg every 6 hours
  Child: 10-20mg/kg per dose
- Postural drainage - surgical drainage is rarely necessary

Prevention

- Early detection and treatment of pneumonia
- Avoid situations which lead to aspiration

3.10 PERTUSSIS (WHOOPING COUGH)

An acute bacterial respiratory infection characterised by an inspiratory whoop following paroxysmal cough.

Cause

- Bordetella pertussis, spread by droplet infection

Clinical features

Stage 1: Coryzal (catarrhal)

- Most infectious stage
- Running nose, mild cough, slight fever

Stage 2: Paroxysmal

- More severe and frequent repetitive cough ending in a whoop, vomiting, conjuctival haemorrhage

Stage 3: Convalescent

- Paroxysmal symptoms reduce
- Cough may persist

Complications may include

Respiratory

- Pneumonia
- Atelectasis
- Emphysema
- Bronchiectasis
- Otitis media

Nervous system

- Convulsions and coma
- Intracranial haemorrhage

Others

- Malnutrition, inguinal hernia, rectal prolapse

Differential diagnosis

- Chlamydial and bacterial RTI
- Foreign body in the trachea

Investigations

- Blood: Haemogram
- X-ray: Chest

Management

Fluids and maintenance of nutrition are crucial in the management of pertussis

Cough mixtures, sedatives, mucolytics, and antihistamines are **useless** in pertussis and should **not** be given

Do not use antibiotics unless pertussis is complicated with pneumonia or otitis media

General management

- ▶ 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 immunization schedule

Prevention

- Educate parents on the importance of following the immunization schedule
- Ensure good nutrition
- Avoid overcrowding

3.11 PNEUMONIA (PYOGENIC)

Infection and inflammation of the lungs - two major types

- *Bronchopneumonia* involving the bronchi
  - Common in children and the elderly
- Lobar pneumonia involving one or more lobes
  - Common in young people

Causes

- Aspiration of secretions from the upper airways, and inhalation of droplets small enough to reach the alveoli containing pathogenic organisms
  - Pathogens vary according to age and whether infection acquired in community or hospital (Gram negative are more common in hospital)
- Direct spread from penetrating wound or nearby tissues

Clinical features

Bronchopneumonia

- Rapid breathing

Age group	Breaths/minute
0-2 months	>60
2-12 months	>50
12-60 months	>40
Adult & children >5 years	>30

- Cough
- Lung crepitations (crackles, rales) heard with a stethoscope
- Fever, cough, flaring of nostrils, purulent sputum, high pulse rate, and lethargy

In severe cases

- Chest indrawing
- Cyanosis

Lobar pneumonia

- Chest (pleural) pain of sudden onset, rigors, vomiting, convulsions, very high temperature, malaise, loss of appetite, aching body, localized pain in the chest
- Tenacious sputum
  - Rust coloured occasionally blood stained
- Respiration is rapid, shallow, and painful
- Rapid pulse, hot dry skin, cyanosis, herpes labialis
- Bronchial breathing is heard with a stethoscope

Note

- Extrapulmonary features, e.g. confusion or disorientation, may predominate and may be the only signs of pneumonia in
  - The elderly

- Immunosuppressed patients (e.g. HIV/AIDS)
- Malnourished children

Differential diagnosis

- Malaria
- Lung fibrosis
- Lung infarction
- Pleural effusion
- Heart failure
- Inflammation below the diaphragm, e.g. in liver abscess

Investigations

- X-ray: Chest
- Sputum: For Gram stain, Ziehl-Neelsen (ZN) stain, culture for AFB, guinea-pig culture
- Blood: Full haemogram

3.11.1. Pneumonia in an infant of 1 week up to 2 months

In neonates, 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.

Causes

The most likely pathogens are

- *Streptococcus pneumonia*
- *Group B streptococci*
- *Escherichia coli*
- *Enterobacteriaceae*
- *Chlamydia trachomatis*
- Severe cases may be caused by *Staphylococcus aureus*

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

Management

- Treat for at least 5 days
- Continue treatment for 3 days after the child is well
- If meningitis is suspected, continue for 14 days
- *In premature babies*, the doses below may need to be reduced

▶ Give a first dose of **benzylpenicillin** **HC2**
50,000 IU/kg IM

▶ Plus **chloramphenicol** 40mg/kg IM

▶ Refer immediately

If referral is not possible

▶ Continue with the above drugs every 6 hours for at least 5 days

After referral and admission

▶ **Ampicillin** 25-50mg/kg IV every 6 hours **HC3**

▶ Plus **gentamicin** 2.5mg/kg IV every 8 hours
Neonates <7 days old: give doses every 12 hours
- Continue both drugs for at least 5 days

Alternative (only use if above not available)

▶ **Chloramphenicol** 25mg/kg IV every 12 hours for at least 5 days (contraindicated in premature babies and neonates <7 days old)

In severely ill infants

- **Ceftriaxone** 100mg/kg IV once daily for 5 days
  - If available at higher referral levels, this may be the drug of choice
  - If septicaemia is suspected: continue treatment for 10 days

Note

- Keep the baby warm
- Breastfeeding should be continued and more frequent
- If the baby cannot suckle, give expressed breast milk

3.11.2. Pneumonia in a child of 2 months-5 years

Causes

- Usually due to *S.pneumoniae* or *H.influenzae*
- Occasionally due to *Staphylococcus aureus*, which should be suspected if there is
  - Clinical deterioration despite treatment with chloramphenicol or other appropriate antibiotic or presence of pneumatocele or empyema

Clinical features

- Cough with difficulty in breathing
- May be signs of chest indrawing
- Rapid breathing: 2-12 months: >50 breaths/minute
- 12-60 months: >40 breaths/minute
- Fever

Management of pneumonia

- Give **vitamin A** to all children with pneumonia
  Child 6-11 months: 100,000 IU single dose
  Child 1-6yrs: 200,000 IU single dose
  Treat fever: **Paracetamol 10mg/kg** every 8 hours for 3 days

- **Cotrimoxazole** 24mg/kg every 12 hours for 5 days
- Or **PPF** 50,000 IU/kg IM daily for at least 3 days **HC3**
  - Once clinical improvement occurs, **amoxicillin** 15-25mg/kg may be used to complete the course of at least 5 days
- Or **amoxicillin** 15-25mg/kg every 8 hours for 5 days**HC4**

If wheezing present

- **Salbutamol** 100 micrograms (0.1mg)/kg every 8 hours until wheezing stops **HC3**
- Reassess child for progress

3.11.2.1 Severe pneumonia

Clinical features

- Cough or difficult breathing with one or more of
  - Chest indrawing
  - Nasal flaring
  - Grunting (in young infants)
- Other clinical signs include
  - Chest crepitations
  - Bronchial breathing
  - Pleural rub

Management HC4

- At lower levels, give the 1st dose of antibiotic of **amoxicillin**

Or if patient cannot swallow

- **Benzylpenicillin** 50,000-100,000 IU/kg IV or IM
- Refer immediately for further management
- Give **oxygen** by nasal catheter
- Continue **benzylpenicillin** 50,000 IU/kg IV or IM every 6 hours
- Monitor and record as in very severe pneumonia

Once the patient improves

- Switch to oral **amoxicillin** 15mg/kg every 8 hours for 5 days to complete a total of at least 5 days of antibiotics

If no improvement in 2 days or condition deteriorates

- Switch to **chloramphenicol** 25mg/kg IV every 6 hours until the child improves then continue with oral **chloramphenicol** for a total of 10 days
- Give supportive care as outlined for very severe pneumonia

3.11.2.2 Very severe pneumonia HC4

Clinical features

- Cough or difficult breathing with one or more of:
  - Central cyanosis
  - Severe respiratory distress
  - Inability to breastfeed or drink
  - Vomiting everything
  - Convulsions, lethargy, or unconsciousness

Management HC4

- Admit the child
- Give **chloramphenicol** 25mg/kg IV or IM every 6 hours until the child has improved then continue with oral chloramphenicol for a total course of 10 days

If chloramphenicol is not available

- Give **benzylpenicillin** 50,000 IU/kg IV or IM every 6 hours
- Plus **gentamicin** 2.5mg/kg every 12 hours for a total course of 10 days
- Give **oxygen**
- Offer supportive care including
  - **Paracetamol** 10mg/kg every 4-6 hours for high fever

- A bronchodilator for wheezing, e.g. **salbutamol** 100 micrograms (0.1mg)/kg every 8 hours until wheezing stops
- Gentle suction of thick secretions from upper airway
- Daily maintenance fluids

If convulsions present

- **Diazepam** 500 micrograms (0.5mg)/kg orally or rectally, repeated prn after 10 mins (rectal) or 30 mins (oral) or 50-200 micrograms (0.05-0.2mg)/kg IV or IM
  - Repeat after 10 minutes if necessary and then prn for a maximum of 3 doses

If convulsions are continuous

- Give a long-acting anticonvulsant, e.g. **phenobarbital** 10-15mg/kg IM as a loading dose. Depending on response, repeat this dose after 12 hours or switch to oral maintenance dose of 3-5mg/kg every 8-12 hours
- Monitor and record
  - Respiratory rate (every 2 hours)
  - Body temperature (every 6 hours)
  - Improvement in appetite and playing
  - Use of accessory muscles of respiration
  - Ability to breastfeed, drink and eat

If not improved in 2 days

- Switch to **gentamicin** 2.5mg/kg every 12 hours
- Plus **cloxacillin** 50mg/kg IV or IM every 6 hours for possible *staphylococcal pneumonia*
- Continue treatment for 2 weeks

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 suggestive of staphylococcal pneumonia

3.11.2.3 Pneumonia in severely malnourished child

- May present with cough or difficult breathing or be asymptomatic
- Is usually caused by the organisms that commonly cause pneumonia in other children (pneumococci, *Haemophilus influenzae* and S.aureus)

Assess for

- Respiratory rate (may be normal)
- Note signs of respiratory distress if any
- Listen to the chest for air entry and added sounds
- Complete the examination and do a chest X-ray
- If there is evidence of pleural effusion investigate for tuberculosis and pyothorax

Management

- ▶ Administer antibiotics parentally (IV/IM)
- ▶ Give **chloramphenicol** 25mg/kg every 6 hours for 10-14 days

If chest X-ray suggests Staphylococcal pneumonia

- ▶ Give **cloxacillin** 50mg/kg every 6 hours
- ▶ Plus **gentamicin** 2.5mg/kg every 12 hours for 10-14 days
- ▶ Give **oxygen** if
  - Breathing >70 breaths/minute
  - Cyanosis

In respiratory distress (e.g. use of accessory muscles of respiration)

- ▶ Attend to fluid needs depending on level of dehydration
- ▶ Manage severe malnutrition

3.11.3. Pneumonia in children >5 yrs and adults

Causes

- Most important pathogen in this age group is *S.pneumoniae*, followed by atypical bacteria, e.g. *Mycloplasma pneumoniae*, *Chlamydia pneumoniae*, *Legionella spp*., and *Coxiella burnetti*

Clinical features

Moderate

- Cough
- Rapid breathing
- No chest indrawing
- Fever

Severe

- All symptoms in moderate pneumonia
- Chest indrawing
- Pulse >120/minute
- Temperature >39.5oC
- Low BP <90/60 mmHg

Predisposing/risk factors

- Malnutrition
- HIV infection
- Being elderly
- Pre-existing lung disease or heart disease
- Renal failure
- Diabetes
- Alcohol dependence

Management

Moderate pneumonia (ambulatory patients)

- **Cotrimoxazole** 960mg every 12 hours for 5 days **HC2**
  Child: 24mg/kg per dose
- Or **doxycycline** 100mg every 12 hours for 7-10 days
  Child >8yrs only: 2mg/kg per dose
  ✕ Contraindicated in pregnancy
- Or **amoxicillin** 500mg every 8 hours for 5 days
  Child: 15mg/kg per dose
- Or **erythromycin** 500mg every 6 hours for 5 days
  - 14 days in cases of atypical pneumonia

  Child: 10-15mg/kg per dose
- Or **PPF** 20,000 IU/kg IM once daily for 5 days **HC2**

Severe pneumonia (hospitalised patients)

- At lower levels, give 1st dose of antibiotic
  benzylpenicillin 2MU IV or IM daily every 4-6 hours for 5 days
  Child: 50,000-100,000 IU/kg per dose
- Or **chloramphenicol** 1g IV every 6 hours for 7 days
  Child: 25mg/kg per dose (max: 750mg)
- Refer immediately for continuation of treatment
- Give nasal **oxygen** **HC4**

Alternative 7-day regimes

- **Benzylpenicillin** 2MU IV or IM daily every 4-6 hours
  Child: 50,000-100,000 IU/kg per dose
- Plus **gentamicin** 5-7mg/kg IV daily in divided doses
  Child: 7.5mg/kg IV daily in 1-3 divided doses
  ✕ Contraindicated in pregnancy
- **Ceftriaxone** 1g IV or IM every 12-24 hours
  Child: 50mg/kg per dose (max: 1g)

For pneumonia due to *Staph. Aureus*

- Cloxacillin 1-2mg every 6 hours

3.11.4. Atypical pneumonia (ambulatory patients)

Due to *Mycoplasma pneumoniae*

- **Doxycycline** 100mg every 12 hours for 7-10 days **HC4**
  Child >8 years: 2mg/kg per dose
  ✕ Contraindicated in pregnancy
- Or **erythromycin** 500mg every 6 hours for 5 days **HC3**
  Child: 10-15mg/kg per dose

3.11.5. Klebsiella pneumonia

- **Gentamicin** 5-7mg/kg IV daily in divided doses **HC3**
- Or **ciprofloxacin** 500mg every 12 hours **HC2**
  Child: **chloramphenicol** 25mg/kg every 6 hours **HC3**
  - Give a 5-day course
  - Amend therapy as guided by C&S results

3.11.6. Pneumococcal pneumonia

- **Benzylpenicillin** 50,000 IU/kg IM every 6 hours for 2 days **HC3**
- Then **PPF** 800,000 IU IM once daily for 5 days

3.11.7. Pneumocystis Jiroveci pneumonia

- **Cotrimoxazole** 80mg/kg every 6-8 hours for at least 14 days **HC4**
  - In an adult >60kg = 10 tablets of 480mg per day
  - Extend duration to 21 days if necessary depending on response

Or (in patients who cannot tolerate or do not respond to cotrimoxazole)

- **Pentamidine** 4mg/kg by IV infusion daily **H**
  - Reduce dose in renal impairment
  - Avoid direct bolus injections whenever possible but if unavoidable, **never** give rapidly

- Plus **prednisolone** 2mg/kg daily in 3 divided doses for 5 days then reduce dose to complete 21 days treatment
  - Ideally start at the same time as the anti-PCP therapy above and certainly not more than 72 hours later

Alternative regime (21-day course) if above not available/ tolerated

- **Clindamycin** 300-450mg every 6 hours **H**
  - Very severe cases: up to 600mg per dose
  - Discontinue treatment if diarrhoea occurs
- Plus **primaquine** 15mg every 6 hours

Prophylaxis

Give to all patients with history of PCP infection and consider also for severely immunocompromised patients

- **Cotrimoxazole** 960mg daily or on alternate days
  - Continue until immunity recovers sufficiently

3.11.8. Pneumonia due to *Staph. aureus*

This form is especially common following a recent influenza infection.

Management **HC4**

Adults & children >5 years:

- **Cloxacillin** 1-2g IV or IM every 6 hours for 10-14 days
  Child >5 years: 50mg/kg per dose (max: 2g)

Children 2 months-5 years

- **Cloxacillin** 25-50mg/kg IV or IM every 6 hours
- Plus **gentamicin** 7.5mg/kg IV in 1-3 divided doses daily
  - Continue both drugs for at least 21 days

3.12 TUBERCULOSIS (TB)

A chronic infection caused by Mycobacteria.
For more information on the management of TB see:

- TB Control & Community-based DOTS as an Essential Component of District Health Service
- Manual of the National TB/Leprosy Programme in Uganda
- TB Desk Aide

Causes

- Mycobacterium tuberculosis
- Mycobacterium bovis

Transmitted by droplet infection and through drinking unpasteurised milk

Clinical features

- Chronic cough of >2 weeks (two weeks or more; however, in HIV settings, any cough)
- Chest pain
- Purulent sputum occasionally blood-stained
- Fevers with excessive night sweats
- Weight loss
- Loss of appetite
- Localized enlargement of lymph nodes depending on the site affected

Complications include

- Massive haemoptysis - coughing up >250mL blood per episode
- Spontaneous pneumothorax
- Pleural effusion
- Gastrointestinal TB (TB peritonitis)
- Tuberculous meningitis
- TB pericarditis
- Bone TB (TB spine, TB joints with deformity)

Differential diagnosis

- Histoplasma pneumonia
- Trypanosomiasis
- HIV/AIDS
- Malignancy
- Brucellosis

Investigations

- Sputum (x2): for AAFBs (ZN stain), if one is positive treat culture. If one or more positive treat, otherwise do other investigations e.g. X-ray, U/S for addominal presentations. For HIV positive, if smear negative, refer for PCR Test-Gene xpert test
- X-Ray: Chest - especially children
- Blood: Full haemogram especially ESR, lymphocytes

Management

The country has adopted community-based TB care with **DOTS** (Directly Observed Therapy Short- Course).
All cases of TB are treated with short course regimens as shown in the table below. Fixed dose combinations (FDC) are encouraged as they may improve compliance.

a) Pulmonary TB **H, HC4, HC3**

(Tuberculosis Treatment Units (TB DTUs).
Treatment is divided into:

- An Initial (Intensive) Phase of 2-3 months and
- A second **Continuation Phase** of 4-6 months depending on the drug combinations used

TB treatment regimens are expressed in a standard format, e.g. **2 RHZE/6 EH or 2RHZE/4RH** where:

- Letters represent abbreviated drug names
- Numbers show the duration in months
- / shows the division between treatment phases

Drugs used:
R = rifampicin, **H** = isoniazid, **Z** = pyrazinamide,
E = ethambutol, **S** = streptomycin

The following regimens are recommended for use in Uganda – see table below:

Short-course TB Treatment Regimes

Category	Diagnostic category	Intensive Phase	Continuation phase
Adult	New patient Regimen - New smear positive - Smear negative PTB with extensive parenchymal involvement - Severe forms of EPTB other than TB meningitis and TB spine	2 RHZE	4HR
	Extra-pulmonary tuberculosis - TB meningitis - TB spine - Abdominal TB	2RHZE	4RH
Adult retreatment cases	Retreatment regimen - Relapse smear positive - Treatment after default S positive	2SRHZE/ 1RHZE	5RHE

	- Treatment failure		
Children under 12 years	New patient Regimen - Children with smear negative PTB - less severe forms of EPTB - severe forms of TB (TBM and MTB) - Smear negative PTB without extensive parenchyma involvement	2HRZ or if available in paediatric form 2RHZE	4HR 4RH
Drug resistant tuberculosis	MDR Regimen	Start with standardized or empirical regimen. Individualized Regimen IF necessary based on documented resistant patterns and individualized resistance of the patient	

Note

- Children with TB menigitis treat with **2RHZE/10RH.**
- You may use **EH** in place of **RH** in case you do not have **RH** (**EH** will be phased out soon)

- In case of MDR TB patient and you are not working at a MDR TB treatment site, contact and refer the patient to a known MDR TB treatment facility nearest to you.
- MDR TB treatment regimens will be determined based on confirmed resistance patterns following drug susceptibility tests (DST) according to drug resistant TB guidelines.

Daily drug doses (in mg) by body weight

	Weight (kg)				
Drug	**5-10**	**11-20**	**21-30**	**31-50**	**>50**
Streptomycin (S)	250	500	500	750	1,000
Isoniazid (H)	100	100	200	300	300
Rifampicin (R)	150	150	300	450	600
Pyrazinamide (Z)	500	500	1,000	1,500	2,000
Ethambutol (E)	1-200	2-400	4-600	800	1,200

Notes

- **Streptomycin:** <50kg should be given 750mg (instead of 1g)
- **Ethambutol**: Can be used by all children with TB especially with smear positive TB. There is need to monitor for visual difficulties which may arise due to optic neuritis.

Notes on drug reactions

- All anti-TB drugs may cause minor or major reactions. These are rare. For guidelines on how to handle such drug intolerance including identification of the offending drug and desensitisation of the patient, see national TB treatment guidelines.

Prevention and infection control of TB

- Early detection of cases, tracing of contacts
- Treatment with short course medicines till cure
- Isolation of sputum-positive cases
- Avoidance of overcrowding
- Coughers to cover cough with pieces of cloth
- Drinking pasteurised milk products only
- BCG vaccination at birth to prevent severe forms of TB
- Good nutrition, good cough hygiene (cover mouth when coughing)
- IPT for patients exposed to TB or at risk but with no established TB disease such as children and HIV positive
- Treatment support DOT and follow up to endure adherence and cure

4. GASTROINTESTINAL DISEASES

4.1 AMOEBIASIS

A common parasitic infection of the gastrointestinal system acquired through oral-faecal transmission.

Causes

- The protozoan *Entamoeba histolytica*

Clinical features

It may present as:

Amoebic dysentery

- Persistent mucoid/bloody diarrhoea
- Abdominal pain
- Fever/chills

Amoebic abscess can occur in one of the following forms as a result of spread via the blood stream:

- Liver abscess - swelling/pain in the right sub-costal area
- 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
- Chronic carriers: Symptomless

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

- **Metronidazole** 800mg every 8 hrs for 8-10 days **HC2**
  Child: 10mg/kg per dose
- Or **tinidazole** 2g daily for 5 days **R**

Chronic carriers (luminal) and tissue amoebiasis (liver, lung, brain, amoeboma)

- **Metronidazole** 800mg every 8 hours for 10 days **HC2**
  Child: 10mg/kg per dose
- Or **tinidazole** 2g daily for 5 days **R**
  Child: 50mg/kg per dose

Notes

- ✕ **Metronidazole, tinidazole**: Contraindicated in pregnancy; avoid alcohol during treatment and for 48 hours after
- △ **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
- Promote use of clean drinking water

4.2 APPENDICITIS (ACUTE)

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
- Locally there is tenderness and rigidity (guarding) in the right iliac fossa
- Generalized abdominal pain follows rupture when the contents are poured into the abdominal cavity
- Low grade fever
- There are signs of peritonitis

Differential diagnosis

- Salpingitis (in females)
- Ectopic pregnancy
- Ovarian cyst
- Kidney infection
- 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

Management

- Emergency surgery **HC4**

If there are signs of peritonitis:

- Give broad-spectrum **antibiotics**

4.3 BACILLARY DYSENTERY (SHIGELLOSIS)

An acute bacterial disease involving the large and small intestine characterised by bloody mucoid diarrhoea.

Cause

- Shigella dysenteriae
- Shigella flexneri
- Shigella sonnei

All the above are 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

▶ Correct any dehydration
▶ **Nalidixic acid** 1g every 6 hours for 5 days **HC2**
▶ Or **ciprofloxacin** 1g single dose

Child >3mths:

▶ **Cotrimoxazole**
▶ Or **ciprofloxacin** 30mg/kg twice daily for 3 days **H**
▶ Or **nalidixic acid** 15mg/kg per dose

✕ **Ciprofloxacin, nalidixic acid:** Contraindicated in pregnancy
- Use instead **chloramphenicol** 500mg every 8 hours for 5 days **H**

Prevention

- Provide health education of the public on:
  - Washing hands before eating food
  - Proper disposal of faeces
  - Boiling of all drinking water
  - Avoiding eating cold foods & roadside foods

4.4 CHOLERA

An acute infection involving the entire small bowel, which usually occurs as an epidemic.

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 acute painless watery diarrhoea (rice-water stools)
- Vomiting
- Muscular cramps
- Dehydration
- Oliguria and collapse

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 **HC2**

Up to 90% of patients with cholera **only require prompt oral rehydration**. Only **severely dehydrated** patients need IV fluids and antimicrobials

- Give oral (**ORS**) or IV fluids IV for **Ringer's lactate** according to degree of dehydration
- **Doxycycline** 300mg single dose **HC3**
- Give **glucose** IV for hypoglycemia
- Give maintenance fluid at least 4 - 5 litres
- Or **ciprofloxacin** 1g single dose or **tetracycline** 500mg every six hours for 3 days
  Child under 12 years: **Erythromycin** 25-50mg/kg every 6 hours for 3 days **HC2**
- Or **doxycycline** 2mg/kg single dose (if > 8 years old) **HC3**
- Or **ciprofloxacin** 20mg/kg single dose **HC4**
- *Child above 12 years*: **Doxycycline** 2mg/kg single dose **HC3**
- Or **ciprofloxacin** 20mg/kg twelve hourly for 3 days **HC4**

Caution

- ✕ **Doxycyline, ciprofloxacin**: Contraindicated in pregnancy

- Use instead **erythromycin** 500mg every 6 hours for 3 days

Prevention

Educate the public about

- Personal and food hygiene, e.g. washing hands before eating
- Using and drinking clean safe water
- Proper human faeces disposal
- Prompt isolation, treatment, and reporting of cases

4.5 CONSTIPATION

A condition characterised by hardened faeces and difficulty emptying the bowels.

Causes

- Dietary: Lack of roughage, inadeqaute fluid intake
- In infants: Concentrated feeds
- Lack of exercise
- Congenital bowel abnormalities
- Patients being bedridden, especially the elderly
- Certain drugs, e.g. narcotic, analgesics
- Depression

Clinical features

- Abdominal discomfort
- Small hard stools passed irregularly under strain

Investigations

➢ X-ray: After barium enema

Management

▶ High dietary **fibre**

▶ Adequate **fluid** intake

Bisacodyl 10mg at night **HC3**

child 5-12 years: 5mg (if suppository) **HC4**

► Contraindicated in acute abdomen as it aggravates the condition

Prevention

- Diet rich in roughage - plenty of vegetables and fruit
- Plenty of oral fluids with meals
- Increased exercise

4.6 DIARRHOEA

Occurrence of 3 or more loose watery stools in 24 hrs.

Causes

- Infectious diseases, e.g. measles, malaria, and other fever-causing conditions
- Bacterial infection, e.g. food poisoning
- Protozoal infections, e.g. giardiasis
- Worm infestation, e.g. strongyloidiasis
- Malnutrition, e.g. kwashiorkor
- Drugs, e.g. prolonged use of purgatives and broad-spectrum antibiotics
- Viral infections, e.g. enteroviruses
- Unhygienic feeding methods
- Malabsorption syndrome
- Lactose intolerance

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

Management

▶ Find and treat the cause **HC2**

▶ Prevent or correct dehydration

Persistent or chronic diarrhoea: ***HC4***

▶ *Adults only:* As above plus **codeine phosphate** 30mg every 8-12 hours as required

▶ *Child:* **vitamin A**
6-11 months*:* 100,000 IU; 1-6 years: 200,000 IU

4.7 GASTRITIS

Acute or chronic inflammation of the gastric mucosa.

Causes

Acute gastritis

- Non-steroidal anti-inflammatory drugs (NSAIDS), e.g. acetylsalicylic acid, indomethacin, 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
- Peptic and duodenal ulcers
- Cancer of the stomach
- Cholecystitis
- Epigastric hernia

Investigations

- Gastroscopy
- Stool for occult blood
- Barium meal for chronic gastritis

Management

- **Magnesium trisilicate** compound 2 tablets every 8 hours as required **HC2**

If there is no response

- Give **ranitidine** 300mg every 12 hours until symptom-free for a total of 4 weeks

If vomiting

- **Metoclopramide** 10mg IM repeated when necessary up to 3 times daily
- **Or chlorpromazine 25mg** deep IM or oral (if tolerated) repeated prn every 4 hours **HC4**

Notes

- ✕ 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

4.8 GIARDIASIS

An 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
➢ Intestinal biopsy
➢ String test

Management

▶ **Metronidazole** 2g after food daily for 3 days **HC2**
Child: 30mg/kg (max: 1.2g) per dose
▶ Or **tinidazole** 2g single dose child: 50mg/kg **RR**

Notes

✕ **Metronidazole, tinidazole**: Contraindicated in pregnancy; 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

4.9 HAEMORRHOIDS ("PILES")

Swelling in the upper anal canal and lower rectum due to engorgement of veins. May be internal or external.

Causes

- Constipation and straining in defecation
- Portal hypertension from any cause
- Compression of pelvic veins, e.g. abdominal tumours during pregnancy
- Sedentary life style

Clinical features

- Painless anal bleeding
- Prolapse of the swelling, especially at defecation
- Mucous discharge at anus
- Pain in passing stool (rare)
- Visible swelling at the anus

Differential diagnosis

- Schistosomiasis
- Rectal polyps
- Prolapsed rectum
- Anal tags
- Tumour of rectum
- Anal warts
- Amoeboma

Management HC2

- Establish the cause
- Correct any constipation
- Insert a **bismuth subgallate compound** rectally every 12 hours for 5 days **HC4**

If infected:

- Give **metronidazole** 400mg every 8 hours for 5 days

✕ Contraindicated in pregnancy and use of alcohol

▶ Give **analgesics** as required for the pain

If there is no response:

▶ Refer for surgery

Prevention

- Maintain high residue (fibre) diet
- Ensure adequate fluid intake

4.10 PEPTIC ULCER

Ulceration of gastro-duodenal mucosa.

- Tends to be chronic and recurrent

Need to treat for H Pylori in all cases

Causes

H Pylori infection

Hyperacidity due to

- Drugs, e.g. acetylsalicylic acid, corticosteroids
- Irregular meals
- Stress
- Other unknown causes

Clinical features

- Epigastric pain typically worse at night and when hungry (duodenal ulcer)
- Epigastric pain; worse with food (gastric ulcer)
- Vomiting
- Nausea
- Regurgitation

Differential diagnosis

- Pancreatits
- Hepatitis
- Disease of aorta
- Heart disease and lung disease

Investigations

- Gastroscopy
- Biopsy of stomach wall
- Barium meal

Management and Prevention

- Same as for Gastritis
  Treat for H Pylori for one week using
- **Amoxycillin** 500mg every 8 hours
- Plus **metronidazole** 400mg every 8 hours
- Plus **omeprazole** 20mg every 12 hours
- Or **ranitidine** 300mg daily

- When using ranitidine all antibiotics should be given for 2 weeks

4.11 PERITONITIS

Irritation (inflammation) of the peritoneum.

Causes

Infection following

- Perforation of the gut and leakage of its contents, e.g. burst appendix
- Injury of the abdominal wall which opens into the abdominal cavity, e.g. stab wound
- Intestinal obstruction with death of part of the gut or intestine (gangrenous bowel)
- Perforation of the uterus as may occur in criminal abortion
- Perforation of gall bladder, containing infected bile

Chemical causes

- Leakage of urine into the peritoneal cavity ifurine is not infected

- Leakage of blood into the peritoneal cavity following damage to abdominal or pelvic organs
- Leakage of bile due to mechanical damage to the gall bladder
- Leakage of stomach contents due to rupture

Clinical features

- Severe and continuous pain
  - Generalised if the whole peritoneum is affected
- Abdominal swelling (distension)
- Fever, vomiting
- Tender rigid abdomen
- Rebound tenderness - pressure on the abdomen and sudden release causes sharper pain
- Absent bowel sounds

Investigations

- Abdominal X-ray
- Blood: White cell count, C&S
- Electrolyte determination

Management

- ▶ Monitor temperature
- ▶ Monitor BP
- ▶ Put up an **IV drip**
- ▶ Pass a nasogastric tube and start suction
- ▶ Refer patient to hospital for further management, including possible exploratory laparotomy **H**

In suspected bacterial infection: (minimum 7-day courses)

- ▶ **Ampicillin** 2g IV or IM every 6 hours
  Child: 50mg/kg per dose
  ✕ Omit this in penicillin-allergic patients
- ▶ Plus **gentamicin** 5-7mg/kg IV daily in divided doses
  Child: 2.5mg/kg every 8 hours

- ► Plus **metronidazole** 500mg by IV infusion every 8-12 hours changing when possible to 400mg orally every 8 hours
  Child: 12.5mg/kg IV per dose changing when possible to oral route
  - ✕ **Metronidazole** is contraindicated in pregnancy and with alcohol

4.12 REFLUX OESOPHAGITIS

inflammation of the lower third of the oesphageal mucosa.

Causes

- Regurgitation of gastric contents into the lower oesphagus

Predisposing factors

- Hiatus hernia
- Increased intra-abdominal pressure
- Gastric ulcer

Clinical features

- Heartburn: Usually brought about by bending or exertion is characteristic. It may also occur on lying down, keeping the patients awake at night. Sitting up, eating food, or alkaline substances relieves the pain.

Differential diagnosis

- Peptic ulcer
- Gastritis
- Pancreatitis

Investigations

- ➢ Gastroscopy
- ➢ Barium meal and follow through

Management

- **Magnesium trisilicate compound** 1-2 tablets every 8 hours **HC2**
- Modify diet: Avoid precipitating causes and increase milk intake

If no response

- **Ranitidine** 300mg daily for 4-8 weeks **H**

4.13 PANCREATITIS

Acute or chronic inflammation of the pancreas.

Cause

- Related to prolonged excessive alcohol intake
- Gall stones
- Biliary tract disease
- Infections, e.g. mumps
- Drugs, e.g. sulphonamides, furosemide
- Peptic/duodenal ulcers

Clinical features

- Acute abdominal pain usually in the epigastrium radiating to the back
- Nausea, vomiting, abdominal distension
- Fever
- Tachycardia

Differential diagnosis

- Perforated peptic ulcer
- Acute cholecystitis
- Inflammation of biliary tract
- Sickle-cell anaemia crisis

Investigations

- Blood: Serum analysis, cell count

Management HC4

Acute

- ▶ Nil by mouth until signs and symptoms of acute inflammation subside (i.e. cessation of abdominal tenderness and pain, return of hunger and well-being)
- ▶ Pass a nasogastric tube for suction when persistent vomiting or ileus occurs
- ▶ Monitor electrolytes
- ▶ Give **IV fluids** to correct metabolic and electrolyte disturbances and to prevent hypovolaemia and hypotension
- ▶ For severe pain: **Pethidine** 25-100mg SC or IM or 25-50mg slow IV
  - Repeat prn every 4-6 hours
  - ✕ **Do not give morphine** - it causes the sphincter of Oddi to contract

In case of specific infection, e.g. biliary sepsis, pulmonary infection, or UTI

- ▶ Treat vigorously with appropriate antibiotic therapy

Chronic

Relapsing pancreatitis is characterised by:

- Intermittent abdominal pain
- Diarrhoea
- Loss of weight

- ▶ **Pethidine** 50-100mg orally as required
- ▶ Avoid alcohol and fatty foods

In case of malabsorption:

- ▶ Refer for specialist management

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
- Treat infections comprehensively

5. INJURIES AND TRAUMA

5.1 BITES

Wounds caused by teeth or jaws.

Causes

- Animals and reptiles, e.g. dog, snake, or person

Clinical features

- Depend on the cause

Management

First aid

- ▶ Public toilet: Immediately clean the wound thoroughly with plenty of clean soap and water to remove any dirt or foreign bodies
- ▶ Stop excessive bleeding where necessary
- ▶ Rinse the wound and allow to dry
- ▶ Apply an antiseptic: **Chlorhexidine** solution 0.05% **HC2**
- ▶ Or **hydrogen peroxide** solution 6%
- ▶ Or **povidone iodine** solution 10% **HC3**

Caution: Do not suture bite wounds

Supportive therapy

- ▶ Treat shock if any or if swelling is significant
- ▶ Give **analgesics** prn
- ▶ Reassure and immobilise the patient

Tetanus prophylaxis

Note

- ◆ Giving TIG or TTV 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

(Prophylactic) Antibiotic ***HC2***

- Give only for infected or high-risk wounds including:
  - Moderate to severe wounds
  - Presentation >8 hours delayed
  - Puncture wounds unable to be adequately debrided
  - Wounds on hands, feet, or face
  - Wounds with underlying structures involved
  - Wounds in immunocompromised patients

Base the choice of treatment on culture & sensitivity test results

- **PPF** 1.5MU IM daily for 5 days
  Child: 50,000 IU/kg per dose
- Followed by **amoxicillin** 500mg every 8 hours for 5 days
  Child: 15mg/kg per dose

If patient allergic to penicillin: (all 5-10 days treatment)

- **Metronidazole** 400mg every 12 hours
  ✕ Contraindicated in pregnancy
  Child: 10-12.5mg/kg per dose
- Plus either **doxycycline** 100mg daily
  ✕ Contraindicated in pregnancy
  Child >8yrs: 2mg/kg per dose
- Or **cotrimoxazole** 960mg every 12 hours
  Child: 24mg/kg per dose

Specific treatment: Depending on type of bite:

5.1.1. Snakebite

Clinical features

- Puncture wounds
- Bleeding, e.g. haematuria, oozing from the site, haematemesis - usually mild but may be uncontrollable
- Pain, swelling

- Paralysis
- Excessive salivation
- Other features will depend on the type of snake and poison, i.e. haemolytic, necrotoxic, neurotoxic

Management

First aid, tetanus prophylaxis, supportive therapy, antibiotics: Same as for Bites

▶ Give **chlorphenamine 4mg every 6-8 hours** **HC2**

Venom in eyes **HC2**

▶ Irrigate eyes with plenty of water
▶ Apply **chloramphenicol eye ointment** 1%
▶ Cover with eye pads

Venom on skin **HC2**

▶ Wipe away excess venom
▶ Assess wound for fang penetration
▶ Clean wound
▶ Apply firm crepe bandage to entire limb to ensure constant pressure
▶ Immobilise limb with a splint

Note

◆ 90% of snake bites do **not** require antivenom
◆ Only use antivenom in patients who really need it

Criteria for referral for administration of antivenom

- Signs of systemic poisoning
- Local damage
- Swelling of hand or foot (site of most bites) within 1 hour of bite
- Swelling of elbow or knee within 3 hours of bite
- Swelling of groin or chest at any time
- Associated bleeding disorder

- Snake size or recognition of venomous snake
- Significant swelling of head or neck
- Muscle weakness or breathing difficulty

If one or more of the above criteria are satisfied

▶ Refer urgently for administration of **H**
Antivenom sera polyvalent (E & C Africa)
- Check package insert for IV dosage details
- Ensure the solution is clear
- Check patient has no history of allergy

If there is history of allergy and signs of systemic poisoning: Still give the antivenom, but be ready to treat possible reactions. See Anaphylactic Shock.

5.1.2. Insect bites & stings

Causes

- Bees, wasps, hornets and ants: Venom is usually mild 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
- Headache, dizziness
- May be signs of anaphylactic shock

Differential diagnosis

- Allergic reaction

Management

First aid, supportive therapy

If required (e.g. if bite is from highly venomous species), treatment is same as in Bites.

If the sting remains implanted in the skin:

− Carefully remove sting with a needle or knife blade

If severe local reaction occurs

- ▶ Give **chlorphenamine** 4mg every 6 hours (max: 24mg daily) until swelling subsides **HC2**
  Child 1-2 years: 1mg every 12 hours
  Child 2-5 years: 1mg every 6 hours (max: 6mg daily)
  Child 6-12 years: 2mg every 6 hours (max: 12mg daily)
- ▶ Cool the affected area, e.g. with ice or other cold object
- ▶ Apply **calamine lotion** prn every 6 hours

If bite/sting causes severe pain, e.g. scorpion

- ▶ Infiltrate 2mL of **lignocaine** 2% around the area of the bite **HC2**

Prevention

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

5.1.3. Human bite

Clinical features

- Teeth marks
- Bleeding
- Laceration

Management

First aid

Ttetanus prophylaxis, supportive therapy, antibiotics.

Treatment

Same as in Bites. **HC2**

5.1.4. Animal bite

Bite from domestic or wild animal

Clinical features

- May result in infection usually by anaerobic bacteria
- May cause complications from tetanus and rabies
- Tooth marks or scratches, puncture wounds, lacerations
- Bleeding, tissue necrosis

Dealing with the animal

If the animal can be identified and caught

▶ Quarantine and feed it for 10 days

If no signs of rabies infection shown within this period:

▶ Release the animal

If it shows signs of rabies infection

▶ Kill the animal, remove its head, and send to the Veterinary Department for verification of the infection

Management

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

First aid, tetanus prophylaxis, supportive therapy, antibiotics. Treatment same as in Bites. **HC2**

Thorough and prompt local treatment of all bite wounds and scratches, which may be contaminated with rabies virus, is **very important.** Elimination of the rabies virus at the site of infection by chemical and physical means is the most effective method of protection.

- The combination of local wound treatment plus passive immunization with **rabies immunoglobulin (RIG)** plus vaccination with rabies vaccine (RV) is recommended *for all severe 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
- As part of local treatment in all cases of possible exposure, carefully infiltrate RIG (if available) in and around the wound. Inject IM any remaining **RIG** at a site distant from the site of RV inoculation
- If it is not possible to give RIG at the start of RV vaccination, it may still be given up to 7 days later even when the wound has started to heal
- Do not suture the wound
- Avoid contact with the patient's saliva and vomitus, which are potentially infective. Observe strict hygiene. If possible, wear eye protection as patients may spit, and infection through the conjunctiva can occur

If the Veterinary Department confirms rabies infection or if the animal cannot be identified/ tested

► Give rabies vaccine

+/- **rabies immunoglobulin human** as per the recommendations in the Table "Recommendations for Rabies Vaccinations"

Recommendations for Rabies Vaccination

NATURE OF EXPOSURE	CONDITION OF ANIMAL		RECOMMENDED ACTION
	At time of exposure	10 days later	
1. Saliva in contact with skin but no skin lesion	Healthy	Healthy	Do not vaccinate
		Rabid	Vaccinate
	Suspect	Healthy	Do not vaccinate
		Rabid	Vaccinate
2. Saliva in contact with skin that has lesions, minor bites on trunk or proximal limbs	Healthy	Healthy	Do not vaccinate
		Rabid	Vaccinate
	Suspect	Healthy	Vaccinate; but stop course if animal healthy after 10 days
		Rabid	Vaccinate
		Unknown	Vaccinate
3. Saliva in contact with mucosae, serious bites (face, head, fingers, or multiple bites)	Domestic or wild rabid animal or suspect		Vaccinate and give antirabies serum
	Healthy domestic animal		Vaccinate but stop course if animal healthy after 10 days

Notes

- Consumption of properly cooked rabid meat is not harmful
- The 10-day observation period applies only to domestic dogs and cats. Except for threatened or endangered species, all other domestic or wild animals should be killed humanely and tissues tested for rabies using appropriate veterinary laboratory techniques.

Administration of Rabies Vaccine (RV)

The following schedules use

- **Purified VERO Cell Culture Rabies Vaccine (PVRV),** which contains one IM immunising dose (at least 2.5 IU) in 0.5mL of reconstituted vaccine

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 depots may interfere with vaccine uptake making it less effective

Pre-exposure immunization

Offer **RV** 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

▶ Day 28: One dose IM

Where there is continuing risk of exposure to rabies

▶ Give an IM **booster dose** of **RV** one year later
- Repeat every 3 years thereafter

Post-exposure vaccination

Give **RV** to all patients unvaccinated against rabies together with local wound treatment. In severe cases, rabies immunoglobulin

The 2-1-1 intramuscular regime

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 in right arm + one dose in left arm
- Day 7: One dose
- Day 21: One dose

Alternative 2-site intradermal (ID) regime

This uses PVRV intradermal (ID) doses of **0.1mL** (i.e. one fifth of the 0.5mL IM dose of PVRV)

- Day 0: One dose into 2 sites (left and right deltoid)
- Day 3: One dose into 2 sites (left and right deltoid)
- Day 7: One dose into 2 sites (left and right deltoid)
- Day 28: One dose into 1 site (deltoid)
- Day 90: One dose into 1 site (deltoid)

Notes on ID regime

- Much cheaper as it requires less vaccine
- Requires special staff training in ID technique using 1mL syringes and short needles
- Compliance with the Day 28 and 90 doses 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

Post-exposure immunization in previously vaccinated patients

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

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

If completely vaccinated >3 years earlier or if incompletely vaccinated:

- Give a complete post-exposure vaccination course of **RV** and passive immunization with rabies immunoglobulin (**RIG**) if necessary

a) Passive immunization with rabies immunoglobulin (RIG)

Give in all high risk rabies cases irrespective of the time between exposure and start of treatment

Human rabies immunoglobulin (HRIG) or
Equine rabies immunoglobulin (ERIG) is used

- **HRIG** 20 IU/kg or **ERIG** 40 IU/kg
  - Infiltrate as much as possible of this dose around the wound/s
  - Give the remainder IM into gluteal muscle
- Follow this with a complete course of **RV**
  - The first dose of vaccine should be given at the same time as the immunoglobulin, but at a *different site*

RV and **RIG** are both very expensive and should only be used when there is an absolute indication

Prevention

- Vaccinate all domestic animals against rabies, e.g. dogs, cats, and others

Management of rabies

Start treatment as soon as possible after exposure but do not withhold from any exposed person whatever time interval has passed since exposure

- ▶ Admit
- ▶ Give appropriate supportive treatment and care
- ▶ Observe strict hygienic precautions
- ▶ Counsel caregivers on rabies and likely consequences

5.2 FRACTURES

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

Causes

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

Clinical features

- Pain, tenderness
- Swelling
- Inability to use/move the affected part
- Deformity
- May be open (with a cut) or closed

Differential diagnosis

- Bone infection
- Bone cancer
- Sickle-cell disease

Investigations

- ➢ X-ray: 2 views to enable comparison with normal side

Management

Simple fractures **HC2**

- ▶ Ensure airway is clear
- ▶ Treat shock.
- ▶ Elevate any fractured limb
- ▶ Immobilise the affected part with a splint; special attention to neck or spinal injuries

- ▶ Give an **analgesic**, e.g. **paracetamol** 1mg every 4-5 hours to relieve pain
- ▶ Refer for further management
- △ **Do not give pethidine and morphine** for rib fractures and head injuries as they cause respiratory depression

Compound fractures **HC4**

Manage in the same way as simple fractures but also:

- ▶ Stop any bleeding
- ▶ Carry out surgical toilet

Prophylaxis against tetanus, i.e. if not fully immunised or if the wound is suspected to be contaminated

If there is anaemia: Manage accordingly

Note

- ◆ First aid management of fractures can be done at the **HC2** level and then refer patient as soon as possible
- ◆ Check blood circulation beyond the affected part

5.3 BURNS

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

Causes

- Thermal, e.g. hot fluids, flame, steam, hot solids, sun
- Chemical, e.g. acids, alkalis, and other chemicals
- Electrical, e.g. domestic (low voltage) transmission in (high voltage) lighting
- 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 use of the affected part

- **Systemic effects** in severe burns include shock, low output, generalised swelling, respiratory insufficiency, deteriorated mental state

Differential diagnosis

- Eczema
- Other conditions causing skin loss, e.g. herpes zoster, toxic epidermal necrosis, friction abrasion

Classification of the severity of burns

Burn injury may be described as mild, moderate, or severe burns depending on the:

- Depth of the burn
- Percentage of total body surface area (TBSA) burnt
- The body parts injured e.g. face, hands, feet, perineum burns are considered severe
- Age /general condition of patient at the time of the burn

i) **Depth of the burn** (a factor of temperature, of agent, and 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.

2nd Degree burns: Partial thickness burns is a dermal injury that is sub-classified as superficial and deep 2^{o} burns. In superficial 2^{o} burns, blister result and the pink wound is extremely painful. A thin eschar is formed and the pale moist wound is painful.

3rd Degree burns: Full thickness skin destruction, leather-like rigid eschar. Painless on palpation or pinprick.

4th Degree burns: Full thickness skin and fascia, muscles, or bone destruction. Lifeless body part.

ii) **The 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.

iii) **Age and general condition of the patient**

In general, children and the elderly fare worse than young adults and need more care. A person who is sick or debilitated at the time of the burn will be affected worse than one who is healthy.

iv) **Categorisation of severity of burns**

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

Minor/mild burn

- Adult with <15% TBSA affected or
- Child/elderly with <10% TBSA affected or
- Full thickness burn with <2% TBSA affected and no serious threat to function

Moderate (intermediate) burn

- Adult with partial thickness burn and 15-25% TBSA or
- Child/elderly with partial thickness burn and 10-20% TBSA
- All above with no serious threat to function and no cosmetic impairment of eyes, ears, hands, feet, or perineum.

Major (severe) burn

Adult with

- Partial thickness burn and >25% TBSA or
- Full thickness burn and >10% TBSA

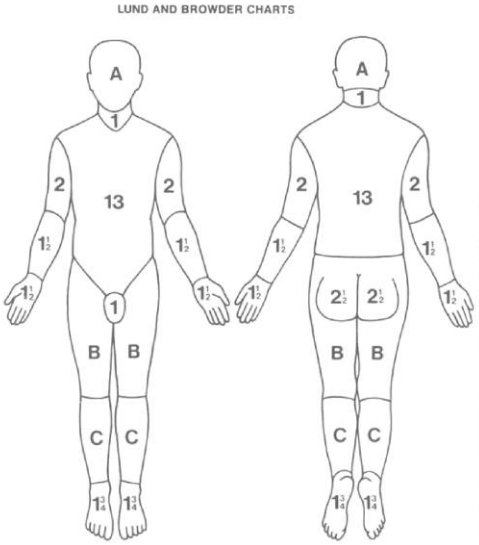
Child/elderly with

- Partial thickness burn >10% TBSA or full thickness burn of >5% TBSA affected

Irrespective of age

- Any burns of the face, eyes, ears, hand, feet, perineum with cosmetic or functional impairment risks
- Chemical, high voltage, inhalation burns
- Any burn with associated major trauma

CHART FOR ESTIMATING % OF TOTAL BODY SURFACE AREA (TBSA) BURNT



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 LEG	2½	2½	2¾	3	3¼	3½

Management

Mild/moderate burns **HC2**

First Aid

- Stop the burning process and move the patient to safety
  - Roll on the ground if clothing is on fire
- Pour or shower the affected area with cold water, especially in the first hour after the burn (this may reduce the depth of injury if started immediately)
- May cleanse the wound with **saline solution** or dilute **antiseptic solution** (e.g. **cetrimide** + **gluconate** 0.15% + 0.015%)
- Cover the wound with a clean dry cloth and keep the patient warm

Health Centre Care

Medication

- ▶ Give oral or IV **analgesics** as required
- ▶ Leave blisters alone. Do not puncture.
- ▶ Expose the patient in a bedcradle
- ▶ If wound is infected:
  Apply **silver sulphadiazine cream** 1**%** daily
  - Use more frequently if volume of exudate is large
- ▶ Dress the wound with paraffin gauze dressing
  - Place enough dry gauze on top to sooth and enhance healing of wound
- ▶ Change the dressing after 2-3 days and prn thereafter
- ▶ Prophylaxis against tetanus, i.e. if not fully immunised or if the wound is suspected to be contaminated:

Wound care

- ▶ Leave blisters alone. Do not puncture (except if non-adherent sterile dressing is possible).

- Apply antiseptic cream e.g. **silver sulphadiazine cream** 1% or **iodine tincture** 2%
- Apply layers of saline moistened gauze. Place enough dry gauze on top to prevent seepage to outer Layers and creep bandage to hold dressings.
- Small superficial 2" burns may be dressed with **paraffin gauze** dressing
- Change the dressings after 1 -2 days and as necessary thereafter

Fluid replacement

- 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. See "calculation and administration of IV fluid replacement"
- The fluid requirements are often very high so give as much as possible.

Other measures

- Give appropriate physiotherapy of joints affected (especially the hand)
- Nutritional support let boost healing
- Counselling and psychosocial support to patient and relatives
- Health education on burns prevention e.g. epileptic control

Severe burns

Treat as for mild/moderate burns with the addition of the following:

- Give **IV fluid** replacement in a total volume per24 hours according to the calculation in the box below.
- Use only **crystalloids** i.e. **Ringer's lactate** or **normal saline** (0.9%NaCl)

Calculation and administration of IV fluid replacement

- The objective is to maintain normal physiology as shown by urine output, vital signs, and mental status
- The total volume of IV solution required in the first 24 hours of the burns is:

4mU x weight (kg) x % TBSA burned 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 (<30kg) 1mL/kg/hour and adults 0.5mL/kg/hour (30-50mls /hour)

NB: The basis of fluid replacement is that fluid is lost from the circulation into the tissues surrounding the burns and some lost through the wounds. Fluid loss is excessive in 18-30 hours after the burns.

Low intravascular volume results in tissue circulatory insufficiency (shock) with results such as kidney failure and deepening of the burns

▶ Give these solutions in a ratio of 2:1
  - i.e. 2 units of **Ringer's lactate** (or **normal saline**) followed by 1 unit of **glucose** infusion 5%
  - Repeat until total required daily volume is reached

Infected burn

▶ Bath the patient daily and dress burns frequently till infection controlled

- ▶ Use antiseptic cream (**silver sulphadiazine** 1% cream) on the wound
  - ✕ contraindicated if pregnant, breast feeding, and for prematures

Give antibiotic only if there are systemic effects of infection

- ▶ Give an antibiotic e.g. **benzylpenicillin** 3 MU every 6 hours in early stages
- ▶ If necessary add **gentamicin** 5-7 mg/kg once a day

Surgery

- ▶ Escharotomy and fasciotomy for circumferential limb or tarsal bums
- ▶ Escharectomy to exercise: Dead skin off
- ▶ Skin grafting to cover clean deep burn wounds
- ▶ Eye protection (temporary tarsorapy)

Notes on severe burns

- Blood transfusion may be required
- There is a risk of systemic inflammatory response syndrome
- With inhalation burns, supplementary oxygen is vital and an airway is needed
- With hand/finger burns, early escharotomy and fosciotomy is required

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
- Encouragement of use of flames, e.g. hurricane lamps

5.4 WOUNDS

Any break in the continuity of the skin or mucosa.

Causes

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

Minor cuts and bruises **HC2**

- ▶ First aid, tetanus prophylaxis, and supportive therapy
- ▶ Antibiotics are not usually required but if the wound is grossly contaminated, give **antibiotic**
- ▶ **Cloxacillin** 500mg every 6 hours as empiric treatment

- ▶ If pus swabs cultures available guide treatment after results.

Wounds (deep and/or extensive) **HC4**

- ▶ Identify the cause of the wound or injury if possible
- ▶ Clean the wound with **chlorhexidine** solution 0.05% or **hydrogen peroxide** solution 6%
- ▶ Explore the wound to ascertain the extent of the damage
- ▶ Surgical toilet: Carry out debridement and cut to freshen the wound

If clean and fresh (<12 hours)

- ▶ Carry out 1° closure by suturing under local anaesthetic
  - use **lignocaine hydrochloride** 2%
  - ✕ Do **not** suture gun shot and bite wounds

If wound is >12 hours old or dirty

- ▶ Carry out delayed 1° closure
  - Use this for wounds up to 2-4 days old

If wound >4 days old

- ▶ Carry out 2° closure

Where necessary and if facilities available

- ▶ Carry out 3° closure with a skin flap or graft
- ▶ tetanus prophylaxis, supportive therapy, prophylactic antibiotic

5.5 HEAD INJURIES

Damage to the head tissue causing swelling, wound, and/or fracture.

Cause

- Road traffic accident
- Assault, fall, or a bang on the head

Clinical feature

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

- Headache pain
- Swelling or cut wound on the head
- Fracture of the skull, e.g. depressed area of the skull, brain matter may be exposed
- Altered level of consciousness if brain tissue is involved including coma
- Haematoma

Differential diagnosis

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

Management

WARNING

Do **not** sedate any patient with a head injury!

Use the Glasgow Coma Score (GCS) to assess the patient (page 146).

This is based on classification of the head injury using the Glasgow Coma Score (GCS) as follows:

Simple: No loss of consciousness (LOC), GCS = 15

- ▶ Give any necessary first aid
- ▶ Monitor level of consciousness and GCS
- ▶ If satisfactory, send patient home with **analgesics** e.g. **paracetamol** 1g every 4-6 hours

Concussion: LOC <6 hours, GCS = 13-15

- ▶ Give necessary first aid
- ▶ Keep under observation for 24 hours
- ▶ If no deterioration, send patient home

- ▶ If condition deteriorates, refer to hospital immediately for specialist management

Contusion: LOC >6 hours, GCS = 8-12

- ▶ Treat as for cerebral oedema below

Haemorrhage: Lucid intervals - GCS may be up to 15

but drops off with increasing LOC

- ▶ Treat as for cerebral oedema below

In all cases

- ▶ Give any necessary first aid
- ▶ If patient able to swallow, give **analgesic** e.g. **paracetamol** 1g every 4-6 hours for the pain
  - ✕ Avoid narcotic analgesics because of sedative effects

If there are signs of cerebral oedema **HC4**

- ▶ Give supportive treatment:
  - Nurse in a semi-prone position
  - Keep a head injury chart to record the Glasgow Coma Score, pupil size, and neurological signs
  - Withhold IV fluids or use with caution
- ▶ Give **oxygen** if available
- ▶ Refer to hospital as soon as possible for specialist management

Open head injury **Ref**

- ▶ **Refer immediately to a specialist** after giving first aid and an initial dose of **antibiotic**
- ▶ If at HC3 level or higher, give antibiotic as in Meningitis prior to referral

Closed head injury **Ref**

- ▶ Treat as for cerebral oedema above

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
- Avoiding climbing trees

Glasgow Coma Score (GCS)

Score	Eyes	Verbal	Motor
1	Does not open eyes	Makes no sounds	Makes no movements
2	Opens eyes in response to painful stimuli	Incomprehensible sounds	Extension to painful stimuli
3	Opens eyes in response to voice	Utters inappropriate words	Abnormal flexion to painful stimuli
4	Opens eyes spontaneously	Confused disoriented	Flexion / Withdrawal to painful stimuli
5	N/A	Oriented, converses normally	Localizes painful stimuli
6	N/A	N/A	Obeys commands

The scale comprises three tests: eye, verbal and motor responses
The three values separately as well as their sum are considered.
The lowest possible GCS (the sum) is 3 (deep coma or death), while the highest is 15 (fully awake person).

6. ENDOCRINE SYSTEM

6.1 ADDISON'S DISEASE

A condition where the adrenal gland produces insufficient gluococorticoid hormones (adrenal insufficiency).

Causes

- Autoimmune (self destruction of the gland)
- TB of the adrenals
- Surgical adrenal removal
- Cancer affecting adrenal glands
- Bleeding into the adrenals
- Necrosis of the adrenals
- HIV/AIDS

Clinical features

Acute or chronic

- General weakness
- Weight loss
- Darkening of the skin and mouth
- Low BP
- Mental changes, e.g. irritability and restlessness
- Hypoglycaemic attacks
- Hair loss
- Menstrual disturbance and infertility
- Patient tires easily
- Fever
- Dehydration

Differential diagnosis

- HIV/AIDS
- Cancer
- Depression

- Diabetes mellitus
- TB

Investigations

- Urine: 17-hydroxycorticoids, 17-ketosteroids
- Plasma cortisol (8.00 am and 6.00 pm)

Management

- **Cortisone** 25mg every 8 hours as replacement therapy **RR**
- Or **prednisolone** 5mg daily for replacement therapy **HC4**

6.2 CUSHING SYNDROME

Chronic glucocorticord excess from whatever cause leads to the constellation of symptom and physical features known as Cushing syndrome. Its most common cause is iatrogenic, resulting from chronic glucocorticoid therapy.

Cause

- Iatrogenic
- Excessive ACTH
- Cushings Disease
- Ectopic ACTH production
- Adrenal adenoma
- Adrenal carcinoma

Clinical Features

- Central (truncal) obesity
- Moon facies
- Buffalo hump
- Thinning of the skin (transparent appearance)
- Striae
- Poor wound healing

- Hirsutism and acne (female) due to increased androgens
- Hypertension
- Muscle weakness

Different diagnosis

- Ordinary Obesity
- Down's Syndrome
- Alcoholism (alcohol-induced pseudo – Cushing's syndrome)
- Depression

Investigation

- Overnight dexamethasone suppression
- Urine free control
- Basal morning and early evening cortisol
- Basal ACTH levels
- High dexamethasome suppression

Management

This will depend on the cause

- **Potassium** replacement
- Treatment of diabetes and early evening cortisol
- Slow withdrawal of hormone source – if iatrogenic
- Surgical removal of ACTH tumours if feasible

6.3 DIABETES MELLITUS

Metabolic disease resulting from insulin insufficiency or ineffectiveness, primarily due to peripheral resistance to the action of insulin.

Cause

- Defective insulin production/release or resistance to its action

Clinical features

- Excessive thirst, excessive fluid intake (polydipsia)
- Excessive urine production (polyuria)
- Tiredness
- Loss of weight
- Increased appetite (polyphagia)
- Genital itching
- impotence
- Poor sight
- Coma

Complications

- Blindness
- Impotence
- Amputations
- Strokes
- Kidney failure
- Heart attack

Differential diagnosis

- Diabetes insipidus
- Other causes of polyuria, polydipsia, weight loss, polyphagia
- Other causes of coma, e.g. alcohol poisoning
- HIV/AIDS

Investigations

- Urine: Glucose
- Blood: Glucose
- HBA1C – Haemoglobin A1C

Management HC4

Type 1 Diabetes

Insulin Dependent Diabetes Mellitus (IDDM)

- **Isophane insulin** 10-20 IU twice daily SC
  child: 5 - 10 IU twice daily
  - **Isophane insulin** is 2/3 of the 24 hour stabilization soluble insulin requirement and should be used only after this daily requirement has been established. **Soluble insulin** 40 - 100 IU SC daily in 3 divided doses before meals
- *Child*: 40-80 IU as above
  - Conventional insulin therapy often combines the two types of insulin in mixture of **30/70 soluble to isophane insulin**

Note

- Avoid using propranolol or other B-blockers in diabetics because they mask hypoglycaemic symptoms
  - if required, use alternative antihypertensives

Type 2 Diabetes

- **Metformin** 500mg twice daily at breakfast and supper **HC4**
- Or **glibenclamide** 5mg once daily with meals initially
  Elderly: 2.5mg daily initially (but see caution below) adjust according to response up to a max. of 10mg

Caution

△ Glibenclamide: Caution in elderly patients because of risk of prolonged hypoglycaemia

6.4 DIABETIC KETOACIDOSIS

An acute metabolic complication of diabetes mellitus more common in the insulin-dependent (IDDM) type diabetics.

Cause

- Newly diagnosed diabetes
- Poor control of diabetes mellitus
- Infections and trauma

Clinical features

- Excessive thirst, fluid intake, and passing of urine
- Tiredness
- Weight loss in new cases
- Abdominal pain, vomiting
- Collapse and unconsciousness
- Sweet, acetone smell on the breath

Differential diagnosis

- Other causes of ketoacidosis
- Other causes of acute abdominal pain
- Other causes of coma

Management HC4

- ▶ **Soluble insulin** 10-20 IU im every hour
- ▶ Monitor urine and the blood sugar hourly
- ▶ Treat any dehydration (with **normal saline** or 5% **glucose** when blood sugar has fallen below 250mg for 5 days)
- ▶ **Potassium chloride** 1g every 8 hours for 5 days
- ▶ Treat any infection present

Prevention

- Early detection
- Good control of diabetes
- Prompt treatment of infections
- General education

6.5 HYPERTHYROIDISM (THYROTOXICOSIS)

Excessive production of thyroid hormones.

Causes

- Grave disease (common in females)
- Neonatal thyrotoxicosis
- Latrogenic causes
- Tumours of thyroid gland (adenomas, multiple nodules)
- Inflammation of the thyroid gland (thyroiditis)

Clinical features

- Weight loss with increased appetite
- Swelling in the neck (goitre)
- Palpitations
- Irritability, nervousness, inability to rest or sleep
- Irregular scanty menstrual periods
- Profuse sweating, extreme discomfort in hot weather
- High blood pressure
- Protruding eyes (exophthalmos)
- Receding up lifted finger nails (onycholysis)
- Endocrine system frequent defection

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 (T3, T4, TSH)
- Thyroid scans
- Biopsy of thyroid gland for cytology/histology

Management H

The aim is to restore the euthyroid state

- Use pulse rate and thyroid function to monitor progress

▶ **Carbimazole** 10-15mg every 8 hours or 20-60mg taken all at once for 1-2 months
Child: 250 micrograms/kg per dose
- Adjust dose according to response (only under specialist management)

▶ **Propranolol** 40-80mg every 12 hours for at least 1 month - to control excessive sympathetic activity
Child: 250-500 micrograms/kg 3-4 times daily

Once patient is euthyroid

▶ Progressively reduce **carbimazole** to daily maintenance dose of 5-15mg and continue for 18 months

▶ Surgery may be required in certain cases, e.g. obstruction, intolerance, or lack of response to drug treatment

▶ Radiotherapy may also be used

Caution

△ Need for vitamin supplements

△ Carbimazole: Patients treated with this should be advised to report any sore throat immediately because of the rare complication of agranulocytosis

6.6 HYPOTHYROIDISM (MYXOEDEMA)

A condition resulting from thyroid hormone deficiency. It is five 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

Clinical features

- Dull facial expression, puffiness, periorbital swelling
- Hoarse voice, slow speech
- Drooping eyelids
- Hair sparse, coarse and dry
- Skin coarse, dry, scaly, and thick
- Forgetfullness, other signs of mental impairment
- Gradual personality change
- Bradycardia
- Constipation (often)
- Parasthesia (numbness) of hands and feet
- Anaemia (often)

Differential diagnosis

- Myasthenia gravis
- Depression

Investigations

➢ Blood levels of thyroid hormone (T3, T4, TSH)

Management H

▶ **Thyroxine** 100 micrograms initially once daily before breakfast

Elderly: 50 micrograms

▶ Depending on response

- Gradually increase by 25-50 micrograms every 4 weeks to maintenance dose of 100-200 micrograms daily

Child: **Thyroxine** 1 microgram/kg daily for the first 6 months, then adjust according to response

- Treat anaemia and give vitamin supplements.
- Max 100 micrograms daily

Prevention

- Educate patients on the use of iodised salt
- Early detection is important

7. GUIDELINES FOR APPROPRIATE USE OF BLOOD

Refer to the National Blood Transfusion Guidelines for further details including information on:

- Donor recruitment and selection
- Blood collection and storage procedures and records
- Laboratory testing of donor and recipient blood
- Transfusion reactions
- Clinical aspects of blood transfusion and administration

The following sections have been adapted from the clinical use of blood WHO BTS/99.3 Geneva.

7.1 KEY POINTS

- The appropriate use of blood and blood products is the transfusion of safe blood products to treat conditions that can lead to significant morbidity or mortality, which cannot be prevented or effectively managed by other means
- Transfusion carries the risk of adverse reactions and transfusion-transmissible infections (e.g. hepatitis, HIV, malaria, etc)
- **NB.** Plasma can transmit most of the infections in whole blood, and there are few indications for its use.
- Blood donated by family/replacement donors carries a higher risk of transfusion-transmissible infections than blood donated by voluntary non-remunerated donors. **NB.** Paid blood donors generally have the highest incidence of transfusion-transmissible infections
- Blood should not be transfused unless it has been
  - Obtained from appropriately selected donors
  - Screened for transfusion-transmissible infections

  - Tested for compatibility between the donor's red cells and the antibodies in the patient's plasma in accordance with national requirements. Ensure that compatibility testing is carried out on all blood transfused even when in life-threatening emergencies, this is done after it has been issued
- Blood transfusion can often be avoided
- Appropriate and inappropriate transfusion

7.2 TRANSFUSION CRITERIA

- Blood transfusion can be a life-saving intervention, but like all treatments, it may cause acute or delayed complications and carries the risk of transfusion-transmissible infections.
- Transfusion may be unnecessary for the following reasons
  - The need for transfusion can often be avoided or minimized by prevention or early diagnosis and treatment of anaemia and its causes.
  - There are rarely valid reasons for transfusion given to raise Hb level before planned surgery or to allow earlier discharge from hospital
  - In many cases of acute blood loss, infusion of normal saline or other IV replacement fluids is safer, less expensive, and equally effective.
- Good anaesthetic and surgical management can often minimize transfusion requirements. If blood is given when not needed
  - The patient is exposed to risk for no benefit
  - An expensive and scarce resource is wasted leading to shortages of blood for patients in real need

Do not use blood transfusion -

To expand blood volume unless there has been blood loss of > 30% of total volume

To enhance wound healing

To "top up" Hb for surgery

To improve the general well-being of the patient in patients with on-going fluid losses, e.g. surgical blood loss

- IV replacement fluids e.g. **normal saline** are 1st line treatment for hypovolaemia as they restore the circulating blood volume and maintain tissue perfusion and oxygenation.
- In severe haemorrhage, initial treatment with IV replacement fluids may be life saving. It also provides time to control bleeding and obtain blood for transfusion if it becomes necessary. Use **crystalloid** solutions with a similar concentration of sodium to plasma (balanced salt solutions [BSS])

7.3 RISK OF TRANSFUSION

In some clinical situations, transfusion may be the only way to save life or rapidly improve a serious condition, but always weigh up the risk of transfusion against risks of not transfusing before prescribing blood/blood products.

Risks of red cell transfusion

- Serious haemolytic transfusion reactions
- Transmission of infectious agents, e.g. HIV, hepatitis
- Can become contaminated with bacteria and very dangerous if manufactured or stored incorrectly
- Circulatory overload

7.4 PRINCIPLES OF CLINICAL TRANSFUSION PRACTICE

- Transfusion is only one part of patient management
- Prescribe transfusion based on national guidelines and according to individual patient needs
- Minimize blood loss to reduce need for transfusion
- In patients with acute loss, give effective resuscitation (IV replacement fluids, oxygen, etc.) while assessing the need for transfusion
- Do not use the Hb value (although important) as the only criteria for starting transfusion. The decision should be supported by the need to relieve clinical signs and symptoms and prevent morbidity and mortality
- Be aware of the risks of transfusions; only prescribe transfusion when the benefits are likely to be greater than the risks
- Clearly record the reason for the transfusion in the patients notes
- Ensure the transfused patient is closely monitored and that there is immediate response if any adverse reactions occur

7.5 PROCEDURE FOR HANDLING REQUEST

- The hospital blood bank laboratory should only handle blood samples that are appropriately labelled on the appropriate sample tubes
- The hospital blood bank laboratory should **not** deal with requests that **do not** meet the hospital's criteria
- The ABO blood group of neonates younger than 3 months cannot be fully determined

- The cause of most haemolytic transfusion reactions with fatal consequences is due to clerical errors whereby blood with wrong ABO blood group was administered to patients. Part of the errors (6-20%) is made by selection of blood products from stock and transfer of these products from the hospital blood bank laboratory to the ward. The procedure of transfer of blood and blood components to the ward must be documented in Standard Operating Procedure (SOP). In principle, the blood bank laboratory should issue one unit of blood per patient to the ward.

7.6 REPLACEMENT FLUIDS

- Replacement fluids are used to replace abnormal losses of blood, plasma, and other extra cellular fluids by increasing the volume of the vascular compartment, mainly in
  - Treatment of patients with established hypovolaemia, e.g. haemorrhagic shock
  - Maintenance of normovolaemic blood loss in patients with on-going fluid losses, e.g. surgical blood loss
  - IV replacement fluids are 1st line treatment for hypovolaemia as they restore the circulating blood volume and maintain tissue perfusion and oxygenation
  - In severe haemorrhage, initial treatment with IV replacement fluids may be life saving and provide some time to control bleeding and obtain blood for transfusion if that becomes necessary
- Crystalloid solutions with a similar concentration of sodium to plasma (balanced salt solutions [BSS] e.g.

sodium chloride 0.9%, compound sodium lactate solution [**Ringer's lactate**], **Hartmann's solution**) are effective as replacement fluids. Infuse 3mL of these for each 1mL of blood lost.

NB. Glucose solutions (e.g. glucose 5% infusion, Darrow's solution ½ strength in glucose 2.5% infusion) have low sodium content and are poor replacement fluids. Do not use unless there is no alternative.

- Never use plasma as a replacement fluid
- Never use plain water as an IV replacement fluid. It will cause haemolysis and will probably be fatal.
- As well as the IV route, the intraosseus, oral, nasogastric, rectal, or subcutaneous routes can be used for administration of replacement fluids. However, except for the intraosseus route, these routes are unsuitable for treating severe hypovolaemia

Management

- Infuse **sodium chloride** 0.9% or compound sodium lactate infusion (**Ringer's lactate**) as soon as possible to restore circulating blood volume rapidly and maintain organ perfusion
  - Give a volume of infusion of at least 3 times the volume of blood lost

    NB. Do not use glucose infusion or other IV infusions with low sodium content unless there is no alternative
- Give an initial fluid bolus of 20-30mL/kg of the above fluids over 60 minutes to any patients with signs of >15% blood loss (class 2 hypovolaemia and above)
  - If possible, warm the fluid to prevent further patient cooling

  - Start rapidly, monitor BP
  - Reduce rate according to BP response
- ▶ Assess patient response to guide further fluid infusion or need for blood transfusion
- ▶ If urgent transfusion likely to save life, do not wait for fully cross matched blood **H**
  - Use uncross matched group O negative blood or of the same ABO and RhD as the patient

Reassessment

- Evaluate response to fluid resuscitation
  - Reassess patient's clinical condition
  - Detect any change
  - Assess response to resuscitation
- Signs of normovolaemia being re-established
  - Decreasing heart rate
  - Normalizing capillary refill time
  - Return of peripheral pulses
  - Increase urine output
  - Return of normal BP

Management strategy

This is based on patient's response to initial resuscitation and fluid administration

Rapid improvement

- Some patients respond quickly to initial fluid bolus and remain stable after it is completed. Blood loss is usually <20 % of total volume

Transient improvement

- Patients who have a blood loss of 20-40 % or are still bleeding will improve with the initial bolus but deteriorate when the fluid is slowed

No improvement

- Failure to respond to adequate volumes of fluids and blood require immediate surgical intervention to control the haemorrhage. In trauma, failure to respond may be due to heart failure caused by myocardial contusion or cardiac tamponade

	Class 1 Mild	**Class 2 Progres-sing**	**Class 3 Severe**	**Class End stage**
Blood loss (L)	< 0.75	0.75 – 1.5	1.5 –2	>2
% of total blood volume	<15	15- 30	30 – 40	>40
Pulse rate	N	>100	>120	>140 (1)
Pulse pressure	N	R	VR	VR/A
Systolic BP	N	N	R	VR
Capillary refill	N	P	VP	A
Respiratory rate	N	20 – 30	30 – 40	>45 (2)
Mental state	Alert	Anxious	Confused	Confused/ uncon-scious
Urine output (mL/h)	>30	20 - 30	5 - 20	<5

Notes on table:

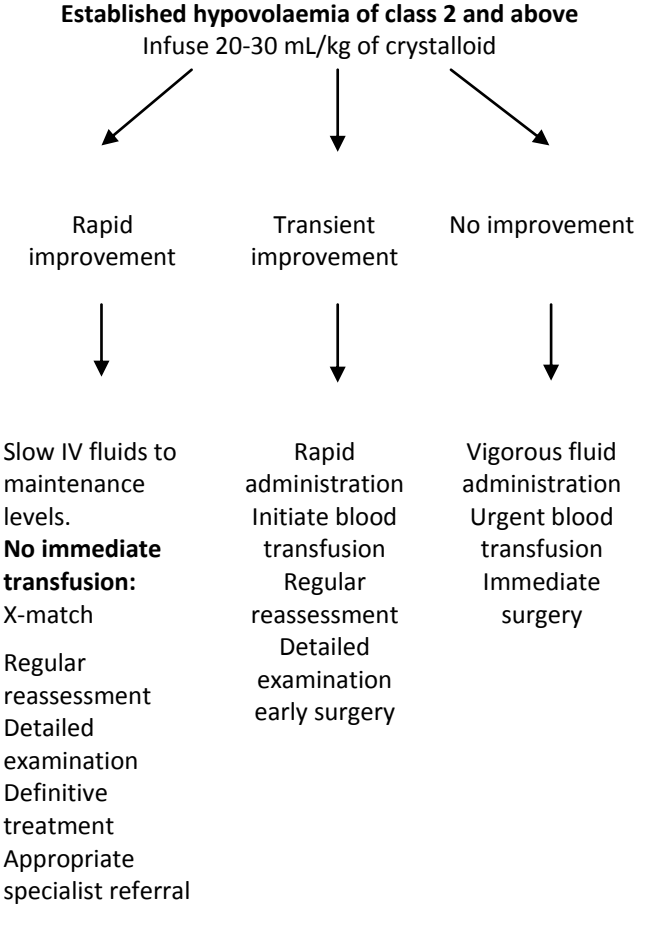
(1) But variable in terminal stages of shock

(2) Or slow sighing respiration

N = normal, R= reduced, VR=very reduced,

P = prolonged, VP= very prolonged, A = absent

Management strategy in adults



Post-transfusion

- Monitor vital signs

- Every 15 minutes for the first hour
- Every 30 minutes for the next hour then
- Every hour thereafter for 24 hours

▶ Check Hb level after 72 hours

7.6.1. Fluid replacement in Children

The principles of management and resuscitation are the same as for adults.

Hypovolaemia

- Recognizing 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

Replacement fluids

▶ 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 (see next page), give 20-30mL/kg of crystalloid fluid 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 60mL/kg maximum

Transfusion

▶ If no response to initial fluid challenge of a total of 60mL/kg, give further **crystalloid fluids** and blood transfusion

▶ Initially transfuse 20mL/kg of **whole blood** or 10mL/kg of **packed cells** (only in severe anaemia

Classification of hypovolaemia in children

	Class 1 Mild	Class 2 Progres-sing	Class 3 Severe	Class End stage
Blood volume lost	< 15%	15-25%	25-40%	>40%
Pulse rate		>150	>150	
Pulse pressure	N			A
Systolic BP	N			A
Capillary refill	N	P	VP	A
Respiratory rate/respirat ion	N			Slow sighing
Mental state	N	Irritable	Lethargic	Comatose
Urine output (mL/kg/hr)	<1	<1	<1	<1

Notes on table

N= normal, P= prolonged, VP= very prolonged, A= absent

Normal value for paediatric vital signs and blood volume

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

7.7 INDICATION FOR TRANSFUSION

Whole blood (WB)

450-500mL blood from the donor is collected into an anticoagulant/preservative solution and undergoes no further processing if used as WB.

7.7.1. Severe anaemia

Neonates

- Refer to hospital for specialized management

Children and infants

- If Hb = 4g/dl or less (or haematocrit 12%) whatever the clinical condition of the patient
- If Hb = 6g/dl or less (or haematocrit 13-18%) if any of the following life threatening clinical complications are also present
  - Clinical features of hypoxia and cardiac decomposition: Acidosis (usually causes dyspnoea), impaired consciousness
  - Hyperparasitaemia (>20%) or cerebral malaria
  - Septicaemia
  - Meningitis

Adults

- Only consider blood transfusion if anaemia is likely to cause or has already caused clinical signs of hypoxia
- Do not transfuse more than necessary; only give sufficient Hb to relieve hypoxia
- Match the dose to the patient's size and blood volume
- Hb content of a 450mL unit of blood may range from 45-75 g
- Patients may be precipitated into cardiac failure by infusion of blood or other fluids

If transfusion is necessary

- ▶ Give one unit (preferably of red cell concentrate) over 2-4 hours
- ▶ Give a rapidly acting diuretic, e.g. **furosemide** 40mg IM
- ▶ Reassess the patient

If symptoms of severe anaemia persist

- ▶ Give further 1-2 units

Pregnancy

Duration of pregnancy less than 36 weeks

- If Hb 5 g/dl or less irrespective of clinical condition
- If Hb 5-7 g/dl and with any of the following present
  - Established or incipient cardiac failure or clinical evidence of hypoxia
  - Pneumonia or other serious bacterial infection
  - Malaria
  - Pre-existing heart disease

Duration of pregnancy 36 weeks or more

- If Hb 6 g/dl or less irrespective of clinical condition
- If Hb 6-8 g/dl and with any of the above conditions are present
- Elective caesarean section
- If there is history of
  - Antepartum haemorrhage (APH)
  - Postpartum haemorrhage (PPH)
  - Previous caesarean section

If Hb 8-10g/dl

- ▶ Establish/confirm blood group and save freshly taken serum for cross matching

If Hb <8 g/dl

- ▶ Have 2 units of blood cross matched and available

Pre-operatively

- If Hb 7-8g/dl in a well-compensated and otherwise healthy patient presenting for minor surgery
  NB. A higher preoperative Hb level will be needed before elective surgery in the following situations
  - Inadequate compensation for the anaemia
  - Significant co-existing cardio respiratory disease
  - Major surgery or significant blood loss expected

7.7.2. Acute haemorrhage with shock

Management of acute haemorrhage/hypovolaemia

- Replacement of blood volume with suitable replacement fluids is more important than red cell replacement in the management of previously healthy patients who have lost >30% of their blood volume
- The need for blood transfusion must be determined by
  - The amount and speed of blood loss
  - The patient's critical signs
  - Response to initial IV fluid resuscitation

7.7.3. Intra-operatively

Where necessary and as required (specialists only)

7.7.4. Sickle – cell anaemia

- Blood transfusion is not necessary for a sickle cell patient with steady Hb of 6-8 g/dL or a haematocrit of 18-20%
- Blood transfusion is necessary if Hb <5 g/dL
- Red cell transfusion may be needed because of cardiac failure or bacterial infection during pregnancy
- Red cell transfusion is not needed in a pregnant patient if Hb is >6 g/dL and there are no complications
- For caesarean section, if there is steady Hb of 8 g/dL, pre-operative blood transfusion is not needed.

- Whole blood transfusion is needed only to replace acute blood loss
- The main purpose of red cell transfusion is to restore Hb to steady level with packed cells only

7.7.5. Indications for transfusion in neonates

▶ Refer to hospital level if transfusion required

Main indications

- Severe unconjugated hyperbilirubinaemia
  - Haemolytic disease of the new born
- Severe anaemia (refer to hospital for specialized management)

Other indications

- Complications of prematurity
- Sepsis
- Acute blood loss from any cause
- Transfusion is needed if blood loss is >8mL/kg or 10% of blood volume in prematures

7.8 TRANSFUSION GUIDELINES FOR BLOOD COMPONENTS

7.8.1. Red Cell Transfusion Guidelines

Major products available

Red Blood Cells (paediatric pack/red cell concentrate)

Description/Contents

Red Blood Cells (RBCs) are prepared from Whole Blood (WB) by the removal of most of the plasma. RBCs are stored in one of several saline-based anticoagulant/ preservative solutions, yielding a haematocrit (Hct) between 55-80%.

Indications

The major indication for RBC product transfusions is prevention or treatment of symptoms of tissue hypoxia by increasing the oxygen-carrying capacity of blood. The transfusion requirements of each patient should be based on clinical status rather than on predetermined Hct or haemoglobin (Hgb) values

1. Haemorrhagic shock due to
   - Surgery
   - Trauma
   - Invasive procedure
   - Medical conditions (e.g. Gastro-intestinal haemorrhage)
2. Active bleeding with
   - Blood loss in excess of 20% of the patients calculated blood volume or
   - Blood loss with 20% decrease in blood pressure and/or 20% increase in heart rate
3. Symptomatic anaemia with
   - Haemoglobin less than 8 g/dl
   - Angina pectoris or Central Nervous System (CNS) symptoms with haemoglobin less than 10g/dl
4. Asymptomatic anaemia
   - Preoperative haemoglobin less than 8 g/dl AND
   - Anticipated surgical blood loss greater than 500mL
5. Sickle cell disease
   - When general anaesthesia is anticipated, when signs and symptoms of anaemia are present, or for exchange transfusion when indicated (e.g. pregnancy, stroke, seizures, priapism, or acute chest syndrome)

- Anaemia due to renal failure/haemodialysis refractory to erythropoietin therapy

Red blood cells products should not be transfused for volume expansion only or to enhance wound healing

Dosage/administration

Red blood cells (RBC) require compatibility testing and should be ABO and Rh compatible. One unit of RBCs should increase the haemoglobin of a 70kg adult by approximately 1 g/dL in the absence of volume overload or continuing blood loss. Clinical signs and symptoms should be assessed after every unit of red blood cell transfusion so that the need for additional transfusion and the patient's blood volume status can be assessed. Patients with chronic anaemia, who are volume expanded, and other patients susceptible to fluid overload should be transfused slowly. The initial transfusion period should be carefully monitored with a slow transfusion rate to allow the early detection of a transfusion reaction. Transfusion should be completed within 4 hours per unit.
Alternatively, the unit may be divided by the Blood Bank in advance and administered in two or more aliquots.

Alternative therapy

Diagnosis and treatment of nutritional anaemias (iron, B12, and folate deficiencies) will usually avoid the need for transfusion. Erythropoeitin has been shown to reduce transfusion needs in patients with chronic renal failure and other patients with chronic anaemia. Autologous transfusion (pre-operative donation, isovolemic haemodilution, perioperative blood recovery, and post-operative blood salvage) has been shown to reduce red

cell requirements in carefully selected patients. DDAVP, aprotinin, and other pharmacologic agents have been shown to reduce blood loss during some surgical procedures.

7.8.2. Platelet transfusion guidelines: Platelets

Major products available

Platelets concentrate (**random donor platelets - RDP**)
Platelets pooled

Description/contents

RDP are separated from whole blood by differential centrifugation. One unit of RDP contains at least 5.5x1010 platelets, typically 7.5x1010 platelets. Pooled RDP are typically prepared from 4-6 units of RDP. Platelets are suspended in donor plasma, unless washed.

Indications

- Prevention/treatment of non-surgical bleeding due to thrombocytopenia
  If possible, prior to transfusion the reason for thrombocytopenia should be established. When thrombocytopenia is caused by marrow failure, the following transfusion triggers are considered appropriate: If platelet count is <10,000/μL and no additional abnormalities exist; if platelet count is between 10,000 and 20,000/μL and coagulation abnormalities exist or there are extensive petechiae or ecchymoses; and if the patient is bleeding at sites other than skin and platelet count is <40-50,000/μL.
- Patients with accelerated platelet destruction with significant bleeding (such as autoimmune thrombocytopenia or drug-induced thrombocytopenia)

- The endpoint should be cessation of bleeding, since an increment in platelet count is not likely to be achieved. Prophylactic transfusion is not indicated in these disorders
- Prior to surgical and major invasive procedures when the platelet count is <50,000/µL
- During neurosurgical and ophthalmologic procedures, some authorities recommend that the platelet count be maintained between 70,000 and 100,000/µL.
- Bleeding with qualitative platelet defect documented by history and/or laboratory tests
- The cause should be identified and corrected, if possible, prior to surgery. Platelet transfusion is indicated only if the defect cannot be otherwise corrected, e.g. a congenital platelet abnormality. Consultation with the blood bank physician is recommended in these situations.
- Diffuse microvascular bleeding after cardiopulmonary bypass or massive transfusion.
- Platelet count and coagulation studies should be performed prior to the transfusion to guide subsequent therapy. During surgery on patients with quantitative or qualitative platelet defects, the adequacy of haemostasis in patients should be evaluated by the assessment of microvascular bleeding.

Note

- Platelet transfusion should be avoided in thrombotic thrombocytopenic purpura, heparin-induced thrombocytopenia, and post-transfusion purpura, except in cases of life threatening haemorrhage.

Issue of platelet concentrates

- It is advised to give as much ABO blood groups as possible that are compatible platelets
- Due to the short shelf life of platelets, they should be kept in the laboratory as short as possible, and must be transfused as soon as possible
- They must be stored at 20–24^{o} Celsius under continuous agitation
- Because of the risk of bacterial contamination, platelets must be administered via the infusion
- The storage of platelets under uncontrolled conditions, e.g. at the ward, should be avoided

Dosage and administration

Compatibility testing is not required. Platelet concentrate products should be ABO identical where possible because platelet increments may be higher. If not possible, good clinical results are usually obtained with ABO mismatched platelets. In this case, transfusion of large quantities of ABO incompatible plasma may lead to a positive direct antiglobulin test and, rarely, clinically significant red cell destruction. Rh compatibility is important but not always possible. Post exposure prophylaxis with anti-Rh immune globulin should be considered following Rh-positive platelet product transfusions to Rh-negative women who may have children in the future.

4-5 pooled RDP should raise the platelet count of a typical 70kg man approximately 30,000-50,000/µL. Platelet count increments after transfusion may be lower than expected in the presence of certain medications, fever, splenomegaly, infection, or alloimmunization to HLA or specific platelet antigens.

Alternative therapy

DDAVP (**Desmopressin**) may improve the platelet functional defect in uremia. It also raises von Willebrand factor levels in mild-moderate von Willebrand's disease, which may improve platelet function. Pharmacologic agents such as aprotinin may reduce major surgical bleeding and thereby avoid the dilutional thrombocytopenia characteristic of massive transfusion. Some of these agents may also have a direct effect on improving platelet function.

7.8.3. Plasma transfusion guidelines

Major products available

- Fresh Frozen Plasma (FFP)
- Plasma Frozen within 24 hours after Phlebotomy (FP24)
- FFP Thawed
- Plasma, Cryoprecipitate Reduced

Description/contents

All plasma products are prepared by separation from whole blood by centrifugation. The volume of plasma varies and appears on the label. **Fresh Frozen Plasma** contains all soluble clotting factors and contains the plasma from one unit of whole blood, approximately 250mL, separated and frozen within 8 hours of collection. **FFP** Thawed should be transfused within 24 hours. Plasma Frozen within 24 hours after Phlebotomy has somewhat reduced levels of Factor VIII (65-80%). Thawed Plasma is a unit of FFP or FP24 thawed at 30-37°C and maintained at 1-6°C for up to 5 days. Levels of Factors V and VIII in Thawed Plasma are reduced, and Thawed Plasma should not be used to treat patients with deficiencies of these

factors. Plasma Cryoprecipitate Reduced is prepared by thawing FFP at 4°C and removing the Cryoprecipitate, which yields plasma that is depleted in Factor VIII, von Willebrand factor (vWF), fibrinogen, Factor XIII, and fibronectin. Other proteins such as albumin, Factors II, V, VII, IX, X, and XI are unaffected.

Indications*

- Bleeding, preoperative, or massively transfused patients with a deficiency of multiple coagulation factors
- Patients with bleeding and/or urgent invasive procedures on warfarin therapy. Vitamin K will reverse the warfarin defect in about 12 hours.
- Thrombotic thrombocytopenic purpura and related syndromes
- Congenital or acquired coagulation factor deficiency when no concentrate is available
- Specific plasma protein deficiencies. Examples include Anti-thrombin III deficiency and C-1 esterase deficiency (hereditary angioedema). Specific treatment protocols for these rare conditions should be referenced.
- Disseminated Intra-vascular Coagulation (DIC) such as in disseminated septaecimia following surgery, abruptio placenta and post abortion sepsis

***** *Not all plasma products are suitable for all the above indications. The choice of plasma product should be based on the underlying deficiency and the contents of the available plasma products (see description/content).*

Plasma product transfusion for coagulopathies is not indicated unless the prothrombin time (PT) or partial

thrombin time (aPTT) is >1.5 times the midpoint of the normal values.

Do not transfuse plasma products for volume expansion, for prophylaxis following cardiopulmonary bypass, or as a nutritional supplement.

Dosage and administration

Plasma product transfusions should be ABO compatible. Crossmatching and Rh compatibility are not required for plasma product transfusions. The usual starting dose is 10-15mL/kg (i.e. 3-4 units for a 70-kg patient). An assessment of the effect of the product on the bleeding problem should be made before continuing therapy.

Alternative therapy

Saline, other electrolyte solutions, albumin, or synthetic colloids are safer, cheaper, and more effective for volume expansion. When appropriate, a specific coagulation factor concentrate should be used for treatment. Treatment with vitamin K can avoid the need for plasma transfusion in patients with **vitamin K** deficiency or on warfarin.

7.8.4. Cryoprecipitate transfusion guidelines

Major Products Available

- Cryoprecipitated AHF (Cryoprecipitate)
- Cryoprecipitated AHF, Pooled

Description/Contents

The cold insoluble portion of plasma that precipitates when fresh frozen plasma is thawed at 1-6^{o}C. The supernatant (cryo-poor plasma) is removed, and the residual volume of cryoprecipitate (approximately 15mL) is refrozen and stored at -18^{o}C. Cryoprecipitate provides

therapeutic amounts of Factor VIII:C, Factor XIII, von Willebrand factor, and fibrinogen. Each bag of cryoprecipitate contains 80-100 units of Factor VIII:C and 150-200mg of fibrinogen (Factor I).
In addition, significant amounts of Factor XIII (fibrin-stabilizing factor) and von Willebrand factor (vWF), including the high molecularweight multimers of vWF, are also present.

Indications

- Fibrinogen levels less than 115mg/dL
- Cases of disseminated intravascular coagulation where both fibrinogen and Factor VIII may be depleted
- Platelet count greater than 100,000 with evidence of platelet dysfuntion and no response to DDAVP
- Prophylaxis or treatment of significant Factor XIII deficiency

Historically, patients with von Willebrand's disease (vWD) and Hemophilia A are treated with **Cryoprecipitate**.
Cryoprecipitate should not be used in the treatment of hemophilia B (Factor IX deficiency, Christmas disease).
Cryoprecipitate has also been used in the production of "fibrin glue" with the addition of thrombin to form an insoluble clot for application to surgical margins and other surgical applications. Such use is not approved by the Food and Drug Administration (FDA), although widespread. The safety of this procedure, including the risk of the thrombin source, has not been established.

Dosage and administration

For fibrinogen replacement, ten bags of cryoprecipitate will increase the fibrinogen level of a 70-kilogram recipient

approximately 70mg/dL. Cryoprecipitate is administered after pooling.

Compatibility testing is not necessary, but the product should be ABO plasma compatible. Rh type is not important.

Alternative therapy

Factor VIII concentrates that are made with recombinant DNA technology or have been pasteurized are safer and are the treatment of choice for patients with hemophilia A and von Willebrand's disease. **DDAVP (desmopressin)** causes the release of **Factor VIII** and vWF in most patients with mild-moderate hemophilia A and vWD. Therefore, **DDAVP** may be used instead of **cryoprecipitate** or factor concentrates in these patients.

Autologous blood transfusion

Autologous blood transfusion is the collection and re-infusion of the patient's own blood or blood components. Autologous blood transfusion allows patients to donate blood for their own use. After collection, blood is clearly marked with the patient's name and reserved for their use only. Documentation carefully monitored. Autologous blood donation is possible by the following

- Those who are not anaemic (starting haemoglobin must be at least 11 g/dL, slightly lower than required of a regular blood donor i.e. 12 g/dL)
- Those who have no medical condition that could cause problems during or after the blood donation process
- Those who are having planned surgery that routinely requires a blood transfusion (except in cases where long term storage is desired)

- For planned surgery, autologous blood must be tested for transfusion transmissible infections, even if it is going to be transfused to the same patient.

Five categories of autologous transfusions recognized

1. Preoperative autologous blood donation, transfusion, and storage: Units of blood are drawn from a patient usually starting (in short term case) 3-5 weeks before elective surgical procedure and stored for transfusion at the time of the surgery
2. Intra-operative heamodilution: Blood is collected at the start of surgery and the fluid volume lost is replaced with appropriate IV solutions, then finally stored blood is re-infused after surgery
3. Intra-operative blood salvage: Blood is salvage from the surgical area during the operation for re-infusion during or after the surgical procedure
4. Postoperative blood salvage: Blood is collected after surgical procedure is complete by drainage of the operative area and re-infused
5. Autologous self stored blood (blood banking): One's own blood is preserved in a frozen state for one's own use in case one needs a blood transfusion. The safest blood one can receive is his or her own! This process eliminates donor-transmitted diseases. If one has a rare blood type or if the blood contains rare components, this process may mean the difference between life and death. Autologous blood is always a perfect match. It will be there when one needs it regardless of the general blood shortage.

7.8.5. Adverse reactions to transfusion

- Immediately report all suspected acute transfusion reactions to the hospital blood bank laboratory that works with the clinician after getting a pre-transfusion sample, post-transfusion sample, patient's urine sample, and the transfused unit. Attention is made to the blood bank when suspected contamination by bacteria or haemolysis is from the blood bank. Regrouping and testing are done on both patients and transfused samples
- 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 cause of life threatening acute haemolytic reactions
- Bacterial contamination of red cells or platelet concentrates is an under-recognized cause of acute haemolytic transfusion reactions
- Patients who receive regular transfusions are at particular risk of acute febrile reactions. With experience, these can be recognized so that transfusions are not delayed or stopped unnecessarily
- Transfusion-transmitted infections are the most serious delayed complications of transfusions. Since these may occur long after the infusion, the association with them may be missed. Therefore, record all transfusions accurately in the patient's case notes, and consider transfusion in the differential diagnosis
- Infusion of large volumes of blood and IV fluids may cause haemostatic defects or metabolic disturbances

Recommendations

1. The blood used for the compatibility testing must be stored for 7 days at 2-8^{o}C for possible investigation on transfusion reactions
2. A nurse should observe the patient during the first 5-10 minutes after starting each unit. At the end of the period, the vital functions must be registered. Vital functions' parameters and frequencies (pulse, temperature, BP) should be documented
3. The clinician handling the patient must be involved in the differential diagnosis of transfusion reactions. Also, a quick and clear investigation should be started in the hospital blood bank laboratory
4. Prior to disconnecting, the unit must be closed to avoid reflux of patient blood into the donor blood
5. Systematic teaching and training of nursing staff to prevent recognize and treatment of transfusion reactions is indicated

7.9 ACUTE TRANSFUSION REACTIONS

occurring within 24 hours of transfusion

7.9.1. Category 1: Mild reactions

Clinical features

- Localized cutaneous reactions, e.g. urticaria, rash
- Pruritis

Management

- ▶ Slow the transfusion
- ▶ Give **antihistamine**, e.g. **promethazine hydochloride** 25-50mg by deep IM or slow IV
  - Give <25mg/min as a diluted solution containing 2.5mg/mL in water for injections (max: 100mg)

Child 1-5 years: 5mg by deep IM

Child 5-10 years: 6.25-12.5mg by deep IM

If no clinical improvement within 30 minutes or if condition worsens

- Treat as category 2

7.9.2. Category 2: Moderately severe reactions

Clinical features

- Flushing
- Urticaria, pruritis
- Rigors
- Fever
- Restlessness, palpitations
- Tachycardia
- Mild dyspnoea
- Headache

Management

- 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
- Give **antihistamine** IM (see category 1 above)
- Give antipyretic**: Paracetamol** 15mg/kg (adult: 1g)
- If there are anaphylactic features (e.g. bronchospasm, stridor): Give **hydrocortisone** 4mg/kg IV and **aminophylline** 6mg/kg IV

- ▶ Collect urine for the next 24 hours for volume output and evidence of haemolysis. Send to the hospital laboratory 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

7.9.3. Category 3: Life-threatening reactions

Clinical features

- Rigors
- Fever
- Anxiety, restlessness
- Hypotension (fall of >20% in systolic BP)
- Tachycardia (rise of >20% in heart rate)
- Haemoglobinuria
- Unexplained bleeding (DIC)
- Pain in chest, or near infusion site, or in loin/back, headache
- Respiratory distress, shortness of breath, dyspoea

Management

- ▶ Stop the transfusion
- ▶ Give **sodium chloride** 0.9% IV infusion 20-30mL/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 1mg/mL 0.01mg/kg slow IM

- If there are anaphylactic features (e.g. bronchospasm, stridor): Give **hydrocortisone** 4mg/kg IV and **aminophylline** 6mg/kg IV
- Give diuretic**: Furosemide** 1mg/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 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
- Refer for further management where necessary

Notes

- If an acute transfusion reaction occurs, stop the transfusion immediately and remove the giving set. Check the blood pack labels and patient's identity. If there is a discrepancy consult the blood bank.
- In an unconscious or anaesthetized patient, hypotension and uncontrolled bleeding may be the only signs of transfusion problem.
- In a conscious patient with a severe haemolytic transfusion reaction, signs/symptoms may appear within minutes of infusing only 5-10mL of blood
  - Close observation at the start of infusion of each unit is therefore vital
- For all category 2 and 3 reactions, record the following in the patient's notes:

- Type of reaction
- Time from start of transfusion that reaction occurred
- Volume, type, and pack numbers of blood products transfused

8. NUTRITION

8.1 POLICY GUIDELINES ON INFANT AND YOUNG CHILD FEEDING (YCF)

1. All mothers should be counselled and supported to initiate breastfeeding within an hour of delivery and to exclusively breastfeed their infants for the first six months of life unless medically contraindicated.
2. Parents should be counselled and supported to introduce adequate, safe, and appropriate complementary foods at six months of age and continue breast feeding until child is two years.
3. Pregnant women and lactating mother should be appropriately cared for and encouraged to consume adequate nutritious foods.
4. Health service providers should establish HIV status of all pregnant women and lactating mothers.
5. All pregnant women and lactating mother should encourage to confidentially share their HIV status with service providers and key family members in order to get appropriate infant and young child feeding (IYCF) services.
6. Exclusive breastfeeding should be recommended for infants of HIV infected women for the first six months irrespective of the infants HIV status, unless replacement is acceptable, feasible, affordable, sustainable, and safe (AFASS).
7. Infants born to mothers with HIV should be tested for HIV infection from six weeks of age. Appropriate feeding and counselling should be shared with the mother based on her personal situation.

8. Malnourished children should be provided with appropriate medical care, nutritional rehabilitation, and follow-up.
9. Mothers of low birth weight infants who can suckle should be encouraged to breastfeed. Those who cannot should be assisted to express breast milk and feed the baby.
10. Mothers, care takers, and families should be counselled and supported to practice optimal IYCF in emergencies and other exceptionally difficult/special circumstances.

8.2 PROTEIN ENERGY MALNUTRITION (PEM) OF EARLY CHILDHOOD

Malnutrition in childhood

The term malnutrition is derived from two French words (mal = bad) and (nutriture = nutrition) and it literally means "bad nutrition". Nutrition technically includes under nutrition and over nutrition.

- Malnutrition is a significant contributor/cause of morbidity and mortality among children less than five years of age in sub-Saharan Africa (SSA).
- Malnutrition (PEM), singly or in combination with other disease, is a significant contributor/cause of morbidity and mortality among children less than five years of age in Uganda as well.
- PEM is the cause of two-fifth (≅ 40%) of childhood deaths in Uganda.
- Thus, protein energy malnutrition (PEM) is a significant public health problem, mainly of the under developed world.

- Current accurate statistics on the magnitude of the problem both on the global and the local level are scanty.

Examples

- 850 million people are chronically hungry in the world
- 4-6 million Ugandans suffer from chronic energy deficiency
- 20% Ugandans live in abject poverty and suffer from chronic hunger
- About 39%, 22.5%, and 4.0% of the under-five year old children are stunted, underweight, and wasted respectively in Uganda

- In the under-five year old children, the most prevalent form of malnutrition is protein energy malnutrition (PEM)
- Protein energy malnutrition (PEM) describes a broad spectrum of clinical conditions ranging from Marasmus (dry malnutrition) on one extreme end to Kwashiorkor (wet malnutrition) on the other extreme end with intermediate forms, such as Marasmic – Kwashiorkor (mixed malnutrition)
- The intermediate forms constitute the majority of cases

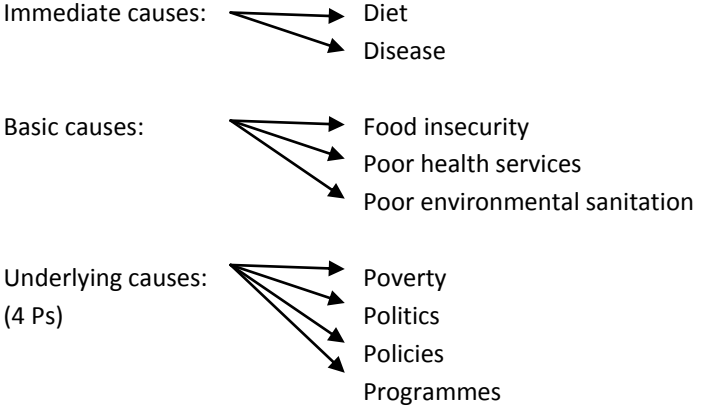
Forms of PEM

- Primary PEM
  - Inadequate diet is the primary cause
- Secondary PEM
  - Disease or other medical condition is the primary cause; diet is secondary
- Acute malnutrition

  - Is an indicator of current nutritional status, reflecting recent weight changes or disruption in nutrient intake
  - Acute malnutrition is the most appropriate indicator of the current nutritional status and appropriate indicator to use in an emergency setting. The children are thinner than their comparable age group of same height
- Chronic malnutrition
  - Is an indicator of the nutritional status overtime; chronically malnourished children are shorter (stunted) than their comparable age group

Aetiology/Causes of PEM

Causes/contributing factors to malnutrition:



- Food factors
  - Food insecurity
  - Balanced diet (6 principles of diet design)

  - Organoleptic characterisitics of food (e.g. colour, taste, consistency, flavour)
  - Food preparation
  - Food taboos
- Non-food factors
  - Infections and infestations
  - Poverty and corruption
  - Poor governance
  - Human rights and the right to food
  - Poor infrastructure
  - Poor marketing and distribution system
  - Underdeveloped agro-industry
  - Inter-sectoral nature of nutrition
  - Loan facilities
  - Nutrition education/advocacy
  - Political economy
  - Saving culture
- Some of the factors responsible for malnutrition include
  - Excessive workload for women; no time to prepare nutritious meals for the children
  - Poverty
  - Inadequate food intake
  - Presence of disease
  - Poor weaning practices
  - Food insecurity
  - Poor maternal and child rearing practices
  - Inadequate water supply
  - Harmful cultural practices/institutions
  - Poor environmental sanitation
  - Family instability

- Low family incomes
- Low education/or illiteracy
- Lack of nutrition education (IEC component of PHC) (IEC = Information, Education, Communication; PHC = Primary Health Care)

Consequences of PEM

- Several consequences of PEM in children include:
  - impaired growth and development
  - Impaired mental development
  - Impaired body resistance/immune system
  - Increased risk of adult chronic diseases
  - Increased risk for the cycle of inter- generational malnutrition
  - Contributes a lot to the loss of millions of dollars to the national economy and overall development

Clinical features of PEM

Marasmus

- Severe wasting (severe weight loss of muscle tissue and subcutaneous fat)
  - Wasting is less than 60% (≤ - 3SD) of the expected weight for age (% Harvard Standard)
  - Absence of bilateral pitting oedema of both feet
  - "Old man's face" because of severe wasting of muscles and subcutaneous fat on the face
  - The 'excess skin' hangs/gathers around the buttocks (baggy pants)
  - The ribs and zygoma bones are prominent
  - Scapular blades and extremities (the limbs)
  - Eyes are sunken (due to loss of orbital fat)
  - 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)

Kwashiorkor

- Presence of bilateral pitting oedema (oedema of both feet)
- Miserable
- Apathetic
- Moon face
- Appears adequately nourished due to excess extra cellular fluid
- 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) and malnutrition
- Organomegaly (liver, spleen) is common

Marasmic – Kwashiorkor

- Presents with features of both Marasmus and Kwashiorkor, such as
  - Oedema of both feet
  - Marked wasting (due to loss of muscles and fat)
  - Apathy/misery
  - Skin changes (dermatosis)
  - Hair changes (silky, pluckable)
  - Some degree of organomegaly (liver and spleen enlargement)

Biochemical and Immunological Features

Variable	Marasmus	Kwashiorkor
• Total protein	↓	↓↓
• Serum albumin	↓	↓↓
• Serum globulin	↑	↑↑ or normal
• Serum transferrin	↓	↓↓
• Serum immunoglobulins	↑ or ↓	↑↑ or ↓ (IgG, IgM, IgA)
• Serum complement	↓	↓
• Cortisol	↑	↑↑
• Insulin	↓	↓
• Glucagon	↑	↑
• Serum electrolytes	↑ or normal	↑ or normal
• Serum sodium	↑ or normal	↑ or normal
• Serum potassium	↓	↓
• Serum magnesium	↓	↓
• Serum zinc	↓	↓
• Serum selenium	↓	↓
• Serum iron	↑ or ↓	↑ or ↓
• Serum copper	↓	↓

Differential diagnosis

- Nephrotic syndrome (nephritis)
- Liver disease
- Heart disease

- Malabsorption syndrome
  Malignancy (e.g. gastrointestinal tract cancer, liver cancer/hepatocellular carcinoma)

Investigations

- History, especially dietary history
- Blood: Complete blood count (full haemogram) (e.g. Hb, ESR, white blood cells (WBC) (total and differential), red blood cells (RBC), haematocrit, blood sugar, serum electrolytes, serum protein (total and albumin, globulins), serum complement, transferin immunoglobulins (IgG, IgM, IgA); haemoparasites, malaria, HIV/AIDS)
- Urinalysis: Urine sugar, protein, casts (granular, hyaline), electrolytes, amino acids/amino acid metabolites, microorganisms, cells (WBC or RBC)
- Stool microscopy for ova and cysts, occult blood, and parasites
- Chest X-ray: Look for evidence of tuberculosis or other chest abnormalities

8.2.1. Management of PEM in early childhood

- Assessment of the nutritional status
  - Histories
  - Physical examination
  - Anthropometric measures
  - Biochemical indicators
  - Immunological indicators
  - Clinical features
- Dietary history
  - Obtain a detailed history on food intake of the child, especially the 24-hour dietary recall

- History on breast-feeding and weaning/complementary feeding should also be sought
- History of both present and past infections/illness and their management
- History of immunization against the six common immunizable diseases (measles, tuberculosis, whooping cough/pertussis, diphtheria, polio, tetanus), influenza, meningitis, and hepatitis B in adults

➢ Clinical examination
- Anthropometry (physical body dimensions)
- Weight for age (W/A)
- Height for age (H/A)
- Weight for height (W/H)
- Mid upper arm circumference (MUAC)
- Quack stick Index (MUAC/Ht)

8.2.2. Systems review (systemic examination)

Examination should be systematic; from head to toe

➢ Central nerve system
- Evidence of mental retardation

➢ Ear, eye, nose, and throat
- Symmetry of eyes, ears, and relation to nose
- Evidence of infection (e.g. otitis media, conjunctivitis)
- Evidence of nutrient deficiency (e.g. bitot spot, angular stomatitis, cheilosis, magenta tongue)
- Pallor of mucous membranes
- Mouth ulcers

➢ Respiratory system
- Evidence of chest infection (e.g. cough, dyspnoea)

  - Increased respiratory rate (RR)
- Cardiovascular system
  - Increased heart rate (HR); increased pulse rate (PR)
- Pectoral and abdominal viscera
  - Bowel movements
  - Abdominal distension: Ascites, organomegaly (e.g. enlarged liver and spleen)
  - Bowel sounds (e.g. alterations in paralytic ileus/dehydration, obstruction (constipation/worms))
- Urinary system/urogenital system (UGS)
  - Painful micturition/crying on passing urine
  - Blood in urine
  - Pain around pubic area; evidence of cystitis (bladder infection)
  - Pus in urine (pyuria)
- Integumental system
  - Skin turgor (malnutrition, dehydration)
  - Skin lesions/dermatosis, flaky paint dermatitis, ulcers
- Musculoskeletal System
  - Wasting (loss of muscle tissue and subcutaneous fat)
  - Bilateral pitting oedema of both feet (may present in grades 0 up to 3)
  - Flabby muscles
- General examination
  - Temperature
  - Cyanosis
  - Jaundice/icterus

8.3 TREATMENT/ PREVENTION OF HYPOGLYCAEMIA

Blood sugar <3mmol/l or <55mg/dL

- Give 2mL/kg of 25% **glucose solution** IV
  - Prepare by diluting 50% **glucose solution** with an equal volume of **normal saline** or **Ringer's Lactate** infusion or – give 10% **glucose solution** – 2mL/kg by mouth
  - Use common table sugar/sucrose if glucose is not available or 5mL/kg/hour of glucose 5% (50g sugar in 1 litre of water)
  - Prepare by dissolving 2 teaspoonful of sugar in half a mug (18 teaspoonful =100mL) of clean water
  - Begin feeding quickly upon admission
  - Provide frequent and regular small feeds (3 hourly day and night)
- Treat infections promptly

If the patient can drink

- give a small feed of an intensive therapeutic diet (e.g. Formula 75)

8.4 TREATMENT/PREVENTION OF HYPOTHERMIA

Hypothermia is axillary temperature <35^{o}C and rectal temperature <35.5^{o}C

- Measure body temperature twice daily
- Ensure that the patient is well covered with cloths, hats, and blankets
- Ensure enough covering/blankets are provided at night
- Encourage caretaker/mother to sleep next to her child (body-to-body contact, direct heat/warmth transfer from mother to child)
- Keep the ward closed during the night and avoid wind drafts inside

- ▶ Quickly clean the patient with a warm wet towel and dry immediately. Avoid washing the baby directly in the first few weeks of admission.
- ▶ Provide frequent and regular small feeds (3 hourly day and night)

8.5 TREATMENT OF DEHYDRATION

Dehydration is a clinical condition brought about by the loss of significant qualities of fluids and salts from the body

Causes

- Diarrhoea
- Excessive sweating as in high fever
- Vomiting
- Respiratory distress

Management

Management with plans A, B, and C, depending on the degree of dehydration

8.5.1.1 Plan A

- There is no clinical dehydration yet
- It is meant to prevent clinical dehydration

- ▶ **Advise the mother/caretaker** on the 3 rules of home treatment (i.e. extra fluids, continue feeding, appointment to come back for review). Give extra fluids, as much as the child can/will take
- ▶ Advise mother to
  - Continue/increase breast feeding
  - If the child is exclusively breastfed, give oral rehydration solution (ORS) or clean water in addition to milk

- If the child is not exclusively breast fed, give one or more of:
  - ORS
  - Soup
  - Rice-water
  - Yoghurt drinks
  - Clean water
  - In addition to the usual fluid intakes, give ORS after each loose stool or episode of vomiting
    < 2years → give 50 –100ml
    > 2 years → give 100 – 200ml
- Give the mother 2 packets of ORS 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 small but frequent sips of ORS from a cup
- If the child vomits, wait for 10 minutes, then give more ORS 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 ceases

▶ Advise the mother on
- Correct breastfeeding and other feeding during sickness and health
- Increasing fluids during illness
- How to maintain her own health
- When to return to the health worker/health facility for review

8.5.1.2 Plan B

- There is some clinical dehydration
- Give ORS in the following amount during the first 4 hours

Age (Months)	Weight (kg)	ORS (mL)
<4	<6	200-400
4-12	6-9.9	400-700
13-24	10-11.9	700-900
25-60	12-19	900-1400

Notes

- Only use the child's age when the 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 75mL
- 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 100-200ml of clean water during the first 4 hours
- Reassess the patient frequently (every 30-60 minutes) for the classification of dehydration and the selection of the treatment plan

8.6 VITAMIN A DEFICIENCY

Lack of vitamin a, which is required for proper functioning of the retina and of epithelial cells. More common in children.

Causes

- Malnutrition
- Severe childhood illness, e.g. measles, whooping cough

Clinical features

- Night blindness
- Conjunctival dryness. See Xerophthalmia
- Corneal ulceration (keratomalacia)
- Dry, rough, and thickened skin ("toad skin")

Differential diagnosis

- Other causes of blindness, e.g. glaucoma, trachoma, onchocerciasis, gonococcal ophthalmia, accidents, cataract

Investigations

- Diagnosis is based on clinical presentation
- Serum vitamin A

Management HC2

- **Vitamin A**: Give 3 doses (days 1, 2 and 14)
  < 6 months: 50,000 IU
  6-12 months: 100,000 IU
  12 months: 200,000 IU

Note

- Give prophylactic vitamin A to children with measles, malnutrition, chronic respiratory infections, persistent diarrhoea, and to lactating mothers

9. CARDIOVASCULAR DISEASES

9.1 DEEP VEIN THROMBOSIS (DVT)

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.

Causes

- Venous stasis (immobilization, prolonged bed rest, surgery, limb paralysis)
- Heart failure, myocardial infarction
- Blunt trauma
- Venous injury including cannulation
- Increased coagulability states such as those associated with some medicines (e.g. oral contraceptive pills, chemotherapy)
- Malignant disease of pancreas, lung, stomach, prostate
- Pregnancy and postpartum
- Polycythaemia
- Anaesthesia – general
- Stroke
- Long distance air travel

Clinical features

- 50% of cases may be clinically silent
- Painful swelling of the calf, thigh, and groin with a positive Homans' sign (unreliable for diagnosis)
- Dislodgment of the thrombus may lead to a greater risk of pulmonary embolism characterized by fever, pleuritic chest pain, haemoptysis, dyspnoea.

Differential diagnosis

- Cellulitis
- Myositis
- Contusion
- Sarcoma of the underlying bone
- Phlebitis
- Kaposi sarcoma of the leg

Investigations

- Blood: Haemogram, clotting/bleeding time, fibrinogen degradation products. Prothrombin time (PT) and international normalised ratio (INR)
- In case of pulmonary embolism: ECG, chest X-ray, echo cardiogram
- Venogram
- Doppler ultrasound (at specialised centres)

Management H

- **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) maintain INR between 2 - 3
- **Low molecular weight heparin (LMWH) (enoxaparin)** 1mg/kg daily for 5 days can be used as an alternative
- Plus **warfarin** 5mg single dose given in the evening, commencing on the same day as the heparin
  - Maintenance dose: 2.5-7.5mg single dose daily, adjusted according to the INR 2 -3
- Check for bleeding, monitor prothrombin time (PT) and INR

Starting therapy with warfarin alone increases the risk of thrombus progression and embolisation.

Antidotes for anticoagulants **H**

For heparin

- **Protamine sulphate**: 50mg slow IV (over 10 minutes) will neutralise the action of 5,000 IU of heparin when given within 15 minutes of heparin
  - 1mg protamine neutralises approximately 80-100 IU heparin (max dose: 50mg)
  - if protamine is given longer than 15 minutes after heparin, less is required as heparin is rapidly excreted

For warfarin **HC4**

- **Phytomenadione** (**vitamin K**) usually 2-5mg SC or oral
  - in severe haemorrhage transfusion with fresh frozen plasma (15mls/kg) or fresh whole blood
  - dose depends on INR and degree of haemorrhage; large doses of vitamin K may reduce response to resumed warfarin therapy for a week or more

Note

- Check for bleeding, monitor INR and APTT

Prevention:

- Early ambulation
- Prophylaxis with heparin in any acutely ill medical patient and prolonged admission

9.2 INFECTIVE ENDOCARDITIS

An infection of the heart valves and lining of the heart chambers by microorganisms, which is difficult to diagnose and treat.

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 albus*

Clinical features

- Acute or chronic illness
- Fatigue
- Weight loss
- Low grade fever and chills
- Embolic phenomena affecting various body organs
- Congenitally abnormal or previously damaged heart valve predisposes to this condition
- Heart failure may occur
- The disease may be of short duration if due to acute endocarditis and if the patient is critically ill
- Prominent and changing heart murmurs may occur
- Splenomegaly, hepatomegaly
- Anaemia
- Finger clubbing

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 before starting treatment
- At least 3 sets of blood cultures 8mLs each should be obtained (each from a separate venepucture) at least one hour apart
- Blood: Haemogram, ESR
- Urinalysis for microscopic haematuria, protenuria
- Echocardiography
- ECG

Management HC3

Initial empirical therapy

- **Benzylpenicillin** 4 MU IV every 4 hours
- **P**lus **gentamicin** 1mg/kg IV every 8 hours
  Child: **Benzylpenicillin** 50,000 IU/kg per dose every 6 hours and **gentamicin** 2.5mg/kg per dose every 8 hours
  ✕ **Gentamicin** is contraindicated in pregnancy

Once a pathogen has been identified

- Amend treatment accordingly

Prevention

- Prophylactic **amoxicillin** 2g (50mg/kg for children) plus **gentamicin** 1 hour before plus 500mgs 8 hourly for 48 hours after dental extraction and tonsillectomy in individuals with cardiac valve defects
- Prompt treatment of skin infections

9.3 CONGESTIVE HEART FAILURE

Inadequate cardiac output for the body's needs despite adequate venous return. May be due to failure of both left and right ventricles.

Causes

- Hypertension
- Valvular heart disease, e.g. rheumatic heart disease
- Anaemia
- Myocarditis
- Prolonged rapid heartbeat (arrhythmias)
- Thyroid disease
- Cardiomyopathy
- Myocardial infarction
- Congenital heart disease

Clinical features

Infants and young children

- Respiratory distress with rapid respiration, yanosisubcostal, intercostal, and sternal recession
- Rapid pulse, gallop rhythm
- Excessive sweating
- Tender hepatomegaly
- Difficulty with feeding
- Cardiomegaly
- Wheezing

Older children and adults

- Palpitations, shortness of breath, exercise in tolerance
- Rapid pulse, gallop rhythm
- Raised jugular venous pressure (JVP)
- Dependent oedema
- Enlarged tender liver
- Fatigue, orthopnea, exertional dyspnoea
- Basal crepitations
- Wheezing

Differential diagnosis

- Severe anaemia
- Protein energy malnutrition (PEM)
- Nephrotic syndrome
- Asthma
- Severe pneumonia

Investigations

- Chest X-ray
- Blood: Haemogram
- Urea and electrolytes
- Echocardiogram
- ECG

Management H

- Bed rest with head of bed elevated
- Prop up patient in sitting position
- Reduce salt intake
- **Furosemide** 20-40mg IV or oral increasing as required to 80-160mg daily or every 12 hours according to response
  Child: 1mg/kg IV or IM repeated prn according to response (max: 4mg/kg daily)
- **ACE inhibitors** start with small dose **captopril** 6.25mg 8 hourly aiming for a maintenance dose of 50mg 8 hourly
  Child: 1mg/kg daily (avoid if systolic BP is less than 90 mmHg)

Plus

- **Spironolactone** for heart failure 25-50mg once a day child: Initially 1.5-3mg/kg daily in divided doses

For acute pulmonary <u>oedema</u>

- **Morphine** 5-15mg IM (0.1mg/kg for children)
- Plus **prochlorperazine** 12.5mg IM

- Repeat these every 4-6 hours till there is improvement
- **Beta-blockers** like carvedilol at specialised centres

In urgent situations

- **Digoxin injection** loading dose 250 micrograms IV 3-4 times in the first 24 hours
  Maintenance dose: 250 micrograms daily
  Child: 10 micrograms/kg per dose as above

In non-urgent situations

- **Digoxin** loading dose 0.5-1mg orally daily in 2-3 divided doses for 2-3 days
  Maintenance dose: 250 micrograms orally daily
  Elderly patients: 125 micrograms daily
  Child loading dose: 15 micrograms/kg orally 3-4 times daily for 2-4 days
  Child maintenance dose: 15 micrograms/kg daily for 5 days

Note

- Ensure patient has not been taking digoxin in the past 14 days before digitalizing because of risk of toxicity due to accumulation in the tissues

Prevention

- Early diagnosis and treatment of the cause
- Effective control of hypertension

9.4 HYPERTENSION

Persistently high resting blood pressure (>140/90mm Hg at least two measurements five minutes apart with patient seated).

Classification of blood pressure (BP)

Category	SBP mmHg		DBP mmHg
Normal	< 120	and	< 80
Prehypertension	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
- Medicines (steroids and decongestants containing caffeine and pseudoephedrine)
- Others

Clinical features

- The majority of cases are symptomless and are only discovered on routine examination

May present as a complication affecting:

- Brain (stroke)
- Eyes (impairment of vision)
- Heart (heart failure)
- Kidney (renal failure)

General symptoms include:

- Headache
- Palpitations, dizziness
- Shortness of breath

Differential diagnosis

- Pre-eclampsic toxaemia (PET)
- Eclampsia
- Other causes of stroke

Investigations

- Urine analysis
- Blood sugar
- Plasma urea and electrolytes
- Chest X-ray
- ECG

Management

Treat to maintain optimal blood pressure

Mild hypertension (Stage 1)

- 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** 2.5mg-5mg each morning, avoid in pregnancy and breastfeeding

Moderate and Severe hypertension (Stage 2)

- **Bendroflumethiazide** 2.5-5mg each morning
- Plus **ACE inhibitor** e.g.
- **Captopril** 25-50mg every 8 hours
- **Or lisinopril** initial 5mg per day
- Or **enalapril** initially 5mg once daily
- Or **calcium channel blocker** e.g. **nifedipine** 20-40mg every 12 hours or every 8 hours
- Or **angiotensin II receptor antagonist** e.g.**losartan** 50mg once or twice daily

- Or **beta blockers** e.g.
- **Atenolol** 25-100mg daily
- Or **propranolol** 20-80 every 12 hours or every 8 hours
  See table on the next page for suitability of medicine for different conditions

9.4.1. Hypertensive emergencies

- Treatment depends on whether there is acute target organ damage, e.g. encephalopathy, unstable angina, myocardial infarction, pulmonary oedema, or stroke.
- If acute end target organ damage present, admit and give parenteral medicines. Give IV furosemide 40-80mg stat.
- Plus IV hydralazine 20mg slowly over 20 minutes. Check blood pressure regularly at least 3 hourly.
- If without acute target organ damage, treat with combination oral antihypertensive therapy as above for severe hypertension
  Special considerations (compelling indications)
  Patients with hypertension and other comorbidities require special attention, and medicine therapy may differ from that above.

The table below indicates the suitable medicines for such patients.

Risk factor	Diuretic	Beta blocker	ACE inhibitor	ARB	CCB	Aldosteron antagonist
Heart failure	✓	✓	✓	✓		✓
Post Myocardial infarction		✓	✓			✓
Coronary artery disease	✓	✓	✓		✓	
Diabetes	✓*	✓	✓	✓	✓	
Chronic kidney disease			✓	✓		
Stroke	✓		✓			

* carvedilol only

Caution

△ **Propranolol, atenolol**: Do not use in heart failure or asthma

△ **Diuretics**: Do not use in pregnancy or breastfeeding except in case of pulmonary oedema or pre-eclampsia

Note

- **Bendroflumethiazide**: Potassium supplements are seldom required; only use in susceptible patients
- **Methyldopa**: Use in hypertension with renal failure and in pregnancy and breastfeeding

Prevention

- Regular physical exercise
- Reduce salt intake

9.5 ISCHAEMIC HEART DISEASE (CORONARY HEART DISEASE)

A condition in which there is insufficient blood flow through the coronary arteries of the heart, thus leading to ischaemia and/or infarction.

Cause/risk factors

- Deposition of fatty material (cholesterol plaques) inside the coronary arteries
- Enlarged heart following hypertension
- Diabetes mellitus, obesity and hypertension
- Smoking
- Hyperlipidemia
- Family history of heart disease

Clinical features

- Chest pain, which may be localised on the left or central part of the chest ranging from mild to severe deep pain
- Tightness in the chest or a sense of oppression worsening on exertion; relieved by rest and lasting only a few minutes
- There may be associated anxiety, vomiting, and sweating
- Signs of sympathetic activation e.g. pallor and tachycardia
- Low BP
- Shortness of breath
- Arrhythmias; may cause sudden death

Differential diagnosis

- Indigestion
- Peptic ulcers
- Pleurisy
- Pericarditis
- Severe anaemia
- Dissecting aneurysm

Management **HC4**

- ▶ Give **acetylsalicylic acid** 150mg single dose (to be chewed)
- ▶ **Glyceryl trinitrate** 500 micrograms sublingually Repeat after 5 min if no response
- ▶ Give **propranolol** 10-40mg daily for as long as is required
  - Ensure close observation of the pulse rate and circulatory status
  - ✕ Avoid in patients with shock or hypotension
- ▶ Refer to higher level of care

Prevention

- Low-fat, low-cholesterol diet
- Stop smoking
- Effective control of hypertension and diabetes mellitus

9.6 PERICARDITIS

Inflammation of the heart membrane (pericardium), which may be:

- Acute and self-limiting, sub-acute, or chronic
- Fibrinous, serous, haemorrhagic, or purulent

Causes

- Viral, e.g. Coxsackie A & B, influenza A & B, *Varicella*
- Bacterial, e.g. *mycobacterium, staphylococcus, meningococcus, streptococcus, pneumococcus, gonococcus*
- Fungal: Histoplasmosis
- Mycoplasma
- Uraemia (less common)
- Hypersensitivity such as acute rheumatic fever, myocardial infarction

- Radiation
- Trauma
- Neoplasms

Clinical features

- Pericardial inflammation: Retrosternal pain radiating to shoulder and much worse on deep breathing, movement, change of position, or exercise
- Pericardial rub is a diagnostic sign
- Pericardial effusion: Reduced cardiac impulses, muffled heart sounds, acute cardiac compression
- Effects on cardiac function: Chronic constrictive pericarditis, acute cardiac compression (cardiac tamponade), dyspnoea, restlessness, rising pulmonary and systemic venous pressure, rapid heart rate, pulsus paradoxus, low BP, and low output cardiac failure

Differential diagnosis

- Any cause of central retrosternal chest pain e.g. pneumonia, ischaemic heart disease, peptic ulcer

Investigations

- ECG
- X-ray: Chest
- Echo-cardiography

Management H

- According to cause and presenting clinical features
- If there is fluid, perform tapping

Prevention

- Early detection and treatment of infections

9.7 PULMONARY OEDEMA

Congestion of the lung tissue with fluid.

Cause

- Cardiogenic: CCF
- Inflammatory diseases, e.g. cancer, TB
- Fibrotic changes

Clinical features

- Dyspnoea, breathlessness
- Rapid breathing rate
- Cough with frothy blood stained sputum

Differential diagnosis

- Pneumonia
- Plural effusion
- Foreign body
- Trauma

Investigations

- Chest X-ray
- ECG
- Echocardiography

Management **H**

Acute

- ▶ Find cause of left ventricular failure and treat accordingly
- ▶ Give high concentration **oxygen**
- ▶ Plus **furosemide** 40-80mg IM or slow IV
  - Repeat prn up to 2 hourly according to response
  - Doses >50mg should be given by IV infusion

  Child: 0.5-1.5mg/kg daily (max: 20mg daily)
- ▶ Plus **glyceryl trinitrate** 500 microgram sublingually every 4-6 hours
- ▶ Give **morphine** 5-15mg IM or 2-4mg slow IV

  Child: 0.1mgs/kg slow IV single dose

- ▶ Plus **prochlorperazine** 12.5mg by deep IM
  - Avoid in children
- ▶ Repeat these every 4-6 hours till there is improvement

Caution

△ No digitalization if patient has had digoxin within the past 14 days but give maintenance dose

Prevention

- Early diagnosis and treatment of cardiac conditions, respiratory tract infections
- Avoid (narcotic) medicine abuse

9.8 RHEUMATIC HEART DISEASE

A valvular complication of rheumatic fever.
The valves commonly involved are

- Mitral valves leading to stenosis, incompetence, or both
- Aortic valve leading to stenosis and incompetence

Cause

- As for acute rheumatic fever

Clinical features

- Heart failure
- Arrhythmias
- Thromboembolic problems e.g. stroke
- Palpitations
- 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 H

- Treat heart failure if present
- **Benzathine penicillin** 2.4 MU IM once monthly
  Child: <30kg: 0.6 MU once monthly, >30kg: 1.2 MU once monthly
- Or **phenoxymethylpenicillin** (penicillin V) 750mg every day
- Or **erythromycin** 250mg per day (if allergic to penicillin)
- Continue either **benzathine penicillin, phenoxymethylpenicillin** or **erythromycin** up to 30 years of age

10. SKIN DISEASES

10.1 BOILS (FURUNCULOSIS)

Deep-seated infection of the hair follicles.

Causes

- Bacterial infection with *Staphylococcus aureus* leading to the collection of pus

Clinical features

- Common in people with poor general health, diabetes, or the debilitated
- Presentation usually occurs with one or more acute, tender, painful swellings (furuncles) at site of infection
- Most common on neck, breasts, face, and buttocks
- The swelling becomes fluctuant, may point after 3 days

Differential diagnosis

- Carbuncles
- Acne

Investigations

➢ Multiple furuncles: Pus swab for Gram staining and C&S

Management H2

▶ Apply intermittent moist heat to allow lesion to point and drain spontaneously
  - Extensive incision may spread the infection

▶ Cover with clean dressing

If in the nose or central facial area or if occurring in immunocompromised patients

▶ Give 5-7 days systemic antibiotic based on C&S results

▶ **Cotrimoxazole** 960mg every 12 hours
Child: 24mg/kg per dose

- ▶ Or **cloxacillin** 250-500mg every 6 hours before food
  Child: 12.5-25mg/kg per dose **HC4**
- ▶ Or **erythromycin** 250mg every 6 hours
  Child: 7.5mg/kg per dose

If more extensive lesions with collections of pus

- ▶ Give systemic **antibiotic** as above
- ▶ When lesion is ready, incise, drain, and dress
  If recurrent: Check for diabetes mellitus and HIV

Prevention

- Personal hygiene with use of antiseptic soap

10.2 CARBUNCLES

A cluster of boils with spread of bacterial infection to subcutaneous tissue.

Cause

- *Staphylococcus aureus*

Clinical features

- Common in males over 40 years
- Pain and induration of the affected area
- Usually on the nape of the neck
- May progress to formation of pus and sloughs
- May spread to involve surrounding tissues while the original site appears to dry
- Differential diagnosis
- Boils
- Lupus vulgaris
- Acne

Investigations

- ➢ Pus swab for Gram staining and culture

Management **HC2**

- ▶ Treatment same as for Boils

▶ Check for diabetes mellitus and HIV

Prevention

- Personal hygiene with use of antiseptic soap

10.3 CELLULITIS AND ERYSIPELAS

An acute inflammation of the skin and subcutaneous tissues.

Causes

- Bacterial infection (often *Streptococcus pyogenes*)
- Predisposing factors
  - Minor trauma
  - Infected spot

Clinical features

- Pain, tenderness
- Acute localised inflammation and oedema
  - In erysipelas, lesions are more superficial and have a defined raised margin
- Skin becomes tense and shiny in advanced stages
- Fine creases and wrinkles indicate resolution of the condition

Differential diagnosis

- Lymphoedema
- Blunt trauma

Management HC3

▶ Elevate the affected limb

▶ Give an **analgesic** e.g. paracetamol 1g every 6-8 hours as required

▶ **Antibiotic** therapy: (7-10 day course)

▶ **PPF** 1.5 MU IM daily
Child: 50,000 IU/kg per dose

- ▶ Or **benzylpenicillin** 1-2 MU IV or IM every 6 hours
  Child: 50,000-100,000 IU/kg per dose

Once clinical improvement occurs

- ▶ Change to **amoxicillin** 500mg every 8 hours to finish 7-10 days course
  Child: 7.5-15mg/kg per dose

If patient allergic to penicillin

- ▶ **Erythromycin** 250mg every 6 hours
  Child: 7.5mg/kg per dose **HC4**

10.4 ECZEMA (DERMATITIS)

Acute or chronic superficial inflammation of the skin.

Cause

- Allergic dermatitis: Allergic reaction to food, chemicals, or other substances
- Atopic dermatitis: Unknown

Clinical features

- Vesicles (acute stage)
- Itchy rash commonly with dry rough scaly skin
- Secondary infection may cause the lesions to ooze and become wet, cause regional lymph nodes to enlarge, and fever to develop

Differential diagnosis

- Seborrhoeic dermatitis

Management **HC2**

- ▶ Remove the cause if known
- ▶ Apply **hydrocortisone cream** 1% every 12 hours until improvement is seen

If no response

- ▶ Apply **betamethasone** cream 0.1% every 12 hours until improvement is seen

- ▶ Give a **sedative antihistamine** e.g. **chlorphenamine** or **promethazine** to relieve itching
- ▶ Give a systemic **antibiotic** as for Boils
  - Continue for at least 7 days

Prevention

- Avoid contact with allergens

10.5 FUNGAL SKIN INFECTIONS

Superficial infection caused by dermatophytes and fungi, which invade dead tissue of the skin and its appendages (stratum corneum, nails and hair), e.g. athletes foot, ringworm.

Causes

- Tricophyton mentagrophytes or *T. rubrum*

Clinical features

- In athletes foot, infection usually starts on the 3rd and 4th interdigital spaces on the under surface of the lateral aspect of the toes
- Dorsum of the feet is mainly affected by *T. rubrum,* causing erythematous and dry scaling of the foot
- Itching (main symptom)
- Skin cracks and ulceration, bullae formation
- Blisters may be formed during acute flare-ups
- Complications may include cellulitis, fungal invasion of toenails (onychomycosis)

Differential diagnosis

- Jiggers
- Ground itch (hookworm)
- Cellulitis
- Eczema, contact dermatitis
- 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 **HC2**

Wet lesion, e.g. in skin folds or toe webs

- Apply **gentian violet paint** 1% twice daily until lesion is dry

Dry lesion, e.g. once wet or initially dry

- Apply **benzoic acid** + **salicylic acid** 6% + 3% sparingly twice daily
  - Continue for 14 days after lesions healed

If poor response

- Apply **clotrimazole** cream 1% every 12 hours
  - Continue for 14 days after the lesions have healed

If still poor response, extensive lesions, chronic cases and/or if nails infected

- Add **griseofulvin** 10mg/kg daily with/after food
  - Hair and skin infections: 2-6 weeks
  - Nail infections: 6 months or until the nail appears normal
  - Double the dose in severe infections
  - Take with fatty food
  - Do not use for Tinea versicolor (pityriasis)

Note

- Advise patient on the need to persist with the long duration treatments
- Personal foot hygiene is important

10.6 HERPES SIMPLEX

A viral infection transmitted by direct contact and characterised by a localised primary lesion, latency, and recurrence.

Cause

- Herpes simplex virus types 1 and 2

Clinical features

Herpes simplex type 1: Primary infection

- May be asymptomatic
- In 10% of cases there may be fever, malaise, gingivostomatitis, and vesicular lesions in the oropharynx
- Generalised cutaneous eruptions
- Meningoencephalitis and chronic eczema may be a complication

Herpes simplex type 1: Reactivation of primary infection

- Herpes labialis
- Severe in the immunosuppressed

Herpes simplex type 2

- Primary and recurrent infections can be asymptomatic
- Vesicular lesions in the genital area
- Aseptic meningitis or disseminated visceral infection in the newborn may occur as complications

Differential diagnosis

- Other causes of genital sores, e.g. syphilis
- Other causes of meningoencephalitis

Investigations

- No routine investigation necessary
- Good history taking and physical examination are
- very important in making a diagnosis

- Cytology
- Serological tests
- Virus isolation

Management **HC2**

- Symptomatic treatment: Clean lesions with antiseptic solution, e.g. **chlorhexidine** solution 0.05% or **hydrogen peroxide** solution 6%

Prevention

Provide health education on

- Personal hygiene
- Avoiding direct contact with infected people
- Use of gloves and condoms as applicable

10.7 HERPES ZOSTER (SHINGLES)

An acute infection involving primarily the dorsal root ganglia. 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 posterior root ganglia by reduced immunity

Clinical features

- Chills, fever
- Malaise
- The above precede characteristic crops of vesicles, which are very painful, typically unilateral, and involve the side supplied by affected nerve

Differential diagnosis

- Chickenpox
- Herpes simplex

Investigations

- Clinical diagnosis is sufficient

Management HC2

Symptomatic and supportive treatment

- Clean the lesions with an antiseptic solution, e.g. **chlorhexidine** solution 0.05%
- Or **hydrogen peroxide** solution 6%
- Apply **calamine** lotion 2-3 times daily
- **Analgesics** e.g. **paracetamol**, **codeine phosphate** or **morphine** as necessary
- **Aciclovir** 800mg every 5 hours for 7 days can be given, especially if the disease is diagnosed very early or is disseminated

Infection involving the eye

- Refer to an Eye Specialist

Prevention

- Protect high-risk individuals (e.g. the immuno-suppressed) from direct contact with the disease

10.8 IMPETIGO

Acute infection of the outer layer of the skin.

Cause

- *Streptococcus* or *Staphylococcus* infection

Clinical features

- Common in children
- Lesions usually on face, head, and hands as 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
- C&S

Management

- Clean affected area with **chlorhexidine** solution 0.05% or **hydrogen peroxide** solution 6% **HC2**

If infection mild and localised

- Apply **gentian violet aqueous paint** 1% every 12 hours
- Keep skin clean by frequent washing and drying, use soap and water to soften, and gently remove any superficial crusts

If signs of regional or systemic spread, e.g. pyrexia

- Give systemic **antibiotic** as for Boils **HC3**
- Apply **potassium permanganate** solution 0.01% followed by debridement and removal of crusts

Prevention

- Proper hygiene with use of antiseptic soap
- Wash and keep children dry

10.9 PEMPHIGUS

A rare potentially fatal skin disease characterised by intra-epidermal bullae on apparently healthy skin or mucous membranes.

Causes:

- Unknown (probably autoimmune)

Clinical features

- Occurs in middle-aged/older persons; rare in children
- Tense or flaccid bullae of varying size
- Lesions may rupture leaving raw painful areas
- Bullae may be generalized or localized; commonly to the face

Differential diagnosis

- Chronic ulcerative facial lesions
- Other bullous dermatoses

Management HC2

▶ Clean affected area with **chlorhexidine** solution 0.05% or **hydrogen peroxide** solution 6%

▶ Apply compresses soaked in **potassium permanganate** solution 0.01% every 4 hours
  - Helps remove skin debris and reduces risk of secondary infection

If there is secondary infection

▶ Give systemic antibiotic as for Boils

If it persists or if severe

▶ Refer to a skin specialist

10.10 PSORIASIS

A chronic recurrent skin disease characterised by scaling, reddened papules or plaques on the scalp and extensor surfaces of the arms and legs (back of the elbows and front of the knees).

The scales are a result of greatly accelerated epidermal growth resulting in incomplete keratinization and maturation. The reddening is due to increased blood flow in the subepidermal cutis. This is clinically demonstrated. The lesions in psoriasis tend to appear at sites of trauma (Koebner's reaction). Bluntly scraping off the superficial scales reveals punctuate bleeding (Ausiptz signs).

Cause

- Unknown, but the predisposition to development is genetically transmitted
- About 30% of cases have a family history

Clinical features

- Onset is gradual and usually in patients 25-40 years old
- Maculopapular scaly eruptions on plaques are either due to psoriatic skin disease and/or psoriatic arthritis
- Worsening psoriasis may lead to total erythroderma
- An extra-articular feature is pitting or thickening of nail plate with accumulation of debris under the nail plate
- Inflammatory psoriatic arthritis (5-10% of patients) involves the distal interphalangeal joints

Differential diagnosis

- Fungal infection, lichen planus (papules, tend to occur on flexor surfaces)
- Mycosis fungoides
- Seborrhoeic dermatitis
- Medicine-induced eruptions

Investigations

➢ Blood: Serum uric acid, rheumatoid factor, and anti-nuclear factor

Management H

After removal of the scales and preferably after bathing treat as below until conditions under control

Mild cases

► Apply **salicylic acid ointment 2%** twice daily

More severe cases

► Apply **coal tar** ointment 1% 1-3 times daily
  - Then expose affected area to sunlight

► Or apply **dithranol** ointment 0.1% twice daily

Caution

△ **Dithranol:** Take care to apply only to the lesions; wash hands well after application

10.11 SCABIES

Contagious skin disease associated with severe itch.

Cause

- A parasitic mite, *Sarcopterus scabiei hominis*
- Transmitted by close personal contact

Clinical features

- Intense pruritic eruption of wheals, papules, vesicles, and thread-like burrows. Common in flexural areas, i.e. wrists and inter-digital creases, axillae, nipples, buttocks, and genitalia
- Secondary infection is common and may lead to glomerulonephritis

Differential diagnosis

- Papular urticaria
- Chickenpox
- Pyoderma
- Drug eruptions
- Atopic dermatitis
- Seborrhoeic dermatitis
- Onchocerciasis

Investigations

➢ Identification of mites, their eggs or faeces

Management HC2

▶ 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

- Repeat twice more with an interval of 24 hours between applications and no bathing for 72 hours after the first application

- For children, dilute the lotion with an equal part of water before application to give a strength of 12.5%

▶ Give a sedative **antihistamine** to relieve itching
- See Skin Allergy/Urticaria

If treatment ineffective or unsuitable

▶ **Ivermectin** 200 micrograms/kg single dose

Supporting measures:

▶ Wash patient's clothing and bedding, and use a hot iron to eliminate the eggs or (if this is not possible) leave items outside exposed to the air to prevent reinfestation

If secondary infection is present

▶ Give an **antibiotic** as in Boils

Prevention

- Personal hygiene (washing clothes and regular bathing)
- Avoid close contact with infected people

10.12 SKIN ALLERGY/URTICARIA

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 the skin with vesicles, redness, oedema, oozing, or wheals that may/may not be well demarcated

- Contact dermatitis: May be localized to the point of contact or generalised
- Seborrhoeic dermatitis: Presents with excessive dandruff, papules and crusting
- Nummular dermatitis: Presents with coin-shaped lesions that may be wide spread

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 (5-day course) HC2

- Establish the cause and treat accordingly. Identify what patient is allergic to by a process of elimination
- Apply **calamine** lotion 15% 1-2 times daily
- Give an **analgesic** e.g. **paracetamol** for any pain or discomfort as necessary
  - ✕ Avoid acetylsalicylic acid
- Give **chlorphenamine** 4mg every 8 hours
  Child: 2mg per dose
- Or **promethazine hydrochloride** 25mg at night
  - Increase to every 12 hours if necessary
    Child: 1mg/kg daily in 1-2 divided doses

Prevention

- Avoid contact with known allergens
- Treat helminth infections

10.13 TROPICAL ULCER (TU)

A specific acute ulcerative skin disease.

Cause

- Trauma followed by presence of fusiform bacilli and spirochetes (Vincent's type)
- Common in people with malnutrition and poor hygiene

Clinical features

- Over 95% occurs in lower third of the leg

Stage 1

- Trauma, painful swelling, blister with blood-stained discharge leading to an oval lesion which spreads rapidly

Stage 2

- Necrosis with yellowish/black sloughs, which separate to form ulcer with raised and thickened edge. Floor has early bleeding granulations and foul smelling yellowish discharge

Stage 3

- Symptoms subside or may go into a chronic stage

Complications include

- Chronic tropical ulcer
- Cancellous osteoma (exostosis)
- Epithelioma
- Contracture

Differential diagnosis

- Buruli ulcer

Investigations

- Swab for C&S
- X-ray

Management HC2

Acute

- Clean the wound with **chlorhexidine** solution 0.05% or **hydrogen peroxide** solution 6%
- Excise the necrotic edges
- Elevate and rest the leg
- Perform daily dressing

If not responding

- Add **PPF** 800,000 IU IM once daily for 7-10 days
  Child: 20,000 IU/kg per dose

Alternative in case of allergy to penicillin: (adults only)

- **Doxycycline** 100mg every 12 hours for 5 days

Chronic

- Give **antibiotics** as per C&S results

If no C&S facilities

- Give **metronidazole** 200mg every 8 hours for 5 days
  Child: 35-50mg/kg per dose
- Plus **cotrimoxazole** 960mg every 12 hours for 5 days
  Child: 24mg/kg per dose
- Then do a skin graft

Prevention

- Ensure personal hygiene
- Ensure good nutrition
- Avoid trauma

11. NEUROLOGICAL/PSYCHIATRIC CONDITIONS

11.1 ALCOHOL DEPENDENCE SYNDROME

A disorder characterised by the need to take large daily amounts of alcohol for adequate functioning.

Causes

- Genetic
- Social and environmental factors including availability
- Stress, peer pressure
- Personality disorders

Clinical features

- *Physical*: Trauma, peptic ulceration, damage to liver and pancreas, hypertension, alcoholic cardiomyopathy, alcohol foetal syndrome, alcohol withdrawal fits, tremors
- *Psychological*: Alcohol intoxication, delirium, dementia, alcoholic hallucinosis
- *Social*: loss of job, marriage, friends

Differential diagnosis

- Abuse of other psychoactive substances
- Depression

Investigations

- Blood: Haemogram
  - Shows elevated mean corpuscular volume
- Social investigations

Management HC2

- Treat any presenting physical or psychiatric problem
- Counselling; must be on going
- Psychosocial rehabilitation

Prevention

- Health education on dangers of alcohol abuse
- Reduce accessibility to alcohol

11.2 DRUG AND SUBSTANCE ABUSE

A state arising from the repeated administration of a drug or other substance of abuse on a periodic or continuous basis leading to physical, social, or occupational problems.

Cause

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

- Alcohol
- Tobacco
- Cannabis (njaga, bhangi, marijuana)
- Khat (mairungi)
- Heroin
- Cocaine
- Petrol fumes
- Organic solvents (e.g. thinners)
- Pethidine
- Amphetamines (e.g. speed)

- Mandrax® (methaqualone)

Presenting features

- 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, unkempt, untidy
- Financial difficulties, e.g. stealing, unpaid debts
- Relationship problems, e.g. increased conflicts, communication breakdown

Management HC2

- ► Psychosocial therapy (counselling)
- ► Treat presenting symptoms, e.g. Delirium
- ► If necessary, refer to higher level for detoxification

Prevention

- Health education on dangers of drug abuse
- Employment/recreational opportunities
- Encourage social and cultural values
- Attempt to reduce availability of drugs of abuse in the community

11.3 ANXIETY

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 state.

Causes

- Mainly psychological

Types and clinical features

- *Generalized anxiety*: Unrealistic and excessive worry about two or more life events
- *Panic attacks*: Sudden onset of intense apprehension or terror usually lasts a few minutes to one hour
- *Phobia*: Persistent fear of a known stimulus (object or situation), e.g. animals, water, confined spaces
- *Obsessive-compulsive disorder*: Repeated disturbing thoughts associated with time-consuming actions
- *Post-traumatic stress disorder*: Where a person who experienced a major threatening life event, later in life begins to experience the same either in dreams or in clear consciousness

Each of the above clinical types will have one or more of the following peripheral manifestations

- Palpitations
- Tremors
- Urinary frequency, hesitancy, or urgency
- Dizziness
- Diarrhoea

Differential diagnosis

- Consider organic conditions, e.g. hyperthyroidism, hypoglycaemia, phaeochromocytoma

Management HC2

▶ **Psychotherapy** (counselling) is of primary importance

▶ Benzodiazepines, e.g. **diazepam** 5mg 1-2 times daily

- Increase if necessary to 15-30mg daily in divided doses

Elderly: Give half the above dose

Caution

△ Benzodiazepines, e.g. diazepam:
- Are addictive
- Avoid prolonged use, i.e. not more than 7 days
- Give the lowest possible dose for the shortest period
- Avoid alcohol

If poor response

► Give an antidepressant at night, e.g. i**mipramine** 25-50mg or **amitriptyline** 25-50mg

Note

◆ 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

Prevention

- Good personality development

11.4 DEPRESSION

A common disorder of both adults and children mainly characterised by low mood and loss of pleasure (dysphoria).

Causes

- Biological, genetic, and environmental factors act together to produce the disease

Clinical features

- Low mood and loss of interest or pleasure are key symptoms; apathy
- Associated lack of energy, body weakness
- Difficulty in concentrating

- Poor sleep
- Poor appetite
- Reduced libido
- Multiple body pains
- Suicidal thoughts; occurs in up to 65% of patients
- Children and adolescents usually present with 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

Investigations

➢ Obtain thorough social and personal history

Management HC4

▶ Psychological support may be adequate in mild cases

In moderate forms

▶ Give a tricyclic antidepressant, e.g. **imipramine** 75-100 mg or **amitriptyline** 75-100mg at bed time. If required: Slowly increase to a maximum of 150mg daily in divided doses
  - Continue treatment for at least 6 months

▶ Add supportive cognitive/behavioural psychotherapy

In severe cases

▶ Refer to higher level for further management including electroconvulsive therapy (ECT)

Note

◆ Amitriptyline: May be particularly useful in depression with associated anxiety

- Carefully evaluate risk of suicide

Prevention

- Early diagnosis (postnatal depression)
- Genetic counselling, good antenatal care

11.5 POSTNATAL DEPRESSION

This type of depression presents as a condition of persistent low mood following delivery. Affects 20% of new mothers. If lasting only 1-2 weeks, it is also known as "maternity blues". May progress to postnatal psychosis.

Causes

- Not well known

Predisposing factors include:

- 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

- As for depression above
- 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
- Apathy

Differential diagnosis

- Febrile illness as a result of infection, e.g. malaria

Management

- ▶ Refer mother to higher level for proper diagnosis if postnatal depression is suspected

11.6 DELIRIUM (ACUTE CONFUSIONAL STATE)

A condition of impaired brain function resulting from diffuse physiological change.

Causes

- Infections, e.g. malaria, trypanosomiasis, syphilis, meningitis, rabies, typhoid fever, pneumonia, HIV/AIDS
- Intoxication with or addiction to alcohol or other substances
- Cerebral pathology, e.g. head trauma, tumour
- Heart diseases, e.g. cardiac failure
- Severe anaemia
- Epilepsy
- Electrolyte imbalance

Clinical features

- Acute onset of mental confusion with associated disorientation
- Reduced ability to think coherently, reasoning, and problem solving are difficult or impossible
- Illusions and hallucinations are common, especially in visual form
- Symptoms tend to fluctuate; patients feel better in the day and worse at night

Differential diagnosis

- Dementia
- Schizophrenia

Investigations

- ➢ Guided by history and physical examination

- Blood: Baseline haemogram can be helpful

Management **HC4**

- Identify and treat the cause such as substance/ alcohol abuse, diabetes, head injury or infections e.g. malaria, UTI, pneumonia in older people
- Withhold any unnecessary drugs
- Restore fluids and monitor electrolytes
- Prevent convulsions

For features of psychosis

- **Haloperidol** 5-10mg every 12 hours (this is the drug of choice)
- Or **trifluoperazine** 15mg every 12 hours
- Or **chlorpromazine** 200mg every 12 hours
- Provide reassurance

For severe agitation and tremulousness of delerium tremens

- **Diazepam** 5-10mg slow IV every 10-15 minutes until patient calm but not asleep
  - Doses required may exceed 100mg daily

Note

- Good nursing care is of prime importance and can give good results
- Changes or stop in treatment require specialist support. If specialist support is unavailable, treatment should be indefinite

Prevention

- Early diagnosis and treatment

11.7 DEMENTIA

A chronic organic mental disorder characterised by failing memory.

Causes

- Primary degeneration of the brain
- Vascular disorders causing intracranial bleeding
- Infections, e.g. syphilis, TB, HIV/AIDS, meningitis
- Metabolic disorders, e.g. hypothyroidism
- Brain trauma
- Toxic agents, e.g. carbon monoxide, alcohol

Clinical features

- Impairment of the short and long term memory
- Impaired judgment, poor abstract thinking
- Language disturbance (aphasia)
- Personality change; may become apathetic or withdrawn, may have associated anxiety or depression because of failing memory

Differential diagnosis

- Normal aging
- Delirium
- Schizophrenia
- Depression

Investigations

➢ Guided by history and clinical picture to establish cause

Management HC4

▶ Where possible, identify and treat the cause

▶ Avoid quiet, dark, private rooms

***Only** if restless and agitated*

▶ Give **haloperidol** 1.5-3mg every 12 hours
  - Adjust according to response
  - Usual daily dose: 1.5-3mg

▶ Give adequate psychological care and nutrition

11.8 EPILEPSY

A discrete recurrent abnormality in electrical activity of the brain, resulting in behavioural, motor, or sensory changes. There may be associated changes in consciousness.

Causes

- Idiopathic
- Brain infections
- Brain trauma
- Metabolic disorders, e.g. hypoglycaemia
- Congenital malformation, brain tumour

Clinical features

- Will depend on the type of epilepsy:

Grand mal

- 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 of muscles occurs followed by jerking movements (clonic phase)
- There may be urinary incontinence, frothing, and
- tongue biting
- A period of deep sleep follows
- Episodes of mental confusion may follow (post-ictal psychosis)

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

Complex–partial seizures (temporal lobe epilepsy)

- Has varied symptoms
- Signs of autonomic nerve dysfunction, i.e. sweating, flushing, and gastric sensation
- Mental confusion with perceptual disorders (illusions, hallucinations), memory loss or distortion, mood variation, abnormal repetitive lip movement, automatism

Focal epilepsy

- Fits begin with motor contraction or sensory change in a particular point of the body, such as the thumb

Myoclonus epilepsy

- Abnormal jerking movements occur usually in the limbs but may involve the whole body

Status epilepticus

- Convulsive state in which the seizure lasts >30 minutes or several epileptic seizures occur in succession without recovery of consciousness in between

Differential diagnosis

- Syncope
- Hypoglycaemia
- Migraine
- Hypocalcaemia
- Conversion disorder
- Hyperventilation and panic attacks

Investigations

- Electroencephalogram (EEG)
  - Useful in petit mal and temporal lobe epilepsy

- X-ray: Skull
- Other investigations are guided by suspected cause

Management **HC4**

All suspected cases of epilepsy should be confirmed by specialist who should also be involved in determining treatment

Petit-mal

- **Ethosuximide** initially 500mg daily in 2 divided doses
  - Increase if necessary by 250mg every 4-7 days up to a usual daily dose of 1-1.5g
    Child >6 years: As above
    Child <6 years: Initially 250mg single dose at night increased gradually as required to usual 20mg/kg daily in 2 divided doses

Grand mal

- **Phenytoin** initially 3-4mg/kg (150-300mg) daily as single dose or 2 divided doses
  - Increase gradually prn to usual 200-500mg daily
- Or **carbamazepine** initially 100-200mg 1-2 times daily increased prn in 100mg increments every 2 weeks to usual 800-1,200mg daily in divided doses **HC4**
- Or **phenobarbital** 60-180mg at night **HC4**
  Child: **phenytoin** initially 5mg/kg daily in 2 divided doses **HC3**
  - Usual range: 4-8mg/kg daily, max: 300mg daily
- or **carbamazepine** 10-20mg/kg daily in at least 2 divided doses or **phenobarbital** 8mg/kg once daily

Temporal lobe epilepsy **HC4**

- **Carbamazepine**: Doses as for grand mal above

Focal epilepsy **HC4**

- **Phenytoin:** Doses as for grand mal above

Myoclonic epilepsy **HC4**

▶ Management as for focal epilepsy

Status epilepticus **HC4**

▶ **Diazepam** 10mg rectally
Child <4 years: 5mg
- Repeat once prn after 5 minutes
Child: 200-300 micrograms/kg IV or IM per dose

▶ Or **diazepam** 10-20mg slow IV (5mg/min)
- Repeat once prn after 30-60 minutes
Child: 200-300 micrograms/kg IV or IM per dose

Note

◆ Diazepam: In serious cases of status epilepticus, doses of 20-40mg titrated to individual patient response, may be needed

◆ Treatment should always continue until patient is seizure-free for at least 2 years, then gradually taper off the doses

Prevention

- Good antenatal care and delivery
- Control causative factors

11.9 MANIA

A disorder of mood control usually in the excited form with associated behavioural problems.

Causes

- Biological, genetic, environmental factors acting together

Clinical features

- Elevated, expansive or irritable moods are the key symptoms
- Speech is increased with flight of ideas

- Increased self image, restlessness, and over-activity are common
- Delusions of grandeur may occur
- Increased libido
- Increased appetite, but weight loss occurs due to over-activity
- Auditory and visual hallucinations may be present

Differential diagnosis

- Organic mental states
- Schizophrenia

Investigations

➢ Good social and personal history

Management

▶ Effective psychological care

▶ **Chlorpromazine** initially 100-200mg every 8 hours then adjust according to response **HC2**
  - Daily doses up to 300mg may be given as a single dose at night

▶ Or **trifluoperazine** initially 5-10mg every 12hours then adjust according to response **H**
  - Up to 40mg or more daily may be required in severe or resistant cases

▶ Or **haloperidol** initially 5-10mg every 12 hours then adjust according to response **HC2**
  - Up to 30-40mg daily may be required in severe or resistant cases

If extrapyramidal side-effects

▶ Add an anticholinergic: **Benzhexol** initially 2mg every 12 hours then reduce gradually to once daily and eventually give 2mg only when required. **HC2**

Prevention

- Genetic counselling
- Good psychosocial support

11.10 MIGRAINE

Periodic severe headache, usually unilateral and associated with visual disturbance and 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
  - Tyramine-containing foods, e.g. red wine, cheese, chocolate

Clinical features

- Severe episodic unilateral headache not responding to common pain-killers
- Nausea and vomiting
- May resolve without treatment

Differential diagnosis

- Any cause of headache
- Conversion disorder (hysteria)

Management HC4

- **Ergotamine tartrate** initially 2mg sublingually then 1-2mg hourly to a maximum of 6mg in 24 hours or 10mg in a week (take first dose when aura appears)
- Plus **propranolol** 10-20mg every 8-12 hours prn for as long as there is migraine

► **Propranolol** can also be used for prevention of episodes

Caution

△ Ergotamine: Contraindicated in pregnancy and ischaemic heart disease

Prevention

- Avoid precipitating factors

11.11 PARKINSONISM (PARKINSON'S DISEASE)

A movement disorder resulting from degeneration and malfunction of the CNS common in old age.

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
- Hormone disorders, e.g. phaeochromocytoma
- Vascular disorders
- Degeneration of basal ganglia
- Intracranial tumour
- Trauma

Clinical features

- Mainly in males
- Intentional tremor
- Excessive salivation
- Vacant facial expression (mask face)
- Muscle rigidity
- Walking with short quick steps (shuffling gait)
- Urinary incontinence (sometimes occurs)

Differential diagnosis

- Any causes of tremor
- Thyrotoxicosis
- Dementia

Investigations

➢ Good history and clinical examination

Management HC4

▶ **Benzhexol** 2-15mg daily in 1-3 divided doses
▶ Or **benztropine** 1-2mg IM or IV - repeat if symptoms reappear

Caution

△ **Benzhexol, benztropine:** Use lower doses in the elderly as they may otherwise cause confusion as a side-effect

Prevention

- Only for secondary type
- Avoid antecedent causes

11.12 POSTNATAL PSYCHOSIS

A condition of marked mental disturbance following delivery. May be regarded as a severe form of postnatal depression.

Causes

- Not well known, but hormonal changes may have a role

Predisposing factors

- First child
- Previous major psychiatric history
- Family history of mental illness
- Inadequate psychosocial support during pregnancy
- Infections in early puerperium

Clinical features

- Usually starts in the first or second week after delivery
- Three clinical types are usually observed
  - Acute organic states
  - Affective disorder (mania and depression)
  - Schizophrenia

Differential diagnosis

- As for other psychiatric conditions

Investigations

➢ Good history, physical and psychiatric assessment

Management HC4

► Treat any identifiable cause/precipitant, e.g. fever

► Give psychotherapeutic drugs as for Mania

Notes

◆ Puerperal psychoses are no different from other similar psychoses

◆ Give concurrent psychotherapy and drug therapy

◆ Gradually adjust doses depending on response

Prevention

- Proper antenatal screening, good psychosocial support
- Early detection and treatment

11.13 SCHIZOPHRENIA

A chronic disorder with disturbance of

- Form and content of thought; perception
- Sense of self, relationship to external world
- Mood, behaviour

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 beliefs); may be multiple, fragmented, or bizarre
- Disconnected ideas with speech which is vague and inadequate in content
- Hallucinations (especially auditory forms)
- Mood is usually inappropriate
- Difficulty in forming and sustaining relationships
- Apathy with self-neglect

Differential diagnosis

- Organic mental states, e.g. following drug abuse
- Mood disorders

Investigations

➢ Good social, personal, and family history

Management HC4

▶ As for Mania

If no response

▶ Refer to next level for further management

Note

- Give concurrent psychotherapy and drug therapy
- Gradually adjust doses depending on response

Prevention

- Genetic counselling
- Good psychosocial support
- Early detection and treatment

11.14 SUICIDAL BEHAVIOUR

An attempted conscious act of self-destruction, which the individual concerned views as the best solution.

Usually associated with feelings of hopelessness and helplessness and conflicts between survival and stress.

Causes

Physical illness, e.g.

- HIV/AIDS
- Head injury
- Malignancies
- Bodily disfigurement

Psychiatric disorders, e.g.

- Depression, schizophrenia, dementia
- Chronic alcohol abuse
- Personality disorders
- Epilepsy

Clinical features

Risk is high if

- Patient >45 years old
- Associated alcoholism
- History of suicide attempts
- Evidence of violent behaviour or previous psychiatric Admission

Risk may be low if patient is

- <45 years old
- Married
- Employed
- In stable interpersonal relationships
- In good physical health

Management

► Identify cause for suicidal behaviour and treat as an emergency, e.g. depression (admission) and

consequences of suicide attempt i.e. overdose of tablets, use of pesticides etc

- ▶ Carefully observe patient to minimize risk of self- harm
- ▶ Provide adequate psychological care

Note

- ◆ Suicide is relatively rare in children and adolescents. However there is increased risk if there is
  - Disturbed family background, e.g. death of parents, divorce
  - Use of alcohol other drugs of abuse
  - Physical illness
  - Psychiatric disorder

Prevention

- Identify and manage risk factors
- Ensure good psychosocial support

12. EYE CONDITIONS

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

12.1 CATARACT

Opacity of the lens inside the eye. By far the most common cause of blindness in Uganda.

Cause

- Old age
- Trauma
- Genetic
- Severe dehydration in childhood

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 HC2

- ▶ Do **not** give any medicines
- ▶ Explain to patient that the condition is very treatable
- ▶ Refer to a cataract surgery centre

Prevention

- Give early treatment for childhood diarrhoea and vomiting to prevent severe dehydration

- Wear protective goggles when hammering, sawing, chopping, grinding, etc
- Caution children playing with sticks about risk of eye injuries

12.2 CONJUNCTIVITIS

Inflammation of the conjunctiva of the eye.

Causes

- Infection: Bacterial or viral
- Trauma: Chemicals, foreign bodies
- Smoke
- Allergy

Clinical features

- Watery discharge (virus 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
- Itching (may be present)

Differential diagnosis

- Corneal ulcer (tends to be in one eye only, redness is greatest near the cornea, pain often great)
  - Urgently refer for specialist treatment

Investigations

➢ Good history and examination

Management

Management in adults and children. All suggested treatments are for 7 days.

▶ Apply **tetracycline** eye ointment 1% 3-4 times daily

- Or **chloramphenicol** eye ointment 1% 3-4 times daily

In allergic conjunctivitis

- Use **hydrocortisone** eye drops 0.5% 1 drop every 2 hours until condition improves then reduce frequency
- Or **hydrocortisone** eye ointment 1%, apply at night
- Or **betamethasone** eye drops 0.1% 1 drop every 2 hours until condition is controlled then reduce frequency

In associated allergy and infection

- Use **hydrocortisone + polymyxin B** eye drops + **oxytetracyline** 1 drop every 2 hours until condition is controlled then reduce frequency
- Or **neomycin + betamethasone** eye drops 1 drop every 2 hours until condition is controlled then reduce frequency

Caution

△ Do not use steroid preparations unless sure of the diagnosis as they may mask infections

Prevention

- Personal hygiene; daily face washing
- Wear protective goggles when using dangerous chemicals, hammering, sawing, chopping, grinding
- Warn children playing with sticks on risk of eye injuries
- Avoid irritants and allergens

12.3 FOREIGN BODY IN THE EYE

Causes

- Solids: Dust, insects, metal or wood particles
- Liquids: Splashes of irritating fluids

Clinical features

- May be severe pain, tears, or redness

- Foreign body (FB) may be visible

Differential diagnosis

- Other injury or trauma

Management HC2

▶ Make a thin 'finger' of moistened cotton wool, move the eyelid out of the way, and gently remove the FB

If this fails

▶ Refer to an Eye Specialist

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

12.4 KERATITIS

Inflammation of the cornea.

Cause

- Infection: Bacterial, viral, or fungal; leading to corneal ulceration
- Trauma: Chemical, foreign bodies

Clinical features

As for conjunctivitis **except** that in keratitis:

- The cornea is **not** clear and **will** stain with fluorescein in the case of corneal ulcer
- Visual acuity is usually reduced
- Condition is often unilateral
- The eye is painful

Management HC2

▶ Apply **tetracycline** eye ointment 1% apply 3-4 times daily for one week

- ▶ Explain the seriousness of the condition to the patient
- ▶ Refer to a qualified eye health worker

Prevention

- Wear protective goggles when hammering, sawing, chopping, grinding
- Warn children playing with sticks on risk of eye injuries

12.5 OPHTHALMIA OF THE NEWBORN

Purulent discharge from the eyes in babies <1 month.

Causes

- Infections: Usually from mother's birth canal or due to poor hygiene of the person caring for the newborn
  - Bacterial, e.g. *Gonococci*
  - Chlamydial

Clinical features

- Reddening of one or both eyes
- Swelling of the eye lids
- Purulent discharge
- Excessive production of tears (lacrimation)
- If not treated early, will result in scar formation or perforation of the cornea, either of which will lead to blindness

Management HC2

- ▶ Use any **antibiotic e.g. tetracycline** or **chloramphenicol** eye drops available (see also note below) as often as possible (preferably every half hour)
- ▶ **Benzylpenicillin** 50,000 IU/kg IM every 12 hours for 5-7 days

For chlamydial infections

- ▶ Apply **tetracycline** eye ointment every 6 hours for at least 21 days

- Or give **erythromycin** 10mg/kg every 6 hours for 14-21 days
- Carefully clean away any purulent discharge as required
- **Prophylactic treatment** of all neonates soon after delivery: Wipe the eyes of the newborn with a sterile gauze immediately after birth then apply **tetracycline** eye ointment 1% single dose to both eyes

Note

- If antibiotic eye drops are not available: Dissolve **benzylpenicillin** 1 MU in 10mL of normal salline injection 0.9%
  - Use this solution as eye drops
  - Make a fresh solution every day

Prevention HC2

- Good antenatal care with screening and treatment of mother for genital or urinary tract infections
- Clean delivery
-

12.6 STYE (HORDEOLUM)

A localized infection of the hair follicle of the eyelids.

Cause

- *Staphylococcus aureus*

Clinical features

- Itching in the early stages
- Swelling
- Pain, tenderness
- Pus formation
- May burst spontaneously

Differential diagnosis

- Other infections of the eyelids
- Blepharitis

Management HC2

Usually the stye will heal spontaneously
Avoid rubbing the 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

Prevention

- Remove any loose eyelashes
- Good personal hygiene

12.7 TRACHOMA

A chronic infection of the outer eye caused by *Chlamydia trachomatis* (a very small Gram-negative bacterium).

Clinical features

- Only the eyes are involved

In early stages

- Reddening of the eye
- Itching
- Follicles (grain-like growth) on the conjuctiva

In the later stages

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

Differential diagnosis

- Allergic conjunctivitis (chronic)
- Other chronic infections of the eye

Management of trachoma

This may be summarised as **SAFE**:

S = Surgery for entropion (part of treatment)
A = Antibiotics (part of treatment)
F = Face washing (part of prevention)
E = Education and environment (part of prevention)

Antibiotic treatment HC3

- ▶ Apply **tetracycline** eye ointment 1% twice daily for 4-6 weeks (until the infection/inflammation has gone)
- ▶ Or **erythromycin** 500mg every 6 hours for 14 days
  Child: 10-15mg/kg per dose

If there are any complications

- ▶ Refer to specialist

Prevention

- Good personal hygiene, regular face washing
- Clean deliveries

12.8 UVEITIS

An inflammation of the uvea of the eye (i.e. the iris, ciliary body, and choroid).

Causes

- TB
- HIV
- CMV (cytomegalovirus)
- Toxoplasmosis
- Leprosy
- Autoimmune disease
- Trauma and others

Clinical features

- Dull, deep-seated pain
- Often unilateral (but can be bilateral)

- Ciliary redness (mostly around the cornea)
- Pupil irregular and has a different size from that in the healthy eye
- Reduced vision (sometimes severely reduced)

Management **HC2**

▶ Do **not** give any medicine
▶ Explain the seriousness of the condition to the patient
▶ Refer to a qualified eye health worker

Prevention

- Wear protective goggles when hammering, sawing, chopping, grinding
- Warn children playing with sticks about risk of eye injuries

12.9 XEROPHTHALMIA

Dryness of the part of the eye ball exposed to air and light due to 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 **HC2**

▶ See under Vitamin A deficiency

Prevention

- Good balanced diet especially for children, women, and institutionalised persons, e.g. prisoners, long-term hospital in-patients, boarding school students, etc.

- Vitamin a supplements
  - Child <5 years presenting with any illness: 100,000 IU
  - Any child being vaccinated against measles: 100,000 IU
  - All mothers after delivery: 200,000 IU
  - Anyone being vaccinated against polio: 200,000 IU

13. EAR, NOSE, & THROAT CONDITIONS

13.1 EAR CONDITIONS

13.1.1. Foreign body in the ear

Causes

- Types of foreign body (FB) commonly involved include insects (e.g. 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 ear

Clinical features

- Blockage; FB may be seen
- Noise in the ear
- Hearing loss

If attempts have been made to remove the FB

- Bleeding/discharge from the ear

Management

Smooth round FBs

► Syringe the ear with clean lukewarm water

► If it cannot be removed by syringing, remove with a blunt hook
  - General anaesthesia will 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

Other FBs

- 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
- 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
- Suction may be useful for certain FBs

13.1.2. Glue ear (otitis media with effusion)

A non-suppurative otitis media.

Cause

- Blockage of the Eustachian tube by
  - Adenoids
  - Infection in the tube
  - Thick mucoid fluid
  - 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 or dullness

Management

- ▶ Eliminate known or predisposing causes
- ▶ **Chlorphenamine** 4mg every 12 hours for 10 days
  Child 1-2 years: 1mg every 12 hour
  Child 2-5 years: 1mg every 6 hours (max: 6mg daily)
  Child 6-12 years: 2mg every 6 hours (max: 12mg 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 beyond 6 weeks in spite of the above:

- ▶ Refer to ENT specialist

13.1.3. Otitis externa

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
- 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

- Thoroughly clean external ear canal
- Apply antibiotic drops, e.g. **chloramphenicol** eye drops 0.5% 2 drops into the ear every 8 hours for 14 days
- Give **analgesics** e.g. paracetamol **HC2**

If fungal infection suspected

- Apply **clotrimazole**, ear drops apply twice daily
  - Continue until discharge dries up
  - Or continue for total of 8 weeks

If severe

- **Cloxacillin** 250-500mg every 6 hours for 5-7 days
  Child: 12.5-25mg/kg per dose

13.1.4. Otitis media (suppurative)

An acute or chronic infection of the middle ear occurring mostly in children <2years.

Causes

- Bacterial infection, e.g. *Streptococcus pneumoniae*, *H.influenzae*
  - Commonly follows an acute infection of the upper respiratory tract

Clinical features

Good history and careful ear examination are very important in making the diagnosis

- Acute onset of pain in the ear, redness
- Fever
- Pus discharge for <14 days
- Bulging of the eardrum

- Chronic: Pus discharge from one or both ears for >14 days

Differential diagnosis

- Foreign body in the ear
- Otitis externa and media with effusion
- Referred ear pain, e.g. from toothache

Investigations

➢ Pus swab for microscopy, C&S

Management HC2

Acute infection

▶ **Cotrimoxazole** 960mg every 12 hours for 5 days
Child: 24mg/kg per dose
▶ Or **amoxicillin** 500mg every 8 hours
Child: 15mg/kg per dose
▶ Give **analgesics** e.g. paracetamol as required
▶ Review after 5 days
- If eardrum is still red, repeat the above course

Chronic infection

Systemic antibiotics are **not** recommended

▶ Dry 3 times daily for several weeks - until it stays dry
▶ Each time after drying, apply 2-4 drops of **chloramphenicol** ear drops 0.5% into the ear
✕ Do not allow water to enter the ear

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 URTI
- Treat infections in adjacent area, e.g. tonsillitis

Note

- Refer if complications occur e.g. meningitis, mastoid abscess (behind the ear), infection in adjacent areas (tonsils, nose)
- Infection in adjacent areas, e.g. tonsils, nose

13.1.5. Mastoiditis

Inflammation of the mastoid bone behind the ear.

Causes

- Usually a complication of suppurative otitis media

Clinical features

- Pain or tender swelling felt over the mastoid bone
  - With or without pus discharge from the ear
- Fever

Differential diagnosis

- Inflamed lymph node behind ear

Investigations

- Diagnosis mainly by clinical features
- X-ray: Useful in chronic mastoiditis
- Blood: Haemogram, shows leucocytosis
- Examine ear with auroscope

Management HC4

- Admit urgently; give emergency treatment
- **Chloramphenicol** 1g IV or IM every 6-8 hours for 10-14 days
  Child: 25mg/kg (max: 750mg) per dose
- Or **ampicillin** 2g IV every 6 hours for 10-14 days
  Child: 25-50mg/kg per dose

▶ Surgical drainage may be necessary to remove pus if an abscess has formed

Caution

△ Refer urgently for specialist care

13.1.6. Wax in the Ear

An accumulation of wax in the external ear.

Cause

- Excessive and/or thick wax production
- Small and/or hairy ear canal

Clinical features

- Blocked ears
- Buzzing sound
- Sometimes mild pain

Management **HC2**

Wax in the ear is normal and usually comes out naturally from time to time.

If it accumulates to form a wax plug and causes a problem for the patient

▶ Soften the wax by inserting drops of **vegetable oil** or **glycerin** 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

✕ Advise the patient not to poke anything into the ear in an attempt to clean it as this may damage the eardrum

✕ Do not syringe if (a) there is history of discharge and (b) if there is pain

13.2 NASAL CONDITIONS

13.2.1. Adenoid disease

Enlargement/inflammation of nasopharyngeal tonsil. Common in children 3-7 years.

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 the Eustachian tube leading to hearing loss, which fluctuates due to fluid in the middle ear ("Glue ear")
- Discharge from the nose
- Cough; recurs frequently
- Physical and other developmental retardation, e.g. small size for age

Investigations

- Diagnosis is usually based on history
- X-ray: 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 HC4

If symptoms are not marked

- Give conservative treatment with **chlorphenamine** 1-2mg daily (depending on age) for 7 days

If symptoms are marked or do not improve on treatment

- Refer to ENT department for surgery

13.2.2. Atrophic rhinitis

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 HC4

- Clean nasal cavities twice daily to remove crusts (most important)
  - Syringe the nose or douche it with warm **normal saline**
- Or **sodium bicarbonate** solution 5% (dissolve 1 teaspoonful of powder in 100mL cup of warm water)

- ▶ Then apply **tetracycline** eye ointment 1% inside the nose twice daily
- ▶ Give **cotrimoxazole** 960mg every 12 hours for 14 days
  - For rhinoscleroma: Give 1.44g (3 x 480mg tabs) every 12 hours for 6 weeks

If atrophic rhinitis not better or is worse after 2 weeks

- ▶ Refer to ENT specialists

Prevention

- Treat/eliminate known causes, such as syphilis

13.2.3. Foreign body in the nose

Occurs usually 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
- ➢ X-rays may be helpful in case of metallic objects like wires or ball bearings

Management HC2

- ▶ 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

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

Prevention

- Prevent children placing objects in mouth, nose, and ears
- Insects of potential danger should be destroyed, e.g. cockroaches, ants, beetles

13.2.4. Epistaxis

Bleeding from the nostrils, which may be arterial or venous.

Causes

Local

- Nose-picking
- Trauma
- Infections of the nose
- 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

- Bleeding from the nose
  - On examination the site of bleeding 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 haemogram, platelet count

Management HC2

General management

▶ Sit the patient up (if patient not in shock)
▶ Instruct patient to pinch the nose between the finger and the thumb for 15 minutes, breathe through the mouth, and spit out any blood
▶ Ask patient to blow out any blood clots

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
▶ Give broadspectrum **antibiotic** e.g. **amoxicillin**

If bleeding still does not stop after this period

▶ Refer to hospital for further management

Prevention

- Avoid picking the nose

- Treat/control predisposing conditions

13.2.5. Nasal allergy

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 is common
- Infections may alter tissue permeability
- Psychological and emotional factors in vasomotor rhinitis

Precipitating

- Changes in humidity and temperature
- Dust mite
- Certain foods; drugs, e.g. acetylsalicylic acid
- Infections
- 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

▶ Avoid precipitating factors (most important)

▶ Antihistamines, e.g. **chlorphenamine** 4mg every 12 hours for up to 21 days then as required thereafter if recurs

▶ Reassurance

▶ Surgery may be required for obstruction of the nose

✕ Do **not** use vasoconstrictor nasal drops, e.g. ephedrine and xylometazoline as (especially with repeated or prolonged use) they cause rebound congestion and alter the nasal environment making structures hardened.

13.2.6. Sinusitis (acute)

Inflammation of air sinuses of the skull.

Causes

- Allergy
- Foreign body in the nose
- Dental focal infection
- Viruses, e.g. rhinovirus, often as a complication of URTI
- Bacteria, e.g. *Streptococcus pneumoniae, Haemophilus influenzae, Streptococcus pyogenes*

Clinical features

- Rare in patients <5 years
- Throbbing headache above the eyes, sinus tenderness
- Discharge from nostrils and into the throat

- Clear when due to viruses
- Yellow (purulent) when due to bacteria

- Nasal blockage (sometimes)

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 HC2

General management (all ages)

► Steam inhalation may help clear blocked nose
► Give analgesics e.g. **paracetamol**

If there is a dental focus of infection

► Extract the tooth
► Give antibiotic e.g. **amoxicillin** plus **metronidazole**, see Gingival infections

If there is a foreign body in the nose

► Remove it in hospital

Note on use of antibiotics

✕ Do **not** use antibiotics except in bacterial sinusitis

◆ Use antibiotics only in those with clear features of sinusitis e.g. persistent purulent nasal discharge, cough with one or more of
  - Sinus tenderness
  - Facial or periorbital swelling
  - Persistent fever

In such cases give

- **Cotrimoxazole** 960mg every 12 hours for 7-10 days
  Child: 24mg/kg per dose
- Or **amoxicillin** 500mg every 8 hours for 7-10 days
  Child: 15mg/kg per dose

13.3 THROAT CONDITIONS

13.3.1. Foreign body (FB) in the airway

Mostly occurs in children <5 years.

Cause

- Types of FBs include seeds (especially 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

- History of inhalation (usually reported as swallowing) or choking
- Stridor (noisy breathing)
- Cough
- Difficulty in breathing, wheezing
- Hoarseness of voice if FB stuck at the vocal cords
- Symptoms start suddenly, fever is initially absent, and some of the symptoms may be transient (may disappear after a short period)
- Upper airway obstruction as shown by:
  - Flaring of the nostrils
  - Recession of the chest inlet and/or below the ribs
  - Rapid chest movements

- Air entry may be reduced (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 HC2

Child

- Refer to higher level as soon as possible
- Prop the child up
- Give **oxygen**
- **Penicillin** intra muscular urgently
- **Antibiotics** or **steroids**
- Refer to an ENT specialist

Adult

- Dislodge large FB, e.g. chunk of meat, from the pharynx by standing behind the patient with both arms around the upper abdomen and giving 6-10 thrusts (Heimlich manoeuvre)
  - Such circumstances are very rare
  - If patient pregnant or very obese: Perform 6-10 chest thrusts with patient lying on the back

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

13.3.2. Foreign body in the food passage

Causes

- Types of FBs commonly involved include fish or chicken bones (in the pharynx and oesophagus); cedar tree (Christmas tree) leaves, which get stuck in the pharynx or even behind the soft palate in the nasopharynx; coins.
- *Children*: Tend to insert objects in their orifices. Coins are particularly likely to be ingested
- *Adults*: Eating fish or chicken while drunk or not paying attention (e.g. watching television) or both is risky
  - Sharp objects lodge in the tonsils, behind the tongue, or in the pharynx. Some may get stuck in the oesophagus.

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

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 HC4

Initial

- ▶ 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

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** 500mg every 8 hours for 5 days

Prevention

- *Children*: Keep potential FBs out of the way as far as is possible
- 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

13.3.3. Pharyngitis (sore throat)

Inflammation of the throat.

Causes

- Most cases are viral
- Infection with various bacterial organisms of which Group A haemolytic *Streptococci* is the commonest
- Diphtheria in non-immunized children
- Gonorrhoea (usually from oral sex)
- Viral upper respiratory tract infections

- May also follow ingestion of undiluted spirits
- *Candida albicans* in the immunosuppressed

Clinical features

- Abrupt onset
- Pain on swallowing
- Fever
- Loss of appetite, general malaise
- In children: Nausea, vomiting, and diarrhoea
- Inflamed tonsils and throat
- Tender neck glands
- Exudates on tonsils

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: Haemogram
- Serological test for haemolytic streptococci (ASOT)

Management HC2

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

If streptococcal pharyngitis suspected

- **Benzathine penicillin** 1.2 MU IM single dose
  Child: <30kg: 30,000 IU/kg
- Or **PPF** 20,000 IU/kg IM daily for 10 days
- or **phenoxymethylpenicillin** 500mg every 6 hours for 10 days
  Child: 12.5mg/kg per dose

If allergic to penicillin

- **Erythromycin** 500mg every 6 hours for 10 days
  Child: 12.5mg/kg per dose

Note

- 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
- Cotrimoxazole is **not effective** for the treatment of streptococcal pharyngitis, and it should **not** be used

13.3.4. Tonsillitis

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
- Enlarged inflamed tonsils and cervical lymph nodes

- Complications include: Sinusitis, endocarditis, nephritis, LRTI, peritonsillar abscess (quinsy), otitis media

Differential diagnosis

- Pharyngitis
- Submandibular lymphadenitis

Investigations

➢ Throat swab: For C&S

Management HC2

Bacterial

▶ **Phenoxymethylpenicillin** 500mg every 6 hours for 10 days
Child: 10-20mg/kg per dose

Viral

▶ Treat symptomatically with analgesics and increased oral fluids

13.3.5. Peritonsillar abscess (quinsy)

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

Early stages: Diseases of adolescents and adults

▶ Conservative management
▶ Bed rest
▶ *Adults:* **Benzylpenicillin** 2MU IV or IM every 6 hours for 48 hours then switch to **amoxicillin** 500mg every 8 hours to complete a total of 7 days

If unable to take oral fluids

▶ Set up an **IV drip** e.g. **normal saline**

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

14. GENITO-URINARY DISEASES

14.1 ACUTE CYSTITIS

A lower UTI involving infection/inflammation of the bladder, which is a common manifestation of uncomplicated UTI especially in young women.

Cause

- Bacterial infection, e.g. *Escherichia coli*

Clinical features

- Lower abdominal pain, usually burning in nature
- Tenderness on touch (palpation)
- Urgency on passing urine, frequent passing of small amounts of urine
  - There may be retention of urine in severe infection
- Dysuria
- Pyuria (pus in the urine making it cloudy)

Investigations

- Midstream urine: Microscopy, protein, WBCs, C&S

Management HC2

Uncomplicated infections

- Ensure high fluid intake
- Alkalinise the urine with oral **sodium bicarbonate** solution 5% (dissolve 5g in 100mL water) twice daily
  - May help to relieve symptoms in mild cases
- **Cotrimoxazole** 1.92g (4 tablets of 480mg) single dose
  Child: 48mg/kg single dose
- Or **ciprofloxacin** 500mg single dose
  Child: 10-15mg/kg single dose

If poor response or recurrent infections

- Do not continue to treat "blind"

► Refer for investigation of C&S and further management

Prevention

- Improved personal/genital hygiene
- Avoid sharing of bathing basins, towels, soap, etc.

14.2 ACUTE GLOMERULONEPHRITIS

Acute inflammation of the renal glomeruli.

Causes

- Immune reactions (usually 1-5 weeks after a streptococcal skin or throat infection)

Clinical features

- Common in children >3 and adolescents
- Haematuria (passing smoky, red, or tea-coloured urine)
- Oedema: Puffiness of the face/around the eyes, less commonly generalized body swelling
- Discomfort in the kidney area (abdominal or back pain)
- May be anorexia
- General weakness (malaise)
- High BP, commonly presenting as headaches, visual disturbances, vomiting, and occasionally pulmonary oedema with dyspnoea
- Convulsions (in hypertensive crisis)
- Oliguria as renal failure sets in
- Evidence of primary streptococcal infection:
  - Usually as acute tonsillitis with cervical adenitis
  - Less often as skin sepsis

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
- Throat & skin swab (where indicated): For C&S

Management HC4

- Monitor urine output, BP, daily weight
- Restrict fluid input (in oliguria)
- Restrict salt and protein in the diet (in oliguria)
- Avoid or use with caution any drugs excreted by the kidney (see section 14.7 Use of drugs in renal failure
- Treat any continuing hypertension (refer to 18.8.4 Hypertension)
- Treat primary streptococcal infection (10-day course): **phenoxymethylpenicillin** 500mg every 6 hours
  Child: 10-20mg/kg per dose
- Or **amoxicillin** 500mg every 8 hours for 10 days
  Child: 15mg/kg per dose

If allergic to penicillin

- **Erythromycin** 500mg every 6 hours for 10 days
  Child: 15mg/kg per dose

Note

- ✕ 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

14.3 NEPHROTIC SYNDROME

Disorder of the kidneys. Common in children and characterised, irrespective of the cause, by:

- Generalised oedema
- Severe loss of protein in urine (proteinuria)
- Low protein (albumin) levels in the blood serum (hypoalbuminaemia)
- Hyperlipidaemia (high blood cholesterol)

Causes

- Idiopathic/unknown (majority of cases)
- Congenital (rare)
- Secondary: Due to post-streptococcal acute glomerulonephritis, malaria, allergy, UTI, hepatitis B, HIV

Investigations

As for Acute glomerulonephritis plus

- ➢ 24 hour urine protein quantification
- ➢ Serum protein and cholesterol

Differential diagnosis

- Cardiac failure
- Nutritional disorders causing low blood protein levels, e.g. kwashiorkor
- Malabsorption syndrome
- Allergic states causing generalised body swelling
- Chronic glomerulonephritis

Management HC4

- ► Restrict salt intake (<2g daily, i.e. <half teaspoon/day)
- ► Restrict water/fluid intake

- Both salt and water/fluid intake should be continued until diuresis is induced and swelling is subsiding which can take several weeks

If severe <u>oedema</u>

- ▶ **Furosemide** 40-80mg each morning to induce diuresis
  Child: 1-2mg/kg per dose (but see notes below)
- ▶ **Prednisolone** 2mg/kg daily (max: 60mg)
  - Continue until no further proteinuria (around 6 weeks)
  - Gradually reduce the dose after the first 4 weeks, e.g. reduce by 0.5mg/kg per day each week

When <u>oedema</u> has subsided and if still hypertensive

- ▶ Give appropriate treatment. See Hypertension

If clinical signs of/suspected infection:

- ▶ Give **antibiotic** as in Acute glomerulonephritis

If UTI suspected

- ▶ Treat as in 14.1 Acute cystitis

If patient from area of endemic schistosomiasis

- ▶ **Praziquantel** 40mg/kg single dose

If no improvement after 4 weeks or patient relapses

- ▶ Refer for further management by Nephrologist **RR**

14.4 ACUTE PYELONEPHRITIS

Upper urinary tract infection involving one or both kidneys (but not usually involving the glomeruli), which may extend to the bladder.

Cause

- Bacterial infection, e.g. *Escherichia coli*, usually following some form of obstruction, such as enlarged prostate and urethral stricture. May occur without an obstruction

- Pregnancy (due to enlarged uterus pressing on the ureters)
- Fibroids pressing on the ureters

Clinical features

- Loin pain, tenderness in one or both kidney areas (renal angle)
- Dysuria, desire to pass urine even when the bladder is empty (strangury), frequent passage of small amounts of cloudy urine
- Fever
- Vomiting
- May be rigors (generalized body tremors)
- In infants: May simply present as fever without other signs
- Diarrhoea and convulsions (common in children)

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
  - The specimen should reach the lab within 2 hours of collection or be refrigerated at $4^{o}C$ for not more than 24 hours
- Blood: Full count, C&S, urea, electrolytes
- Ultrasound kidneys/prostate

Management **HC4**

- Ensure adequate intake of **fluid** (oral or IV) to irrigate the bladder and dilute bacterial concentrations
- Ensure perianal hygiene

- ▶ Ensure regular complete emptying of the bladder and/or double voiding (additional attempt to empty bladder after initial urine flow ceases)
- ▶ Give **paracetamol** 1 gram 3-4 times daily for pain and fever
- ▶ **Amoxicillin** 500mg every 8 hours for 10-14 days
  Child: 15mg/kg per dose
- ▶ Or **Cotrimoxazole** 960mg every 12 hours for 10-14 days
  Child: 24mg/kg per dose

In severe cases or if no response to above in 48 hours

- ▶ **Ampicillin** 1-2g IV or IM every 6 hours for 7-14 days
  Child: 50mg/kg per dose
- ▶ *Plus* **gentamicin** 2.5mg/kg IV or IM every 8 hours for 7 days (reduce dose in renal impairment)

Following initial response to parenteral therapy

- ▶ Consider change to **ciprofloxacin** 750mg every 12 hours for the rest of the course
  - ✕ Contraindicated in pregnancy

14.5 RENAL COLIC

Acute severe pain in the loin (kidney area) as a result of obstruction of the ureters by a stone.

Cause

- Urinary stones

Clinical features

- Acute severe, steady, and continuous loin pain often radiating to the lower abdomen, testes, or labia

Differential diagnosis

- Lower UTI
- Acute upper UTI
- Other causes of acute abdominal pain

Investigations

- X-ray: For radio-opaque stones
- IVP
- Blood
- Ultrasound
- Urinalysis

Management HC4

- Treat underlying cause
- Pethidine 50-100mg IM single dose
- Ensure oral fluid intake of 3-4L/day after the crisis

14.6 RENAL FAILURE (ACUTE KIDNEY INJURY/CHRONIC KIDNEY DISEASE)

Acute or chronic impairment of renal function.

Causes

- Compromised renal perfusion e.g. dehydration, heart failure, shock
- Obstructed urinary flow
- Damage to renal tissue

Clinical features

- Oliguria (urine flow <1mL/kg/hour)
- Generalised oedema
- Heart failure, hypertension
- Hyperkalaemia
- Nausea and vomiting
- Lethargy
- Dyspnoea
- Convulsions
- Encephalopathy
- Anorexia

Differential diagnosis

- Other renal disorders
- Biventricular heart failure

Management HC4

Same management for adults and children. As dialysis facilities are limited to referral hospitals, the initial management is conservative to support the patient and maintain body biochemistry as near normal as possible until renal function recovers.

Acute

- ▶ Monitor fluid input and output
  - Daily fluid requirements = 10mL/kg + total of losses through urine, vomitus and diarrhoea
- ▶ Monitor BP twice daily
- ▶ Daily weighing
- ▶ Restrict salt intake (<2g or half teaspoonful daily)
- ▶ Restrict potassium intake e.g. oranges, bananas, vegetables, meat, fizzy drinks
- ▶ Restrict 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

Note:

- ✕ Do not give any drugs which may make kidney damage worse e.g. use gentamicin with caution

If no response to above general measures **RR**

- ▶ Refer for specialist management including possible peritoneal dialysis as soon as possible and before the patient's condition becomes critical

Chronic **RR**

Permanent impairment of renal function due to progressive damage to the renal tissue

▶ Refer for specialist management

Prevention

- Early, effective treatment of throat, skin, and urinary tract infections
- Manage diabetes
- Control hypertensin

14.7 USE OF DRUGS IN RENAL FAILURE

- Be very careful when prescribing any drug and check available prescribing information (e.g. in BNF) regarding use in renal failure/impairment
- Many drugs 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 6g 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
✕ Nalidixic acid
✕ Nitrofurantoin
✕ Streptomycin

15. HIV AND AIDS AND SEXUALLY TRANSMITTED INFECTIONS (STI)

Always refer to the latest *PMTCT, ART, and STI Guidelines* for the management of HIV infections and STIs. There is need to prioritise the management of conditions related to motherhood and children. (Also see WHO publication on "P*riority Medicines for Mothers and Children 2011*").

15.1 HIV INFECTION / ACQUIRED IMMUNODEFICIENCY SYNDROME (AIDS)

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

Causes

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 (clippers), nail cutters, and other sharp objects
- Exposure to HIV-infected materials through an open wound or cut

Clinical features

For more information on clinical features please refer to WHO Clinical Staging of HIV for adults and children that is

found in Appendix 2 and 3. This is based on demonstration of one or more opportunistic infections or key findings

- Cardinal findings: The presence of any one of these is diagnostic of underlying HIV infection
  - Kaposi sarcoma
  - Cryptococcal meningitis
  - Oesophageal candidiasis
  - Herpes zoster in patients <50 years
  - Oral thrush in patients <50 years (if no antibiotics taken in the past month)
  - Pneumocystis jiroveci pneumonia (PCP)
  - Toxoplasmosis infection
  - Cytomagalovirus retinitis

Presence of any two or more of the following is suggestive of underlying HIV infection

- Characteristic findings
  - Severe pruritic maculopapular skin rash (prurigo)
- Associated findings
  - Weight loss >10%
  - Recurrent fevers for >1 month
  - Recurrent diarrhoea for >1 month
  - Generalised lymphadenopathy
- For children under 5 years of age
  - HIV infection should be suspected if the child has two or more of the following:
  - Pneumonia
  - Persistent diarrhoea (diarrhoea lasting more than two weeks)
  - Very low weight-for-age
  - Oral thrush
  - Ear discharge

  - Generalized lympadenepathy (enlarged palpable lymph nodes in more than one site)
  - Parotid enlargement
  - Mother is HIV positive
  - Positive HIV antibody test in a child less than 18 months
- 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

Differential diagnosis

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

Investigations

- Blood: HIV serology
- Investigations for specific complicating diseases

Management **HC2**

The number of eligible patients not yet reached is still big because of the following reasons

- Stigma and late presentation by HIV positive patients
- Poor health seeking behaviour

- Inadequate HIV testing facilities
- Limited access to HIV treatment centres
- Poverty and ignorance in the community

Management before ARV treatment **HC2**

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

- ▶ By use of cotrimoxazole 960mg daily prophylaxis
  Child: 480mg daily
- By treating opportunistic infections as they occur
- By treating symptoms, such as pain, diarrhoea, and skin problems, as they develop
- Encouraging the patient and family to help themselves by
  - Eating a balanced diet
  - Taking regular exercise
  - Keeping active and resting well
  - Going for treatment promptly if unwell
  - 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
- ▶ Whatever the stage of HIV/AIDS infection, it is very important to counsel the patients/clients about taking an HIV test. This means counselling before, during, and after blood testing, bearing in mind that eventually most HIV patients will develop AIDS.
- ▶ ARV treatment (see 15.4)

Prevention of HIV

- Always follow safe sex practices, e.g. use condoms; avoid multiple sexual partners

- Avoid unsafe injections given by unlicensed persons
- Never share used needles, syringes, razors, hair shavers, nail cutters, and other sharp objects
- Avoid contact with infected body fluids, especially blood
- Follow safe blood transfusion practices
- Follow safe infusion and injection practices, e.g. proper sterilisation of reusable surgical items
- Whenever possible, avoid (especially unnecessary) use of injectable medicines. Instead, use oral, rectal, or other non-injectable dose-forms where these are appropriate and available.
- Ensure effective implementation of all interventions for Prevention of Mother-to-Child Transmission (PMTCT) of HIV infection
- Avoid tattooing, body-piercing, and scarification unless carried out under strictly hygienic conditions in properly controlled premises
- Ensure one sterilised knife per circumcision candidate
- Provide HIV counselling and testing (HCT) for HIV infection

15.2 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:

- Provision of emotional support
  - Empathise with concerns and fears
  - Use good counselling skills

- Helping 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
- Connecting the person with support services, including (religious) support groups, orphan care, income-generating activities, home care, and others
- Helping the person find strategies to involve his/her partner and extended family in sharing responsibility
- Helping the person identify someone from the community to support and care for him/her
- Discussing with HIV positive mothers how to provide for the other children in the family:
  - Help her identify a person from the extended family or community who will provide support
  - As appropriate, confirming and supporting information given in HCT on mother-to-child transmission, possibility of ARV treatment, safer sex, infant feeding, and FP advice
  - Help the person absorb and apply information given
- If the person shows signs of AIDS or terminal illness, refer him/her for appropriate management

15.2.1. How to provide psychosocial support

- Conduct peer support groups for persons who tested HIV positive and for couples affected by HIV/AIDS:
  - Led by a social worker and/or HIV positive person who has come to terms with his/her status
  - Held outside the clinic so as not to reveal the HIV status of the participants

Groups are the key to success in psychosocial support

- Ensure good links between health services and psychosocial support services
  - Exchange information for coordinated interventions
  - Make a plan for each family involved
  - The health professional and social worker/Community Health Worker (CHW) should keep active links with each other and with support organizations
- Referring individuals or couples for counselling by community counsellors

15.2.2. Counselling on safer sex and use of condoms

- Safer sex is any sexual practice which reduces the risk of transmitting HIV and other STIs
- Advise the person that the best protection comes from:
  - Correct and consistent use of condoms during every sexual act
  - Choosing sexual activities which do not allow semen, vaginal fluid, or blood to enter the mouth, anus, or vagina of the partner or to touch any open wound of the partner
- Make sure the person knows how to use condoms and where to get them

If the person is HIV positive

- Explain to him/her that he/she is infected and can give the infection to his/her partner and must therefore use a condom during every sexual act
- Explain the extra importance of avoiding infection during pregnancy and breastfeeding

- The risk of infecting the baby is higher if the mother is newly HIV+

If partner's HIV status is unknown:

- Counsel on the benefits of testing the partner

If the person is HIV negative or status unknown

- Explain that he/she is at risk of HIV and in women, the importance of remaining negative during pregnancy and breastfeeding

15.2.3. For women: Benefits of involving and testing male partners

Men are still generally the main decision-makers in the family and community. Involving them will:

- Have a greater impact on increasing acceptance of condom use and safer sex practices to avoid infection and unwanted pregnancies
- Help reduce risk of suspicion and violence
- Help increase support to their partners
- Motivate men to get tested

15.3 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 for example very low CD4 cell counts

- 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

Investigation

- Blood: HIV serological test
- HIV DNA PCR testing of babies

Management

Access to the recommended package for prevention of mother-to-child transmission of HIV (PMTCT). See also "Pregnancy and HIV Infection".

- Provide routine counselling and testing for HIV during pregnancy for the woman and her male partner
- Give preventive counselling for HIV negative women

For HIV positive women

- Provide **cotrimoxazole** daily for all positive women

Administer one of the following antiretroviral drugs for PMTCT according to the policy

- *Mother*: 200mg oral **nevirapine** at onset of labour
- *Baby*: 2mg/kg body weight within 72 hours of birth
- *Mother*: 300mg oral **zidovudine** and 150mg oral **lamivudine** twice a day from 32-36 weeks through labour and for one week after delivery; plus 200mg oral **nevirapine** at onset of labour
- *Baby*: Oral **nevirapine** 2mg/kg body weight within 72 hours of birth plus oral **zidovudine** 4mg/kg body weigth twice a day for one week

- *Mother*: 300mg oral **zidovudine** twice a day from about 28 weeks through labour plus 200mg oral **nevirapine** at onset of labour
- *Baby*: Oral **nevirapine** 2mg/kg body weight within 72 hours of birth plus oral **nidovudine** 4mg/kg body weight twice a day for one week
- *Mother*: **zidovudine, lamivudine,** and **nevirapine** combination or stavudine, lamivudine, and nevirapine combination from after 14 weeks of gestation, throughout pregnancy and for life
- *Baby*: Oral **zidovudine** 4mg/kg body weight twice a day for one week
- Apply modified obstetric practices
- Provide counselling and support for optimal infant feeding

Prevention

- Abstinence from sex during pregnancy and while breast feeding
- Correct and consistent use of condoms during pregnancy and while breast feeding
- HIV counselling and testing for the couple to know sero-status
- Access the recommended PMTCT package for HIV infected mothers

15.4 ANTIRETROVIRAL TREATMENT (ART)

15.4.1. Initial evaluation checklist for patients starting ART

Assessment	
1	History • Level of understanding of HIV/AIDS; the 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, hospitalizations, and surgeries • Current medications (including anti-TB drugs, traditional therapies, etc.)
2	Physical exam • Weight • Nutritional status • Functional capacity and level of disability • Examination of vital signs, skin, eyes, oropharynx (presence of thrush), lymph nodes,

	lungs, heart, abdomen, genital tract (STIs), extremities, nervous system
3	Baseline laboratory tests to assess immunosupression and disease aggressiveness • Confirming HIV serostatus • CD4 testing • Viral load if available and affordable • Full blood count particularly for patients starting on a AZT-containing regimen • Pregnancy test for women of child bearing potential starting on EFV-containing regimen
4	Baseline Labs to assess general health and diagnose any pre-existing HIV complications • A sputum smear for AFB for patients who have coughed for more than 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 • Serum chemistries (liver and renal function tests) if available • If ALT is elevated, do hepatitis B surface antigen test if available or refer • Symptom directed lab tests to diagnose pre-existing illnesses
5	Staging of disease using WHO clinical criteria (see Appendices 2 and 3)
6	Counselling and assessment of patients' readiness to start therapy, including assessment for specific education/information/counselling support needs

15.4.2. Background of ART

The goals of treatment with antiretroviral medicines are to inhibit viral replication, while minimizing toxicities and side effects associated with the medicines. The inhibition of virus replication permits restoration of the immune system. Viral eradication from the host genome is not achievable, thus a cure for HIV is not yet possible. 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. In summary, the goals of ART are:

- The suppression of HIV replication as reflected in plasma HIV concentration to as low as possible and for as long as possible
- The preservation or enhancement of the immune function (CD4 restoration), thereby preventing or delaying the clinical progression of HIV disease
- Quality of life improvement
- Reduction in HIV-related morbidity and mortality
- Promotion of growth and neurological development in children

HAART may be defined as therapy, which is potent enough to suppress HIV viraemia to undetectable levels (<50 copies/mL). It is measured by the most sensitive assay available and is durable in its virologic effect. HAART conventionally includes three or more medicines from at least two classes. However, as long as there is full and durable suppression of viral load, any regimen should be regarded as HAART. On the other hand, known sub

optimal regimens, e.g. monotherapy, double nucleoside, or certain triple nucleoside combinations are not HAART and are contraindicated in HIV disease.

15.4.2.1 Tools to achieve the goals of therapy

- Maximization of adherence to ART. This may require getting a treatment buddy who will support the patient to adhere to his/her treatment.
- Disclosure of HIV serostatus reinforces patient adherence to ART
- Rational sequencing of medicines to preserve future treatment options
- Use ARV medicine resistance testing when appropriate and available
- Use of viral load estimates for monitoring if available

15.4.2.2 Principles of ART

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

- Not to start ART too soon (when CD4 cell count is close to normal) or too late (when the immune system is irreversibly damaged)
- Efficacy of the chosen medicine regimens
- Freedom from serious adverse effects
- Ease of administration including no food restrictions.
- Affordability and availability of medicines and medicine combinations
- Ongoing support of the patient to maintain adherence

15.4.2.3 Limitations of ART

Antiretroviral medicines are not a cure for HIV. However, when properly used by both patients and health care providers, they are associated with excellent quality of

life. They are relatively expensive and require an adequate infrastructure and knowledgeable health care workers. Training health care personnel to use ARVs is critical to safely and effectively use these medicines. Even when all these are in place, ART has its own limitations in several ways:

- Medicine interactions and medicine resistance may decrease the potency of these medicines
- Patients on ART may develop adverse medicine reactions
- The HIV medicines are still relatively expensive even though their prices have significantly reduced
- 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. At present, eradication of HIV in the body is not possible
- Some patients may not respond (benefit) to treatment and continue to progress with their HIV disease in spite of doing everything right
- Children are dependent on adults for adherence to ART

15.4.2.4 Available agents for ART

At present antiretroviral medicines come in six classes, each of which attacks a different site (NNRTIs, NsRTIs, NtRTIs all work at the same site) or stage of the HIV life cycle, thereby interfering with its reproduction.

- Nucleoside reverse transcriptase inhibitors (NtRTIs), (e.g. Tenofovir) incorporate themselves into the DNA of the virus, thereby stopping the building process. The resulting DNA is incomplete and cannot create new virus.

- Non-nucleoside reverse transcriptase inhibitors (NNRTIs) stop HIV production by binding directly onto the reverse transcriptase enzyme, thus preventing the conversion of RNA to DNA.
- Integrase inhibitors (e.g. raltegravir) interfere with the HIV DNA's ability to insert itself into the host DNA and copy itself.
- Protease inhibitors (PIs) work at the last stage of the virus reproduction cycle. They 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.
- Entry inhibitors also called HIV fusion inhibitors (e.g. enfuvirtide or T-20), which prevent the HIV virus particle from infecting the CD4 cell.
- CCR5 antagonists (e.g. maraviroc) block the CCR5 coreceptor molecules that HIV uses to infect new target T-cells. Some forms of HIV use a different coreceptor and thus, some patients may not benefit from maraviroc.

For more information about available ARVs please refer to the essential medicines list in Appendix 6 and toxicity in Appendix 4

15.4.3. Initiation of ART in adults and adolescents

It is recommended to initiate ART in documented HIV-infected adults and adolescents with a CD4 cell count of 350 and below whether symptomatic or not. Those with a count above 350 should start on ART as provided below:

- CD4 cell count above 350 cells/ mm^3 in those:
  - Who are co-infected with tuberculosis (TB) or WHO Stage III disease

- Pregnant women
- WHO Stage III and IV disease irrespective of CD4 cell count

WHO clinical staging and immunological criteria for initiating ART

Clinical stage (WHO clinical staging, see Appendix 1)	CD4 cell count	Comments
I	CD4 guided	Treat if ≤ 350
II	CD4 guided	Treat if ≤ 350
III	Treat	Treat
IV	Treat	Treat

Appendix 2 includes more details about clonical staging of HIV infection in adults and adolescents

CD4 cell count criteria for initiation of ART

CD4+ count (cells/µL)	Actions
<350	Treat irrespective of clinical stage
350-500	Consider treatment in patients who are symptomatic (WHO stage III or IV), have TB, or are pregnant (prophylaxis)
>500	Do not initiate treatment unless TB-co-infected, pregnant (prophylaxis), or stage III or IV

A CD4 count is essential for ART initiation and subsequent monitoring of patients. The decision to initiate ART is based on clinical staging and CD4 count. CD4 testing is becoming more readily available and accessible,

particularly at all sites that are participating in ART national programs, including HC 4. Anyone on ART must have blood drawn for a baseline cell count within 3 months of initiation.

15.5 RECOMMENDED FIRST AND SECOND LINE REGIMENS IN ADULTS AND ADOLESCENTS

1st Line Regimens	2nd Line Regimens	Comments
Preferred		
TDF/3TC +NVP Or TDF/3TC +EFV	AZT +3TC* +ATV/r Or AZT+3TC* +LPV/r	Use of TDF, 3TC, and EFV has low toxicity, once daily administration, and effective against hepatitis B This combination is the preferred first-line.
Alternative		
AZT/3TC + NVP Or AZT/3TC + EFV	TDF + 3TC* + ATV/r^ Or TDF+ 3TC* + LPV/r	- Relatively inexpensive regimen -AZT causes anemia -If patient is anemic, start with TDF
Women who started with PI-based regimens as their first line		
TDF/3TC/ATV/r	AZT/3TC/LPV/r	LPV/r can be used by ATV/r experienced individuals
AZT/3TC/ATV/r	TDF/3TC/LPV/r	
Patients with a poor renal function and anaemia		

1st Line Regimens	2nd Line Regimens	Comments
ABC/3TC + NVP or EFV	Correct anaemia and put on AZT/3TC* + ATV/r^ or LPV/r	This class of patients has limited options and if toxicities are not corrected they are candidates for d4T containing regimens or 3rd line ART regimens
ABC/3TC + NVP or EFV	Correct anaemia and put on AZT/3TC* + ATV/r^ or LPV/r	
Patients who started on triple NRTI regimens	NVP or EFV/3TC/ATV/r or LPV	Triple NRTI regimens are now discouraged due to high virological failure rates and decrease of patients future ART options

* 3TC can be considered as a 2nd line regimen to reduce the viral fitness

* All new 2nd line patients should be placed on ATV/r

Key :

AZT Zidovidin
d4T: Stavudine
3TC: Lamivudine
NVP: Nevirapine
EFV: Efavirenz
ABC: Abacavir
ddI: Didanosine
LPV/r: Lopinavir/ritonavir (aluvia/kaletra)
TDF: Tenofovir
FTC: Emitricitabine
ATV/r: Atazanavir/ritonavir

15.6 ANTIRETROVIRAL THERAPY FOR CHILDREN

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

Evidence has shown that HIV infection follows a more aggressive course among infants and children than among adults. Thirty percent die by age 1 year and 50% die by age 2 years without access to life-saving drugs, including antiretroviral therapy and preventive interventions, such as cotrimoxazole prophylaxis. In addition, new evidence highlights early HIV diagnosis and antiretroviral treatment as critical for infants and indicates that a significant number of lives can be saved by initiating antiretroviral treatment for HIV-positive infants immediately after diagnosis within the first 12 weeks of life.

15.6.1. Determination of HIV exposure status

- All infants at or around birth should have their HIV exposure status established at their first contact with the health system. Status should be established before 6 weeks of age. This may be ascertained in one of the following ways:
  - Preferably by checking the child's Health Card for the mother's PMTCT codes if they were transferred to the card at birth
  - If there is no indication in the Child Health Card, determine whether the mother's HIV status was assessed in this pregnancy. Check the Antenatal Care Card for record of the mother's PMTCT code or maternal or caregiver in question.
  - If maternal HIV testing has not been done or the HIV status of the mother remains unclear for the

duration of the pregnancy, then perform an HIV serological test on the mother after obtaining informed consent.
- If the mother is unavailable or does not consent to maternal HIV testing, then perform HIV serological testing of the infant to determine HIV exposure status. Maternal or guardian consent is required for such testing.
- Once the exposure status has been determined, then the appropriate HIV test can be done to diagnose HIV depending on the age of the infant.

- All HIV exposed infants should be **given NVP prophylaxis** from birth. **Nevirapine** syrup should be refilled at every visit at the facility according to the prescribed visit schedule.

Infant NVP dosing

Age	Birth to 6 weeks		6weeks-6 month	>6 month 9 month	>9month to end of being breastfed
	2.0-2.5kg	>2.5kg			
Daily dose	1mL	1.5mL	2mL	3mL	4Ml

- **Cotrimoxazole prophylaxis** should be provided for infants from 6 weeks of age. This should be continued until the final HIV status is determined.
  - For infants whose final HIV status is negative, **cotrimoxazole** prophylaxis should be stopped
  - For infants whose final HIV status is positive, **cotrimoxazole** prophylaxis should be continued

15.6.2. Nutrition and infant feeding

Infant feeding counselling should begin 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. This support and counselling should be provided from birth and at every visit. For more details, see Infant and young child feeding counselling.

15.6.3. Antiretroviral therapy in infants and children

Children grow quickly and thus, their weight changes. ARV doses need to be adjusted from time to time. When in doubt, the attending clinician should consult or refer the child.

Before a child begins ART, the following assessments must be made:

- If the child is eligible for ART
- Readiness of parents/caretakers or child (if older) to start ART
- Complete pre-treatment baseline assessment to ensure that the child fulfils the criteria below

The following criteria is used to initiate infants and children on ART

All infants and children under 2 years of age should begin ART irrespective of the WHO clinical stage, CD%, or CD count. All children with WHO clinical stage 3 or 4 disease should begin ART irrespective of the CD4 count (see Appendix 1 for the WHO Clinical Staging Chart for guidance on how to stage).

All children aged 2 years and under 5 years should begin ART if the CD4% is less than 25% or CD4 count is <750 cells/mm^3.

When to initiate ART in children

Age	Criteria for Initiating ART		
	WHO Clinical Staging	CD4%	CD4 Count
Under 2 years*	Initiate ART if child is confirmed HIV positive, regardless of CD4 or Clinical Staging		
5 years and above**		N/A	<350

*All infants under 18 months with presumptive diagnosis of HIV
**All children above 5 years should be started on ART if CD4 count is less than 350 cells/mm^3

For more information about HIV infection staging in infants and children, please refer to Appendix 3

A presumptive diagnosis of severe HIV disease should be made if	
1.The child is confirmed as being HIV antibody-positive	2a. The infant is symptomatic with two or more of the following: • Oral thrush • Severe pneumonia • Severe sepsis OR 2b. A diagnosis of any AIDS-indicator condition(s) as can be made
Other findings that support the diagnosis of severe HIV disease in an HIV-sero positive infant include – Recent HIV-related maternal death or advanced HIV disease – Child's % CD4+ <20%	
Confirm the diagnosis of HIV infection as soon as possible	

15.7 RECOMMENDED FIRST AND SECOND LINE ANTIRETROVIRAL REGIMENS FOR CHILDREN AND INFANTS

	First line therapy	Second line therapy
Preferred	AZT+3TC+NVP or EFV	ABC+3TC+LPV/r
1st Alternative	ABC+3TC+NVP or EFV	AZT+3TC+LPV/r
2nd Alternative	d4T +3TC+NVP or EFV	ABC+3TC+LPV/r
If there is previous exposure to NVP for PMTCT	AZT+3TC+LPV/r	ABC+3TC+ NVP or EFV
	ABC+3TC +LPV/r	AZT+3TC+NVP or EFV
	d4T+3TC+LPV/r	ABC+3TC+NVP or EFV

If a child is anaemic (Hb <7.5g/dl), use ABC or d4T instead of AZT

*Do not use EFV in children under 3 years (or 15kg), 1st trimester of pregnancy, or sexually active adolescents

First line ARV regimens for infant and children with TB co-infection			
TB-HIV co-infected	< 3 years	Preferred	AZT + 3TC + ABC
		Alternative	AZT + 3TC + NVP
	≥ 3 years	Preferred	AZT + 3TC + EFV
		Alternative	ABC + 3TC + EFV

15.8 ANTIRETROVIRAL DOSAGE REGIMENS FOR CHILDREN AND INFANTS

15.8.1. Nucleoside Reverse Transcriptase Inhibitors (NRTIs)

Dose	Formulations	Comments
Zidovudine (AZT/AZT)		
>6weeks – 12years: 180 -240mg/m^2 twice daily *>12yrs:* 300mg twice daily *IV*: 1.5mg/kg infused over 30 minutes every 6 hours until oral dosing is possible For children with suspected nervous system involvement, dose of 240mg/m^2 per dose given twice daily may be more beneficial	Syrup: 10mg/mL Tablet: 300mg	Do not use d4T with AZT due to an antagonistic effect; No food restrictions; Use with caution with anemic children due to potential for bone marrow suppression
Lamivudine (3TC)		
6 weeks–12 years: 4mg/kg twice daily; *>12yrs*: 150mg twice daily	Tablet: 150mg	Well tolerated; No food restrictions; Also active against hepatitis B

Dose	Formulations	Comments
Abacavir (ABC)		
>6months–16years 8mg/kg twice daily; If *>30kg*: 300mg twice daily	Oral solution: 20mg/mL Tablet: 300mg	Parents must be warned about potential ABC hypersensitivity reaction; ABC should be stopped permanently if hypersensitivity reaction occurs; No food restrictions
Emtricitabine (FTC)		
> 33 kg: 200mg once daily	Capsules: 200mg	
Tenofovir (TDF)		
≥ 12 yrs: 300mg/day	Tablet: 300mg	Preferred for treatment of Hepatitis B in children above 12 years of age

15.8.2. Non-nucleoside reverse transcriptase inhibitors (NNRTIs)

Dose	Formulations	Comments
Efavirenz (EFV)		
Capsule or tablet: 15mg/kg/day; Weight greater than 40kg, 600mg once daily Wt (kg) Dose(mg) 20 250 20-25 300 25-32 400 >32 600 Capsules, once a day at night	Capsules: 100mg Capsules: 200mg Tablets: 600mg	Insufficient data on dosing for children <3 years; Can be given with food but if taken with food, especially high-fat meals, absorption is increased by an average of 50%; Best given at bedtime in order to reduce CNS side-effects, especially during first two weeks
Nevirapine (NVP)		
160–200mg/m^2 to maximum dose of 200mg taken twice daily *<8yrs* 4mg/kg once daily for 14 days then 7mg/kg twice daily *>8yrs* 4mg/kg once daily for 14 days then	Oral suspension: 10mg/mL Tablet: 200mg	Parents must be warned about a potential severe, life-threatening rash during the 14-day lead-in period. The once-daily induction dose is used to reduce the frequency of rash. Should be

Dose	Formulations	Comments
4mg/kg twice daily *PMTCT*: 2mg/kg/dose within 72 hours of birth once only. If the maternal dose of NVP was given less than 2 hours before delivery, then administer 2mg/kg/dose to the infant immediately after birth and repeat within 24–72 hours of first dose. If the infant weight is not available, administer 0.6mL oral suspension		permanently discontinued and not restarted in children who develop severe rash; Medicine interactions: Avoid nevirapine if rifampicin is co-administered; Can be given without food

15.8.3. Protease inhibitors

Dose	Formulations	Comments
Lopinavir/ritonavir (LPV/r)		
>2years: 2.9ml/m^2 twice daily with food Max. 5ml/m^2 twice daily	Oral solution: 80mg/mL LPV + 20mg/mL ritonavir (RTV) Capsules: 133.3mg LPV + 33.3mg RTV	Should be taken with food; Preferably, oral solution and capsules should be refrigerated but

Dose	Formulations	Comments
	(should not be crushed or opened; must be swallowed whole) Tablets: 100mg LPV + 25mg RTV Tablets: 200mg LPV + 50mg RTV (should be taken with food)	can be stored at room temperature up to 25°C for two months (at >25°C medicine degrades more rapidly); There are many medicine-to-medicine interactions because RTV inhibits cytochrome
Atazanavir/ritonavir (ATV/r)		
310mg/m^2 once daily *Weight 15kg - <20kg:* 8.5mg/kg ATV and 4mg/kg RTV once daily *Weight > 20kg:* 7mg/kg ATV and 4mg/kg RTV once daily Maximum dose: 300mg ATV and 100mg RTV once daily	Capsules 300mg + 100mg RTV	Should be taken with meals; Approved for children over 6 years but has been used in 3mths – 6yr olds; Store in cool dry place, protect from light (15-25^{o}C); There are many medicine-to-medicine interactions because RTV inhibits cytochrome; Currently recommend for

Dose	Formulations	Comments
		2nd line therapy; **Discuss with experts prior to use**

15.8.4. Fixed-dose combinations (FDGs)

Dose	Formulations	Comments
Stavudine (d4T) + Lamivudine (3TC) + Nevirapine (NVP) (Triomune)		
d4T dose: *< 30kg:* 1mg/kg/dose twice daily *> 30kg:* 3mg/dose twice daily For other medicines refer to individuation ARVs	Dispersible tablet: 6mg d4T + 30mg 3TC + 50mg NVP (baby) Dispersible tablet: 12mg d4T + 60mg 3TC + 100mg NVP (junior)	Contains a fixed dose of NVP, therefore cannot be used for induction as NVP dose escalation required (see NVP dose recommendation)
Tenofovir (TDF) + Emtricitabine (FTC) + Efavirenz (EFV)		
See for individual ARVs	Tablet : 300mg TDF + 300mg FTC + 600mg EFV	See for individual ARVs
Tenofovir (TDF) + Lamivudine (3TC) + Efavirenz (EFV)		
See for individual ARVs	Tablet : 200mg TDF + 300mg 3TC + 600mg EFV	See for individual ARVs
Zidovudine (AZT) + Lamivudine (3TC) + Nevirapine (NVP)		
See for individual	Tablet : 300mg AZT +	See for individual

Dose	Formulations	Comments
ARVs	150mg 3TC + 200mg NVP	ARVs
Zidovudine (AZT) + Lamivudine (3TC) Abacavir (ABC)		
See for individual ARVs	Tablet: 300mg AZT + 150mg 3TC + 300mg ABC	Parents must be warned about potential ABC hypersensitivity reaction; ABC should be stopped permanently if hypersensitivity reaction occurs; Pharmacokine-tic data is only available for adults and adolescents
Zidovudine (AZT) + Lamivudine (3TC) (Combivir)		
Dose	**Formulations**	**Comments**
See for individual ARVs	Tablet: 300mg AZT + 150mg 3TC	See for individual ARVs

Stavudine (d4T) + Lamivudine (3TC)		
See for individual ARVs and for d4T see d4T + 3TC + NVP	Tablets: 30mg d4T + 150mg 3TC Tablet : 6mg d4T + 30mg 3TC Tablet : 12mg d4T + 60mg 3TC	See for individual ARVs

Dose	Formulations	Comments
Abacavir (ABC) + Lamivudine (3TC)		
See for individual ARVs	Tablet: 60mg ABC + 30mg 3TC	See for individual ARVs
Tenofovir (TDF) + Emtricitabine (FTC)		
See for individual ARVs	Tablet: 300mg TDF + 200mg FTC	See for individual ARVs
Tenofovir (TDF) + Lamivudine (3TC)		
See for individual ARVs	Tablet: 300mg TDF + 150mg 3TC	See for individual ARVs

15.9 PEOPLE CO-INFECTED WITH TUBERCULOSIS AND HIV INFECTIONS

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. Active TB may be present when ART needs to be initiated or it may develop during treatment. For patients with active TB in whom HIV infection is diagnosed and ART is required, the first priority is to initiate standard anti-TB treatment.

Management

- It is recommended that people co-infected with TB/HIV initiate on ART after stabilizing on their TB therapy, which ranges from 2-8 weeks.
- Patients with CD4 >350/mm^3 should start ART after the intensive TB treatment phase, which usually lasts for 2 months.

- If a person needs TB and HIV treatment concurrently, the recommended first line treatment option is **TDF/3TC + EFV** and the alternative is **AZT/3TC + EFV**.
- In the exceptional circumstances where CD4 cell counts cannot be obtained, ART should be initiated 2-8 weeks after the start of TB therapy when the patient has stabilized on TB treatment.

15.9.1. Antiretroviral therapy for individuals with tuberculosis co-infection

Situation	Recommendations
Pulmonary TB and CD4 count <350 cells/mm3, extra pulmonary TB, or WHO stage IV	Start TB therapy and when stable (usually within 2 to 8 weeks) ADD one of these regimens: • TDF/3TC/EFV (alternative AZT/3TC/EFV) – not to be used in first trimester of pregnancy or in women of childbearing potential without assured contraception • TDF/3TC/NVP, AZT/3TC/NVP - used only if in rifampicin-free continuations phase
Pulmonary TB and CD4 >350 cells/mm^3	Start TB therapy for 2 months THEN start one of these regimens: • TDF/3TC/EFV or NVP • AZT/3TC/EFV or NVP
HIV pregnant women with TB	Treat TB first. When stable introduce one of

	these regimens: • CD4 ≤ 350 cells/mm3: TDF/3TC (alternative AZT/3TC) + NVP (or EFV after 1st trimester) • CD4 ≥ 350: TDF/3TC (alternative AZT/3TC) + EFV after 1st trimester

15.9.2. Second line ART for patients with TB

There are significant drug interactions with PIs and rifampicin. Unboosted PIs cannot be used with rifampicin containing regimens because PI levels are sub-therapeutic. Therefore, boosted PIs (LPV/r) can be considered but with close laboratory monitoring for hepatotoxicity.
LPV and RTV may be given with rifampicin at 400mg LPV and 400mg RTV. ATV/r is not recommended with **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.

15.10 SEXUALLY TRANSMITTED INFECTIONS (STIs)

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 (very important)
- 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

15.11 URETHRAL DISCHARGE SYNDROME (MALE)

A number of diseases, usually spread by sexual intercourse, produce similar manifestations in males and may be difficult to distinguish clinically.

Causes

- **Gonorrhoea**: Caused by the bacterium *Neisseria gonorrhoea*
- **Trichomoniasis**: Caused by the protozoan *Trichomonas vaginalis*
- **Non-gonococcal urethritis**: Caused by virus-like bacteria *Mycoplasma* and *Chlamydia trachomatis*

Clinical features

- Patients complain of mucus or pus appearing at the tip of the penis or staining of underwear
- Burning pain on passing urine (dysuria)
- Examination may show a scanty or profuse discharge

Investigations

- Pus swab: Gram stain, C&S
- Blood: Screening tests for syphilis
- Examine patient carefully to confirm discharge
- Retract prepuce to exclude presence of ulcer

Management HC2

Both patient and sexual partners must be treated

- **Cefixime** 400mg single dose
- Plus **doxycycline** 100mg every 12 hours for 7 days

If partner is pregnant

- Give **erythromycin** 500mg every 6 hours for 7 days

If discharge or dysuria persists and partners treated:

- Exclude presence of ulcers under prepuce
- Repeat **doxycycline** 100mg every 12 hours for 7 days
- Also give **metronidazole** 2g single dose

If discharge or dysuria persists and partners not treated:

- Start the initial treatment all over again

If discharge still persists

- **Ceftriaxone** 1gm single dose and refer for specialist management

15.12 ABNORMAL VAGINAL DISCHARGE SYNDROME

Often the first evidence of genital infection, although absence of abnormal vaginal discharge does not mean absence of infection.

Causes

- Can be a variety and often mixture of organisms
- Bacterial vaginosis

Clinical features

- In all cases: Abnormal increase of vaginal discharge
  - Normal discharge is small in quantity and white to colourless
- *Gonorrhoea* produces a thin mucoid slightly yellow pus discharge with no smell
- Trichomoniasis causes a greenish-yellow discharge with small bubbles, a fishy smell, and itching of the vulva
- *Candida albicans* causes a very itchy, thick white discharge like sour milk
- *Mycoplasma and chlamydia* may cause a non-itchy, thin, colourless discharge

Differential diagnosis

- Cancer of the cervix, especially in older women with many children (multiparous)
  - Causes a blood-stained smelly discharge

Investigations

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

Management HC2

Lower abdominal tenderness

- Treat as in lower abdominal pain syndrome

No lower abdominal tenderness but itching, erythema or excoriations

- Insert **fluconazole** 200mg single dose
- Plus **metronidazole** 2g single dose

If pregnant

- Replace **fluconazole** with **clotrimazole** pessary 500mg single dose
- Add **metronidazole** only after 1st trimester

If discharge or dysuria persists:

- Give **cefixime** 400mg stat
- Plus **doxycycline** 100mg 12 hourly for 7 days

If pregnant

- Give **erythromycin** 500mg 6 hourly for 7 days and treat sexual partners

If discharge or dysuria still persists and partners treated:

- Refer for specialist management

No lower abdominal tenderness and no itching, erythema or excoriations

- **Cefixime** 400mg stat

- ▶ *Plus* **doxycycline** 100mg 12 hourly for 7 days
- ▶ *Plus* **metronidazole** 2g single dose
- ▶ Treat sexual partners

If pregnant

- ▶ Replace **doxycycline** with **erythromycin** 500mg 6 hourly for 7 days

If discharge or dysuria persists and partners treated:

- ▶ Refer for further management

In pregnancy

- ✕ Do **not** give ciprofloxacin, chloramphenicol, doxycycline, or tetracycline
- △ Postpone giving **metronidazole** until after 1st trimester

15.13 LOWER ABDOMINAL PAIN SYNDROME (FEMALE) / PELVIC INFLAMMATORY DISEASE (PID) SYNDROME

Causes

- Infection of the uterus, tubes, and ovaries by *N. gonorrhoea, Chlamydia* and anaerobes

Differential diagnosis

- Ectopic pregnancy
- Puerperal sepsis
- Ovulation pain

Investigations

- ➢ Take history; check if period overdue
  - If possible examine the patient bianually for pregnancy, bleeding, recent delivery or abortion
- ➢ Check for severe pain, vomiting, or rebound tenderness

Management HC2

***Any** of the above signs and symptom*

- ▶ Refer quickly for further management

***None** of the above signs and symptoms*

- ▶ Give **ceftriaxone** 1gm IM start then give **cefixime** 400mg once a day for 3 days
- ▶ Plus **doxycycline** 100mg 12 hourly for 14 days
- ▶ Plus **metronidazole** 400mg bd for 14 days
- ▶ Treat sexual partners for urethral discharge syndrome

If no improvement in 7 days

- ▶ Give **ceftriaxone**, 1g once a day for 3 days

If there is an Intra uterine device (IUD):

- ▶ Remove it 2-4 days after commencing treatment

If no improvement within 7 days

- ▶ Refer for specialist management

15.14 GENITAL ULCER DISEASE (GUD) SYNDROME

Causes

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

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

Clinical features

- Primary syphilis: The ulcer is at first painless and may be on the fold between the large and small lips of the vulva (labia majora and labia minora), on the labia, or on the penis
- Secondary syphilis: Multiple, painless ulcers on the penis or vulva
- Herpes: Small, multiple, usually painful blisters, vesicles, or ulcers

- Granuloma inguinale: An irregular ulcer 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 HC4

Blisters or vesicles

- ▶ **Aciclovir** 400mg 3 times per day for 7 days and perform RPR test. If positive, give **benzathine** penicillin 2.4 MU IM single dose (half into each buttock)
- △ If allergic to penicillin, give **erythromycin** 500mg every 6 hours for 14 days
- ▶ Advise on genital hygiene

If blisters or vesicles *persist*

- ▶ Repeat **aciclovir** as above for 7 days

<u>No</u> blisters or vesicles

- ▶ **Ciprofloxacin** 500mg twice daily for 3 days
- ▶ Plus **benzathine penicillin** 2.4 MU IM single dose (half into each buttock)
- △ If allergic to penicillin, replace benzathine penicillin with **erythromycin** 500mg every 6 hours for 14 days
  - ✕ Avoid ciprofloxacin in pregnancy

If ulcer persists for >10 days and partners were treated

- ▶ **Erythromycin** 500mg every 6 hours for 7 days

If ulcer persists for >10 days and partners were not treated

- ▶ Repeat the above course of **ciprofloxacin** and **benzathine penicillin**

If the ulcer still persist

- ▶ Refer for specialist management **HC4**

Alternative regime if patient is pregnant or allergic to penicillin:

- ▶ **Erythromycin** 500mg every 6 hours for 14 days

Note

- ◆ Genital ulcers may appear together with enlarged and fluctuating inguinal lymph nodes (buboes), which should be aspirated through normal skin and never incised

15.15 INGUINAL SWELLING (BUBO)

Found in many sexually transmitted conditions affecting the female and male genitals.

Causes

- Lymphogranuloma venereum (LGV)
- Grauloma inguinale (GI)
- Chancroid

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

Investigations

- ➢ As for Genital Ulcers
- ➢ C&S of pus

Management HC2

- ▶ Give **doxycycline** 100mg 12 hourly for 10 days
- ▶ Treat partner

If partner pregnant

- ▶ Give **erythromycin** 500mg every 6hours for 14 days
- △ Do not incise bubo. Aspirate through normal skin with a large bore needle gauge < 20 every 2 days till resolution

15.16 WARTS

Cause

- Viral infection

Clinical features

- Usually light coloured umbilicated papules with irregular rough surface found on the face and genital areas

Differential diagnosis

- Rashes
- Eruptive skin lesions

Management HC4

- ▶ Apply **podophyllum resin** paint 15% to the warts 1-3 times weekly until warts have resolved which can require multiple weekly treatments
  - Apply precisely on the lesion avoiding normal skin
  - Wash off with water 2-4 hours after each application
- ▶ Treat underlying infection and advise on personal hygiene

If no improvement after 3 applications

- ▶ Refer for surgery

Note

△ Podophyllum resin paint (podophyllin paint): Protect normal skin with Vaseline® before application

Prevention

- Give health education about STI
- 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

16. OBSTETRIC AND GYNAECOLOGICAL CONDITIONS

16.1 ANTENATAL CARE (ANC)

The main objectives of antenatal care are:

- Prevention and treatment of any 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 4 routine visits as follows:

Antenatal Visit	Week of Pregnancy
1st	10-20
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 BP, 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

16.1.1.1 First antenatal visit (between weeks 10-20)

Goals

- 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
- Medical history
  - Include family history of HIV, diabetes, hypertension, TB, hereditary diseases, multiple pregnancy
  - Surgical history
- Obstetric and gynaelogical history
  - Record for each 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) by adding 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 = 12/02/2013

- Any problems encountered, for example, bleeding
- Contraceptive use
- Check for STIs
- Social history:
  - Smoking, (alcohol) drinking, drug use habits

Examination

- 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

Laboratory investigations

- Blood: For ABO, rhesus grouping, RPR (syphilis), Hb, RCT
- 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

Management of common complaints

(See table overleaf)

Health promotion

- Address any problems
- Involve husband in ANC
- 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 ITN
- 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
- Adequate hygiene
- Breastfeeding and breast care
- Discuss sexual activity during pregnancy, dual protection for FP/HIV
- Avoidance of smoking and alcohol

Management of common complaints

Complaint	Action	Remarks
Low back ache	Exclude UTI and local lesion. If none, reassure	Avoid unnecessary medication
Morning sickness (nausea & vomiting)	Reassure up to 3 months. If severe + dehydration, admit for observation	Avoid anti-emetics
Indigestion (flatulence & constipation)	High roughage diet, increase fluids. If severe, treat as constipation	Avoid strong laxatives & enemas
Excessive salivation (ptyalism)	Reassure	Avoid anticholinergic drugs
Food craving (pica)	Ensure balanced diet.	Discourage harmful materials, e.g. soil
Generalised pruritus	Reassure. If severe, treat as skin allergy/ urticaria	Avoid steroids
Vulval pruritus	Treat as for abnormal vaginal discharge,	Avoid douching with antiseptics
Cramps	Give calcium lactate 600mg 8 hourly for 5 days	Avoid giving NSAIDS
Fatigue	Reassure, bed rest	Avoid drugs

16.1.1.2 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
- 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])
- Date of first foetal movements and drainage of liquor

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

16.1.1.3 Third antenatal visit (between weeks 28-36)

Goals

- Check foetal growth
- Exclude anaemia
- Assess for signs of PIH
- 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

16.1.1.4 Fourth antenatal visit (after week 36)

Goals

- As for 3rd antenatal visit plus
- Exclude abnormal presentation/lie

History taking, examination, laboratory investigations, health promotion

- As for 3rd antenatal visit plus
- Lab test: Serology for syphilis

16.2 PREGNANCY AND HIV INFECTION

For general information on HIV, including clinical diagnosis, management, and psychosocial support, refer to specific HIV/AIDS guidelines.

16.2.1. Additional care for HIV positive women

Ensure the following additional care is provided during pregnancy, labour, delivery, and postpartum period to all HIV+ women

- Find out what she has told her partner, labour companion, and family support. Respect her choice and desired confidentiality.
- Use universal precautions as for all HIV patients
  - Training employees in handling and disposal of potentially infectious materials
  - Providing guidelines for prevention and control of infections within their facilities
  - Providing the necessary equipment and supplies for prevention and control of infections, e.g. educational materials, disposable gloves, disposable syringes and needles, and sharp bins
  - Monitoring mechanism to ensure Implementation of the prevention measures
- Revise the birth plan
  - Advise her to deliver in a health facility
  - Advise her to go there as soon as labour starts or membranes rupture
- Counsel on ARV treatment as appropriate
- Discuss infant feeding choice
- Give appropriate PMTCT medicines or refer for PMTCT
- Be sensitive to special concerns and fears
  - Give psychosocial 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

- Advise her that she is more liable to infections and to seek medical help as soon as possible for
  - Fever
  - Persistent diarrhoea
  - Respiratory infections, e.g. cough and cold
  - Burning urination
  - Vaginal itching or foul-smelling discharge
  - Severe weight loss
  - Skin infections
  - Foul-smelling lochia

During postpartum period

- Advise on the infectiousness of lochia and blood-stained sanitary pads and how to dispose off these safely according to local facilities
- If not breastfeeding exclusively, advise her to use a family planning method immediately
- Breast care: If not breastfeeding, advise as follows:
  - Breasts may be uncomfortable for a while
  - Avoid stimulating the breasts
  - Support breasts with firm well-fitting bra or cloth
  - Express just enough milk to make breasts comfortable
  - Advise to seek care if breasts become painful, swollen, red; if she feels ill; or has fever

16.2.2. Counselling on infant feeding choice

Special training is needed to counsel an HIV positive mother about this issue and to support the chosen method. Mothers should be referred to a suitable trained counsellor. However, if one is not available or the woman will not seek such help, counsel her as follows

Explain the risks of HIV transmission by breastfeeding and other risks by not breastfeeding

- 5% (1/20) of babies born to HIV positive mothers will be infected during pregnancy and delivery without ARV treatment
- Another 15% (3/20) may be infected by breastfeeding
- If the baby is exclusively breastfed, the risk may be reduced by keeping the breasts healthy
  - Mastitis and cracked nipples raise HIV infection risk
- The risk of not breastfeeding may be much higher because alternative feeding has its own risks
  - Diarrhoea: From use of unclean water, utensils, or stale milk
  - Malnutrition: From insufficient quantity, milk too dilute, or from recurrent diarrhoea
- Mixed feeding may also increase risk of HIV transmission and diarrhoea

If a woman has unknown or HIV negative status

- Counsel on importance of exclusive breastfeeding and encourage this
- Counsel on need to know HIV status and where to go for VCT
- Explain risks of HIV transmission:
  - Even in areas where many women have HIV, up to 70% of babies may be born HIV negative

If a woman knows and accepts that she is HIV positive

- Tell her about options for feeding, advantages, and risks
  - Exclusive breastfeeding then complementary feeding after 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)
- In some situations other possibilities are
  - Expressing and heat-treating mother's breast milk
  - Wet nursing by an HIV negative woman
- Help her to assess choices, decide on the best option, and then support her choice

If she chooses breastfeeding

- Give her special advice (see overleaf)

If she chooses replacement feeding

- Ensure she understands it includes enriched complementary feeding for up to 2 years. If this cannot be ensured, an alternative is exclusive breastfeeding, stopping early when replacement feeding becomes feasible
- All babies on replacement feeding need regular follow-up ,and all of their mothers need support to ensure correct use of this method

If mother chooses replacement feeding

- Ask her which kind of replacement feeding she chose
- For the first few feeds after delivery, prepare the formula for her then teach the mother how to do this and how to cup feed the baby:
  - Wash hands with soap and water
  - Boil the water for milk preparation for 5-10 minutes

  - Clean cup carefully with soap and water and if possible, boil or pour hot boiled water in it
  - Decide how much milk and water is needed from the instructions
  - Measure these amounts and mix well together
  - Allow the liquid to cool down
  - Teach mother how to feed baby by cup (8 times daily in the 1st month) and to be flexible and respond to baby's demands

If baby does not finish the feed within 1 hour of preparation

- Give it to an older child or add to cooking. Do **not** use for the next feed!
  - Wash utensils with soap and water soon after feeding
  - Make a new feed each time
- Give her written instructions on safe preparation of formula feeds
- Explain replacement feeding risks and how to avoid them
- Ensure regular follow-up visits for growth monitoring
- Ensure necessary support for safe replacement feeding
- Advise mother to return if baby
  - Is feeding <6 times/day or taking smaller amounts
  - Has diarrhoea
  - Has other danger signs

If mother HIV positive and chooses breastfeeding

- Give special counselling
- Support her in her choice
- Advise mother to breastfeed exclusively (i.e. not to give any other drinks or food) for the first 3-6 months

  - Breast milk is enough and best for young infants
  - Once the mother decides to stop breastfeeding, this should be stopped abruptly and completely, and suitable replacement foods started
- Ensure good attachment and suckling to prevent mastitis and nipple damage
- Advise her to return immediately if
  - Any breast problems
  - Any baby feeding problems
- Ensure a visit in 1st week to assess the above
- Arrange for further counselling to prepare for possible early stopping of breastfeeding
- Encourage correct condom use to prevent new HIV infection
- Give psychosocial support

16.3 ANAEMIA IN PREGNANCY

This is the most frequent and major complication of pregnancy.

Causes

- Complications such as premature labour, poor intrauterine foetal growth, weak uterine contractions in labour foetal hypoxia, postpartum haemorrhage, poor lactation, and postpartum sepsis, which can lead to death of either the baby or mother

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
- Evidence of heart failure such as engorged neck veins, dyspnoea, hepatomegally, ascites, gallop rhythm, and oedema

Investigations

- Blood
  - Hb (<10.5 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

Depends on degree of anaemia, duration of pregnancy (i.e. time available before delivery) and associated complications:

If severe anaemia (Hb ≤7g/dL)

- Refer patient to a well-equipped facility for further management

If Hb >7g/dL

- Give **ferrous salt (sulphate)** 200mg 3 times daily
  - The combination tablets with folic acid may be used
- Plus **folic acid** 5mg daily

If mother still anaemic at 36 weeks of gestation or at time of delivery

- Refer to a well-equipped facility for further management

- 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** 500mg single dose or **albendazole** 400mg in 2nd and 3rd trimesters; follow-up
- Treat cause as found from investigations
- Monitor the response to treatment by Hb estimation every 2 weeks. When giving iron tables, Hb should rise by 0.7-1.0g/dL/week
- Advise child spacing with an interval of at least 2 years

If patient has sickle-cell disease **RR**

- Refer to higher level for ANC and delivery

16.4 MALARIA IN PREGNANCY

Malaria complicates about 80% of all pregnancies in Uganda, which are associated with abortion, poor foetal mental development, premature labour, intrauterine growth retardation and foetal death, maternal severe 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.

Prevention and control of malaria in pregnancy

- Use of **insecticide-treated mosquito nets** (ITN) is the most cost-effective malaria preventive measure currently known. It reduces mosquito-human contact by barricading, repelling, or killing mosquitoes. These nets should be used even before the woman conceives,

throughout pregnancy, and thereafter with her newborn

- Give all pregnant women intermittent preventive treatment (IPTp) with **sulphadoxine pyrimethamine (SP)**
- If there is a history of allergic reaction to sulphonamide, do not give SP but emphasize use of the other available infection control options, especially the ITNs
- Give expectant mothers ferrous salt (sulphate) plus folic acid and mebendazole (or albendazole) for de-worming to complement SP in preventing maternal anaemia found in >60% of all those attending ANC
  - Delay folic acid for 1 week after administration of SP to avoid antagonism between the two drugs

Record keeping

- Keep proper records
- Provisions are included on the antenatal card for "IPT" provision, "net use"
- For overt malaria cases, make a record in the "Complaints" column
- Also record the information in the antenatal treatment book, summarise in the monthly return forms, and record in the delivery book when mothers come to deliver

Education messages to mothers and the community

- Malaria is transmitted by 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 less able to survive 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
- Simple, uncomplicated malaria can be easily treated if recognised early, but it is very important to complete the course of treatment in order to achieve a cure
- Severe complicated malaria needs special management, therefore refer cases immediately to higher levels

16.5 VAGINAL BLEEDING IN EARLY PREGNANCY/ ABORTION

This is always abnormal, and patients may need to be admitted or referred. The most common cause of bleeding in the first six months (<26 weeks gestation) is abortion, ectopic pregnancy, and sometimes abnormal periods. Abortion (miscarriage) occurs when the foetus is lost before 20 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)

Clinical features

- Depend on the cause and stage of the abortion

Threatened abortion

Little vaginal bleeding and may be no lower abdominal pain; pregnancy may still continue; uterus is of expected size by dates and cervix is closed

Inevitable abortion

Process irreversible; contractions (pain similar to labour pains) and bleeding; cervix may proceed to open

Complete abortion

All uterine contents have been passed out, little bleeding, cervix closed; uterus empty and reduced in size

Incomplete abortion

Uterine contents not completely passed out, bleeding sometimes with clots from the vagina (may be severe), severe lower abdominal cramps, cervix open, and products of conception may be felt in the cervical canal

Septic abortion

Incomplete abortion with infection (often criminal): Fever, offensive vaginal discharge, lower abdominal pain, and tenderness on palpating the abdomen

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

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

Habitual abortion

More than two consecutive, spontaneous abortions; usually associated with incompetent cervix

Differential diagnosis

- Pregnancy outside the uterus (ectopic pregnancy)
- Other causes of bleeding from the vagina, e.g. cancer
- Other causes of lower abdominal pain

Investigations

- Urine: Pregnancy test
- Ultrasound
- Blood: Complete count

Management **HC2**

Complete abortion

- Bed rest

If patient in shock **HC2**

- Resuscitate with IV fluids

If anaemic **HC4**

- Refer to HC4 for replacement of blood loss
- Treat anaemia

Threatened abortion

- Bed rest
- Abstain from sex for at least 14 days
- Observation

For pain

- **Paracetamol** 1g every 6-8 hours prn for 5 days

Incomplete abortion

- **Ergometrine** 1.0mg IM or IV stat or **misoprostol** 600 microgram orally or 400 microgram sublingual stat

If signs of infection

- **Amoxicillin** 500mg orally every 6 hours for 7 days

- Plus **metronidazole** 400mg orally every 8 hours for 7 days
- Refer to **HC4** for manual vacuum aspiration/ evacuation of uterus

Septic abortion

- Give 7-day course of **antibiotics** as in incomplete abortion (above)
- Evacuate the uterus

Missed abortion

- Refer to hospital

Molar abortion

- Resuscitate and give E**rgometrine** as in incomplete abortion (above)
- Refer to hospital for further management

16.6 PREMATURE RUPTURE OF MEMBRANES (PROM)

PROM is a rupture of membranes before the start of labour and can occur either when foetus is immature (preterm or <37weeks) or mature (term).

Investigation

The typical odour of amniotic fluid is diagnostic.
If membrane rupture is not recent or leakage is gradual, confirming the diagnosis may be difficult

- Place a vaginal pad over the vulva and examine visually and by smell after 1 hour
- Use a high-level disinfected speculum for vaginal 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

Do **not** do digital vaginal examination -
it does not help diagnosis and may cause infection

- If available, do tests:
  - Nitrazine test (may get false positive due to blood and some vaginal infections)
  - Ferning test (false negative common)

Management

If vaginal bleeding with abdominal pain (intermittent or constant)

- Suspect and treat as abruptio placentae (see 16.3016.30)

If signs of infection (fever, foul-smelling vaginal discharge)

- Give **antibiotics** as for Amnionitis

If no signs of infection and pregnancy <37 weeks (foetal lungs more likely to be immature)

- Give 7-day course of **antibiotics** to reduce maternal and neonatal infective morbidity and to delay delivery
  - **Erythromycin** 250mg every 8 hours
  - Plus **amoxicillin** 500mg every 8 hours
- Consider referral for special care of the newborn
- Give **corticosteroids** to the mother to improve foetal lung maturity: **dexamethasone** 6mg IM every 6 hours for a total of 4 doses
  - ✕ Do not use steroids in presence of infection
- Deliver at 37 weeks

If palpable contractions and blood- stained mucus

- *Suspect preterm labour*

If no signs of infection and pregnancy 37 weeks

If the membranes have been ruptured for >18 hours

- ▶ Give prophylactic **antibiotics** as above until delivery to help reduce neonatal group B streptococcus infection
  - **Ampicillin** 2g IV every 6 hours
  - Or **benzylpenicillin** 2MU IV every 6 hours

If no signs of infection after delivery

- ▶ Stop the antibiotics

If the membranes have been ruptured for <18 hours

- ▶ Assess the cervix

If the cervix is favourable (soft, thin, partly dilated)

- ▶ Refer to HC4 or above (with facilities for emergency obstetric management) for induction with **oxytocin**

16.7 AMNIONITIS

Infection of amniotic membranes/fluid before delivery.

Clinical features

- History of vaginal draining of liquor
- Labour for >48 hours
- Fever
- Foul-smelling vaginal discharge

Management

- ▶ Give a combination of antibiotics until delivery
  - **Ampicillin** 2g IV every 6 hours
  - Plus **gentamicin** 5mg/kg IV every 24 hours

If the woman delivers vaginally

- ▶ Stop antibiotics postpartum

If the woman has a Caesarean section

- ▶ Continue the above antibiotics and add **metronidazole** 500mg IV every 8 hours
  - Continue until 48 hours after fever has gone
- ▶ Assess the cervix and manage as in 16.13 "Care of mother and baby immediately after delivery" above

If <u>metritis</u> is suspected (fever, foul- smelling discharge)

▶ Give **amoxicillin** 500mg every 8 hours for 7 days

If patient allergic to penicillins

▶ Give **erythromycin** 500mg every 8 hours for 7 days

If newborn sepsis is suspected

▶ Arrange for a blood culture

▶ Give **antibiotics** as for Septicaemia

16.8 HYPEREMESIS GRAVIDARUM

Excessive vomiting during pregnancy.

Cause

- Not known but may be common in multiple and molar pregnancy

Clinical features

- May occur from the 4th week of pregnancy and could continue beyond the 12th week
- Patient may develop complications of excessive vomiting, such as vomiting blood and dehydration

Differential diagnosis

- Intestinal obstruction
- Other causes of vomiting
- Molar pregnance

Investigations

➢ Blood: Complete count, slide for malaria parasites

➢ Urinalysis: To exclude UTI

➢ Ultrasound scan: To detect molar or multiple pregnancies

Management

▶ Treat any dehydration **HC4**

▶ **Chlorpromazine** 25mg IM or orally every 6 hours prn

▶ Or **metoclopramide** 10mg IM or orallyevery 6 hours prn

- Or **prochlorperazine** 10mg orally every 8 hours prn

If vomiting severe **HC4**

- **Chlorpromazine** 25mg deep IM every 6 hours prn
- Or **prochlorperazine** 12.5mg deep IM followed by 10mg oral dose after 6 hours
- Or **metoclopramide** 10mg IV/IM every 6 hours prn
- **Vitamin B complex** 1 tab every 8 hrs for 7 days

For sedation **HC2**

- **Promethazine** 25mg IM or orally every 8 hours prn

If vomiting does not respond to the above treatment

- Refer to hospital for further management

16.9 ECTOPIC PREGNANCY

Pregnancy outside the uterus, usually in the uterine tubes; could result in an emergency.

Cause

- Partial blockage of the tube due to a previous infection
- Excessively long tubes

Clinical features

- Menstruation ceases 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 on palpation and could stop moving with normal breathing
- Tenderness of moving cervix during vaginal examination
- There may be signs of free fluid in the abdomen

Differential diagnosis

- Other causes of acute abdominal pain and vaginal bleeding, e.g. twisted ovarian cyst
- Appendicitis
- Abortion
- Pelvic inflammatory disease

Investigations

- Usually diagnosed clinically
  - If the tube ruptures, there may be little time for investigations but ultrasound could be useful (if patient not in shock)
- Pregnancy test (to exclude other causes)

Management HC3

▶ Set up **IV** drip with **normal saline** and run very slowly

Refer for definitive treatment, i.e. laparotomy and salpingectomy

16.10 ECLAMPSIA

Occurrence of fits after 20 weeks of pregnancy in a mother with no previous fits.

Clinical features

- Patient may or may not have had previous clinical features of severe pre-eclampsia
- Patient develops headache, blurring of vision, and sees aura (flickering lights before her eyes)
- Fits like an epileptic
- BP raised >140/90
- Oedema of legs and sometimes face and body
- Unconsciousness if condition not treated

Differential diagnosis

- Other causes of fits, e.g. cerebral malaria, meningitis, epilepsy, poisoning

Investigations

- Blood for
  - Hb
  - Malaria parasites
  - Urea, electrolytes
  - Clotting time
  - Fibrinogen levels

Management HC2

Aims at stopping convulsions and then delivering the baby

First aid

- Protect the airway by placing the patient on her left side
- Prevent patient from hurting herself, e.g. stop her from biting the tongue by using a padded spatula or airway
- Refer to hospital as soon as possible

When there are convulsions

- Start anticonvulsants with a loading dose of **magnesium sulphate** injection 50%
  - Dilute 4g (8mL) to 20mL total volume with water for injection
  - Give as slow IV bolus over 10-15 minutes
- Check respiration rate and patellar reflexes

If there are further convulsions

- Repeat the dose of **magnesium sulphate** as above

Note

- Magnesium sulphate is the first line recommended anticonvulsant in management of this condition.

However, if the drug is not available, use **diazepam** 10mg slow IV over 2 minutes as an alternative

If these are satisfactory

- ▶ Refer to HC4 for further management
- ▶ Continue loading dose with **magnesium sulphate HC4**
  - Use 10g (20mL of 50% solution)
  - Mix with 1mL of **lignocaine** injection 2%
  - Give 10.5mL of this mixture IM into each buttock
- ▶ Monitor BP, pulse, and respiration half hourly; pass indwelling Foley's catheter for continuous bladder drainage
- ▶ Monitor fluid balance

Only if the following are noted

- Patient passed 100mL urine or more over last 4 hours
- Respiratory rate is >16 per minute
- Patellar reflexes are present

- ▶ Give maintenance dose of **magnesium sulphate** 5g (10mL of 50% solution) deep IM every 4 hours
- ▶ Continue until 24 hours after convulsions have stopped

If BP is >110mm diastolic or >170mm systolic

- ▶ Give **hydralazine** 10mg IV bolus **HC4**
  - According to response, repeat **hydralazine** dose every 15 minutes until diastolic BP down to 100mm
  - Alternative if hydralazine not available: **Nifedipine** 20mg sublingually every 12 hours for 1-2 doses until delivery
- ▶ Monitor BP every 15 minutes until stable
- ▶ Deliver the baby within 6-12 hours by the quickest method once BP is controlled

Note

- ◆ Antidote for magnesium sulphate
- ▶ Give **calcium gluconate** 1-2g slow IV and repeat prn until rate increases if there is respiratory distress (rate <16 breaths per minute)

Prevention

- Regular attendance for antenatal care

16.11 SEVERE PRE-ECLAMPSIA

A hypertensive condition of pregnancy, which may result in maternal fits.

Clinical features

- Headache
- Epigastric pain, vomiting
- Blurring of vision
- Oedema (swelling of legs and other parts of the body)
- Diastolic BP 110
- Urine protein ++
- May be oliguria
- Excessive weight gain

Differential diagnosis

- Other causes of oedema and hypertension, e.g. renal disease

Investigations

- ➢ Urine: for protein
- ➢ Blood for:
  - Urea, uric acid, and electrolytes
  - Clotting time
  - Fibrinogen levels

Management

High BP in pregnancy should be managed at HC4 level or higher

If diastolic BP >95mm

- Refer the patient **HC2**

If patient has severe pre-eclampsia

- Set up **IV normal saline**
- Give loading dose of **magnesium sulphate**
- Refer as soon as possible to HC4 for further management (same as for Eclampsia)

16.12 OBSTRUCTED LABOUR

Failure of labour to progress despite good uterine contractions.

Causes

- Any failure of baby's descent down the birth canal
- Large baby
- Small or deformed pelvis
- Malpresentation: The presenting part of the foetus is not the head, e.g. breech presentation, arm
- Malposition: An abnormal position of the foetal head when this is the presenting part, e.g. occipito-posterior

Clinical features

- Contractions are strong but no evidence of descent of the presenting part
- Malposition or malpresentation may be felt on abdominal examination
- In late stages, the pains may stop when the uterus is ruptured or in a first delivery, they will just stop spontaneously

Management **HC2**

- Set up an **IV normal saline**
- Start 5-day course of antibiotics: **Amoxicillin** 500mg every 8 hours

► Or **erythromycin** 500mg every 6 hours
► Plus **metronidazole** 400mg every 8 hours
► Refer urgently to HC4 for further management

Prevention

- Careful monitoring of labour using a partogram

16.13 CARE OF MOTHER AND BABY IMMEDIATELY AFTER DELIVERY

Provide the following care for the first hour after complete delivery of the placenta:

- Constant attention
  - **Never** leave the mother and baby alone
  - Record any findings, treatment, and procedures in the Postpartum Record
- Monitor every 15 minutes

  Mother
  - Rapid assessment for danger signs
  - Feel if uterus is hard and round

  Baby
  - Breathing, warmth

If any complication in pregnancy or delivery:

- Temperature, BP, pulse

Care of mother

- Encourage mother to pass urine, eat, and drink
- Ask the companion to stay with her
- Assess amount of vaginal bleeding

If pad soaked in <5 minutes or constant trickle of blood

► Manage as "16.20 Postpartum haemorrhage" below

If uterus is soft

► Manage as "16.20 Postpartum haemorrhage" below

If bleeding is from perineal tear

► Suture if trained or refer for further management

Care of baby

- ▶ Apply an eye antimicrobial e.g. **tetracycline** eye ointment
  - Leave in place and do not wash it away
- ▶ Wipe off blood or meconium with wet cloth
  - Do not remove vernix or bathe the baby
- ▶ Keep baby warm with skin to skin contact

If feet are cold or mother and baby are separated

- ▶ Ensure room is warm
- ▶ Cover baby (and mother) with blanket
- ▶ Reassess after 1 hour

If breathing difficulty

- ▶ Examine the baby according to first newborn examination requirements, classify the condition, and treat accordingly

If baby is stillborn/dead

- ▶ Give supportive care
- ▶ Respect local customs
- ▶ Advise mother on breast care
- ▶ Counsel on appropriate family planning
- ▶ Advise on postpartum care and hygiene
- ▶ Provide death certificate and complete required reporting formalities
- ▶ Check, identity and give wrapped body to family for disposal/burial according to local customs

Breastfeeding

- Encourage mother to start this when baby seems ready
- Offer mother help to position/attach the baby if ready

If unable to start breastfeeding:

- ▶ Plan for alternative feeding method

△ Do not give artificial feeds before baby has initiated natural breastfeeding

△ Do not give (sugar) water or local feeds to the baby

16.14 NEWBORN RESUSCITATION

Start resuscitation within one minute of birth if baby is not breathing or is gasping for breath. Observe universal hygiene precautions to prevent infection.

- Keep the baby warm
  - 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
  - Suction first the mouth then the nose
- If still not breathing, VENTILATE
  - Form a seal with mask covering chin, mouth and nose
  - Squeeze bag 2-3 times
  - Observe chest

If not rising

  - Reposition head, check mask seal, squeeze bag harder
- Stop and look for breathing after 1 minute

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
- 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

If no gasping or breathing at all after 20 minutes of ventilation

- Stop ventilation

16.15 CARE OF NEWBORN FROM FIRST HOURS AFTER DELIVERY

Provide the following care up to the time of discharge:

Type of Care/Monitoring	Notes
Keep baby with mother - In bed or within easy reach	*If baby in cot*, ensure baby is dressed or wrapped/covered with blanket, head covered
Ensure room is warm (>25^{o}C) and has no draughts	Do **not** put baby in direct sun or on any cold surface
Advise/teach mother how to: - Keep the baby warm - Give cord care - Ensure hygiene	*If mother unable to take care of baby*, provide required care; Wash hands before and after handling baby; Do not bath baby <6 hours old
Support exclusive breastfeeding on demand, day and night,	If breastfeeding difficult: - Help mother to position and attach the baby

Type of Care/Monitoring	Notes
whenever baby wants	
Ask mother and companion to: - **Watch** the baby - **Report** breastfeeding or breathing problems, cold feet, bleeding from cord **Check every baby** at 4 and 8 hours then daily for: - Warm feet - Feeding - Breathing problems	If feet cold: - T*each mother* how to rewarm the baby; - R*eassess* in 1 hour; *if no improvement*, measure temperature and manage accordingly; *If breathing problem*: Assess and manage accordingly; *If cord tie loose/cord bleeding:* - - *If bleeding persists,* - refer urgently
Check any baby with warning signs at 2, 4, 8, and 12 hours: - Listen for grunting - Look for chest indrawing - Count breaths/minute - Measure temperature - Observe breastfeeding	Refer urgently if: - Breathing problem worsens or persists for >8 hours - Temperature <36.5^{o}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 baby <12 hours old

Type of Care/Monitoring	Notes
Examine baby before discharge Advise mother: - When to seek care - When to return if danger signs	Do **not** plan early discharge if: - Baby small (LBW or preterm) - Not feeding well

16.16 EXTRA CARE OF SMALL BABIES/TWINS IN THE FIRST DAYS OF LIFE

Provide the following care for small babies:

- Preterm up to 1 month early
- LBW <2,500g

Note

- Refer very small babies for specialized attention:
  - Very preterm >1 month early
  - LBW <1,500g

Type of Care/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 bath the baby - Clean prn with swabs or cloth
Give special support for breastfeeding - Assess daily	*If not breastfeeding well*: teach mother alternative feeding methods
Assess small baby daily:	*If breathing or breastfeeding*

Type of Care/Monitoring	Notes
- Measure temperature - Feeding progress, weight - Breathing	*problem or hypothermia:* Examine and manage accordingly; *If maternal concern:* Examine and manage the baby accordingly; *If breastfeeding problem persists >3days 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

16.17 ASSESSMENT FOR SPECIAL TREATMENT NEEDS, LOCAL INFECTION, AND JAUNDICE

Assess every baby as follows

- Check records, ask mother if special treatments/test given

- Mother tested RPR positive
- Mother started TB treatment <2 months ago
- Mother HIV positive

➢ Look, listen, feel
- Eyes: Swollen and draining pus?
- Umbilicus: Red and draining pus?
- Skin: Many or severe pustules? Swelling, hardness or large bullae?
- Palms and soles: Yellow? Blisters?
- Movements: Less than normal? Limbs moving symmetrically?
- Presenting part (head or buttocks): Swelling, bruising?
- Malformation?

Classify and manage as follows

Signs	Classify	Manage by / advise on
• Blisters on palms	CONGENITAL SYPHILIS	▶ Refer newborn urgently to hospital
• Mother tested RPR positive	RISK OF CONGENITAL SYPHILIS	▶ Give baby single dose **benzathine penicillin** 50,000 IU/kg ▶ Follow up every 2 weeks
• Mother started TB treatment <2 months before	RISK OF TB	▶ Give baby prophylaxis with **isoniazid** 5mg/kg daily for 6 months ▶ Vaccinate with BCG

Signs	Classify	Manage by / advise on
delivery		only after treatment completed ▶ Follow up every 2 weeks
• Mother known HIV positive	RISK OF HIV	▶ Counsel on infant feeding ▶ Special counselling if mother breastfeeding ▶ Follow up every 2 weeks
• Eyes swollen, draining pus	GONO-COCCAL EYE INFECTION	▶ Give **ceftriaxone** 25mg/kg plus **azithromycin syrup** 20mg/kg /day for 3 days ▶ Teach mother how to treat eye infection at home ▶ Assess and treat mother and partner for possible gonorrhoea ▶ Follow up in 2 days ▶ *If no improvement*: Refer urgently to

Signs	Classify	Manage by / advise on
		hospital
• Umbilical redness extending to skin or draining pus	SERIOUS UMBILICAL INFECTION	▶ Give **ampicillin** 50mg/kg IM* every 12 hours plus **gentamicin** 5mg/kg every 24 hours (4mg/kg if preterm) for 7 days ▶ Reassess after 2 days ▶ If not improved, refer
• Red umbilicus	LOCAL UMBILICAL INFECTION	▶ Teach mother how to treat at home ▶ Follow up in 2 days ▶ If not improved, refer
• Many/severe skin pustules/ bullae • Skin swelling, redness, hardness	SEVERE SKIN INFECTION	▶ Give **ampicillin** 50mg/kg IM* every 12 hours plus **gentamicin** 5mg/kg every 24 hours (4mg/kg if preterm) for 7 days ▶ Reassess after 2 days ▶ If not improved, refer

Signs	Classify	Manage by / advise on
• <5 pustules	LOCAL SKIN INFECTION	▶ Teach mother to how to treat infection at home
• Yellow palms and soles	SEVERE JAUNDICE	▶ Refer urgently ▶ Encourage breastfeeding - If breastfeeding problem, give expressed milk by cup

** give IM doses into thigh muscle*

16.18 NEWBORN HYGIENE

Eye care

At birth

- ▶ Wipe each eye with a separate clean cloth, cotton wool, or corner of the towel used to dry the baby
  - Apply **tetracycline** eye ointment 1% within 1 hour
  - Do not wash this away
- ▶ Explain to mother to seek care if eyes drain pus and not to apply anything into the eyes

Cord prophylaxis

- Wash hands before and after cord care
- Put nothing on the stump
  - 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

If umbilicus red or draining pus or blood

- ▶ Examine the baby and manage accordingly
  - Do not bandage the stump or abdomen
  - Do not apply anything to the stump
  - Avoid touching the stump unnecessarily

General baby care hygiene

- Use cloth on baby's bottom to collect stool
  - Dispose as for sanitary towels/pads and wash hands
- Wash the baby

At birth: Only remove blood or meconium

- Do **not** remove vernix
- Do **not** bath baby if cold or <6 hours old

Later and at home

- ▶ Wash the face, neck, and under arms daily
- ▶ Wash the buttocks when soiled and dry completely
- ▶ Bath when necessary using warm water
  - Ensure room is warm with no draughts
  - Dry completely, then dress and cover the baby

Note

- ◆ Small babies need specially careful attention
  - Wash hands before and after baby care

Keep baby warm during washing/bathing, and dry very carefully

16.19 PRE-DISCHARGE NEWBORN EXAMINATION

Use the following procedures to examine all newborn babies before discharge or if baby seen >12 hours of age as an out patient for routine, follow-up, or sick newborn visit

- ➢ Ask the mother
  - How old is the baby?
  - How is the baby feeding? How is breastfeeding going?

- 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?

If first visit

- 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?
- Abnormal or danger signs on previous examination?

➢ Look, listen, feel
- Observe a breastfeed: Is the baby able to attach?
- Suckling effectively?
- Well-positioned?
- Look for ulcers and white patches in the mouth (thrush)

If breast or nipple pain/discomfort

- Assess breasts
- Weigh if birth weight not known or to assess weight gain on a follow-up visit for a small baby or after an illness

➢ Check to see if the feet are cold

Classify and manage as follows

Signs	Classify	Manage by / advise on
• Feeding well • Weight >2,500g • No abnormal 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
• Receiving other foods/drinks or given pacifier • Breastfeeding <8 times/ 24hrs • Not well attached/not suckling well • Thrush • Poor weight gain	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 ▶ Follow up visit in 2 days, recheck weight ▶ If no improvement: Refer for breastfeeding counselling
• Preterm	SMALL	▶ Give special support to

Signs	Classify	Manage by / advise on
• Low birth weight (LBW) 1,500-2,500g • Twin	BABY	breastfeed small baby/twins ▶ Teach other feeding methods ▶ Teach mother how to care for a small baby ▶ Follow-up every 2 days and assess breastfeeding until feeding and growing well
• Mother very ill/receiving special treatments • Mother transferred	MOTHER UNABLE TO TAKE CARE OF BABY	▶ Consider other feeding methods till mother can breastfeed ▶ Ensure warmth using other methods ▶ Cord care and hygiene ▶ Monitor daily

16.20 POSTPARTUM HAEMORRHAGE (PPH)

Severe bleeding from the vagina following delivery

- Primary PPH occurs in the first 24 hours after delivery
- Secondary PPH occurs between 24 hours and six weeks after delivery

Causes

- Failure of uterus to contract or damage to/rupture of the perineum, vagina, or uterus
  - Tends to cause bleeding in the first 24 hours
- Precipitated labour
- Infection in the uterus

- Retained placenta

Clinical features

- Bleeding from the genital tract often >500mL
- The uterus may be still large, soft, and not contracted especially in primary PPH
- In secondary PPH, there may be signs of infection, e.g. fever, abdominal tenderness
- Check for signs of shock if bleeding severe or of any amount, which causes worsening of the patient's condition

Investigations

- If time (e.g. in secondary PPH), check blood: For Hb, clotting, grouping

Management HC3

- Establish and treat the cause of the bleeding; look for local causes if bleeding continues
- Check uterus to see if contracted
- Check if placenta has been expelled - if yes, expel any clots in the birth canal
- Ensure bladder is empty
- If bleeding not severe, rub uterus to stimulate contractions
- Start IV infusion
- Refer to HC4 level
- Restore blood volume
- Give **ergometrine** 500 micrograms slow IV or IM - single dose
- Or **oxytocin** 10-40 IU IV- single dose
- Where oxytocin or egometrine is not available or appropriate, then **misoprostol** 800 micrograms sublingually or 1000 microgram rectally

NB: Even if bleeding persists, never give repeat misoprostol

If the placenta is retained

- ▶ Carry out manual removal of the placenta under general anaesthesia, especially if bleeding is present
  - If this is not possible, refer for further management

If there is infection

- ▶ Give **antibiotics** as in Puerperal sepsis

Prevention

- Identify mothers at risk and manage accordingly
- Ensure active management of 3rd stage of labour and delivery by skilled staff
- ▶ 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 HC, retained placenta, instrument delivery:
- ▶ **Amoxicillin** 500mg every 8 hours
- ▶ Or **erythromycin** 500mg every 6 hours
- ▶ Plus **metronidazole** 400mg every 8 hours

16.21 RETAINED PLACENTA

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
- 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)
- The uterus may be poorly contracted and high in the abdomen
- *If the placenta is retained >24 hours*: May be signs of infection, e.g. fever, unpleasant bloody discharge

Differential diagnosis

- Retained second twin

Investigations

➢ Blood: Hb, grouping and cross-matching

Management

▶ Set up IV **normal saline** infusion
▶ **Amoxicillin** 500mg every 8 hours for 7-10 days
▶ Or **erythromycin** 500mg every 6 hours for 7-10 days
▶ Plus **metronidazole** 400mg every 8 hours for 7-10 days

If bleeding

▶ Give **ergometrine** 250-500 micrograms IM - single dose
▶ Or **oxytocin** 10 IU, IV or IM single dose
▶ Try controlled contraction

If this fails

▶ Refer to HC4 for further management

16.22 POSTPARTUM CARE

- Counsel patient on contraception
- Provide appropriate method if required
- Advise mother to abstain from sexual activity for at least 6 weeks after birth
- Check if mother and baby are sleeping under insecticide-treated bed-net, encourage this if necessary
  - Baby should always sleep under a net, day and night
- Advise mother on when to seek care as follows:

Routine postpartum visits

1st visit: Within 1st week (ideally within 2-3 days)

2nd visit: Within 4-6 weeks

Follow-up visits:

Nature of problem	Return after
Fever, lower UTI	2 days
Urinary incontinence	1 week
Hypertension, anaemia, bleeding, vaginal infection, HIV/AIDS signs, depression	2 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); convulsions; fast or difficult breathing; fever; too weak to get out of bed; severe abdominal pain	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**

- Discuss with mother how to prepare for any postpartum 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
- Discuss with mother newborn hygiene and other baby care
  - Let baby sleep on the back or side
  - 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

Advise mother to return with the baby as follows

Routine Visits	Return At
Postnatal visit	Age 3-7 days
Immunization visit (note: BCG and Polio 0 are given at birth)	Age 6 weeks
Follow-up visits	
Type of problem found on examination:	Return In
• Feeding problem • Red umbilicus • Skin infection • Eye infection • Thrush	2 days

• Mother has: Breast engorgement mastitis	
LBW: - First week of life - Not yet gaining weight	2 days
LBW and: - >1 week old - Gaining weight	7 days
• Mother is HIV positive • Mother is RPR positive • Orphan baby • INH prophylaxis against TB	14 days

Advise mother to seek health care for the baby as follows

Signs	Action to Take
• Difficult breathing • Convulsions • Fever • Baby becomes cold • Bleeding • Diarrhoea • Becomes more ill after being seen by birth attendant	Seek health care **immediately**, day or night
• Feeding problems • Feeds <5 times in 24 hours • Pus from eyes or cord or skin pustules • Yellow skin and eyes • Swollen limb or joint	Return to health facility **as soon as possible**

16.23 OBSTETRIC FISTULA

Obstetric fistula is a hole in the birth canal and is one of the major causes of maternal mortality and morbidity making the women suffer from constant urinary incontinence which can lead to skin infections, kidney disorder or death if left untreated.

Cause

- Obstructed labour

Clinical features

- History of risk factors
- History of uncontrolled leakage of urine or faeces

Differential diagnosis

- Stress incontinence
- Urge incontinence
- Ureterovaginal fistula (UVF)
- Overflow incontinence

Investigations

- Confirmed by dye test on pelvic examination/speculum examination, and/or EUA

Management

Immediate management

- ▶ Catheterize the bladder for 3-4 weeks if fistula is diagnosed within one month
- ▶ Recommend increase in fluid intake up to 5 litters a day
- ▶ Sitz or salt baths twice daily to help the perineum to heal
- ▶ Determine time of surgery after careful clinical assessment

Pre-operative assessment of the patient

Perform: Detailed history, clinical assessment (general and genital), full haemogram, blood group, HIV serology (mandatory), renal and liver function, stool analysis, ultrasound scan, IVP, cystoscopy, urethroscopy (optional) and interpret results, patient counselling and informed consent, and enema (optional for VVF and essential for RVF). Administer antibiotics for prophylaxis (optional).

Basic surgical steps and principles

Surgical principles (all approaches and techniques used in fistula repair share the same principles), but there is need to individualize cases

- Surgical approach (vaginal or abdominal)
- Patient position (exaggerated lithotomy, knee-chest)
- Type of sutures(Vicrl 0,2/0,3/0,4/0)
- Need for adequate light
- Specific instruments
- Incise or dissect around the edge of the fistula looking for ureteric orifices
- Mobilize the bladder and trim the edge of the fistula as necessary
- Close the fistula without tension in one or two layers
- Introduce an indwelling catheter (14F-18F) and perform a dye test to check closure and reveal any missed fistulae
- Measure the length of the urethra and bladder and record values
- Close the vaginal mucosa
- Check urethral catheter patency
- Apply vaginal pack (optional)
- Removing ureteric catheters if present and indicated

Post operative care

Immediate

Take patient vital signs, manage pain, watch for bleeding, ensure proper catheter drainage, ensure high fluid intake (5L), record fluid input and output

Intermediate

Take vital signs, remove vaginal pack if present 24-72 hours after placement, irrigate the ureteric catheters if necessary, and remove them 3-7 days after placement. According to surgeon preference, remove urethral catheter 7-28 days after placement and according to surgeon preference, encourage the patient to drink 3-5L of fluid per day, eat normally, walk and exercise while in bed, and attend physiotherapy as required

At discharge

Consider performing dye test, perform discharge assessment and give advice and counselling on use of family planning, coitus, when she gets pregnant, and delivery time. Provide counselling with emphasis on couple counselling after repair, support from immediate family members and the community, physical rehabilitation, referral to social and health services, and income generating support organizations

Prevention

- When labour is prolonged or obstructed, insert urethral catheter to drain the bladder for about 7 days. With this measure alone, fistula can be prevented or cured in up to 20% of cases
- 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

16.24 MASTITIS

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

Clinical features

- Pain in the breast, which is swollen, often shiny, and tender with enlarged veins
- Fever
- May proceed to become an abscess (see below)

Differential diagnosis

- Breast engorgement

Investigations

➢ Breast milk: For C&S

Management HC2

▶ Stop breastfeeding on the affected breast
▶ Apply hot compresses to relieve pain in affected breast
▶ Express milk to avoid breast engorgement
▶ Continue breastfeeding on the normal breast
▶ Treat the baby if thought to be the source of infection

If the infected breast improves

▶ Restart breastfeeding on it

If there is pain

▶ Give **acetylsalicylic acid** 600mg every 8 hours prn
▶ Plus **gentamicin** 4-7mg/kg IV once daily

► or **erythromycin** 500mg every 6 hours for 10-14 days

Prevention

Manage breast engorgement if not breastfeeding or lost baby: Suppress lactation, do not express milk, wear a tight bra

16.25 PUERPERAL SEPSIS

Infection of the female internal genital tract within 6 weeks of childbirth or abortion.

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*

Clinical features

- Persistent fever >38°C
- Pain in the lower abdomen
- Persistent bloody/pus discharge (lochia) from genital tract, which may have an unpleasant smell
- Tenderness on palpating the uterus

Differential diagnosis

- Other causes of fever after childbirth, e.g. malaria, UTI, DVT

Investigations

- Thorough systemic examination to exclude other causes of fever
- Abdominal examination for tenderness and uterine size
- Vaginal examination: To rule out retained products
- Blood: Complete count, C&S, malaria parasites
- Lochia: C&S

➢ Urine: For protein, sugar, microscopy, C&S

Management **HC4**

Parenteral antibiotic therapy

- **Ampicillin** 500mg IV or IM every 6 hours
- Plus **gentamicin** 5-7mg/kg IV or IM daily in 2 divided doses (every 12 hours)

If fever persists for >48 hours

- Add **metronidazole** 500mg IV every 8 hours for at least 3 doses

After clinical improvement

- Continue antibiotics until cured (usually 7-10 days), switch to **metronidazole** 400mg orally every 8 hours
- Plus **amoxicillin** 500mg every 8 hours
- Continue antibiotics until cured (usually 7-10 days)

Supportive/additional therapy

- Give IV fluids
- Give analgesics
- If anaemic, transfuse with blood
- Look for retained products and evacuate uterus if necessary

Caution

△ **Metronidazole**: Avoid strictly use of alcohol during treatment

Prevention

Use of clean delivery kits or just ensuring clean deliveries

16.26 RUPTURED UTERUS

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
- Damage to uterus due to a blow, e.g. kick or accident
- Oxytocic herbs

Clinical features

- Labour pains have stopped
- 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: Hb, grouping and cross-matching

Management

▶ Set up IV **normal** saline infusion
▶ **Amoxicillin** 500mg every 8 hours
▶ Or **erythromycin** 500mg every 6 hours
▶ Plus **metronidazole** 400mg every 8 hours
▶ Give oxygen
▶ **Refer to hospital immediately**

Caution

✕ Do not attempt fundal pressure

16.27 ANTENATAL & POSTNATAL MEDICATION

In general, try to 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.

- Ensure adequate nutrition and consumption of foods with iron (meat, fish, beans, and many vegetables) and folate (green vegetables, fruits, liver, and yeast)
- Check for and treat any anaemia
- ▶ Check on **tetanus toxoid (TT)** immunization status and vaccinate if required

At second antenatal visit

- ▶ De-worm with **mebendazole** 500mg single dose (or **albendazole**)

Throughout pregnancy

- ▶ **Ferrous salt (sulphate)** + **folic acid** 200mg + 400 microgram once daily to prevent iron and folate deficiency and **multivitamins**: one tablet 3 times daily
- ▶ Intermittent preventive treatment of malaria (**IPTp**): **SP** single dose (3 tabs) in 2nd and 3rd trimesters
  - Give first dose between weeks 16-24
  - Give second dose between weeks 28-36
  - *In HIV positive patients:* Give **IPTp** on **three** occasions between weeks 16-36 with at least 4 weeks between doses

After delivery

- ▶ **Vitamin A** (retinol) 200,000 IU single dose
  - Ideally day 2 after delivery or at any time during the first 2 months after delivery

- **Iron/folic supplementation**: Ensure mother has 3 months' supply of **ferrous salt (sulphate) + folic acid** and give counselling on compliance
- Syphilis: Check RPR status in records
  - If no RPR in pregnancy then do RPR test
- If positive: Treat woman and partner with **benzathine penicillin** 2.4 IU single dose
- Treat the newborn with **benzathine penicillin** 50,000 IU/kg single dose

16.28 HIGH RISK PREGNANCY (HRP)

This is a pregnancy with a higher risk of an adverse outcome for the mother or baby, e.g. abortion, intrauterine death, still birth, prematurity, other morbidity or mortality. However, any pregnancy involves a level of risk.

High risk criteria: history or current

- Extremes of reproductive age: <18 and >35
- Primigravida: Especially if too young, short, or old
- High parity: 5+ or short birth interval
- Large infants: 4kg and over
- Prematurity: Low birth weight (LBW) <2.5kg
- Obstructed and difficult labours
- Poor obstetric history, e.g. stillbirths, neonatal deaths, abortions, caesarean section
- History of reproductive tract surgery, e.g. VVF repair (ruptured uterus)
- Genetic or familial diseases
- Medical conditions: Diabetes, cardiac, renal, hypertension, rhesus, those with disabilities, those with obstetrical risks, e.g. multiple pregnancy, malpresentations, etc.

- APH, PPH, DVT, IUGR
- PROM, post dates, CPD

Management **HC4**

► Refer the patient to HC4 for further HRP management

Principles of management

- Identification of high risk cases
- 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
- Timely intervention for therapy and delivery

16.29 BREAST ABSCESS

Bacterial infection of the breast with collection of pus.

Cause

- *Staphylococcus aureus* most common

Clinical features

- Breast is hot, swollen, painful, and very tender
- Skin is red and shiny
- Firm lump, felt initially but may later fluctuate

Investigations

- Pus: For C&S

Differential diagnosis

- Breast cancer
- Other breast lumps

Management HC4

► Incision and drainage under general anaesthesia

► Dress the wound

- Give **gentamicin** 5-7mg/kg IV in divided doses daily for 5 days (contraindicated in pregnancy)
- Or **erythromycin** 500mg every 6 hours for 5 days
- Give **paracetamol** 1g every 6 hours to treat pain
- Breastfeeding: Handle as in "Mastitis"

Prevention

- Frequent emptying of the breast

16.30 ANTEPARTUM HAEMORRHAGE (APH)

Vaginal bleeding occurring after the 28 weeks of pregnancy and up to 2nd 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

Clinical features

Placenta Praevia	Abruptio Placentae
• Painless	• Severe pain
• Foetal movements usually present	• Loss of foetal movements common
• Open bleeding from the vagina	• Open bleeding may be absent; only serous fluid in some cases (bleeding is behind the placenta)
• Shock and anaemia if bleeding is heavy	• Shock and anaemia, even when no open bleeding
• Uterus soft and not tender	• Uterus hard and tender

• 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 usually heard	• Foetal heart often absent

Differential diagnosis

- Ruptured uterus especially in a patient with previous Caesarean section
- Local causes, e.g. cervical cancer

Investigations

- Take a good history and do a careful examination
- Ultrasound: To find the site of the placenta
- Blood:
  - Grouping, cross-matching
  - Haemoglobin, fibrinogen levels
  - Clotting time

Management

- Set up IV **normal saline** infusion
- Refer for further management **RR**

16.31 DYSMENORRHOEA

Painful menstruation.

Causes

- Not known

Clinical features

- Severe lower abdominal pain just before the period which could continue during the period

Differential diagnosis

- Endometriosis
- Other causes of lower abdominal pain

Management HC2

- ▶ Give NSAID medicines like **ibuprofen** 200-400mg every 8 hours as required
- ▶ Review the patient after 5 days
- ▶ If no response or if recurrent, refer for specialist management

16.32 PELVIC INFLAMMATORY DISEASE (PID)

Infection (usually ascending from the vagina) occurring in the uterus, ovary, or uterine tubes.

Causes

- *Gonococcus (Neisseria gonorrhoea)*
- *Chlamydia trachomatis*
- Mycoplasma
- Gram-negative bacilli, e.g. *Escherichia coli*

Clinical features

- Pain in lower abdomen
- Vaginal discharge; could be smelly and mixed with pus
- Tenderness on palpating the lower abdomen
- Swellings may be felt if there is pus in the tubes or pelvic abscess
- Vaginal examination will produce tenderness when the cervix is moved

Differential diagnosis

- Cancer of the cervix
- Bladder infection
- Ectopic pregnancy

Investigations

- Speculum examination
- Pus swab: For C&S
- Ultrasound (if available)

Management HC4

- **Ceftriaxone** 1g IM stat then give **cefixime** 400mg orally in 2 divided doses for 3 days
- Plus **doxycycline** 100mg orally 12 hourly for 14 days
- Plus **metronidazole** 400mg twice daily orally for 14 days
- Treat sexual partners as for urethral discharge syndrome

Caution

△ Avoid alcohol: Increases nausea caused by metronidazole

△ Remove any IUD 2-4 days after commencing treatment

△ Avoid sex during menstrual period and for 6 weeks after an abortion

17. MUSCULOSKELETAL AND JOINT DISEASES

Treatment of all of these conditions should start at HC4 level or higher where there is a qualified medical officer. Lower levels should only carry out clinical diagnosis before urgently referring for management

- Diseases of the musculoskeletal system present mainly with pain and stiffness
- Rheumatic diseases cause physical impairment and disability (30%) in the community
- Most rheumatic disease require symptomatic treatment of pain

Cause of joint disease

- Infections
- Inflammatory disorder
- Degeneration disorders

17.1 PYOGENIC ARTHRITIS (SEPTIC ARTHRITIS)

An inflammatory lesion affecting a joint, mainly affecting children

Causes

Usually haematologenous spread from a primary focus following bacteremia, e.g. septic skin lesions, sinustic, throat infections, abrasions, wounds, pressure sores, and osteomyelitis

- *Staphylococcus aureus*
- Gram negative bacilli, e.g. *Salmonella spp*
- *Streptococcus spp*

Clinical features

- Fever: Neonates may not show this but refuse to feed
- Jaundice (e.g. yellow eyes)

- Dehydration
- General malaise
- Swelling of joint
- Severe pain
- Reduced or abolished movement, temporary loss of limb function (pseudoparalysis)
- Localised heat and tenderness

Differential diagnosis

- Inflammatory joint disease (instead of other causes)
- Intra articular haemorrhage, e.g. haemophilia and other bleeding disorders
- Trauma
- Sickle-cell arthritis
- Other causes of joint swelling
- Osteomyelitis of neighbouring bone

Investigations

- X-ray: Affected joint and similar opposite joint (for comparison)
- Blood: Haemogram, C&S, ESR (usually elevated)
- Joint fluid: Aspirate for C&S; if fail to get pus by aspiration, use arthrotomy (in theatre)
- Joint fluid: Gram stain

Management **HC4**

- Admit the patient
- Immobilise the affected limb leaving the joint free
- Aspirate/drain the joint
  - Repeat daily prn until no further pus obtained
- Give an NSAID such as **indomethacin** or **diclofena** for 3 days

Initial empirical antibiotic therapy

- **Gentamicin** 2.5mg/kg IV every 8 hours or 4-7mg/kg once a day

When acute phase is over/ clinical improvement occurs

- Change to **cloxacillin** 500mg every 6 hours before food to complete the course
  Child up to 2 years: 125mg/dose
  Child 2-10 years: 250mg/dose
- Continue for at least 3 weeks after inflammation gone
- Modify antibiotic therapy as necessary according to the results of C&S of the joint aspirate
  - Alternative antibiotic in adults for pathogens other than *S.aureus*: **Ciprofloxacin** 500mg every 12 hours for at least 3 weeks
    - Continue until patient improves

Child (for sedation)

- Give **diazepam** 2.5-5mg rectally
  - Repeat prn after 30 minutes

Salmonella arthritis

- **Chloramphenicol** 500mg every 6 hours for 14 days
  Child: 12.5mg/kg per dose
- Other management as above

Notes

- In some cases, especially adults with infection due to *S.Aureus*, repeated aspiration or surgical washout of the joint may be necessary in addition to appropriate antimicrobial therapy.

17.2 RHEUMATOID ARTHRITIS

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

- Articular manifestations
- Extra articular manifestations
  - Rheumatoid nodules (20%) at extensor surface like forearm below joint
  - Anorexia
  - Weight loss
  - Muscle wasting
  - Ocular and cardiac effects
  - Neurological effects may also occur
- Typically attacks hand joints, especially metacarpophalangeal
- Pain in affected joints
- Moderate increase in local heat
- Swelling with some joint effusion
- Mainly synovial membrane thickening
- In chronic cases, joint deformities may occur

Differential diagnosis

- Osteoarthrosis
- Gouty arthritis (in males)
- Reactive arthritis

Investigations

- X-ray: Of affected joint/s
- Blood: Haemogram, ESR, rheumatoid factor, antinuclear factor

Management HC4

Goals of treatment

- Relief of symptoms

- Preservation of joint function
- Suppression of active and progression of disease (prevent of structure damage and deformity)
- Maintenance of patient's normal lifestyle

General treatment

- Physical rest
- Anti inflammatory medicines
- Physical therapy

NSAIDS: Provide symptomatic relief but does not modify the disease

Simple analgesics: For simple pain relief

Corticosteroids: Very potent anti inflammatory activity

Medicines that suppress the disease process: (2nd line, disease modifying) require special management

- Antimalarials, e.g. chloroquine
- Sulphasalazine
- Methotrexate
- d-penicillamine
- Gold (parenteral)

Indications for disease modifying medicines

- Persistent symptoms and signs of inflammatory arthritis
- Evidence of progressive radiological damage
- Troublesome extra articular manifestations

▶ **Acetylsalicylic acid** 1.2g after food every 8 hours until symptoms are relieved, combined with **omeprazole** 20mg once a day when patient experience serious gastrointestinal intestinal discomfort

▶ Or **indomethacin** 50mg as above

▶ Or **diclofenac** 50mg as above

✕ Contraindicated in patients with peptic ulcer

- Refer for specialist management

If patient does not respond

▶ Refer for specialist management **RR**

17.3 GOUT ARHTHRITIS

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
- Attacks mostly the big toe at the metatarsophalangeal joint (podagra), occasionally may start in other joints
- Sudden severe pain (often at night)
- Lumps under the skin (tophi) in soft tissues, e.g. the ear
- Differential diagnosis: Pseudo gout

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

Investigations

➢ Joint aspiration uric acid crystals viewed by a polarizing microscope

➢ X-ray: Of the joint/s

➢ Blood: Serum uric acid (usually elevated)

Management HC4

Acute attacks

Non steroidal anti inflammatory medicines (NSAIDS)

- ▶ **Indomethacin** 50mg every 4-6 hours for 24-48 hours, then 25-50mg every 8 hours for the duration of the attack
- ▶ Or **colchicine** 500 microgram - 1mg initially, followed by 500 microgram every 2-3 hours until relief of pain, or vomiting or diarrhoea occurs. Maximum total dose is 6mg over 4 days
- ▶ Or **diclofenac** 25-50mg every 8 hours after food
- ▶ Rest the joint
- ▶ Control the diet

△ Avoid acetylsalicylic acid

△ Avoid diuretics

△ Do not treat with allopurinol or uricosuric medicines

Chronic gout

- ▶ **Allopurinol** initially 100mg daily after food then increase by 100mg weekly according to plasma or urinary uric acid levels to daily maintenance dose of 100-900mg depending on the severity of the condition
  - Average dose: 300mg daily
  - Give daily doses totalling >300mg in divided doses
  - ✕ Allopurinol: Do not use for treating acute attacks of gout or for treating asymptomatic hyperuricaemia. Do not start the medicine within 1 month of an acute attack
- ▶ Use prophylactic **colchicine** 500 micrograms every 12 hours 2-3 days before starting allopurinol. Continue for

at least 1 month after the hyperuricaemia has been corrected (usually about 3 months therapy is required).

If an acute attack starts during treatment of chronic gout

► Treat this in its own right while continuing the therapy for the chronic condition

Prevention

- Avoid eating red meat, especially if roasted
- Avoid drinking alcohol
- Weight reduction

17.4 OSTEOARTHRITIS

A joint disease usually affecting obese adults >40 years.

- Commonest form of joint disease
- Characterized by the degeneration of articular cartilage and simultaneous proliferation of new bone, cartilage, and connective tissue
- Pathological changes in osteoarthrosis are irreversible

Causes

- Previous injury
- Previous joint inflammatory
- Over weight

Clinical features

- May involve any joint; most common in the hip, spine, and knees
- Restriction of movement, pain on moving the joint but tends to be absent at rest; limp in case of lower limbs
- Swelling, deformity
- No accumulation of joint fluid

Differential diagnosis

- Gout; gouty arthritis
- Rheumatoid arthritis

Investigations

- Normal blood count and ESR
- X-ray: Of the joint/s

Management **HC4**

Goals of treatment

- Patient education
- Pain relief
- Optimazation of function
- Minimize progression

General measure

- Weight reduction
- Encourage activity and regular exercise
- Use of appropriate foot wear and walking aids

Drug treatment

- Adequate doses of simple analgesics e.g. **paracetamol** 1 g 6 hourly
- Topical preparation (**NSAIDS**)
- NSAIDS: Only in acute exacerbation or severe pain (review their continued use)
- Intra articular corticosteroid injections (specialist)

▶ **Indomethacin** 25-50mg every 8 hours
  - Continue until pain is relieved

If lower limb is involved

▶ Provide a walking aid for the patient
  - This should be held on the opposite side to the affected limb

▶ Range of motion exercises

If no response (i.e. if cannot walk >100m without pain)

▶ Refer for specialist management **RR**

Note

- Other non-steroidal anti-inflammatory medicines (NSAIDS) may be used instead of indomethacin. See management of somatic pain under "Nociceptive or somatic pain".

Caution

△ Indomethacin: Contraindicated in peptic ulcer
△ Indomethacin gives more serious side effects compared to **diclofenac** and **ibuprofen**

17.5 OSTEOMYELITIS

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

Clinical features

- Onset is usually sudden
- 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
- May also be swelling of the neighbouring 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

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
  - C&S: Type of bacterium may be detected
  - Cell count: Shows increase in neutrophils (neutrophilia)

Management HC4

If skin abscess has formed

- Incision and drainage of pus in theatre followed by C&S
  - Usually requires at least 4-6 weeks of mostly parenteral therapy

Acute osteomyelitis

- Admit the patient; this is an emergency condition
- Immobilise and elevate the leg, leaving the affected area visible for constant monitoring
  - Drill the infected bone in order to drain pus from the abscess, and reduce intraosseous pressure
  - With the knee, use arthrotomy
- Give **antibiotics**; same as for Septic Arthritis

- Monitor response using temperature; when this falls, switch to oral antibiotics
- Continue prn for up to 3 months

▶ Give **paracetamol** or NSAID e.g. **indomethacin**
Child (for sedation)

▶ Give **diazepam** 2.5-5mg rectally
- Repeat prn after 30 minutes

Note

◆ In children, cellulitis may be a complication or differential diagnosis, which is often missed. If diagnosed, it should be treated in the same way as Acute Osteomyelitis.

17.6 PYOMYOSITIS

Inflammation of muscle, which may lead to pus formation and deep-seated muscle abscess.

Causes

- Bacterial infection (commonly *Staphylococcus aureus*)
- Trauma

Clinical features

- Most commonly localised in one muscle; usually large striated muscle
- History of trauma
- Fever
- Painful swelling of the involved muscle
- Affected area is hot, swollen, and tender
- Fluctuation when pus forms

Differential diagnosis

- Cellulitis
- Boils
- Osteomyelitis

- Peritonitis (in pyomyositis of abdominal muscles)
- Consider HIV infection

Investigations

- Blood: Full count, C&S
- Pus: C&S

Management **HC4**

- Elevate and immobilise affected limb (where relevant)
- Check frequently for pus formation
- **Cloxacillin** 2g IV or IM every 6 hours for 5-10 days
  Child: 12.5-25mg/kg per dose

As soon as pus localises:

- Carry out surgical incision and drainage of the abscess
  - Leave the wound open

Once clinical improvement occurs:

- Change to **cloxacillin** 500mg every 6 hours before food to complete the course
  Child up to 2 years: 125mg per dose
  Child 2-10 years: 250mg per dose

Alternative antibiotic:

Only to be used if above medicines not available:

- **Chloramphenicol** 500mg every 6 hours for 5-10 days
  Child: 12.5mg/kg per dose

17.7 TUBERCULOSIS OF THE SPINE (POTT'S DISEASE)

Most common form of skeletal TB, which often causes complete destruction of the intervertebral disc with partial destruction of two adjacent vertebrae that is most marked anteriorly. The destruction may involve a single or multiple spinal segments of dorsal spine (75%), cervical spine (<10%), or (rarely) lumbar spine.

Causes

- A chronic infection caused by Mycobacteria

Clinical features

- Most common in young adults
- Back stiffness due to muscle spasms
- Anterior collapse of affected vertebrae leads to visible deformity (angular kyphosis or gibbus)
- Localised tenderness, localised abscess
- Weakness of legs
- Visceral dysfunction
- In thoracic spinal TB: Pus formation produces a paravertebral abscess
- In lumbar spinal TB: Pus tracks along the iliopsoas muscles and points in the groin
- In thoracic or thoraco-lumbar spinal TB: Spinal cord involvement results in (Pott's) paraplegia
- Signs of spinal cord compression (Pott's paraplegia) or nerve root lesion

Differential diagnosis

- Staphylococcal spondylitis
- Brucellosis
- Metastatic lesion

Investigations

- Adequate history and careful examination
- X-ray spine shows
  - 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
  - Expanding inflammatory mass
- Blood

- WBC (within normal limits),
- Lymphocyte:monocyte ratio is approx 5:1
- ESR = 25mm/hr (Westergreen method)

➢ Skin tuberculin test (not specific)

➢ Tissue biopsy
- ZN staining of aspirate
- For needle aspirate guided by fluoroscopy, open biopsy and guinea pig inoculations, refer to regional referral hospital

Management **HC4**

▶ Rest the spine

▶ Fit a **spinal corset** or **plaster jacket** for pain relief

All patients (see "Tuberculosis" for explanation of medicine regimes)

▶ 2 SHRZ / 7 HR

Alternative regime:

▶ 2 EHRZ / 7 HR

If patient has progressive paraplegia despite adequate conservative treatment:

▶ Refer for specialist surgery to regional or national referral hospital

18. MISCELLANEOUS CONDITIONS

18.1 ANAPHYLACTIC SHOCK

Acute hypersensitivity reaction.

Cause

- Allergy to pollens, some drugs (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

- Sudden collapse
- Hypotension
- Excessive sweating
- Thin pulse

Differential diagnosis

- Other causes of shock, e.g. bleeding, severe dehydration

Management HC2

- ▶ Determine and remove the cause
- ▶ Keep patient warm
- ▶ Secure the airway
- ▶ Restore the BP: Lay the patient flat and raise the feet
- ▶ **Adrenaline (epinephrine)** injection 1 in 1000 (1mg/mL) 0.5-1mg IM
  - Repeat initially (several times if necessary) every 10 minutes according to BP, pulse rate, and respiratory function until improvement occurs
    Child: see dose table below
- ▶ Administer 100% **oxygen**
  - This is of prime importance

Child adrenaline doses for IM injection

Age (years)	Volume of adrenaline 1mg/mL	
	Normal	Underweight
<1	0.05	0.05
1	0.1	0.1
2	0.2	0.1
3-4	0.3	0.15
5	0.4	0.2
6-12	0.5	0.25
> 12	0.5-1	0.5-1

Note:

- Adrenaline: IM is the route of choice
  - Absorption is rapid and more reliable than SC

- Give an **antihistamine** as useful adjunctive treatment, e.g. **promethazine** 25-50mg by deep IM or slow IV (give <25mg/min as a diluted solution of 2.5mg/mL in water for injections, max: 100mg)
  Child 1-5 years: 5mg by deep IM
  Child 5-10 years: 6.25-12.5mg by deep IM
  - Repeat dose every 8 hours for 24-48 hours to prevent relapse

*To prepare the diluted solution: Dilute each 1mL of **promethazine** injection 25mg/mL with 9mL of water for injections*

In severely affected patients

- **Hydrocortisone** 200mg IM or slow IV stat
  Child <1 year: 25mg
  - *Child 1-5 years:* 50mg; 6-12 years: 100mg
    - Helps to prevent further deterioration
- Repeat **adrenaline** and **hydrocortisone** every 2-6 hours prn depending on the patient's progress

► **Sodium chloride** 0.9% infusion 20mL/kg by IV infusion over 60 minutes
  - Start rapidly then adjust rate according to BP

Prevention

- Always ask about allergies before giving patients medicine
- Avoid being stung

18.2 DEHYDRATION

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

Cause

- Diarrhoea
- Vomiting
- Excessive sweating as in high fever
- Respiratory distress

Clinical features

- Underlying cause for the dehydration e.g. vmiting, diarrhoea
- Loss of skin turgor, sunken eyes
- Hypotension, tachycardia

18.2.1. Dehydration in children

Management **HC2**

► Assess the degree of dehydration according to clinical signs (see table below)

► Management with Plan A, B, or C (see sections 18.2.1.1, 18.2.1.2, and 18.2.1.3)
  - Refer to Management of Childhood Illness MoH 2000 for further details.

Clinical features of dehydration in children

Signs	Degree of dehydration		
	None/ mild	Some	Severe
General condition	Well, Alert	Restless, irritable	Lethargic or unconscious or very drowsy
Eyes	Not sunken	Sunken	Sunken
Fontanelle	Not sunken	Sunken	Sunken
Ability to drink	Drinks normally	Drinks eagerly thirsty	Drinks poorly or not able to drink
Skin pinch	Goes back quickly	Goes back slowly	Goes back very slowly
Treatment	Plan A	**Plan B**	**Plan C**

18.2.1.1 Plan A (No dehydration and for prevention)

- Counsel the mother on the 3 rules of home treatment:
  - Extra fluids, continue feeding, when to return
- Give extra fluids: As much as the child will take

Advise the mother to

- Continue/increase breastfeeding
  - *If child exclusively breastfed*, give ORS or clean water in addition to milk
  - *If child not exclusively breastfed*, give one or more of: **ORS**, soup, rice-water, yoghurt drinks, clean water
- In addition to the usual fluid intake, give **ORS** after each loose stool or episode of vomiting
  Child <2 years: 50-100mL;

Child 2 year: 100-200mL

- 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

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
- Counsel the mother on:
  - Correct breastfeeding and other feeding during sickness and health
  - Increasing fluids during illness
  - How to maintain her own health
  - When to return to the health worker

18.2.1.2 Plan B (some dehydration)

- 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 when you do not know the weight
- You can also calculate the approximate amount of **ORS** to give a child in the first 4 hours as weight (kg) x 75mL

- 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 100-200mL of clean water during this 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

If the 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 the mother on the 3 rules of home treatment
  - Extra fluids, continue feeding, when to return

18.2.1.3 Plan C (severe dehydration)

If you are able to give IV fluids

- Set up an **IV fluids** line immediately
  - If the child can drink, give **ORS** while the drip is set up
- Give 100ml/kg of compound **sodium lactate** infusion (**Hartmann's solution** or **Ringer's Lactate** solution)
- Or half-strength [HS] Darrow's solution in glucose 2.5%
- Or **sodium chloride** infusion 0.9%

Divide the IV fluid as follows:

Age	First give 30mL/kg in:	Then give 70mL/kg in:
Infants (<12 months)	1 hour*	5 hours*
Children (12 months-5years)	30 minutes*	2½ hours*

* Repeat once if radial pulse still very weak/undetectable

- Reassess patient frequently (every 30-60 minutes) for classification of dehydration and selection of Treatment Plan

If the patient is not improving

- Give the **IV drip** more rapidly

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

- Also give **ORS** 5mL/kg/hour
- Continue to reassess the patient frequently; classify the degree of dehydration; and select appropriate Plan A, B, or C to continue treatment

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

- Refer urgently for IV treatment

If the child can drink:

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

c) *If you are unable to give IV fluids and this therapy is not available nearby (i.e. not 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 20mL/kg/hour for 6 hours (total = 120mL/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

Note

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

18.2.2. Dehydration older children & adults

Management **HC3**

- Assess the level of dehydration using the table below

Clinical Features of Dehydration Older Children and Adults

Clinical Feature	Degree of Dehydration		
	Mild	Moderate	Severe
General appearance	Thirsty, alert	Thirsty, alert	Generally conscious, anxious, cold extremities, clammy, 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

At least 2 of these signs must be present

- Rehydrate the patient as follows (number in brackets refer to notes under the table):

Degree of dehydration	Rehydration fluid	Route	Volume to give in first 4 hours [(1)]
Mild	ORS [(2)]	Oral	25mL/kg
Moderate	ORS	Oral	50mL/kg [(3)]
Severe	Sodium lactate	IV	50mL/kg [(5)]

	compound infusion [4]		

Notes on table

1. Volumes shown are guidelines only. Necessary volumes can be increased or the initial high rate of administration maintained until clinical improvement occurs
2. In addition to **ORS**, other fluids, such as soup, fruit juice, and clean water may be given
3. Initially, adults can usually take up to 750mL ORS/hour.
4. If **sodium lactate compound** IV infusion (**Ringer-Lactate**) is not available then
   use half-strength [HS] **Darrow's solution** in glucose 2.5%
   or **sodium chloride** infusion 0.9%
   - However, both of these are less effective
5. In severe dehydration, give IV fluids as rapidly as possible until radial pulse can be felt. Then decrease the rate of administration.
   Volumes that may be given over the first 24 hours (60kg adult) are shown in the table below

Time Period	Volume of IV Fluid
First hour	1L
Next 3 hours	2L
Next 20 hours	3L

- After 4 hours, evaluate rehydration in terms of clinical signs (and not in terms of volumes of fluid given).
- As soon as signs of dehydration have gone (but not before), start **fluid maintenance therapy** with as much

alternating **ORS** and water (to avoid hypernatraemia) as the patient wants.

▶ Continue this for as long as the cause of the original dehydration persists.

Note

◆ Continued nutrition is important. There is no physiological reason to discontinue food during treatment for dehydration.

Prevention (for all age groups)

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

18.3 FEBRILE CONVULSIONS

A disorder mainly affecting children between 6 months and 6 years. It is characterised by generalized tonic-clonic seizures in a febrile illness. This is a diagnosis of exclusion.

Cause

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

Clinical features

- Elevated temperatures (>38°C)
- Convulsion is usually brief (<15 minutes) but may recur if temperature remains high
- No CNS infection or neurological abnormality in the period between convulsions

Differential diagnosis

- Epilepsy
- Meningitis
- Encephalitis

- Brain lesions
- Trauma
- Hypoglycaemia

Investigations

- Blood: Slide for malaria parasites; haemogram
- LP and CSF examination
- Full blood count
- Random blood glucose
- Urinalysis, culture and sensitivity
- Chest X-ray

Management HC2

- Treat the cause
- Lie prone
- Use tepid sponging to help lower the temperature
- Give an antipyretic**: Paracetamol** 10mg/kg every 8 hours prn
- Give **diazepam** 500 micrograms/kg rectally
  - Maximum dose: 10mg
  - Repeat prn after 10 minutes

If diazepam rectal dose-form is not available

- Use **diazepam injection** solution, and give the same dose rectally using the syringe after removing the needle.

Prevention

- Tepid spongng of febrile children may help

18.4 HYPOGLYCAEMIA

A clinical condition due to reduced levels of blood sugar (glucose).

Causes

- Overdose of insulin or anti-diabetic drugs

- Excessive alcohol intake
- 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

- Profuse sweating
- Nervousness
- Fainting
- Palpitations
- Poor sight
- Weakness
- Hunger
- Abdominal pain
- Vomiting
- Convulsions
- Loss of consciousness

Differential diagnosis

- Other causes of loss of consciousness

Investigations

- Blood sugar
- Specific investigations: To exclude other causes of hypoglycemia

Management HC3

- Oral **glucose** or **sugar** (before coma sets in) 10-20g in 200mL water (2-4 teaspoons) is usually taken initially and repeated after 15 minutes if necessary

- ▶ Or if patient is unconscious give **glucose 50%** 20-50mL IV followed by **10 % glucose** solution by drip at 5-10mg /kg/min until patient regains consciousness, then encourage oral sugary drinks
- ▶ Where possible, treat the cause of the hypoglycemia

Prevention

- On recognition of symptoms of hypoglycemia, educate patients at risk of hypoglycaemia, e.g. diabetics, patients who have had a gastrectomy
- Advise patients at risk to have regular meals and always to have glucose or sugar with them for emergency treatment of hypoglycaemia

18.5 PAIN

"Pain is what the patient says hurts"

This is the most common symptom of disease. The nature, location, and cause of pain 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. Important categories of physical pain are:

- **Nociceptive pain**: The pain pathways are intact. These pains respond to the analgesic ladder.
- **Neuropathic pain:** There is damage to nerves or the pathways. These pains respond only partially to the analgesic ladder and need adjuvants of amitryptiline or phenytoin (see below).

Causes

- Acute: Postoperative, acute infection, or trauma
- Chronic pain:

- Constant and usually increasing: cancer
- Recurrent sickle-cell crisis, arthritis, HIV/AIDS
- Drug side-effect or toxicity, e.g. peripheral neuropathy due to isoniazid (anti-TB drug) or d4T (stavudine, antiretroviral drug)

Clinical features

- Clinical features of the underlying disease

Further therapeutic clues to the nature and management of pain may be elicited by:

- Duration
- Severity: Can 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
- Remember there may be more than one pain. Ask the patient and get a detailed history as above for each pain
- A targeted physical examination

Management

Reasons for poor management of pain

Pain, especially if chronic, is often poorly managed for a number of reasons, including:

- Waiting for the patient to complain about pain rather than asking the patient about it
- Failure to obtain details of pain from attending nurses and relatives who often know the patient better than the clinician

- Prescribing the right drug in the wrong dose or with the wrong frequency or duration
- Failure to prescribe an appropriate adjuvant drug, e.g. antidepressant or anticonvulsant in neuropathic pain
- Failure to make adequate use of strong opioids (e.g. morphine) where indicated because of misplaced fear of causing addiction, respiratory depression, or death
- Failure to use other forms of therapy where appropriate, e.g. radiotherapy, steroids, cytotoxic chemotherapy, antibiotics, muscle relaxants, etc.
- Failure to regularly review the patient's condition and the drug regimen prescribed
- Lack of the right medicines

The aim of pain management is to

- Diagnose and treat the disease causing the pain
- Achieve total pain relief with minimal side-effects and therefore enable the patient to live as normal a life as possible

Non-drug treatment may include

- Lifestyle adjustment
- Patient counselling
- Massage with aromatherapy oils: May be useful for neuropathic pain and muscular pain
- Reflexology
- Application of heat or cold packs
- Relaxation
- Distraction, e.g. listening to radio
- Non-pharmacological treatment of underlying cause, e.g. surgery or radiotherapy of cancer

Important management points

- 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
- See also "Pain and Symptom Control in the Cancer and/or AIDS Patient in Uganda and Other African Countries, 4th edition", Hospice Africa, Uganda, 2006
- 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)

18.5.1. Management of nociceptive or somatic pain HC2

Pain arising from any organ of the body with intact nerves:

- The most common type of pain (may occur in any patient)

Medicines required depend on intensity of pain and are selected in steps according to the *WHO Analgesic Ladder*

Step 1: Non-opioids

- ▶ **Paracetamol** 1g every 4-6 hours (max: 4g daily)
- ▶ Or **acetylsalicylic acid** 600mg every 4-6 hours
  - ✕ Do not give acetylsalicylic acid in 3rd trimester of pregnancy
- ▶ Or **NSAIDS** (give doses after food), e.g. **ibuprofen** 1.2–1.8g daily in 3-4 divided doses
  Max: 2.4g daily
- ▶ Or **indomethacin** 50-200mg daily in divided doses
- ▶ Or **diclofenac** 75-150mg daily in 2-3 divided doses

Child: **Paracetamol** 10–15mg/kg every 4-6 hours
or **ibuprofen** 20mg/kg every 4-6 hours (give after

food),
Max: 500mg per day in children < 30kg

✕ Not recommended for children under 1 year old

Note on antipyretic effect

- The above doses of **acetylsalicylic acid**, **paracetamol**, and **ibuprofen** may also be used for antipyretic therapy

Step 2: Weak opioids

ALWAYS GIVE WEAK OPIOIDS WITH A LAXATIVE UNLESS SEVERE DIARRHOEA IS PRESENT

- **Codeine phosphate** 30-60mg every 4 hours
  Child 1–12 years: 3mg/kg daily in divided doses
- **Bisacodyl** 10mg in the evening
- Or **liquid paraffin** 10ml every 8 hours
- Give with or without step 1 drug

Step 3: Strong opioids

ALWAYS GIVE STRONG OPIOIDS WITH A LAXATIVE UNLESS SEVERE DIARRHOEA IS PRESENT

- **Morphine** (as oral solution 1mg/mL): Initially 2.5-5mg orally (see also note below) every 4 hours
  - Then titrate the dose according to response (continued drowsiness indicates too much, so the dose should be titrated down slowly)
  - Oral **morphine** solution is absorbed from the buccal mucosa and can be dripped into the mouth in adults and children
    Or **morphine** as slow-release (SR) tablets, e.g. **morphine** SR
  - Start with 10mg orally or rectally every 12 hours

  - Adjust the dose (but not the frequency) to achieve satisfactory pain control
  - If the patient is changing from oral liquid to slow-release tablet preparation, add the total taken in 24 hours to control pain. Divide this by 2 to get the nearest equivalent dose for **morphine** SR (10mg and 30mg available in Uganda)
- Leave patient with a few extra doses of oral **morphine** to take for breakthrough pain (breakthrough pain is a temporary exacerbation of pain after pain has been controlled on a regular dose of oral **morphine**); calculate needs at next visit
- The breakthrough dose is equivalent to the 4 hourly dose of oral liquid morphine being taken. If the patient needs regular breakthrough doses, then add the number of breakthrough doses given in a day to the total daily dose and divide by six to get the new 4 hourly dose. For example, a patient on 5mg oral morphine every 4 hours (=30mg in 24 hours) requiring 3 breakthrough doses in a day (=3 x 5mg, total 15mg) would need a new total of 45mg of oral morphine in a day = 45/6 or 7.5mg every 4 hours).
- Give **bisacodyl** 10mg in the evening
- Or liquid paraffin 10ml every 8 hours
- Give with or without step 1 drug

Notes on morphine

- **Morphine** 10mg parenteral is equivalent to 30mg by mouth (i.e. multiply parenteral dose by 3 to get oral equivalent)

- **Morphine** 5mg by mouth is equivalent to 1.6mg parenteral (i.e. divide oral dose by 3 to get the parenteral equivalent)
- Regular injections are not indicated in chronic pain
- Chronic pain is more manageable when controlled using small doses of oral morphine titrated to control pain without causing drowsiness. It is due to accumulation of metabolites, which are also active analgesics
- Respiratory depression has not been recorded when **morphine** is given orally and titrated against pain and drowsiness; however, it has occurred due to regular parenteral dosing

Note on dose titration

- When titrating the dose upwards because pain is not controlled, increase by 50-75% of the previous dose

Note on pethidine

- Avoid pethidine for treating chronic pain
  - It accumulates with severe side-effects on the gut
  - It does not work well by mouth except in large doses with severe side-effects
- Use for analgesia in labour: 50-150mg orally every 4 hours prn or 50-100mg SC repeated prn after 1-3 hours
  Max: 400mg/24 hours
  Child >6 months: 0.5-2mg/kg/dose
  - Only use as one off-dose for acute severe pain if morphine not available

Respiratory depression

- This side-effect of opioids does not occur when oral small doses are used initially and gradually titrated according to response

- If mistakenly given in large doses by injection, respiratory depression can be reversed by **naloxone** 40-80micrograms slow IV prn

Nausea and vomiting

- Rarely occurs in Africans, more common in Caucasians
- Occurs only in the first five days (it is self-limiting)
- Control with an oral antiemetic (for 5 days only) e.g. **metoclopramide** 10mg every 12 hours
- Vomiting later on is usually due to another cause in the illness

Use of morphine in dyspnoea and severe diarrhoea

- Use in small oral doses to relieve dyspnoea in respiratory diseases such as lung cancer, pleural effusion, COPD, heart failure, and pneumonia
  - It increases relaxation and oxygenation
  - Start with 2.5mg orally every 4 hours or add 2.5mg every 4 hours to present analgesic dose
- Use similar small doses for severe diarrhoea in HIV/AIDS patients

Cautions on use of opioids

△ Contraindicated in respiratory depression and head injury

△ Use with care in the following conditions

- Advanced liver disease (but can be used in hepatocellular carcinoma [HCC] when titrated as above)
- Acute asthma
- Acute abdomen 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:

- Hypovolaemic shock: Start with 10mg IV (as absorption is slow due to hypovolaemia)
- Recurrent or concurrent intake of alcohol or other CNS depressants

18.5.2. Neuropathic pain

Occurs as a result of damage to nerve tissue. There are two clinical kinds of pain

- 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**
- Both elements may be combined

Trigeminal neuralgia or stabbing-type pain

Acute phase

▶ **Phenytoin** 200-400mg daily in 1-2 divided doses
  - Drug of choice because has minimal side-effects and does not need monitoring
  - May need up to 600mg daily
  - Avoid if patient is on antiretroviral therapy due to interactions (**nevirapine** and protease inhibitors)

▶ Or **carbamazepine** initially 100mg 1–2 times daily
  - Increase gradually according to response

- Causes white cell depression
- Needs monitoring
- More expensive than phenytoin
- Usual dose: 200mg 3-4 times daily (up to 1.6g daily may be needed)

▶ Plus **amitriptyline** 12.5-25mg at night or every 12 hours depending on response

Post-herpetic neuralgia

Acute phase

▶ **Amitriptyline** 12.5-25mg at night or every 12 hours depending on response

If stabbing element to pain

▶ Add **phenytoin** (doses as above)

18.5.3. Back or bone pain

- Pain in the lumbar region of the spine; is a symptom, not a disease entity
- Bone pain anywhere

Causes

- 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
- Metastatic disease, e.g. breast or prostate cancer
- Cervical cancer
- Strain
- Congenital abnormalities
- Spondylolisthesis (forward shirt of one vertebra upon another due to defect of the joints, which normally bind them together)
- Renal disease

- Pelvic infection
- Retroperitoneal infection

Clinical features

- Depends on the cause
- In infections: Pain is throbbing and constant
- Sciatica if sciatic nerve roots involved

Differential diagnosis

- See distant causes above

Investigations

- As far as possible, try to establish the cause and type of pain
- X-ray: Spine and pelvis
  - If available, is affordable, and will aid management

Management

- **Analgesics** (see management of somatic pain)
  - 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

18.6 FLUID AND ELECTROLYTE IMBALANCE

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.

Water and electrolyte exchange

- Fluid consumption is 2-2.5L in 24 hours (1.5L by mouth and 0.5-1L in solid food)
- Daily fluid loss is through:
  - Urine (800-1,500mL)
  - Stool (250mL)
  - Insensible loss through skin and lungs (600mL), which is affected by hyperventilation, fever, and high environmental temperatures
- Daily sodium intake is 100-200mmol
- Daily potassium intake is 50-100mmol
- There will be a deficiency of salts if:
  - There are increased losses, e.g. excess sweating, urinary losses, or GIT losses through diarrhoea and vomiting
  - There is reduced intake, e.g. post-operative patients

Disorders of fluid and electrolytes

Disorders may occur in the fluid volume, concentration (sodium composition), and distribution of fluid and other electrolytes and pH. The main disorders likely to cause such problems are:

- Diarrhoea - prolonged
- Vomiting - prolonged
- Burns - excessive
- Haemorrhage - severe
- Intestinal obstruction
- Peritonitis
- Diabetes
- Nasogastric drainage
- Paralytic ileus
- Fistula drainage (especially if high output)

- Third spacing e.g. Peritonium
- Major organ failure (e.g. renal, hepatic, cardiac)

Caution

△ Over-infusion of IV fluids may also cause fluid and electrolyte imbalance

△ Mild to moderate fluid loss will lead to varying degrees of dehydration

△ Severe fluid loss will lead to shock

Management

IV fluid and electrolyte therapy **HC2**

This has three main objectives to:

- Replace lost body fluids and continuing losses
- Correct electrolyte and acid-base disturbances
- Maintain daily fluid requirements

Always use an IV drip in patients who are seriously ill (except patients in congestive heart failure; for them, 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.

- ▶ Administer daily fluid and electrolyte requirements to any patient not able to feed
- ▶ The basic 24-hour requirement for a 60kg adult is 3L and for children is 150mL/kg
- ▶ One third of these daily fluids (1L in an adult) should be (isotonic) **sodium chloride** 0.9% infusion
- ▶ The other two thirds (2L in an adult) should be: **Glucose** 5% infusion
- ▶ Or half-strength **Darrow's solution in glucose** 2.5% infusion

- ▶ Or compound **sodium lactate** infusion (**Ringer-Lactate** solution)
- ▶ As well as the daily requirements, replace fluid lost due to the particular condition according to the assessed degree of dehydration

Caution

- △ Closely monitor all IV drips to ensure that the rate is adjusted as required and that the drip **is not allowed to run dry** as this will introduce air bubbles into the circulation with the potentially fatal risk of air embolus.
- △ If the drip has been neglected and allowed to run dry, remove it and set up a new drip at another site.
- △ 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).

Clinical features and management of severe dehydration

- Refer to sections 18.2.1 and 18.2.5 for dehydration n chilren and adults respectively

Clinical features and management of hypovolaemia

- Tachycardia (rapid pulse, often thready, small volume)
- Low BP
- Postural change (e.g. supine to sitting/standing – change in heart rate and BP)

In diarrhoea and vomiting with severe dehydration, paralytic ileus, etc.

- ▶ Replace fluid losses with isotonic (sodium) solutions containing potassium, e.g. compound **sodium lactate infusion** (**Ringer-Lactate solution**)
- ▶ Or **half-strength Darrow's solution in 2.5% glucose infusion** (see also Dehydration)

If there is blood loss and the patient is not in shock

- Use **sodium chloride** 0.9% infusion for blood volume replacement giving 0.5-1L in the 1st hour and not more than 2-3L in 4 hours

If there is blood loss >1L

- Give 1-2 units of blood to replace volume and concentration

Clinical features and management of severe burns

Refer to burns

Management of shock

- Give compound **sodium lactate** infusion (**Ringer-Lactate solution**)
- Or **sodium chloride** 0.9% infusion 20mL/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

Management of intestinal obstruction

- Patient may be dehydrated due to vomiting; if dehydration is severe, replace fluid losses with isotonic solutions containing potassium, e.g. compound **sodium lactate** infusion (**Ringer- Lactate** solution) or half-strength **Darrow's solution in 2.5% glucose** infusion
- Aspirate upper gastrointestinal fluids using a nasogastric tube and large syringe
- Consult a surgeon
- Give pain relief parenterally
- **Avoid metoclopramide** as it would worsen colic
- Instead use **prochlorperazine** 12.5mg IM

18.7 ANAESTHESIA GUIDELINES

Main objectives during surgery are to

- Relieve pain
- Support physiological functions
- Provide good conditions for the operation

18.7.1. General considerations

The facilities for administering anaesthesia must be

- Available and in a state of readiness at all times
- Appropriate in quality and quantity
- Compatible with safety

Staffing requirement for anaesthesia

- 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
  - Patient

During anaesthesia

Anaesthesia is administered (induction and maintenance)
The patient must be monitored meticulously to:

- Ensure his/her wellbeing
- Detect dangerous signs as soon as they arise and appropriately treat them

Expertise in resuscitation is obligatory. If in trouble ask for help.

After anaesthesia

The patient

- Recovers from effects of anaesthesia
- Has stable vital signs
- Is returned to the ward in the fully conscious state, no worse or if at all possible, even better than before operation

Always pay attention to details

- **The anaesthetist, surgeon, and theatre staff are on the same team**
- **Know your limits**
- **Seek help, consult, or refer to a higher level of care**

18.7.2. 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

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 appropriate 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: gowns, gloves, masks, and eye shields
- Drugs necessary for management of conditions, which may complicate or co-exist with anaesthesia

Preoperative management

The aim is to make the patient as fit as possible before surgery.

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
- Establish 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 understanding
- 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/prosthesis that may injure the patient
  - Make-up that may interfere with monitoring
- Remaining preparation according to condition of the patient 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.

18.7.2.1 General anaesthetic agents

Most anaesthetic agents are included in the specialist essential medicines list meaning that use is restricted to specialised health workers.

1. Intravenous agents

Thiopentone

- Solution concentration: 2.5% or 25mg/mL
- Route: Intravenous
- Dose: 3 to 5mg/kg body wt.
- Indication: 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)
- Complication: Hypotension, apnoae (dose dependent), tissue necrosis in case of extravasation of the solution

Ketamine

- Solution concentration: 50mg/mL, 10mg/mL
- Route: Intravenous, intramuscular
- Dose: I.V. 1-2mg/kg body wt I.M. 5-7mg/kg body wt
- 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) concentration: 1% or 10mg/mL
- Route: Intravenous
- Dose: 1-2.5mg/kg body wt titrated at a rate of 4ml/sec
- Indications: Induction of anaesthesia, maintenance of anaesthesia
- Contraindication: Hypersensitivity, hypotension, obstetrics, paediatrics
- Side effects: Pain at site of injection

2. 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

Halothane

A volatile liquid at room temperature

- Indication: 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 adrenalin to prevent high incidence of arrhythmias
- Adverse effects which may occur include
  - Atony of the gravid uterus
  - Postoperative shivering
  - Severe cardiopulmonary depression

18.7.2.2 Muscle relaxants

Used to provide muscle relaxation to facilitate a procedure

Precaution before using a muscle relaxant:

- Have means of supporting the airway and respiration
- Used in a patient who is unconscious, e.g. general anaesthesia, or sedated

Short acting muscle relaxant

Suxamethonium

- Solution concentration: 50mg/mL
- Action: Fast onset and short duration
- Route: Intravenous or intramuscular
- Dose: 1-2mg/kg body weight
- Indication: Muscle relaxation for short procedure, e.g. tracheal intubation, reduction of fracture
- Contraindications: Airway obstruction, hyperkalaemia conditions, e.g. tetanus, burns >3 days old

Long acting muscle relaxants

Pancuronium

- Solution concentration: 2mg/mL
- Action: Slow onset and long duration (45 min.)
- Route: Intravenous
- Dose: 4-6mg initially thereafter 2mg or 80-100 microgram/kg
- Indication: Muscle relaxants for long procedure e.g. laparotomy

Atracurium

- Solution concentration: 10mg/mL
- Action: Duration = 20–40 min
- Route: Intravenous
- Dose: 300-600 microgram/kg
- Indication: Muscle relaxation for operation of intermediate duration

18.7.2.3 Local anaesthetic agents

These are not specialist medicine

Lignocaine

Solution concentrations of **lignocaine** commonly used:

- Topical: Larynx pharynx 20-40mg/mL or 100mg/mL
- Infiltration 2.5-5mg/mL with or without **adrenaline** 1:2.000.000
- Nerve block 10-20mg/mL with or without **adrenaline** 1:2.000.000
- Spinal 50mg/mL hyperbaric solution
- Action: Fast onset
  - Plain lignocaine 40–60 min
  - Lignocaine with adrenaline 60– 90 min
- Dose: Lignocaine with adrenaline 6-7mg/kg body weight
- Dose: Plain lignocaine 3mg/kg body weight

It is important to calculate the volume of lignocaine that could be used safely

Note

- Lignocaine toxicity, signs and symptoms:
  - CNS stimulation followed by depression
  - Stimulation: Restlessness, tremor, convulsions
  - Depression: Semi consciousness, coma

Treatment

- Give sufficient/titrate IV **diazepam** to control convulsions
- **Thiopentone** may be used, e.g. 50mg **oxygen** is given
- Support airway, breathing, and circulation as indicated
- Admit the patient to ward to continue treatment and observation as needed

Bupivacaine

- Solution concentration: 5mg/mL
- Action: Slow onset but long duration 4-6 hours or longer
- Dose: 2mg/kg body weight
- Indication: All regional anaesthesia except intravenous regional anaesthesia
- Use hyperbaric bupivacaine solution for spinal anaesthesia

Other medicines

Analgesics, naloxone, neostigmine, atropine, diazepam

Drugs for managing the following condition

Anaphylaxis, cardiac arrhythmias, pulmonary oedema, hypotension, hypertension, bronchospasm, respiratory depression, hypoglycaemia, hyperglycaemia, adrenal dysfunction, Raised intracranial pressure, uterine atony, coagulopathies (refer to the relevant sections)

18.7.3. Selection of type of anaesthesia for the patient

Consider

- 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

18.7.3.1 Techniques of general anaesthesia

Requirements for all

- Take and record baseline vital signs

- Establish intravenous line and commence infusions

1. 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 min or more frequently, BP, pulse, respiration, colour, oxmetry

Indication

- This technique may be used for operations on limbs, perinium, superfial wall of chest, and abdomen
- Suitable for operations lasting less than 30 min

2. General anaesthesia with controlled ventilation

Induce anaesthesia:

- Intravenous/inhalation (see above)
- Tracheal intubation
  - When spontaneously breathing (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
  Neostigmine is given 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

3. 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 min
- Induce with selected **intravenous anaesthetic** agent
- Assistant applies cricoid pressure
- IV **suxamethonium** is given
- Laryngosopy 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

18.7.3.2 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

Precautions

- Discuss the procedure with the patient
- Identify the injection site using appropriate landmarks
- Observe aseptic conditions
- Use small bore needle, which cause 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 min 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

18.8 MANAGEMENT OF THE SURGICAL PATIENT WITH SPECIAL CONDITION

18.8.1. Internal haemorrhage

- As may occur in ruptured spleen, ruptured tubal pregnancy
- An emergency condition with unstable vital signs
- Invasive surgical intervention in whatever state the patient is in is life saving
- Do not delay operation in attempt to stabilize the patient as this may not be achieved
- Prompt resuscitative operation is required, which includes:
  a) Establish an IV line and infuse fluids rapidly
  b) Rapid sequence induction of general anaesthesia
     - Use drugs with no or minimal cardiac depression
  c) Laparotomy to achieve surgical haemostasis

18.8.2. Intestinal obstruction

Preoperative fluid therapy

- Fluid deficit, the electrolyte abnormalities, and acid-base disturbances must be corrected
- Replace on going fluid losses e.g. vomit, fistula, NG-tube drainage
- Give maintenance fluid
- Duration, depending on urgency of surgery, may be as long as 6 hours to achieve cellular hydration
- Monitoring outcome. The following signs will show the effectiveness of the therapy:
  - Pulse rate a gradual decline

- BP may rise
- Urine output good if it is 0.5 to 1mL/kg/hour
- CVP arise of 2-3 cmH20 with rehydration
- CNS patient more rational
- Mouth less dry
- Skin turgor increased

- The fluid to use: Balanced solution, e.g. **Ringers Lactate**; physiological **normal saline** may be used

Operative fluid therapy

- Blood loss, fluid aspirated from the gut and other fluid losses must be replaced
- Maintenance fluid be given 5mL/kg/hour

Postoperative fluid therapy

- Replace all fluid losses
- Maintenance fluid
- Monitor for adequate rehydration

18.8.3. Co-existing medical conditions

Principle:

The medical condition must be stabilized as much as possible before surgery

Preoperative management

- Establish whether condition is stable or unstable
- If unstable, control or correct the condition

Operative and postoperative management

- Anaesthesia technique based on condition and nature of surgery
- Maintain the stable condition

18.8.4. Hypertension

- Diastolic of 90 mmHg is acceptable

If poorly controlled patient may have

- Vasoconstriction and hypovolaemia
- Exaggerated vasoactive response to stress leading to hypotension or hypertension
- Hypertensive complications under anaesthesia

Management

- Control hypertension preoperatively
- Take antihypertensive drugs on schedule, even on the day of operation
- General anaesthesia technique is preferred
- Ensure adequate depth of anaesthesia and analgesia
  - Oxygenation
  - Ventilation
  - Circulatory volume replacement

18.8.5. Anaemia

Condition of reduced oxygen carrying capacity; patient prone to hypoxia

- Heart failure may occur
- Hypotension or hypoxia can cause cardiac arrest
- This should be corrected to acceptable level depending on urgency of surgery
- Regional anaesthesia is the preferred method
- If general anaesthesia is used, avoid myocardial depressant, e.g. thiopentone
  - Use small doses of drugs
  - 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 postoperative period

For sickle cell anaemia, the above also applies, as well as avoiding use of tourniquet

18.8.6. Asthma

- Avoid drugs and other factors likely to trigger bronchospasms, e.g. thiopentone
- Regional anaesthesia is the preferred method
- If general anaesthesia selects drugs accordingly, maintain adequate depth of anaesthesia

18.8.7. Diabetes mellitus

- Achieve control using standard treatment preoperatively
- 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
- Patient should be operated early in the morning when possible
- 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 2mL/min 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 ≤200mg/dl

19. POISONING

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 and medicines (in excessive amounts)

For food poisoning, see Management of Food Poisoning.
For alcohol poisoning, see Management of Alcohol Poisoning.

Introduction

If possible, refer/admit all patients showing signs of poisoning to hospital. Send a note of what is known 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

Even though it may not be possible to identify the poison and the amount taken, it is usually not important because:

- 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.

19.1 GENERAL MEASURES

Respiration

Often impaired in unconscious patients

- ▶ Ensure the airway is cleared and maintained
  - Insert an airway if available
- ▶ Position patient semi-prone to minimise risk of inhalation of vomit
- ▶ Assist ventilation if necessary

Blood pressure

Hypotension is common in severe poisoning with CNS depressants. A systolic BP <70mmHg may cause irreversible brain or renal damage.

- ▶ Carry the patient head down on the stretcher and nurse in this position in the ambulance
- ▶ Give **oxygen** to correct hypoxia
- ▶ Set up an **IV normal saline**

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.

Heart

Cardiac conduction defects and arrhythmias may occur in acute poisoning, especially with tricyclic antidepressants, but these often respond to correction of any hypoxia or acidosis.

Body temperature

Hypothermia may develop in patients with prolonged unconciousness, especially after overdose of barbiturates or phenothiazines, e.g. chlorpromazine, trifluoperazine.

- It may be missed unless temperature is monitored
- Treat by covering the patient with a blanket

Convulsions

Do not treat single brief convulsions

If convulsions are prolonged or recur frequently:

- **Diazepam** 10mg rectally repeated if necessary
  Child: 400 micrograms (0.4mg)/kg per dose
- Or **diazepam** 10mg slow IV repeated if necessary **HC4**
  Max: 30mg
  Child: 200 micrograms (0.2mg)/kg
  - Do not give IM
  - If IV route is not possible, remove the needle of the syringe and give the dose rectally

19.2 REMOVAL AND ELIMINATION OF THE POISON

Removal from the stomach

- Balance the dangers of attempting to empty the stomach with the likely toxicity of any swallowed poison as determined by the type of poison and amount swallowed.
- Gastric lavage
  - Only useful if done within 2 hours of poisoning (except with salicylates when it may be of use within 4 hours)
  - Seldom practicable or necessary before the patient reaches hospital
  - Do **not** attempt in drowsy or comatose patients because of the risk of inhaling stomach contents

(unless there is a good cough reflex or the airway can be protected with a cuffed endotracheal tube)
- Do **not** attempt with corrosive or petroleum products

Prevention of absorption of the poison

- 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)
- It is safe and especially useful for poisons toxic in small amounts, e.g. antidepressants
- If patient unable to swallow the charcoal/water mixture (slurry), give by gastric lavage tube

▶ Give **activated charcoal** 50g
Child: 25g (50g if severe)
- Grind these into a fine powder before mixing with 100-200mL of water (50g = 200 tablets of 250mg)

Active elimination of the poison

- Repeated doses of **activated charcoal** increase elimination of some medicines after they have been absorbed, e.g. acetylsalicylic acid, carbamazepine, phenobarbital, quinine, theophylline

▶ Give **activated charcoal** 50g 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. 25g every 2 hours or 10g every hour

19.3 ACUTE ORGANOPHOSPHATE POISONING

Organophosphates are ingredients of some pesticides and insecticides intended for agricultural and household use. Poisoning occurs by ingestion, inhalation, or absorption through the skin.

Causes

- May be accidental, e.g. rat poison
- 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

Differential diagnosis

- Other causes of poisoning
- Other causes of convulsions
- Acute infection

Management HC4

- ▶ Remove contaminated clothing
- ▶ Wash contaminated skin with lots of cold water
- ▶ Establish and maintain the airway
  - Artificial respiration with air or **oxygen** may be required during the first 24 hours after poisoning
- ▶ Perform gastric lavage if the poison was ingested
- ▶ **Atropine** 2mg IM or IV (according to the severity of the poisoning)

Child: 20 micrograms/kg per dose

- Repeat dose every 20-30 minutes until signs of atropinization occur (pupil dilatation, hot dry skin, dry mouth, fast pulse)

*In moderate to severe poisoning **only** and if not responding to atropine*

▶ Add **pralidoxime mesylate** 30mg/kg IM **Ref**

- Follow by 1-2 more doses at 4-6 hour intervals depending on the severity of the poisoning and response to treatment

In very severe poisoning

- The initial dose of pralidoxime may be doubled
- Usual maximum dose: 12g/24 hours
- The dose can also be given by slow IV (over a 5 minute period) by diluting 1g in 10-15mL of water for injection or by IV infusion (up to 500mg/hour may be required)

▶ Give **IV fluids** e.g. **normal saline** prn for dehydration, hypovolaemia, and shock (refer to18.6 Fluid and electrolyte imbalance)

Note

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

Prevention

- Label agricultural and domestic pesticides properly
- Store such products away from children
- Wear protective clothing when using the products

19.4 PARAFFIN & PETROLEUM PRODUCTS POISONING

Includes paraffin, petrol, paint thinners, organic solvents.

Cause

- Accidental or intentional ingestion

Clinical features

- Patient may smell of paraffin/other petroleum product
- Burning sensation in mouth and throat
- Patient looks pale (transient cyanosis)
- Vomiting, diarrhoea
- Cough, dyspnoea

Differential diagnosis

- Other causes of poisoning
- Acute infections

Management HC2

Treatment is supportive and symptomatic

- The main danger is damage to lung tissue
  - ✕ Avoid gastric lavage or use of an emetic as this may lead to inhalation of the gastric contents, causing pneumonitis

▶ Give plenty of **oral fluids** (preferably milk)

▶ **Activated charcoal** may be used:

- 50g repeated prn every 4 hours
- Or 25g repeated prn every 2 hours

▶ Refer if complications occur, e.g. pulmonary oedema, pneumonia

Prevention

- Store paraffin, etc. safely (e.g. in a locked cupboard)

19.5 ACETYLSALICYLIC ACID (ASPIRIN) POISONING

Clinical features

- Hyperventilation
- Tinnitus, deafness
- Vasodilation

- Sweating
- Coma (if very severe poisoning)
- Complex acid-base disturbances

Management **HC4**

- ▶ Gastric lavage: Worthwhile up to 4 hours after poisoning as stomach emptying is delayed
- ▶ **Activated charcoal** 50g repeated as needed every 4 hours or 25g repeated prn every 2 hours
  - To delay absorption of any remaining salicylate
- ▶ Fluid and electrolyte monitoring and management
  - To correct acidosis, hyperpyrexia, hypokalaemia, and dehydration (See 18.6 "Fluid and electrolyte imbalance")
- ▶ Look out for and treat hypoglycaemia
  - Glucose 50% as IV bolus

  Adult: 20mL

  Child: 1mL/kg
- ▶ Anticipate and treat convulsions with IV **diazepam** 10mg prn

19.6 PARACETAMOL POISONING

Clinical features

- As little as 10-15g (20-30 tablets of 500mg) may cause severe hepatic and renal damage
- Nausea and vomiting (usually settle within 24 hours)

Management **HC4**

If poisoning took place <2 hours before treatment:

- ▶ Empty the stomach to remove any remaining medicine using gastric lavage or an emetic
- ▶ Despite few significant early symptoms, transfer patients to hospital urgently

- Maximal liver damage occurs 3-4 days after poisoning

If poisoning took place <12 hours before treatment:

▶ Also give **methionine** 2.5g
- Repeat 3 times at 4 hourly intervals

In hospital setting: **H**

▶ **Acetylcysteine**, 200mg/mL injection in 10mg ampoule.
Adult and child: Initially 150g/kg over 15 min, then 50mg/kg over 4 hours, then 100mg/kg over 16 hours
*Administration of **acetylcysteine**:* Dilute the required dose in 5 % **glucose** as follows:
Adult and child >12 years: 200mL/kg over 15 minutes, then 500mL over 4 hours, then 1 litre over 16 hours
Child >12 years with body weight over 20kg: Initially 100mL/kg over 15 min, then 250mL over 4 hours, then 500mL over 16 hours
Child < 12 years with body weight under 20kg: Initially 3mg/kg over 15 min, then 7mL/kg over 4 hours, then 14mL/kg over 16 hours

19.7 IRON POISONING

Clinical features

- Most common in children
- Nausea, vomiting, abdominal pain, diarrhoea
- Haematemesis
- Rectal bleeding
- Later: Hypotension, coma, hepatic necrosis

Management **H**

▶ **Deferoxamine** 15mg/kg/hour by continuous IV infusion in **sodium chloride** 0.9% or **glucose** 5% infusion
- Max dose: 80mg/kg/24hours

- Dissolve initially in water for injections (500mg in 5mL) then dilute with infusion fluid

19.8 CARBON MONOXIDE POISONING

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

Clinical features

- All due to hypoxia
- Headache, nausea, vomiting
- Weakness, collapse, coma, death

Management HC4

- Remove person to fresh air
- Clear the airway
- Give **oxygen** 100% as soon as possible
- Give artificial respiration as required
  - Continue until adequate spontaneous breathing starts
- Admit to hospital due to possibility of delayed complications

In severe poisoning:

- Anticipate cerebral oedema and treat with **mannitol** 20% 1g/kg by rapid IV infusion

19.9 BARBITURATE POISONING

Clinical features

- Appropriate history of taking e.g. phenobarbitone
- Patient will be drowsy

Management HC2

- Monitor vital signs
- **Gastric lavage**

▶ **Activated charcoal** 50mg may be used to absorb the poison
Child: 25g (50 if severe)

19.10 NARCOTIC ANALGESIC POISONING

Clinical features

- Respiratory depression
- Pinpoint pupils
- Coma

Management HC4

▶ **Naloxone** 800 microgram-2mg IV
Child: 10 microgram/kg IV

If respiratory function does not improve

▶ Adult: Repeat dose of **naloxone** every 5 minutes to a maximum of 10mg total dose
Child: Give one subsequent dose of 100 micrograms/kg

If respiratory function still does not improve

- Question the diagnosis

Note

◆ Use IM or SC route if IV not possible
  - Onset of action will be slower

◆ 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

19.11 WARFARIN POISONING

Warfarin is an ingredient of some rat poisons.

Clinical features

- May not present with clinical features
- Could be having bleeding from mucosa e.g. gastroinstestinal bleeding

- Haematuria

Management

- ▶ Empty the stomach
- ▶ Give **activated charcoal** 50mg
  Child: 25g (50g if severe)
  - Absorbs any remaining poison

If there is major bleeding

- ▶ **Phytomenadione** (vitamin K_1) 5mg IV
  - Give very slowly

19.12 METHYL ALCOHOL (METHANOL) POISONING

Methanol is used as an industrial solvent and is an ingredient of methylated spirits.

Clinical features

- Similar to alcohol intoxication/poisoning but milder
- Symptoms do not usually appear until 12-24 hours after ingestion and may include headache, dizziness, nausea, vomiting, vasomotor disturbances, CNS depression, and respiratory failure
- Toxic metabolites may cause severe acidosis and retinal/optic nerve damage

Management HC4

- ▶ Gastric aspiration and lavage
  - Only use if done within 2 hours of ingestion
- ▶ Correct metabolic acidosis with oral **sodium bicarbonate solution 5%**
  - Leave the solution in the stomach

In severe cases

- ▶ Give **sodium bicarbonate** 8.4% 50mL by slow IV
  - Monitor plasma pH

- Give 30-35mL of **alcohol** 40% (e.g. waragi, whisky, brandy) in 100mL of water every 3 hours until the acidosis has been corrected
  - Delays oxidation of methanol to toxic metabolites
- Keep the patient warm
- Protect the eyes from strong light
- Refer to hospital for further management

19.13 ALCOHOL (ETHANOL) POISONING

Alcohol poisoning may be acute or chronic.

19.13.1. Acute alcohol poisoning

Symptoms of alcoholic poisoning following ingestion of 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 on the breath
- Excessive sweating
- Dilated pupils
- In later stages, stupor and coma develop

As coma deepens the following appear:

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

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 **HC3**

- Maintain a clear airway
- Take measures to reduce the special hazard of aspiration of stomach contents
- Check blood glucose level
- If indicated, treat hypoglycaemia with **glucose** 50% 20-50mL IV bolus
  Child: 1mL/kg
- Assess clinical and biochemical response over the next 15 minutes and repeat **glucose** 50% IV prn
- Monitor hourly blood glucose levels
- Repeat **glucose** 50% IV prn until the patient wakes up

If IV glucose is not available

- Give **glucose** 50% or sugar solution 50% rectally or by NGT

Once patient wakes up

- Continue with oral **glucose** or sugar solution as required until the patient can eat a meal

19.13.2. 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
- Change in behaviour
  - See Alcohol Dependence Syndrome

Management HC4

For delirium

- ▶ **Diazepam** 10-30mg rectally every 12 hours prn
- ▶ Anticipate and treat hypoglycaemia as in 19.13.1. Acute alcohol poisoning
- ▶ Refer to hospital for further management including:
  - Bed rest
  - Proper diet
  - Treatment of thiamine deficiency
  - Psychiatric assistance and counselling on alcohol, withdrawal, abstinence, and lifestyle adjustment

19.14 OTHER CHEMICAL/MEDICINE POISONING

Management HC2

For ingested poisons

- ▶ Carry out nasogastric suction and gastric lavage

- ▶ Give activated charcoal
- ▶ Provide symptomatic treatment as necessary, e.g. for pain, dehydration
- ▶ Refer patient to HC4 for further management if the condition deteriorates

19.15 FOOD POISONING

Illness caused by consumption of food or water contaminated by certain pathogenic microorganisms

- 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
- *Botulism*: Paralysis of skeletal, ocular, pharyngeal, and respiratory muscles
- Fever (especially if poisoning is the infective type)
- May be self-limiting
  - Features disappear without specific treatment

Differential diagnosis

- Cholera
- Dysentery
- Other causes of stomach and intestinal infections

Investigations

- Good history and examination is important for diagnosis
- Stool: Examination for C&S

Management: HC2

- Establish the cause and treat accordingly
- Give **oral or IV fluids** for rehydration e.g. **normal saline** as required
- For pain, give **paracetamol** 1g every 4-6 hours
  Max daily dose: 4g
  Child: 10mg/kg per dose

If the poisoning is bacterial in origin and diarrhoea persists or is severe (i.e. >5 stools/day, bloody, and/or fever)

- Give an **antibiotic** for 3-7 days, depending on response:
- **Cotrimoxazole** 960mg every 12 hours
  Child: 24mg/kg per dose
- Or **erythromycin** 500mg every 6 hours
  Child: 10mg/kg per dose
- Or **ciprofloxacin** 500mg every 12 hours
  Child: 10mg/kg per dose
  ✕ Contraindicated in pregnancy
- Follow up patients and manage according to organism/ toxin involved and how patient progresses
- If not improvement refer to higher level for management **RR**

Prevention

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

20. ZOONOTIC DISEASES

Zoonotic diseases can be transmitted between species for example from animals to humans. Infectious agents are bacteria, virus, parasites or fungi.

20.1 ANTHRAX

Anthrax is an acute infectious disease caused by the bacterium *Bacillus anthracis*. Anthrax most commonly occurs in wild and domestic animals, such as cattle, sheep, gouts, camels, antelopes, and other herbivores. It can also occur in humans when they are exposed to infected animals or tissue from infected animals. The incubation period is usually 1-3 days.

Transmission

B. anthracis spoils can live in the soil for many years, and humans can become infected with anthrax 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

- Anthrax is diagnosed by isolating *Bacillus anthracis* from the blood, skin lesions, or respiratory secretions or by measuring specific antibodies in the blood of persons with suspected infection.
- Symptoms of disease vary depending on how the disease was contracted, but symptoms usually occur within 7 days.

Anthrax infection can occur in three forms:

- Cutaneous (skin)
- Inhalation

- Gastrointestinal

Cutaneous: Most (about 95%) anthrax infections occur when the bacteria enter a cut or abrasion on the skin when handling contaminated animal products (e.g. wool, hides, leather, or hair products (especially gnat hair). Skin infection begins as a 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 the adjacent area may swell. About 20% of untreated cases of cutaneous anthrax will result in death.

Inhalation: Initial symptoms may resemble a common cold. Alter several days, the symptoms may progress to severe breathing problems and shock. Inhalation anthrax is usually fatal.

Intestinal: The intestinal disease form of anthrax may follow the consumption of contaminated meat and is characterized by an acute inflammation of the intestinal tract. Initial signs of nausea, loss of appetite, vomiting, and fever are followed by abdominal pain, vomiting of blood, and severe diarrhoea. Intestinal anthrax results in death in 25% to 60% of cases.

Management **HC4**

- Health workers/doctors can prescribe effective antibiotics for 7 to 10 days, such as **ciprofloxacin** 500mg twice a day, which is the medicine of choice
- Alternatives are **doxycycline** 100mg twice a day
- Or **amoxicillin** 500mg every 8 hours
- Intravenous antibiotics are used in severe infections

► 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 buying of carcasses; burning is the alternative but not recommended as this could spread spores when carcasses bursts.
- 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
- Hides and skins from infected animals should be destroyed (e.g. bury, burn)
- Mass vaccination of animals is recommended in endemic areas using animal anthrax vaccine

Vaccination using human anthrax vaccine for the following groups is recommended

- Persons who work directly with the organism in the laboratory
- Persons who handle potentially infected animal products in high-incidence areas

Note: Pregnant women should be vaccinated only if absolutely necessary

Protocol for anthrax vaccination

The immunization consists of three subcutaneous injections given 2 weeks apart followed by three

additional subcutaneous injections given at 6, 12, and 18 months. Annual booster injections of the vaccine are recommended thereafter.

20.2 AVIAN INFLUENZA TYPE A H5N1

This section aims to guide on control and prevention of nosocomial spread of Influenza A (H5N1)

- Use high-efficiency masks in addition to droplet and contact precautions. In addition, get negative pressure room if available
- Isolate the patient to a single room
- Beds should be placed more than 1 metre apart and preferably be separated by a physical barrier (e.g. curtain, partition). Reinforce standard precautions with droplet and contact precautions
- Appropriate personal protective equipment (APPE) in all those entering patients' rooms
  - Consists of mask (high efficiency mask if available or surgical mask), gown, face shield or goggles, and gloves
- Limit the number of health care workers (HCWs) who have direct contact with the patient(s):
  - These HCWs should not look after other patients
  - Number of other hospital employees (e.g. cleaners, laboratory personnel) with access to the environment of these patients should also be limited
  - Designated HCWs should all be properly trained in infection control precautions
- Restrict the number of visitors, provide them with APPE, and instruct them in its use

- Ask HCWs with direct patient contact to monitor their own temperature twice daily and report to hospital authorities any febrile event
- A HCW who has a fever (>38^{0}C) and who has had direct patient contact should be treated immediately

Case management **RR**

- Take respiratory and blood specimens for laboratory testing for influenza and other infections as clinically indicated
- Treat with a neuraminidase inhibitor, such as **oseltamivir phosphate**
- If clinically indicated, hospitalize patients under appropriate infection control precautions as described in previous sections
- If a case does not require hospitalization, educate the patient and his/her family on personal hygiene and infection control measures (e.g. hand-washing, use of a paper or surgical mask by the ill person, and restriction of social contacts). Instruct the patient to seek prompt medical care if the condition worsens
- As resources permit, follow up non-hospitalized patients with home visits or telephone contact
- Provide supportive care
- Administer **oxygen** as required
- As nebulizers and high-air-flow oxygen masks have been potentially implicated in the nosocomial spread of severe acute respiratory syndrome (SARS), use these measures only if clinically justified. Apply them under strict infection control, including airborne transmission precautions

- Take respiratory and blood specimens serially to check for possible bacterial infection. Consider intravenous antibiotic therapy to control secondary bacterial infections as required

▶ Use **paracetamol** or **ibuprofen** orally for management of fever as clinically indicated
  - Avoid administration of salicylates (such as acetylsalicylic acid) in children under 18 years of age because of the risk of Reye syndrome

Treatment of influenza in patients one year and above who have been symptomatic for no more than two days

- Duration of treatment is 5 days

▶ **Oseltamivir phosphate**
  - Adults and adolescents (13 years or more): 75mg twice daily
  - *Children (> 1 year*): <15kg body weight: 30mg twice daily
  - *Child 15 - 23kg body weight*: 45mg twice daily
  - *Child 23 - 40kg body weight*: 60mg twice daily
  - *Child > 40kg body weight*: 75mg twice daily

Prophylactic use

- Indicated for chemoprophylaxis in persons 13 years and above

▶ Give **oseltamivir phosphate**
  - Close contact: 75mg once daily for at least 7 days
  - Community contacts: 75mg once daily up to 6 weeks
  - Protection last only during the period of chemoprophylaxis

Treament

- **Oseltamivir phosphate** is effective against all subtypes of influenza viruses A (including H5N1)
  - Indicated for both therapeutic and prophylactic use

Discharge policy

- Infection control preemptions for adult patients should remain in place for 7 days after resolution of fever
- Children younger than 12 years can shed the virus for 2I days after onset of illness. Therefore, infection control measures for children should ideally remain in place for this period
- Children should not attend school during this period

21. ORAL AND DENTAL CONDITIONS

21.1 ACUTE PERIAPICAL ABSCESS OR DENTAL ABSCESS

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 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

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 HC4

In the absence of systemic signs and symptoms, antimicrobial therapy is usually not indicated:

- Drainage and relief of the tooth out of occlusion
- Consider extraction of the infected tooth
- Endodontic therapy (root canal treatment) of the affected tooth

If systemic signs and symptoms are present, prescribe a 3-day course of:

- **Phenoxymethylpenicillin** 500mg every 6 hours
  Child: 10-20mg/kg per dose
- Or **amoxicillin** 250mg every 8 hours
  Child: 25mg/kg per dose
- Or **PPF** 1MU IM daily child: 50,000 IU/kg per dose
- **Paracetamol** 1gm every 6 hours
- Or **ibuprofen** 400mg every 8 hours

Prevention

- Prevention and early management of dental caries
- Dietary advice: Advise the patient to avoid sugary foods and soft drinks and have adequate fresh fruit and vegetables in their diet
- Oral hygiene instructions: The patient should regularly brush their teeth after meals

21.2 DENTAL CARIES

Sugar-dependent infectious disease resulting in cavities or holes in the teeth.

Cause

Poor oral hygiene results in bacteria accumulation in a plaque on the tooth surface. Acid is produced as a by-product of the metabolism of dietary carbohydrate by the plaque bacteria. This causes demineralization of the tooth surface. The weakened tooth structure disintegrates, resulting in a cavity in the tooth.

Clinical features

- Localized toothache
- Cavitations in the teeth
- Tooth sensitivity to hot and cold stimuli

- Susceptible sites are those areas where plaque accumulation can occur unhindered, e.g. 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 HC2

- **Paracetamol** 1gm every 6 hours
- Or **Ibuprofen** 400 mg
- Refer to a dental specialist for fillings or extraction

Prevention

- Dietary advice: Advise the patient to avoid sugary foods and soft drinks and have adequate fresh fruit and vegetables in their diet
- Reduction in the availability of a microbial substrate by regular brushing, preferably after every meal
- Tooth strengthening and protection of teeth by rinsing with fluoride rinses and applying sealants to susceptible sites

21.2.1. Nursing caries

Definition: Anterior caries in the pre-school child

Cause

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

- 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
- Rapid progression of decay commencing labially and quickly encircling the teeth
- Teeth are affected in order of eruption

Management **HC4**
- Build-up of the teeth should be done using composites to restore shape and function
- Disc affected teeth interproximally to create self-cleansing areas
- Dietary advice: Eradicate, frequent on-demand liquids at night
- Regular fluoride applications

21.2.2. 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)

Cause
- Frequent ingestion of sugary foods and drinks in individuals with reduced saliva flow
- Prolonged 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 **HC4**
- Removal of aetiological factors as mentioned above

- Education, fluoride treatment, tooth restoration, endodontic therapy, extractions

21.3 GINGIVITIS

21.3.1. Acute nectrotizing ulcerative gingivitis (ANUG)

Also known as Vincent's gingivitis or Vincent's gingivostomatitis and should not be confused with Vincent's angina. Inadequately treated ANUG will lapse into a less symptomatic form known as chronic ulcerative gingivitis.

Cause

Fusospirochaetal complex together with gram negative anaerobic organisms

Clinical features

- Swelling and erythema of the gingival margins, which bleed easily when touched, causing difficulty drinking and eating
- Painful papillary yellowish-white ulcers
- Patient complains of metallic taste and the sensation of their teeth being wedged apart
- Fever, malaise, and regional lymphadenitis may be present
- Is associated with poor oral hygiene, but stress and smoking act as cofactors
- ANUG and severe periodontitis are often associated with uncontrolled diabetes mellitus and debilitated patients with poor hygiene
- ANUG may be a presenting sign of HIV infection in an otherwise apparently healthy individual

- Rarely, ANUG presents with 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

21.3.2. Chronic gingivitis

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 (these result in acute necrotising ulcerative gingivitis [ANUG or Vincent's infection]); 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 HC2

In the absence of systemic signs and symptoms, antimicrobial therapy is not usually indicated

► Mouthwash consisting of warm **salt solution**

- Dissolve a 5mL spoonful of salt in 200mL warm water or **hydrogen peroxide** solution 6%, add 15mL to a cup (200mL) of warm water
- Or **chlorhexidine** solution 0.2%
- Repeat mouthwash 3 times daily

▶ **Paracetamol** 1gm every 6 hours
▶ Or **ibuprofen** 400mg every 8 hours
▶ as required

If systemic signs and symptoms present:
Give a 5-day course of **antibiotic**:

▶ **Metronidazole** 400mg every 12 hours
Child: 10-12.5mg/kg (max: 250mg) per dose
✕ Metronidazole is contraindicated in pregnancy
▶ **Phenoxymethylpenicillin** 500mg every 6 hours
Child: 10-20mg/kg per dose
▶ Or **PPF** 1MU IM daily
Child: 50,000 IU/kg per dose
▶ Or **erythromycin** 250mg every 6 hours
Child: 7.5mg/kg per dose
▶ Refer to a dentist for scaling root planing and polishing to remove plaque and calculus deposits

Prevention

- Give instructions on oral hygiene:
  - Regularly cleaning of teeth to remove plaque (at least twice daily and preferably after every meal)
  - Avoid sugary foods and soft drinks
  - Regular visits to the dentist for checkups and calculus removal
  - Good nutrition with increased intake of vitamin C

21.4 PERIODONTAL ABSCESS

Localized collection of pus within a periodontal pocket.

Causes

- Introduction of virulent organisms into an existing pocket
- Impact of a foreign body, e.g. a fishbone into healthy periodontal membrane

Clinical features

Needs to differentiate it from a dental abscess

Dental 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: HC4

- Incision and drainage under a local anaesthetic
- Debridement of the pocket with a scaler
- **Metronidazole** 400mg 8 hourly for 5 days
- And **amoxicillin** 500mg 6 hourly for 5 days

21.5 PERIODONTITIS

21.5.1. Chronic periodontitis

Progression of the combination of infection and inflammation of gingivitis into the deep tissues of the periodontal membrane.

Cause

Mixed microbial flora commonly *B. gingivalis, B. forsythus, B. intermedius, Wolinella sp,* and *Fusobacter sp.*

Clinical features

- Bleeding of gums on probing and brushing
- Presence of periodontal pockets due to apical migration of the junctional epithelium beyond the enamel-cemental junction of the tooth

- Presence of sub-gingival calculus with increased tooth mobility

21.5.2. Juvenile periodontitis

This condition occurs in the presence of good plaque control and may be related to an immune defect.

Cause

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 gingival around the affected tooth may appear entirely normal, but deep pockets are detected on probing
- Early tooth loss

Management

- ▶ Oral rinses with mouthwash consisting of **chlorhexidine solution** 0.2% 3 times daily
- ▶ Give instructions on oral hygiene
- ▶ Refer to a dentist for scaling, root planning, and polishing to remove plaque and calculus deposits

21.6 PERICORONITIS

Inflammation of the operculum covering an erupting tooth occurs more commonly in association with the mandibular wisdom teeth.

Cause

- 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, and halitosis
- The operculum is swollen, red, and often ulcerated
- Fever and regional lymphadenitis may be present

Management

- ▶ Operculectomy done under local anaesthesia
- ▶ Extraction of the third molar associated with the condition
- ▶ Grinding or extraction of the opposing tooth
- ▶ Application of caustic agents (**trichloracetic acid** and **glycerine**)
- ▶ **Amoxicillin** 500mg every 8 hours for 5-7 days
- ▶ Add **metronidazole** 400mg every 8 hours for 5-7 days if necessary

21.7 PULPITIS

Inflammation of the pulp of a tooth.

Cause

- 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 sinusitis, temporomandibular joint pain dysfunction syndrome, or erupting mandibular wisdom teeth
- Dentine sensitivity due to thermal, tactile, or osmotic stimulus

Management

- ▶ Give an analgesic for pain relief e.g. paracetamol 1gm every 6 hours
- ▶ Or ibuprofen 400mg every 8 hours
- ▶ Refer to dentist for pulpotomy, endodontic (root canal) treatment, or extraction

Prevention

- Prevention and early management of dental caries
- Dietary advice: Advise the patient to avoid sugary foods and soft drinks and have adequate fresh fruit and vegetables in their diet
- Oral hygiene instructions: The patient should regularly brush their teeth after meals

21.8 STOMATITIS

Inflammation of the lining of the mouth.

Causes

- Nutritional deficiency, e.g. vitamin A
- 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
- Lead poisoning
- Lichen planus
- Pemphigus
- Erythema multiforme

Investigations

- Swab the 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 HC2

- Wash mouth with **salt solution**
  - Dissolve 5mL spoonful of salt in a cup of warm water or **hydrogen peroxide** solution 6%
  - Add 15mL to a cup (200mL) of warm water
- Repeat this mouthwash 3 times daily
- Continue treatment until healing takes place

21.9 DENTURE STOMATITIS

Redness of the palate under a denture with petechial and whitish areas

Causes

- 90% 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

Differential diagnosis

- Acrylic allergy

Investigations

➢ Exclude diabetes i.e. blood glocose

Management HC2

▶ Remove dentures at night
▶ Improve denture hygiene by soaking in **hypochlorite** cleanser and brushing fitting surface
▶ Replace ill-fitting dentures
▶ Reduce sugar intake
▶ Antifungal treatment: **Nystatin** suspension 100,000 units/mL 6 hourly
▶ or **amphotericin** suspension 100mg/mL 6 hourly

21.10 TRAUMA

Injury to the oral or dental tissues as a result of trauma.

21.10.1. Traumatic lesions I

a) Fibroepithelial polyp

Over-vigorous response to low grade recurrent trauma resulting in fibrous hyperplasia

Clinical features

Well-localized sessile or pedunculated lump, usually located on the palate or lateral surface of the tongue

Management RR

► Excision biopsy and histological confirmation

b) Mucocoele

Saliva extravasation into the tissues from damage to minor salivary gland ducts. They are commonly seen in the lower labial and ventral lingual mucosa.

Clinical features

- History of trauma and characteristic appearance

Management

► Surgical removal (recurrence may occur if there is regular trauma)

c) Ranula

A mucocele that occurs from the sublingual gland.

Clinical features

- Blue, transparent sublingual swelling

Management

► Excision of the sublingual gland

21.10.2. Traumatic lesions II

These simple lesions are often confused for more severe conditions like lichen planus, oral candidiasis, pemphigus, erythema multiforme.

a) Burns

Most common after ingestion of hot foods and are 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.

Clinical features

- Burns in the palate located in characteristic sites related to eating, restored, or painful tooth

Management

- ▶ Reassurance that healing will occur without scarring; topical anaesthetic **lidocaine** 2%may help

b) Sharp teeth and restorations

Trauma from sharp teeth or restorations is often worsened in patients with physical or intellectual disability.

Clinical features

- Lesion is site specific and is related to a sharp edge

Management **RR**

- ▶ Smooth the edge and/or apply a restorative material to the tooth

c) Ulceration due to local anaesthetic

Ulceration due to biting the area of anaesthetised mucosa.

Clinical features

- Ulcer confined to the area of anaesthetised mucosa

Management

- ▶ Reassurance
- ▶ May require antibiotic therapy if the area becomes secondarily infected
- ▶ Amoxicillin 500mg every 8 hours for 5-7 days if necedssary

21.10.3. Traumatic lesions III

Trauma due to physical injury, e.g. a fall, sports, road traffic accident.

Management **HC2**

- ▶ Give tetanus booster if needed (see 1.12 Tetanus)
- ▶ Check for facial fractures and/or lacerations

- If evidence of head injury (amnesia, loss of consciousness, neurological signs), transfer patient to hospital immediately (See Head Injuries and Trauma)
- Intra-oral look for soft-tissue lacerations, dento-alveolar fractures, and damage to teeth
- Check for 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
- 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
- Wash mouth with warm **salt solution**
  - (Dissolve a 5ml spoonful of salt in 200ml of warm water)
  - Or **hydrogen peroxide** solution 6% (add 15ml to a cup 200ml of warm water).
  - Repeat mouth wash 3 times daily
- For elimination of pain, give an analgesic
- **Paracetamol** 1gm every 6 hours
- Or **ibuprofen** 400mg every 8 hours
- Give prophylactic **antibiotics** if indicated
- **Amoxicillin** 500mg every 8 hours for 5-7 days

▶ Refer to a dentist for orthodontics, endodontic (root canal) treatment, or protection of pulp

Prevention

- Early orthodontic treatment in children with large overjets that are susceptible to trauma
- Provision of a mouth guard for sports made of vacuum formed thermoplastic vinyl
- Be alert for evidence of child abuse

21.11 FLUOROSIS

Fluorosis/Mottling.

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 **RR**

Tooth coloured (composite) fillings, veneers

Prevention

- Monitoring of fluoride levels in drinking water
- Use of fluoride-free toothpastes in endemic areas

21.12 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* or *false teeth* is based on the belief that the 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 prevalence of this practice in Uganda and neighbouring countries is varied. The procedure is done as early as one month and up to three years of age. Most studies report a peak age of four to eighteen 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 reared.

The term *ebinyo* encompasses both the child's ailment, as well as the treatment offered by the traditional healer

Consequences of traditional treatment of ebinyo:

- Even when the procedure is aimed at removal of the primary canine, damage to the surrounding tissues is a possibility
- 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

► Treat the condition causing the symptoms

Prevention

- Oral health education

- Appropriate treatment of childhood illnesses
- Provision of proper nutrition to children

21.13 MALOCCLUSION

Malocclusion has been described as any deviation from the normal relation of the teeth in the same arch to each other and to the teeth in the opposite arch. Although the aetiology is multifactorial, malocclusion may occur as a result of discrepancies in the craniofacial skeleton, dentition, or both. The need for treatment is determined by the severity of malocclusion. The main indications for orthodontic treatment are aesthetics and function.

Reasons for treatment:

- 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 of the teeth)
- While severe malocclusion can have a psychologically debilitating effect, it is often influenced by social and cultural factors

Management **RR**

- ▶ Removable appliance orthodontic therapy for mild cases in the mixed dentition by a dentist
- ▶ Fixed appliance orthodontic therapy for moderate to severe case in adolescents and adults by an orthodontist

- Severe orthodontic cases with discrepancies in the craniofacial skeleton may require orthognathic surgery by an oral and maxillofacial surgeon

21.14 HIV/AIDS ASSOCIATED ORAL LESIONS

21.14.1. Oral candidiasis

Cause

Caused primarily by *Candida albicans*.

Clinical features

Intractable oral and oesophageal candidiasis can present as pseudomembranous, hyperplastic, or erythematous. Angular cheilitis is also common.

Management

- **Nystatin** tablets 100,000 units. Dissolve in mouth 4 times daily for 7- 1 4 days after meals

21.14.2. Herpes Infections

Cause

Both simplex and zoster infections can affect the face and oral cavity.

Clinical features

- The clinical presentation of herpes zoster includes multiple small vesicles (2-3mm) that ulcerate and coalesce to form larger ulcers on the oral mucosa. They are commonly on the vermillion border, gingiva, dorsal tongue, and hard palate. Facial or oral lesions of herpes zoster may arise in the areas supplied by the branches of the trigeminal nerve. They 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 for Herpes zoster

- **Acyclovir** 800mg 5 times daily for 5 days.
  Symptomatic management: **Analgesics**, topical anaesthetic (e.g. **lidocaine**)

21.14.3. Acute Necrotizing Ulcerative Gingivitis

See section on Gingivitis

21.14.4. Kaposi's sarcoma

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 **RR**

- Refer for chemotherapy

21.14.5. Persistent submandibular and/or cervical lymphadenopathy

Otherwise inexplicable lymphadenopathy larger than 1cm in diameter and persisting for more than three months; may be prodromal or a manifestation of AIDS

21.14.6. Hairy leukoplakia

Clinical features

Clinically hairy leukoplakia may present as an adherent white, corrugated plaque, usually found bilaterally on the borders of the tongue

Management

- **Podophyllin rosin** 25%: Apply to lesion once weekly if necessary
- ARV

21.15 BURKITT'S LYMPHOMA

Burkitt lymphoma (or "Burkitt's tumor" or "Malignant lymphoma, Burkitt's type") is a cancer of the lymphatic system (in particular, B lymphocytes). It is named after Denis Parsons Burkitt, a surgeon who first described the disease in 1956 while working in Equatorial Africa. Of all cancers involving the same class of blood cell, 2% of cases are Burkitt's lymphoma.

Cause

- Associated with poor social economic status

Clinical features

- Often presents as a tooth ache in the maxilla
- Teeth are mobile
- Extractions do not relieve the swelling

Classification

Burkitt's lymphoma can be divided into three main clinical variants: the endemic, the sporadic, and the immunodeficiency-associated variants

- The **endemic variant** occurs in Equatorial Africa. It is the most common malignancy of children in this area. Children affected with the disease often also had chronic malaria, which is believed to have reduced resistance to Epstein-Barr virus (EBV), allowing it to take hold. The disease characteristically involves the jaw or other facial bone, distal ileum, caecum, ovaries, kidney, or the breast.

- The **sporadic type** of Burkitt lymphoma (also known as "non-African") is another form of non-Hodgkin lymphoma found outside of Africa.
  - The tumor cells have a similar appearance to the cancer cells of classical African or endemic Burkitt lymphoma. It is believed that impaired immunity provides an opening for development of the Epstein-Barr virus related tumor.
  - Non- Hodgkins, which includes Burkitt's, accounts for 30-50% of childhood lymphoma. Jaw is less commonly involved, comparing with the endemic variant. Ileo-cecal region is the common site of involvement.
- **I**mmunodeficiency-associated Burkitt lymphoma is usually associated with HIV infection or occurs in the setting of post- transplant patients who are taking immunosuppressive drugs. Burkitt lymphoma can be the initial manifestation of AIDS.

Differential diagnosis

- Other cancer diseases

Investigtations

- Biopsy of the mass

Management RR

Effect of chemotherapy, as with all cancers, depends on the time of diagnosis.

- With faster growing cancers, such as this one, the cancer actually responds quicker than with slower-growing cancers
- This rapid response to chemotherapy can be hazardous to patient as a phenomenon called "tumor lysis

syndrome" could occur. Close monitoring of patient and adequate hydration is essential during the process.

Chemotherapy **RR**

Treatment must be carried out by specialists and is specific to each patient

- Cyclophosphamide
- Doxorubicin
- Vincristine
- Methotrexate
- Cytarabine
- Ifosfamide
- Etoposide
- Rituximab

Other treatments are

- Immunotherapy
- Bone marrow transplants
- Surgery to remove the tumor
- Radiotherapy

22. HEPATIC AND BILIARY DISEASES

22.1 ACUTE CHOLECYSTITIS

Inflammation of the gall bladder; a surgical emergency. Acute cholecystitis can become chronic which will require surgical treatment in hospital

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
  - Pain worsens on deep breathing
- Nausea and vomiting
- Jaundice (sometimes)
- Low grade fever (38°-39°C) with chills

The severity of acute cholecystitis is classified into three grades:

Grade I (mild acute cholecystitis) is defined as acute cholecystitis in a patient with no organ dysfunction and limited disease in the gallbladder, making cholecystectomy a low-risk procedure.

Grade II (moderate acute cholecystitis) is associated with no organ dysfunction, but there is extensive disease in the gallbladder, resulting in difficulty in safely performing a cholecystectomy.

Grade II disease is 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; and imaging studies indicating significant inflammatory changes in the gallbladder.

Grade III (severe acute cholecystitis) is defined as acute cholecystitis with organ dysfunction.

Differential diagnosis

- Acute alcoholic hepatitis
- Intestinal obstruction

Investigations

- X-ray, abdominal ultrasound
- Blood: Haemogram, liver tests, pancreatitis
- Enzymes and renal function tests.

Management HC4

- Nil by mouth
- Relieve pain with **pethidine** 50-100mg IM every 6-8 hours
- Rehydrate with **IV fluids** and **electrolytes** e.g. **Ringer's lactate**
- Broad spectrum **antibiotic**, e.g.. **ampicillin** 1-2g IV or IM every 6 hours for up to 7 days
  Child: 25-50mg/kg per dose
- When possible, switch to oral **amoxicillin** 500-1,000mg every 8 hours to complete the course
  Child: 15mg/kg (max: 500mg) per dose
- Plus **gentamicin** 5-7mg/kg IV once daily
  Child: 2.5mg/kg IV every 8 hours
  ✕ Contraindicated in pregnancy
- Refer to hospital within 2-3 days for surgery (cholecystectomy)

22.2 CIRRHOSIS

Liver disease causing irreversible damage. Clinically, it can be classified as compensated or decompensated.

Decompensated cirrhosis is defined by the presence of ascites, variceal bleeding, encephalopathy, or jaundice, which are complications that result from the main consequences of cirrhosis: portal hypertension and liver insufficiency.

Causes

- Infections, e.g. viral hepatitis B and D, hepatitis C
- Intoxication with alcohol, drugs, or toxins, e.g. methotrexate, isoniazide, methyl-dopa
- Infiltrative disorders, e.g. non-alcoholic fatty liver disease, Wilson's disease, haemochromatosis
- 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

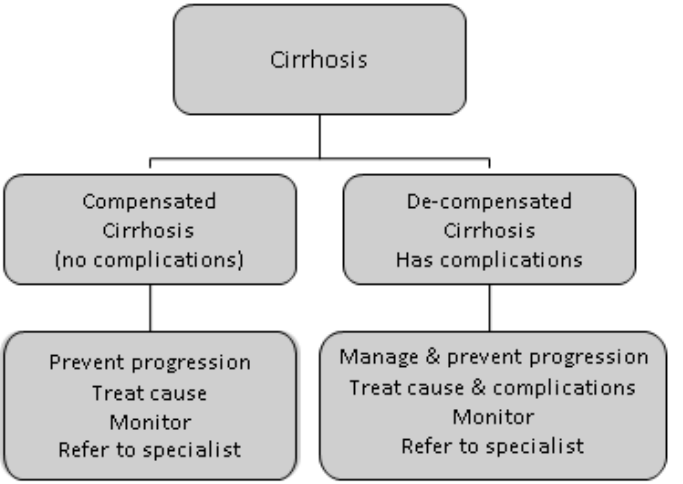
- Fatigue, weight loss, features of malnutrition
- Jaundice, features of encephalopathy
- Swelling of abdomen (ascites) with or without oedema
- Enlarged spleen

Differential diagnosis

- Diffuse hepatic parenchymal disease
- Metastatic or multifocal cancer in the liver
- Renal disease
- Hepatic vein obstruction
- Any cause of enlarged spleen
- Heart failure
- Chronic inflammation of the pancreas

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 feto protein, and biopsy
- Endoscopy **HC4**



22.2.1. Ascites

Pathological accumulation of fluid in the peritoneal cavity.

22.2.1.1 Uncomplicated ascites

Clinical features

Ascites that is not infected and not associated with hepatorenal syndrome

- Reduced urinary output (<500ml in 24hrs in adults),

- Abnormal renal function test
- Ascites not improving on treatment

Grade 1 Ascites (mild)

Ascites is only detectable by ultrasound examination

Grade 2 Ascites (moderate)

Ascites causing moderate symmetrical distension of the abdomen

Grade 3 Ascites (severe)

Ascites causing marked distension abdominal distension

Clinical diagnosis

- Fluid thrill (fluid wave)
- shifting dullness
- peritoneal tap (paracentesis)
- analysis of fluid

Investigations

- Abdominal ultrasound scan
- Endoscopy
- Liver function tests
- Complete blood count
- Renal function tests
- Serum sodium and serum potassium)

Management HC4

- Diet
  - **Restrict dietary salt** to a no-add salt diet 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)
  - **Water** restrict if oedema and hyponatremia is present

- Abstain from **alcohol**
- Avoid **NSAIDS** and herbs

- **Daily monitoring**: Daily weight, BP, pulse, stool for melaena, encephalopathy
- **Diuretics**: Spironolactone is the main stay of diuretic therapy.
  - Use **spironolactone** (50-100mg/day in the morning) to reach goal of weight loss: 300-500g/day. If needed, doses to be increased every 7 days up to maximum of 400mg/day of **spironolactone**.
  - **Furosemide** can be added at a starting dose of 20-40mg/day and subsequently increased to 160mg/day if needed (monitor for hypotension and best used if pedal oedema is present).
  - For maintenance, it is best titrate to the lowest diuretic dose. Most patients do well with **spironolactone** 50mg/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 5L in 3-4 hours) or **large volume** (5-10L) with infusion of a plasma expander (e.g. 8g **albumin** per litre of ascites removed). Monitor for hypotension.
- Refer if patient has or develops complicated ascites
  - More than 50% of patients with complicated ascites die within two years

22.2.1.2 Spontaneous bacterial peritonitis (SBP) H

Medical emergency occurring in up to 20% of patients with ascites. Patients must be admitted to hospital and should be suspected of SBP infection when ascites

increases in severity, particularly in the presence of fever, abdominal pain, abdominal tenderness, and worsening encephalopathy. It is also a cause of renal failure, bleeding varices, and death. The diagnosis is confirmed by an ascitic tap and cell counts. **A neutrophil count of >250/mm^3 in ascitic fluid confirms the diagnosis.**

Management

- ▶ Treat with IV antibiotics for 5 -10 days
- ▶ Empirical therapy includes use of **IV ciprofloxacin** 500mg every 12 hours, **IV ceftriaxone** 1gm daily, or **IV co-aminoclavulinic acid**.
- ▶ May add **metronidazole** 500mg IV every 8 hours to the above
  - △ Avoid gentamicin and NSAIDs
- ▶ Give **albumin infusion** 1g/kg to prevent hepatorenal syndrome
- ▶ Refer to a hospital as soon as possible

22.2.2. Hepatic encephalopathy (HE)

Hepatic encephalopathy is a syndrome of neuropsychiatric symptoms and signs, including coma.

Clinical features

- Grade 0: Subclinical HE-construction apraxia
- Grade I: Confusion, flap tremor
- Grade II: Drowsy
- Grade III: Stuporous
- Grade IV: Coma

Management

- ▶ Address possible pathophysiological mechanisms related to brain, gut, and liver

Brain

- Treatment involves recognition and correction of **precipitating factors**, including renal impairment, gastrointestinal bleeding, infections, and electrolyte disturbances.
- Encephalopathy may be aggravated by surgery, parencentsis, excessive diuretics, sedatives, and opioid analgesics.
- Intracranial hypertension and sepsis are the main causes of death.

Gut

- Empty the gut
  - Give **oral lactulose** 15-30mL 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

If referral delays

- Give an antibiotic with a local action on the gut: Oral **metronidazole** 400-800mg every 8 hours for 5 days
- Or oral **paromomycin** 1000mg every 6 hours for 5 days

22.2.3. Bleeding varices

- Resuscitate with IV **normal saline**
  - Blood transfusion may be required in severe anaemia
- Refer to hospital for further management

22.3 VIRAL HEPATITIS

A condition characterised by inflammation of the liver due to hepatitis viruses may be acute (hepatitis A, B, C, D, E,

and yellow fever) or chronic (hepatitis B, D, C). May be symptomatic or asymptomatic.

Clinical features

- Abdominal discomfort, nausea, diarrhoea
- Malaise
- Enlarged liver and tenderness, pain over the liver area
- Jaundice
- Fever
- Anorexia
- Joint pain
- Urticaria

Differential diagnosis

Includes:

- Other causes of hepatitis, e.g. drugs, herbs, tumours, and autoimmune diseases
- Gastroenteritis
- Relapsing fever
- Pancreatitis
- Malaria
- Leptospirosis, Haemorhagic fevers, e.g. Marburg and Ebola

Investigations

- Blood:
  - Haemogram
  - Slide for malaria parasites
  - Liver tests
  - Serum for viral antigens and antibodies; Hepatitis B, Hepatitis C, and HIV serology.

Management HC2

- Refer for admission (only if patient condition is poor)

- ▶ 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
- ▶ Diet: High in carbohydrates and vitamins/ allow vegetable proteins but discourage animal proteins i.e. meat
  - ✕ Avoid drugs generally but especially sedatives and hepatotoxic drugs
- ▶ Refer if patient has features of liver failure or decompensated liver disease

22.4 CHRONIC HEPATITIS

22.4.1. Chronic Hepatitis B infection

Clinical features

- Hepatitis B surface antigen positive at 0 and 6 months,
- Hepatitis B core antibody (Negative IgM and Positive IgG)

Investigation

- ➢ HIV serology
- ➢ Liver tests
- ➢ Alpha fetoprotein
- ➢ Abdominal ultrasound
- ➢ Hepatitis B panel
- ➢ Hepatitis B surface antigen
- ➢ e-antigen status
- ➢ Hepatitis B core antibody (IgM andIgG)

Management

- ▶ Refer to a regional hospital or higher for the attention of specialist

Prevention

- Vaccination of all individuals at risk e.g. health workers, children of Hepatitis B positive parents and all those coming from high endemic areas
- Refer to the vaccination section

22.4.2. Hepatitis B and HIV coinfection

Diagnosis

- Hepatitis B surface antigen positive and HIV serology reactive

Management

▶ Refer to a regional hospital or higher for the attention of specialist

22.4.3. Chronic hepatitis C infection

Clinical features

- Anti hepatitis C antibody positive at 0 and 6 months

Management

▶ Refer to a regional hospital or higher for confirmatory investigations and treatment

22.4.4. Drug induced liver injury

Clinical features

- Diagnosis of exclusion
- Any patient who has evidence of 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

Common Drugs

- Phenytoin, carbamazepine, anti tuberculosis drugs, cotrimoxazole, diclofenac, paracetamol, antiretroviral drug, ketoconazole

Management

- ▶ Stop all drugs or herbs
- ▶ Do not give the drug again (do not rechallenge!)
- ▶ Refer to a regional hospital or higher for attention of the specialist

22.5 HEPATOCELLULAR CARCINOMA

Clinical features

- Presents with right upper quadrant pain, hepatomegaly with or without splenomegaly
- Fever
- Weight loss
- Jaundice, ascites, and lympadenopathy
- Risk factors include Hepatitis B, aflatoxin, and cirrhosis.

Differential diagnosis

- Liver metastasis
- Liver abscess
- Hydatid cyst
- Haematological disease

Investigations

- ➢ Abdominal ultrasound (sonogram)
- ➢ Alpha fetoprotein
- ➢ Liver tests
- ➢ Liver biopsy

Management

- ▶ Refer to a regional hospital or higher

23. CHILDHOOD ILLNESS

This chapter is adapted from "*Management of Childhood Illness"*, MoH 2000, which should be consulted for more detailed information and management flow charts.
The following guidelines use a syndromic approach to the management of common childhood conditions (Integrated Management of Childhood Illness - IMCI) 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

23.1 SICK CHILD (AGE 2 MONTHS TO 5 YEARS)

Assess, classify, and treat

- Ask the mother what the child's problems are
- Check for general danger signs where the child:
  - Is unable to drink or breastfeed
  - Is vomiting everything
  - Has had convulsions
  - Is lethargic or unconscious

  If any of these **danger signs** is present:

▶ Give the child urgent attention
▶ Complete the assessment
▶ Give required pre-referral treatment immediately to avoid delay
▶ Treat any current convulsion with **IV diazepam** 0.3mg/kg
▶ Refer urgently as required

Ask about main symptoms

a) Cough or difficult breathing
b) Diarrhoea
c) Fever
d) Ear problem

- Then check for malnutrition, anaemia, and other problems

23.1.1. Child has cough or difficult breathing

- Ask for how long child has had this

Ensure the child is calm, then

- Count the number of breaths/minute
- Look for chest indrawing and look/listen for stridor
- Classify and treat as directed in the table below:

Clinical features	Classify As	Management
• Any general danger sign (see previous page) • Chest indrawing or stridor in calm child	SEVERE PNEUMONIA or VERY SEVERE DISEASE	▶ Give 1st dose of **cotrimoxazole** ▶ Give vitamin A ▶ Refer urgently*
• Fast breathing: - 2-12 moths: 50 bpm - 1–5 years: 40 bpm	PNEUMONIA	▶ Give **cotrimoxazole** for 5 days ▶ Give vitamin A ▶ Soothe throat/relieve cough ▶ Advise mother when to return immediately

Clinical features	Classify As	Management
		▶ Follow up in 2 days
None of above signs	NO PNEUMONIA, COUGH, or COLD	▶ If cough >30 days: refer for assessment ▶ Soothe throat/relieve cough ▶ Advise mother when to return immediately ▶ If not improving, follow up in 5 days

bpm: Beats per minute

**If referral is not possible, manage as Severe pneumonia (section 3.11.2)*

23.1.2. Child has diarrhoea

- Ask 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 directed in the table below:

Clinical features	Classify As	Management
Dehydration		
Any 2 of these signs: • Lethargic or unconscious • Sunken eyes • Unable to drink or drinks poorly • Skin pinch returns very slowly (>2 seconds)	SEVERE DEHYDRATION	▶ If child has no other severe classification, give Plan C (see 18.2.1.3) ▶ If child also has another severe classification: - Refer urgently with mother giving frequent sips of **ORS** on the way - Advise mother to continue breastfeeding ▶ If child ≤2yrs and there is cholera in your area: - give 1st dose of **cotrimoxazole**
Any 2 of these signs: • Restless, irritable • Sunken eyes	SOME DEHYDRATION	▶ Give Plan B (see 18.2.1.2) ▶ If child also has another severe classification, manage as above
• Thirsty, drinks eagerly • Skin pinch returns slowly	SOME REHYDRATION	▶ Advise mother when to return immediately ▶ If not improving, follow up in 5 days
• Not enough	NO	▶ Give Plan A (see

Clinical features	Classify As	Management
signs to classify as some or severe dehydration	DEHYDRATION	18.2.1.1) ▶ Advise mother when to return immediately ▶ If not improving, follow up in 5 days
If diarrhoea for 14 days:		
• Dehydration present	SEVERE PERSISTENT DIARRHOEA	▶ Give **vitamin A** ▶ Treat dehydration before referral (unless child has another severe classification) ▶ Refer
• No dehydration	PERSISTENT DIARRHOEA	▶ Advise mother on feeding child with this condition ▶ Give **vitamin A**; follow up in 5 days
• Blood in stool	DYSENTERY	▶ Give **cotrimoxazole** for Shigella for 5 days; follow up in 2 days

Management

The current recommendation for treatment of diarrhoea is oral rehydration salts (ORS) and zinc salts (Zn sulphate, Zn gluconate or Zn acetate).

- ▶ ORS
- ▶ Give **zinc** (10 - 20mg) daily for 10 days
- ▶ Children above 6 months: Give 20mg per day
  Child <6 months: 10mg per day
  Child >6 months: 20mg per day

23.1.3. Child has fever

By history, feels hot, or temperature 37.5°C (see note 1 in table below).

Ask for how long child has had this

- If >7 days, ask if fever been present every day
- Ask if the child has had measles in the last 3 months
- Look/feel for stiff neck
- 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 directed in the table below:

Clinical features	Classify As	Management
• Any general danger sign • Stiff neck	VERY SEVERE FEBRILE DISEASE	▶ Give 1st dose of **quinine** or **rectal artesunate** for severe malaria ▶ Give 1st dose of **cotrimoxazole** ▶ Treat child to prevent low blood sugar (see page 545) ▶ Give one dose of **paracetamol** ▶ 10mg/kg for high fever

Clinical features	Classify As	Management
		(38.5°C) ▶ Refer urgently

• Fever
  • By history
  • Feels hot
  • Temperatur e 37.5°C
	MALARIA	▶ Give 1st line malaria treatment (oral **ACT)**
		▶ Give one dose of **paracetamol** 10mg/kg for high fever (38.5°C)
		▶ Advise mother when to return immediately
		▶ If fever persists, follow up in 2 days
		▶ If fever every day for >7days, refer for assessment

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 **cotrimoxazole** - If clouding of cornea or pus draining from eye: apply **tetracycline** eye ointment ▶ Refer
• Pus draining from	MEASLES + EYE	▶ Give **vitamin A**

Clinical features	Classify As	Management
eye • Mouth ulcers	OR MOUTH COMPLICATIONS	If pus draining from eye: - Apply **tetracycline** eye ointment ▶ If mouth ulcers, apply gentian violet paint ▶ Follow up in 2 days
• Measles now or in last 3 months	MEASLES	▶ Give vitamin A

Notes:

1. Body temperatures are based on axillary measurement
   - Rectal readings are approximately 0.5°C higher
2. Other measles complications (i.e. pneumonia, stridor, diarrhoea, ear infection, and malnutrition) are classified in other tables

23.1.4. Child has an ear problem

- Ask if there is ear pain
- Ask if there is discharge:
  - If yes, ask for how long has there been a discharge?
- Look for pus draining from the ear
- Feel for tender swelling behind the ear

Clinical features	Classify As	Management
• Tender swelling behind the ear	MASTOIDITIS	▶ Give 1st dose of **cotrimoxazole** ▶ Give 1st dose of **paracetamol** for

Clinical features	Classify As	Management
		pain ▶ Refer urgently
• Ear pain • Pus seen draining from the ear, and discharge reported for <14 days	ACUTE EAR INFECTION	▶ Give **cotrimoxazole** for 5 days ▶ Give **paracetamol** for pain ▶ Dry ear by wicking ▶ Follow up in 5 days
• Pus seen draining from the ear, and discharge reported for 14 days or longer	CHRONIC EAR INFECTION	▶ Dry ear by wicking ▶ Follow up in 5 days
• No ear pain • No discharge	NO EAR INFECTION	▶ No additional treatment needed

23.1.5. Malnutrition and anaemia

- Look for severe wasting, palmar pallor (severe or some?), oedema of both feet; is the child a sickler?
- Determine weight for age (WFA), see page 574)

Signs	Classify As	Treatment
• Visible severe wasting • Severe palmar pallor • Oedema of	SEVERE MALNUTRITION or SEVERE ANAEMIA	▶ Give **vitamin A** ▶ Refer urgently

Signs	Classify As	Treatment
both feet		
• Some palmar pallor • Very low WFA (see notes)	ANAEMIA or VERY LOW WFA	▶ Assess child's feeding and counsel mother ▶ If feeding problem: - Follow up in 5 days - Give **mebendazole** ▶ If pallor and child is not a sickler: Give **iron** ▶ If pallor and child is a sickler: Give **folic acid** ▶ Give 1st line oral antimalarial treatment (**ACT**) ▶ Advise mother when to return immediately ▶ If pallor, follow up in 14 days ▶ If very low WFA, follow up in 30 days
• Not very low WFA • No other signs of malnutrition	NO ANAEMIA and NOT VERY LOW WFA	▶ Give **mebendazole** ▶ If child <2 years: - assess feeding and counsel mother on feeding ▶ If feeding problem: - Follow up in 5 days - Advise mother when to return

Signs	Classify As	Treatment
		immediately

Notes on table

- **Mebendazole** or **albendazole**: Only give the medicine if child 1 year and no dose given in last 6 months
- **WFA**: Use the graph to determine weight-for-age status

23.1.6. Check immunization

- Refer to national immunisation schedule
- And refer to relevant sections in the UCG

23.1.7. Check vitamin A supplementation

Child 6 months

- Ask if child has had vitamin A in past 6 months. If not

▶ give vitamin A

23.1.8. Check deworming

Child 1 year

- Ask if child has had mebendazole in past 6 months. If not

▶ give **mebendazole** or **albendazole**.

23.1.9. Assess other problems

- Ensure child with any danger sign is referred as soon as possible after giving
  - Initial dose of the appropriate antibiotic
  - Any other urgent treatments

Note

- Referral may not be necessary if rehydration of a dehydrated child using Plan C has resolved danger signs

23.1.10. Assess feeding (if anaemic, very low weight, or child <2 years old)

- Ask about the child's usual feeding and feeding during the current illness
- Compare the answers given with the feeding recommendations for the child's age

Ask

- Do you breastfeed the child? If yes:
  - How many times during the day?
  - How many times at night?
- Do you give the child any other food or fluids? If yes:
  - What food or fluids?
  - How many times daily?
  - What do you use to feed the child?
  - What foods are available in the home?

If very low weight for age

  - How large are 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?

23.1.11. Medicines and treatments

23.1.11.1 Medicines for clinics only

For each

- 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

a) Procaine penicillin (once daily IM for 5 days); 2 moths - <5 years: 50,000 IU/kg
- Used as 3rd line treatment of acute ear infection, very severe disease, and pneumonia, i.e. when the 2nd line medicine amoxicillin is not available or child cannot swallow oral medication

b) Chloramphenicol (every 12 hours IM); 2 months - <5 years: 40mg/kg
- Used for children being referred urgently who cannot take an oral antibiotic

▶ Give first dose then refer urgently

If referral not possible

▶ Repeat dose every 12 hours for 5 days

▶ Then change to an appropriate oral antibiotic to complete 10 days treatment

c) Quinine or rectal artesunate
- Used for severe malaria

d) Diazepam
- Rectal diazepam is used to treat convulsions

e) Prevention of low blood sugar

If the child is able to breastfeed:

- Ask mother to breastfeed the child

If the child is unable to breastfeed but can swallow

- Give 30–50mL of expressed breastmilk or a breastmilk substitute, e.g. fresh cow's milk, before the child leaves the clinic

*If neither of these is available, give 50mL **sugar water***

- Dissolve 5 g sugar (1 level teaspoon) in 50mL of clean water

- Or dissolve 20g sugar (4 level teaspoon) in a mug (200mL) of clean water and give 50mL (a quarter) of this

If child unable to swallow

- Give 50mL of milk or sugar water by nasogastric tube

23.1.11.2 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
- Collect, measure/count, pack, and label it separately
- Check the mother's understanding before she leaves

23.1.11.3 Oral medicines used in IMCI

- **Cotrimoxazole,** (every 12 hours for 5 days)
  2–12 months (4-10kg): 240mg
  12 months – 5 years (10–19kg): 360mg
  - Used as 1st line medicine in
    - Pneumonia
    - Dysentery
    - Cholera
    - Acute ear infection
    - Very severe disease (initial pre-referral dose)

- **Amoxicillin** (every 8 hours for 5 days)
  2-12 months (4–10kg): 125mg
  12 months - 5 years (10–19kg): 250mg
  - Used as 2nd line medicine in
    - Pneumonia
    - Acute ear infection
    - Very severe disease (initial pre-referral dose)
- Antimalarials (see Malaria section 2.7)
- **Erythromycin** (every 6 hours for 3 days)
  2–4 months (4 - <6kg): 62.5mg
  4 -12 months (6 - <10kg): 125mg
  12 months – 5 years (10 - 19kg): 250mg
  - Used as 2nd line medicine in
    - cholera
- **Folic acid** (single daily dose for 14 days)
  <5 years: 2.5mg
- **Iron, ferrous sulphate**, (daily in 2 divided doses)
  - Supply for 14 days initially

  2-<4mths (4-<6kg): 30mg elemental iron
  4 months- 3 years (6-<14kg): 60mg elemental iron
  3 years-<5 years (14-<19kg): 90mg elemental iron
  - Used in iron-deficiency anaemia
  - Give to non-sicklers
  - If child is a sickler, give folic acid (see below) Continue iron for 3 months after Hb is normal
  - Ferrous salt (sulphate) tablets 200mg = 60mg elemental iron

  Available formulations
  - Ferrous salt (sulphate) oral solution paediatric 60mg/5mL = 12mg elemental iron/5mL

- **Mebendazole** or **albendazole** (single dose, repeat every 6 months)
  <2 years: 250mg
  2 years: 500mg
- **Nalidixic acid** (every 6 hours for 5 days)
  2–4 months (4 - <6kg): 62.5mg
  4–12 months (6 - <10kg): 125mg
  12 months – 5 years (10–19kg): 250mg
  - Used as 2nd line medicine in dysentery
- **Oral rehydration salts (ORS)**
- P**aracetamol** (every 6 hours for 24 hours, i.e. 4 doses)
  2 months - <3yrs (4 - <14kg): 125mg
  3 - <5 years (14 - <19kg): 250mg
  - Used for fever 38.5^{o}C or (ear) pain
- **Vitamin A**
  Up to 6mths: 50,000 IU
  6–12 months: 100,000 IU
  12 months – 5 years: 200,000 IU
  - In measles, persistent diarrhoea, severe malnutrition, give 3 doses:
    - 1st dose in clinic
    - 2nd dose given by mother at home the next day
    - 3rd dose at clinic 4 weeks later
  - In pneumonia, give 1 dose in the clinic
  - For supplementation of children above 6 months, give single dose in clinic every 6 months
  - Record doses on the <5 card
  - ✖ Do not give a dose of vitamin A within 4 weeks of any previous dose the child may have been given

23.1.11.4 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 she understands completely before leaving

a) Eye infection

▶ Clean both eyes 3 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 3 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 gone

✕ Do not put anything else into the eye

b) 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

✕ Do not put anything else into the ear

c) 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

d) 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)

23.1.12. Follow-up care

- Care for the child who returns for follow-up using all of the sections/steps below, which match the child's previous classification

If the child has any new problem

- Assess, classify, and treat the new problems using the tables 1a) to 1e) above

If any more follow-up visits are needed

- Advise the mother when to return with the child

Also advise the mother when to return immediately

23.1.12.1 Pneumonia

After 2 days

- Check for general danger signs
- Assess for cough and difficult breathing

Ask

- Is the child breathing more slowly?
- Is there less fever
- Is the child feeding/eating better?

If chest indrawing or any general danger signs

▶ Give a dose of 2nd line antibiotic **amoxicillin** or IM **chloramphenicol**

If unable to swallow

▶ Refer urgently

If breathing rate, fever, and eating are unchanged:

▶ Change to 2nd line antibiotic **amoxicillin**

▶ Advise mother to return in 2 days

▶ Refer (e.g. if child had measles in past 3 months)

If breathing slower, fever less, or eating better:

▶ Complete the 5 day course of **cotrimoxazole**

23.1.12.2 Persistent diarrhoea

After 5 day

Ask:

- Has the diarrhoea stopped?
- How many loose stools does the child have per day?

If diarrhoea not stopped (3 or more loose stools/day)

- Do a full reassessment
- Give any treatment needed
- Refer

If diarrhoea stopped (<3 loose stools/day)

- Tell mother to follow usual feeding recommendations for the child's age

23.1.12.3 Dysentery

After 2 days, assess for diarrhoea

Ask:

- Are there fewer stools?
- Is there less blood in the stool?
- Is there less fever?
- Is there less abdominal pain?
- Is the child eating/feeding better?

If the child is dehydrated

▶ Treat dehydration

If above signs and symptoms same or worse

▶ Change to 2nd line oral antibiotic recommended for Shigella: **Nalidixic acid** 500mg tablet (every 6 hours for 5 days)

2–4 months (4 - <6kg): 62.5mg

4–12 months (6 - <10kg): 125mg

12 months – 5 years (10–19kg): 250mg

▶ Or **ciprofloxacin** 20mg/kg single dose

- Advise mother to return with the child in 2 days

△ **Exceptions** *if the child*:

- Is <12 months old
- Was dehydrated on the 1st visit
- Has measles in last 3 months

▶ Refer to hospital

If above signs and symptoms improve

▶ Continue giving the 1st line antibiotic **cotrimoxazole** until the 5-day course is completed

23.1.12.4 Malaria

If fever persists >2 days or returns within 14 days

- Do a full reassessment of the child and assess for other causes of fever

If child has any general danger sign or a stiff neck:

- Treat as very severe febrile diseaseTemporomandibular

If child has any cause of fever other than malaria

- Treat the cause

If malaria is the only apparent cause of the fever

- If possible, do a blood test for malaria parasites
- Treat with 2nd line oral antimalarial **quinine**
  - Advise mother to return with the child in 2 days if fever present for 7 days: refer for reassessment

23.1.12.5 Measles with eye or mouth complications

After 2 days

- Look for red eyes and pus discharge
- Look at mouth ulcers
- Smell the mouth

23.1.12.6 Eye infection

If pus discharge is persisting

- Ask mother to describe how she has been treating the infection

If treatment was correct

- Refer

If treatment not correct

- Teach mother the correct way and ask her to return with the child in 2 days

If discharge gone but redness remains

- Continue the treatment

If no discharge or redness

- Stop the treatment

23.1.12.7 Mouth ulcers

If mouth ulcers worse or bad smell from the mouth

▶ Refer

If mouth ulcers the same or better

▶ Continue using **gentian violet aqueous paint** 0.5% for a total of 5 days

23.1.12.8 Ear infection

After 5 days

- Reassess for ear problem
- Measure child's temperature

If there is tender swelling behind the ear or high fever (38.5℃):

▶ Refer urgently

Acute ear infection

If pain or discharge persists:

▶ Treat with 5 more days of the same antibiotic (**cotrimoxazole** or **amoxicillin**)

▶ Advise mother to continue drying the ear by wicking

▶ Follow-up in 5 days

Chronic ear infection (discharge for 14 days)

- Check that mother is wicking the ear correctly
- Encourage her to continue

If no ear pain or discharge

- Praise the mother for her careful treatment of the child
- Ensure that the 5-day course of antibiotic is completed

23.1.12.9 Feeding problem

After 5 days

- Reassess feeding
- Ask about any feeding problems found on the 1st visit
- Counsel the mother on any new or continuing problems

- If you advise the mother to make significant changes in feeding, ask her to bring the child back again after 30 days

If the child is very low weight for age

- Ask mother to return 30 days after the 1st visit to measure the child's weight gain

23.1.12.10 Pallor

After 14 days

- ▶ If the child is not a sickler, give **iron**
- ▶ If child is a sickler, give **folic acid**
- ▶ Advise mother to return in 14 days for more treatment
- ▶ Continue giving iron or folic acid every 14 days for 2 months
- ▶ If child still has palmar pallor after 2 months, refer for assessment

23.1.12.11 Very low weight for age (WFA)

After 30 days

- Weigh the child and determine WFA status using the WFA graph
- Reassess feeding

If child is no longer very low WFA

- Praise the mother and encourage her to continue

If child is still very low WFA

- Counsel the mother about any feeding problem found
- Ask her to return again in 30 days
- Continue to see the child monthly until feeding well and gaining weight regularly or no longer very low WFA
  - △ **Exception**: *If you do not think that feeding will improve, or if the child has lost weight:*
- ▶ Refer the child for further management

23.1.13. Counsel the mother (use Mothers Card)

23.1.13.1 Feeding recommendations

- These recommendations are for sick and healthy children

Age <6 months

- **Breastfeed** on demand, day and night
  - At least 8 times/24 hours
- Do not give other food or fluids

Only *if the child appears hungry after breastfeeding or is not gaining weight adequately*

- Give **complementary foods** 1 - 2 times daily after breastfeeding (foods listed below in age 6 - <12 months section)

Age 6-12 months

- Breastfeed on demand, day and night
- Give adequate servings of complementary foods:
  - Thick porridge made with maize, cassava, millet, soya flour, or any mix of these. Add sugar and oil, and mix with milk or pounded groundnuts.
  - Mixtures of 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

Age 12-24 months

- Breastfeed on demand, day and night
- Give adequate servings of complementary foods as above except that you may also add meat to mashed foods

- Give a nutritious snack or family food 5 times daily whether breastfeeding or not

Age 2 years and over

- Give family foods at 3 meals per day to provide a good daily diet which should:
  - Be adequate in quantity
  - Include an energy-rich food (e.g. thick cereal and oil)
  - Include protein (e.g. meat, fish, eggs, pulses)
  - Include fruits and vegetables
- Also add nutritious snacks between meals

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
- Half the milk with nutritious mashed foods

If taking other foods

- Follow feeding recommendations above for child's age

23.1.13.2 Feeding problems

- After counselling the mother as detailed below, follow-up any feeding problem in 5 days

If the child is not being fed as above

- Counsel the mother accordingly

If mother reports 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

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, counsel mother to

- 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

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

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 and vegetables

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

23.1.13.3 Increased Fluids 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

23.1.13.4 When to return

Follow-up visits: Advise mother to return as follows:

Condition	Return in
• Pneumonia • Dysentery • Malaria (if fever persists) • Measles + eye/mouth complications	2 days
• Persistent diarrhoea • Acute or chronic ear infection • Feeding problem • Any other condition (if not improving)	5 days
• Pallor	14 days
• Very low weight for age	30 days

Next well-child visit

- Advise mother when to return for next immunization according to national immunization schedule

When to return immediately

- Advise mother to return immediately if the child has any of these warning signs:

Condition	Warning signs
• Any sick child	• Not able to drink or breastfeed • Becomes more sick Develops fever
• Pneumonia, cough, or cold	• Fast breathing • Difficult breathing
• Diarrhoea	• Blood in stool • Poor drinking or breastfeeding

23.1.13.5 Mother's 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 management

For all mothers

- Give advice to eat well to maintain strength and health
- Check immunization status and give TT if needed
- Make sure each mother has access to:
  - Family planning services
  - Counselling on prevention of STIs, HIV/AIDS
  - Antenatal care (if pregnant)

23.2 SICK YOUNG INFANT (AGE 1 WEEK TO 2 MONTHS)

Assess, classify, and treat

- 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 treatment
  - If initial visit: Continue as below

23.2.1. Check for possible bacterial infection

Ask

- Has the infant had any convulsions?

Look, listen, feel

- Count the number of breaths per minute
  - Repeat the count if this is elevated
- 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?

Classify and treat possible bacterial infection as in the table below:

Signs	Classify As	Treatment
Any of the following: • Convulsions • Fast breathing (>60 breaths per minute) • Severe chest indrawing • Nasal flaring • Grunting • Bulging fontanel • Pus discharge from ear • Umbilical redness extending to skin • Fever (>37.5°C	POSSIBLE SERIOUS BACTERIAL INFECTION (PSBI)	▶ Give 1st dose of IM **antibiotics** ▶ Treat to prevent low blood sugar ▶ Advise mother how to keep infant warm on the way to hospital ▶ Refer urgently - If referral is not possible, give a broad spectrum antibiotic, e.g. **chloramphenical** and **benzylpenicillin**

Signs	Classify As	Treatment
or feels hot) • Low body temp (<35.5°C or feels cold) • Many or severe skin pustules • Lethargic or unconscious • Less than normal movements		
Any of the following: • Umbilicus red or discharging pus • Skin pustules	LOCAL BACTERIAL INFECTION	▶ Give appropriate oral **antibiotic** ▶ Teach mother to treat local infection at home Advise mother on home care for the young infant ▶ Follow up in 2 days

Notes on table

* Body temperatures are based on axillary measurement
- Rectal readings are approximately 0.5°C higher

23.2.2. Check for diarrhoea/dehydration

If diarrhoea is present

Ask

- For how long it has been present
- If there is any blood in the stool

Look and feel

- Check the general appearance of the young infant
  Is the infant

- Lethargic or unconscious?
- 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?

Classify and treat the dehydration and diarrhoea as in the table below

Clinical features	Classify As	Management
For dehydration:		
Two of these signs: • Lethargic or unconscious • Sunken eyes • Abdominal skin pinch returns very slowly (> 2 seconds)	SEVERE DEHYDRATION	▶ If infant doesn't have PSBI: Give Plan C If infant also has PSBI: - Refer urgently with mother giving frequent sips of **ORS** on the way - Advise 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 ▶ Advise mother when to return immediately ▶ Follow up in 2 days if not improving ▶ If child also has PSBI: Manage as above
• Not enough signs to classify	NO DEHYDRATION	▶ Give Plan A ▶ Advise mother

Clinical features	Classify As	Management
as some or severe dehydration		when to return immediately ▶ Follow up in 2 days if not improving
If diarrhoea of 14 days		
• Dehydration lasting 14 days	SEVERE PERSISTENT DIARRHOEA	▶ Refer but if the young infant is dehydrated: Treat this before referral (unless PSBI also present- see above)
• Blood in stool	DYSENTERY	▶ Give 1st dose of cotrimoxazole ▶ Refer

23.2.3. Check for feeding problem or low weight

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?

Determine weight for age

- Weigh the child and using the chart on page determine if the child is low weight for its age in months

Classify and treat feeding problems

*Only if infant has any difficulty feeding **or** is breastfed <8 times/24 hours **or** is taking any other foods/drinks **or** is*

*low WFA **and** has no indications for urgent hospital referral:*

Look, listen, feel

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 a few 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
- Look for ulcers or white patches in the mouth (thrush)

Clinical features	Classify As	Management
Any of these signs: • Unable to feed • No attachment at all • Not sucking at all	UNABLE TO FEED - POSSIBLE SERIOUS BACTERIAL INFECTION (PSBI)	▶ Prevent low blood sugar ▶ Give 1st dose of IM **antibiotics** ▶ Advise mother how to keep infant warm on way to hospital ▶ Refer urgently

Clinical features	Classify As	Management
Any of these signs: • Not well attached • Not suckling effectively • <8 BF in 24 hours • Receives other food or drinks • Low weight for age (WFA) according to IMCI chart • Thrush	FEEDING PROBLEM or LOW WEIGHT	▶ Advise mother to breastfeed (BF) on demand day and night ▶ If not well attached or not suckling effectively: Teach correct positioning and attachment ▶ If feeding <8 times/24 hours: Advise mother to increase BF frequency ▶ If receiving other food or drinks: Counsel mother to increase BF, reduce other foods and drinks, use a cup ▶ If not BF at all: refer for BF counselling and possible relactation - Advise on correctly preparing breastmilk substitutes, e.g. cow's milk and on using a cup ▶ If thrush: Teach mother to treat at home ▶ Advise mother on home care for the baby ▶ Follow-up any feeding problem or thrush in 2 days ▶ Follow-up low weight for age in 14 days
• Not low WFA	NO FEEDING	▶ Advise mother on home

Clinical features	Classify As	Management
and no other signs of inadequate feeding	PROBLEM	care for young infant ▶ Praise mother for feeding the infant well

23.2.4. Check young infant's immunization status

- Refer to national immunization schedule
- Or refer to relevant sections in UCG

23.2.5. Assess other problems

- E.g. presenting problems, eye problems, rashes, birth injuries

23.2.6. Treatments and medicines

23.2.6.1 Assess mother's own health needs

- Check for current health problems
- Check whether family planning help is required
- Check on tetanus immunization status

23.2.6.2 Summary of IMCI medicines used for young infants

- **Amoxicillin 250mg tablet** (every 8 hours for 5 days)
  Birth-<1month (<3kg): 31.25mg (=1.25mL syrup)
  1month-<2months (3 - <4kg): 62.5mg (=2.5mL syrup)
  - Used as 2nd line medicine in local bacterial infection
    If not available, use **procaine penicillin injection**
- **Benzylpenicillin** (initial single pre-referral dose)
  Birth - <2 months (<4kg): 50,000 IU/kg IM
  - Used together with **chloramphenicol** (below) as initial (pre-referral) treatment of PSBI

If referral is not possible: Give every 6 hours for at least 5 days (with **chloramphenicol**)

- **Chloramphenicol** (initial single pre-referral dose)
  Birth - <2 moths (<4kg) : 40mg/kg IM
  Infant <1 week: Reduce dose by half to 20mg/kg
  - Used together with **benzylpenicillin** (above) as initial (pre-referral) treatment of PSBI
    If referral is not possible: Give every 6 hours for at least 5 days (with **benzylpenicillin**)
- **Cotrimoxazole** (every 12 hours for 5 days)
  Birth - 1 month (<3kg): 60mg
  1 month - 2 months (3 -4kg) 120mg
  - Used as 1st line medicine in local bacterial infection and dysentery
  - Avoid in infants <1 month who are premature or jaundiced
- **Nalidixic acid** (every 6 hours for 5 days)
  Birth - 2 months (<4kg): 62.5mg
  - Used as 2nd line medicine in dysentery
- **Procaine penicillin** (once daily IM dose)
  Birth - 2 months (<4kg): 50,000 IU/kg
  - Used as 3rd line medicine in local bacterial infection where either
    - **Cotrimoxazole** and **amoxicillin** are not available
    - Or **cotrimoxazole** is available but may not be used (see above) and **amoxicillin** is also not available
    - Or patient unable to swallow oral medication

23.2.6.3 Teach mother to treat local infections at home

- Explain how the treatment is given
- Watch her as she does the first treatment in the clinic
- Advise her to return if the infection gets worse

Skin pustules or umbilical infection

- Wash hands before and after treatment
- Gently wash off pus and crusts with soap and water
- Dry the area
- Apply **gentian violet aqueous paint** 1%
- Do this twice daily

Thrush

- Wash hands
- Gently wash mouth with clean soft cloth, wetted with salt water and wrapped around the finger
- Apply **gentian violet** aqueous paint 0.5%
- Wash hands
- Do this twice daily

23.2.7. Provide follow-up care for the young infant

23.2.7.1 Local bacterial infection

After 2 days

- Check the umbilicus and any skin pustules

If pus discharge or redness is the same or worse

- Refer

If pus discharge or redness has improved

- Tell mother to:
  - Keep giving antibiotic until 5-day course is completed
  - Continue treating the local infection at home

23.2.7.2 Feeding problem

After 2 days

- Reassess feeding
- Ask about any feeding problems found on 1st visit
- Counsel mother about any new or continuing problems

- If this requires the mother to make major changes, ask her to return with the child again after 2 days

If the infant is low weight for age

- Ask the mother to return 14 days after the 1st visit to measure the child's weight gain
  - △ **Exception***: If you think that feeding will not improve or if the child has **lost** weight*, refer

23.2.7.3 Low weight for age (WFA)

After 14 days

- Weigh the young infant and using the WFA chart, determine if the child is still low weight for age
- Reassess feeding

If the infant is no longer low weight for age

- Praise the mother and encourage her to continue

If the infant is still low weight for age but is feeding well

- Praise the mother and encourage her to continue
- Ask her to return to have the child weighed again within 1 month or when she comes for immunization

If the infant is still low weight for age and still has a feeding problem

- Counsel the mother about the feeding problem
- Ask her to return to have the child weighed again after 14 days or when she comes for immunization (if this is earlier)
- Continue to see the child every 2 weeks until the child is feeding well and gaining weight regularly or is no longer low WFA

***Exception**: if you do not think that feeding will improve or if the young infant has **lost weight** – refer to hospital*

23.2.7.4 Thrush

After 2 days

- Check for ulcers or white patches in the mouth (thrush)
- Reassess feeding

If thrush is worse or if there are problems with attachment or suckling

- Refer

*If thrush is the **same or better** and infant is **feeding well***

- Continue applying **gentian violet aqueous paint 0.5%** to complete a total of 5 days treatment

23.2.8. Counsel mother

23.2.8.1 Teach correct positioning and attachment for breast feeding (BF)

- 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

23.2.8.2 Advise mother on home care for the young infant

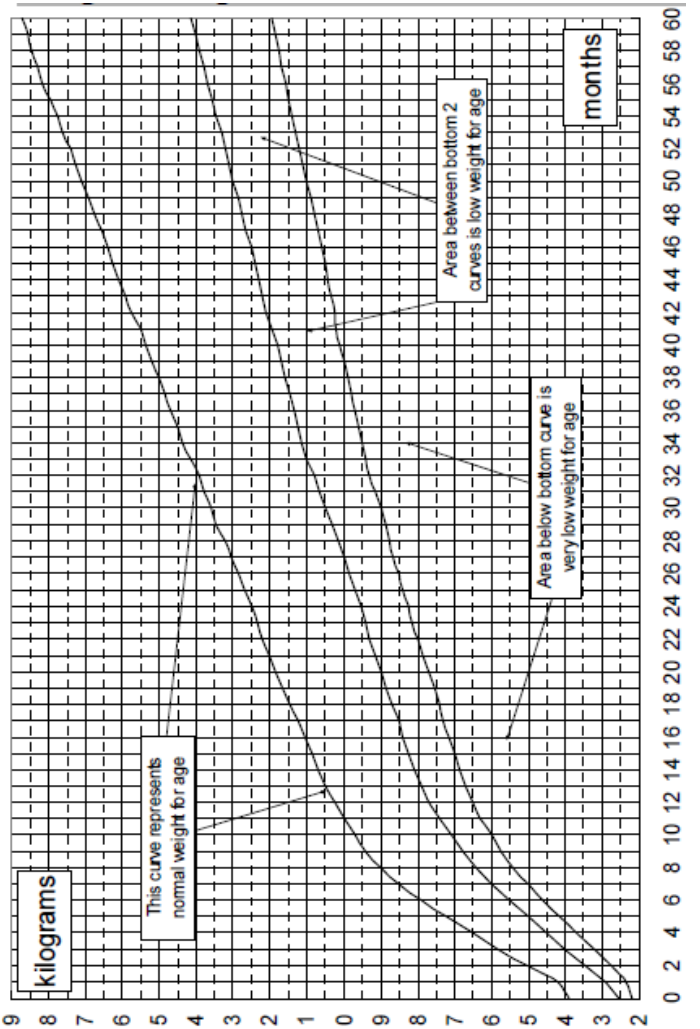
- Food and fluids: Breastfeed frequently on demand (as often and for as long as the infant wants) day and night, during sickness and health
- When to return for a follow-up visit:

Condition	Return in:
• Breastfeeding or drinking poorly • Becomes more ill • Develops fever • Fast or difficult breathing • Blood in stool	**Immediately**
• Local bacterial infection • Any feeding problem • Thrush	2 days
• Low weight for age	14 days

Warmth: Ensure the young infant is always warm

- In cool weather, cover the infant's head and feet, and dress the infant with extra clothing

Weight for Age Chart



23.3 VACCINATIONS

23.3.1. VACCINATION SCHEDULE for CHILDREN

Adapted from the UNEPI/MoH Immunization Schedule, 2002.

Age	Vaccinations	Doses
At birth	BCG Polio	*Children <11 months:* 0.05mL intradermally *Children >11 months:* 0.1mL 0:2 drops orally
6 weeks	DPT-HepB + Hib 1 Polio 1	0.5mL IM 2 drops orally
10 weeks	DPT-HepB + Hib 2 Polio 2	0.5mL IM 2 drops orally
14 weeks	DPT-HepB + Hib 3: Polio 3	0.5mL IM 2 drops orally
9 months	Measles	0.5mL SC
12 months	Measles	0.5mL SC

Sites of Vaccine Administration

Vaccine	Recommended Site
BCG	Right upper arm
DPT-HepB + Hib	Outer upper aspect of left thigh
Polio (OPV)	Mouth
Measles	Left upper arm

Notes

- Aim to complete this schedule within the 1st year of life

- **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. Complications are uncommon.
  Do not give BCG vaccine to any child with clinical signs and symptoms of HIV/AIDS
  Diluent: Only use the diluent provided for BCG vaccine to reconstitute this vaccine
- **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**: This is a new combination of DPT vaccine + hepatitis B vaccine (HepB) + haemophilus influenzae type b (Hib) vaccine
- **DPT-HepB + Hib/Polio**: Four weeks is the minimum dosage interval between each of the three occasions when these vaccines
  - Ideally given at 6 weeks, 10 weeks, and 14 weeks
- **Measles vaccination**: Normally given at 9 months of age or first contact after this age but also give to any unimmunised child of 6-9 months old who has been exposed to measles patients
  - Children of 6-9 months vaccinated in this way must have the vaccination repeated at 9 months of age
  - Diluent: Only use the diluent provided for measles vaccine to reconstitute this vaccine
- **Vaccination of sick children**: Admit and treat any child who is severely ill and vaccinate at the time of discharge
- **Administration and storage of vaccines**:

- Never use any vaccine after its expiry date, when the vaccine vial monitor (VVM) has changed to discard point, if there has been contamination, or vial labels are lost
- Only open one vial or ampoule of a vaccine at a time and when there is a child to vaccinate
- Remember to discard reconstituted vials of BCG, measles, and DPT-HepB + Hib after 6 hours
- In a static unit, if there is a balance of doses left in a vial of TT and OPV at the end of a vaccination session, return the opened vial to the fridge for subsequent use
- Do not keep any opened vial for >4 weeks, store vaccines in health units at +2°C to +8°C but do not keep them for longer than 6 weeks
- In district and central vaccine stores where freezers exist, polio and measles vaccines may be stored for prolonged periods at -20°C
- Never use the diluents provided for vaccines to mix other injections
- Do not freeze DPT-Hep B + Hib and TT vaccines (other vaccines may be kept at freezing temperatures without harm)
- Never freeze the diluents for BCG and measles vaccines
- Do not vaccinate in direct sunlight (always carry out immunization in a building or under shade)
- 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, and use the sponge method during each immunization session
- Record every vaccination completed in the child register and tally sheet. Use the child register for tracking drop outs.
- A child who received any immunization dose during national immunization program should still get the routine vaccination dose

23.3.2. Other vaccinations

23.3.2.1 Hepatitis B vaccination

- 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)
- Vaccination is recommended for high risk groups, such as health workers in clinical settings and training, intravenous drugs users, and persons who frequently receive blood transfusions
- Three doses for either schedule: 0, 1, 6 months or 0, 2, 4 months. The storage temperature for the vaccine is 2°C to 8°C
- Dose: 0.5mLs given intramuscularly on the deltoid muscle (upper arm). Injections of Hepatitis B vaccine should not be given on the buttocks because of low immune response (decreased protective antibody response) and risks of injury to the sciatic nerve

23.3.2.2 Yellow fever vaccination

The yellow fever 17D vaccine is live attenuated, and it is reconstituted before use. Ideally, it should be used within an hour after reconstitution.

- Dose: 0.5mLs given sub-cutaneously on the upper arm as a single dose. The storage temperature for the vaccine is 2°C to 8°C
- Immunity is almost lifelong but for international travel, the international travel certificate is valid for only 10 years.

23.3.2.3 Rota virus vaccination

The most common brand of Rota Virus vaccine on the market is Rotarix. It is an attenuated human rota virus strain.

- Route of administration: Oral in 2 doses. The schedule is two doses at 4 weeks interval after 6 weeks such as 6 and 10 weeks. However, the schedule should be completed before 4 months of life. Rota virus vaccine has an efficacy of about 80% against rotavirus gastro-enteritis.

23.3.2.4 Human papilloma virus vaccination

Currently (2009), vaccination of young girls between 9-12 years is being carried out in two districts in Uganda on a pilot basis. Full coverage will be done after analysis of the pilot study.

23.4 TETANUS PREVENTION

23.4.1. Childhood immunization

- Immunise all children against tetanus during routine childhood immunization
  - See immunization schedule, section 23.3

23.4.2. Prophylaxis against neonatal tetanus

- Immunise all pregnant women/women of child-bearing age (15 – 45 years) against tetanus

- Give tetanus toxoid vaccine (TT) 0.5mL IM into the left upper arm or upper outer thigh as follows:

Vaccine	Recommended Timing
TT1 (1st dose)	At first contact with the girl or woman, during primary/secondary school, at the 1st antenatal visit, or as early as possible during pregnancy
TT2 (2nd dose)	At least 4 weeks after TT1
TT3 (3rd dose)	At least 6 months after TT2 - or as early as possible during a subsequent pregnancy
TT4 (4th dose)	At least 1 year after TT3 - or as early as possible during a subsequent pregnancy
TT5 (5th dose)	at least 1 year after TT4 - or as early as possible during a subsequent pregnancy

23.4.3. Vaccination against adult tetanus

- School going children should get 3 booster doses at 0, 1, and 6 months intervals
- High risk groups such as farm workers, military personnel, miners, and road traffic accident victims should also be vaccinated according to the schedule in the table above
- Ensure hygienic deliveries, including proper cutting and care of umbilical cords

Notes

- Refer to Immunization Schedule for general information on administration, storage, and handling of vaccines
- Store TT at +2°C to +8°C. Do not freeze TT.

23.4.4. Prophylaxis in patients at risk of tetanus as a result of contaminated wounds, bites and burns

General measures

- Ensure adequate surgical toilet and proper care of wounds

Passive immunization

- Give IM tetanus immunoglobulin human (TIG):
  Child <5 years: 75 IU
  Child 5-10 years: 125 IU
  Child >10 years/adult: 250 IU

Notes

- Double the dose if heavy contamination suspected or if >24 hours since injury was sustained
  Alternative - only if TIG not available:
- **Antitetanus serum** (tetanus antitoxin) 1,500 IU deep SC or IM

Active immunization

Unimmunised or partially immunised patients:

- Give a booster dose for patients who are partially immunized
- Give a full course of vaccination for those who are not immunized at all
- For fully immunised patients with 5 doses of TT administered at the correct intervals but last dose given >30 years ago: Give one booster dose of **TT** 0.5mL deep SC or IM

Note: Fully immunised patients who have had a booster dose within the last 10 years do not need treatment with tetanus antitoxin (anti-tetanus serum) or antitetanus immunoglobulin, human, or tetanus toxoid vaccination
Note: Giving TIG or TT to a fully immunised person may cause an unpleasant reaction, e.g. redness, itching, swelling, fever, but with a severe injury this is justified

24. 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", March 1995.

The key objective of FP is to ensure that everyone should plan their family so that all children are born when **wanted, expected,** and **welcome**. The health benefits of FP also have a major role in protecting the lives of infants, children, women, and the family as a whole.

The key steps to be followed in provision of FP services are as follows:

1. Provide information about FP 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 method
4. Obtain and record client history
5. Perform physical assessment
6. Perform pelvic examination
7. Manage client for chosen FP method

1. Provide information about FP to different groups

The procedures used here are also used in the next step to recruit high-risk clients for FP and maternal health services in young child, antenatal, out-patients, 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

2. Counsel clients at high-risk of pregnancy complications to accept/use FP services

Identify high-risk clients while

- Conducting other clinics
- Reviewing client records
- Obtaining client history
- Reviewing physical assessment findings

Look out for the following risk factors in clients

- Recent delivery/abortion
- >4 pregnancies
- >35 years old
- <20 years old
- Complicating medical conditions, e.g. diabetes, heart disease
- HIV/AIDS
- Having children with birth interval <2 years
- Bad obstetric history, which is likely to recur in future pregnancies, e.g. postpartum haemorrhage, pre-eclampsia

Counsel high-risk clients on

- Risk factors
- FP services: Type, benefits, availability, procedures

3. Counsel clients to make informed choice of FP method

The objectives are

- To dispel any rumours and misconceptions about FP
- To help the client make a voluntary informed choice

Procedure

- Prepare the room/materials needed ensuring privacy

- Receive the client and determine when she wants the next pregnancy and how many children she has
- 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
  - Explain next steps needed

4. Obtain and record client history

The objectives are

- To obtain clients personal and social data and information on health status
- To identify abnormalities/problems needing treatment or referral

With FP clients, pay particular attention to

- Social history
  - Smoking, how much/day?
  - Drinking, how much alcohol/day?
- Family health history, ask about
  - Diabetes mellitus
  - High BP
  - Asthma
  - Heart disease
- Medical history, ask about

- Excessive weight gain/loss (that is +/-5 kg/year)
- Severe headaches (relieved by analgesics?)
- Growth on neck (enlarged thyroid)
- Asthma
- Cardiac disease, high BP
- TB (on treatment?)
- Liver disease/jaundice in last 6 months or during pregnancy
- Mental illness, epilepsy
- Diabetes mellitus
- Unilateral pain in thigh or calves
- Thrombophlebitis
- Varicose veins
- Allergies
- Chronic anaemia, e.g. sickle-cell anaemia
- Any medicines being taken and reason

- Surgical history, ask about
  - Any previous or planned operations
  - When operation was intended or performed
  - Where operation was performed or is to be performed
- Reproductive history, ask about
  - Total pregnancies
  - Number/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 wishes to have next child

  - Whether breastfeeding
- Menstrual history, ask about
  - 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
- Gynaelogical history, ask about
  - Vulval sores or warts
  - PID? If yes, was it treated and when?
  - STI? If yes, which one, was it treated and when?
  - Lower abdominal pain
  - Offensive vaginal odour
  - Pain during intercourse
  - Pain on urination
  - Bleeding between periods
- Family planning history, ask about
  - How/where first learned about FP
  - Whether new to FP or used FP method before
  - If used before, which method used
  - Age when started using FP
- Last FP method used
  - Duration of using each FP method used
  - Any discontinuation of FP method and reason why
  - Currently preferred method
- Inform client
  - Whether chosen method seems contraindicated or not
  - Explain that physical assessment will confirm suitability of this method

- Next steps needed

5. Perform physical assessment

- Assess general health status
- Examine client from head to toe
  - Look out especially for alopecia, acne, chloasma, hirsuitism, jaundice, anaemia, enlarged glands, goiter
  - Pay particular attention to breasts (e.g. lumps) and abdomen (enlarged organs e.g. liver, uterus)

6. Perform pelvic examination

- Inspect external genitalia
- Perform speculum examination
- Perform bimanual examination
- 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)

7. Manage client for chosen FP method

- Take/record client's BP and weight
- Take/record client's history
- Use history checklist in Procedure Manual to assess suitability of chosen method
- 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
- Manage any serious side-effects and complications
- Arrange for client to return for routine follow-up and for additional FP supplies

24.1 CONDOM (MALE)

For example *no-logo donation condoms, branded condoms.*

Indications

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

Advantages

- Man plays role in FP
- Also protects against STI and HIV infection

Disadvantages

- Some men may have difficulty maintaining an erection with condom on
- May cause insensitivity of the penis
- Occasional sensitivity to latex or lubricants

Management

- ▶ Ensure client understands correct use, storage, and disposal
- ▶ Supply at least 40 condoms to each client
- ▶ Advise client to return for more before they are finished

24.2 CONDOM (FEMALE)

For example *Femidom, Care.*

A soft plastic prelubricated sheath with an inner and outer ring which is inserted into the vagina before intercourse.

Indications

- As for condoms (male) above
- Women whose partners will not user the male condom
- Where the man has allergy or sensitivity to condom latex

Advantages

- Woman plays active role in FP
- Can be inserted 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

- Requires special training and practice to use correctly
- New product with limited public awareness

Management

- ▶ Ensure client understands correct use, storage, and disposal
- ▶ Supply at least 40 female condoms to each client
- ▶ Advise client to return for more before they are finished

24.3 COMBINED ORAL CONTRACEPTIVE PILL (COC)

For example *Lo-femenal, Microgynon*

Contains an oestrogen plus a progestogen, the types and quantities of which may vary in different preparations.

Indications

- Women under age 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
- Active liver disease
- Within 2 weeks of childbirth
- When major surgery 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 progrestogen-only or non-hormonal FP method

- Smoking (especially if >10 cigarettes/day)
- Age >35 years
- Diabetes

Disadvantages and common side-effects

- Spotting, nausea, and vomiting within first few months
- May cause headaches, weight gain
- Effectiveness dependent on regular daily dosage
- 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 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
- Swelling or pain in calf muscle

Management

► 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

24.4 PROGRESTOGEN-ONLY PILL (POP)

For example *Microlut.*

Indications

- Breastfeeding clients after 3 weeks postpartum
- 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)
- Undiagnosed vaginal bleeding

Disadvantages and common side-effects

- Spotting, amenorrhoea
- Unpredictable irregular periods
- Not as effective as COC
- Medicine interactions: Effectiveness reduced by medicines, which increase hepatic enzyme activity

Management

- ▶ 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 abstention from sex
- ▶ Ask client to return 11 weeks after start of using POP
  - Use the last pill packet to show when this will be

24.5 INJECTABLE PROGESTOGEN-ONLY CONTRACEPTIVE

A slowly absorbed depot IM injection, which provides contraceptive protection for 3 months (e.g. *Depo-Provera*).

Indications

- Proven 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
- Women without proven fertility unless they have HIV/AIDS

Disadvantages and common side-effects

- 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

► **Medroxyprogesterone acetate depot (Depo Provera)** injection 150mg deep IM into deltoid or buttock muscle
  - Do **not** rub the area as this increases absorption and shortens depot effect

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

24.6 INTRAUTERINE DEVICE (IUD)

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

Indications

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

Contraindications

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

Disadvantages and common side-effects

- Mild cramps during first 3-5 days after insertion
- Longer and heavier menstrual blood loss in first 3 months

- Vaginal discharge in first 3 months
- Spotting or bleeding between periods
- Increased cramping pains during menstruation

Complications and warning signs

- Lower abdominal pain
- Foul-smelling vaginal discharge
- Missed period
- Displaced IUD/missing strings
- Prolonged vaginal bleeding
- PID

Management

- Insert the **IUD** closely following recommended procedures and explaining to the client as each step is undertaken
- Carefully explain possible side-effects and what to do if they should arise
- Advise client
  - To abstain from intercourse for 7 days after insertion
  - To avoid 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 after menstruation is finished to ensure the IUD is still in place
  - 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

24.7 PROGESTOGEN-ONLY SUB-DERMAL IMPLANT

Flexible progestogen-releasing plastic rods surgically inserted under the skin of the woman's upper arm which provide contraceptive protection for 3 years (e.g *Implanon*) and 5 years (e.g. *Jadelle*).

Indications

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

Contraindications

- As for POP

Advantages

- Highly effective (1-3% failure rate)
- No delay in return to fertility after removal
- Long-acting
- Low user-responsibility

Disadvantages and common side-effects

- 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

- ▶ 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: For routine follow-up

24.8 NATURAL FP: CERVICAL MUCUS METHOD (CMM)

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

- **Abstaining from sexual intercourse**: Avoiding vaginal sex completely (also called periodic abstinence)
- **Using withdrawal**: Taking the penis out of the vagina before ejaculation (also called coitus interruptus)
- Using barriers methods, e.g. condoms

Guidance on correct use of the method is only available at centres with specially trained service providers

Management

- ▶ Ensure client understands how the method works
- ▶ Explain how to distinguish the different types of mucus
- ▶ Show client how to complete the CMM chart
- ▶ 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

24.9 NATURAL FP: LACTATIONAL AMENORRHOEA METHOD (LAM)

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

Management

- Ensure client understands how the method works
- Explain to client that
  - She must breastfeed her child on demand on both breasts at least 10 times during day and night
  - She must not give the child any solid foods or other liquids apart from breast milk
- Advise the client that LAM will no longer be an effective FP method
  - If the baby does not feed regularly on demand
  - If 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

24.10 VOLUNTARY SURGICAL CONTRACEPTION (VSC) FOR MEN: VASECTOMY

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

Indications

- Fully aware, 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

- ▶ 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
- ▶ 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

24.11 VOLUNTARY SURGICAL CONTRACEPTION (VSC) FOR WOMEN: TUBAL LIGATION

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

Indications

As for vasectomy (above) but for females

Management

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

25. OCCUPATIONAL ILLNESSES

Causes

Occupational illnesses vary depending on the nature of work. Illnesses include physical injury, chemical injury or poisoning, infections from biological agents, and psychosocial trauma. Potential hazards range from physical, chemical, biological, ergonomic, and psycho-social.

For example, health care workers are exposed to a wide range of hazards such as micro-organisms (HIV, hepatitis, and TB), radiation, chemicals, and ergonomic/postural problems among others.

The table below highlights examples of potential occupational illnesses in some high risk occupations in Uganda.

Sector	Occupational disease	Physical injuries	Chemical injuries
1. Health Sector: All health workers especially: • Surgeons • Nurses, and midwives • Laboratory • Mortuary • Blood transfusion units • Renal dialysis units • Intensive care units • Emergency units • Ambulance workers	• HIV/AIDS • Hepatitis A, B, and C • Ebola • Tuberculosis • Tetanus • Emerging and re-emerging viral and microbial infections • Hospital acquired infections, e.g. Staph. Aureus	• Radiation injuries • UV keratitis • Needle sticks • Bruises • Cut wounds • Burns/scalds • Work overload • Stress • Cardiovascular disorders • Mental illnesses • Ergonomic injuries (tenosynovitis, backache)	• Acute/chronic poisoning • Contact and allergic dermatitis • Occupational asthma • Occupational cancers • Medicine and antiseptics causing, e.g. allergies, dermatoses
• Radiology and radiotherapy units		• Assault and violence at work place, e.g. in mental	• Cytotoxic medicines and other immuno

• STI clinics • HCW waste handlers • Biological active agents handlers, e.g. of enzymes, vaccines, laboratory specimen, experimental animals etc • Poor environmental design (lighting, heating, ventilation, noise, vibration) These can lead to accidents, fatigue, and spread of contagious disease		clinics, medicine addicts • Ergonomical Musculo-skeletal disorders • Poor design of work places, work processes, and tools • Musculo - skeleton disorders, e.g. lifting heavy loads and patients • Needle stick injuries and other traumatic injuries, e.g. in theatres	suppressants (oncology) • Steroid medicines • Anaesthetic • Cleaning agents, pesticides • Others, e.g. formaldehyde
• Work stress and work overload, with their effects on C.N.S, C.V.S.		• Air pollution, odour e.g. in mortuary, • Laboratories.	

• Immune system, Ageing process, and the negative effect on work efficiency and job satisfaction. • Changing working hours - leading to chronobiologic disturbances e.g. sleep and social disruption e.g. Divorces, Accidents on night shifts. Medicine, Alcohol, Tobacco Abuse. This is one of the commonest and most • Serious occupational health hazard in health workers		• Radiation Exposure. Non-ionising Radiation exposure • Infra Red U.V light • Laser beam e.g. used in surgery • V.D.U's • Electromagnetic fields • Ionising Radiation X- ray and Imaging Departments Radiotherapy	

• Working in unusual places and doing unusual jobs e.g. in pathology department and mortuary. • The aged health worker and his/her dilemma as retirement come in.		• Radioisotope work Laboratory and Research work with radioactive chemicals during treatment of patients with radioactive medicines. • Noise and vibration - e.g. electric drills and motors. Psycho-social disorders	
2. Agriculture • Irrigation schemes • Animal husbandry: Veterinary workers, farmers poultry workers, paddy field workers • Slaughter house and butcheries	Zoonotic diseases especially: • Anthrax • Rabies • Brucellosis • Leptospirosis • Trypanasomiasis • Q fever • Psittacosis	• Bruises, cuts, wounds, and other traumatic injuries • Work overload • Stress • Heat over exposure • Cardiovascular disorders • Mental illnesses • Ergonomic injuries (tenosynovitis, backache)	• Acute/chronic poisoning • Contact and allergic dermatitis • Allergic reactions to animal, plant or chemical irritants • Extrinsic allergic alveolitis

• Laboratories • Waste handlers • Exposure to and inhalation or ingestion of mineral and organic dusts and volatile organic chemical fumes (pesticides and other agro- chemicals)	• Avian Influenza • Trichinosis cysticercosis • Hookworms • Malaria • Schistosomiasis • Tuberculosis • Tetanus • Typhoid • Agro-chemical poisoning		• Occupational asthma • Occupational cancers • Byssinosis
3. Construction • Exposure to and inhalation of mineral • Metal and organic dusts, volatile organic chemical fumes due to machining, drilling, sanding, milling,		• Crush and traumatic injuries • Ergonomic injuries (tenosynovitis, backache) • Electrical injuries (e.g. shocks, burns, VS arrest)	• Contact and allergic dermatitis • Acute and chronic obstructive airways diseases • Asbestosis • Silicosis • Pneumoconiosis

welding, cutting, sawing, and grinding • Electrocution			• Occupational asthma • Occupational cancers
4. Mining, Quarrying • Tunneling exposure and inhalation of mineral dusts, chemical fumes, exposure to noise • Radiation (radon)	• Hookworms	• Work overload • Stress • Heat over exposure • Cardiovascular disorders • Mental illnesses • Ergonomic injuries (tenosynovitis, backache) • Crush and traumatic injuries • Auditory injuries and deafness	• Mercury poisoning in gold miners • Acute and chronic obstructive airways diseases • Asbestosis • Silicosis Pneumoconiosis • Occupational asthma • Occupational cancers
5. Iron mongers, welding • Exposure and inhalation of metal dusts and fumes, chemical		• Ergonomic injuries (tenosynovitis, backache) • Traumatic injuries • Auditory injuries and	• Acute and chronic obstructive airways diseases • Occupational asthma

fumes/vapours • Exposure to wood dust, fungal spores, microbes, volatile organic chemicals, enzymes		deafness	• Occupational lung cancer
6. Wood works, carpentry and joinery, grain milling • Inhalation of mineral dusts • Exposure to organic wood and grain dust, fungal spores, microbes, chemicals, enzymes			• Contact and allergic dermatitis • Byssinosis • Acute and chronic obstructive airways diseases • Bronchitis, occupational asthma • Occupational lung cancers

Prevention

Emphasis should be placed on instituting preventive measures through sensitization, awareness, and training of workers in Good Work Practices, proper use of and maintenance of working tools and equipment, Standard Operating Procedures (SOPs), proper and adequate use of protective wear and equipment, and orientation in application of the Universal Hygiene Precautions and Infection Control Procedures for health workers.

Other preventive measures include:

- Immunization against some diseases like tetanus and hepatitis B for those workers at high risk, e.g. farm workers, surgeons, midwives, laboratory, and mortuary attendants
- Inspection of workplaces to ascertain good working conditions and safe guard against occupational accidents, diseases, and injuries
- Identifying occupational hazards and putting in place measures to control their occurrences/reoccurrences
- Ensure the provision of adequate Occupational Health Services, e.g. first aid, clinics on site health services
- Ensure compliance with all provisions of the Factories Act and its subsidiary legislation
- Carry out specific inspections with regard to working methods, production methods and processes, and planning agricultural activities to improve productivity
- Ensure safe handling and use of toxic chemicals and other dangerous materials, including proper waste management
- Carry out medical inspections of workplaces

- Monitor, record and interpret statistical data of agricultural accidents, diseases and health hazards
- Investigate illness arising out of different economic activities
- Organize training courses/seminars on occupational safety and health for employees, employers, and other stakeholders to stimulate interest in occupational safety and health related to agricultural activities
- Setting occupational safety and health standards and enforcing their compliance throughout the country

Treatment

Clinical management, including rehabilitation, should be specifically tailored to the cause, nature, and status of illness of an individual patient. Treatment (pre-exposure prophylaxis, post-exposure management, and treatment of clinical onset) for diseases acquired via occupational exposure should follow the recommendations in these guidelines, especially for the following diseases:

1. Hepatitis B
2. HIV/AIDS
3. Ebola
4. TB
5. Tetanus
6. Other highly infectious viral diseases

Appendix 1. **ANTI-TB MEDICINES INTOLERANCE GUIDELINES**

1. Minor toxic reactions

All anti-TB drugs are likely to cause minor subjective intolerance. These minor toxic reactions are basically like the general side-effects of other drugs and should be managed in a similar manner.

2. Major toxic reactions

The reactions are mainly of four types

2.1 Hypersensitive reactions

2.2 Hepatitis

2.3 Neurotoxicity

2.4 Pyrazinamide arthralgia

If any of these reactions occurs, all anti-TB treatments should be stopped immediately, and each reaction managed accordingly as described below.

2.1 Hypersensitivity reactions

Most anti-TB drugs cause hypersensitisation between week 3 and week 8 of treatment. These reactions are characterised by

- Sudden onset of fever, often accompanied by headache
- Vomiting
- Appearance of an itchy erythematous rash

Other manifestations include

- Malaise
- Lymphadenopathy
- Splenomegaly, hepatomegaly

- Albuminuria occasionally and particularly with thiacetazone, exfoliative dermatitis, or erythema multiforme (Stevens-Johnson syndrome)

Management of hypersensitivity reactions

This is done in three stages

Stage A: Treat the reaction

- Stop all anti-TB drugs and any other drugs, which the patient was taking before the reaction occurred
- Give an antihistamine, e.g. **chlorphenamine** 4mg every 4-6 hours
  - Max: 24mg/day
- Or **promethazine hydrochloride** 25mg at night
  - Increase to 25mg twice daily if required

If the reaction is severe

- Give **prednisolone**: In severe reactions, like exfoliative dermatitis and Stevens-Johnson Syndrome, the initial dose should be high (e.g. 45-60mg daily)

Occasionally, the reaction is too mild to justify withdrawal of the anti-TB drugs. In such cases, it is permissible to add an antihistamine for a few days while continuing with the anti-TB drugs.

At times, the TB is so severe that it is an immediate threat to life (e.g. miliary TB, meningitis). In such cases, the anti-TB drugs must be continued under steroid cover.

Stage B: Identify the offending drug

When the fever and skin rash have subsided, proceed to confirm hypersensitivity, and identify the drug to which the patient is hypersensitive as follows:

a) In all cases, test for hypersensitivity to all the drugs in use at the time of the hypersensitivity reaction

b) First test for isoniazid, then for the other drugs in any order
c) Test for hypersensitivity as follows
   i. Give 1/8 of the normal daily dose on the day 1
   ii. If there is no reaction to i), give ¼ of the normal daily dose on the following day (day 2)
   iii. If there is no reaction to ii), give ½ of the normal daily dose on the following day (day 3)
   iv. If there is no reaction to iii), give a full daily dose on the following day (day 4)

The first test dose at i) may be omitted except in those cases where the original hypersensitive reaction was severe

d) If there is a reaction to the drug and dosage as at c) above, it should be allowed to subside completely before starting the hypersensitivity test for the next drug

Desensitisation

If drug hypersensitivity is confirmed, desensitise as follows

a) Start with 1/8 normal daily dose
   - If on hypersensitivity testing above a severe reaction was produced by the initial 1/8 dose, desensitisation should begin with a lower dose
b) If there is no reaction to the 1/8 desensitisation dose, increase the dose by a similar amount each day (e.g. 1/8, 1/4, 3/8, 1/2) until a full dose is reached, provided there is no reaction to any of the increased doses
   - If a reaction occurs after any dose, allow it to subside, then repeat that same dose daily and for as long as necessary, until it can be given without any

reaction occurring. Then proceed to the next higher dose

Note

- If the hypersensitivity is severe at the start of treatment (e.g. Stevens-Johnson Syndrome), change the anti-TB regimen immediately.

Stage C: Reinstitute anti-TB therapy

When the patient has reached full dose as above for each offending drug, restart the regimen.

If desensitisation fails, change to another regimen.

2.2 Hepatitis

Hepatitis occasionally occurs in patients receiving isoniazid, rifampicin, or pyrazinamide. In all cases where there is any manifestation of liver toxicity, liver function tests should be performed if possible. Supportive therapy should be given while awaiting full recovery before treatment can be reinstituted.

2.3 Neurotoxicity

Streptomycin: The most serious complication of streptomycin treatment is neurotoxicity, in particular damage to the vestibular branch of the 8th cranial nerve, especially in older patients.

There may be tinnitus, severe giddiness, and ataxia

- If severe, stop the drug and substitute it with ethambutol or change to another regimen

Isoniazid: Peripheral neuritis or mental confusion may occur. Give pyridoxine 10mg daily or a vitamin B compound preparation containing pyridoxine

- This almost invariably resolves the peripheral neuropathy and may resolve the mental confusion

2.4 Pyrazinamide arthralgia

If troublesome and not responding to paracetamol, the drug should be stopped and the regimen changed to one without pyrazinamide.

Advise on adequate intake of oral fluids.

Appendix 2. **WHO STAGING FOR HIV INFECTION AND DISEASE IN ADULTS AND ADOLESCENTS**

Clinical Stage I:

1. Asymptomatic
2. Persistent generalised lymphadenopathy

Clinical Stage II:

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

Clinical Stage III:

1. Severe weight loss (more than 10% of presumed or measured body weight)
2. Unexplained chronic diarrhoea for more than 1 month
3. Unexplained prolonged fever, intermittent or constant, for more than 1 month
4. Oral candidiasis
5. Oral hairy leukoplakia
6. Pulmonary tuberculosis (current)
7. Severe bacterial infections such as pneumonias, pyomyositis, empyema, bacteraemia or meningitis
8. Acute necrotizing ulcerative stomatitis, gingivitis or periodontitis
9. Unexplained anaemia (<8gm/dl), neutropenia (<0.5×109 per litre), or chronic thrombocytopenia (<50× 109 per litre)

Clinical Stage IV:

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 jiroveci pneumonia (PCP)
3. Recurrent severe bacterial pneumonia
4. Toxoplasmosis of the brain
5. Cryptosporidiosis with diarrhoea for more than 1 month
6. Chronic isosporiasis
7. Extrapulmonary cryptococcusis including meningitis
8. Cytomegalovirus infection (retinitis or infection of other organs)
9. Herpes simplex virus (HSV) infection, mucocutaneous for more than 1 month, 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. Atypical mycobacteriosis, disseminated
14. Recurrent non-typhoid salmonella septicaemia
15. Extrapulmonary tuberculosis
16. Lymphoma
17. Invasive cancer of the cervix
18. Kaposi's 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

Appendix 3. **WHO CLINICAL STAGING OF HIV FOR INFANTS AND CHILDREN WITH HIV INFECTION**

Clinical Stage I:

1. Asymptomatic
2. Persistent generalised lymphadenopathy

Clinical Stage II:

1. Unexplained persistent hepatosplenomegaly
2. Papular pruritic eruptions
3. Extensive wart virus infection
4. Extensive molluscum contagiosum
5. Recurrent oral ulcerations
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:

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 (<8.0g/dl), neutropenia (<0.5 x 109/L3) or chronic thrombocytopenia (<50 x 109/ L3)

Clinical Stage IV:

1. Unexplained severe wasting, stunting or severe malnutrition not responding to standard therapy
2. Pneumocystis jiroveci 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 Candida of trachea, bronchi or lungs)
8. Central nervous system toxoplasmosis (after the neonatal period)
9. HIV encephalopathy
10. Cytomegalovirus (CMV) infection, retinitis, or CMV infection affecting another organ with onset at age over 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 mycobacteria infection
16. Cerebral or B cell non-Hodgkin lymphoma
17. Progressive multifocal leukoencephalopathy
18. HIV-associated cardiomyopathy or nephropathy

Appendix 4. **ANTIRETROVIRAL DRUG TOXITY**

Antiretroviral Drug Toxicity

Antiretroviral Drug	Primary toxicities	Minor toxicities	Monitoring/ Management
Zidovudine (AZT)	Haematological (anaemia, neutropenia, thrombocytopenia), myopathy, GI intolerance	Blue to black discoloration of nails, nausea, and headache	For severe anaemia: • Reduce dose or change to d4T or transfuse For myopathy: • Discontinue if CPK high
Lamivudine (3TC)	Painful peripheral neuropathy, pancreatitis	Skin rash, headache	• Do serum amylase, stop if elevated • Restart when resolved or change to ABC
Stavudine (d4T)	Painful neuropathy, lipoatrophy, lactic acidosis, hepatitis, Pancreatitis	Insomnia, anxiety, panic attacks	Severe peripheral neuropathy, abnormal serum amylase, and transaminases; discontinue therapy
Didanosine	Pancreatitis,	Abdominal	Discontinue if

Antiretroviral Drug	Primary toxicities	Minor toxicities	Monitoring/ Management
(ddI)	painful peripheral neuropathy	cramps, diarrhoea	neuropathy severe, raised serum amylase, and transaminases
Tenofovir (TDF)	Renal dysfunction		• Monitor renal function at baseline and every 6 months. • Avoid use in pregnant women except if other alternatives are not available.
Abacavir (ABC)	Hypersensitivity reaction,	Lactic acidosis	Discontinue therapy and do not restart when resolved
Nevirapine (NVP)	Skin rash, Stevens- Johnson syndrome, hepatoxicity		• Low-dose over first 2 weeks minimizes rash occurrence • If mild or moderate, continue

Antiretroviral Drug	Primary toxicities	Minor toxicities	Monitoring/ Management
			cautiously or substitute with EFV. • If severe, stop NVP; permanently stop if hepatitis positive
Efavirenz (EFV)	Nightmares, rash, hepatitis	Dizziness	• Rash in 10% but rarely severe (<1%) • CNS symptoms often resolve 2-4 weeks • Stop if hepatitis is confirmed
Lopinavir / Ritonavir	Diarrhoea, skin rash	Headache, weakness	Diarrhoea rarely severe
Indinavir (IDV)	Nephrolithiasis, hepatitis, lipid, glucose abnormalities	Headache, rash, retinoid-like effects, alopecia	• Ensure adequate rehydration (1.5 L/day) • Monitor liver enzymes
Emtricitabine	Lactic acidosis	Hyperpigm	Do serum

Antiretroviral Drug	Primary toxicities	Minor toxicities	Monitoring/ Management
(FTC)	with hepatic steatosis	en tation Skin coloration	lactate if suspicious symptoms exist

Appendix 5. **HIV/AIDS HEALTH WORKER SAFETY AND UNIVERSAL HYGIENE PRECAUTIONS**

Take the following universal hygiene precautions when managing HIV+ patients and also whenever high levels of hygiene must be observed, e.g. surgical procedures, deliveries, newborn resuscitation:

- **Wash your hands** thoroughly with soap and water or use a suitable disinfectant:
  - Before and after each procedure
  - When any skin area is contaminated with body fluids
  - After removing gloves (which may have holes in them)
  - After changing soiled bed sheets or clothing
- Wear protective gloves:
  - Wear sterile or high-level disinfected gloves when performing sterile procedures
  - Wear clean gloves for handling body fluids/secretions, contaminated waste,
  - instruments, and for cleaning body fluid spills
- Protect yourself from body fluids:
  - Wear gloves (as above)
  - Cover wounds or cuts with a waterproof bandage
  - Wear protective boots and gloves and where possible, wear a water-proof apron when working in a heavily contaminated area, e.g. toilets
  - Wear eye protection to protect from blood splashes (normal spectacles are adequate)
  - Avoid mouth-to-mouth resuscitation and pipetting by mouth where possible

  - Avoid unnecessary procedures, e.g. episiotomy
  - In surgical procedures, use a needle holder and appropriate sized needle, wear double gloves and eye shield
  - Ensure safe sharps handling and disposal
  - Avoid accidental pricks and cuts with contaminated sharp instruments (e.g. needles) by careful handling and proper disposal
  - Keep a puncture-resistant container nearby
  - Use each needle and syringe only once
  - 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
- Practice safe waste disposal:
  - Dispose of placenta or blood/body-fluid contaminated items in leak-proof containers
  - Burn or bury contaminated solid waste
  - Wash hands, gloves, and containers after disposal of infectious waste
- 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
  - Rinse off blood/body fluids before washing with soap
- Ensure correct cleaning and sterilisation

- Thoroughly clean/disinfect (according to instructions) any equipment which contacts intact skin
- Properly sterilise all instruments that penetrate the skin, and ensure reusable needles and syringes are:
- Carefully and thoroughly cleaned after use and rinsed in clean water
- Kept in disinfectant solution before (re- sterilisation)
- Cleaned again in clean water before sterilisation in an autoclave or by boiling for at least 30 minutes

Post-exposure prophylaxis

The risk of a health worker acquiring HIV infection at work is extremely small if the above measures are followed. However, if significant exposure to HIV has occurred:

- Immediately wash the skin with soap and water
- Flush mucous membranes with lots of water
- Evaluate the source (if known) of HIV, including serology and stage of the disease
- Initiate post-exposure prophylaxis (PEP) with specific antiretroviral drugs (if available) within 1-2 hours of exposure to HIV-infected material (refer to current national guidelines for PEP regimen)
- Monitor the health worker and provide initial and follow-up counselling and medical evaluation
- Do HIV serology at baseline, 6 weeks, 3 months, and 6 months

Appendix 6. **ESSENTIAL MEDICINES LIST**

The last four columns of the medicines list are labelled as follows:

DS: Dosage form
STR: Strength
L: Level of use
C: VEN classification
HC: Health centre of the level indicated by HC1, HC2, HC3, HC4
H: Hospital
RR: Regional Referral Hospital
NR: National Referral Hospital

MEDICINE	DS	STR	L	C
1. Anaesthetics				
1.1 General Anaesthetics and Oxygen				
Etomidate	Injection	2mg/mL	RR	E
Halothane	Liquid for inhalation	100%	HC4	V
Medical air	Medical gas	99.99%	HC4	V
Oxygen	Medical gas	99.8%	HC4	V
1.2 Local Anaesthetics				
Bupivacaine (with preservative)	Injection	0.50%	RR	V
Lignocaine	Injection	2%	HC2	V
Lignocaine	Spray	10%	HC4	N
Lignocaine	Ointment	5%	HC4	N
Lignocaine	Gel	2%	HC3	N
Lignocaine (preservative free)	Injection	5%	HC4	V
Lignocaine + adrenaline	Injection	1% + 1:200,000	NR	N
1.3 Preoperative and Peri-operative Medication				
Atropine	Injection	1mg/mL	HC4	V
Diazepam	Rectal tube	2mg/mL	HC4	V
Diazepam	Injection	5mg/mL	HC4	V
2. Analgesics, Antipyretics				
2.1 Non-opioids				
Acetylsalicylic acid	Tablet	300mg	HC2	E
Diclofenac	Suppository	12.5mg	H	V

MEDICINE	DS	STR	L	C
Diclofenac	Suppository	50mg	NR	E
Diclofenac	Tablet	25mg	HC4	E
Diclofenac	Injection	25mg/mL	HC4	V
Ibuprofen	Tablet	200mg	HC3	E
Paracetamol	Tablet	500mg	HC2	E
Paracetamol	Suppository	125mg	HC2	E
2.2 Medicines Used for Gout				
Indomethacin	Capsule	25mg	H	N
2.3 Opioid Analgesics				
Codeine	Tablet	30mg	HC4	E
Morphine	Oral solution	10mg/5mL	HC3	E
Morphine (concentrated)	Oral solution	20mg/mL	NR	V
Morphine	Injection	10mg/mL	H	V
Pethidine	Injection	50mg/mL	HC4	V
3. Anti-allergics and Medicines Used in Anaphylaxis				
Cetirizine	Tablet	10mg	H	N
Chlorphenamine maleate	Tablet	4mg	HC2	E
Epinephrine (adrenaline)	Injection	1mg/mL	HC2	V
Hydrocortisone sodium succinate	Powder for injection	100mg	HC3	V
Prednisolone	Tablet	5mg	HC4	E
Promethazine	Tablet	25mg	HC2	E

MEDICINE	DS	STR	L	C
Promethazine	Injection	25mg/mL	HC4	E
4. Antidotes				
4.1 General Antidotes				
Charcoal (activated)	Tablet	250mg	HC2	E
Flumazenil	Injection	0.1mg/mL	H	V
Pralidoxime	Powder for injection	1 g	RR	E
4.2 Specific Antidotes				
Benztropine	Injection	1mg/mL	H	E
Calcium gluconate	Injection	10%	HC3	E
Naloxone	Injection	400 µg/mL	NR	E
5. Antiepileptics and Anticonvulsants				
Carbamazepine	Tablet	200mg	HC3	V
Carbamazepine	Tablet (chewable)	100mg	HC3	V
Carbamazepine	Syrup	100mg/5mL	HC4	N
Clonazepam	Tablet	2mg	RR	E
Diazepam	Rectal tube	2mg/mL	HC2	V
Diazepam	Injection	5mg/mL	HC4	V
Ethosuximide	Capsules	250mg	RR	E
Magnesium Sulphate	Injection	500mg/mL	HC3	V
Phenobarbital	Tablet	30mg	HC2	E
Phenobarbitonal	Injection	200mg/mL	H	V
Phenytoin	Injection	50mg/mL	RR	V
Phenytoin	Tablet	50mg	HC2	V
Phenytoin	Tablet	100mg	HC2	V

MEDICINE	DS	STR	L	C
Valproate	Tablet (EC)	500mg	RR	V
Valproate	Tablet (crushable)	100mg	H	N
Valproate	Syrup	200mg/5mL	H	N
6. Anti-infective Medicines				
6.1 Santihelmintics				
6.1.1 Intestinal Antihelmintics				
Albendazole	Tablet	400mg	HC2 (HC1)	V
Mebendazole	Tablet	500mg	HC2	E
Mebendazole	Tablet	100mg	HC2	E
Niclosamide	Tablet	500mg	HC4	N
6.1.2 Antifilarials (only specialist treatment)				
6.1.3 Antischistosomals				
Praziquantel	Tablet	600mg	HC4	E
6.2 Antibacterials				
6.2.1 Beta-lactam Medicines				
Amoxicillin	Tablet	250mg	HC2	V
Amoxicillin	Capsule	500mg	HC2	V
Ampicillin	Powder for injection	500mg	HC3	V
Azithromycin	Tablet	250mg	RR	N
Azithromycin	Oral suspension	200mg/5mL	HC2	N
Benzathine benzylpenicillin	Powder for injection	2.4 MU	HC3	E

MEDICINE	DS	STR	L	C
Benzylpenicillin	Powder for injection	600mg	HC3	E
Cefixime	Tablet	200mg	H	N
Ceftriaxone	Powder for injection	1 g	HC4	V
Cefuroxime axetil	Tablet	250mg	RR	E
Cefuroxime axetil	Oral suspension	125mg/5mL	RR	N
Cefuroxime sodium	Injection	750mg	RR	E
Cloxacillin	Powder for injection	500mg	HC4	E
Phenoxymethylpenicillin	Tablet	250mg	HC2	N
Procaine benzylpenicillin forte	Powder for injection	4 MU	HC3	V
Vancomycin	Injection	500mg	RR	E
6.2.2 Other Antibacterial Medicines				
Chloramphenicol	Powder for injection	1 g	HC3	V
Chloramphenicol	Capsule	250mg	HC4	V
Ciprofloxacin	Tablet	250mg	HC3	E
Ciprofloxacin	Tablet	500mg	HC2	V
Cotrimoxazole	Tablet	120mg	HC2	V
Cotrimoxazole	Tablet	480mg	HC2	V
Cotrimoxazole	IV infusion	96mg/mL	RR	E
Doxycycline	Tablet	100mg	HC2	V
Erythromycin	Tablet (scored)	250mg	HC4	N

MEDICINE	DS	STR	L	C
Gentamicin	Injection	40mg/mL	HC3	V
Metronidazole	IV infusion	5mg/mL	HC4	V
Metronidazole	Tablet	200mg	HC2	V
Nalidixic acid	Tablet	500mg	H	N
Nitrofurantoin	Tablet	100mg	HC2	E
6.2.3 Antileprosy Medicines				
Prednisolone	Tablet	20mg	HC3	E
Prednisolone	Tablet	5mg	HC3	E
Rifampicin + Clofazimine + dapsone	Tablet (blister)	600mg + 300mg + 100mg	HC3	V
Rifampicin + Clofazimine + dapsone	Tablet (blister)	450mg + 150mg + 50mg	HC3	V
Rifampicin + dapsone	Tablet (blister)	600mg + 100mg	HC3	V
Rifampicin + dapsone	Tablet (blister)	450mg + 50mg	HC3	V
Thalidomide	Tablet	50mg	RR	N
6.2.4 Anti-tuberculosis Medicines				
Ethambutol	Tablet	400mg	HC3	E
Ethambutol + isoniazid	Tablet	400mg + 150mg	HC3	E
Isoniazid	Tablet	100mg	HC3	E
Pyrazinamide	Tablet	500mg	HC3	E
Rifampicin + isoniazid	Tablet	60mg + 30mg	HC3	V

MEDICINE	DS	STR	L	C
Rifampicin + isoniazid	Tablet	150mg + 75mg	HC3	E
Rifampicin + isoniazid d	Tablet	300mg + 150mg	HC3	V
Rifampicin + isoniazid + pyrazinamide	Tablet	60mg + 30mg + 150mg	HC3	V
Rifampicin + isoniazid + pyrazinamide + ethambutol	Tablet	150mg + 75mg + 400mg + 275mg	HC3	V
Streptomycin	Powder for injection	1g	HC3	V
6.3 Antifungal Medicines				
Amphotericin b	Oral suspension	100mg/mL	RR	E
Clotrimazole	Pessary	500mg	HC2	E
Griseofulvin	Tablet	125mg	HC3	N
Griseofulvin	Tablet	500mg	HC3	N
Miconazole	Pessary	100mg	HC4	N
Nystatin	Pessary	100,000IU	HC3	E
Nystatin	Oral suspension	100,000 IU/mL	HC2	E
Nystatin	Tablet	500,000IU	HC3	N
6.4 Antiprotozoal Medicines				
6.4.1 Antiamoebic Medicines				
Metronidazole	Tablet	200mg	HC2	V
Tinidazole	Tablet	500mg	H	N

MEDICINE	DS	STR	L	C
6.4.2 antileishmaniasis medicines (only specialist treatment)				
6.4.3 antimalarial medicines				
Artemether	Injection	80mg/mL	HC3	E
Artemether + Lumefantrine	Tablet	20mg + 120mg	HC2	V
Artesunate	Injection	60mg/mL	HC3	V
Artesunate	Suppository	50mg	HC2 (HC1)	V
Artesunate	Suppository	200mg	HC2 (HC1)	V
Artesunate + amodiaquine	Tablet	50mg + 200mg	HC4	E
Chloroquine	Tablet	155mg	HC4	E
Dihydroartemisi-nin + piperaquine	Tablet	40mg + 320mg	HC4	N
Mefloquine	Tablet	250mg	RR	N
Proguanil	Tablet	100mg	HC4	N
Quinine	Injection	300mg/mL	HC3	E
Quinine	Tablet	300mg	HC3	E
Sulfadoxine + pyrimethamine	Tablet	500mg + 25mg	HC2	V

MEDICINE	DS	STR	L	C
6.4.4 Antitrypanosomal Medicines (African trypanosomiasis) (only specialist treatment)				
6.4.5 Antitrichomoniasis Medicines				
Tinidazole	Tablet	500mg	RR	N
6.4.6 medicines used in totoxoplasmosis				
Clindamycin	Capsule	150mg	H	E
Clindamycin	Injection	150mg/mL	H	E
6.5 Antiviral Medicines				
Aciclovir	Tablet	200mg	HC4	E
7. Antimigraine Medicines				
7.1 Treatment of Acute Attacks				
Acetylsalicylic acid	Tablet	300mg	HC2 (HC1)	N
Ergotamine	Tablet	1mg	H	E
Paracetamol	Tablet	500mg	HC2 (HC1)	E
7.2 Prophylaxis				
Propranolol	Tablet	20mg	HC4	V
8. Antineoplastic and Immunosuppressive medicines				
8.1 Immunosuppressive Medicines (only specialist treatment)				
8.2 Cytotoxic Medicines (only specialist treatment)				

MEDICINE	DS	STR	L	C
8.3 Hormones and Antihormones				
Betamethasone	Injection	4mg/mL	HC4	E
Hydrocortisone sodium succinate	Powder for injection	100mg	HC4	V
Prednisolone	Tablet	5mg	HC4	E
9. Anti-Parkinsonism Medicines				
Benzhexol	Tablet	2mg	HC4	E
Benztropine	Injection	1mg/mL	HC4	E
10. Medicines Affecting the Blood				
10.1 Antianaemia Medicines				
Ferrous salt	Tablet	60mg iron	HC2 (HC1)	N
Ferrous salt + folic acid	Tablet	60mg iron + 400µg	HC2 (HC1)	V
Ferrous salt (paediatric)	Oral solution	25mg iron/mL	HC2	N
Folic acid	Tablet	5mg	HC2	N
Hydroxocobalamin (Vitamin b12)	Injection	1mg/mL	H	E
10.2 Anticoagulants and Antagonists				
Enoxaparin	Injection	100mg/mL	H	N
Heparin	Injection	5000 IU/mL	H	V
Phytomenadione (vitamin k_1)	Injection	1mg/mL	HC3	V
Phytomenadione	Injection	10mg/mL	HC4	E

MEDICINE	DS	STR	L	C
(vitamin k_1)				
Protamine	Injection	10mg/mL	H	E
Warfarin	Tablet	5mg	H	V
Warfarin	Tablet	1mg	H	E
10.3 Fibrinolytic Medicines (only specialist treatment)				
11. Blood Products and Plasma Substitutes				
11.1 Plasma Expanders				
Dextran 70	IV infusion	6%	HC4	E
Polygeline solution	IV infusion	3.5%	HC4	N
11.2 Plasma Extracts (only specialist treatment)				
12. Cardiovascular Medicines				
12.1 Angianginal Medicines				
Acetylsalicylic acid	Tablet	75mg	HC4	E
Atenolol	Tablet	100mg	H	V
Glyceryl trinitrate	Tablet (sublingual)	500µg	H	V
Isosorbide dinitrate	Tablet (sublingual)	5mg	H	N
Nifedipine	Tablet	10mg	H	E
12.2 Antidysrhythmic Medicines				
Adenosine	Injection	3mg/mL	RR	E
Propranolol	Tablet	40mg	HC4	E
12.3 Antihypertensive Medicines				

MEDICINE	DS	STR	L	C
Atenolol	Tablet	100mg	H	N
Captopril	Tablet	25mg	H	E
Enalapril	Tablet	5mg	RR	N
Hydralazine	Tablet	25mg	RR	E
Hydralazine	Tablet	50mg	H	N
Hydralazine	Powder for injection	20mg	HC4	V
Lisinopril	Tablet	10mg	H	E
Losartan	Tablet	50mg	RR	N
Methyldopa	Tablet	250mg	HC3	E
Nifedipine	Tablet	20mg	HC3	E
Propranolol	Tablet	40mg	HC4	E
12.4 Medicines Used in Heart Failure				
12.4.1 Cardiac Glycosides				
Digoxin	Tablet	62.5 µg	HC4	E
Digoxin	Tablet	250 µg	HC4	E
Digoxin	Injection	250 µg/mL	H	N
12.4.2 Medicines Used in Vascular Shock				
Dopamine	Concentrate for IV inf	40mg/mL	H	E
Hydrocortisone sodium succinate	Powder for injection	100mg	HC4	E
13. Dermatological Medicines				
13.1 Topical Antifungals				

MEDICINE	DS	STR	L	C
Benzoic acid + salicylic acid	Ointment	6% + 3%	HC2	N
Clotrimazole	Cream	1%	HC3	E
Miconazole	Cream	2%	H	N
Nystatin	Cream / ointment	100,000 IU/g	HC3	N
Sulphur + salicylic acid	Cream / ointment	2% + 2%	HC3	N
13.2 Topical antiinfectives				
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	1%	HC2	N
Methylrosanilinium chloride (gentian violet)	Paint	0.50%	HC2	N
Neomycin + bacitracin	Ointment	5mg + 250IU	H	N
Potassium permanganate	Aqueous solution	0.01% (1:10,000)	HC4	N
Silver sulphadiazine	Cream	1%	HC3	N
Trichloracetic acid	Cream	10%	H	N
13.3 Topical Anti-inflammatory Medicines				
Betamethasone	Cream/ointm	0.10%	HC4	N

MEDICINE	DS	STR	L	C
	ent			
Calamine	Lotion	15%	HC2 (HC1)	E
Hydrocortisone	Cream/ooint ment	1%	HC3	N
13.4 Keratoplastics and Keratolytics				
Benzoylperoxide	Lotion/ cream	5%	HC4	N
Coal tar	Solution	5%	H	N
Dithranol	Ointment	0.10%	H	N
Podophyllum resin	Solution	15%	HC4	N
Salicylic acid	Ointment	2%	HC2	N
13.5 Scabicide				
Benzyl benzoate	Application	25%	HC2	N
13.6 Pediculicide				
Malathion	Lotion aqueous	0.5%	HC2	N
13.7 Other topical preparations				
Silver nitrate	Pencil	40%	HC3	N
14. Diagnostic Medicines				
14.1 Ophthalmic Diagnostic Medicines				
Fluorescein sodium	Eye drops	1%	HC4	V
Iodine + potassium iodide (lugol's iodine)	Solution	2%	HC3	N
Physostigmine	Eye drops	0.25%	RR	N
Rose bengal	Eye drops	1%	HC4	N

MEDICINE	DS	STR	L	C
14.2 Radiocontrast Media (only specialist treatment)				
14.3 Other Diagnostic Medicines				
Acetic acid	Solution	5%	HC3	E
Iodine + Potassium iodide (lugol's iodine)	Solution	2%	HC3	E
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	Solution	10% (equiv. 1% iodine)	HC3	N
15.2 Disinfectants				
Alcohol with glycerin	Solution	70%	HC2 (HC1)	E
Calcium or sodium hypochlorite	Solution	5%	HC2 (HC1)	E
Glutaraldehyde	Solution	2%	H	N
16. Diuretics				
Bendroflumethiazide	Tablet	5mg	HC3	E
Furosemide	Injection	10mg/mL	HC4	V
Furosemide	Tablet	40mg	HC4	E

MEDICINE	DS	STR	L	C
Spironolactone	Tablet	50mg	H	N
17. Gastrointestinal Medicines				
17.1 Antacids and Other Antiulcer Medicines				
Magnesium trisilicate compound, bp	Tablet	370mg	HC2	E
Omeprazole	Tablet	20mg	HC4	E
Ranitidine	Tablet	150mg	H	E
Ranitidine	Injection	25mg/mL	H	E
17.2 Antiemetics				
Metoclopramide	Tablet	10mg	HC4	E
Metoclopramide	Injection	5mg/mL	HC4	E
Prochlorperazine maleate	Tablet	5mg	HC4	E
Promethazine	Tablet	25mg	HC3	N
Promethazine	Injection	25mg/mL	HC3	N
17.3 Antihaemorrhoidals				
Bismuth subgallate compound bp	Suppository	320mg	HC4	N
17.4 Antispasmodics (only specialist treatment)				
17.5 Laxatives				
Bisacodyl	Tablet	5mg	HC3	E
Bisacodyl	Paediatric suppository	5mg	HC4	N
Lactulose	Solution	3.1-3.7 g/5mL	RR	N

MEDICINE	DS	STR	L	C
17.6 Medicines Used in Diarrhoea				
17.6.1 Oral Rehydration				
Oral rehydration salts	Oral powder for solution	WHO formula-tion	HC2 (HC1)	V
17.6.2 Antidiarrhoeals				
Codeine	Tablet	30mg	HC4	E
Loperamide	Tablet	2mg	H	N
Zinc sulphate	Tablet	30mg	HC2	E
Zinc sulphate	Tablet (ef-fervescent)	20mg	HC2 (HC1)	V
18. Hormones, Other Endocrine Medicines, and Contraceptives				
18.1 Adrenal hormones and Synthetic Substitutes				
Dexamethasone	Tablet	0.5mg	H	N
Dexamethasone	Injection	4mg/mL	HC4	E
Hydrocortisone sodium succinate	Powder for injection	100mg	HC3	V
Methylpredniso-lone	Powder for injection	500mg	RR	N
Prednisolone	Tablet	5mg	HC4	V
18.2 Androgens (only specialist treatment)				
18.3 Hormonal Contraceptives				
Ethinylestradiol + levonorgestrel	Tablet	30µg + 150µg	HC2	E

MEDICINE	DS	STR	L	C
Ethinylestradiol + levonorgestrel	Tablet	50µg + 250µg	HC2	E
Ethinylestradiol + norethisterone	Tablet	50µg + 1mg	HC2	E
Ethinylestradiol + norgestrel	Tablet	30µg + 300µg	HC2 (HC1)	V
Etonogestrel	Implant (1 radiopaque rod)	68mg	HC3	V
Levonorgestrel	Tablet	750µg	HC2 (HC1)	V
Levonorgestrel	Implant (2 silicone rods)	75mg	HC3	E
Medroxyprogesterone acetate	Injection (aqueous suspension)	150mg/mL	HC2	V
18.4 Oestrogens (only specialist treatment)				
18.5 Insulins and Other Antidiabetic Medicines				
Biphasic isophane insulin (soluble) + Isophane insulin	Injection	30% + 70% in 100IU/mL	HC4	V
Glibenclamide	Tablet	5mg	HC4	V
Insulin isophane	Injection	100IU/mL	HC4	V
Insulin zinc suspension	Injection	100IU/mL	HC4	N
Metformin	Tablet	500mg	HC4	V
Soluble insulin	Injection	100IU/mL	HC4	V

MEDICINE	DS	STR	L	C
18.6 Ovulation Inducers (only specialist treatment)				
18.7 Progestogens (only specialist treatment)				
18.8 Thyroid Hormones and Antithyroid Medicines				
Carbimazole	Tablet	5mg	H	V
Levothyroxine (thyroxine)	Tablet	100µg	H	V
19. Immunologicals				
19.1 Immunologicals and Diagnostic Medicines				
Tuberculin purified protein derivative (ppd)	Injection	100IU/mL	HC4	N
19.2 Sera and Immunoglobulins				
Anti-d immunoglobulin, human	Injection	250µg/mL	RR	E
Antirabies immunoglobulin, human	Injection	150IU/mL	H	V
Antirabies vaccine, human diploid	Injection	≥2.5IU/ 0.5mL	H	V
Antiscorpion serum	Injection	mixture of *Androctonus*, *Leiurus* and *Buthus spp* in 10mL vial	RR	N
Antitetanus immunoglobulin,	Injection	500IU	HC4	V

MEDICINE	DS	STR	L	C
human				
Antivenom sera polyvalent (East and Central Africa)	Injection	mixture of 11 *Bitis*, *Naja*, *Echis,* and *Dendroaspis spp* in 10mL vial	H	E
Normal immunoglobulin, human	Injection	16%	NR	N
19.3 Vaccines				
19.3.1 Vaccines for Routine Immunisation				
BCG vaccine (freeze dried)	Injection	1.5mg vial with 1.5mL diluents	HC2	V
Diphtheria-Pertussis-Tetanus (DPT)	Suspension for injection	25 Lf Diphtheria Toxoid; 6 Lf Tetanus Toxoid; 10,000 million Borditella Pertussis in 20-dose vial (10mL)	HC2	V
Diphtheria-Pertussis-Tetanus-hepatitis b-*haemophilus influenzae*	Injection	2-dose vial	HC2	V

MEDICINE	DS	STR	L	C
b (DPT hepb-hib)				
Measles vaccine, live attenuated	Powder for injection	10 x 0.5mL dose vial + diluent	HC2	V
Pneumococcal polysaccharide conjugate vaccine (adsorbed)	Injection	0.5mL/dose in 2 dose vial	HC2	V
Poliomyelitis vaccine, live attenuated	Oral solution	20-dose vial (2mL)	HC2	V
Rotavirus vaccine, live attenuated	Oral suspension	1.5mL prefilled oral syringe	HC2	V
Tetanus toxoid	Injection	≥40IU/0.5mL	HC2	V
19.3.2 Vaccines for Specific Groups of Individuals				
Anthrax vaccine	Injection	0.125mL (anthrax antigens)/0.5mL dose	RR	V
Hepatitis b vaccine	Intradermal injection	Single-dose vial	HC4	E
Human Papilloma Virus vaccine (type 16 + type 18 capsid protein)	Injection	40µg/mL + 40µ/mL	HC2	V
Meningococcal vaccine conjugate (a+c))	Injection	0.5mL-vial	HC4	E
Plague vaccine	Injection	Single-dose	H	N

MEDICINE	DS	STR	L	C
		vial		
Yellow fever vaccine, live	Injection	1,000 LD50 units/0.5mL	H	N
20. Muscle Relaxants and Cholinesterase Inhibitors				
Cisatracurium	Injection	2mg/mL	H	N
Rocuronium bromide	Injection	10mg/mL	H	E
Vecuronium bromide	Powder For Injection	10mg	NR	V
21. Ophthalmological Preparations				
21.1 Antiinfective Medicines				
Chloramphenicol	Ophthalmic ointment	1%	HC2	N
Chloramphenicol	Eye drops	0.50%	HC2	N
Ciprofloxacin	Ophthalmic solution	0.30%	RR	N
Gentamicin	Drops (for eye/ear)	0.30%	HC4	N
Povidone	Eye drops	5%	RR	E
Tetracycline	Eye ointment	1%	HC2	V
Tobramycin	Eye drops	0.3%	RR	E
21.2 Anti-infective and Anti-inflammatory Medicines				
Dexamethasone + tobramycin	Topical	0.1% + 0.3%	RR	E

MEDICINE	DS	STR	L	C
Hydrocortisone + oxytetracycline + polymyxin b	Eye drops	1.5% + 0.5% + 10,000IU/mL	HC4	N
Neomycin + dexamethasone	Eye drops/ointment	0.35%+0.1%	RR	E
21.3 Anti-inflammatory Medicines				
Betamethasone	Eye drops	0.10%	HC4	N
Dexamethasone	Eye drops	0.10%	RR	E
Hydrocortisone	Eye drops	1%	HC4	N
Hydrocortisone	Eye ointment	0.50%	HC4	N
Prednisolone	Eye drops	0.50%	HC4	E
Prednisolone, forte	Eye drops	1%	HC4	N
Sodium chromoglycate	Eye drops	2%	RR	N
21.4 Antifungal Medicines				
Econazole	Eye drops	2%	RR	N
Natamycin	Ophthalmic suspension	5%	RR	N
Natamycin	Eye ointment	1%	RR	E
21.5 Antiviral Medicines				
Aciclovir	Eye ointment	3%	HC4	E
Ganciclovir	Ophthlamic gel	0.15%	RR	E
21.6 Local Anaesthetics				
Bupivacaine	Injection	0.50%	H	E

MEDICINE	DS	STR	L	C
Hyaluronidase	Injection (powder for reconstitution)	1,500IU	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	250mg	RR	E
Diethylcarbamazine	Tablet	100mg	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	12mg/mL	RR	N
Timolol maleate	Eye drops	0.25%	RR	N
Timolol maleate	Eye drops	0.50%	RR	N
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	50mg/mL	RR	N
Mitomycin	Powder for	20mg	RR	N

MEDICINE	DS	STR	L	C
	injection			
21.10 Lubricants				
Hydroxyethylcellu-lose (artifical tears)	Eye drops	0.44%	H	E
21.11 Astringents				
Zinc sulphate	Eye Drops	0.20%	RR	N
22. Oxytocics and Anti-oxytocics				
22.1 Oxytocics				
Ergometrine maleate	Injection	500µg/mL	HC4	N
Misoprostol	Tablet	200µg	HC2	V
Oxytocin	Injection	10IU/mL	HC3	E
22.2 Anti-oxytocics (tocolytics)				
Nifedipine	Capsule (immediate release)	10mg	HC3	E
Ritodrine	Tablet	10mg	RR	V
23. Peritoneal and Haemodialysis Solutions				
Liquid concentrate for haemodialysis	Liquid	32 mEq/L bicarbonate + 5 mEq/L acetate	RR	V
Peritoneal dialysis solution	Solution	2.5% (glucose)	RR	E
Peritoneal dialysis solution	Solution	4.25% (glucose)	RR	E
24. Psychotherapeutic Medicines				
Amitriptyline	Tablet	25mg	HC3	V

MEDICINE	DS	STR	L	C
Benzhexol	Tablet	2mg	HC2	V
Carbamazepine	Tablet	200mg	HC4	V
Chlorpromazine	Tablet	25mg	HC2	E
Chlorpromazine	Tablet	100mg	HC2	V
Chlorpromazine	Injection	25mg/mL	HC4	V
Diazepam	Injection	5mg/mL	HC4	V
Diazepam	Tablet	5mg	HC2	V
Fluoxetine	Capsule	20mg	H	V
Fluphenazine decanoate	Injection (oily)	25mg/mL	H	E
Haloperidol	Tablet	5mg	HC4	E
Haloperidol	Tablet	10mg	HC4	V
Haloperidol	Injection	5mg/mL	HC4	V
Imipramine	Tablet	25mg	HC4	E
Promethazine	Tablet	25mg	HC2	V
Promethazine	Injection	25mg/mL	HC3	V
Trifluoperazine	Tablet	5mg	H	E
25. Medicines Acting on the Respiratory Tract				
25.1 Antiasthmatic Medicines				
Aminophylline	Tablet	100mg	HC3	N
Aminophylline	Injection	25mg/mL	HC4	N
Beclomethasone	Aerosol inhalation	50µg/metered dose inhalation	HC4	E
Epinephrine (adrenaline)	Injection	1mg/mL	HC4	V

MEDICINE	DS	STR	L	C
Prednisolone	Tablet	5mg	HC4	V
Salbutamol	Nebuliser solution	2mg/mL	HC3	V
Salbutamol	Respirator solution	5mg/mL	H	V
Salbutamol	Aerosol inhalation	100 µg /metered inhalation	HC4	E
Salbutamol	Tablet	4mg	HC3	E
25.2 Antitussive Medicines				
codeine	Tablet	30mg	HC4	E
26. Solutions Correcting Water, Electrolyte, and Acid-base Disturbances				
26.1 Oral Rehydration				
Oral rehydration salts	Powder for 1L	WHO formula	HC2 (HC1)	V
26.2 Parenterals				
Calcium chloride (dihydrate)	Injection	10%	H	E
Calcium gluconate	Injection	10%	H	E
Darrow's solution	Injection	½ strength in 5% glucose	HC3	V
Glucose	IV infusion	5%	HC3	V
Glucose	IVinfusion	50%	HC3	V
Potassium chloride	Sterile concentrate	150mg/mL	H	V

MEDICINE	DS	STR	L	C
Sodium bicarbonate	IV injection	8.4%	RR	E
Sodium chloride	IV infusion	0.9%	HC3	V
Sodium lactate compound (Hartmann's and Ringer's Lactate solution)	IV infusion	BP formula	HC4	E
26.3 Miscellaneous				
Water for injection	Injection	2mL	HC2	V
Water for injection	Injection	5mL	HC2	V
Water for injection	Injection	10mL	HC2	V
27. Vitamins and minerals				
Calcium lactate	Tablet	300mg	HC3	N
Multivitamin	Tablet	BPC 73	HC2 (HC1)	N
Phytomenadione (vitamin K_1)	Injection	1mg/mL	HC2	V
Potassium chloride	Tablet	600mg	H	E
Pyridoxine (vitamin B_6)	Tablet	50mg	HC3	E
Retinol (vitamin A)	Capsule	100,000 IU	HC2	E
Retinol (vitamin A)	Capsule	200,000 IU	HC2	V
Thiamine	Tablet	100mg	HC4	E
Thiamine	Injection	100mg/mL	H	E
Vitamin B compound (B_3+B_2+B_1)	Tablet	15mg + 1mg + 1mg	RR	V
Vitamin B compound (strong) (B_5+B_6+B_2+B_1)	Tablet	20mg + 2mg + 2mg + 5mg	HC4	N

MEDICINE	DS	STR	L	C
28. Ear, Nose, and Oropharyngeal Preparations				
28.1 Ear Preparations				
Betamethasone	Eye/ear drops	0.10%	H	E
Clotrimazole	Solution	1%	H	E
Gentamicin	Ear drops	0.30%	H	V
28.2 Nasal Preparations				
Beclomethasone	Nasal spray (aqueous suspension)	50µg/metered spray	H	N
Ephedrine	Nasal drops	1%	H	E
Lignocaine + Epinephrine (adrenaline)	Nasal drops	2% + 1:100,000	RR	N
Xylometazoline	Paediatric nasal drops	0.05%	HC4	E
Xylometazoline	Nasal drops	0.10%	HC4	E
28.3 Oropharyngeal Preparations				
Lignocaine	Lozenge	4%	HC4	N
Lignocaine	Spray	5%	HC4	N
Miconazole	Oral gel	24mg/mL(20mg/g)	HC4	N
Povidone-iodine	Mouthwash	1%	HC3	N
Triamcinolone acetonide	Oral paste	0.10%	RR	N
29. Medicines for Neurosurgical Use				
29.1 Cerebral Metabolism/Perfusion				

MEDICINE	DS	STR	L	C
Cerebrolysin	Injection	5mL	NR	E
30. Antiretroviral Medicines				
30.1 Nucleoside/Nucleotide Reverse Transcriptase Inhibitors (NRTI)				
Abacavir	Oral solution	20mg/mL	HC4	E
Abacavir	Tablet	300mg	HC4	E
Emtricitabine	Capsule	200mg	HC 4	E
Lamivudine	Tablet	150mg	HC4	N
Tenofovir	Tablet	300mg	HC4	N
Zidovudine	Oral solution	10mg/mL	HC4	V
Zidovudine	Tablet	300mg	HC4	N
30.2 Non-nucleoside Reverse Transcriptase Inhibitors (NNRTI)				
Efavirenz	Tablet	600mg	H	V
Efavirenz	Capsule	200mg	H	E
Efavirenz	Capsule	100mg	H	E
Nevirapine	Tablet	200mg	H	V
Nevirapine	Syrup	10mg/mL	HC4	V
Nevirapine	Tablet	200mg	HC4	V
30.3 Protease Inhibitor (PI)				
Atazanavir + ritonavir	Tablet	300mg + 100mg	H	N
Lopinavir + ritonavir	Oral solution	80mg + 20mg/mL	HC4	E
Lopinavir + ritonavir	Tablet	100mg +	H	N

MEDICINE	DS	STR	L	C
		25mg		
Lopinavir + ritonavir	Capsule	133.3mg + 33.3mg	H	N
Lopinavir + ritonavir	Tablet	200mg + 50mg	H	V
30.4 Dual Fixed Dose Combinations				
Abacavir + lamivudine	Tablet	60mg + 30mg	HC4	E
Stavudine + lamivudine	Tablet	6mg + 30mg	HC4	V
Stavudine + lamivudine	Tablet	12mg + 60mg	HC4	V
Stavudine + lamivudine	Tablet	30mg + 150mg	HC4	N
Tenofovir + emtricitabine	Tablet	300mg + 200mg	HC4	N
Tenofovir + lamivudine	Tablet	300mg + 150mg	HC4	V
Zidovudine + lamivudine	Tablet	300mg + 150mg	HC4	V
30.5 Triple fixed dose combinations				
Stavudine + lamivudine + nevirapine	Dispersible tablet	6mg + 30mg + 50mg	H	V
Stavudine + lamivudine +nevirapine	Dispersible tablet	12mg + 60mg + 100mg	H	V
Tenofovir + emtricitabine + Efavirenz	Tablet	300mg + 200mg + 600mg	HC4	N

MEDICINE	DS	STR	L	C
Tenofovir + lamivudine + Efavirenz	Tablet	300mg + 300mg + 600mg	HC4	E
Zidovudine + lamivudine + Abacavir	Tablet	300mg + 150mg + 300mg	RR	N
Zidovudine + lamivudine + nevirapine	Tablet	300mg + 150mg + 200mg	HC4	V
31. Nutrition				
Formula 75	Powder	75 kCal + 0.9 g protein/100 mL	H	V
Formula 100	Powder	100 kCal + 2.9 g protein/100 mL	H	E
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)	N

INDEX - CONDITIONS

INDEX - MEDICINES

AMENDMENT FORM

Use the format shown on this form to propose amendments to any part of these guidelines. Forward your proposals together with relevant supporting documentation/references by post, fax or e-mail to:

The Permanent Secretary

Ministry of Health, PO Box 7272, Kampala

Attention: The Commissioner for Clinical Services

Tel: (+256) 41 231576

Fax: (+256) 41 231584

E-mail: dghs@health.go.ug

Name: …… ..

……

Position: ……

……

Address: ……

…….. .....

UCG Section number: ……

……

Condition: ……

……

Suggested amendments:

GLOSSARY

Alopecia: Absence of hair in areas where it usually grows

Alveoli: Microscopic blind-ended air sacs in the lung

Anorexia: Loss of appetite

Anthropometry: Measurement of the human body or its parts

Arthrotomy: Surgical incision of a joint capsule to inspect the contents and drain any pus present

Bullae: Large blisters containing serous fluid

Chloasma: Ill-defined but symmetrical brown patches on the face

Conjuntiva: Mucous membrane lining the eye and inside of the eyelids

Dorsiflexion: Backward flexion of the foot or hand or their digits, ie. bending towards the upper surface

Dyspnoea: Difficult breathing

Dysuria: Painful or difficult urination

Effusion: Escape of pus, serum, blood, lymph, or other fluid into a body cavity as a result of inflammation or presence of excess blood/tissue fluid in an organ or tissue

Fornix: Any of the 3 vaulted spaces at the top of the vagina around the cervix

Gibbus: Sharply angled curvature of the backbone

Hernia, herniation: Protrusion of an organ or tissue out of a body cavity in which it normally lies

Hirsuitism: Presence of coarse pigmented hair on face, chest, upper back, or abdomen in a female as a result of excessive male hormone production

Homans' sign: Where pain from muscular causes is absent or minimal on dorsiflexion of the ankle with the knee flexed but maximal with the knee extended or during straight leg raising

Keratinization: The process by which cells become horny due to deposition of keratin within them, e.g. as in the epidermis of the skin

Kyphosis: Excessive outward curvature of the spine causing hunching of the back

Metritis: Inflammation of the uterus

Oedema: Excessive build up of fluid in body tissues

Oliguria: Reduced renal output (production of abnormally small amount of urine)

Paracentesis: tapping – the process of drawing off excess fluid from a part of the body through a hollow needle or cannula

Paroxysm: Sudden, violent attack, especially a spasm or convulsion (paroxysmal adj)

Partogram: A graphic record of the course of labour

Pneumatocoele: Herniation of lung tissue

Rhinoscleroma: Formation of nodules in the interior of the nose and nasopharynx which become thickened; caused by bacterial infection

Sciatica: Pain and sensation in the area of distribution of sciatic nerve

Septum: Partition or dividing wall within a bodily structure, e.g. nasal septum

Stridor: Noise heard on breathing when trachea or larynx is obstructed, usually louder than a wheeze

Thrombophlebitis: Inflammation of the wall of a vein

Uvula: Small extension of the soft palate which hangs from the roof of the mouth above the root of the tongue

UGANDA CLINICAL GUIDELINES **2012**