EDLIZ 2020

8th Essential Medicines List
and
Standard Treatment Guidelines
For
Zimbabwe

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EDLIZ 8TH EDITION 2020

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The information presented in these guidelines conforms to current medical, nursing and pharmaceutical practice. It is provided in good faith. Whilst every effort was made to ensure that medicine doses are correct, no responsibility can be taken for errors and omissions.

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Thank you!

FOREWORD

It is our national objective that the health care needs of all Zimbabweans are met through the provision and proper use of essential medicines. Sometimes we do not need to give medicines, and this implies that, there is **not** always a "pill for every ill." Therefore, there is need to use medicines rationally, appropriately, efficiently and effectively.

The guidelines in EDLIZ have always reflected the consensus of local experts, and thus take into consideration factors such as the Zimbabwean setting, prevailing economic climate, practical experience as well as evidence-based therapeutics.

This new edition of EDLIZ has considered the dynamic changes in the Burden of Disease as reflected by the inclusion of updated antiretroviral medicines and treatment of other opportunistic infections other than Tuberculosis (TB), COVID-19 and antimicrobial resistance. Many of the therapeutic regimens of the previous edition of EDLIZ still hold true and remain the same and should reinforce the confidence of the prescriber in making reliable therapeutic choices.

I therefore urge all health workers to familiarise themselves with the revised guidelines, to prescribe within the bounds of this publication, and to recognise the critical importance of providing a quality service to all health care recipients through the rational use of medicines.

EDLIZ **REMAINS** good medicine! Use it.

Honorable Retired General Dr C G D N Chiwenga
Vice President and Minister of Health and Child Care

THE STANDARD TREATMENT GUIDELINES & ESSENTIAL MEDICINES LIST FOR ZIMBABWE –EDLIZ 8TH EDITION

This 8th essential medicines list and standard treatment guidelines for the most common health conditions in Zimbabwe has been endorsed by the National Medicine & Therapeutics Policy Advisory Committee [NMTPAC]. It is the product of many years of combined efforts by hundreds of health workers at all levels of the health care system in Zimbabwe – from the front-line primary health care providers to the providers of specialist care. It has been refined over the years as a result of its widespread use by our healthcare workers. We continue to revise the standard treatment guidelines and consider medicine developments and new healthcare problems.

The essential medicine list is based on the Essential Medicines Concept of the World Health Organisation. Medicines in EDLIZ are chosen to meet the health care needs of the majority of the population, and should therefore always be available and accessible at a price that both the patient and the nation can afford.

SELECTION OF MEDICINES FOR INCLUSION IN THE ESSENTIAL MEDICINES LIST

Selection of medicines for inclusion in EDLIZ has been based on the following criteria, with special emphasis on proven evidence for their use in the Zimbabwean setting:

- ✔ relevance to prevalent diseases
- ✔ proven efficacy and safety
- ✔ adequate scientific data in a variety of settings
- ✔ adequate quality
- ✔ favourable cost-benefit ratio
- ✔ desirable pharmacokinetics
- ✔ possibilities for local manufacture

Safe
Efficacious
Quality
Available
Affordable
Accessible
Rationally used

✔ preferably available as single ingredient items and approved fixed dose combination (FDC) to improve adherence

Single ingredient items are preferred to FDC to reduce incidence of adverse medicine reactions (ADRs) and to monitor ADRs. However, FDC are useful to reduce pill burden in the case of HIV/AIDS, TB, hypertension and diabetes.

GENERIC MEDICINES

Every medicine has a chemical name and a generic name. For example, paracetamol, its chemical name is N-(4-Hydroxyphenol) acetamide and the international non-proprietary name (INN) or generic name is paracetamol. The INN is the medicine's official name regardless of who manufactures or markets it. An additional brand name is chosen by the manufacturer to facilitate recognition and association of the product with a particular manufacturer for marketing purposes.

For most common medicines there are several branded products that all contain the same active ingredient and therefore share the same INN. For example, the *African Monthly Index of Medical Specialties* (MIMS) lists over fifteen different brand names of paracetamol. There are 12 different preparations containing aspirin, 13 different brands of amoxicillin and 12 different brands of ampicillin.

The use of generic names for medicine procurement as well as prescribing carries considerations of clarity, quality, and price. Proponents of generic medicines procurement and prescribing point out that:

- generic names are more informative than brand names and facilitate purchasing of products from multiple suppliers, whether as brand-name or as generic products.
- generic medicines are generally cheaper than products sold by brand name; and this is demonstrated very clearly when it comes to antiretroviral medicines
- generic prescribing also facilitates product substitution, whenever appropriate.

Opponents argue that the quality of generic medicines are inferior to that of brand (innovator) products. However, quality assurance and naming of medicines are completely separate issues. Generic medicines from reliable suppliers are as safe, effective, and high in quality as medicines with brand names. At the same time, branded medicines from a manufacturer with inadequate procedures for quality control can be of poor quality, despite the brand name. Also, although any medicine can be counterfeited, there are more

incentives for counterfeiting brand-name medicines than generic medicines. Some pharmaceutical companies also sell their branded products under the generic name, for a much lower price.

Bioequivalence is often misused as an argument against the use of generic equivalents. For many medicines, the variation in bioavailability among individual patients is much larger than the variation among products of different manufacturers. In fact, bioavailability is clinically relevant for only a relatively small number of medicines such as furosemide, digoxin, levodopa, isoniazid, theophylline and phenytoin.

Zimbabwe has a well understood generic policy which requires that all prescribing is in the generic name and the dispenser can make generic substitutions (unless bioavailability is an issue, in which case the prescriber should indicate accordingly).

ADVANTAGES OF EDLIZ

The benefits of the selection and use of a limited number of essential medicines are:

- 😊 Improved medicines supply
- 😊 More rational prescribing
- 😊 Lower costs
- 😊 Improved patient use

IMPROVED MEDICINES SUPPLY

The regular supply of medicines is difficult in many countries, and the consequent health implications are many. Improved medicines availability should lead to improved clinical outcomes.

With fewer essential medicines being purchased, the mechanisms and logistics for procurement, storage & distribution will clearly be easier. It is not practical for every clinic in Zimbabwe to attempt to procure, transport and warehouse all the hundreds of items in EDLIZ. Conversely, limiting the number of medicines available at the primary health care level makes a regular supply of medicines more practical and possible.

- ✓ procurement, storage & distribution
  - ✓ lower holding stocks
  - ✓ lower losses
  - ✓ better quality assurance

With an improved supply the possibilities of holding lower quantities exist. This has financial implications as well as reducing the likelihood of medicines expiring or being damaged during storage.

Quality assurance can be better managed when the number of medicines is limited, and quality checks can be performed more frequently.

MORE RATIONAL PRESCRIBING

- ✓ focused, more effective training
- ✓ more experience with fewer medicines
- ✓ no irrational treatment alternatives available
- ✓ focused medicine information
- ✓ better recognition of adverse medicine reactions

In the absence of limited lists, the large variety of products available on the market contributes to inconsistent prescribing and consequently, variation in clinical practice even within the same health care facility. Irrational prescribing may lead to therapeutic hazards and increased costs.

When the number of medicines is limited, training can be more focused, and the quality of care enhanced. This is especially true when the list represents a consensus of opinion on first choice of treatment such as in EDLIZ.

Using EDLIZ enables the prescriber to become more familiar with the medicines they use, and better able to recognise adverse effects.

The use of EDLIZ also eliminates irrational products from being available for prescribing and allows for more focused medicine information to be provided on suitable essential medicines.

LOWER COSTS

- ✓ more competition
- ✓ lower prices

Improved effectiveness and efficiency in patient treatment lead to lower health care costs. The essential medicines concept is increasingly being accepted as a universal tool to promote both quality of care and cost control.

Essential medicines are usually available from multiple suppliers. With increased competition, more favourable prices can be negotiated.

By limiting the number of different medicines that can be used to treat a particular clinical problem, larger quantities of the selected medicine will be needed, with potential opportunities to achieve economies of scale.

IMPROVED PATIENT USE

Focusing on fewer medicines can enhance patient education and efforts to promote the proper use of medicines in both patients and prescribers.

- ✓ focused education efforts
- ✓ better understanding & increased adherence to treatment

Additionally, with improved medicine availability changes to chronic medication regimens are less likely and as a consequence patient have a better understanding of their disease, their medication and the importance of adherence.

IMPLEMENTATION OF EDLIZ AND SETTING UP OF HOSPITAL MEDICINE AND THERAPEUTICS COMMITTEES (HMTCS)

The advantages presented here however do not just happen. EDLIZ itself will not ensure rational prescribing or facilitate good procurement or quality assurance. Educational, regulatory, financial or managerial strategies when implemented separately are less effective in promoting the rational use of medicines than combined strategies. The production of EDLIZ is one such regulatory strategy, but further steps such as training and re-training, patient education and the establishment and effective functioning of hospital medicine and therapeutic committees (HMTCs) have to be put in place to ensure cost-effective prescribing and patient care. It is therefore necessary for every hospital to have a forum where medicine use issues can be discussed. Ideally, a separate hospital medicine and therapeutics committee (HMTC) should be set up. Given the current manpower constraints, we encourage hospitals to exploit every opportunity such as the regular divisional meetings held in Central Hospitals to discuss and address medicine related problems. The NMTPAC is available to assist those hospitals that are ready to set up an HMTC. A technical guideline to set up a HMTC which was developed by the NMTPAC is available from the Directorate of Pharmacy Services.

EXPLANATIONS & CHANGES FROM THE PREVIOUS VERSION

This edition is essentially the same in format, layout and categorisation of medicines as the last edition. You will need to read it carefully to note changes in recommendations that apply to your areas of interest. Extra bulletins will be sent out where drastic changes in medicine recommendations have occurred.

All medicines in EDLIZ are categorised firstly by level of availability (ABCS) in the health care system, and secondly, according to priority

(VEN). Hence in the example below, amoxicillin is available at primary health care facility (C) level and is ranked vital (V).

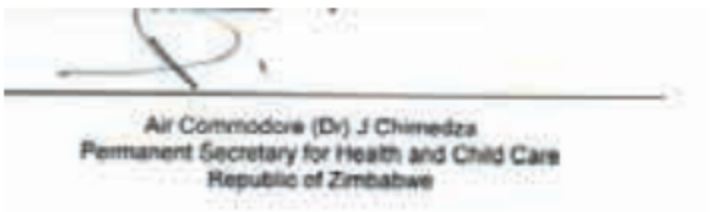
Medicine	Codes	Adult dose	Frequency	Duration
amoxicillin po	**C V**	500mg	3 times a day	7 days

LEVEL OF AVAILABILITY

C medicines are those required at primary health care level and should be available at all levels of care.
B medicines are found at district hospital level or secondary and higher levels of care. Some B medicines may be held at primary health care facilities on a named patient basis – for example in the management and follow up of chronic illnesses.
A medicines are prescribed at provincial or central hospital levels.
S medicines (specialist only) have been brought back into this edition. These are medicines that require special expertise and /or diagnostic tests before being prescribed.

VEN CLASSIFICATION

All medicines are also classified according to their priority. This is mostly a tool to assist in giving priority to medicines based on economic considerations. Thus, **V** medicines are **vital, they** are considered lifesaving or their unavailability would cause serious harm and efforts should always be aimed at making them 100% available. **E** medicines are **essential** and are given second priority. Without E medicines there would be major discomfort or irreversible harm. And **N** medicines are still **necessary** but are lower in priority than V and E medicines.
This edition of EDLIZ has been produced as a result of a highly consultative process and represents both the practical nature of the input from health care workers and the changing nature of medicine especially over the recent years. It has adopted an evidence-based approach wherever possible and has balanced this with the resources available to the health care system.
The NMTPAC is a standing committee that reviews the therapeutic guidelines in EDLIZ on a continual basis, and always looks forward to feedback from the providers of health care in Zimbabwe. Contact the NMTPAC through Directorate of Pharmacy Services on dps@mohcc.org.zw or nmtpac2020@gmail.com with your comments.



MAJOR HIGHLIGHTS IN THE LATEST EDLIZ

Preamble

The major changes in this latest edition of EDLIZ will be highlighted here so that you are aware of recommendations that you need to consider in your medicine management or supply issues. Ideally each hospital should create its own local medicine formulary which shows which medicines are considered very useful in that setting so that you do not have to order medicines that your doctors will not prescribe or use. For instance, you should not keep specialist medicines if there is no specialist to prescribe them. Hospital Medicine and Therapeutics Committees should select medicines from the EDLIZ for use in their hospital.

New chapter/Renaming of chapters

There is a new chapter in this edition on COVID-19 & there are new sub-topics included and renaming of some chapters as highlighted below:

Title in previous version	Title in new version
Guidelines on antimicrobial treatment and prophylaxis	Antimicrobial treatment and prophylaxis
Antineoplastic agents	Systemic Therapy for cancer
	Severe Acute Respiratory Syndrome Coronavirus 2 -COVID-19

Hepatitis B and C treatment has been included in the chapter on Gastro-intestinal conditions.

Antibiotics

Tinidazole has been added to the treatment of sexually transmitted infections.

The first-line treatment for UTI has been changed to nitrofurantoin given the microbiological sensitivity patterns which were showing resistance to the fluoroquinolones. You should, as much as possible, try and get laboratory support for your antibiotic usage.

Immunisation

Human Papilloma Virus (HPV) vaccination has now become routinely available for girls at 10 and 11 years old. Typhoid Conjugate Vaccine

(TCV) was approved for introduction into routine immunization in 2020.

There are discussions on how to introduce routine Td (tetanus/diphtheria) booster in the country and further information will be provided in due course.

ART Guidelines (use latest ART guidelines)

The recommended first-line HIV treatment includes the use of integrase strand transfer inhibitor (INSTI)-based ART i.e.dolutegravir (DTG) in adults/adolescents and raltegravir (RAL) in newborns. This is due to increasing prevalence of non-nucleoside reverse transcriptase (NNRTI) resistance, hence the transitioning from NNRTI-based ART, such as nevirapine (NVP) or efavirenz (EFV) to INSTIs.

A shift from using age limits to using weight bands to determine ART formulations and dosing for children is needed.

- For children who weigh at least 25 kg, DTG-based regimens are now the preferred first-line ART.
- For children and infants under 25 kg, lopinavir-ritonavir (LPV/r)-based ART is the recommended first-line treatment until appropriate DTG dosing is defined for young children.
- For the newborn, RAL is now recommended as the preferred first-line treatment (instead of NVP-based ART) due to its ability to rapidly reduce viral load (VL). RAL is the only INSTI with approved dosing for infants and young children.

Third line antiretroviral medicines will be available in selected hospitals. Please familiarise yourself with the dosing of these new medicines and the algorithm for their use.

Tropical Diseases

You will need to familiarize yourself with the recognition and management of outbreaks; for example, Ebola which caused a huge epidemic in West Africa or COVID-19 which is causing havoc globally and has been termed a pandemic. Hence, our healthcare delivery centres are on the lookout for such infections. Get hold of the MOHCC comprehensive COVID-19 guidelines.

TB recommendations (use latest TB guidelines)

Until recently, six-month isoniazid therapy was the widely used regimen for TB preventive therapy (TPT) or isoniazid preventive treatment (IPT). New TPT guidelines include the use of combination therapies with isoniazid and a rifamycin as an alternative to 6 months

IPT. Use of a regimen including isoniazid (INH) and rifapentine (RPT) - also known as the 3HP regimen - has been recommended for adults and for children >2 years of age; while rifampicin (RIF) and isoniazid for 3 months has been recommended for children <15 years of age (also known the 3RH regimen). You should familiarise yourself with the protocols.

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1. 1 Antimicrobial Treatment and Prophylaxis guidelines

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GENERAL GUIDELINES

Antimicrobial medicines are the most over-used class of medicines worldwide including Zimbabwe. It has become a global concern that we are reaching the post-antibiotic era where common bacterial infections are no longer treatable with common antibiotics. Apart from the unnecessary cost and risk to the patient, overuse encourages development of resistant organisms, a problem that has proven serious and expensive in many countries. In many cases anti-microbial medicines are given “blindly” or “empirically”, based on clinical suspicion without microbiological confirmation. Antimicrobials should be used **only** in patients with likely bacterial illness requiring systemic therapy. Positive identification of the pathogen and anti-microbial susceptibility testing should be sought wherever possible as this will result in improved and more cost-effective treatment outcome.

Principles of antimicrobial use

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

2. **Prophylactic therapy** should be restricted to the use of a limited range of agents of proven efficacy in invasive procedures with a high risk of infection or where the consequences of infection are disastrous. Most surgical prophylaxis should be parenteral and commence just before the procedure, continuing for no more than one or two doses after the end of the operation. The aim is to achieve high plasma and tissue levels at the time that contamination would most likely occur i.e. during the operation.

3. **Empirical therapy** should be based on local epidemiological data on potential pathogens and their patterns of antibiotic susceptibility. Appropriate specimens for Gram stain, culture and sensitivity testing should be obtained **before** commencing antimicrobial therapy. Maintaining a database of susceptibility profile is useful as a guide for appropriate choice of empirical antibiotic therapy which is based on local, regional and national patterns.

4. **Directed antimicrobial therapy** for proven pathogens should include the most effective, least toxic, narrowest spectrum agent available. This practice reduces the problems associated with broad-spectrum therapy, that is, selection of resistant micro-organisms and super-infection.

5. **Choice of route of administration** should be determined by the site and severity of infection. For mild to moderate infections the oral route is preferred, whilst the parenteral route should only be used for severe infections. It is also important that topical antimicrobial therapy be restricted to a few proven indications, for example, eye infections because of the capacity of most agents to select for resistant micro-organisms and to cause sensitisation.

6. **Antimicrobial combinations** have few indications. These include:

   - to extend the spectrum of cover, for example, in empirical therapy or in mixed infections,
   - to achieve a more rapid and complete bactericidal effect, for example, in enterococcal endocarditis,
   - to prevent the emergence of resistant micro-organisms, for example in the therapy of tuberculosis.

   Note: Doses given are for a 70kg adult with normal hepatic and renal function. Paediatric doses are given in the chapter on Paediatric Conditions. In the elderly, as a general rule, doses given could be lower than the recommended adult dose (see Chapter on Medicines and the Elderly).

7. Access, Watch, Reserve Principles (AWaRe)

To improve the quality of hospital antibiotic use, the selection of antibiotics was guided by the WHO Essential Medicines List Access, Watch, and Reserve (AWaRe) classification.

Access: *Which indicates the antibiotic of choice for each of the 25 most common infections. These antibiotics should always be available, affordable and quality assured.*
Watch: *Which includes most of the "highest-priority critically important antimicrobials" for human medicine and veterinary use. These antibiotics are recommended for specific and limited conditions*
Reserve: *Antibiotics that should only be used as a last resort when all other antibiotics have failed.*

Notes on Specific Antimicrobials

Some antibiotics are becoming ineffective because micro-organisms are resistant to them hence antimicrobial susceptibility testing should be sought where possible. Patients should be counselled to complete courses even when they feel better.
Oral **amoxicillin** should be used in preference to oral **ampicillin** because of its better absorption, efficacy and cost-effectiveness. However, the same is **not** true of the injectable preparations because they have similar efficacy.

Chloramphenicol must be limited to serious infections such as, *Klebsiella* pneumonia, *Haemophilus influenzae* infections, difficult to treat pelvic inflammatory disease and brain abscesses and **not** used indiscriminately in the treatment of fever. An exception to this is when there is need for a broad-spectrum antibiotic and it is unavailable. Furthermore, the oral preparation should be used judiciously as it is more prone to cause aplastic anaemia than the injectable formulation.

Dosage of **gentamicin, streptomycin, and kanamycin** (aminoglycosides) must be carefully adjusted for weight and renal function. Careful monitoring of serum urea and/or creatinine and checking for complaints of auditory or vestibular symptoms (adverse effects) is necessary. An exception exists for duration less than 3 days use or when lower doses are used.

Patients with **penicillin allergy** (that is, a pruritic rash, angioedema, or anaphylaxis) must not be given penicillin. Rashes occurring after 48 hours are rarely due to allergy and are not a contraindication to further use. Note that, penicillins have cross-reactivities with other medicines including cephalosporins and carbapenems. In such instances macrolides are suitable alternatives. Patients with a history of co-trimoxazole allergy may be offered desensitisation (see Chapter on HIV related diseases.

Pyrexia/Fever of unknown Origin

In case of pyrexia/fever of unknown origin, which is a common presenting symptom for all ages, in adults there usually would be some localising signs or symptoms, which point to a likely focus of infection.
If after careful examination no clear focus of infection is identified, the following should be considered in a previously healthy patient admitted from the community with fever of less than two weeks' duration:

- Viral infections (frequently resolve after 4-5 days, or may be the prodromal phase, for example, hepatitis)
- Malaria
- Typhoid
- Urinary tract infection
- Bacteraemia
- HIV related causes of fever

If HIV infection is suspected see guidelines in the chapter on HIV Related Diseases.

If the patient's general condition is satisfactory, it is reasonable to withhold antibiotics while carrying out a few basic investigations: that is urinalysis (dip-stick), *urine microscopy*, *haemoglobin, white cell count and differential and malarial parasites* which are all within the capabilities of e.g. a district hospital laboratory. If possible, send a *blood culture* to the nearest microbiology diagnostic laboratory (NMRL and the TB laboratories). *Liver function tests* and *urine testing* for bile products are appropriate if hepatitis is suspected. If no improvement occurs after 3-4 days, and there is still no identifiable focus of infection, and there is no evidence of malaria (at least two negative blood films), the subsequent management of the patient should be guided by further results of the investigations.

In those patients who present very ill or toxic, or whose condition deteriorates, antibiotic therapy should be initiated on the basis of clinical suspicion (typhoid **– ciprofloxacin** , staphylococcal septicaemia **- cloxacillin**, etc, anaerobes **- metronidazole**).

Recommended 'blind' therapy for septicaemia with no identifiable source is as follows:

	Medicine	Codes	Adult dose	Frequency	Duration
	ceftriaxone iv	**C V**	2g	twice a day	7-14 days
and	**gentamicin iv**	**C V**	4-5mg/kg	once a day	max 2 weeks

Alternative:

	Medicine	Codes	Adult dose	Frequency	Duration
	chloramphenicol iv	**B V**	1g	4 times a day	review
and	**gentamicin iv**	**C V**	4-5mg /kg	once a day	max 2 weeks

The use of antimicrobials for infection prophylaxis

There are some instances where the use of prophylactic antibiotics is well established. However, this often consumes a disproportionate amount of all antibiotics used in the hospital setting and consideration to their appropriate use must be given. Prophylactic antibiotic use **must** be within accepted principles and guidelines.

General Recommendations:

- use the appropriate medicine (*see below*)
- give as a **single dose** where possible
- repeat when the procedure lasts longer than 3-4 hours
- give intravenously 10-15 minutes before incision, or orally 1-2 hours before incision.

Specific indications:

Surgical prophylaxis

NB: There is need for the recommendations to be guided by sensitivity patterns. It is important to establish a Healthcare Associated Infection Surveillance system for monitoring of sensitivity or resistance patterns.

Vaginal operations:

Medicine	Codes	Adult dose	Frequency
chloramphenicol iv	**B V**	1g	single dose

Caesarean section:

Medicine	Codes	Adult dose	Frequency
ceftriaxone iv	**C V**	1g	single dose

Hysterectomy, or Colorectal surgery e.g. appendicectomy:

	Medicine	Codes	Adult dose	Frequency
	ceftriaxone iv	**C V**	1g	single dose
and	**gentamicin iv**	**C V**	4-5mg/kg	single dose

If signs of infection after operation, give:

	Medicine	Codes		Adult dose	Frequency	Duration
	amoxicillin po	**C**	**V**	500mg	3 times a day	7 days
and	**metronidazole po**	**C**	**V**	400mg	3 times a day	7 days

Subacute bacterial endocarditis *See Cardiovascular Chapter*

For meningococcal meningitis contacts. Give as soon as diagnosis is made in the index case:

Medicine	Codes		Adult dose	Frequency	Duration
ceftriaxone im	**C**	**V**	250mg	single dose	

2. Basic Infection Prevention and Control Measures

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GENERAL NOTES

Transmission of infections in healthcare facilities can be prevented and controlled through the application of basic infection prevention and control practices. The 2 tiers or categories of infection control prevention and practices are standard precautions and transmission-based precautions. The goal of this two-tier/category system is to minimise the risk of infection, the spread of antimicrobial resistance and maximise safety level within our healthcare facilities.

These precautions should be embedded in a facility-based infection prevention and control programme (See National Infection Control Guidelines).

It is important to:

- Educate healthcare workers not only on what to do but why it is important to do it.
- Emphasize outcomes which helps healthcare workers to see how their routine duties interact with the infection control system.

Categories of Infection Control Practices:

a. Standard Precautions (previously known as Universal Precautions) - must always be applied to all patients, regardless of diagnosis or infectious status.

b. Transmission based precautions - are specific to modes of transmission and include airborne, droplet and contact precautions.

Standard Precautions

Treating all patients in the healthcare facility with the same basic level of "standard" precautions involves work practices that are essential to provide a high level of protection to patients, healthcare workers and visitors.
These precautions include the following:

- Hand hygiene (hand washing, hand antisepsis)
- Use of personal protective equipment when handling blood, excretions, and secretions.
- Appropriate handling of patient care equipment and soiled linen.
- Prevention of needle stick/sharp injuries.
- Environmental cleaning and spills management.
- Appropriate, safe handling of waste.

Hand Hygiene

Appropriate hand hygiene can minimise micro-organisms acquired on the hands by contact with body fluids and contaminated surfaces.
Hand hygiene breaks the chain of infection transmission and reduces person to person transmission.

Hand hygiene is the simplest and most cost- effective way of preventing the transmission of infection and reducing the incidence of healthcare associated infections. It should be performed before and after touching a patient, before an aseptic procedure, after touching a patient's surroundings and body fluid exposure.

Types of Hand Hygiene

1. Hand washing is usually limited to hands and wrists, the hands are washed for a period of 20-30 seconds with hand washing soap and water.

2. Hand antisepsis/Decontamination

    - Decontaminate hands with a waterless alcohol-based hand gel or rub for 40-60 seconds. This is appropriate for hands that are not visibly soiled.

3. Surgical hand antisepsis

    - This removes or destroys transient micro-organisms and confers a prolonged effect. The hands and forearms are washed thoroughly with an antiseptic soap for a period of 2-3 minutes and dried with a sterile towel. This is required before performing invasive procedures.

NB: Hands should be dried with single use towels or disposable paper towels.

Use of Personal Protective Equipment.

Types:

- Scrub Suit or Gowns
- Plastic Aprons
- Boots or shoes covers
- Caps
- Protective eye wear
- Gloves

➢ Gloves reduce the incidence of hand contamination with infectious material which in turn reduces the opportunity for personnel to become

infected and/or the organisms to spread to other personnel and /or patients.

➢ ***Gloves should not replace hand hygiene***

Gloves are to be worn when touching the following:

- Blood
- All body fluids
- All body secretions
- All body excretions

Gloves should be removed before touching clean items (e.g. phone, door knobs or patients' charts.) Perform hand hygiene after removing gloves.

Important points to remember when using:

a) Gloves.

- Use gloves when there is potential exposure to blood, body fluids, excretions, or secretions.
- Change gloves between patients, between procedures on the same patient when they become soiled.
- Remove gloves before leaving the patient's bedside and decontaminate hands immediately with 70% alcohol hand rub solution.
- Discard gloves after attending to each patient.

b) Boots/shoe covers

- These are used to protect the wearer from splashes of blood, body fluids, secretions, and excretions.
- Shoe covers should be disposable and waterproof.
- Waterproof boots should be washable.

c) Caps

- Disposable and waterproof caps that completely cover the hair are used when splashes of blood and body fluids are expected.

d) Masks and Respirators

- A surgical mask protects healthcare providers from inhaling respiratory pathogens transmitted by the droplet routes. It prevents the spread of infectious diseases such as COVID-19, influenza and meningococcal diseases (meningococcal meningitis.)

- A N95 respirator protects healthcare providers from inhaling respiratory pathogens that are transmitted via the airborne route. This helps to prevent the spread of infectious diseases such as TB, or MDR-TB, chicken pox (varicella), measles or rubella.

NB: In order to prevent the spread of infection, the appropriate mask/respirator should be worn by healthcare providers and visitors when attending to a patient suffering from a communicable disease that is spread via the airborne or droplet route.

The patient with a communicable disease via the droplet or airborne route should wear a surgical mask when being transferred to other departments or hospitals or in an isolation room to prevent spread of infection.
Disposable masks are for single use only and should be discarded after use.

Precautions

- Masks/Respirators should not be worn around the neck
- Masks/Respirators cannot be worn with beards or unshaven faces.
- Respirators should be “fit-tested” to ensure maximum protection or at least “fit-checked” before use to ensure complete seal to ensure effective filtering of micro-organisms.

e) Gowns

- Gowns made of impervious material are worn to protect the wearer’s clothing/uniform from possible contamination with micro-organisms and exposure to blood, body fluids, secretions and excretions.

- Use gown once for one patient and discard.

- Healthcare workers should remove gowns before leaving the unit.

Recommendations for use of gowns

- Lab coats or scrub suits should not be viewed as an effective barrier to blood or other body fluids.

- Use of fluid resistant gowns, impervious gowns or plastic aprons, is highly recommended where soiling of clothes with blood or other potentially infectious material will likely occur.

f) Plastic Aprons

- A plastic apron protects the wearers' uniform from contact with contaminated body fluids.
- The inside of the apron is considered clean, the outside is considered contaminated. The neck of the apron is clean because that part is not touched with contaminated hands.
- Wash hands thoroughly after removing apron.

g) Protective eyewear/Goggles

- Should always be worn during patient contact where there is a possibility that patients' body fluids may splash or spray onto the care giver's face/eyes (e.g. during suctioning, intubation, endoscopy and cleaning of instruments used for these procedures)
- During all dental, surgical, laboratory and post-mortem procedures.
- Full face shields may also be used to protect the eyes and mouth of the healthcare worker in high risk situations.
- Re-usable goggles should be washed and decontaminated after removal and in-between use.

Please note: All protective equipment should be removed prior to leaving work area.

h) Needles, sharp instruments and other devices.

All equipment contaminated with blood or other body fluids should be handled with special care. Keep in mind these recommendations:

- Never recap needles
- Never bend or break needles
- Never remove needles from disposable syringes
- Immediately dispose of all disposable syringes and needles, scalpel blades and other sharp instruments, after use, in a ***labelled leak-proof puncture resistant container***.
- Never over-fill the container. Seal and dispose when ¾ full

Transmission-based precautions.

These are designed to supplement standard precautions or protocols and must always be used in conjunction with Standard Precautions isolation techniques.

Transmission based precautions provide extra safety by facilitating a concerted effort to control the spread of specific types of bacteria. Whilst mostly used for diagnosed infection, they are useful when a specific diagnosis is suspected. Transmission-based precautions are divided into 3 basic categories:

- Contact
- Droplet
- Airborne

Contact Precautions:

- Reduces the risk of transmission of organisms from infected or colonised patient through direct or indirect contact.(e.g. Herpes Simplex, Haemorrhagic Fever Virus e.g. Ebola, multi-drug resistant bacteria)

- ***Precautions include:*** Hand gloving/Patient placement /Hand washing/Use of aprons and gowns/Patient care equipment/Patient transport.

Droplet Precautions:

- Reduces the risk of nosocomial transmission of pathogens spread by large droplets particles usually within a metre (e.g. Mumps, Diphtheria, Haemophilus, Influenza and SARS-CoV-2.)

- Droplets may be expelled during: Sneezing/Coughing/Talking

- Teach cough hygiene i.e. cover mouth when coughing

- **Precautions include:** Patient placement/Respiratory protection /Patient transportation

Airborne Precautions:

- Designed to provide protection from infectious aerosols which may be suspended in the air for an extended period of time.

- Used in addition to Standard Precautions for patients known or suspected to be infected with micro-organisms transmitted by airborne route e.g. TB, chicken pox, measles.

- ***Precautions include:*** Respiratory protection/Patient placement/Patient transportation

3. SEVERE ACUTE RESPIRATORY SYNDROME CORONAVIRUS-2: COVID-19

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GENERAL NOTE

What is COVID-19?

Coronaviruses are responsible for the simple colds that we know about but COVID-19 is a viral infection due to the new/novelcorona virus that was identified in China in December 2019. This new coronavirus (SARS-CoV-2) is easily transmitted from person to person and those not exhibiting symptoms can transmit it too, unlike SARS/MERS where transmission appeared to be via those already exhibiting symptoms.

We expect that 80% of those who get infected will be able to take care of themselves at home. However, 20% will need to be admitted as they will have moderate /severe symptoms of COVID-19. We also expect that 5% of the total that will be infected will need ventilation in an intensive care setting.

Given our limited capacity to handle infected cases in our hospitals all over Zimbabwe, it is important that we avoid getting infected. Hence, we need to observe the current public health measures and practice infection prevention and control to the highest extent possible.

What is the incubation period?

The incubation period appears to be about 14 days in most cases but most symptoms will appear at about day 5 of infection. Hence, WHO recommends that contacts of patients with laboratory-confirmed COVID-19 be quarantined for 14 days from the last time they were exposed to the patient.

What is self-quarantine and self–isolation?

Self-quarantine refers to when you distance yourself from others after exposure or potential exposure just in case you may develop symptoms of COVID-19.

Self-isolation refers to those with symptoms suggestive of COVID-19 and therefore need to assume they are infected even if not yet tested so as to protect others around them. This will also apply to confirmed COVID-19 cases with mild symptoms and being managed at home i.e. not deemed sick enough to be admitted.

What are the symptoms?

The case definition is changing all the time but in general a new fever, dry cough, myalgia, shortness of breath and extreme fatigue warrant an exclusion of COVID-19. Thus, anyone presenting with flu-like symptoms should be

assumed to be a potential COVD-19 case until proved otherwise. Children may also have poor feeding, nausea and vomiting.

TESTING FOR COVID-19

The testing is still limited. But the definitive test is a RT-PCR testing of nasopharyngeal swabs for most patients. The results have a turnaround time of about 6 hours. Point of care tests are likely to be available soon.

Definitions of COVID-19 cases and contacts are as per the World Health Organisation guidelines which are updated periodically. They are depicted in the table below:

Suspect cases meet one of the following criteria	A. A patient with acute respiratory illness (fever and at least one sign/symptom of respiratory disease, e.g., cough, shortness of breath), AND a history of travel to or residence in a location reporting community transmission of COVID-19 disease during the 14 days prior to symptom onset
	B. A patient with any acute respiratory illness AND having been in contact with a confirmed or probable COVID-19 case (see definition of contact) in the last 14 days prior to symptom onset
	C. A patient with severe acute respiratory illness (fever and at least one sign/symptom of respiratory disease, e.g., cough, shortness of breath; AND requiring hospitalization) AND in the absence of an alternative diagnosis that fully explains the clinical presentation.
A probable case has either one of the following	A. A suspect case for whom testing for the COVID-19 virus is inconclusive
	B. A suspect case for whom testing could not be performed for any reason
Confirmed case	A person with laboratory confirmation of COVID-19 infection, irrespective of clinical signs and symptoms.

The following patients should be considered at high risk of dying if they

have COVID-19 symptoms and should be considered for admission:

- Patients older than 60 years,
- Patients with underlying medical conditions (chronic lung disease, heart disease, diabetes mellitus, HIV infection)
- Pregnant women.

Healthy individuals with mild illness do not need to be tested but should stay at home and where possible isolate themselves even from household contacts to prevent spread of infection.

*******COVID-19 HOTLINE -Call 2019*******

INFECTION PREVENTION AND CONTROL (IPC)

A COVID-19 IPC response plan should be embedded in the overall facility IPC policy and plan. In COVID-19, the hierarchy of control measures are:

1. Administrative – Policies and SOPs to enable early assessments and triaging of cases (including spatial distancing); early recognition and reporting of cases, adequate staffing levels, and implementation of the two-tier control measures (Standard and Transmission based precautions)
2. Engineering controls – including ventilation, isolation facilities with dedicated ablution facilities, restricting access, signage for contact and droplet precautions, provide hand hygiene stations (with soap and water or sanitizers) at health facilities and mobilize clients and staff to use them
3. Personal Protective Equipment (PPE) – availability of appropriate and adequate PPE at all settings to prevent transmission of SARS- Cov2 to staff and other patients (**refer to latest COVID-19 PPE Policy)**

The following measures should be strictly observed in order to prevent transmission of SARS-Cov-2:

- Perform hand hygiene frequently with an alcohol-based hand rub (60 -80% alcohol content) or wash hands with soap and water if hands are visibly soiled. Avoid touching your face, mouth, nose and eyes with dirty hands. Also avoid hand shaking. To effectively clean hands, rub the hands for at least 20 seconds using the recommended steps (refer to the latest National IPC Guidelines on the 5 moments and the technique for hand hygiene).

- Staff who develop symptoms should self-quarantine until they are cleared of COVID-19 and are feeling better. Teach cough etiquette and provide IEC materials as a reminder for staff and patients.

- When caring for patients or working in areas providing care to suspected and confirmed cases of COVID-19, wear PPE as recommended in the PPE Policy for COVID-19. Training in the proper donning and doffing of PPE should be given.

- Increase the frequency of environmental cleaning and provide appropriate cleaning agents and disinfectants, which are active against enveloped viruses. Segregate linen, without shaking, according to the National IPC Guidelines. Wet linen should be placed in impervious bags before putting in laundry bags. It is crucial to train laundry workers on linen management and provide appropriate PPE.

- Manage waste as per National IPC Guidelines. Waste segregation at point of care (using colour coded bins and job aides), provision of PPE for waste handlers and timely disposal of the waste. Note waste from COVID-19 care areas is highly infectious and should not be kept in the facility waste holding area.

- It is critical that we apply infection prevention and control and avoid catching COVID-19 as there is no specific therapy for this infection right now apart from supportive care.

In summary:

Wash hands with soap and water as often as possible for at least 20 seconds. If you have no access to water, use hand sanitizer ideally one with 60-80% alcohol.
Given that we will not know who is infected and who is not, healthcare workers (HCW) will need to use appropriate PPE in the hospital setting in particular at Emergency Rooms and when caring for a person with COVID-19.
HCW must be trained in the donning and doffing of this PPE and its correct disposal.
We need to identify dedicated isolation centers/hospitals for COVID-19 treatment.

What is social distancing?

- We suggest that people keep a distance of at least 1 metre from each other so that if one coughs or sneezes, there is less likelihood of inhaling the droplets that might have the virus.

- Limit getting out of your home for social visits. Limit being in gatherings such as funerals, church services and adhere to the messages as provided by our government.

HANDLING OF CONTACTS of COVID-19

Self- Quarantine - for all persons with history of exposure to COVID-19 who had a close contact with an infected person or have had limited contact with an infected person for a short period of time including travel outside the country or exposure to a case of COVID-19. Those who feel sick should also stay home and self-quarantine even if symptoms seem mild.
Self –isolation for all persons with symptoms suggestive of COVID-19 to prevent the spread of the virus, including those within your home. Those who are sick should be separated from others in their home to the greatest extent possible.

How to handle a suspected case of COVID-19:

TRIAGE:

- Early recognition of suspected COVID-19 cases.
- Suspected COVID-19 need to be quickly identified when they present to our healthcare settings/hospitals.
- Screen at arrival in hospital and refer appropriately. If you suspect COVID-19 refer to the nearest isolation centre for testing and avoid admitting patients to centres that may not be able to handle the case or risk infecting non-COVID cases.
- If you suspect a patient has Covid-19 symptoms, put a mask on them and isolate them in a separate room whilst waiting for the rapid response team to come and collect the patient to take them to the Isolation Centre or to the appropriate place for their admission. Keep the patient at least 3 meters from other suspect cases.
- If possible, use dedicated or disposable patient-care equipment.
- Clean and disinfect reused equipment before use on another patient.
- Keep a record of all patients who have had to be isolated at your unit and follow up their result. This is important for contact tracing should their test result be positive, especially the healthcare workers at that facility.(Use appropriate surveillance tools for COVID-19)
- If the healthcare workers who looked after such a patient were not wearing appropriate PPE, they should be isolated from work until the disposition of that case is known (COVID-19 positive or negative), for up to 14 -21 days.
- Patients with mild symptoms can be sent back home for self-quarantining for at least 14 -21 days. When they are at home, they will need to stay in their own room and avoid infecting their family members. Ideally, they should be in their own room, use their own utensils i.e. not share these

with other members of the family, use their own toilet/bathroom or use these facilities after every one else has used them. Their waste will need to be handled as infectious and disposed of safely.

- Those with underlying chronic disease like HIV, diabetes mellitus, chronic lung disease, chronic heart failure, cancer, older individuals, are at risk of developing moderate/severe infection.
    - Therefore, they need to be admitted
    - Check if they have a respiratory rate > 24, tachycardia >120, O_2 saturation <90%

Where to refer to:

You will need to know where to refer patients for admission from your site.

Whom to contact:
Keep the numbers of the local/focal person that you need to contact if you suspect COVID-19.

CARE OF SUSPECTED CASE WITH MILD SYMPTOMS WHO IS BEING SENT BACK HOME:

- practice social distancing- keep at least 2 meters away from other people
- practice infection prevention and control (IPC) e.g. washing hands frequently or using hand sanitizers, cough etiquette
- avoid elderly people as they are at risk of getting severe disease
- stay at home to limit exposing their infection to others or picking up COVID-19 just in case their illness is just a simple flu/other infection.

Presenting symptoms and signs:

- Suspect Covid-19 when a person presents with a **fever, dry cough and shortness of breath.** They may also have fatigue, muscle aching, diarrhea and /or vomiting.
- Having a runny nose is not that common in Covid-19.
- Thus, the symptoms of this COVID-19 are likely to be confused with our usual flu-like syndromes.
- Be wary of those who may have travelled from countries reporting a lot of COVID-19 cases which is now declared a pandemic by WHO as most countries have cases including Zimbabwe.
- Any person presenting with **a severe acute respiratory tract infection is a potential COVID-19 case** and in particular those with a flu-like illness with a fever, dry cough and shortness of breath.

- Any case of pneumonia should be considered as a potential COVID-19 case and have that possibility excluded through checking for risk factors i.e. have they travelled, have they been exposed to a COVID-19 case etc.

Who should be admitted?

- Assess the patient.
- If mild symptoms can go home
- If having **difficulty breathing**, **O2 saturation <90**, arrange for admission,
- Make sure that you have excluded other possible causes of fever and shortness of breath e.g. PCP, malaria, bacterial pneumonia, pulmonary embolism etc.

MANAGING THE CASE:

- Treat as we would normally do **for a case of pneumonia as per EDLIZ guidelines**
- Give empiric antibiotics to treat all likely pathogens causing pneumonia e.g. in most patients unless they have documented allergies give:

  Ceftriaxone 2g iv start followed by 1g bd iv x 1/52 & Azithromycin 500mg od po on day 1 and then 250mg daily x 4 days

- **For children -use Ceftriaxone 50-80mg/kg plus Azithromycin 10mg/kg**
- **Paracetamol 500mg -1gm** every 6 -8 hours as required for fever
- Give patient a surgical mask if you suspect COVID-19. Wear PPE yourself.
- Give supplemental oxygen therapy immediately to patients with respiratory distress, hypoxaemia, or shock,
- Avoid overloading the patient with intravenous fluids. Patients should be treated cautiously with intravenous fluids, because aggressive fluid resuscitation may worsen oxygenation, especially in settings where there is limited availability of mechanical ventilation,
- O_2 @ 5 L/min - SpO2 ≥90% in non-pregnant & SpO_2 ≥92-95 % in pregnant patients,
- Dexamethasone 6mg iv or orally or use Prednisolone 40 mg daily
- Avoid rapid infusion of fluids
  - aim for maintenance fluids unless if there is evidence of septic shock or obvious dehydration.
  - Rapid IV fluid infusions may accelerate the respiratory decompensation in those with pneumonia and/or ARDS and

- Conduct a portable Chest X-ray which may show ground glass appearance, especially in the peripheral areas.

LABORATORY TESTING OF PATIENT:

- Conduct usual basic blood tests e.g. FBC, U&E, glucose, LFT
- Collect blood cultures for bacteria that cause pneumonia and sepsis, ideally before antimicrobial therapy.
- **DO NOT delay antimicrobial therapy just to collect blood cultures.**

MANAGEMENT OF HYPOXEMIC RESPIRATORY FAILURE AND ARDS

- Recognize severe hypoxemic respiratory failure when a patient with respiratory distress is failing standard oxygen therapy.
- High-flow nasal oxygen (HFNO) or non-invasive ventilation (NIV) should only be used in selected patients with hypoxemic respiratory failure. These modes of ventilation require negative ventilation in the ICU because they increase aerosolization and risk to HCW. We recommend CPAP is delivered in negative pressure room with air exchanges greater than regulatory thresholds (10cycles per hour) if negative pressure room is not available, a neutral pressure room with air cycling is preferable.
- Endotracheal intubation should be performed by a trained and experienced provider using airborne precautions.
- Implement mechanical ventilation using lung protective approach lower tidal volumes (4–8 ml/kg predicted body weight, PBW) and lower inspiratory pressures (plateau pressure <30 cmH2O). Target SPO_2 88-95%, pH >7.25 and permissive hypercapnia $PaCO_2$.
- In patients with severe ARDS, prone ventilation for >12 hours per day is recommended.
- Use a conservative fluid management strategy for ARDS patients without tissue hypoperfusion.
- Be extra careful when providing rehabilitation (e.g. chest physiotherapy etc) care to these patients

Management of septic shock

- Recognize septic shock in adults when infection is suspected or confirmed AND vasopressors are needed to maintain mean arterial pressure (MAP) ≥65 mmHg AND lactate is ≥2 mmol/L, in absence of hypovolemia.

- Recognize septic shock in children with any hypotension (systolic blood pressure [SBP] <5th centile or >2 SD below normal for age) or 2-3 of the following: altered mental state; tachycardia or bradycardia (HR <90 bpm or >160 bpm in infants and HR <70 bpm or >150 bpm in children); prolonged capillary refill (>2 sec) or warm vasodilation with bounding pulses; tachypnoea; mottled skin or petechial or purpuric rash; increased lactate; oliguria; hyperthermia or hypothermia.
- Adults, give at least 30 ml/kg of isotonic crystalloid in 3 hours. Give 20 ml/kg as a rapid bolus and up to 40-60 ml/kg in the first 1 hr.
- Do not use hypotonic crystalloids, starches, or gelatines for resuscitation.
- Fluid resuscitation may lead to volume overload, including respiratory failure. If no response discontinues. This step is particularly important where mechanical ventilation is not available.
- Administer vasopressors when shock persists during or after fluid resuscitation. The initial blood pressure target is MAP ≥65 mmHg in adults and age-appropriate targets in children.
- Vasopressors (VPs) can be given through a peripheral IV if a central line is not available but use a large vein and closely monitor for signs of extravasation and local tissue necrosis. If extravasation occurs, stop infusion. **VPs can also be administered through intraosseous needles.**
- If signs of poor perfusion and cardiac dysfunction persist despite achieving MAP target with fluids and vasopressors, consider inotropes e.g. dobutamine.

HOW DO WE DECIDE WHEN TO DISCHARGE A CASE?

- Criteria for discharging patients from isolation (i.e., discontinuing transmission-based precautions) without requiring retesting:
- For symptomatic patients: 10 days after symptom onset, plus at least 3 additional days without symptoms (including without fever and without respiratory symptoms);
- For asymptomatic cases:10 days after positive test for SARS-CoV-2.
- ***As the disease evolves, follow national guidance on discharge.***

POST –DISCHARGE:

How should the patient behave or what should they do to prevent getting infected again?

- We have no concrete evidence that those infected with COVID-19 will develop immunity and if so for how long. We will extrapolate that

information from other viral infections where immunity develops but if this new corona virus mutates, it is likely that one might get re-infected as happens with e.g. influenza.

- If a patient has been discharged on the basis of two negative COVID-19 tests, there will be no need for additional isolation post-discharge.
- If the patient has been discharged on the basis of clinical improvement, the patient should self-isolate at home for at least 72 hours after resolution of fever and shortness of breath.

RECOMMENDED SPECIFIC ANTIVIRAL INTERVENTIONS FOR COVID-19

- **We do not currently have any specific therapies for COVID-19 and any use of medicines is "off-label".**
- Use of any medicines like *Chloroquine, Hydroxychloroquine, Lopinavir/Ritonavir, Interferon alpha-2b or Remdesivir* etc. should be in a clinical trial setting.
  e.g. WHO SOLIDARITY Trial or any other trials that will have been approved by our institutional and national review boards such as MRCZ, MCAZ.

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GENERAL NOTES:

The content of this chapter reflects the major causes of infant mortality and morbidity in Zimbabwe – prematurity, neonatal sepsis, perinatal asphyxia, acute respiratory infections, diarrhoeal diseases, malnutrition and, immunizable diseases. Some of the paediatric conditions may have underlying HIV infection.

Refer to relevant chapters in EDLIZ for other paediatric conditions and note that appropriate paediatric doses have been included.

- Note: doses are also given by age and weight wherever possible, and volumes of liquids or injections to be administered are indicated. However, **always check** the concentration of the preparation, as preparations may change. This should not be a 'short-cut' to calculating the proper dose.

NEONATAL CONDITIONS

Medicine Dosage for Infants Under 1 Month

During the first month of life absorption, metabolism and excretion in a baby are not yet fully developed. For this reason, the frequency of medicine dosing is based on gestational age and not on the characteristics of the medicine.

The table below gives the frequency of dosing for all medicines and is referred to in the therapies that follow in the text.

Table 4.1 Frequency of dosage by gestational age

Gestational age ≥ 37 weeks (term baby)	
First two days	2 doses per 24 hours
3 days to 2 weeks	3 doses per 24 hours
> 2 weeks	4 doses per 24 hours
Gestational age < 37 weeks (pre-term baby)	
First week	2 doses per 24 hours
1-4 weeks	3 doses per 24 hours
> 4 weeks	4 doses per 24 hours

NB: *Not for gentamicin- see table 4.3*

For example: Benzyl penicillin dose 100,000u/kg/dose (0.1MU/kg). Thus, a 2kg pre-term baby 5 days old would receive 200,000u Benzyl penicillin every 12 hours, whilst a 2kg term baby 5 days old would receive 200,000u every 8 hours.

Routine Management at Birth

- Do not routinely suction mouth but suction only if there is something (e.g. thick meconium) to suck out.
- Dry and wrap up, preferably in a dry pre-warmed soft towel.
- Delayed cord clamping - clamping the umbilical cord after 1 minute is recommended for all normal births except in intrauterine growth restriction (IUGR), infants of diabetic mothers and asphyxia.
- To prevent neonatal ophthalmia, instil eye ointment into **both eyes**:

Medicine	Codes	Paed dose	Frequency	Duration
tetracycline eye ointment 1%	**C V**	instil into both eyes	once only	at birth

- To prevent haemorrhagic disease of the newborn, give:

Medicine	Codes	Paed dose	Frequency	Duration
vitamin K im	**C V**	1mg [preterm = 0.5mg]	once only	single dose

- Hand the baby to the mother for her to put immediately to breast.

Resuscitation of the newborn

Essential Newborn Care

- Apply tetracycline ointment to the eyes
- Give Vitamin K 1mg IM once
- Weigh the baby
- Put baby skin to skin with the mother
- **DO NOT LEAVE THE BABY ALONE**

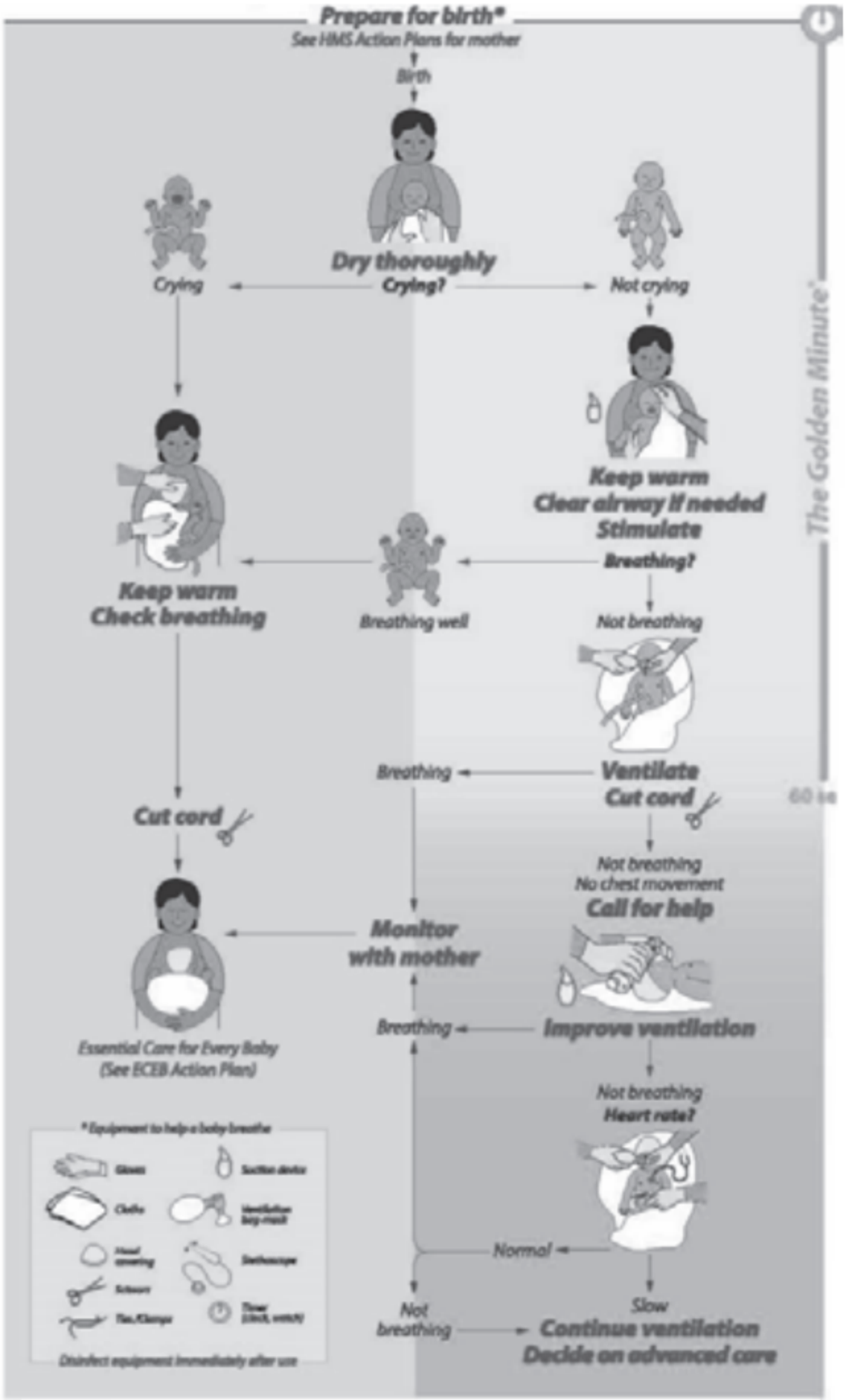

Figure 4.1: Action plan to help babies breathe

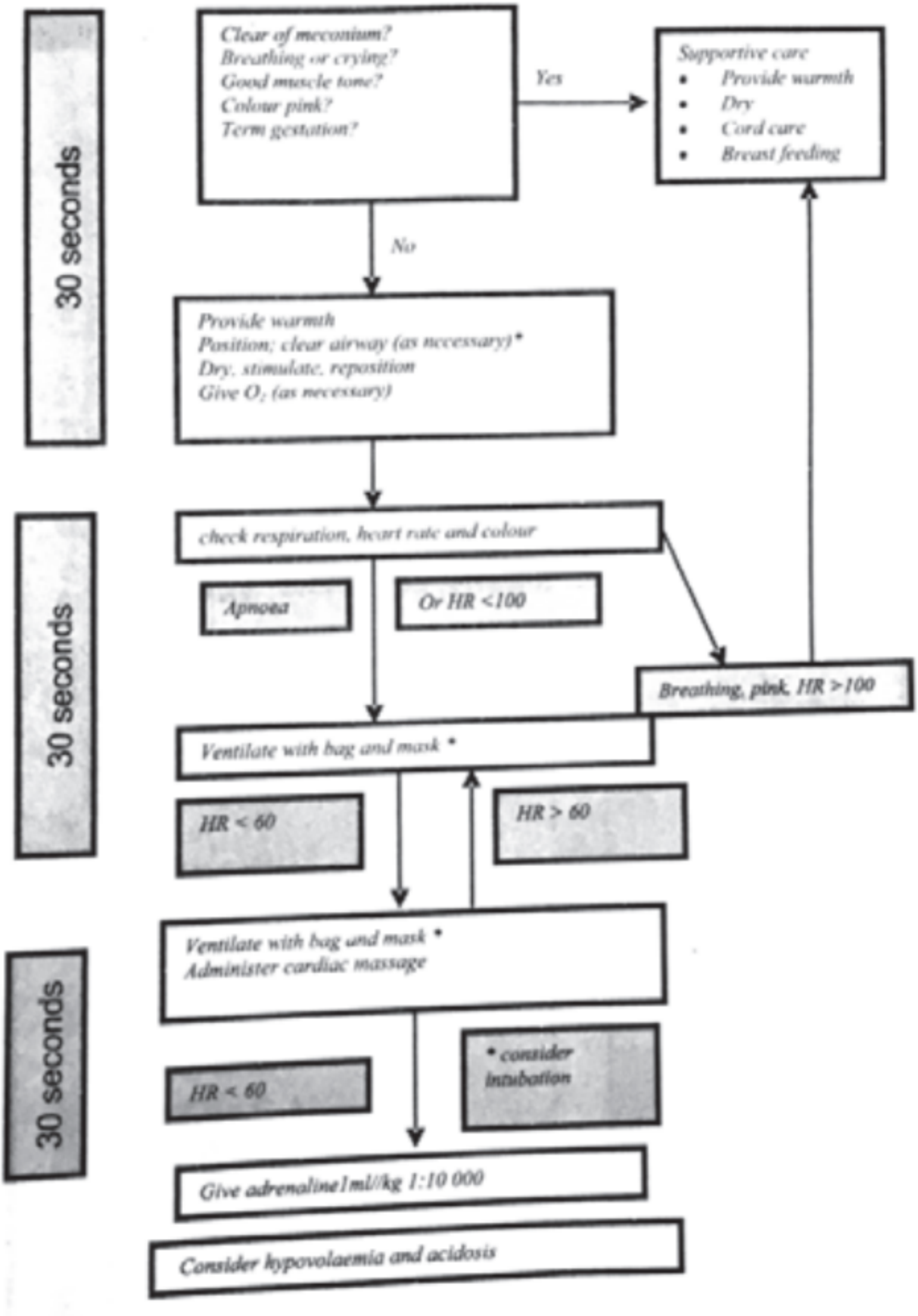

Figure 4.2: Essential steps for newborn care

Ensuring adequate warmth and ventilation (either by mask or intubation) is much more important than administering any medicines.

The following may be useful:

For respiratory depression, but **only** if the mother was given pethidine in labour:

Medicine	Codes	Paed dose			Freq.	Duration
naloxone neonatal 20mcg/ml im *NB: check strength.*	**B V**	<1kg 1-2kg 2-3kg >3kg	10mcg 20mcg 30mcg 40mcg	=0.5ml =1ml =1.5ml =2ml	repeat as necessary	
adrenaline dilute to 1:10 000	**C V**		10mcg	1ml/kg		

Only if the baby has no spontaneous breathing after 5 minutes of ventilation, give a **slow intravenous injection directly into the umbilical vein:**

Medicine	Codes	Paed dose	Freq.	Duration
sodium bicarbonate 4.2% slow iv	**B N**	4-6ml/kg		

or *2-3 ml/kg of 8.4% solution diluted with equal quantity of water for injection, if only strength available.*

Helping babies survive

Every newborn baby must receive the 'Essential Care for Every Baby' package of care. This is essential for preventing and managing common illnesses in the first 24hrs of life because that is when newborn mortality is highest.

See management algorithm on the next page

Feeding and Fluids

Healthy term babies and late preterm babies more than 34 weeks are usually able to suck unless they are ill.

- Breastfeed and exclusive breastfeeding is encouraged
- Initiate breastfeeding within the first hour of life
- Allow mothers to breastfeed on demand and room-in

For sick and/or premature infants who are unable to suck

- Give expressed breast milk (EBM) via Nasogastric or orogastric tube or cup
- Use formula feeds only if EBM is not available
- Give preterm Infant milk formula if < 2000g and/or 35 weeks
- Standard infant formula ≥ 2000g

Fluid Requirements

- Infants ≥ 1500g and ≥ 32 weeks start on intermittent bolus feeds at 60mls/kg/day and increased by 30mls/kg/day as tolerated to a maximum of 150mls/kg/day for term babies and 200mls/kg/day for preterm infants.
- Infants < 1500g or < 32 weeks should receive IV fluids to allow gradual increase of enteral feeds. Start enteral feeds at 20mls/kg/day and increase by 30 mls/kg/day.
- Keep infants <1500g/<32wks nil by mouth immediately after birth (unless mother's colostrum is present) to allow mum to start expressing breastmilk.
- SEE table below for daily fluid requirements;

Table 4.2: Preterm Fluids and Feed Management Protocol

DAY	0	1	2	3	4	5	6	7
≥ 1500g and ≥ 32weeks								
Total mls/kg	60	90	120	150	180	200		
Enteral	60	90	120	150	180	200		
Intravenous	0	0	0	0	0	0		
1200- 1499g OR <32 weeks								
Total mls/kg	70	90	120	150	180	200	200	200
Enteral	0	20	50	80	110	140	170	200
Intravenous	70	70	70	70	70	60	30	0
1000-1199g OR<32weeks								
Total mls/kg	80	100	130	160	190	200	200	200
Enteral	0	20	50	80	110	140	170	200
Intravenous	80	80	80	80	80	60	30	0

<1000g								
Total mls/kg	90	110	140	170	200	200	200	200
Enteral	0	20	50	80	110	140	170	200
Intravenous	90	90	90	90	90	60	30	0

Consider transfer to a specialist unit for babies unable to feed and requiring intravenous fluids for longer than 3 days. (ALWAYS KEEP THE BABY WARM)

Choice of fluids

- 5% or 10% Dextrose water in the first 36-48 hours
- 10% Neonatalyte after 36-48 hours

Blood glucose must be monitored in the first 36-48 hours and can be stopped if normal.

Breastmilk Fortification

- Breastmilk fortification helps to meet the increased energy and mineral requirements of preterm infants.
- Fortify breastmilk of preterm infants < 1500g or < 32 weeks with FM85 when they are tolerating 160mls/kg/day of EBM.
- Add 0.5g FM85 to bolus feeds of ≤ 24mls and 1g per bolus feed ≥ 25mls.
- If breastmilk is fortified a total volume of 160mls/kg/day will suffice to meet energy requirements.

Neonatal Infections

Indications for doing a blood culture and starting antibiotics in first 48 hours

Any Major Criteria or two or more Minor criteria do a blood culture and start antibiotics.
Suspected sepsis - give antibiotics as soon as possible, within 1hr
One minor criterion present - observe the baby on postnatal wards for 12h. Start antibiotics if the baby not feeding well, has respiratory distress or appears lethargic or sick in any other way.

Major Criteria (Start antibiotics if any of these present)	**Minor Criteria** (Start antibiotics if any two available)
Confirmed sepsis or chorioamnionitis in mother	Antenatal: • ROM >18h • Spontaneous Preterm Birth

Confirmed or suspected sepsis in twin	• GBS sepsis in previous baby or documented GBS carriage in this pregnancy (urine or vaginal swab)
Seizures	
Severe Respiratory Distress in a term infant	Natal • Born Before Arrival • Meconium Stained Liquor

Respiratory distress starting more than 4h after birth	Postnatal
	• Respiratory distress that is not obviously related to:
	  ○ environmental hypothermia
	  ○ "delayed transition to extra-uterine life" i.e. mild to moderate respiratory distress apparent soon after birth that is improving with time.
	• Hypoxia
	• Apnoea
	• Hypoglycaemia/Hyperglycaemia not otherwise explained
	• Temperature instability not explained by environmental factors
	• Acidosis not obviously related to HIE
	• Unexplained bleeding or thrombocytopenia
	• Mild encephalopathy/Altered responsiveness
	• Altered tone not otherwise explained
	• Feed intolerance/feeding difficulty
	• Abnormal heart rate (<90 or >160)
	• Jaundice in first 24h

Neonatal Infections

Table 4.3: Gentamicin dosages:

Premature or full-term neonates			
Weight	Age	Dose	Frequency
less than1000gm	28 weeks	5mg/kg	Once every 48 hours for first two weeks, then once every 36 hours.
1000g to 2000g		5mg/kg	Less than 1 week old once every 48hours more than >1-week-old once every 36hours
More than 2000g	Less 1 week old 1 week and above	4mg/kg	Once every 24hours Once every 24-48hrs

There are usually few localising signs in infants, and accurate diagnosis may not be possible. The following regimens are recommended for suspected sepsis.

Suspected sepsis in first 48hrs:

	Medicine	Codes		Paed dose	Freq.	Duration
	benzylpenicillin im/iv	**C**	**V**	0.1MU/kg	*Table 4.1*	10 days
and	**gentamicin im/iv**	**C**	**V**	2.5mg/kg	*Table 4.3*	10 days

Suspected sepsis after 48hrs:

	Medicine	Codes		Paed dose	Freq.	Duration
	gentamicin im/iv	**C**	**V**	2.5mg/kg	*Table 4.3*	10 days
and	**cloxacillin im/iv**	**B**	**V**	30mg/kg	*Table 4.1*	10 days

Kanamycin 7.5mg/kg/dose BD can be used if gentamicin unavailable

Meningitis:

	Medicine	Codes		Paed dose	Freq.	Duration
	benzylpenicillin im/iv	**C**	**V**	0.1MU/kg	*Table 4.1*	14-21 days
and	**gentamicin im/iv**	**C**	**V**	2.5mg/kg	*Table 4.3*	
and	**chloramphenicol iv**	**B**	**V**	12.5mg/kg	*Table 4.1*	

Ampicillin can be used if benzyl penicillin is not available: dose= 50mg/kg

For meningitis **ceftriaxone** can be used as an alternative: dose = 50mg/kg/dose

Necrotising enterocolitis

Give nothing by mouth. Supportive care is vital: oxygen, intravenous fluids, warmth, and nasogastric continuous drainage. Anticipate complications such as bleeding, vomiting, perforation, seizures. **Refer** for specialist diagnosis and care.

	Medicine	Codes		Paed dose	Freq.	Duration
	benzylpenicillin im/iv	**C**	**V**	0.1MU/kg	*Table 4.1*	10 days
and	**gentamicin im/iv**	**C**	**V**	2.5mg/kg	*Table 4.3*	10 days
and	**metronidazole iv**	**A**	**N**	7.5mg/kg	*Table 4.1*	10 days

Neonatal tetanus

- The important principle in treating these babies is **minimal handling**. Give:

	Medicine	Codes		Paed dose	Freq.	Duration
	benzylpenicillin im/iv	**C**	**V**	0.05MU per kg	12hrly	5-7days
or	**procaine penicillin im**	**C**	**V**	50mg/kg	once a day	5-7 days
and	**anti-tetanus immunoglobulin im**	**B**	**E**	500-1000 units	once only	single dose

- Control of muscle spasms:

	Medicine	Codes		Paed dose	Freq.	Duration
	diazepam iv	**C**	**V**	0.25-1mg/kg [to a max total dose of 10mg]	4-8hrly, titrated according to response	

or	**chlorpromazine iv/im/nasogastric**	**C**	**V**	2mg/kg/24hrs in	4-6 divided doses
and	**phenobarbitone iv/im/nasogastric**	**B**	**E**	2.5-5mg/kg	12hrly for as long as necessary

Congenital syphilis: Also see section on STIs

	Medicine	Codes		Paed dose	Freq.	Duration
	procaine penicillin im	**C**	**V**	50mg/kg	once a day	10 days

Jaundice

Refer all babies developing jaundice within 24 hours of birth to a unit capable of performing exchange transfusion.

Refer jaundiced babies who look ill.

- Jaundice developing in well babies may be treated using phototherapy. If phototherapy equipment is not available, **expose** to the sun intermittently for a maximum of two hours (keep warm). Shade the baby's eyes with a loose-fitting bandage over cotton wool pads. Continue until the baby is no longer yellow.

- Give an extra 20ml/kg/24 hrs of fluid. Be very careful that the baby does not get cold (or hot). Encourage increased breastfeeding.

Where possible check the serum bilirubin levels

Table: 4.4: Management of jaundice based on phototherapy levels

Management	**PHOTOTHERAPY**		**EXCHANGE TRANSFUSION**	
Age in days	≥35/40	<35/40	≥35/40	<35/40
1	Any visible jaundice	Any visible jaundice	260	
2	260µmol/l	170 µmol/l	425 µmol/l	260 µmol/l
3	300 µmol/l	250 µmol/l	425 µmol/l	340 µmol/l

Convulsions

- **Always** check for hypoglycaemia. If dextrose <2.2mmol/l (45mg/dl) immediately give:

	Medicine	Codes	Paed dose	Freq.	Duration
	dextrose 50% slow iv	**C V**	1ml/kg diluted with equal quantity of water for injection as slow bolus		
or	**dextrose 10% iv infusion**	**A N**	4ml/kg per hour OR **2ml/kg given as a bolus followed by a continuous infusion of dextrose at 6-8mg/kg/minute**		

- recheck blood sugar (dextrostix /glucometer) in 30 minutes

If intravenous route impossible give breast milk through nasogastric route -10-20ml/kg initially and continue normal requirement two hourly. ***Dextrose should not be given by nasogastric tube. If blood glucose cannot be measured give empirical treatment with glucose.***

HOW TO PREPARE 10% DEXTROSE

The formula for preparing 100 mL of fluid with a desired concentration of glucose using 5% dextrose and 25% dextrose solutions is given by the formula 5X-25 = Y where X is the required percentage of dextrose and Y is the amount of 25% dextrose (in mL) to be made up with 5% dextrose to make a total of 100 mL.

To prepare 100ml of 10% dextrose from 5% dextrose and 25% dextrose, add 5x10-25=25ml of 25% dextrose to the remaining volume, i.e. 100- 25 =75 ml of 5% dextrose.

Other common causes of neonatal convulsions: Hypoxic Ischaemic Encephalopathy, Meningitis, Hypocalcaemia.

MANAGEMENT: ABC

Manage Airways and Breathing (have bag and mask ready) Ensure Circulatory access

Anticonvulsants:

Phenobarbitone is the drug of choice for neonatal seizures.

	Medicine	Codes		Paed dose	Freq.	Duration
	phenobarbitone iv	**B**	**E**	20mg per kg repeat in 30 minutes if still convulsing, add dose of 10mg/kg every 30 minutes until a maximum dose of 40mg/kg	over 5-10mins	
	maintenance dose started 12 hours after the loading dose.			5mg/kg /day		
or	***phenytoin iv**	**C**	**V**	20mg/kg iv repeat dose of 10mg/kg may be repeated in refractory seizures.		
	maintenance dose			3-5mg/kg/day in 2-4 divided doses		

indicated when maximum dose of phenobarbitone 40mg/kg fails to resolve the seizures or adverse effects like respiratory depression, bradycardia or hypotension occur.** *Please note; Dilute phenytoin in Normal saline* ***Do Not Use Dextrose

Benzodiazepines

These may be required in 15-20% of neonatal seizures. Lorazepam: 0.05mg/kg iv bolus over 2-5 minutes (may be repeated)
Midazolam: 0.15mg/kg iv bolus followed by an infusion of 0.1-0.4mg/kg/hr

**Avoid diazepam in neonatal seizures because of its short duration of anti-epileptic effect and its very prolonged sedative effect.*
Perform lumbar puncture, to rule out any CNS infection and start meningitis treatment whilst waiting for results.

Check blood levels of Calcium and Magnesium

If there is hypocalcaemia give 2mls/kg of 10% Calcium Gluconate.

RESPIRATORY DISTRESS SYNDROME (RDS)

RDS is a common problem in premature infants. It is due to surfactant deficiency.

Treatment of RDS

Minimal handling

- Supplemental Oxygen with nasal prongs Maintain Oxygen saturation 90-94%
- Use Continuous Positive Airways Pressure (CPAP) ventilation if available.
- Initially no oral feeds if severe respiratory distress
- Intravenous fluids (see section on fluids)
- Treat for neonatal sepsis with antibiotics (see section on NNS)
- Maintain normal temperature range by Kangaroo Mother Care or using an incubator if available
- If respiratory distress persists do a chest x-ray to rule out pneumothorax

Prevention of RDS: For pregnant mothers <34/40 and at risk of premature delivery, give Dexamethasone 12mg/kg 24-hours apart for 3 days

Apnoea of Prematurity

Premature infants are at risk of apnoea due to immaturity of the respiratory centre.

Prevention of apnoea

Give caffeine citrate 20mg/kg orally or slowly by intravenous route over 30 minutes and a maintenance dose of 5 mg/kg/day, to all preterm babies <32/40 weeks. Give until 34/40 postmenstrual age.

If caffeine citrate is not available give a loading dose of aminophylline at 6mg/kg iv over 20 minutes followed by a maintenance dose of 2.5 mg/kg every 12 hours.

Monitoring for Apnoea

Use an apnoea monitor if available or a Pulse oximeter with alarm turned on for hypoxaemia.

NB. The following conditions can also cause apnoea in the premature infant and every attempt should be made to exclude them and manage: Central

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nervous system infections, Hypoxic Ischaemic encephalopathy, Respiratory distress syndrome, Hypoglycaemia, Severe Anaemia, Congestive cardiac failure

Immunization:

Low birth weight infants should be given all the scheduled vaccines at the time of birth and any second doses that are due at discharge and according to chronological age.

Vitamins and Iron

Normal newborn babies do **not** require any long-term vitamin or mineral supplementation.

- Those babies born at <36 weeks gestation and/or <1.5kg should be given from age 2 weeks:

	Medicine	Codes		Paed dose	Freq.	Duration
	vitamin D po	**B**	**V**	800units	once a day	to age of 3months
and	**folic acid po**	**C**	**E**	5mg	weekly	

- and, starting from the age of one month:

	Medicine	Codes		Paed dose	Freq.	Duration
and	**ferrous sulphate po** **(60mg/5mls = 12mg elemental iron /5mls)**	**C**	**E**	3-6 mg/kg elemental iron	once a day	to age of 3 months

Table 4.5: Dosages for infants under one month:

Medicine	Route	Dosage	Freq. (per day)
Adrenaline 1:1000 1mg/ml injection	iv/sc	0.01mg/kg (=10mcg/kg)	-
Aminophylline 25mg/ml injection	iv/ infuse	Loading: 6mg/kg over 30mins Maintenance: 0.16mg/kg/hr	-
Amoxicillin 125mg/5ml syrup	Po	30mg/kg/dose	2 to 4
Atropine sulphate 0.6mg/ml injection	iv/im/sc	0.01mg/kg	-
Benzylpenicillin (3g) 5MU injection	iv/im	0.1MU/kg/dose (=100,000 u/kg/dose)	2 to 4
Calcium chloride (dihydrate) injection 0.7mmol Ca/ml (10%)	Iv	0.2ml/kg over 5mins	single dose
Calcium gluconate 0.22mmol Ca/ml(10%) injection	Iv	0.5ml/kg over 5mins	-
Chloramphenicol 1g injection 125mg/5ml syrup	iv/po	12.5mg/kg/dose	2 to 3
Clindamycin 1g injection	Iv	10mg/kg over 30mins	3
Cloxacillin 500mg injection 125mg/5ml syrup	iv/im/po	30mg/kg/dose	2 to 4

Cotrimoxazole 240mg/5ml syrup 120mg dispersible tablet	Po	24mg/kg/dose	2
Dexamethasone 4mg/ml injection	Im	0.5mg/kg/dose	3 to 4
Dextrose 5% infusion 50% injection	Iv	5 to 10ml/kg of 5% repeatable	
		1 to 2ml/kg of 50% diluted 1:1 over 3 to 4mins	
Diazepam 5mg/ml injection	iv/pr	0.3.mg/kg/dose repeatable	-
Digoxin 0.25mg/ml 50mcg/ml syrup	iv/im	Loading: 10mcg/kg at 8 hour intervals for total of three doses	
	Po	Maintenance: 10mcg/kg/24hrs	1
Erythromycin 125mg/5ml syrup	Po	40mg/kg/24 hrs	3
Ferrous sulphate 12mg Fe/5ml syrup	Po	12mg Fe/24hrs	Once
Folic acid 5mg tablet	Po	5mg	weekly
Frusemide 10mg/ml injection 40mg tablet	iv/im	0.5 to 2mg/kg/dose	1 to 2
	Po	1 to 4mg/kg/dose	2
Gentamicin 10mg/ml injection	im/iv	≥ 1500 g = 2.5mg/kg/dose	2
		<1500g = 2,5 mg/kg/dose	once

Hydrocortisone 100mg injection	iv/im	10mg/kg/dose	3
Isoniazid 100mg dispersible tablets	Po	10mg/kg/24hrs	once
Kanamycin 1g injection	Im	7.5mg/kg/dose	1 to 2
Metronidazole 5mg/ml injection	Iv	7.5 mg/kg/dose	2 to 3
Morphine **10mg/ml injection** 15mg/ml injection	iv/im	0.1 to 0.2 mg	-
Naloxone 0.02mg/ml injection 0.4mg/ml injection	Iv	0.02mg/kg repeatable	
	Im	0.06mg/kg repeatable	
Nystatin 100 000units/ml	Po	100 000u/dose	4
Penicillin procaine 300mg/ml injection	Im	50 mg/kg/24hrs [=50 000u/kg/day]	once
Phenobarbitone 200mg/ml injection 15mg/5ml syrup	Iv	10 to 20mg stat over 10mins	-
	im/po	maintenance = 3 to 5mg/kg/24 hrs	1 to 2
Phenytoin 30mg/5ml syrup 50mg/ml injection	po	4mg/kg/dose	2
	iv	Loading: 15-20mg/kg slow (0.5mg/kg/min)	

Sodium bicarbonate 4.2% infusion (or 8.4%)	Iv	5ml/kg of 4.2% slowly	-
Theophylline 200mg tablet	Po	Loading: 6mg/kg Maintenance: 5mg/kg/24hrs	3
Thyroxine 100mcg tablet	Po	10mcg/kg/24 hrs	once
Vitamin D (calciferol) 50 000u capsule	Po	800u/day (age >14days)	once
Vitamin K (phytomenadione) 2mg/ml inj.	Im	1mg for ≥2500g, 0.5mg for <2500g	-

PAEDIATRIC CONDITIONS

Common paediatric conditions such as acute respiratory infections (ARI), diarrhoea, child with fever (axillary temperature 37.5°C and above); severe malnutrition or protein energy malnutrition (PEM) are now incorporated in the Integrated Management of Childhood Illness (IMCI).

General guidelines on the use of antibiotics

Paediatric doses are given in Tables 4.1 and 4.2 (Neonatal doses are given separately in Table 3.5)

- ALWAYS DO BLOOD CULTURES IN SUSPECTED SEPSIS.
- supportive measures are often more important than antibiotics themselves: for example, fluids in diarrhoea and vomiting;
- antibiotics should be given in the full dosage appropriate for the age and weight of the child; **dosage is best calculated according to body weight** up to 40kg (do not exceed the adult dose);
- change to oral administration wherever possible (except for meningitis); benzylpenicillin intramuscularly/ intravenously can be changed to procaine penicillin intramuscularly (if response is good) once child is afebrile.

Check for General Danger Signs:

Ask:

- if the child is not able to drink or breastfeed
- if the child is vomiting everything
- if the child has had convulsions
- if there are periods of not breathing

Look to see:

- If the child is lethargic or unconscious.

A child with **any** general danger sign needs **urgent** attention.

Acute Respiratory Infections

Check for any general danger signs (above).

Any history of fever in a malaria area:

- take a blood slide

- treat for malaria (see chapter on Malaria)

Fever for more than 5 days: **refer** for assessment.

*In malaria endemic areas, a child with pneumonia and a fever of 37.5°C or more (or a history of fever) may need an antibiotic for pneumonia **and** an anti-malarial for malaria.*

Management of a child with cough/difficult breathing

Note: Antihistamines and sedating cough mixtures **MUST NOT** *be used in managing respiratory infections. Breast milk, warm drinks including water, and fruit are effective cough /sore throat relievers.*

Pneumonia is recognised by difficulty in breathing which is either fast breathing or chest indrawing.

Table 4.6: definition of fast breathing:

Age:	Fast breathing is defined as:
< 2 months	60 breaths per minute
2 months to 12 months	50 breaths per minute
12 months to 5 years	40 breaths per minute

***Chest indrawing** is when the lower part of the chest moves in when the child breathes in.*

***Grunting** is a soft short sound that the infant makes when breathing out.*

Table 4.7: Management: of pneumonia

SIGNS	CLASSIFY AS:	TREATMENT Urgent pre-referral treatments are in bold print
Any general danger sign **or** chest indrawing **or** stridor in a calm child	**Severe pneumonia** or **very severe disease**	➢ **Give first dose of an appropriate antibiotic (Benzylpenicillin and gentamycin)** ➢ **Treat to prevent low blood sugar (see below)** ➢ **Keep the child warm** ➢ **Treat wheeze if present** ➢ **Refer URGENTLY to hospital**
Fast breathing	**Pneumonia**	➢ **Give an appropriate antibiotic for 5 days** ➢ Treat wheeze if present ➢ Advise mother to return immediately if condition worsens ➢ Follow-up in 2 days

No signs of pneumonia or of very severe disease	**No pneumonia:** cough or cold	➢ If coughing more than 21 days, refer for assessment ➢ **Treat wheeze if present** ➢ Advise mother to return immediately if condition worsens ➢ Follow-up in 7 days if not improving

Management of severe pneumonia:

The major cause of pneumonia is infection with *Streptococcus pneumoniae* or *Haemophilis influenzae.* These respond well to the antibiotics recommended below if recognised early.

Note: Paediatric dose starts at 2 months in IMNCI. For babies 1-2 months see neonatal doses Table 3.5

- Well-nourished children over 6 months with severe pneumonia can be managed with benzylpenicillin only.
- Give first dose of intramuscular benzylpenicillin and gentamicin and refer child urgently to hospital.
- If referral not possible repeat the benzylpenicillin 6 hourly and gentamicin once daily.

	Medicine	Codes		Paed dose	Freq.	Duration
	benzylpenicillin im	**C**	**V**	0.05-0.1MU/kg	6hourly	10 days
and	**gentamicin im**	**C**	**V**	5-7mg/kg	once daily	10 days

Note: ***change to oral amoxicillin when patient improves and tolerates oral drugs.***

If less than 6 months add high dose cotrimoxazole for 21 days and check HIV status. In HIV positive children consider steroids

Table 4.8: Cotrimoxazole dosage per age group

Age or weight	Paediatric tablet 120mg dispersible	Syrup 240mg/5ml
2-6 months (4-5.9 kg)	1	2.5mls
6months-3yrs (6-13.9kg)	2	5mls
3-5yrs (14 -19kg)	3	7.5mls

All HIV positive children should continue with cotrimoxazole prophylaxis at appropriate dose once daily. Infants confirmed HIV infected should commence ART as soon as possible.

- If benzylpenicillin is not available, substitute with:

	Medicine	Codes		Paed dose		Freq.	Duration
	ampicillin iv	**B**	**E**	50mg/kg		6hourly	5 days
or	**procaine penicillin im**	**C**	**V**	<1yr 1-3yrs 3-5yrs	½ ml (= 150mg) 1ml (= 300mg) 1½ ml (=450mg)	once a day	5 days

Supportive measures

- Prevent low blood sugar:
- If the child is able to breastfeed ask the mother to breast feed the child
- If the child cannot breastfeed but is able to swallow give expressed breast milk or a breast milk substitute. If neither are available give sugar water = 4 level teaspoons sugar (20gm) in 200ml clean water.
- If the child is not able to swallow, give 50ml of milk or sugar water by nasogastric tube.
- Fluids (po/iv/nasogastric) 100ml/kg/24hrs - iv fluids monitored closely
- Nasal suction (or normal saline nasal drops) to clear the airway.
- Continued feeding.
- Check oxygen saturation
- Give Oxygen.

Management of pneumonia

- First line:

	Medicine	Codes	Paed dose		Frequency	Duration
	amoxicillin po	**C V**	4 - <6kg 6 - <14kg 14 - 19kg	= 62.5mg = 125mg = 250mg	3 times a day	5 days

- Alternative: Refer

	Medicine	Codes	Paed dose		Frequency	Duration
or	**procaine penicillin im**	**C V**	<1yr	= 150mg	once a day	5 days
			1-3yrs	= 300mg		
			3-5yrs	= 450mg		

- Reassess after 2 days of antibiotic treatment If not responding then **refer**, as the second line choices are limited.

- Treat fever and pain, if present with:

	Medicine	Codes	Paed dose	Frequency	Duration
or	**paracetamol po**	**C N**	10mg/kg	6hrly	as required.

Note: Do not give paracetamol to children under 3 months of age due to liver immaturity, if indicated give cautiously.

Give clear instructions on

- how to take medicines
- home care:
  - ✓ continue breast-feeding
  - ✓ maintain nutrition by giving easy-to-digest high energy food 5-7 times a day
  - ✓ and plenty of fluids a day.

Advise mother to return with the child in 2 days for re-assessment, or earlier if the child is getting worse:

- increased difficulty in breathing
- increased difficulty in drinking
- increased respiratory rate,

If the child returns with any of these, **refer**

Table 4.9: Monitoring the child with pneumonia:

Child Worse	**Child Same**	**Child better**
• Not able to drink • Has chest indrawing • Has other danger signs	• Fast breathing	• Slower breathing • Fever reduced • Eating better
Refer urgently	**Refer**	Finish course

Management of cough/cold

Home care and instructions on when to return are all that are needed. **No antibiotics, antihistamines or cough mixtures are required.**

Give clear instructions on

- home care:

  - ✓ continue breast-feeding
  - ✓ maintain nutrition by giving easy-to-digest high-energy food 5-7 times a day
  - ✓ and plenty of fluids a day.

Advise mother/ caregiver to return with the child in 2 days for reassessment, or earlier if the child is getting worse:

- breathing becomes difficult
- child is not able to drink
- breathing becomes fast
- child seems worse

If the child returns with any of these, **reassess.**
If the temperature is above 37.5°C:

Medicine	Codes		Paed dose	Frequency	Duration
paracetamol po	**C**	**N**	10mg/kg	6hrly	as required.

Wheezing

- In a young infant below 2 months, wheeze is a sign of serious illness **- refer.**
- An infant between 2 months and 12 months may wheeze because of bronchiolitis, which is usually a viral infection. If a child with bronchiolitis is breathing fast, **refer**. If not, give home care.
- In a child more than one-year wheezing may be due to asthma. If it is the first episode refer. If this child is in distress, give a rapid-acting bronchodilator for example salbutamol and **refer.**

Children with <u>first episode</u> of wheezing

- **child under 1 year:**

➢ If chest indrawing; or any danger sign; or if fast breathing	Give first dose of benzyl penicillin and refer **urgently** to hospital.
➢ If no fast breathing	Treat as “no pneumonia, cough/ cold”. Follow up after 2 days.

Children with first episode of wheezing

- **child 1 year and over**

If chest indrawing; or any danger sign	Give rapid-acting bronchodilator, oral prednisolone and antibiotic Refer **urgently** to hospital
If fast breathing	Nebulise with salbutamol or Give oral bronchodilator; Send home on treatment as "pneumonia": Follow up in 2 days
If no fast breathing	Nebulise with salbutamol or Give oral bronchodilator; Send home on treatment as "no pneumonia, cough/ cold"; Follow up in 7 days

Children with Previous Episodes of Wheezing

- **child under 1 year**

If chest indrawing; or any danger sign	Nebulise with salbutamol or Give oral bronchodilator Give first dose of antibiotic Refer **urgently** to hospital
If fast breathing	Nebulise with salbutamol or Give oral bronchodilator; Send home on treatment as "pneumonia": Follow up in 2 days
If no fast breathing	Nebulise with salbutamol or Give oral bronchodilator; Send home on treatment as "no pneumonia, cough / cold"; Follow up in 7 days

Children with Previous Episodes of Wheezing

- **child 1 year and over**

➢ Start with	Give a rapid acting bronchodilator Assess the child's condition 30 minutes later and treat according to this assessment.
➢ If chest indrawing; or any danger sign	Give first dose of antibiotic and prednisolone Refer **urgently** to hospital.
➢ If fast breathing	Give oral bronchodilator Send home on treatment as "pneumonia" Follow up in 2 days.
➢ If no fast breathing	Send home on treatment as "no pneumonia, cough/ cold"; Give oral bronchodilator Follow up in 7 days.

- **Prednisolone** dose in wheezing:

Medicine	Codes	Paed dose		Frequency	Duration
prednisolone po	**B V**	<1yr >1yr	= 10mg = 20mg	Once	repeat in 6hrs if reqd.

- If a rapid acting bronchodilator is required:

	Medicine	Codes	Paed dose	Frequency	Duration
	salbutamol nebulised 5mg/ml in 2ml sterile water	**B V**	<1yr >1yr	= 2.5mg = 5mg	as required
or	**salbutamol syrup po**	**B V**	2-12mnths 1-5yrs	= 1mg = 2mg	3 times a day -
or	**adrenaline *subcutaneously* 1:1000**	**C V**	0.01ml/kg up to a max of 0.25ml	repeat after 20mins if required	

If asthma is suspected refer to Asthma section for detailed management

Stridor

Definition: Harsh noise made when a child breathes in

Management of croup at the primary level

- If no stridor at rest, do not give antibiotics.
- If there is stridor at rest or chest indrawing or fast breathing refer **urgently** to hospital for possible intubation or tracheostomy and a course of cloxacillin and chloramphenicol.

Mild croup

- Stridor present only when upset.
- Likely to be of viral origin. An antibiotic is **not** required. Home care.

Severe croup (Laryngotracheobronchitis)

This is stridor in a calm child at rest with chest indrawing.

- Refer to higher centre of care.
- **Do not examine the throat in case it's Epiglottitis!**
- If referral not possible or there is a delay give chloramphenicol or ceftriaxone **and** cloxacillin:

	Medicine	Codes		Paed dose	Frequency	Duration
	chloramphenicol iv	**B**	**V**	12.5mg/kg	6hourly	7 days
		C	**V**	50mg/kg	once daily	7 days
or	**ceftriaxone iv**					
and	**cloxacillin iv**	**B**	**V**	2.5-25mg/kg	6hourly	7 days

- Suspect Epiglottitis if child very ill, toxic and drooling saliva.
- Continue antibiotics
- Watch carefully for signs of obstruction. Intubation or a tracheostomy may be required (poor air entry; severe chest indrawing, restlessness, pallor).
- Minimal handling (keep on mother's lap)
- NB. Remember cyanosis is a very late sign.

Foreign Body

Common in age 1-2 years: sudden onset (choking); sometimes local wheeze and/or decreased air entry. May cause stridor/cough; there is usually a history that suggests inhalation of foreign body.

- Admit for bronchoscopy in order to remove the foreign body.
- X-ray: opacity and/or air trapping
- Use antibiotics if there is fast breathing (secondary infection.)

Whenever Foreign Body is suspected consult cardiothoracic surgeons

Retropharyngeal Abscess

- Surgical drainage is required. Give:

	Medicine	Codes	Paed dose	Frequency	Duration
	cloxacillin im/iv	**B V**	25mg/kg/dose	6hourly	7 days
and	**gentamicin im/iv**	**C V**	6mg/kg	24hourly	7 days

Empyema / lung abscess

	Medicine	Codes	Paed dose	Frequency	Duration
	cloxacillin iv/im/po	**B V**	12.5-25mg/kg	6hrly	6 weeks
and	**gentamicin im/iv**	**C V**	5-7mg/kg	24hrly	14 days

Empyema –should also insert a chest drain

Diphtheria

- Give antitoxin and:

Medicine	Codes	Paed dose	Frequency	Duration
benzyl penicillin im	**C V**	100 000 unit/kg per dose	6hrly	7 days

Pertussis

Medicine	Codes	Paed dose	Frequency	Duration
erythromycin po	**C V**	12.5mg/kg/dose	6hrly	10 days

Management of a child with an ear problem

See also Chapter on Ear, Nose and Throat Disorders

Precautions for a child with a draining ear.

Advise the mother:

- **not** to leave anything in the ear, such as cotton wool, between wicking treatments;
- **not** to put oil or any fluid into the ear;
- **not** to let the child go swimming or get water in the ear.

Mastoiditis

Tender swelling behind the ear.

- Give first dose of antibiotics, paracetamol for pain and **refer** to hospital.

	Medicine	Codes		Paed dose	Frequency	Duration
	benzylpenicillin im	**C**	**V**	0.05-0.1MU/kg	6hrly	10days
and	**gentamicin im**	**C**	**V**	5-7 mg/kg	24hrly	
and	**paracetamol po**	**C**	**N**	10mg/kg	6hrly	as required.

Acute ear infection

Pus is seen draining from the ear and discharge is reported for less than 14 days; or ear pain.

- Give antibiotics and analgesia:

	Medicine	Codes		Paed dose		Frequency	Duration
	amoxicillin po	**C**	**V**	4-<6kg 6 - <14kg 14-19kg	=62.5mg =125mg =250mg	12hrly	5 days
and	**paracetamol po**	**C**	**N**	10mg/kg		6hrly	as required.

- Use amoxicillin as first line in children on cotrimoxazole prophylaxis
- Dry the ear by wicking
- Follow-up for 5 days

Chronic ear infection

Pus is seen draining from the ear and discharge is reported for 14 days or more.

- Dry the ear by wicking
- Instil quinolone drops (such as ciprofloxacin, norfloxacin, or ofloxacin)
- Follow-up after 5 days then reassess.
- If not improving, refer to ENT specialist.

Managing a Child with a Sore Throat

Antibiotics are only needed for streptococcal sore throats to prevent complications such as rheumatic fever. A streptococcal sore throat

presents as tender enlarged lymph nodes in front of the neck and a white exudate on the tonsils.

Sore throat but no swollen tender glands in neck and no pus on tonsils

- No antibiotics.
- Give paracetamol for pain.
- Feed child normally, continue breastfeeding.
- Give plenty of fluids.

Sore throat with swollen tender glands in neck or pus on tonsils (age > 2 years)

- Give antibiotic:

	Medicine	Codes	Paed dose		Frequency	Duration
	procaine penicillin im	**C**	< 1yr 1 to 3yrs 3 to 5yrs	1/2mls(=150mg) 1ml(= 300mg) 11/2mls(450mg)	once a day	5 days then penicillin V for 5 days
or	**amoxicillin**	**C**	<3yrs >3yrs >12yrs	= 125mg = 250mg = 500mg	3 times a day	10 days

- Give paracetamol for pain.
- General / home care & feed child as above.

Treatment of oral candidiasis (thrush)

	Medicine	Codes	Paed dose	Frequency	Duration
	nystatin po	**B E**	250 000iu after feeds	3-6 times a day	5 days
or	**miconazole 2% gel po**	**C V**	2.5ml after feeds		

Managing a child with a blocked nose or nasal discharge

For clear or mucous nasal discharge, do not give antibiotics; keep nose clean with wet soft tissue or cloth and normal saline nasal drops. For a foreign body in nose refer to hospital/admit for removal.

Diarrhoea in Children

About 90% of deaths from diarrhoea in under-fives would be **prevented** by:

- giving extra home fluids or salt sugar solution (SSS) or ORS at home at onset of diarrhoea to prevent dehydration;
- exclusive breastfeeding for first 6 months of life and continuing breast feeding with solids throughout the attack of diarrhoea to prevent malnutrition;
- making sure mothers know when to take the child to a health facility;
- correct assessment, treatment and continued feeding at the health facility level (see MoHCC Chart and IMNCI Manual);
- treatment of invasive diarrhoea (bloody stool) with antibiotics;
- clear instructions on discharge from the health facility for continuing above treatments and when it may be necessary to return for further treatment;
- referring to hospital for investigation and treatment: severe malnutrition, persistent diarrhoea (lasting > 14 days);
- **appropriate** use of antibiotics, **no anti-diarrhoeal or anti-emetic medicines.**
- **zinc sulphate 20mg/day for 10-14 days to all children ≥6months and 10mg/day to infants less than 6 months.**

If the child has diarrhoea

Ask:

- For how long?
- Is there blood in the stool?

Look:

- Is the child lethargic or unconscious?
- Does the child have sunken eyes?
- Is the child able to drink or drinking poorly?
- Is the child drinking eagerly or thirsty?

Pinch the skin of the abdomen:

- Does it go back very slowly (longer than 2 seconds)?

Classify the dehydration – see table 4.10

NB: If temperature is 38.5°C or higher look for other causes of fever and treat.

Table 4.10: Classification of Dehydration:

Signs	Dehydration	Management
Two or more of the following signs: ▪ Lethargic or unconscious ▪ Sunken eyes ▪ Not able to drink or drinking poorly ▪ Skin pinch goes back very slowly	**Severe dehydration**	➢ Initiate treatment for severe dehydration (Plan C), ➢ or if another severe classification* – refer urgently to hospital with caregiver giving frequent sips of oral rehydration fluid or by nasogastric tube on the way. Advise mother to continue breastfeeding. ➢ If the child is 2 years or older and there is cholera in your area, give antibiotic for cholera.
Two or more of the following signs: ▪ Restless or irritable ▪ Sunken eyes ▪ Drinks eagerly or thirsty ▪ Skin pinch goes back slowly	**Some dehydration**	Give fluid and food for some dehydration (Plan B). ➢ *If child also has a severe classification from another main symptom refer urgently to hospital with caregiver giving frequent sips of oral rehydration fluid on the way. Advise mother to continue breastfeeding. ➢ Advise mother when to return urgently ➢ Follow -up in 2 days if not improving.
Not enough signs to classify as 'some' or severe dehydration	**No dehydration**	➢ Give fluid and food to treat diarrhoea at home (Plan A) ➢ Advise caregiver when to return immediately ➢ Follow -up in 2 days if not improving

** e.g. severe pneumonia, severe febrile disease, severe malnutrition*

Plan A: Treat Diarrhoea at Home

Counsel the mother on the 3 Rules of Home Treatment:

- Give extra fluid
- Continue feeding
- When to return

Explain function of ORT (oral rehydration therapy) to mother

Give extra fluid (as much as the child will take)

Tell the mother:

- Breastfeed frequently and for longer each feed
- If the child is exclusively breastfed, give Sugar Salt Solution or ORS in addition to breast milk
- If the child is not exclusively breastfed, give food-based fluids available at home

It is especially important to give ORT at home when the:

- child has been treated with Plan B or Plan C during this visit.
- child cannot return to a clinic if the diarrhoea gets worse.

Teach the mother how to prepare and give Sugar Salt Solution or ORS.

Explain to mother the reason for giving Oral Rehydration Therapy and what it does.

Show the mother how much Sugar Salt Solution or ORS to give.

Continue to give as much of the normal feeds as the child will take AND give Sugar Salt Solution or ORS.

Amount to give is:

Child's weight x 100 = ml to give per 24 hours

Show mother how to measure this in a container available at home

Tell the mother:

- To give frequent small sips from a cup.
- If the child vomits, wait 10 minutes. Then continue but more slowly.
- To continue giving extra fluid until the diarrhoea stops.
- To continue (breast) feeding
- When to return

Plan B: Treat Some Dehydration with Oral Rehydration Therapy

In the health facility give the recommended amount of oral rehydration therapy:

Give approximately 75ml/kg of oral rehydration therapy over four (4) hours

- Start with 10ml per kg in first hour
- If the child wants more oral rehydration therapy than this, give more
- After the first hour give15 to 20mls per kg per hour
- If the child wants and can take more oral rehydration therapy without vomiting, give more

Show the mother how to give oral rehydration solution

- Give frequent small sips from a cup and spoon
- If the child vomits. Wait 10 minutes, then continue, but slowly
- Continue breastfeeding or other normal feeding whenever the child wants.

Reassess after 4 hours

- If no signs of dehydration → **Plan A,** and can send home
- If still some dehydration → **Plan B,** remaining in health facility
- If signs of severe dehydration → **Plan C,** start in health facility and **refer**
- Begin feeding the child if not already doing so. If

the mother must leave before completing the treatment:

- Show her how to prepare Sugar Salt Solution at home
- Show her how much Sugar Salt Solution to give to finish Plan B treatment at home
- **If available give 2 packets ORS sachets** to prepare and give at home.
- Explain to caregiver the reason for giving oral rehydration therapy and what it does
- Explain the 3 Rules of Home treatment:

1. Give extra fluid - See Plan A for recommended fluids

2. Continue feeding and COUNSEL the mother

3. When to return

Plan C: Treat Severe Dehydration Quickly

Start intravenous fluid immediately:

- Amount of fluid: 30 ml per kg body weight in 1 hour
- Type of fluid: Ringers lactate
- **OR ½ strength Darrow's solution in 2.5% dextrose iv**
- OR if above unavailable 0.9% sodium chloride solution iv
- If the child can drink, give oral rehydration therapy while the infusion is being set up (about 5mls per kg body weight per hour).
- Caution if child malnourished or is a neonate

Reassess after one hour

If response good (Good response: child regaining consciousness and radial pulses easily palpable or child passing good quantity of urine)

Response may be poor if child is hypoglycaemic

- Continue intravenous fluid at 10ml per kg body weight per hour for next **7** hours
- Give oral rehydration therapy (about 5mls per kg body weight per hour) as soon as the child can drink

If response poor (Poor response: child remains unconscious or radial pulses weak or undetectable and no urine passed)

- Repeat 30 ml per kg body weight in next hour
- Then continue intravenous fluid at 10 ml per kg body weight per hour for next 4 hours
- Continue to assess hydration status and general condition hourly

If intravenous fluid cannot be started, give by nasogastric tube while awaiting referral

- **Give 20ml per kg body weight per hour for 6 hours**
- **Reassess hourly: if there is repeated vomiting or abdominal distension, give fluid more slowly**

Refer urgently to hospital.

Reassess hydration status 6 hours after starting fluids

- If no signs of dehydration → **Plan A**
- If still some signs of dehydration → **Plan B** remaining in health facility
- If signs of severe dehydration → Plan C and **refer urgently to hospital**
- **Begin feeding the child if not already doing so**

Child should be referred urgently to hospital if at any time assessment shows poor response.

Persistent diarrhoea

- **Severe persistent diarrhoea** is diarrhoea lasting 14days or more **and** dehydrated. Start rehydration and **refer** to hospital.
- **Persistent diarrhoea** is diarrhoea lasting 14days or more **but** no dehydration. Advise on feeding (below), give vitamin A, and follow up in 5days.

General notes: persistent diarrhoea

- if breastfeeding, give more frequent, longer breast feeds, day and night
- milk feeds should be mixed with maize meal porridge to reduce the concentration of lactose
- sour milk is better tolerated than fresh milk
- give fermented porridge if available
- give foods rich in vitamin A, folic acid and zinc– liver, kidney, dark green vegetables, fish, beans, groundnuts, breast milk, or vitamin supplements.

Indications for antibiotics in diarrhoea:

Bloody diarrhoea, cramps and fever (dysentery):

- First line:

	Medicine	Codes		Paed dose		Frequency	Duration
	ciprofloxacin po	**B**	**V**	5-17yrs	20mg/kg (max 1.5gm/day	twice a day	3 days
or	**nalidixic acid po**	**B**	**V**	4-<10kg >10kg 5 –12yrs	= 125mg = 250mg = 375mg	4 times a day	5 days

- Follow up after 2 days.
- Second line (**intestinal amoebiasis**):

	Medicine	Codes		Paed dose	Frequency	Duration
	metronidazole po	**C**	**V**	10mg/kg	3 times a day	5 days

Cholera:

*CASE DEFINITION: rice watery diarrhoea, with or without vomiting, causing **severe dehydration or death***

*In suspected cases **immediately** notify the Provincial Medical Director, and obtain current cholera guidelines. See also the chapter on gastrointestinal conditions.*

- Rehydration is most important. The mainstay of cholera management is rehydration, intravenously or orally.
- The use of antibiotics is strictly limited to very few indications such as: (i) severe dehydration (ii) high attack rate within a household or congregate settings (iii) as prophylaxis in areas described under (ii) or (iv) if specific guidance is provided as part of the cholera response. Start antibiotics after the patient is rehydrated and vomiting has stopped – usually after 4-6hrs.
- **Always confirm recommended medicines for the outbreak**

	Medicine	Codes		Paed dose	Frequency	Duration
	ciprofloxacin po	**B**	**V**	20mg/kg	twice a day	3 days
or	**azithromycin po**	**C**	**V**	20mg/kg	single dose	

Composition of fluids

Sugar Salt Solution (SSS)

- 6 level teaspoons of any household sugar (white or brown),
- ½ level teaspoon of salt (coarse salt may have to be ground fine), dissolved in

- 1000ml of clean water measured in any 1000ml bottle (soft drink, oil etc). [The water is boiled only if from a contaminated source and is cooled before adding ingredients.]

'Home fluids'

Any fluids including water, tea, thin porridge, 'mahewu', but avoiding cold drinks with high sugar content.

Oral Rehydration Solution: Full Formula has now been replaced with low osmolarity ORS formula.

It has low levels of glucose and salt to achieve osmolarity of 245mOsm/L resulting in improved efficacy and decreased stool output. It is safe and effective even in children with cholera.

Made in hospital pharmacies as follows:

Low osmolarity ORS

ingredient	weight
sodium chloride	2.6
trisodium citrate dihydrate*	2.9g
potassium chloride	1.5g
glucose, anhydrous	13.5
Water	to 1 litre

**Trisodium citrate dihydrate may be replaced by sodium bicarbonate 2.5 grams/litre.*

However, ORS may be available in packets (sachets) in certain situations according to current ministry policy.

Give Zinc sulphate 20mg/day for 10-14 days with every bout of diarrhoea in infants 6 months and above. Give 10mg/day in infants below 6 months.

ACUTE MALNUTRITION

(Severe acute malnutrition – oedematous and non-oedematous)

Growth monitoring

Regular weight and height measurements during growth monitoring are very important to assess the nutritional status of each child.

Growth faltering

Refers to a child whose weight remains static or is going down on 3 consecutive monthly weighing.

Low-weight-for-age refers to the weight for age below -2 SD. Counselling of the mother should start from the time loss of weight or static weight is identified.

- If no improvement by the third consecutive month, the child should be referred.
- Check for malnutrition and anaemia – see chart below.

Table 4.11: Classification of acute malnutrition in children

Age Group	Measurement Index	Classification	
		Severe Acute Malnutrition	Moderate Acute Malnutrition
Children Less than 6 Months	Classify severe if presence of any of the following: • Bilateral pitting oedema • Weight for length ≤ SD (WHO) • Infant too weak to suckle effectively leading to poor intake • Mother reports insufficient milk to feed child AND child is not growing adequately		
Children 6 to 59 months •	Weight for height	≤ 3 SD (WHO)	≤ 2 & ≥ 3 SD (WHO)
	Mid-upper Arm circumference (MAUC)	< 115mm	≥ 115mm &< 125mm
	Bilateral Pitting Oedema	Yes	No
Children and adolescents (5 to 18 Years	Body Mass Index (BMI) for Age	≤3 SD (WHO) OR visible wasting	≤2 & ≥3 SD (WHO)
	Bilateral Pitting Oedema	Yes	No

Acute malnutrition and complications

Patients with severe or moderate acute malnutrition AND complications should be admitted for inpatient care. Complications should be managed according to national protocols for different age groups.

Routine Medicines to Accompany Inpatient Therapeutic Feeding

Provide routine medicines in both Phases I and II per national protocol as appropriate for age and complications of patient.

Treatment of hypoglycaemia in Severe Acute Malnutrition

Hypoglycaemia and hypothermia usually occur together and are signs of infection. Check for hypoglycaemia whenever hypothermia (axillary<35.0°C; rectal<35.5°C) is found. Frequent feeding is important in preventing both conditions.

If the child is conscious and has hypogylcemia give:

Medicine	Codes	Child Dose	Frequency	Duration
10% glucose solution	**C E**	50ml bolus	once	
Or				
10% sucrose solution	**C E**	3ml/kg/Feed	every30 minutes	2 hours
then F-75	**C E**	11ml/kg/Feed	2hourly	2 days

The glucose or sucrose solution (1 rounded teaspoon of sugar in 3.5 tablespoons water), can be given orally or by nasogastric (NG) tube. If the child is unconscious, lethargic or convulsing give IV sterile 10% glucose (5ml/kg), followed by 50ml of 10% glucose or sucrose by Ng tube. Then give starter F-75.

Treatment of Infection in Severely malnourished children

The usual signs of infection, such as fever are often absent in severe malnutrition. Therefore, presume infection in severe malnutrition and give routinely broad-spectrum antibiotic(s) AND measles vaccine if child is > 6months and not immunized (delay if the child is in shock).

1. If the child has no complications, give cotrimoxazole paediatric suspension orally or amoxicillin

	Medicine	Codes	Child Dose		Frequency	Duration
	cotrimoxazole po	**C V**	BW ≥4kg	5ml	twice daily	5 days
			BW<4kg	2.5ml		
or	**amoxicillin po**	**C V**	15mg/kg		8 hourly	5 days

2. If the child is severely ill (apathetic, lethargic) or has complications (hypoglycaemia, hypothermia, raw skin/fissures, respiratory tract or urinary tract infection) give iv/im ampicillin AND gentamicin.

- If seriously unwell give ampicillin and gentamicin or kanamycin. If condition less severe, consider oral broad-spectrum antibiotics (cotrimoxazole or amoxicillin).

	Medicine	Codes	Child Dose /(kg/feed)	Frequency	Duration
	ampicillin im/iv	**C V**	50mg/kg	6hrly	2 days
then	**amoxicillin po***	**C V**	15mg/kg	8hrly	5 days
and	**gentamicin im/iv**	**C V**	7.5mg/kg	once daily	7 days
Give benzylpenicillin if ampicillin is not available. If the child fails to improve after 48 hours					
add	**chloramphenicol im/iv**	**B V**	25mg/kg	8hrly	5 days
If the child has chronic diarrhoea					
add	**metronidazole po**	**C V**	7.5mg/kg	8hrly	7 days

** If amoxicillin is not available continue with ampicillin but give orally 50mg/kg every 6 hours*

For parasitic worms, give albendazole 200mg orally a day for three days.

Treatment of dehydration in Severe Malnourished Children

Severe acute malnourished children with profuse watery diarrhoea and signs such as sunken eyes, slow skin pinch, absent tears, dry mouth, very thirsty, reduced urine output, rapid pulse and respirations. These should be considered as severely dehydrated.

Do not use the IV route for rehydration except in cases of shock and then do so with care, infusing slowly to avoid flooding the circulation and overloading the heart. Do not give standard oral rehydration salts solution (90 mmol sodium/l) in severely malnourished children as it contains too much sodium and too little potassium children. Give special Rehydration Solution for Malnutrition (ReSoMal).

Medicine	Codes	Child Dose /(kg/feed)	Frequency	Duration
ReSoMal	**C E**	5ml/kg	every 30 minutes	2 hours
then		5-10ml/kg/hr	determined by stool loss, vomiting and how much the child wants,	4-10hrs

Replace the ReSoMal doses at 4, 6, 8 and 10 hours with F-75 if rehydration is continuing at these times, then continue feeding with F-75

Table 4.12: When ReSoMal is not available prepare as follows:
(Used if no therapeutic milk, F75/F100 as they contain electrolytes)

Ingredient	**Amount**
Water (boiled & cooled)	2 litres
WHO-ORS	One 1 litre-packet*
Sugar	50 g
Combined Vitamin and Mineral mix (CMV)*	3g

If CMV is not available,

Table 4.12b: Electrolyte/mineral solution can be prepared as follows:

Quantity	**grams**	**molar content of 20 ml**
Potassium Chloride: KCl	224	24 mmol
Tripotassium Citrate: C6H5K3O7.H2O	81	2 mmol
Magnesium Chloride: MgCl2.6H2O	76	3 mmol
Zinc Acetate: Zn(CH3COO)2.2H20	8.2	300 µmol

Copper Sulphate: CuSO4.5H2O	1.4	45 µmol
Water:	Make up to 2500 ml	

Weigh the ingredients and make up to 2500 ml. Add 20 ml of electrolyte/mineral solution to 1000 ml of milk feed. Add selenium if available (sodium selenate 0.028 g, NaSeO4 10H20) and iodine (potassium iodide 0.012g, KI) per 2500 ml.

Vitamin and mineral therapy supplementation in severe acute malnutrition:

	Medicine	Codes		Paed dose		Freq.	Duration
	vitamin A (retinol) po	**C**	**V**	<6mnths 6-12mths 1-5yr	50,000iu 100,000iu 200,000iu	once at the clinic and one dose at home -2 doses only	
and	**ferrous sulphate po**	**C**	**E**	4-<6kg 6-<10kg 1-3yrs 3-5yrs	6mg Fe 12mg 18mg 24mg	once a day	14 days
and	**folic acid po**	**C**	**E**	<6kg >6kg	2.5mg 5mg	once a day	14 days
and	**albendazole po**	**C**	**E**	≥2 years	400 mg	single dose	on discharge from SC/ direct admission to OTP

Ferrous sulphate suspension has 12mg Fe/5mL

Vitamins and Electrolytes

	Medicine	Codes		Paed dose	Freq.	Duration
	multivitamin syrup po	**B**	**E**	5-10ml	Daily	1 month
and	**folic acid po**	**C**	**E**	5mg	Weekly	3 months
and	**vitamin A po**	**C**	**V**	<6mths 6-12mths 1-5yr	50,000 iu 100,000 iu 200,000 iu	once at the clinic and one dose at home -2 doses only

- In all Severe acute malnutrition (oedematous and non oedematous kwashiorkor and marasmic-kwashiorkor children) give:

	Medicine	Codes		Paed dose	Freq.	Duration
	electrolyte mixture po*	**B**	-	1ml/kg	4 times a day	until no oedema
or	**potassium chloride mixture po**	**B**	-	1-2mmol/ kg		

No need for these if on F75 or F100.

Nutritional rehabilitation at the referral level

General guidelines:

- Keep malnourished children in a special area where they can be **constantly monitored.**
- Malnourished children should be **isolated** from other patients because they are very susceptible to **infection**,
- Try not to separate the caregiver from the child; they should share a bed where possible.
- Keep the child in a warm environment. **Properly cover** the child with clothes, including a hat, and blankets. The child must be **dried immediately** and properly after bathing. Bath time should be minimal and, done during the day.
- Attempt to incorporate an educational message into each intervention.
- **Intravenous infusions should be avoided** except when essential, as for severe dehydration with shock or septic shock.
- Intramuscular injections should be given with care in the thigh, using the smallest possible gauge needle and volume of fluid.
- The room temperature should be kept at 28-32 degrees Celsius. This will seem uncomfortably warm for active, fully clothed staff, but is necessary for small, immobile children who easily become hypothermic.
- Those children who do not need emergency treatment for complications should be admitted directly to outpatient therapeutic

programme (OTP) and started on Ready to Use (RTU) feed e.g. plumpy nut, as soon as possible (refer to nutrition guidelines).

Therapeutic Feeding

The therapeutic diet for malnourished children consists of two formulas, F-75 and F-100 or Ready to use Therapeutic Food (RUTF). F-75 (75 kcal/100 ml), is used during the initial phase of treatment, while F-100 or RUTF (100 kcal/100 ml) is used during the rehabilitation phase, after the appetite has returned.

Table 4.13: Inpatient Therapeutic Feeding Recommendations Phase 1

Phase 1 (Stabilization care)	
Age Group	***Product and Prescription***
Children <6 Months	• Give Diluted F-100 at 130 ml/kg of body weight per day • Breastfed children should always be offered breast milk before the therapeutic milk, and always on demand
Children 6 to 59 Months	• Give F-75 at 130 ml per kg of body weight per day until the patient re-gains appetite. • Start with 2 hourly feeds (12 feeds per day), and gradually decrease the frequency of feeding and increase the volume of each feed until the patient is getting 3-hourly feeds (8 feeds per day)

In the stabilization phase give F-75 formula as above. These provide 130ml/kg/day. If there is oedema, reduce the volume to 100 ml/kg/day. Give F-75 from a cup or from a spoon, dropper or syringe if the child is very weak to feed. If the appetite is poor, coax and encourage the patient to finish the feed. If intake does not reach 105ml /kg/day despite frequent feeds, coaxing and re-offering, use a nasogastric tube. If the child is breastfed, encourage continued breastfeeding but also give prescribed amounts of F-75 to make sure the child's needs are met.
Transfer to F-100 formula as soon as appetite has returned (usually within 7days) and oedema has subsided.

Table 4.14: Inpatient Therapeutic Feeding Recommendations Phase 2

Phase 2 (Transition and Rehabilitation)	
Age Group	***Product and Prescription***
Children <6 Months	• Give twice the volume offered during phase I
Children 6 to 59 Months	• Replace F-75 with F-100 at 150ml per kg of body weight per day • Gradually introduce RUTF in small amounts until the child can consume ¾ Sachet per day • When accepted, provide RUTF at 130kcal per kg of body weight per day

In the rehabilitation phase a vigorous approach to feeding is required to achieve very high intakes and rapid weight gain of >10 g gain/kg/day. The recommended milk-based F-100 contains 100 kcal and 2.9 g protein/100 ml. *Readiness to enter the rehabilitation phase* is signalled by a return of appetite, usually about one week after admission. A gradual transition is recommended to avoid the risk of heart failure which can occur if children suddenly consume huge amounts.

To change from F-75 to F-100 formula replace F-75 with the same amount of F-100 for 48 hours then, increase each successive feed by 10 ml until some feed remains uneaten. The point when some remains unconsumed is likely to occur when intakes reach about 30 ml/kg/feed (200 ml/kg/d). F-100 can be replaced by an alternative Ready-to-use therapeutic food (RUTF) once the appetite has returned.

If commercial formulas F-75 and F-100 are not available, prepare as follows. DO NOT USE HIGH ENERGY MILK.

Ingredient	Amount	
	F-75	F-100
Fresh Cow's Milk	300ml	900ml
Sugar	100g	50g
Vegetable oil	20ml	25ml
Vitamin & Mineral mix (CMV)	3g *(½ scoop)*	3g *(½ scoop)*
Add Water to make	1000ml	1000ml

For alternate ingredients refer to Protocol for management of acute malnutrition

Home management

- Regularly monitor child's weight: For children less than 1year old monitor weight every month and for those 1year and above, check weight every 2 months.
- Encourage exclusive breastfeeding up to 6 months (no additional fluids/foods), introducing other foods in addition to breast milk at 6 months, and breastfeeding up to two years. For young children, continue breastfeeding on demand.
- RUTF is a food and medicine for children with Severe acute malnutrition. (SAM)- oedematous and non oedematous (Kwashiorkor or Marasmus) only. It should not be shared.
- Children with SAM (Kwashiorkor or Marasmus) often do not like to eat. Give small regular meals of RUTF and encourage the child to eat often (if possible eight meals a day).
- Always offer the child plenty of cooled, boiled water to drink while he or she is eating RUTF.
- Keep food clean and covered. Hygienic food handling and preparation. Use soap to wash children's hands and face before feeding. Wash hands with soap and water after visiting the toilet.
- Children with SAM (Kwashiorkor or Marasmus) get cold quickly. Always keep the child covered and warm.
- When a child has diarrhoea, never stop feeding. Give extra food and extra clean water.

As soon as the child gets better, introduce the fortified, family type diet.

Anaemia:

Test and treat for Hookworm (see Tropical Diseases) After recovery from the acute state treat with ferrous sulphate.

	Medicine	Codes		Paed dose		Frequency	Duration
	albendazole po	**C**	**E**	<2yrs	200mg	one dose only	
				>2yrs	400mg		
and	**ferrous sulphate po**	**C**	**E**	6 -<10kg	12mg	once a day	30 days
				1-3yrs	18mg		
				3-5yrs	24mg		

Treatment of Severe anaemia

Children with severe anaemia should be treated with daily iron and folic acid supplementation. After completing 3 months of therapeutic supplementation, children should continue preventive supplementation regimen. Children with SAM (kwashiorkor or marasmus) should be assumed to be severely anaemic. However, oral iron supplementation should be delayed until the child regains appetite and starts gaining weight, usually after 14 days.

4.1 PAEDIATRIC HIV INFECTION

See National Guidelines on Antiretroviral Therapy.

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GENERAL NOTES

Paediatric HIV infection can be significantly reduced by implementing an effective Prevention of Mother to Child Transmission (PMTCT) program. Symptomatic HIV infection may be difficult to distinguish from other childhood conditions such as respiratory infections, diarrhoea and malnutrition. Suspect HIV related disease if two or more of the following signs are present:

- severe or recurrent pneumonia
- generalised lymphadenopathy
- hepato-splenomegaly
- failure to thrive
- severe/recurrent oro-pharyngeal candidiasis.
- finger clubbing

In the majority of cases, the route of transmission is from mother to child. Ensure pre-test counselling of parents/caregivers before testing the child for HIV infection. Antibody detection tests are not diagnostic of true infection before 18 months due to persistence of maternal antibodies in the child.

General Guidelines for HIV care in children

- Nutrition: advise the caregiver on high calorie diet and other essential nutrients for the child. Safe food and water practices

- Hydration: oral rehydration, together with dietary advice is most important in the management of persistent diarrhoea. Intravenous fluids may be needed during severe diarrhoeal episodes.

- Immunisation: BCG should be given to all children at birth. Immunisation is contraindicated only where there is symptomatic HIV infection. The current recommendation is to give the other live vaccines, measles and oral poliomyelitis vaccine even in immune-compromised children. [See chapter on Immunisation.]

- Home care: is preferable to hospital admission for chronic care.

- Counselling: the family will require support in facing the emotional and financial demands of the child's chronic ill health as well as those arising from the parents' own HIV status. Facilitate access to OI clinics.

Management of Specific HIV related Conditions

Bacterial infections

In the HIV infected child infections are likely to be more frequent, of longer duration with a poorer response to treatment. Septicaemia, meningitis, pneumonia and abscesses frequently occur before any other features of HIV infection are evident. The causative organisms, however, are likely to be similar to those found in non-HIV-infected children and the standard guidelines on the choice of antibiotics apply. (However, in a child with severe pneumonia where *Pneumocystis jiroveci* pneumonia (PCP) is suspected, a course of high dose cotrimoxazole (60mg/kg every 8hrs) and steroids are indicated.

Once a child is diagnosed as having HIV-related pneumonia **cotrimoxazole prophylaxis** should be commenced:

Medicine	Codes	Paed dose	Frequency	Duration
cotrimoxazole po	**C V**	< 6mths = 120mg 6-12mths = 240mg >1 year = 480mg	once a day	for paediatric life

There is an increased risk of **tuberculosis** infection in the HIV infected child. Where TB is confirmed, or with a diagnosis of probable TB, use the anti-TB treatment regimens recommended in the Chapter on Tuberculosis.

Recurrent/ persistent diarrhoea: current evidence suggests that no single pathogen is responsible for the persistence of episodes of diarrhoea (>14 days). Follow the diarrhoea management guidelines in the section on diarrhoea.

Chronic otitis media, **oral candidiasis**, **eczema**/ papular rash, and **anaemia**, may be related to HIV infection but are managed according to standard guidelines.

Lymphocytic interstitial pneumonitis (LIP) is more commonly seen, presenting after the first year of life. Short term steroids have been used with good effect in children with severe respiratory symptoms. Give first dose of antibiotic (see management of pneumonia) and **refer** for specialist diagnosis. Child needs to be initiated on ART.

Table 4.15: Dose by age and weight for commonly used medicine:

Age	Weight	benzylpenicillin 0.05-0.1MU/kg 6 hourly	Gentamicin 5-7.5mg/kg daily	cotrimoxazole 12hourly	paracetamol 10mg/kg 6hourly	amoxicillin 16mg/kg 8 hourly	procaine penicillin 50mg/kg once daily
		5MU (3gm) vial of 500mg/ml [add 6ml water to 5MU vial]	1gm vial of 250mg/ml [add 4ml water to 1gm vial]	syrup of 200mg+40mg per 5ml	syrup of 120mg/5ml *use nearest 2.5ml vol	syrup of 125mg/5ml - use nearest 2.5ml vol	300mg/ml injection
2-4 months	4 - <6kg	0.3MU (0.4ml)	40mg (0.16ml)	100/20mg (2.5ml)	50mg (2.5ml)	62.5mg (2.5ml)	
4-9 months	6 - <10kg	0.4MU (0.5ml)	50mg (0.2ml)	200/40mg (5ml)	100mg (3-5ml)	125mg (5ml)	
9-12months	10- <12kg	0.5MU (0.6ml)	75mg (0.3ml)	200/40mg (5ml)	120mg (5ml)	125mg (5ml)	150mg (0.5ml)
1-3 years	12- <14kg	0.7MU (0.8ml)	100mg (0.4ml)	300/60mg (7.5ml)	120mg (5-7ml)		300mg (1.0ml)
3-5 years		0.8MU (1.0ml)	125mg (0.5ml)	300/60mg (7.5ml)	250mg (10ml)	250mg (10ml)	450mg (1.5ml)
5-12 years		1MU (1.2ml)	200mg (0.8ml)	400/80mg (10ml)	375mg (15ml)	375mg (15ml)	600mg (2.0ml)

Paediatric Medicines Doses

Notes on Paediatric Medicines Doses:

- *for infants under one month see Tables 4.1,4.2, 4.3 and 4.5;*
- *read the "dosage" column carefully in conjunction with the "doses/day" column;*
- *do not exceed the adult dose: the dosage per kg is not applicable for children > 40kg;*

Table 4.16: Dosages for Children and Infants Over 2 Months

For antibiotics where "Doses/Day" give a range (e.g. 2-4) the number of doses/day should be chosen according to both the baby's gestational age and postnatal age. Do not exceed the frequency recommended in the table.

Medicine	Route	Dose	Frequency
Acetylcysteine 200mg/ml injection	iv	150mg/kg over 15mins then 50mg/kg over 4hours then 100mg/kg over 16hours	-
Adrenaline 1:1000 1 mg/ml injection	sc im	0.01ml/kg, repeat after 20mins 0.3 to 0.5ml IM	-
Aminophylline 25mg/ml injection	iv po	Loading: 6mg/kg over 30mins	-
Amoxicillin 125mg/5ml syrup	po	16mg/kg	8hrly
Ampicillin 500mg injection	im/ iv	mild 12.5 mg/kg severe 25mg/kg	6hrly
Atropine sulphate 0,6mg/ml injection	im	Pre-operatively 0.02mg/kg	-
Benzylpenicillin 3 g injection = 5MU	iv/ im	50 000 – 100 000u/kg (0.05 –0.1MU/kg)	6hrly

Chloramphenicol 1g injection; 125mg/5ml syr	iv/ im/po	mild 12.5mg severe (meningitis) 25mg/kg	6hrly
Chlorpromazine 25mg/ml injection 50mg/5ml syrup	iv/ im/po	0.75mg /kg	4 times a day
Clindamycin 75mg/5ml syrup; 250mg capsule; 1g injection	po /im	mild 4mg/kg severe 10mg/kg	6hrly
Cloxacillin 125mg/5ml syrup; 250mg capsule; 0.5g injection	iv/ im/po	12.5 to 25mg/kg	6hrly

Table 4.16: Dosages for Children and Infants Over 2 Months: [contd.]

Medicine	Route	Dose	Frequency
Codeine Phosphate 30mg tab	po	0.4mg/kg (>1yr = 0.75mg/kg)	6hrly
Cotrimoxazole 120mg tab; 480mg tab; 240mg/5ml syrup	po	normal dose 30mg/kg	12hrly
		high dose 60mg/kg	8hrly
Diazepam 5mg/ml injection	iv/ pr/ po	0.2 to 0.5 mg/kg/24 hours	Var
Digoxin 62,5mcg tab / 50mcg/ml elixir	po	initial 0.01mg (10mcg)/kg	8hrly for 3 doses
		maintenance 0.005mg (5mcg)/kg	12hrly
Erythromycin 125mg/5ml syrup	po	6.25 to 12.5mg/kg	6hrly
Ethambutol 100mg dispersible tab	po	15mg/kg	once a day
Ferrous Sulphate 60mg iron tab / 12mg iron/5ml syrup	po	2mg iron /kg	3 times a day
Folic acid 5 mg	po	1 to 2mg/kg	once a day

Frusemide 10mg/ml injection; 40 mg tab	im/ iv po	O.5mg to 1mg/kg 1 to 3mg/kg	once a day
Gentamicin 20mg/ml injection; 40mg/ml	iv/ im	7.5 mg/kg	once a day
Griseofulvin 125 mg/5ml; 125mg tab; 500mg tab	po	5mg /kg	12hrly
Hydrochlorothiazide 25mg tablet	po	0.5mg /kg	12 hourly
Hydrocortisone 100mg injection	iv	100 to 200 mg/dose depending on indication	-
Ibuprofen **100mg/5ml; 200mg tab**	po	5-10mg/kg	3 time a day
Isoniazid 100mg tab	po	10 to 20mg/kg	once a day
Kanamycin 1g injection	im	7.5mg/kg	12hrly
Ketoconazole 200mg tab;100 mg/5ml	po	5 to 10mg/kg	once a day
Lamotrigine **25mg tab, 100mg**	po	0.2-4mg/kg	12 hrly
Metronidazole 200mg tab / 1gm suppository 5mg/ml inj; 200mg/5ml	pr / iv po po	severe anaerobic inf. 7.5mg/kg intestinal amoebiasis 10mg /kg giardiasis 5mg/kg	8hrly
Morphine Sulphate 15mg/ml injection; 5mg/5ml syrup	im/o	Up to 0.25mg/kg per dose	-

Table 4.16: Dosages for Children and Infants Over 2 Months: [contd.]

Medicine	Route	Dose	Frequency
Nitrofurantoin 50mg tab	po	1.5 mg/kg (age >3mnth)	4 times a day
Paracetamol 125 mg tab; 500mg tab; 120mg/5ml syrup	po	10mg/kg	6hrly
Penicillin V 125mg/5ml syrup; 250mg tablet	po	12.5mg/kg	6hrly
Pethidine 50mg/ml injection	iv/ im/o	1mg/kg	not less than 4hrly
Phenobarbitone 30mg tab; 15mg/5ml mixture; 200mg/ml inj.	iv/im/ po	5mg/kg	once at night
Prednisolone 5mg tab scored	po	1 to 2 mg/kg	once a day
Procaine penicillin 300mg/ml injection	im	50mg/kg	once a day
Promethazine 25mg tab; 5mg/ml syrup; 25mg/ml injection	po /im	0.3mg/kg	3 times a day
Propanolol 40mg tab	po /im	1mg/kg	3 times a day
Ranitidine 150mg tab	po	1-6 months 1mg/kg 6m-3yrs 2-4mg/kg 3-12yrs 2-4 mg/kg (up to 5mk/kg max 300mg)	3 times 2 times a day 2 times a day

Rifampicin 300mg cap, 100mg/5ml syrup	po	10 to 20mg/kg	Daily
Salbutamol 4mg tab; 2m/5ml syrup; 5mg/ml solution; 100mcg dose inhaler	neb po/ inh.	nebulised 2.5mg in 2mls saline maintenance 0.1mg/kg	- 3 times a day
Sodium valproate **200mg**	po	Aged 1month to 12 years: 5-7.5mg/kg Aged 12-18 years :10-30mg/kg	2 times aday
Theophylline 200mg tab, 60mg/5ml syrup	po	5mg/kg (max 4 doses/ 24hrs) (age > 6 months)	6hrly
Thyroxine sodium 100microgram tab	po	10 to 50mcg/kg	once a day

5. IMMUNISATION

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GENERAL NOTES

*The terms Immunisation and Vaccination will be used interchangeably in this chapter. Further information on immunisation may be found in the **Manual for the Zimbabwe Expanded Programme on Immunisation (ZEPI)**. Information relating to rabies can be found in the chapter on tropical diseases*

DISEASES PREVENTABLE BY IMMUNIZATION

- Diphtheria
- Measles
- Rubella
- Hepatitis B
- Pertussis (whooping cough)
- Poliomyelitis
- Rotavirus Diarrhoea
- Rabies (see Tropical disease section)
- Tetanus
- Tuberculosis
- Typhoid
- Some pneumonias, septicaemia and meningitis (caused by Haemophilus Influenza type B and Streptococcus pneumoniae)
- Diarrhoea, vomiting and systematic upset due to Rotavirus infection.
- Cancer caused by Human Papilloma Virus infection.
- (There are other vaccine preventable diseases for example, Anthrax that are not yet provided under the national immunization programme

COLD CHAIN

- All vaccines should be kept at temperatures of +2°C to +8°***C.***

MANAGEMENT OF OPEN VIALS

- Open vials of DTP, DTP-Hep B-Hib (Pentavalent), DT, Td, OPV,IPV, HPV and Hep B may be used in subsequent sessions for a maximum of 28 days (ZEPI Policy) provided the vaccine has not expired, the vaccine vial monitor (VVM) has not reached the discard point, the vial has not been contaminated, the vaccine has been kept in appropriate cold chain condition.
- Any vaccine that contains an ingredient that has not yet been approved by WHO for Multi-dose vial policy (e.g Typhoid vaccine-Typbar-TCV 5-dose vial), once opened should be discarded after 6 hours of opening.
- Reconstituted vials of measles-rubella and BCG vaccines must be discarded after 6 hours or as per manufacturer's instructions, whichever comes first.

EFFECTIVENESS OF VACCINES IN HIV INFECTED INDIVIDUALS

EPI recommended vaccines have shown satisfactory sero-conversion rates in early stages of HIV infection. However, the proportion of responders decreases with progression from HIV infection to AIDS.

- Children with known or asymptomatic HIV infection should receive all EPI vaccines according to the schedule.
- BCG vaccine should not be given to children with clinical symptoms of HIV infection.

CONTRAINDICATIONS TO VACCINATION

There are very few absolute contraindications to vaccines. Fever, diarrhoea, mild respiratory infection and malnutrition are not contraindications to vaccines.

- BCG vaccine should not be given to a child with symptomatic HIV infection but polio and measles/rubella vaccines should be given to children with HIV and AIDS together with other vaccines.
- The current DTP contains whole cell pertussis, some children are sensitive to whole cell pertussis and a second or third dose of Pentavalent and DTP at 18 months should not be given to a child who severely reacted to a previous dose of Pentavalent. DT should be given instead (Note: DTP in Pentavalent contains whole cell Pertussis which may cause severe anaphylaxis, collapse, or convulsions).
- A child with an evolving neurological disease such as uncontrolled epilepsy or progressive encephalopathy should not be given Pentavalent or DTP. Give DT instead.

ADVERSE EVENTS

All adverse events following immunisation should be reported using the *'Adverse Events Following Immunisation'* (AEFI) form. Health workers should refer to the ZEPI AEFI guidelines and Standard Operating Procedures

Immunisation Schedule for Children

See Table 4.1**.** This schedule is the only schedule to be used in Zimbabwe. Ages given are **minimum ages** for each vaccination. Children should receive doses at these stated ages **or** at the first contact after reaching that age (**maximum age limits are**: Hepatitis B birth dose within the first 24 hours after birth, BCG 11 months, Rotavirus 24 months , and Pentavalent 23 months, Measles Rubella 5 years).

- Always check the dosage instructions in the manufacturer's information supplied with the vaccine, as the strength may vary between manufacturers.
- Always remember to record the batch number of the vaccine on the child's health card when entering the date of immunisation.

- Always ensure that the emergency box is available and is stocked with appropriate emergency medicines.

Table 5.1: Immunisation schedule by age

Name of Vaccine	Age of administration	Route	Site	Dosage
BCG	At birth or first contact before one year	Intradermal	Insertion of right deltoid muscle	0,05 ml
Hepatitis B	At birth or within 24 hours of delivery	Intramuscular	Right anterolateral aspect of mid thigh	0,5ml
OPV1	6 weeks	Oral	Oral	2-3 drops
DPT-HepB-Hib1	6 weeks	Intramuscular	Right anterolateral aspect of mid-thigh	0,5 ml
Pneumococcal 1	6 weeks	Intramuscular	Left anterolateral aspect of mid-thigh	0,5 ml
Rotavirus 1	6 weeks	Oral	Oral	1,5 ml
OPV2	10 weeks	Oral	Oral	2-3 drops
DPT-HepB-Hib2	10 weeks	Intramuscular	Right anterolateral aspect of mid-thigh	0,5 ml
Pneumococcal 2	10 weeks	Intramuscular	Left anterolateral aspect of mid-thigh	0,5 ml
Rotavirus 2	10 weeks	Oral	Oral	1,5ml
Inactivated Polio vaccine	14 weeks	Intramuscular	2,5cm from PCV site	0,5 ml
OPV3	14 weeks	Oral	Oral	2-3 drops

DPT-HepB-Hib3	14 weeks	Intramuscular	Right anterolateral aspect of mid-thigh	0,5 ml
Pneumococcal 3	14 weeks	Intramuscular	Left anterolateral aspect of mid-thigh	0,5 ml
Measles and Rubella 1 (MR)	9 months	Subcutaneous	Left deltoid muscle	0,5 ml
TCV	9 months	Intramuscular	Left anterolateral aspect of mid thigh	0,5ml
Measles and Rubella 2 (MR)	18 months	Subcutaneous	Left deltoid muscle	0,5ml
DPT Booster	18 months	Intramuscular	Right anterolateral aspect of mid-thigh	0,5 ml
OPV Booster	18 months	Oral	Oral	2-3 drops
Td Booster	5 years	Intramuscular	Left deltoid muscle	0,5 ml
Td Booster	10 years	Intramuscular	Left deltoid muscle	0,5 ml
Human Papilloma Virus	10 years	Intramuscular	Right deltoid muscle	0,5ml
Human Papilloma Virus	11 years	Intramuscular	Right deltoid muscle	0,5ml

IMMUNISATION DETAILS FOR AVAILABLE VACCINES

- Always check the dosage instructions in the manufacturer's information supplied with the vaccine as strengths may vary.
- In the event of a measles epidemic, children aged 6 months up to 14 years may be vaccinated with an extra dose of measles, depending on the epidemiological picture, irrespective of the previous measles

vaccination status. However routine doses at 9 months and 18 months should be given as per schedule after the campaign dose.

- The minimum interval for Hepatitis B2 and Hepatitis B3 is 5 months, if given as a monovalent dose.
- For premature infants, vaccination should follow the standard schedule (according to age since birth)

INTERVAL BETWEEN MULTI-DOSES OF THE SAME ANTIGEN

- The minimum interval between doses is 28 days.
- If a dose of an antigen is delayed, vaccinations on the next attendance should be continued as if the usual interval had elapsed (i.e. 4 weeks have elapsed). All the EPI antigens are safe and effective when administered simultaneously i.e. during the same vaccination session but on different sites. Pentavalent, Pneumococcal, Rotavirus, IPV and OPV are given simultaneously.
- If a vaccine dose is given at less than the recommended 28 days interval, it should not be counted as a valid dose and therefore should be repeated at the appropriate interval of 28 days from the previous dose. This applies to vaccines given during campaigns such as child health days, national immunisation days or in reaction to outbreaks of vaccine preventable diseases.

HOSPITAL ADMISSION POLICY ON IMMUNISATION

- To reduce nosocomial transmission, Measles vaccine should be given on admission to all children six months to 15 years. This admission dose must be recorded on the graph side of the child health card corresponding with the age at which it was given and written vertically. If the child is 9 months and receives the first dose on admission this is charted on the appropriate section of the card.
- Health workers should ascertain the vaccination status for all admitted children including those without a child health card and give the appropriate antigens.
- Children who are very ill on admission should be vaccinated as soon as their condition has improve

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GENERAL NOTE:

Medicines should be avoided if possible, throughout pregnancy, and especially during the first trimester. However, medicines may be required for a number of conditions commonly encountered during pregnancy; medicines which are appropriate and safe are covered in the sections that follow. At the end of the chapter is a list of those medicines which should be avoided or used with caution during pregnancy or lactation. The Family Planning Guidelines of Zimbabwe provide comprehensive guidance. Refer to them wherever possible. Instructions for use, contraindications etc, are also found in the manufacturers' package inserts.

Hormonal Contraception

Important: Ensure a free and informed choice by providing counselling on the advantages and disadvantages of contraceptive methods. Oral, injectable and implants **do not protect against HIV.** For added protection there is need to use a 'barrier' contraceptive such as a male condom, a female condom or diaphragm.

Checklist for those not trained in family planning:
Before prescribing oral contraceptives ask the following questions. If answers to **all** these questions are *'no'*, the woman may be given any oral contraceptives. If any of the answers are *'yes'*, a doctor must first see her.

- History of severe leg pain or swelling of calf?
- History of sugar in urine?
- History of yellow eyes or skin?
- Severe chest pain?
- Unusual shortness of breath after walking or light work?
- Severe headaches (not relieved by pain tablets)?
- Bleeding between periods or after sexual intercourse?
- Missed a menstrual period?
- Missed a menstrual period, and then started bleeding?
- Very heavy menstrual periods?
- Increased frequency of menstrual periods?
- History of mental disturbances?
- Goitre or history of goitre?
- 35 years of age and over?
- Painful varicose veins?
- Had any surgical operation within last 2 weeks?
- Previous treatment for high blood pressure?
- History of epilepsy?

Oral Contraceptives

IMPORTANT: Instruct the woman to always inform the doctor or nurse that she is taking oral contraceptives when she attends a clinic or hospital. Encourage clients to have a check-up every two years or when she develops a problem.

Ensure that the supplies given to the woman allow her to always have an extra pack of pills. Also, provide a supply of condoms with the first pack of pills for additional protection if the client is not menstruating. Encourage use of condoms as well to protect against STIs especially HIV.

Oral contraceptives fall into two main categories.

Combined oral contraceptives (COCs)
These contain synthetic oestrogen and progestogen and if taken daily they inhibit ovulation. Those with oestrogen content 15-35 micrograms (as ethinyloestradiol) are 'low dose' while those containing 50 micrograms of oestrogen are referred to as 'high dose'.

The lower oestrogen dose pills have fewer side effects than higher dose pills (notably, reduced risk of thrombo-embolism) while maintaining a high rate of effectiveness. Menstruation on COCs will be regular and light.

Progestogen only pills (POPs)
These contain synthetic progestogen e.g. norethisterone or norgestrel. Progestogens protect against pregnancy by thickening the cervical mucus. This type is particularly suitable for lactating mothers.

Menstrual irregularities are a more common side effect.

CAUTION: Progestogen Only Pills have a significant failure rate in non-lactating women. They should be taken at the same time each day.

Conditions warranting withdrawal of oral contraceptives

- pregnancy or suspected pregnancy
- severe headaches especially associated with visual disturbances
- numbness or paresis of extremities
- unexplained vaginal bleeding
- suspected or known carcinoma of the breast
- known liver tumour
- unexplained chest pain or shortness of breath
- severe leg pains;
- development of any of the absolute contra-indications mentioned in the manufacturer's information sheet.

Medicines Interactions with Oral Contraceptives

Medicines reducing the effect of oral contraceptives
Caution is needed when prescribing any of the following medicines to any woman taking oral contraceptives; they reduce the effectiveness of the oral contraceptive and pregnancy is more likely:

- Anti-convulsants: carbamazepine, ethosuximide, phenobarbitone, phenytoin, primidone.
- Antibacterials: rifampicin, rifabutin, rifapentine
- Anti-retrovirals: efavirenz

If the medicine is only going to be used for a short time the woman should be advised to take extra contraceptive precautions (for example, condoms or abstinence from intercourse) for the duration of the therapy, and seven days after treatment. If the medicine is to be used on a long-term basis the woman should be advised to use another suitable method of contraception.

Medicines which are made less effective by oral contraceptives
Doses of particular medicines may need to be increased, with careful monitoring:

- Anticoagulants
- Anti-convulsants (phenytoin)
- Antidepressants (imipramine)
- Anti-hypertensive agents (methyldopa)
- Corticosteroids
- Hypnotics, sedatives or other CNS depressants (diazepam, phenothiazines)
- Anti-asthmatic agents

Long term hormonal contraceptives

- **Injectable Contraceptive**

	Medicine	Codes		Adult dose	Frequency	Duration
	medroxyprogesterone acetate im	**C**	**V**	150mg	once every 3 months	
or	**norethisterone enanthate im**	**B**	**N**	200mg	once every 2 months	

CAUTION: If the woman is hypertensive, has a history of heart disease, or has signs of damage to the arteries, vision, kidneys, and/or nervous system caused by diabetes do not administer medroxyprogesterone [Depo-provera ®]. Side

effects of medroxyprogesterone are like those of Progestogen Only Pills i.e. headaches, irregular uterine bleeding, nausea and vomiting, weight changes and depression. Transient infertility and irregular cycles may occur after discontinuation.

Note: Norethisterone enanthate can be given up to 2 weeks (14 days) early or 2 weeks (14 days) late.

- **Implant Contraceptives**
  Levonorgestrel implant (Jadelle) is effective for five years and etonogestrel implant (Implanon) is effective for three years. They are suitable for women who have probably completed their family but are not yet ready for sterilisation. They may also be suitable for some women who cannot take oestrogen-containing contraceptives. HIV positive women of childbearing age who are on a dolutegravir-based regimen should be encouraged to use them.

	Medicine	Codes		Adult dose	Frequency	Duration
	levonorgestrel implant	**B**	**N**	2 rods	once only	once in 5yrs
	etonogestrel	**B**	**N**	1 rod	once only	once in 3yrs

CONTRAINDICATIONS: hypertension; thrombo-embolism; active liver disease; undiagnosed genital bleeding, severe headaches, malignancy of breast (known or suspected); malignancy of cervix, uterus or ovaries (known or suspected), cerebro-vascular or coronary artery disease, pregnancy or suspected pregnancy.

Emergency Contraception

- *Hormonal OC* ***-Within 72 hours*** *of unprotected intercourse, give:*

	Medicine	Codes		Adult dose	Frequency	Duration
	combined oral contraceptive po 50mcg ethinyloestradiol + 150-250mcg levonorgestrel	**C**	**V**	2 tablets	repeat after 12 hours	
or	**combined oral contraceptive po** 30-35mcg ethinyloestradiol + 150-250mcg levonorgestrel	**C**	**V**	4 tablets	repeat after 12 hours	
or	**levonorgestrel 750mcg po**	**C**	**V**	1 tablets	repeat after 12 hours	
	or			2 tablets	once	
or	**levonorgestrel 1500mcg po**	**C**	**V**	1 tablets	once	

Note: Advise to return if menstruation does not occur within 3 weeks. Give appropriate contraceptive advice.

Emergency contraception: intrauterine device method

- *IUCD- copper T within 5 days of unprotected intercourse*

Infections of the Genito-Urinary Tract during Pregnancy

Urinary tract infection during pregnancy
Urine specimen for microscopy, culture and sensitivity where possible. **Urine strips** can also be used to detect UTI especially at the primary health care level

- **First line:**

	Medicine	Codes		Adult dose	Frequency	Duration
	amoxicillin po	**C**	**V**	500mg	3 times a day	*7 days
or	**ciprofloxacin po** *(avoid in first trimester or preferably avoid completely during pregnancy if a safer alternative is available)*	**B**	**V**	500mg	2 times a day	7 days

- **Second line:**

	Medicine	Codes		Adult dose	Frequency	Duration
	norfloxacin po	**B**	**N**	400mg	3 times a day	*7 days
or	**nalidixic acid po**	**B**	**V**	500mg	4 times a day	*7 days
or	**amoxicillin-clavulanic acid po**	**B**	**N**	375mg	3 times a day	*7 days

**Note: Duration for UTI in pregnancy longer than other general UTI.*

Third line: **as per culture and sensitivity.**

Positive serology for Syphilis during pregnancy

- **Both partners** to be counselled and treated with:

Medicine	Codes		Adult dose	Frequency	Duration
benzathine penicillin im	**C**	**V**	2.4MU (=1.44g)	once a week	3 doses

See chapter on Sexually Transmitted Infections for further information particularly for women who are allergic to penicillin.

Vaginal discharge during pregnancy

The discharge can be due to candidiasis, bacterial vaginosis or trichomoniasis. A syndromic diagnosis should be made before treatment. Need to consider possibility of sexually transmitted infections including gonorrhoea and chlamydia (see Sexually Transmitted Infections chapter).

	Medicine	Codes		Adult dose	Frequency	Duration
	miconazole pv	**C**	**V**	200mg	every night	3 days
or	**clotrimazole pessary**	**C**	**V**	500mg	every night	3 days
and	**metronidazole po**	**C**	**V**	400mg	3 times a day	7days
or	**secnidazole po**	**B**	**N**	2g	once only	

Clotrimazole cream can also be used
***Caution**: Avoid metronidazole in 1st trimester.*

Post Miscarriage Sepsis

Pyrexia in a woman who has delivered or miscarried in the previous 6 weeks may be due to puerperal or post miscarriage sepsis and should be managed actively. Abdominal pain in addition to pyrexia is strongly suggestive. The uterus may need evacuation. Suction curettage or manual vacuum aspiration are safer than sharp curettage and are the recommended first line procedures.

***Note:** Every year a few women die because of what is thought to be post-miscarriage sepsis when in reality it is fever from malaria causing abortion. Post-miscarriage sepsis will need a laparotomy and evacuation of uterus if the patient does not respond to antibiotic therapy.*

- **Mild/moderate sepsis:**

	Medicine	Codes		Adult dose	Frequency	Duration
	amoxicillin po	**C**	**V**	500mg	3 times a day	10 days
or	**ciprofloxacin po**	**B**	**V**	500mg	2 times a day	10 days
and	**metronidazole po**	**C**	**V**	400mg	3 times a day	10 days
and	**doxycycline po**	**C**	**V**	100mg	2 times a day	10 days

Acute Pelvic Inflammatory Disease (PID)

Acute PID refers to the acute syndrome attributed to the ascent of microorganisms, not related to pregnancy or surgery, from the vagina and cervix to the endometrium, fallopian tubes and adnexal structures. Gonorrhoea, chlamydia, mycoplasma, anaerobic bacteria and gram-negative organisms can cause acute PID.

Mild / Moderate Pelvic Inflammatory Disease

First line:

	Medicine	Codes		Adult dose	Frequency	Duration
	ceftriaxone im	**C**	**V**	250mg	once only	
or	**kanamycin im**	**C**	**V**	2g	once only	
and	**doxycycline po**	**C**	**V**	100mg	2 times a day	14 days
and	**metronidazole po**	**C**	**V**	400mg	3 times a day	14 days

Severe pelvic inflammatory disease

Temperature greater than 38°C with marked abdominal tenderness. Patients need IV fluids and IV medicines.

	Medicine	Codes		Adult dose	Frequency	Duration
	ceftriaxone iv	**C**	**V**	2g	once a day	12 hours after clinical improvement
and	**doxycycline po**	**C**	**V**	100mg	twice a day	14 days
and	**metronidazole pr**	**B**	**V**	1g	12hourly	72 hrs

** Note: Duration as determined by patient's response. Switch to oral after review – treatment for 14 days total.*

Alternative

	Medicine	Codes		Adult dose	Frequency	Duration
	ampicillin iv	**B**	**E**	500mg	6hourly	48-72hrs
and	**gentamicin im**	**C**	**V**	160mg	12hourly	48-72hrs
and	**metronidazole pr**	**B**	**V**	1g	12hourly	72hrs

** Note: Duration as determined by patient's response. Switch to oral after review.*

If no response within 48 hours suspect pelvic abscess and patient may need laparotomy or referral. Change to oral administration after temperature has settled.

PRE-LABOUR RUPTURE OF MEMBRANES (PROM) (this is rupture of amniotic membranes at term before onset of labour)

	Medicine	Codes		Adult dose	Frequency	Duration
	oxytocin infusion	**C**	**V**	1 unit initially		
	then (see section on myometrial stimulants/ induction of labour)			4 units in 1L sodium chloride 0.9% at 15, 30, 60 drops per minute until regular contractions		
or	**misoprostol po**	**C**	**V**	25 mcg	4 hrly	max 3 doses,
or	**misoprostol pv**	**C**	**V**	50 mcg	24 hrly	max 1 dose

Note: For oral administration, dissolve Misoprostol 200mcg in 200ml of normal saline or water for injection. This gives a concentration of 1mcg per ml.

Repeat dosing of oral misoprostol can be done 24 hours after commencing the initial dose if the cervix remains unfavourable (Bishop score<6). Proceed with oxytocin infusion if bishop score is favourable.

- If >24 hours or pyrexia in labour. Early delivery should be effected:

	Medicine	Codes		Adult dose	Frequency	Duration
	benzylpenicillin iv	**C**	**V**	2MU	6hrly	until delivery
and	**chloramphenicol iv**	**B**	**V**	500mg	6hrly	
and	**metronidazole iv**	**A**	**N**	500mg	8hrly	until delivery

Switch to oral antibiotics for 7 days after delivery:

	Medicine	Codes		Adult dose	Frequency	Duration
	amoxicillin po	**C**	**V**	500mg	3 times a day	7 days
and	**metronidazole po**	**C**	**V**	400mg	3 times a day	7 days

Prophylaxis for Caesarean Section

As the patient is put on theatre trolley:

	Medicine	Codes		Adult dose	Frequency	Duration
	benzylpenicillin iv	**C**	**V**	5MU	once only	single dose
or	**ceftriaxone iv**	**C**	**V**	1 gm	once only	single dose
or	**cefuroxime iv**	**B**	**V**	750 mg	once only	single dose
and	**metronidazole iv**	**B**	**V**	500mg	once only	single dose

If during caesarean section there is evidence of infection treat for a week with the above regime.

Nausea and Vomiting in Pregnancy

During the first trimester, if vomiting is not excessive, advise small frequent bland meals and drinks.

Antacids may give symptomatic relief if gastritis is present. If vomiting persists, look for underlying cause e.g. urinary tract infection, molar pregnancy, and multiple pregnancies.

Give:

	Medicine	Codes		Adult dose	Frequency	Duration
	promethazine po	**B**	**N**	25mg	once at night	as required
or	**chlorpheniramine po**	**C**	**E**	4mg	once at night	5 days
or	**metoclopramide po**	**C**	**N**	10mg	3 times a day	as required

**Note: If severe, the dose may be given two to three times a day.*

Hyperemesis Gravidarum (Vomiting and Dehydration)

Admit or refer for intravenous fluids and give:

	Medicine	Codes		Adult dose	Frequency	Duration
	prochlorperazine im	**B**	**E**	12.5mg	twice a day	as needed
or	**promethazine im**	**B**	**V**	25mg	twice a day	as needed
or	**metoclopramide po**	**C**	**N**	10mg	3 times a day	as needed

Anaemia during Pregnancy

Prophylaxis in Antenatal Care

	Medicine	Codes		Adult dose	Frequency	Duration
	ferrous sulphate po	**C**	**E**	200mg	once a day	throughout pregnancy
and	**folic acid po**	**C**	**E**	5mg	once a week	throughout pregnancy
or	**combined ferrous and folic acid po**	**C**	**E**		once daily	throughout pregnancy

** Start at booking for antenatal care. Continue prophylaxis for 6 weeks after delivery. Also give dietary advice.*

For reducing the risk of neural tube defects

Medicine	Codes	Adult dose	Frequency	Duration
folic acid po	**C E**	5mg	once a day	preconceptionally and up to 3 months of pregnancy

CAUTION: Iron preparations should be taken after food to avoid gastrointestinal irritation. If vomiting occurs, reduce dosage to that which can be tolerated.

Severe anaemia in pregnancy requires full investigation:

- stool for ova and parasites;
- peripheral blood film for malarial parasites;
- full blood count;
- mid-stream specimen of urine for microscopy, culture and sensitivity;
- and HIV test.

Severe anaemia (Hb $\leq$ 8 gms) after 36 weeks of gestation requires admission and possible transfusion, as well as oral iron therapy. (See the chapter on Haematology and blood products). Parenteral iron preparations can be used if Hb is <7g/dl.

Cardiac disease in pregnancy

Types of cardiac disease:

- rheumatic heart disease accounts for over 95% of conditions
- hypertension
- puerperal cardiomyopathy
- congenital heart disease
- post-operative cardiac patients

Antenatal Management

The woman should be managed and reviewed more frequently by both a specialist obstetrician and physician.

In the antenatal period avoid fluid overload, anaemia and infection. Any infection should be treated aggressively with the appropriate antibiotics.

Treatment:
See treatment of heart failure under cardiovascular disease chapter.

Anticoagulants: long term anticoagulation (e.g. for valve replacement) – using warfarin should be avoided in the first trimester. Alternatively, use **heparin or enoxaparin** for the first 13 weeks, and change back to warfarin between weeks 13 – 37. After 37 weeks change back to heparin until after delivery. Warfarin can be commenced 24hrs after delivery.

Labour in cardiac patients
Cardiac disease patients should not be induced. They usually have easy vaginal deliveries, which can be assisted by forceps delivery or vacuum extraction to avoid stress.

- Give a single dose of ampicillin at the onset of labour:

Medicine	Codes	Adult dose	Frequency	Duration
ampicillin iv	**B V**	1g	once only	single dose

- Keep the resuscitation trolley at hand.
- Nurse in a propped up position
- Do not give ergometrine. Use oxytocin:

Medicine	Codes	Adult dose	Frequency	Duration
oxytocin im	**C V**	10units	once at delivery of the anterior shoulder	

- Post-natally keep the woman in high care for 24 hours and organise regular reviews at the clinic to avoid sudden decompensation.

Contraception:
At 6 weeks after delivery, use the progesterone only oral contraceptive or injectable medroxyprogesterone acetate or progesterone implants.

Hypertension in Pregnancy

Women who develop hypertension during pregnancy (after 20 weeks) have pregnancy-induced hypertension (PIH), which is a potentially serious condition possibly requiring early or urgent delivery (see below).

Pregnant women who have essential hypertension may also develop superimposed PIH and merit the same treatment. Methyldopa is the recommended anti-hypertensive throughout pregnancy.

***Caution**: Avoid diuretic medicines during pregnancy.*

Essential Hypertension
Monitor for development of proteinuria.

	Medicine	Codes		Adult dose	Frequency	Duration
	methyldopa po	**C**	**V**	250-500mg	3-4 times a day	review

If not responding refer to district level, where a combination of methyldopa and nifedipine can be used:

	Medicine	Codes		Adult dose	Frequency	Duration
	methyldopa po	**C**	**V**	250-500mg	3-4 times a day	review
and	**nifedipine po**	**B**	**V**	20mg	2 times a day	review

Pregnancy Induced Hypertension

- Monitor closely and check urine for protein (exclude urinary tract infection). Manage as high-risk antenatal patient.
- Any pregnant woman (especially primigravida) with a rise of diastolic pressure > 15 mm may have severe pregnancy induced hypertension, even with a BP < 140/90.

Mild Pregnancy Induced Hypertension

Diastolic 90-100 mm Hg; no proteinuria.

- Bed rest at home.
- Weekly antenatal visits.
- Admit if there is a history of foetal loss or eclampsia

Moderate Pregnancy Induced Hypertension

Diastolic 100-110 mm Hg; no proteinuria.

- Admit, monitor blood pressure 4 hourly, and give:

	Medicine	Codes		Adult dose	Frequency	Duration
	methyldopa po	**C**	**V**	250-500mg	3-4 times a day	review
and	**nifedipine po**	**B**	**V**	20mg	2 times a day	review

- At gestation > 37 weeks, plan delivery.

Severe Pregnancy induced hypertension

- Diastolic > 110mm Hg; in first 20 weeks of pregnancy -this is likely to be essential hypertension. Severe PIH in the second half of pregnancy needs careful monitoring for organ damage. Manage as for moderate pregnancy induced hypertension. If not controlled add hydralazine as follows:

	Medicine	Codes		Adult dose	Frequency	Duration
	methyldopa po	**C**	**V**	250-500mg	3-4 times a day	review
	nifedipine po	**B**	**V**	20mg	twice a day	review
plus	**hydralazine im**	**B**	**V**	10mg	every 4 hours	review

Severe Pre-Eclampsia (organ dysfunction/ severe features such as proteinuria, deranged kidney, liver and haematology, placental insufficiency)

Manage as an inpatient. Plan to deliver at 37 weeks or before.

- Monitor blood pressure 4 hourly.
- Daily check urine for protein (exclude urinary tract infection).
- Watch for signs of eclampsia
- If diastolic > 110 mmHg check blood pressure hourly and continue giving medicines as for severe PIH (above).

Imminent Eclampsia

Proteinuric pregnancy induced hypertension with symptoms of visual disturbance or epigastric pain and/or signs of brisk reflexes:

- Plan urgent delivery. Prevent convulsions with:

Medicine	Codes	Adult dose	Frequency	Duration
magnesium sulphate infusion	**C V**	4 gm iv in 20mls of Normal Saline over 20 minutes plus 5 gm in each buttock as the loading dose, followed by 5gm in alternate buttocks every four hrs until 24 hours after delivery		

- Check blood pressure at least hourly. If diastolic pressure > 110 mmHg give anti- hypertensives as for severe PIH (above).

Eclampsia

This is pregnancy-induced hypertension with epileptiform fits.

- Ensure clear airway.
- **Stop convulsions** with:
-

Medicine	Codes	Adult dose	Frequency	Duration
magnesium sulphate infusion	**C V**	4 gm iv in 20mls of Normal Saline over 20 minutes plus 5 gm in each buttock as the loading dose, followed by 5gm in alternate buttocks every four hrs until 24 hours after delivery, or 24 hrs after the last fit whichever is the later.		

- Plan urgent delivery, within 6 hours.
- Monitor carefully:
  - Patellar reflex
  - Respiration (respiratory rate must not be less than 16/min)
  - Urine output > 100mls in 4 hours

- All nurses, midwives and doctors attending to pregnant women should familiarise themselves with the magnesium sulphate regime. Once competence is achieved in its administration, the regime should be used

at all levels. *At the primary level, the intravenous component of the loading dose may be omitted, but the intramuscular component (10 grams) should always be given.*

- Check blood pressure at least hourly. If diastolic pressure >110mmHg give:

Medicine	Codes		Adult dose	Frequency	Duration
hydralazine im	**B**	**V**	10mg	Once	-

Diabetes in Pregnancy

Diabetic women who fall pregnant require management before and throughout pregnancy. Some women may develop diabetes while pregnant (gestational diabetes), usually in the second trimester. Ideally, all pregnant diabetics should be managed by specialists. For general information refer to the relevant section in the chapter on diabetes.

- Strict blood sugar control pre-conceptually is advised.
- Good blood sugar control with insulin, diet and exercise is essential. All known diabetics should have their glucose control assessed before conceiving if possible.
- Throughout pregnancy blood sugar control should be kept strictly within the range 4-6mmol/L. Control should be measured by regular blood sugar profile (admit and take 4 hourly blood glucose levels for 24 hours). Insulin requirements will increase as pregnancy progresses, so profiles will be necessary at frequent intervals of approximately 2 weeks.
- Labour should be in a tertiary level hospital. Well-controlled diabetics may be allowed to go into labour spontaneously up to term provided the foetus is clinically well. If labour is induced, give half the usual insulin dose in the morning and start an intravenous infusion of dextrose 5% at 1 litre per hour. Labour should not be prolonged. After labour, manage the patient on a sliding scale of insulin.

Anaesthesia, Analgesia, Antacids

- **For indigestion**

Medicine	Codes		Adult dose	Frequency	Duration
magnesium trisilicate po	**C**	**N**	10-20ml	as required	

- **Prior to general anaesthetics**
  Prior to general anaesthesia for caesarean sections give:

Medicine	Codes		Adult dose	Frequency	Duration
sodium citrate po	**B**	**N**	15ml	once only	-

***Caution**: Particulate antacids (e.g. magnesium trisilicate) may be harmful to the lungs if aspirated; sodium citrate is favoured if available.*

- **For severe pain in labour**

	Medicine	Codes		Adult dose	Frequency	Duration
	pethidine im	**B**	**V**	50-100mg	4-6hourly	max. 3 doses
or	**morphine im**	**B**	**V**	5mg	4hourly	as required
and	**promethazine im**	**B**	**V**	25mg	once a day	max. 3 doses

- Note: To avoid respiratory depression in the neonate the last dose should be given if delivery is not anticipated within the next 2 hours, and no more than two doses should be given during labour.
- For caesarean section, spinal anaesthesia is now the standard method to be used. All doctors and nurse anaesthetists should become competent in this method.

If the neonate is breathing poorly after pethidine was given to the mother, give respiratory support plus naloxone. See the section in Neonatal Conditions.

For the incision and subsequent suturing of episiotomies

Medicine	Codes		Adult dose	Frequency	Duration
lignocaine 1% local infiltration	**C**	**V**	up to max of 10ml	once	-

***Caution**: Avoid injecting into a vein! Draw back several times during infiltration.*

Use of steroids in pre-term labour

Steroids are used to prevent respiratory distress syndrome of the newborn in premature labour before 35 weeks gestation. Most useful between 28-35 weeks gestation.

- Give the mother:

Medicine	Codes		Adult dose	Frequency	Duration
dexamethasone im	**C**	**V**	2 doses of 12mg given 12 hours apart		

Cervical ripeners/ labour initiators (Prostaglandins)

Use prostaglandins (PG) with caution in multiparous women. Excessive uterine contractions can lead to uterine rupture, particularly if the cervix is not ripe.

- The safest and simplest method of ripening the cervix:

Medicine	Codes		Adult dose	Frequency	Duration
misoprostol pv	**C**	**V**	50 mcg	once daily	max 1 dose
misoprostol po*	**C**	**V**	25 mcg	2hrly	max 8 doses

*Dosing can be repeated, PROM
Not to be used in women with previous uterine incisions

Traction method

Where no medicines are available, a size 14 Foley's catheter can be inserted through the cervix under clean conditions, and then inflated with 40ml water. By strapping to the leg under tension, gentle traction is applied.

Myometrial Stimulants (Oxytocics)

Oxytocics are used for:

- induction of labour;
- augmentation of labour;
- uterine stimulation after delivery.

Use them with great caution in highly parous women before delivery and avoid use in obstructed labour. Oxytocin (for induction of labour) does not work well without rupture of the membranes. ***This may result in unnecessary caesarean section and/or vertical transmission of HIV****.*

Induction of Labour

- Artificial rupture of membranes. If labour fails to progress, give :

	Medicine	Codes		Adult dose	Frequency	Duration
	oxytocin iv infusion	**C**	**V**	Initially 1 unit, Then 4 units in 1L sodium chloride 0.9% at 15, 30, 60 drops per minute **–** until regular contractions are maintained.		

- If 4 units is insufficient, and it is the woman's first pregnancy:

  Increase the dose stepwise with regular monitoring **–** 16, 32 then 64 units in the litre of sodium chloride 0.9% **-** each time increasing the delivery rate through 15, 30 and 60 drops per minute.

or	**misoprostol pv**	**C**	**V**	50 mcg every 24 hrs (max 2 doses)		
or	**misoprostol po**	**C**	**V**	25 mcg every 2 hours (max 8 doses) repeat cycle next day if cervix not favourable. Do amniotomy and oxytocin infusion if bishops score is >6		

Augmentation of Labour

If membranes have already ruptured but labour is not progressing: follow the same steps and precautions as above. Obstructed labour should be considered as a cause if labour fails to progress.

Active management of the third stage of labour

	Medicine	Codes		Adult dose	Frequency	Duration
	oxytocin im	**C**	**V**	10 units	once with the appearance of the anterior shoulder	

- If the uterus remains relaxed OR THERE IS POST PARTUM HAEMORRHAGE in spite of above measures and manual stimulation, give:

	Medicine	Codes		Adult dose	Frequency	Duration
	oxytocin iv infusion	**C**	**V**	20 units in 1L of sodium chloride 0.9% running in at 10 – 60 drops per minute.		
or	**misoprostol pr**	**C**	**V**	600mcg once only		

Termination of Pregnancy

Legal Conditions for Abortion:

- where the pregnancy results from rape, whether or not the rapist is caught;
- where continuing with pregnancy poses substantial threat to the woman's physical health or life (e.g. she suffers from very high blood pressure, diabetes or another serious medical or surgical condition);
- where there is a significant risk, or it is known that the foetus has a serious medical condition or malformation (e.g. HIV, rubella in first trimester, or Down's Syndrome).

Recommended Methods

- medical methods as recommended below using mifepristone/misoprostol as the first preferred option
- manual vacuum aspiration in the first trimester with or without prior use of misoprostol
- suction curettage in the first trimester with or without prior use of misoprostol
- dilatation and curettage in the first trimester and early second trimester with or without prior use of misoprostol
- cover with antibiotics where appropriate

	Medicine	Codes		Adult dose	Frequency	Duration
	amoxicillin po	**C**	**V**	500mg	3 times a day	5 days
or	**ciprofloxacin po**	**B**	**V**	500mg	2 times a day	5 days
and	**metronidazole po**	**C**	**V**	400mg	3 times a day	5 days

Termination of Pregnancy

First trimester (up to 12 weeks)

Cervical ripening pre instrumentation

Medicine	Codes	Adult dose	Frequency	Duration
misoprostol pv	**C V**	400mcg	4 hours before procedure	once only

Induced abortion (< 12 weeks)

Medicine	Codes	Adult dose	Frequency	Duration
misoprostol pv	**C V**	600mcg	12hrly	max 2 doses

Or Method 2

	Medicine	Codes	Adult dose	Frequency	Duration
	mifepristone po	**B V**	200mg	once	
then in 1-2 days	**misoprostol B, pv or SL**	**C V**	800mcg	once	

B = buccal, SL = sub-lingual

Combination regimen (Method 2) is recommended because it is more effective.

Missed abortion

Medicine	Codes	Adult dose	Frequency	Duration
misoprostol pv	**C V**	600mcg	12hrly	max 2 doses

Incomplete abortion

Medicine	Codes	Adult dose	Frequency	Duration
misoprostol po	**C V**	600mcg	single dose	

SECOND TRIMESTER (14 TO 27 WEEKS)

Induced abortion (>12 weeks)

Medicine	Codes	Adult dose	Frequency	Duration
misoprostol pv	**C V**	200mcg	12hrly	max 4 doses

Or Method 2

	Medicine	Codes	Adult dose	Frequency	Duration
	mifepristone po	**B V**	200mg	once	
then in 1-2 days	**misoprostol B, pv or SL**	**C V**	400mcg	3 hrly	

B = buccal, SL = sub-lingual

NB: Combination regimen (Method 2) is recommended because it is more effective.
Repeat doses of misoprostol can be considered when needed to achieve success of the abortion process. Health-care providers should use caution and clinical judgement to decide the maximum number of doses of misoprostol when managing pregnant individuals with prior uterine incision. Uterine rupture though a rare complication, must be considered with advanced gestational age and therefore clinical judgement and health system preparedness for emergency management should be made available.

Intra uterine foetal death (13-17 weeks)

	Medicine	Codes		Adult dose	Frequency	Duration
	misoprostol pv	**C**	**V**	200mcg	12hrly	max 4 doses

Intra uterine foetal death (18-27weeks)

	Medicine	Codes		Adult dose	Frequency	Duration
	misoprostol pv	**C**	**V**	100mcg	12hrly	max 3 doses

Third trimester (28-40weeks)

Intra uterine foetal death (27-43weeks)

	Medicine	Codes		Adult dose	Frequency	Duration
	misoprostol po	**C**	**V**	25mcg	2hrly	max 8 doses
or	**misoprostol pv**	**C**	**V**	50mcg	24hrly	max 2 doses

Induction of labour

	Medicine	Codes		Adult dose	Frequency	Duration
	misoprostol pv	**C**	**V**	50mcg	24hrly	max 2 doses
or	**misoprostol po**	**C**	**V**	25 mcg	2hrly	max 8 doses

Rape and Sexual Assault: Prophylaxis against infections and pregnancy
STI prophylaxis for sexual assault survivors (see STI/ART guidelines):

Survivors should be given STI prophylaxis/post exposure prophylaxis:

	Medicine	Codes		Adult dose	Frequency	Duration
	ceftriaxone im	**C**	**V**	250mg	once only	
and	**azithromycin po**	**C**	**V**	1g	once only	
or	**doxycycline po**	**C**	**V**	100mg	twice a day	7 days
and	**metronidazole po**	**C**	**V**	2g	once only	
or	**tinidazole po**	**B**	**V**	2g	once only	
and	**benzathine penicillin im**	**B**	**V**	2.4MU	once only	

and	**tenofovir/ lamivudine, dolutegravir po**	**C**	**V**	See ART guidelines

Offer counselling and HIV test at the time of the rape and three months later.

Post Coital Contraception ('Morning-after pill') / Emergency Contraception

This method is particularly appropriate after rape and unprotected sexual intercourse.

- **Within 72 hours** of unprotected intercourse, give:

	Medicine	Codes		Adult dose	Frequency	Duration
	combined oral contraceptive po 50mcg ethinyloestradiol + 150-250mcg levonorgestrel	**C**	**V**	2 tablets	repeat after 12 hours	-
or	**combined oral contraceptive po** 30-35mcg ethinyloestradiol + 150-250mcg levonorgestrel	**C**	**V**	4 tablets	repeat after 12 hours	
or	**levonorgestrel 750mcg**	**C**	**V**	1 tablet	repeat after 12 hrs	
or	**levonorgestrel 1.5mg**	**C**	**V**	1 tablet	stat dose	

Note: Advise to return if menstruation does not occur within 3 weeks. Give appropriate contraceptive advice.

MEDICINES IN PREGNANCY AND LACTATION

Note: the tables below include commonly used medicines, but the absence of a medicine from these tables does not necessarily imply no risk. Always check if unsure.

General principles

- medicines should be prescribed during pregnancy and lactation only if the expected benefit to the mother outweighs the risk to the foetus or neonate;
- all medicines should be avoided if possible during the first trimester;
- well known medicines, which have been extensively used during pregnancy or lactation, should be used in preference to new medicines;

Table 6.1: Medicines to be avoided/used with caution during breastfeeding

Medicine	Recommendations
Alcohol	Small quantities probably not harmful
Aspirin	Avoid – risk of Reye's syndrome
Atropine	Avoid
Bromocriptine	Avoid
Carbimazole	May cause hypothyroidism in infant
Chloramphenicol	May cause bone marrow toxicity in infant
Diazepam / Nitrazepam	Avoid repeated doses
Doxycycline	Caution, although probably minimal levels in the milk.
Ergotamine	Toxic to infant, may inhibit lactation
Lithium	Monitor mother's levels carefully
Oestrogen	High level may affect milk flow
Oral anti-coagulants	Caution, risk of haemorrhage
Phenobarbitone	Inhibits infants sucking reflex
Radioactive iodine	Avoid breastfeeding for 24hrs after diagnostic doses, contraindicated in therapeutic does.
Sulphonamides	Caution – significant risk of kernicterus
Thiazides	Caution. Doses are usually too small (25-50mg) to be harmful. Large doses may suppress lactation.

Table 6.2: Medicines to be used with caution or avoided in pregnancy [Cont]

Medicine	Trim.	Note	Rationale / advice
Albendazole	1	Avoid	Potentially teratogenic. Wait until after delivery.
	2 & 3	Caution	
Alcohol	All	Avoid	Small quantities probably not harmful
Amitriptyline	3	Caution	Convulsions in neonate.
Androgens	All	Avoid	Virilisation of female foetus.
Antiemetics	All	Caution	Use promethazine or chlorpheniramine ONLY if vomiting is severe.
Antiepileptics	All	Caution	Benefits outweigh risks - monitor blood levels and adjust dose accordingly. Use single medicine if possible. See individually listed medicines.

Aspirin	3	Avoid	Low dose aspirin in PIH is safe in 2 and 3.
	1 & 2	Caution	
Atenolol Propranolol	3	Caution	Neonatal hypoglycaemia, bradycardia, intrauterine growth retardation.
	1 & 2	Avoid	
Carbimazole	2 & 3	Caution	Refer to specialist.
Chloramphenicol	3	Caution	'Grey baby syndrome' avoid long courses.
Ciprofloxacin	1	Avoid	
	2	Caution	
Cotrimoxazole	All	Avoid	Risk of teratogenicity and methemoglobinemia.
Diazepam Nitrazepam	3	Caution	Neonatal respiratory depression, drowsiness, hypotonia. Avoid regular and prolonged use.
Doxycycline	All	Avoid	Dental discolouration, maternal hepatotoxicity with large doses.
Ergotamine	All	Avoid	
Gentamicin Kanamycin Amikacin (aminoglycosides)	All	Avoid	May cause auditory or vestibular nerve damage, risk greatest with streptomycin and kanamycin, small with gentamicin.
Heparin	All	Caution	Maternal bone demineralisation/ thrombocytopenia.
Laxatives-stimulant	All	Caution	
Lithium	All	Avoid	Needs careful control of levels.
Metronidazole	1	Avoid	Avoid high doses.
	2 & 3	Caution	
NSAIDS -Other	All	Avoid	Paracetamol is preferred for analgesia in standard doses.
Opiates	3	Caution	Neonatal respiratory depression, gastric stasis in mother with risk of aspiration in labour.
Oral hypoglycaemics	All	Avoid	Change to insulin.
Podophyllin	All	Avoid	
Phenobarbitone Phenytoin	1 & 3	Caution	Congenital malformations. Prophylactic use of vitamin K and folate is recommended.
Praziquantel	1	Avoid	Wait.

Prednisolone	All	Caution	If essential cover neonate for adrenal suppression.
Pyrimethamine/ Sulphadoxine	1	Avoid	Give with folic acid.
	2 & 3	Caution	
Quinine	All	Caution	High doses teratogenic. Benefit outweighs risk
Reserpine	All	Avoid	
Sulphonamides	3	Avoid	Risk of teratogenicity, methemoglobinemia, kernicterus.
Streptomycin	All	Avoid	May cause auditory or vestibular nerve damage, risk greatest with streptomycin and kanamycin.
Thiazides	All	Caution	May cause neonatal thrombocytopenia. Avoid for treatment of hypertension.
Vaccines – live	All	Avoid	
Vitamin A	1	Avoid	High dose may be teratogenic in early pregnancy.
Warfarin	1	Avoid	Subcutaneous heparin may be substituted in the first trimester and the last few weeks of pregnancy in those with prosthetic heart valves, deep vein thrombosis and pulmonary embolism.
	2 & 3	Caution	

PMTCT

Follow the current national guidelines.

7. SEXUALLY TRANSMITTED INFECTIONS

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GENERAL NOTE

Accurate laboratory-proven diagnosis of sexually transmitted infections (STI) is desirable but not always possible. Management guidelines recommended in this section are based on the diagnosis of STI-associated syndromes. This involves the provision of the complete management package including provision of antibiotics for the STI syndrome, provision of health education, promoting risk reduction behaviour and treatment compliance, provision of condoms, providing information on partner referral and treatment and arranging for follow-up examination. To prevent further spread it is essential that all sex partners of persons with STI be contacted and treated. In addition to syndromic management, recommendations for treatment of specific infections when laboratory diagnosis has been made.

FIRST LINE *therapy is recommended when the patient makes his/her first contact with the health care facility.*

SECOND LINE *therapy is administered when first line therapy has failed, re-infection and poor treatment compliance have been* ***excluded****, and other diagnoses have been considered.*

THIRD LINE *therapy should only be used when expert attention and adequate laboratory facilities are available, and where results of treatment can be monitored.*

To ensure complete cure, doses **less** than those recommended must **not** be administered. The use of inadequate doses of antibiotics encourages the growth of resistant organisms, which will then be very difficult to treat.

URETHRAL DISCHARGE IN MEN

The commonest causes are *Neisseria gonorrhoeae* and *Chlamydia trachomatis,* and the two often co-exist. *Trichomonas vaginalis* also causes a urethral discharge in men. All males with urethral discharge and all women with cervicitis should be treated for both gonorrhoea and chlamydia in view of the fact that the two coexist and present with similar signs and symptoms. **Any sex partners in the preceding three months should be treated presumptively for the same infections as in the index patient, and any other conditions found on examination** Recent studies (2015) from Zimbabwe showed that a small proportion of men with urethral discharge have *Mycoplasma genitalium.*

First Line:

	Medicine	Codes		Adult dose	Frequency	Duration
	ceftriaxone im	**C**	**V**	250mg	one dose only	
or	**kanamycin im**	**C**	**V**	2g (1g in each buttock)	one dose only	
and	**doxycycline po**	**C**	**V**	100mg	twice a day	7 days
or	**azithromycin po**	**C**	**V**	1g	one dose only	

- If the patient still has a urethral discharge, or evidence of urethritis 7 days after start of treatment, suspect re-infection, poor treatment compliance or antimicrobial resistance in *Neisseria gonorrhoeae*. If re-infection is suspected re-start first line treatment.

Otherwise treat the patient with second line therapy or refer for investigations and laboratory guided treatment.

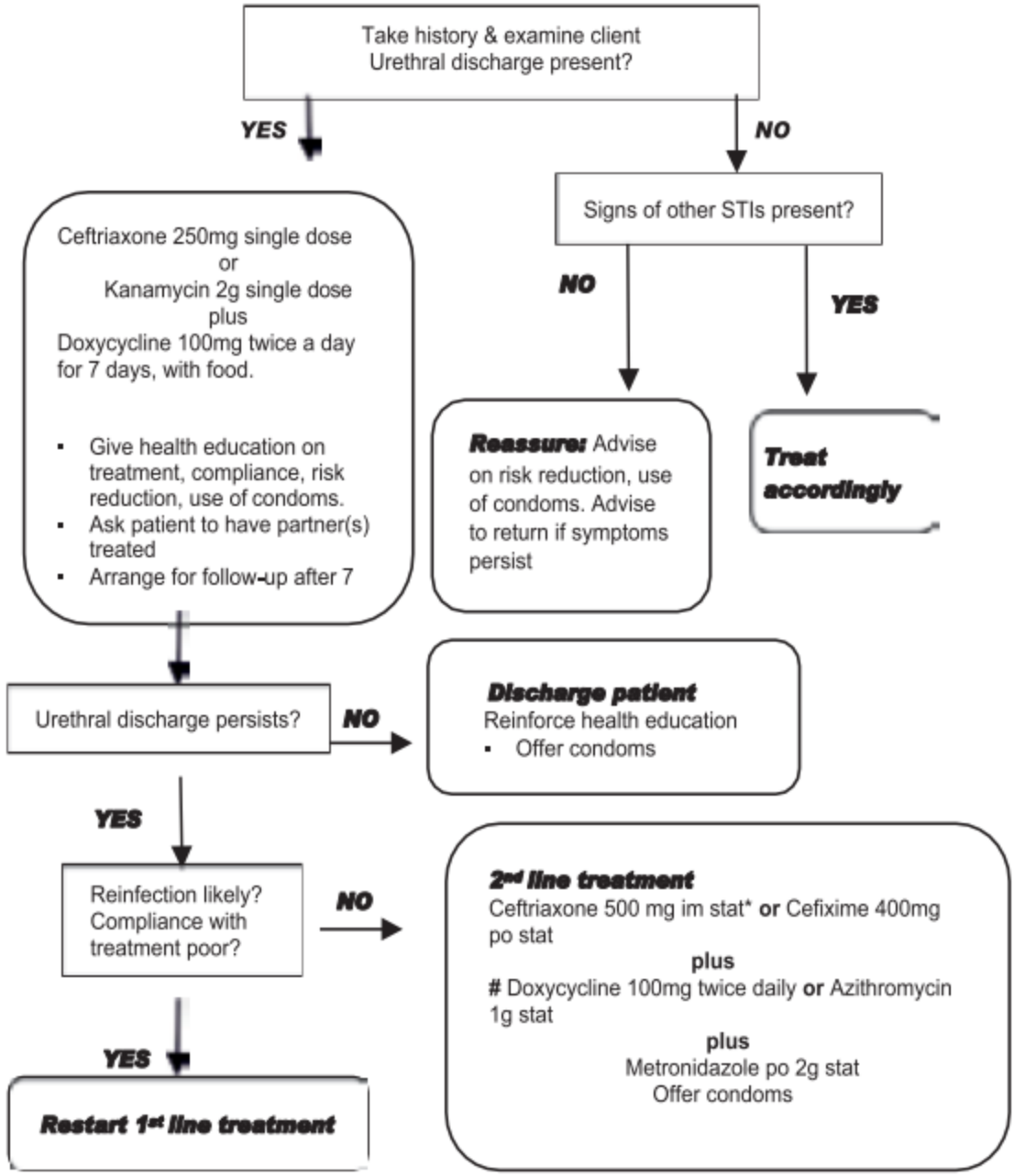
Second Line:

	Medicine	Codes		Adult dose	Frequency	Duration
	ceftriaxone im	**C**	**V**	500mg	one dose only	
or	**cefixime po**	**B**	**V**	400mg	one dose only	
and	**metronidazole po**	**C**	**V**	2g	one dose only	
and	**doxycycline po** *(Dependent on 1st line Rx** **if 1st line Azithromycin***)*	**C**	**V**	100mg	twice a day	7 days
or	**azithromycin po (if 1st line doxycycline)**	**C**	**V**	1g stat then 500mg od for 2 days	3 days	

** New evidence suggests this approach which is updated from Zimbabwe STI guidelines*

If these medicines are not available locally, refer to the next level.

Figure 7.1: Management of Urethral Discharge in Men



- If the client received ceftriaxone at the initial consultation and there is no re-infection (non-compliance does not apply here because patient will have received single dose IM injection), then the second ceftriaxone dose should be ceftriaxone 500mg im stat.
- If kanamycin was given at the initial consultation giving ceftriaxone 500mg im stat is appropriate.
- **#** depends on whether doxycycline or azithromycin given first line.

VAGINAL DISCHARGE IN WOMEN

All women with a vaginal discharge **must** have a vaginal examination. Some vaginal discharges are normal. However, any woman concerned about a vaginal discharge should be examined and the patient managed appropriately.

All women presenting with abnormal vaginal discharge that looks like a yeast infection (curd-like discharge, redness of the vulva and vulva itching) should receive treatment for candida. All women with an abnormal vaginal discharge that is not consistent with candida should receive treatment for bacterial vaginosis and trichomoniasis and gonorrhoea and chlamydia.

Treatment for cervical infection both *gonococcal* and *chlamydial* infection should be given in situations where infection seems likely or the risk of developing complications is high. Treatment for cervical infection should be added to the treatment for vaginal infections if suspected (for example a patient's partner has urethral discharge), or if the signs of cervical infection (mucopurulent cervical discharge or easy bleeding) are seen on speculum examination.

First line treatment vaginal discharge

Therapy for bacterial vaginosis

	Medicine	Codes		Adult dose	Frequency	Duration
	metronidazole po	**C**	**V**	400mg or 500mg	3 times/day or twice daily	7 days
or	**metronidazole po**	**C**	**V**	2g	once only	
or	**clindamycin po**	**B**	**V**	300mg	twice day	7 days

Therapy for Trichomoniasis if clindamycin given for BV

	metronidazole po	**C**	**V**	400mg or 500mg	3 times/day or twice daily	7 days
or	**metronidazole po**	**C**	**V**	2g	once only*	
or	**tinidazole po#**	**C**	**V**	500mg	twice daily	5 days
or	**tinidazole po#**	**C**	**V**	2g	once only	

*Likely to be less effective than longer course if HIV infected
Tinidazole not recommended in pregnancy
Avoid alcohol consumption during treatment with either Metronidazole or Tinidazole
#Defer breastfeeding by 72 hours following a single 2g dose of tinidazole

PLUS

Therapy for yeast infection if curd-like white discharge, vulvo-vaginal redness and itching are present

	Medicine	Codes		Adult dose	Frequency	Duration
	miconazole pv	**C**	**V**	200mg	every night	3 days
or	**clotrimazole pv**	**C**	**V**	100mg	every night	7 days
or	**nystatin pessary**	**C**	**V**	200,000iu	at night	7 days

PLUS

Therapy for cervical infection if partner has urethral discharge or mucopurulent cervicitis / easy bleeding.

	Medicine	Codes		Adult dose	Frequency	Duration
	ceftriaxone im	**C**	**V**	250mg	one dose only	
or	**kanamycin im**	**C**	**V**	2g [1g into each buttock]	one dose only	
and	**doxycycline po**	**C**	**V**	100mg	twice a day	7 days
or	**azithromycin po**	**C**	**V**	1g	one dose only	

Second line treatment for vaginal discharge

- If the patient still has a vaginal discharge, or evidence of cervicitis 7 days after start of treatment, suspect re-infection, poor treatment compliance or antimicrobial resistance in *Neisseria gonorrhoeae*. If reinfection is suspected re-start first line treatment.
- Otherwise treat the patient with second line therapy or refer for investigations and laboratory guided treatment.

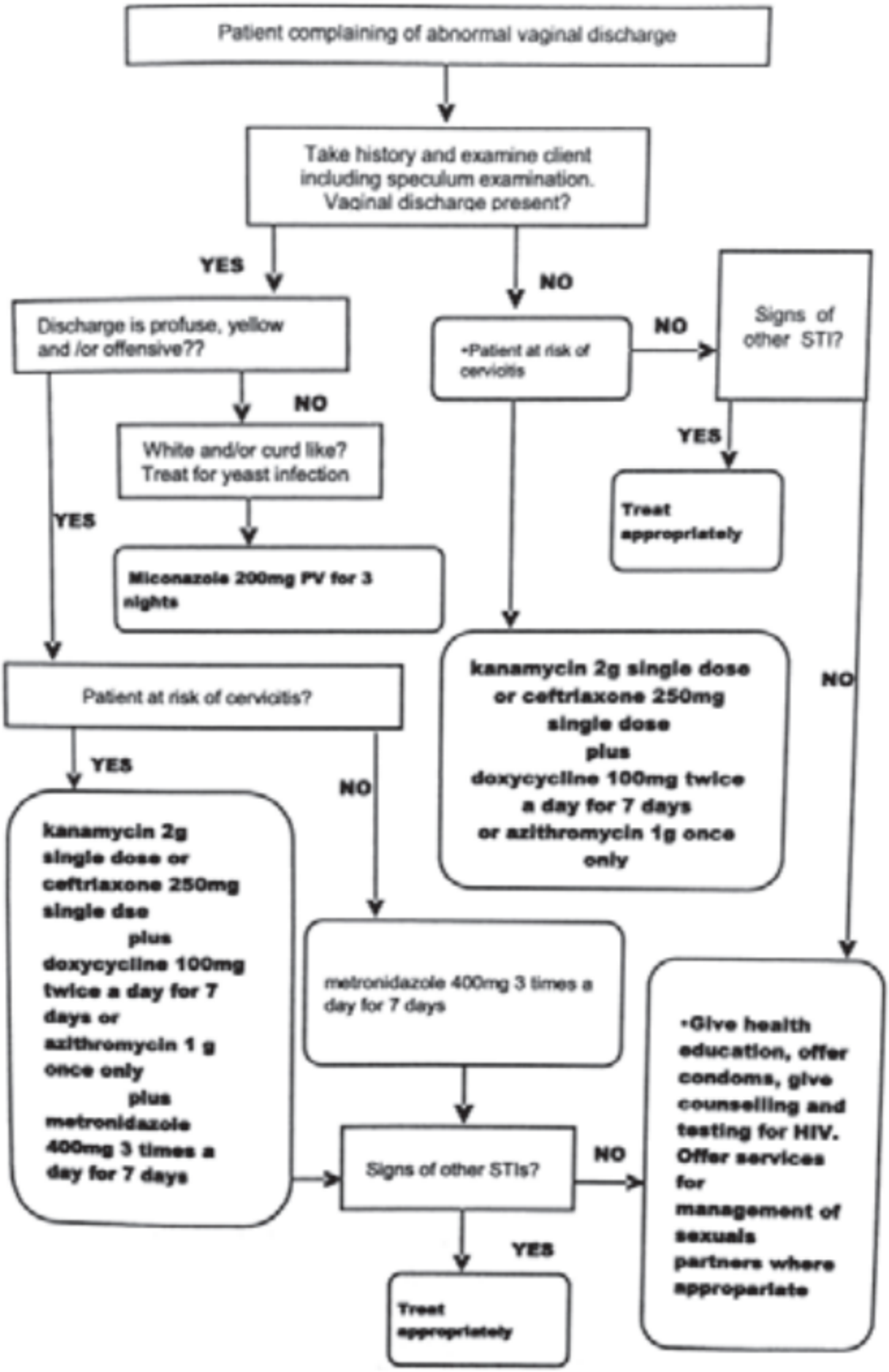
- **Second Line:**

	Medicine	Codes		Adult dose	Frequency	Duration
	ceftriaxone im	**C**	**V**	500mg	one dose only	
Or	**cefixime po**	**B**	**V**	400mg	one dose only	
and	**metronidazole po**	**C**	**V**	400mg	three time a day	7 days
and	**doxycycline po** (*Dependent on 1st line Rx* if 1st line Azithromycin*)	**C**	**V**	100mg	twice a day	7 days
Or	**azithromycin po** (*if 1st line doxycycline)*	**C**	**V**	1g	one dose only	

If these medicines are not available locally, refer to the next level.

CAUTION IN PREGNANCY: See chapter Obstetric and Gynaecological Conditions. ***Doxycycline*** *should* ***not*** *be used during pregnancy, or in lactating women. In pregnant women chlamydial infection is best treated with azithromycin or erythromycin (which-ever is available) while kanamycin or ceftriaxone should be used for gonococcal infection*

Figure 7.2: First line management of vaginal discharge using a speculum



ANAL AND RECTAL INFECTIONS

Anorectal symptoms and sexually transmitted anorectal infections are prevalent in men who have sex with men (MSM), in female sex workers, transgendered and heterosexual individuals who practise anal sexual intercourse.

ANATOMICAL SITES OF INFECTION

Infections of the ano-rectal region can be divided into the following anatomical sites.

- ***Anal infections***: infections of the external anus and anal canal, involving the stratified squamous epithelium – a common site for pathogens such as the human papillomavirus (HPV), herpes simplex virus (HSV) and syphilis;
- ***Proctitis***: infections from the dentate line to the rectosigmoid junction – a common site for gonococcal and chlamydial infections and HSV (the dentate line is the line between the simple columnar epithelium of the rectum and the stratified epithelium of the anal canal, usually defined as being at the level of the anal valves;
- ***Proctocolitis***: infections of the rectum and colon – a common site for *Shigella*, *Campylobacter*, *Salmonella*, cytomegalovirus and amoebiasis.

For syndromic diagnosis and management, these infections can be grouped under anorectal infections. Anorectal infections may be associated with anorectal pain, itching, discharge, bleeding, sensation of rectal fullness, tenesmus, constipation, and mucus streaking of stools. However, more frequently, ano-rectal infections tend to be asymptomatic.

An examination for anal infections includes an external examination of the anus and a proctoscopy examination. In the absence of a proctoscope, as is the case in most primary point-of-care settings, an external examination of the anus may be the only practical procedure to observe a discharge, ulcers or external warts.

If painful perianal ulcers are reported and observed, or mucosal ulcers are noted on proctoscopy, treatment should include a regimen for genital herpes and syphilis as if following the genital ulcer disease (GUD) flowchart. If ulcers persist, LGV must be considered and managed accordingly.

Thus, in implementing a flowchart for the management of anorectal infections, the following should be taken into consideration.

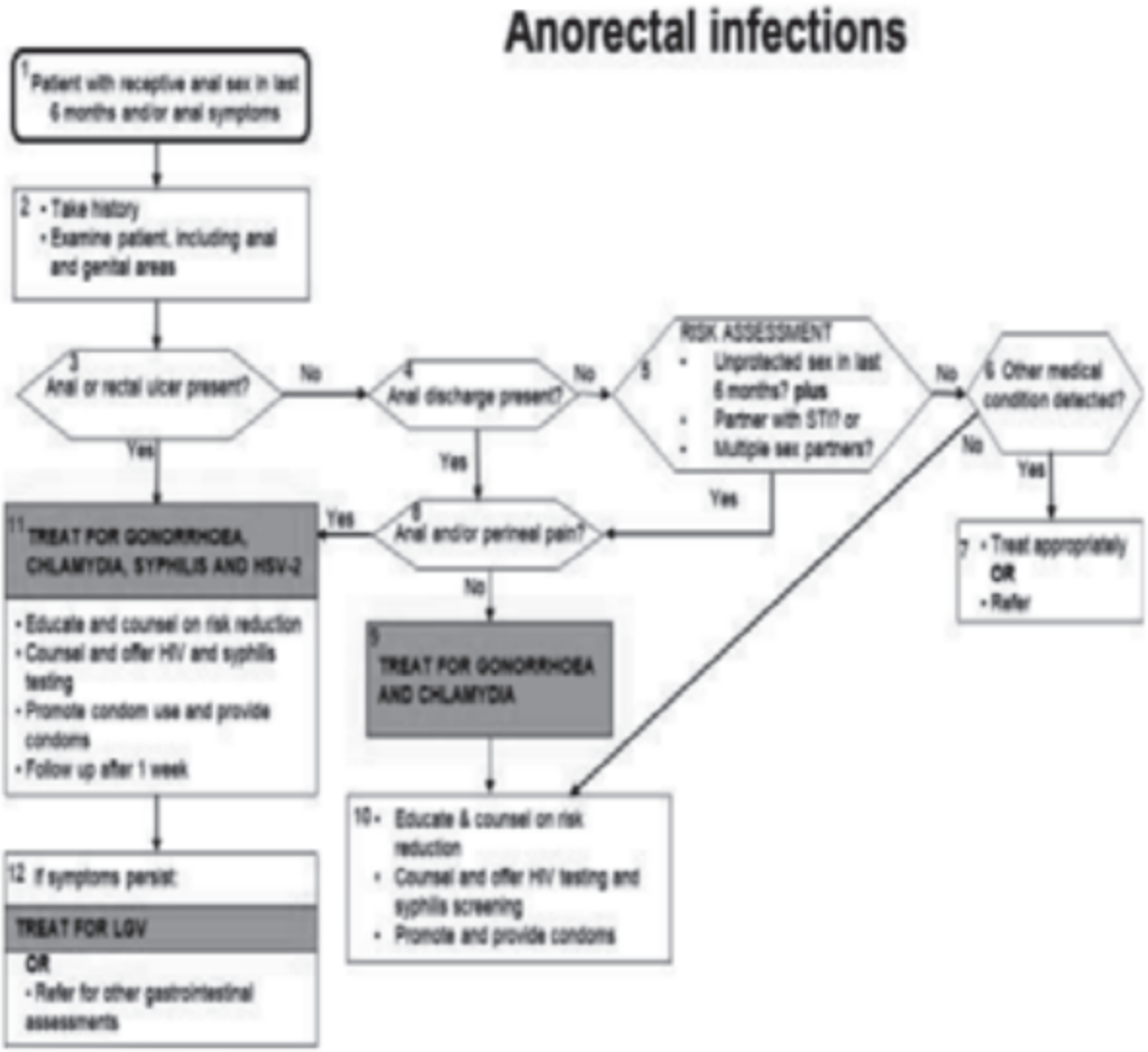
(a) identification of persons at risk,

(b) identification of risk behaviours for rectal infection in persons at risk,
(c) proctoscopy skills (and availability of a proctoscope),
(d) differentiation between anorectal infection and other pathology,
(e) entry points for the management protocol, and
(f) thresholds for adding treatment for HSV, LGV or syphilis.

Treatment recommendations for ano-rectal infections

Figure 6.3 guides through the management process for persons practising anal sex, be they heterosexual or MSM. The choice of medicines, dosage and duration of treatment are, in general, not different from those for infections at other anatomical sites.

Figure 7.3: First line management of anal discharge



There have been no evaluations conducted to determine the specificity or sensitivity of the anorectal flowchart. Where possible, it should be implemented as part of operational research to determine its performance. As the entry point for this flowchart is sexual behaviour rather than symptoms, it is likely that a number of patients will repeatedly be treated for infections.

GENITAL ULCERS IN MEN & WOMEN (WITH OR WITHOUT BUBOES)

The commonest cause of genital ulcers in both men and women is genital herpes simplex virus type 2 (HSV2) infection. Syphilis and chancroid also cause genital ulcers but the prevalence of chancroid is low in Zimbabwe. Clinical differentiation between the causes of genital ulcers is inaccurate except if the patient gives a clear history of recurrent attacks of vesicular lesions that may crust and heal spontaneously or if the clinical appearance of the lesions are those of superficial ulcers, when the diagnosis of genital herpes may be suspected. It should be noted that syphilis may remain undetected in the body for long periods of time and clinical manifestations may only occur when long-term complications develop**. Syphilis should be ruled out in all patients presenting with genital ulcers.** Immunosuppressed persons with HIV infection frequently develop attacks of genital herpes that produce lesions which tend to persist and require treatment with antiviral medicines, such as acyclovir. Hence it is important to bear in mind all these three diagnoses whenever managing persons with genital ulcers syndromically.

Treatment of genital ulcers:

Advice on local hygiene such as washing the ulcer twice a day with salt water (1 teaspoon salt to 1 litre water) and give the following:

	Medicine	Codes		Adult dose	Frequency	Duration
	benzathine penicillin im	**C**	**V**	2.4MU (1.44gm)	once only	
and	**ciprofloxacin po**	**B**	**V**	500mg	twice a day	3 days
and	**acyclovir po**	**C**	**V**	400mg	three times a day	5 days
Or	**acyclovir po**	**C**	**V**	800mg	twice a day	5 days
	If treating Primary Genital Herpes**					
	acyclovir po	**C**	**V**	400 mg	three times a day	10 days
or	**acyclovir po**	**C**	**V**	200mg	five times a day	10 days

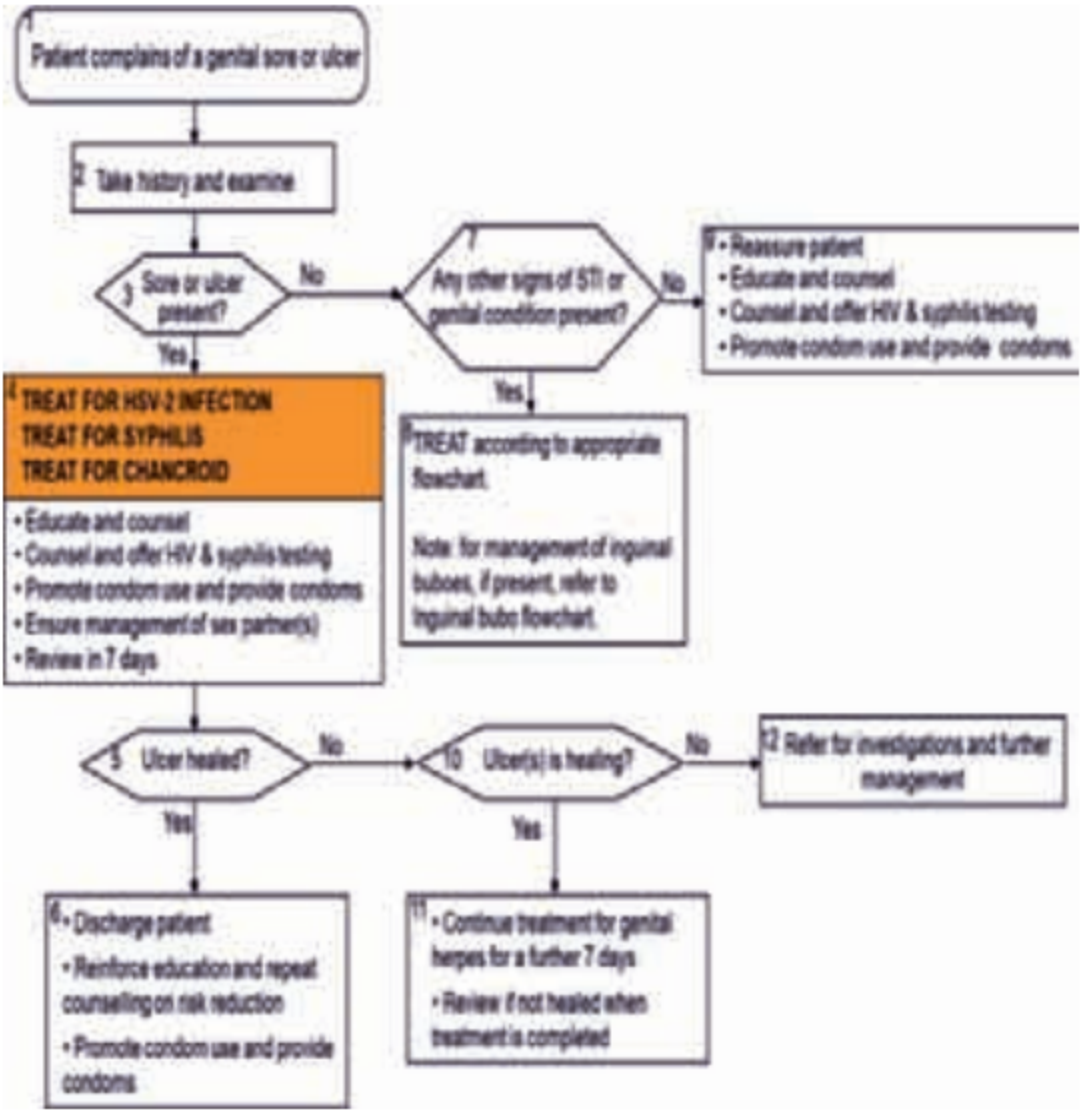
In case of penicillin allergy, use doxycycline 100mg twice a day for 20 days

CAUTION IN PREGNANCY: see chapter on Obstetric and Gynaecological Conditions. ***Ciprofloxacin*** *should* ***not*** *be used during pregnancy or in lactating mothers. In pregnant women genital ulcers are best treated with erythromycin 500mg four times a day for 7 days or Azithromycin 1g single dose or ceftriaxone 250mg IM single dose. Women who are penicillin allergic should be treated with*

erythromycin 500mg four times a day for 14 days or 30 days depending on stage of syphilis (less than 2yrs or more than 2yrs)

****Note:** In an individual with primary genital herpes ulcers, the lesions tend to be more severe (usually accompanied by systemic illness such as fever, headaches, myalgia), with eruptions lasting up to 3 weeks. For this reason, primary genital herpes is treated for 10 days, and not for 5 days as with recurrent genital herpes.

Figure 7.3: Management of Genital Ulcers: First Line



GRANULATING ULCERS WITHOUT BUBOES

These are most likely to be lesions of granuloma inguinale, a condition also known as Donovanosis and caused by *Calymmatobacterium granulomatis*. It should be remembered that persons who are immunosuppressed may not develop a bubo and occasionally persistent genital ulcers without bubo formation may occur as a result of chancroid in persons with immunosuppression and HIV infection.

First line:

	Medicine	Codes	Adult dose	Frequency	Duration
	benzathine penicillin im	**C V**	2.4MU (1.44g)	one dose only	
and	**azithromycin po**	**C V**	1g	once only followed by 500mg daily until ulcer healed*	
or	**doxycycline po**	**C V**	100mg	twice a day until ulcer is healed	

- or, in penicillin allergy

Medicine	Codes	Adult dose	Frequency	Duration
erythromycin po	**C V**	500mg	4 times a day	14 days

*** review patients on a weekly basis**

Second line:

Medicine	Codes	Adult dose	Frequency	Duration
cotrimoxazole po	**C V**	960mg	twice a day until ulcer is healed	

BUBOES WITHOUT ULCERS

This usually occurs in persons with lymphogranuloma venereum (LGV) which is caused by the L-types of *Chlamydia trachomatis*. The main effect of the infection is on the lymphatics and patients may present with penile and vulval lymphoedema together with inguinal buboes. Rectal LGV infection can also present with anal discharge and may be confused with inflammatory bowel disease. A small transient genital ulcer, which may heal on its own, may precede the swelling and buboes. The bubo is typically multilocular and may be grooved by the inguinal ligament.

First Line:

Medicine	Codes	Adult dose	Frequency	Duration
doxycycline po	**C V**	100mg	twice a day	21 days

Second line, or in pregnant women:

Medicine	Codes	Adult dose	Frequency	Duration
erythromycin po	**C V**	500mg	4 times a day	21 days

ACUTE EPIDIDYMO-ORCHITIS

Acute scrotal swelling may occur in persons with acute epididymo-orchitis, testicular torsion and scrotal trauma, and in those with irreducible or strangulated inguinal hernia. Patients should be examined carefully in order to exclude these conditions. If patients do not respond to first line therapy, they should be referred for further investigations.

First Line:

	Medicine	Codes	Adult dose	Frequency	Duration
	ceftriaxone im	**C V**	250mg	one dose only	
or	**kanamycin im**	**C V**	2g [1g into each buttock]	one dose only	
and	**doxycycline po**	**C V**	100mg	twice a day	10 days
or	**erythromycin po**	**C V**	500mg	four times a day	14 days

SYPHILIS

Early Syphilis

Includes primary, secondary and latent syphilis of less than 2 years duration:

	Medicine	Codes	Adult dose	Frequency	Duration
	benzathine penicillin im	**C V**	1.44g [2.4 MU]	one dose only	
or	**doxycycline po** (in penicillin allergy)	**C V**	100mg	twice a day	14 days
or	**erythromycin po**	**C V**	500mg	4 times a day	14 days

Late Syphilis and syphilis during pregnancy

Includes latent syphilis of more than 2 years duration, latent neurosyphilis, gummatous, cardiovascular & neurosyphilis, and syphilis of unknown duration:

	Medicine	Codes	Adult dose	Frequency	Duration
	benzathine penicillin im	**C V**	1.44g (2.4MU)	once a week	3 doses
or	**doxycycline po** (in penicillin allergy **NOT pregnancy**)	**C V**	100mg	twice daily	30 days

or	**erythromycin po** (in pregnancy)	**C**	**V**	500mg	4 times a day	30 days

- Pregnant women are now routinely tested for syphilis using a rapid diagnostic kit (TPHA equivalent). Pregnant women with syphilis require close surveillance especially, to identify re-infection after treatment.
- **Partner Treatment:** Note the importance of having sex partner treated, therefore always provide Contact Tracing Slip.
- Babies born to women found to have syphilis during pregnancy should be treated **even if** the mother had been adequately treated during pregnancy:

Treatment for babies born to mothers with syphilis

	Medicine	Codes		**Paed** dose	Frequency	Duration
	benzathine penicillin im	**C**	**V**	30mg/kg [=50 000u/kg]	one dose only	

Congenital Syphilis (babies clinically infected): ****

	Medicine	Codes		**Paed** dose	Frequency	Duration
	benzathine penicillin im	**C**	**V**	50,000 u/kg [30mg/kg]	one weekly	3 weeks
or	**procaine penicillin im**	**C**	**V**	50mg/kg [=50 000u/kg]	once a day	10 days
or	**erythromycin po** (in penicillin allergy)	**C**	**V**	12.5mg/kg	4 times a day	10 days

Neurosyphilis:

	Medicine	Codes		Adult dose	Frequency	Duration
	benzyl penicillin iv	**C**	**V**	1.8-2.4g	four hourly	2 weeks
or	**benzathine penicillin im**	**C**	**V**	2.4MU	one weekly	3 weeks
or	**procaine penicillin im**	**C**	**V**	600mg [=1ml in each buttock]	once a day	21 days
or	**doxycycline po**	**C**	**V**	200mg	twice a day	30 days
or	**erythromycin po** (in penicillin allergic pregnant women)	**C**	**V**	500mg	4 times a day	30 days
and	**prednisolone po**	**B**	**V**	40mg	once daily	three days starting 24 hours before other treatment

GENITAL WARTS (CONDYLOMATA ACUMINATA)

- **External, Genital, Perianal:**

Medicine	Codes		Adult dose	Frequency	Duration
podophyllin paint 20%	**B**	**N**	wash off after 4 hrs	once a week	review
imiquimod 5% cream	**B**	**N**	apply at bedtime and leave overnight	three times a week	max 4 months
trichloro-acetic acid	**B**	**N**	apply with a stick to warts only	once a week	

CAUTIONS: *For* ***external use only****. Do NOT use podophyllin in pregnancy. Do not apply to the cervix, urethra or anal mucosa. Do not use imiquimod cream for genital warts on children under 12 years*

If patient fails to respond, refer for cryotherapy

- **Cervical, urethral, rectal and vaginal warts:**

  Do **not** use podophyllin. Treat by cryotherapy, electro-cautery, or by surgical excision.

  If the lesions are very extensive and large then the patient should be offered HIV testing and counselling, referred to the OI Clinic or for specialist attention.

MOLLUSCUM CONTAGIOSUM

The lesions of molluscum contagiosum may resolve spontaneously. In most instances, they do not have to be treated unless cosmetically unacceptable. If not acceptable, each lesion should be pricked with a sharpened "orange-stick" or needle and the contents of the lesion expressed. This alone may be sufficient, or each lesion can then be touched carefully with liquefied phenol. Referral for cryotherapy is also an option.

Lesions of molluscum contagiosum may become extensive and large in immunosuppressed persons with HIV infection. If the lesions are very extensive and are very large then the patient should be offered HIV testing and counselling, referred to the OI Clinic or for specialist attention.

PEDICULOSIS PUBIS (PUBIC LICE)

Patients with pediculosis pubis and their sexual partners should be treated as follows

Medicine	Codes		Adult dose	Frequency	Duration
permethrin 5% cream	**C**	**N**	apply to infested and adjacent hairy areas. Wash off after 10 minutes	reapply after 7 days if necessary	

or	**benzyl benzoate 25% emulsion *** [irritant]	**B**	**N**	apply to infested and adjacent hairy areas.	once at night wash off next morning	
	*Dilute with one part water (1:1) for children. *Dilute with three parts water (1:3) for infants.				repeat treatment after no more than 10 days.	

*Note: apply to hairy areas, do **not** shave.*

Second line therapy

	Medicine	Codes		Adult dose	Frequency	Duration
	gamma benzene hexachloride 1% lotion	**C**	**V**	wash off after 24hrs	reapply 7 to 10 days later to kill hatched lice.	

*Caution: Do **not** use G.B.H in pregnancy and lactation - refer mothers to district level for benzyl benzoate.*

OPHTHALMIA NEONATORUM

This is defined as conjunctivitis with discharge occurring in a neonate within the first month of life. The condition is commonly caused by gonococcal, chlamydial and bacterial infection. The condition is preventable by detecting and treating maternal gonococcal and chlamydial infection during pregnancy and by instilling **1% tetracycline eye ointment** carefully into the conjunctival sacs of every baby as soon as possible after birth.

Ophthalmia Neonatorum is treated as follows:

	Medicine	Codes		Paed dose	Frequency	Duration
	ceftriaxone im	**C**	**V**	50mg/kg to max of 125mg	once	single dose
or	**kanamycin im**	**C**	**V**	25mg/kg to a max of 75mg	once	single dose

Treat the parents and the baby for gonococcal **and** chlamydial infection as described above. Also provide health education and counselling to the parents.

Pelvic Inflammatory Disease

See chapter Obstetrics & Gynaecology

8. HIV Related Disease

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GENERAL GUIDELINES

These guidelines aim to encourage a consistent clinical management approach and draw a balance between possible interventions and available resources. Further information is available in the Guidelines for Antiretroviral Therapy in Zimbabwe. Always refer to the latest edition of these guidelines.

Clinical presentation

Clinical presentation in HIV infection varies greatly, from asymptomatic infection in a normal, fit individual to life threatening conditions. Most infected persons remain healthy for a varying period, often many years, but may transmit the virus to others during unprotected sex.

General Notes

All patients should be offered HIV counselling and testing services (HTS). A documented proof of a positive HIV test result should be availed before a patient is enrolled into the Chronic HIV Care program.

For notes on the management of HIV infection and related conditions in children, see also “Paediatric HIV Infections”.

The goal is to provide the earliest possible diagnosis of HIV infection, diagnose opportunistic infections (OIs) promptly and implement therapeutic measures that will extend and improve the quality of life. Please refer to the Guidelines for Antiretroviral Therapy in Zimbabwe for more detail about how to deal with OIs and how to use the ARVs. Most early problems can be adequately and effectively treated so that the HIV infected persons continue to lead a normal and productive life. A continuum of care should be provided from the nearest possible facility to the home or workplace.

If a patient presents at the primary care level (“C level”) or district hospital (“B level”), follow EDLIZ as far as possible, then refer to the next level if need be. Keep referrals to a minimum and only where essential for investigations requiring specialised facilities and specialist advice. Check where your nearest OI/ART Clinic is.

The following are fundamental to the management of HIV related illness, but cannot be covered fully here:

- Counselling: pre-testing, post-test, crisis/support;
- Health education for prevention of further transmission of HIV,and positive living;
- Maintenance of good nutrition, vitamin and mineral supplements.
- Prevention, diagnosis and treatment of OIs
- Use of antiretroviral medicines

Cotrimoxazole prophylaxis:

Cotrimoxazole (trimethoprim-sulfamethoxazole) prophylaxis provides protection against some but not all severe bacterial infections and has been shown to prolong life and reduce hospital admissions.

Cotrimoxazole prophylaxis should be given to the following:

- All patients with WHO clinical stages 2, 3, and 4 disease
- All patients with CD4 counts equal or less than 350 cells/mm^3
- Pregnant women with CD4 counts equal or less than 350 cells/mm^3
- All children born to HIV-positive mothers from six weeks of age until they are tested and confirmed to be HIV negative
- Cotrimoxazole prophylaxis should be started *as soon as any of the above conditions are suspected*; this should be done at every entry point and not just be left to the OI clinics.

- ***Cotrimoxazole prophylaxis must be stopped when patients become clinically stable and are virally suppressed below 1000 copies/ml for those patients who have been on ART for at least 6 months***

Medicine	Codes	Adult dose	Frequency	Duration
cotrimoxazole po	**C V**	960mg	once a day	until CD4>350 cells/mm^3 for 6 months with ARVs or VL is less than 1000 copies per ml for at least 6 months

Cotrimoxazole prophylaxis in children
Give once daily orally according to the following table.

Table 8.1 Cotrimoxazole Prophylaxis in Children

Age	**Dose (ml)**	
	Suspension (240 mg / 5 ml)	**Paediatric tablets (120 mg)**
up to 6 months	2.5	1
6 months to 3 years	5	2
Over 3 years	10	4

Give cotrimoxazole for the duration of the paediatric life

If allergic to cotrimoxazole, try desensitization

Consider using Dapsone or desensitization. Desensitization can be offered rapidly or over a longer period of time. Do not desensitize anyone who has had an anaphylactic reaction to cotrimoxazole or a severe skin rash such as Stevens-Johnson syndrome

TB PREVENTIVE THERAPY (TPT):

Approximately 5-15% of adults with latent TB infection (LTBI) develop active TB disease during their life. Provision of preventive treatment has proven itself as an effective intervention to avert the development of active TB disease, with efficacy ranging from 60% to 90%. The likelihood of progression of TB infection to active disease depends on bacterial, host, and environmental factors. In high TB prevalence and resource-limited settings such as Zimbabwe, the following four target populations are recommended for preventive treatment: (1) people living with HIV, (2) children less than five years of age, who are household contacts of bacteriologically confirmed pulmonary TB cases, (3) all household contacts of bacteriologically confirmed pulmonary TB cases with TB infection and (4) clinical risk groups (such as patients initiating anti-tumor necrosis factor [TNF] treatment, receiving dialysis, preparing for solid organ or bone marrow transplants and those with silicosis).

HIV infection is the strongest risk factor associated with the development of active TB, with up to 40% of patients progressing to TB disease after exposure. Treatment of LTBI in people living with HIV (PLHIV) reduces the risk of TB disease development by up to 35% and plays a synergistic role in further risk reduction when used with antiretroviral therapy (ART). Children less than five years old are a particularly vulnerable population due to their higher risk of progressing to active TB disease and their greater risk of developing more severe forms of TB (including TB meningitis and disseminated TB), in addition to the difficulty of confirming the diagnosis, given the paucibacillary nature of their disease. Together, these factors result in high TB-associated child morbidity and mortality. As diagnosing active TB disease in young children is a challenge, averting new paediatric TB cases by delivering preventive treatment is of strategic importance to decrease the overall burden of paediatric TB disease.

People living with HIV are 20 to 37 times more likely to develop active TB from LTBI than those without HIV, making HIV infection the strongest risk factor for TB disease. TB is responsible for more than a quarter of deaths of people living with HIV. IPT has been shown to reduce the incidence of TB in HIV-infected people with LTBI by 33-62%.

Among PLHIV, TPT is likely to provide protection against the risk of developing TB by decreasing the risks of:

- Progression of recent infection
- Reactivation of latent M. Tuberculosis

In addition, TPT programs decrease the rate of TB in the community and improve TB control.

Inclusion Criteria for Children

1. Negative TB screening (no current cough, no fever, good weight gain) or evaluation found no active TB.
   And child fits into one of the following categories:
   i. **Routinely**: All HIV exposed and HIV infected children between the ages of 12 and 15 years, regardless of contact history
   ii. **After any contact with TB**: All HIV exposed; HIV infected children above 15yrs and HIV uninfected children less than 5yrs having had contact with any case of TB
   iii. **Post TB treatment**: All HIV exposed and HIV infected children <15 years of age immediately following the successful completion of TB treatment.
2. Caregiver demonstrates a good understanding of TPT and no known risk factors for poor adherence are identified.

NB: Investigations for TB should be done according to national guidelines.

Inclusion Criteria for Adults and Adolescents including Pregnant Women (≥15 years):

1. **ALL CONFIRMED HIV INFECTED ADULTS** who are:
   - On ART for more than 3 months or
   - Post TB treatment (immediately following the successful completion of TB treatment).
   - Contacts of PTB
   - No signs or symptoms of TB (Based on adult TB Screening guidelines)

Tuberculosis Screening Tool

I. Does the patient have any of the following
a. Current cough (if HIV +) or cough of greater than 1-2 weeks?
b. Fever
c. Night sweating

d. Loss of weight (>10%) or a BMI of less than 17Kg/m2

II. *CXR for TB High Risk Groups if available*

III. *Collect a sputum specimen for Xpert MTB/Rif assay (GeneXpert) for any person who has one or more or the above symptoms or an abnormal CXR.*

- No signs or symptoms of Tuberculosis (Based on the adult TB screening criteria)
- Good understanding of TPT and willingness to adhere

Dosages for Isoniazid:

- The recommended dose of INH in adults and adolescents is **5mg/kg/day** to a **maximum** of **300mg/day.**
- The recommended dose of INH in children is **10mg/kg/day** (with a daily **maximum** dosage not supposed to exceed **300mg**). Refer to the table below for guidance on the recommended weight bands versus INH to be administered:
- INH and Rifampicin can be used for TPT in children
- All patients on TPT must be given pyridoxine

Table 8.2: Dosage of Isoniazid per weight

Weight range (kg)	Number of 100mg tablets of INH to be administered per dose (total dose 10mg/kg/day)	Dose given (mg)
≤ 5	½ tablet	50
5.1-9.9	1 tablet	100
10-13.9	1 ½ tablet	150
14-19.9	2 tablets	200
20-24.9	2 ½ tablets	250
≥ 25	3 tablets or one adult tablet	300

Table 8.3 Three months of daily rifampicin and isoniazid preventive therapy (*RH 75/50) for children*

Weight bands	Number of Tablets
	RH 75/50 mg
4-7.9 kg	1
8-11.9 kg	2
12-15.9 kg	3
16-24.9 kg	4

Table 8.4 Supplemental pyridoxine for children

Weight bands	Number of tablets of pyridoxine 50mg
1-13.9kg	¼
14-24.9kg	½
≥ 25kg	Go to adult dosages and preparations

Pyridoxine dosage for adults and children:

Adults: pyridoxine (vitamin B6): **25mg/day**
Children: pyridoxine **25mg/day**
Note: Liver toxicity symptoms should be apparent e.g. any one on TPT who develops poor appetite, nausea, or vomiting should be assumed to have liver toxicity until proven otherwise and should be referred to hospital for same day admission to investigate possible liver toxicity

HIV Related Persistent Generalised Lymphadenopathy (PGL)

DEFINITION: Lymph nodes >1.5 cm in two or more areas, not due to another cause such as TB and persisting for 1 month or more.

No treatment is required, but exclude other causes of PGL, particularly TB, Kaposi's Sarcoma, lymphomas or syphilis.

HIV Related Oral and Oesophageal Candidiasis (Thrush) – (Refer to Chapter on Common Oral Conditions)

Candida infections are commonly encountered in patients with HIV infection. Oral thrush may precede AIDS but is a sign of waning immunity that signals the development of AIDS. Oesophageal thrush is an indicator of more severe cellular immunodeficiency.

CAUTION: Neither of these conditions occur exclusively in patients with HIV infection. For example, oral thrush may follow treatment with broad spectrum antibiotics or steroids or be associated with any other debilitating disease.

HIV Related Diarrhoea - Acute

DEFINITION: Three or more liquid stools daily for 2 to 14 days in patients with symptomatic HIV infection.

Management of diarrhoea should be broadly along the same lines as that described in the chapter on Gastrointestinal Conditions.

***Note: Anti-diarrhoeals should NOT be used in the initial treatment of acute diarrhoea, especially in children or with bloody diarrhoea cases**.*

If there is no improvement after 5 days, attempt to identify pathogen through stool microscopy, culture and sensitivity tests then treat according to the result.

HIV Related Diarrhoea - Chronic

DEFINITION: Three or more liquid stools daily continuously or episodically for more than 1 month in patients with symptomatic HIV infection.

Management

- Assess for dehydration, malnutrition, and check electrolytes for hypokalaemia.
- Rehydrate as required, maintain nutrition.
- Initially treat diarrhoea with blood in stool and/or fever as acute diarrhoea.
- If diarrhoea (without blood/fever) continues after conservative management for 14 days, and exclusion of common causes of acute diarrhoea, symptomatic anti-diarrhoeal treatment may be appropriate:

	Medicine	Codes		Adult dose	Frequency	Duration
	loperamide po	**C**	**N**	4mg stat, then 2mg after every loose stool	as needed	review
or	**codeine phosphate po**	**B**	**V**	30-60mg	≤ 4 times a day	7 days

***CAUTION:** Only use the above agents if diarrhoea is disabling. Before constipating agents are given, rule out helminth infestation.*

- If diarrhoea continues or recurs within 3 weeks, and no pathogen is identified, repeat microscopy and C/S.
- If there is weight loss investigate for concurrent disseminated TB with CXR and stool for AAFBS

  In cases of diarrhoea with fever, bloody and/or mucus; ensure Culture and sensitivity testing is conducted.

- **If no diagnosis:**

	Medicine	Codes		Adult dose	Frequency	Duration
	ciprofloxacin po	**B**	**V**	500mg	twice a day	7 days

- **If no improvement OR very ill/toxic admit to hospital for iv fluids and:**

	Medicine	Codes		Adult dose	Frequency	uration
	ciprofloxacin po	**B**	**V**	500mg	twice a day	7 days
and	**ceftriaxone iv**	**C**	**V**	1g	twice a day	maximum 7 days

If bloody diarrhoea:

	Medicine	Codes		Adult dose	Frequency	Duration
	ciprofloxacin po	**B**	**V**	500mg	twice a day	5 days

HIV RELATED WASTING SYNDROME (SLIM DISEASE)

DEFINITION: Weight loss of more than 10%, plus either unexplained chronic diarrhea for more than one month, or unexplained prolonged fever for more than one month. *This places the patient in WHO Clinical Stage 4 HIV disease and hence patient should be considered for ART.*

- It is important to exclude treatable conditions, especially TB, and to treat them appropriately. A chest Xray is mandatory.
- **Emaciation:** encourage a high calorie and protein diet. Add mineral and vitamin supplementation:

	Medicine	Codes		Adult dose	Frequency	Duration
	nicotinamide po	**B**	**E**	50mg	once a day	review
and	**pyridoxine po**	**B**	**E**	25-50mg	once a day	review
and	**thiamine po**	**A**	**N**	50mg	once a day	review

Further Management

- Treat according to results of investigations. Keep referrals to a minimum and refer only if alternative diagnosis is suspected e.g. malabsorption.
- Initiate antiretroviral therapy or switch ART medication if there is treatment failure

HIV RELATED RESPIRATORY CONDITIONS

A multitude of different manifestations of respiratory complications may occur in patients with HIV infection. These include bacterial pneumonias, pulmonary tuberculosis, *Pneumocystis jiroveci* pneumonia (PCP) and pulmonary Kaposi's sarcoma. All HIV infected patients should be screened for TB at every visit using the standard TB screening tools.

Management depends on the severity of the condition, location and mobility of the patient. Outpatient management in adults is preferred wherever possible. Only severe cases requiring investigations and inpatient admission should be referred for admission.

Treat initially as for other respiratory conditions. For acute infection (less than 2 weeks) that does not warrant admission:

	Medicine	Codes		Adult dose	Frequency	Duration
	amoxicillin po	**C**	**V**	500mg	3 times a day	7 days
or	**erythromycin po** (in penicillin allergy)	**C**	**V**	500mg	4 times a day	7 days
or	**doxycycline po** (in penicillin allergy)	**C**	**V**	100mg	twice a day	7 days

If severe symptoms i.e. respiratory distress, cyanosis, tachycardia, hypotension or altered mental state, consider admission:

Medicine	Codes		Adult dose	Frequency	Duration
ceftriaxone iv	**C**	**V**	*1g	bd	7 days

**Use 2gm BD iv if there are features of septicaemia-low BP tachycardia or meningitis*

A stat dose may be given at primary care level prior to transfer.

Note: Switch to oral amoxicillin to complete the course

If there is no response, get a chest x-ray and follow management guidelines in the chapter on respiratory conditions.

Then start on prophylactic cotrimoxazole:

Medicine	Codes		Adult dose	Frequency	Duration
cotrimoxazole po	**C**	**V**	960mg	once a day	until CD4 >350 or viral load < 1000

PNEUMOCYSTIS JIROVECI PNEUMONIA (PCP)

An opportunistic infection caused by *Pneumocystis jiroveci*. Patients present with progressive shortness of breath and possibly cyanosis with few or no chest signs.

- Manage with:

	Medicine	Codes	Adult dose	Frequency	Duration
	cotrimoxazole po	**C V**	1920mg (4 tabs)	3 times a day	21 days
	For infant or child *over 1 month:* 10 mg/kg every 12 hours for 21 days. Total daily dose may alternatively be given in 3–4 divided doses orally.				

If they are allergic, try cotrimoxazole desensitisation

- or in sulphonamide allergy:

	Medicine		Codes	Adult dose	Frequency	Duration
	clindamycin po	**B**	**V**	450-600mg	6hourly	21 days
and	**primaquine po**	**C**	**V**	30mg	once a day	

- If any tachypnoea or cyanosis is present, **add:**

	Medicine		Codes	Adult dose	Frequency	Duration
	prednisolone po	**B**	**V**	40mg	twice a day	5 days
then	**prednisolone po**	**B**	**V**	40mg	once a day	5 days
then	**prednisolone po**	**B**	**V**	20mg	once a day	11 days

High flow oxygen and nursed propped up are key in treatment of severe PCP

- **After PCP has been treated give cotrimoxazole prophylaxis until immunity is restored. (Follow current ART Guidelines). This also applies to any other patients with AIDS defining disease.**
- If still no response, consider malignancy, for example, Kaposi's sarcoma.

HIV Related Headache and Problems of the Nervous System

The symptom of headache is commonly encountered in patients with HIV infection. Careful evaluation and follow up is required to exclude meningitis and other CNS infections. Rule out a serum cryptococcal antigenaemia (CrAg) especially is CD4 count is less than 100. If CrAg positive refer for lumbar puncture (LP). Also refer for LP if the headache is associated with fever, vomiting, neck stiffness, seizures, confusion as all these are "danger" symptoms and signs. Also r*efer to Section on Neurological Conditions*

Other commonly encountered neurological conditions in HIV infection include AIDS dementia complex, peripheral neuropathy, Guillan-Barré syndrome, facial nerve palsy and stroke.

TREATMENT OF CRYPTOCOCCAL MENINGITIS

Cryptococcal meningitis is caused by *Cryptococcus neoformans*. It is less acute in onset than bacterial meningitis and may occur as part of the Immune Reconstitution Syndrome (IRIS). Diagnosis is confirmed by India Ink Stain and cryptococcal antigen tests (CrAg) in the cerebrospinal fluid after LP. **Treatment of cryptococcal disease must be with amphotericin B based regimens**. Ideally **amphotericin B** must be combined with **flucytosine.** However, combination therapy with **amphotericin B and fluconazole is recommended** as flucytosine is not available. In the absence of amphotericin B, **high dose fluconazole can be used as an alternative therapy**. Amphotericin B and fluconazole therapy is characterised by a 2-week induction phase, followed by 8 weeks consolidation phase and a maintenance therapy which is continued until adequate immune reconstitution is achieved.

Diagnosis of cryptococcal meningitis is based on either LP positive CSF CrAg /India Ink stain or positive serum CrAg plus headache or relevant symptoms

Pay attention to raised CSF pressure management and monitoring of renal function as per the Consolidated ART Guidelines.

	Medicine	Codes		Adult dose	Frequency	Duration
	amphotericin B iv (*infusion*) *Give KCl 1.2g PO BD, and MMT 500mg PO BD to prevent hypokalaemia and hypomagnaesemia*	**B**	**V**	0.7mg/kg	once a day	2 weeks
plus	**fluconazole po**	**B**	**V**	1200mg	once a day	2 weeks
then	**fluconazole po**	**B**	**V**	800mg	once a day	8 weeks
then	**fluconazole po**	**B**	**V**	200mg	once a day for at least one year.	until CD4 count >200 cells/mm3 for 6 months and VL less than 1000copies per ml for 6months

If flucytosine is available:

	Medicine	Codes		Adult dose	Frequency	Duration
	amphotericin B iv (*infusion*) *Give KCl 1.2g PO BD, and MMT 500mg PO BD to prevent hypokalaemia and hypomagnaesemia*	**B**	**V**	1mg/kg	once a day	1 weeks

plus	**flucytosine po**	**B**	**V**	100mg/kg	divided into four doses	1 weeks
then	**fluconazole** [paeds; adolescence]	**B**	**V**	1200mg 12mg/kg/day; max 800mg/day	once a day	1 weeks
then	**fluconazole po**	**B**	**V**	800mg	once a day	8 weeks
then	**fluconazole po**	**B**	**V**	200mg	once a day for at least one year.	until CD4 count >200 cells/mm3 for 6 months and VL less than 1000copies per ml for 6months

If Amphotericin B IV is not available:

	Medicine	Codes		Adult dose	Frequency	Duration
	fluconazole po	**B**	**V**	1200 mg	once a day	2 weeks
then	**fluconazole po**	**B**	**V**	800mg	once a day	8 weeks
then	**fluconazole po**	**B**	**V**	200mg	once a day for at least one year	until CD4 count >200 cells/mm3 for 6 months and VL less than 1000copies per ml.

For neonate, infant or **child** initial test dose of Amphotericin B 100 micrograms/kg (maximum 1 mg) included as part of first dose, then 250 micrograms/kg daily, gradually increased up to 1 mg/kg daily (maximum of 1.5 mg/kg daily). Prolonged treatment is usually necessary.
If treatment is interrupted for longer than 7 days, recommence at 250 micrograms/kg daily and increase gradually.
Then:

Neonate *under 2 weeks*

Medicine	Codes		Dose	Frequency
fluconazole po	**B**	**V**	6-12 mg/kg	every 72 hours

Neonate *2–4 weeks*

Medicine	Codes		Dose	Frequency
fluconazole po	**B**	**V**	6-12 mg/kg	every 48 hours

Infant or **Child**

Medicine	Codes		Dose	Frequency
fluconazole po	**B**	**V**	6-12 mg/kg	(maximum 800 mg) daily

Treatment should continue according to response and should be for at least 8 weeks for cryptococcal meningitis.

Management of Raised Intracranial Pressure (ICP)

Mortality and morbidity from cryptococcal meningitis are high with a significant proportion attributable to raised intracranial pressure (ICP). Clinical features of raised intracranial pressure include headache, nausea & vomiting, reduced vision or hearing, change in mental status or reduced level of consciousness, seizures, 6th cranial nerve palsy or other focal neurology.

Management of raised ICP is critical to ensure good clinical outcomes. CSF pressure can be measured using a CSF manometer or improvisation using an IV fluid tubing and a ruler or tap measure. If the ICP is > 20cm of water, remove maximum 20-25ml of CSF using daily therapeutic LPs until the CSF pressure is less than 20cm or half the baseline pressure if this was extremely high. The LP might need to be repeated more than once a day if the CSF pressure is grossly elevated and symptoms recur quickly despite the initial therapeutic LP on a given day. If the CSF pressure cannot be measured then take off a maximum of 20mls CSF.

Management of Amphotericin B associated toxicities

Liposomal amphotericin B has less renal toxicities. Amphotericin B deoxycholate is associated with renal tubular toxicities and can lead to electrolyte abnormalities such as hypokalemia and hypomagnesemia. It can also result in anaemia and administration related febrile reactions.

- Amphotericin B is often provided as a powder and should be mixed with 5% dextrose water. It should NEVER be mixed with normal saline or half normal saline as this will result in precipitation of the amphotericin B. To minimize renal toxicities, amphotericin B must be administered slowly over 4 hours. Initial therapeutic doses should be given as Amphotericin B 0.7-1mg/kg/day.
- For adults, pre-hydration with 1000ml (1L) of normal saline with 20mEq of potassium chloride over 2 hours is recommended based on the volume status of the patient. Patients must receive oral potassium supplementation such as 1200mg twice a day. The potassium supplementation minimizes the extent of hypokalemia that can develop. Where available supplementation with magnesium trisilicate 500mg orally twice daily is also recommended.
- Renal function must be monitored at baseline. U&Es should be measured twice weekly and abnormal results repeated daily until they normalize. Amphotericin B should be discontinued if renal toxicity is noted but can be restarted at a reduced dosage if the U &Es are improving

If potassium is less than 3.3mmol/L increase oral KCL to 600-1200mg three times daily and monitor U& Es daily. If potassium levels do not increase

despite oral potassium replacement, this may be due to low magnesium levels therefore consider measuring magnesium levels and replenishing magnesium if necessary. If the creatinine increases (which is already too late and should be avoided), a dose of amphotericin B can be omitted, and pre-hydration increased to 1L of normal saline every 8 hours and creatinine rechecked. If creatinine normalises, pre-hydrate with 1L normal saline with 20mEq KCl and restart at amphotericin B (0.7mg/kg/day) given over 4 hours and thereafter consider giving Amphotericin B on alternate days. Monitor renal function two to three times weekly.

If repeat creatinine remains elevated or continues to increase, discontinue amphotericin B and initiate high dose fluconazole 1200mg orally once daily.

ART initiation

ART initiation or switching (in setting of treatment failure) should be done 4 weeks after amphotericin induction or 4-6 weeks after fluconazole induction. This is to minimise risk of cryptococcal IRIS syndrome which is associated with mortality.

Cryptococcal IRIS syndrome
Occurs after initiation of ART or switching ART and is associated with raised intracranial pressure and resultant symptoms. The patients will need admission, therapeutic LPs as above, an assessment for cryptococcal relapse with CSF being sent to lab for India ink exam, CSF biochemistry, CrAg titres and culture for Cryptococcus (up to 14 days). Relapse would indicate re-induction with amphotericin B. The CSF CrAg may remain positive for a long time after treatment.

Primary prevention of cryptococcal meningitis
Patients with CD4 count 100 or less are at higher risk of cryptococcal meningitis. Every newly diagnosed patient with a CD4 count less than 100 should have a serum CrAg screen done. If CrAg negative, they should be started on ART. If CrAg positive, they should be referred for LP to exclude cryptococcal meningitis. Patients with a CD4 of 101-200 also have a substantial incidence of cryptococcal meningitis and should receive CrAg screening when resources allow.

Secondary prevention of relapse of cryptococcal meningitis in AIDS patients after completion of primary management

Patients must be educated about adhering to the correct doses of fluconazole, not running out of treatment, completing the consolidation, continuation and maintenance phases at appropriate doses.

Discontinuation of fluconazole can be considered with one of the following criteria is fulfilled:-
either

- stable on ART and fluconazole for 1-year; CD4 >100 and viral load undetectable or
- stable on ART and fluconazole for 1 year; CD4>200 where a viral load is not able to be obtained

AIDS DEMENTIA COMPLEX (HIV ENCEPHALOPATHY)

Characterized by progressive impairment in cognitive function that is accompanied by behavioural changes and motor abnormalities. *Note: Other causes of dementia must be excluded*

Highly active antiretroviral therapy (HAART) is the best treatment to offer. Provide supportive care for the patient and their family. If psychotic or depressive features are prominent, refer for/add specific therapy to cover these conditions.

HIV RELATED SKIN CONDITIONS

Skin manifestations of HIV infection may be the result of opportunistic infections or HIV itself. Start ART as soon as possible as restoration of immunity tends to result in a resolution in most instances. Refer to a Skin Specialist if not getting better.

Persons with HIV/AIDS should be informed of the likelihood of increased photosensitivity as many develop hyperpigmentation of the face and the “V” of the neck. Excessive exposure to the sun should be avoided.

See also chapter on Skin Conditions for guidelines on common skin conditions and chapter on Sexually Transmitted Infections for guidelines on molluscum contagiosum and condyloma acuminata.

Herpes Zoster (Shingles)

Caused by a reactivation of Varicella Zoster virus infection.

Antiviral treatment should be started as soon as possible, ideally within 72 hours of onset of the shingles rash, for the treatment to be most effective. However, after this time, antiviral medications may still be helpful if new blisters are appearing. The three antiviral medicines used are acyclovir, Valaciclovir or Famciclovir. Acyclovir is the cheapest of them but has to be taken more frequently.

The pain of shingles can be very severe, and medications to reduce pain are frequently needed. The best options are the nonsteroidal anti-inflammatory medicines (e.g, ibuprofen). Topical lotions, such as calamine lotion are

helpful in reducing the pain and itching of the lesions, thus avoiding traumatic sores and consequent keloid formation.

Following an attack of shingles, a person may experience continued pain for more than three months after the onset of the rash and this is referred to as post-herpetic neuralgia. In addition to pain medicines, tricyclic antidepressants, such as amitriptyline, are effective in controlling the pain,

	Medicine	Codes		Adult dose	Frequency	Duration
	acyclovir po	**C**	**E**	800mg	5 times a day	7 days
or	**valaciclovir po**	**B**	**E**	1 gram	3 times a day	7 days

- Give analgesia:

Medicine	Codes		Adult dose	Frequency	Duration
paracetamol po	**C**	**N**	500mg-1gram	3 to 4 times a day (max 4 grams a day)	
Ibuprofen po	**C**	**N**	200-400mg	3 to 4 times a day (max 1200 mg per day)	be aware of contraindications and cautions for anti-inflammatory medicines, in people with renal impairment or gastrointestinal ulcer

or

- Add :

Medicine	Codes		Adult dose	Frequency	Duration
amitriptyline po	**B**	**E**	25mg	once at night	review

- and Skin care:

	Medicine	Codes		Adult dose	Frequency	Duration
	calamine topical	**C**	**N**	topically	often	as required
and	**povidone iodine topical**	**B**	**E**	daily, for wound care, as required		

Patients should be started on Cotrimoxazole prophylaxis

Refer immediately if there is ophthalmic or pulmonary involvement.

Secondary infection (bacterial) may require treatment.

Post-Herpetic Neuralgia
This is pain that occurs after the rash is fully resolved:

Medicine	Codes	Adult dose	Frequency	Duration
amitriptyline po	**B E**	25-75mg increased to 150mg if required.	every night	as required
carbamazepine po	**B V**	100-200mg increased over 10 days to a max of 400mg (dose divided in 3).	every night	

Herpes Simplex Virus

In immunosuppressed persons, primary and recurrent herpes simplex lesions are usually more severe, more persistent, more symptomatic and more resistant to treatment. The early vesicular lesions (blisters) may be transient or never seen. In immunosuppressed patients, any erosive mucocutaneous lesion should be regarded as herpes simplex until proven otherwise.

Patients need to be counselled about the following:

- The recurrent nature of the lesions, as well as their likely persistence,
- The infectiousness of mucocutaneous or genital herpes.
- Care of local lesions: keep them clean with frequent (2 to 3 times a day) washing with soap and water and keeping them as dry as possible.
- In very severe cases or immunocompromised patients, ***acyclovir*** should be given.
- Bacterial superinfection may complicate lesions and will require antibiotics
- Suppressive therapy may be required for frequent (more than 4 to 6 episodes per year) recurrent HSV infections. After 1 year, the situation may be reviewed to either continue or change to episodic treatment or discontinue and assess the clinical situation.

Episodic and Suppressive treatment for herpes simplex

	Medicine	Codes	Adult dose	Frequency	Duration
	acyclovir po	**C E**	400 mg	3 times a day	5 days
or	**valaciclovir po**	**B E**	500 mg	twice a day	5 days
	acyclovir po	**C E**	400 mg	twice a day	daily for 12 months then review
or	**valaciclovir po**	**B E**	500 mg	twice a day	daily for 12 months then review

Seborrhoeic Dermatitis

Seborrhoeic dermatitis is a common, chronic, superficial inflammatory disease with a tendency to affect the scalp (dandruff), the eyebrows, eyelids,

nasolabial folds and ears. Other areas affected are the lips, sternal area, axillae, submammary folds and groins. The condition is characterised by scales on an erythematous (reddened) base. Dandruff represents a mild form of seborrhoeic dermatitis.

People with HIV infection (even without immunosuppression) have an increased incidence of seborrhoeic dermatitis. This may be because one of the aetiological factors of seborrhoeic dermatitis is the presence of the yeast, *Pityrosporum ovale* which is found in higher density in such persons.

- Topical steroids, such as hydrocortisone 1% combined with a topical antifungal cream, such as miconazole cream 2%, are effective when applied twice daily.
- For the scalp, shampoos, such as 2% ketoconazole shampoo may be helpful, used 2 to 3 times a week. Subsequently, weekly use of such shampoos may reduce recurrence of the condition.
- Systemic treatment may be required in severe cases, using either itraconazole or terbinafine tablets.

Pruritic papular eruption

Pruritic papular eruption (PPE) of HIV is often reported as the most common skin rash seen in persons living with HIV infection. It is a form of prurigo. Between 20 and 46% of patients with HIV have this condition at some point in time. It can be the presenting symptom of HIV in 25-80% of cases, as well as be a dermatological sign of advanced HIV, being three times more common when the CD4 lymphocyte count is less than 200 ..

The rash can be very distressing for patients as it can be disfiguring and stigmatising, and treatment can be difficult and unsatisfactory.

PPE of HIV is nearly always a very itchy rash presenting as multiple, discrete scratched pimples or bumps, which are symmetrical and diffusely distributed. The extremities (arms and legs) and trunk are affected more than the face and usually the mucous membranes (mouth, nostrils, eyes, genitals), palms, and web spaces are spared.

Treatment is primarily to alleviate the itching, as PPE often proves very resistant to treatment. However, there are different treatment approaches that have been shown to be effective in some patients, which include the following.

- Medium- to high-potency topical steroids, together with emollients (moisturisers),
- Oral antihistamines e.g. chlorpheniramine **or** promethazine.

- Calamine lotion.

Medicine Reactions

These are frequently caused by cotrimoxazole, nevirapine, efavirenz, TB medicines. Stop the medicines and reassess.

HIV AND CANCER

HIV-infected individuals have an increased incidence of several malignancies, including both AIDS-defining malignancies (Kaposi sarcoma [KS], cervical cancer, and non-Hodgkin lymphoma [NHL] including systemic NHL, CNS lymphoma, primary effusion lymphoma, and multicentric Castleman disease [MCD]), as well as a number of non-AIDS-defining cancers (NADCs) including lung, breast, prostate, colorectal.

Factors contributing to pathogenesis may include direct effects of HIV, immunosuppression, coinfection with other oncogenic viruses (eg. HPV, EBV, HBV or HCV) and other environmental oncogenic stimuli.

The rollout and widespread use of ART has prevented severe immunosuppression for prolonged periods in many HIV-infected individuals which has been associated with a decrease in the incidence of KS.

Note that patients with non-Hodgkin lymphoma (NHL), Hodgkin lymphoma (HL), cervix cancer, squamous cell conjunctival carcinoma are likely to be HIV positive and will need ART and treatment for the cancer (chemotherapy, surgery, radiotherapy).

HIV positive patients should continue their ART while they receive treatment for the cancer. Avoid zidovudine because of side effect of anaemia.
They should be managed by HIV specialists and oncologists.

KAPOSI'S SARCOMA (KS)

Patients with KS are in WHO clinical stage 4 and will require ART. Assess the KS stage (limited or mild, moderate or severe/extensive). Also assess for signs and symptoms of visceral involvement. Most patients present late with a high burden of tumour and hence chemotherapy is required. If possible, refer patients for specialist opinion prior to starting ART (this might avoid IRIS which may occur with extensive KS especially pulmonary KS) and should submit a biopsy for tissue diagnosis before referral. KS patients (in good general health, with limited early KS, ≤5 lesions) may respond to ART alone but most patients will need chemotherapy; and the timing of chemotherapy is important.

Immune reconstitution with ART occurs and may worsen the KS dramatically.

9. ANTIRETROVIRAL THERAPY

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GENERAL NOTES

Appropriate and effective provision of ARVs needs to be provided by those who have received standardised training in the management of opportunistic infections as well as in the use of antiretroviral medicines. For more details on the use of ARVs refer to the current ***Guidelines for Antiretroviral Therapy for the Prevention and Treatment of HIV in Zimbabwe.*** Comprehensive HIV/AIDS care requires that there be provision of counselling; HIV testing services, laboratory capacity for baseline assessment and monitoring as well as to diagnose commonly encountered opportunistic infections such as TB and cryptococcal meningitis. Pharmacy personnel should also be trained in OI/ART management as they will be required to ensure rational prescribing and proper dispensing of the antiretroviral medicines. In addition, they are required to ensure that their hospital/clinic has adequate ARV medicine supplies.

GOALS OF ART

The aims of antiretroviral therapy (ART) are:

- Maximal and durable suppression of replication of HIV,
- Restoration and/or preservation of immune function,
- Reduction of HIV-related morbidity and mortality,
- Improvement of quality of life,
- Prevention of parent-to-child transmission of HIV (vertical transmission)
- Reduction of transmission of HIV from infected to uninfected individuals through use of ARVs by the infected individual now commonly known as 'Treatment as prevention'
- Reduction of transmission through provision of pre-exposure (PrEP) prophylaxis to high risk individuals.

CRITERIA FOR INITIATING ART IN ADOLESCENTS AND ADULTS

Prior to starting ART, patients should be assessed for readiness to take ARVs; the ARV regimen; dosage and scheduling; the likely potential adverse effects; and the required monitoring. Both medical and psychosocial issues need to be addressed before initiating ART. Patients should be adequately counseled about adopting appropriate life style measures such as safer sexual practices (including appropriate use of condoms), and any other psychosocial problems that may interfere with adherence (e.g., alcohol, psychiatric disorders) should be addressed. At each clinic visit always screen for tuberculosis using a TB symptom checklist, advise patients about adequate nutrition, the importance of medicine adherence and regular follow

up care. People taking ARVs should also be regularly asked whether they are taking other medicines including herbal remedies as they may interfere with the efficacy of ARVs.

Early treatment is associated with clinical and HIV prevention benefits, improved survival and reduced incidence of HIV infection at the community level. Increasing evidence also indicates that untreated HIV may be associated with the development of severe non-AIDS defining conditions including cardiovascular disease, kidney disease, liver disease and neurocognitive disorders.

Medical Criteria for initiating ART in adolescents/ adults

All individuals with a confirmed HIV diagnosis are eligible for anti-retroviral therapy (ART) irrespective of WHO clinical stage and CD4 count level i.e. TREAT ALL. Health workers should retest all people newly and previously diagnosed with HIV before they initiate ART. As a priority, initiate ART in all individuals with severe or advanced HIV clinical disease (WHO clinical stage 3 or 4) or CD4 count less than or equal to 350 cells/ mm3. It is also recommended to initiate ART, as a priority, in the following categories of patients regardless of CD4 cell count:

1. Active TB disease
2. Pregnant and breast-feeding women with HIV
3. Individuals with HIV in sero-discordant relationships
4. HBV co-infection with severe chronic liver disease

Once an individual is confirmed to be HIV positive; health workers should provide adequate counselling and start ART within a week. However, for those patients who are not yet ready to start ART, they should receive on-going counselling and support.

Patients with CD4 <100
Patients with low CD4 below 100 should be fast-tracked for treatment initiation. They should be screened for symptomatic TB, cryptococcal disease (CrAg screening), visual changes and direct retina exam. They should receive Cotrimoxazole prophylaxis and TB Preventive Therapy (TPT) and should be closely monitored for 3 months as this is their highest risk period for bacterial infections and TB or crypto IRIS. Health workers should educate them and their families to report immediately to a health facility if they are unwell whilst their CD4 is < 100.

Psychosocial criteria for initiating ART

Consider the following psychosocial criteria when initiating ART:

- Has the patient been adequately counselled and informed about ARVs?

- Is a treatment partner available and/or has disclosure been made to that treatment partner (strongly encouraged)?
- Is there an easy method of following up on the patient?
- Is the patient ready to take medication indefinitely?

Situations where it may be necessary to defer ART initiation

A patient may be deferred (delayed) from starting therapy if the patient

- has cryptococcal meningitis,
- needs further psychosocial support (e.g. for alcohol problems),
- has TB (defer starting ART for at least 2 weeks),
- needs further information on HIV and AIDS,
- very ill patient and unable to swallow oral medication (palliative care is then offered to such a patient).

SUCH PATIENTS SHOULD BE OFFERED CONTINUED MONITORING AND CLOSE FOLLOW-UP AS WELL AS COUNSELLING SO THAT ART CAN BE COMMENCED AT AN APPROPRIATE TIME.

ADHERENCE TO ART

WHO defines treatment adherence as 'the extent to which a person's behaviour- taking medications, following a diet and/or executes lifestyle changes' corresponds with agreed recommendations from a health care provider.

Efforts to support adherence should start before ART initiation and should include basic information about HIV, the ARV medicines, expected adverse events, preparations for long-term ART. Effective adherence support interventions include client-centred behavioural counselling and support, support from peer educators trained as "expert patients," community treatment supporters and mobile text messaging. Other interventions involve encouraging people to disclose their HIV status and providing them with adherence tools such as pill boxes, diaries, and patient reminder aids. During follow-up, patients should be assessed for adherence to whatever treatment plan has been agreed upon (Integrated HIV training curriculum, MoHCC).

Recommended treatment regimens for adolescents and adults

The choice of medicine regimen is based on the "essential medicine" concept and the rational use of medicine. To maximise adherence, use of fixed-dose combinations (FDC) medicines is strongly encouraged.

The choice of ARVs has been based on evidence of efficacy and safety, on availability and cost of medications, as well as on the side effects profile and the potential for development of resistance. The national ART programme will use the following FDCs in the first line regimens:

1st line ART	Preferred 1st line Regimens	Alternative 1st line Regimens
Adults and adolescents including women of child-bearing potential	Tenofovir (TDF) 300mg + Lamivudine (3TC) 300mg + Dolutegravir (DTG) 50mg (once daily FDC)* (TLD1)	TDF (or **TAF) + Emtricitabine (FTC) 200mg (or 3TC) + Atazanavir/Ritonavir (ATV/r) 300/100mg (once daily) ***Abacavir (ABC) 600mg + Lamivudine (300mg) + Dolutegravir 50mg** (once daily) TDF (or TAF*) +3TC (or FTC) + Efavirenz (EFV) 400mg (once daily)

First Line ART

A. Adults and adolescents including women of child-bearing potential

	Medicine	Codes	Adult dose	Frequency	Duration
	tenofovir (TDF) + lamivudine (3TC) + dolutegravir (DTG) FDC) (TLD1) po	**C V**	300+300+50 mg	once a day	life
or	**TDF (or *TAF) + emtricitabine (FTC) (or 3TC) + atazanavir/ritonavir (ATV/r) po**	**C V**	300+200+300 /100mg	once a day	life
or	****abacavir (ABC)+ lamivudine + dolutegravir po**	**C V**	600+300+50 mg (one tablet of each)	once daily	life
or	**TDF (or TAF*) +3TC (or FTC) + efavirenz (EFV) po**	**C V**	300+300+ 400mg	once daily	life

*TAF (tenofovir alafenamide) can be used as a substitute for TDF (tenofovir disoproxil fumarate)
*TB patients on Rifampicin to receive DTG 50mg twice a day
*#ABC/3TC/DTG 50mg can be administered to patients weighing at least 20 kg
*** TAF (tenofovir alafenamide) can be used as a substitute for TDF (tenofovir disoproxil fumarate)
AZT/3TC backbone may be used in special circumstances

- DTG is one of the preferred antiretroviral medicines for first- and second-line regimens for everyone living with HIV including adults, pregnant

women, women and adolescent girls of childbearing potential, children and people co-infected with TB.

- Dolutegravir (DTG) is a safe and efficacious medicine with a rapid viral suppression, low potential for drug-drug interactions and a high genetic barrier to developing ARV drug resistance. It should be included in the preferred first line regimen for all populations unless where contraindicated.
- Exposure to DTG at the time of conception may be associated with an increased risk of neural tube defects (NTDs) among infants although NTD risk has been further reduced compared to when first reported.
- DTG use has been associated with weight gain especially when co-administered with TAF/3TC. Prior to initiating DTG containing regimens; clinicians should advise patients on this potential side effect and advise on the importance of adopting healthy life-styles including exercising, taking healthy diets and avoidance of smoking.
- Effective contraception should be offered to adult women and adolescent girls of childbearing age or potential.
- DTG can be prescribed for adult women and adolescent girls of childbearing age or potential who wish to become pregnant or who are not otherwise using or accessing consistent and effective contraception if they have been fully informed of the potential increase in the risk of neural tube defects (at conception and until the end of the first trimester).
- Pregnancy test should be made available at health facilities to ascertain pregnancy status among women in order to support patient management. However, non-availability of pregnancy test kits should not be a barrier for administering DTG based regimens. If a woman's first realization of pregnancy is after the first trimester, DTG should be initiated or continued for the duration of the pregnancy.
- ART experienced patients should be transitioned to a DTG-containing regimen **after confirming a suppressed HIV viral load of <1,000 copies/ml in the past twelve months:**
    - If VL is suppressed, substitute the NNRTI with DTG
    - If VL is unsuppressed, manage as treatment failure. Provide 3 enhanced adherence counselling (EAC) sessions over 3 months to allow for good adherence followed by a repeat VL test. If the patient remains unsuppressed, switch patients to a DTG-based second line regimen.
- In PLHIV with **TB using rifampicin**, the dose of DTG should be increased to **50 mg twice daily.**

- Tenofovir alafenamide (TAF) a derivative of TDF has less renal and bone toxicity compared to TDF. TAF may be used as a substitute for TDF for adults and adolescents. When available, TAF should be considered in

elderly patients above 50 years, patients with Creatinine Clearance of 30 – 60(ml/min and HBV co-infected. However, TAF should **NOT** be used in: HIV/TB co-treatment or HIV infected pregnant women and patients with renal impairment with CrCl below 30.

- In order to facilitate effective management of patients on ART; it is critical to make the distinction between patients on first line versus those taking second line ART. The program will use TLD1 to refer to patients taking first line DTG-based regimens while TLD2 will refer to those on second line DTG-based regimens.
- Use of Nevirapine (NVP) and Efavirenz (EFV) 600mg (NNRTI) in adults and adolescents is being phased out and health providers are advised to limit its use. Due to high levels of pretreatment HIV drug resistance in Zimbabwe (>10%), NNRTIs are less preferred.

- Efavirenz 400mg is safe for use among pregnant women. Pharmacokinetic and pharmacodynamics studies suggest that the drug concentrations decline slightly during pregnancy; however, remain within therapeutic range and unlikely to reduce the drug efficacy.
- Efavirenz 400 mg can be co-administered with rifampicin containing anti-TB treatment; is well tolerated and plasma concentrations were maintained above the levels considered to be effective.
- When available, tenofovir alafenamide (TAF) may be considered for elderly patients above 50 years; patients with impaired kidney function, established osteoporosis and among HBV co-infected patients.

Caution: Tenofovir (TDF)

TDF may be associated with acute kidney injury or chronic kidney disease as well as reduced bone mineral density in pregnant women.

Clinical considerations when using TDF

- Patients should be initiated on TDF even in the absence of laboratory monitoring capacity for U &Es. However, efforts should be made to strengthen laboratory monitoring of patients,
- Routine blood pressure monitoring,
- Urine dipsticks may be used to detect glycosuria or severe TDF nephrotoxicity in individuals without diabetes using TDF-containing regimens.
- If the creatinine test is routinely available, use the estimated glomerular filtration rate at baseline before initiating TDF regimens.

Do not initiate TDF when the estimated glomerular filtration rate is <50 ml/min, or in long term diabetes, uncontrolled hypertension and renal failure.

Calculation of GFR or Creatinine clearance in ml/min using Cockcroft Gault Equation

Male: 1.23 X (140-age)x wt in Kg/ Creatinine (in micromols/L)

Female: 1.04 X (140-age) x wt in kg/ Creatinine (in micromols/L

Substitution in the event of medicine toxicity / adverse events and unavailability

If the patient has suspected adverse medicine events, therapy should be altered as follows (change of a single medicine in a multi-medicine regimen is permitted—that is, the offending medicine may be replaced, preferably with an alternative medicine of the same class):

- Given Zidovudine toxicity such as anaemia or neutropenia, Zidovudine will be replaced by Tenofovir.
- In the event of lactic acidosis, the current ARVs should be discontinued and ART restarted after checking for normalization of the lactate levels.
- In case of severe psychiatric reaction on EFV give NVP
- In case creatinine clearance is known and < 50ml/min give AZT.

An alternative to lamivudine (3TC) is emtricitabine (FTC); these medicines are considered pharmacologically equivalent. In the event that you come across a patient on Tenofovir/Emtricitabine /Efavirenz, you may substitute Emtricitabine with Lamivudine.

For patients presenting with renal impairment, consult/ refer for specialist opinion.

SECOND-LINE TREATMENT RECOMMENDATION FOR ADULTS AND ADOLESCENTS

Ideally, patients who fail to respond to first-line treatment should be treated with a different regimen containing medicines that were *not* included in the first regimen. The second-line regimen will consist of two NRTIs but with a PI if the initial regimen contained DTG. The second-line regimen should be initiated only after assessing treatment adherence and failure and in consultation with a specialist in HIV and AIDS treatment or the clinical mentorship team at the OI/ART clinic, as the recommendation will be based

on what the patient is already taking or has taken in the past. *Clinical mentors should be consulted where there is doubt about what to do.* More adherence counselling will be required in preparation for the planned new therapy.

Table 9.1: Preferred second line regimens for adults and adolescents including pregnant and breastfeeding women

Failing first line Regimens	Preferred second line Regimens	Alternate second-line Regimens
Tenofovir 300mg {TDF (or TAF)} + Lamivudine 300mg (3TC) + Dolutegravir 50mg (DTG) or ABC + 3TC + DTG	Zidovudine 300mg (AZT) + Lamivudine 300mg (3TC) + Atazanavir/Ritonavir 300/100mg (ATV/r)	Zidovudine 300mg (AZT) + Lamivudine 300mg (3TC) +Lopinavir/ritonavir LPV/r
TDF (or TAF) + 3TC (or FTC) + ATV/r **TDF (or TAF) + 3TC + EFV**	AZT + 3TC + DTG	AZT + 3TC + LPV/r
AZT + 3TC + EFV	TDF (or TAF) + 3TC + DTG	

Failing first line Regimens

A. Tenofovir 300mg {TDF (or TAF)} + Lamivudine 300mg (3TC) + Dolutegravir 50mg (DTG) or ABC + 3TC + DTG

Preferred second line Regimen

Medicine	Codes	Adult dose	Frequency	Duration
zidovudine 300mg (AZT) + lamivudine 300mg (3TC) + atazanavir/ritonavir 300/100mg (ATV/r) (PO)	**C V**	1 tablet of AZT/3TC in the morning and 1 tablet each of AZT/3TC and ATV/r in the evening		life

or	**zidovudine 300mg (AZT)+ lamivudine 300mg (3TC) + lopinavir/ritonavir LPV/r**	**C**	**V**	1 tablet of AZT/3TC and 2 tablets of LPV/r in the morning and evening	life

B. TDF (or TAF) + 3TC (or FTC) + ATV/r or TDF (or TAF) + 3TC + EFV

Preferred Second Line Regimen

	Medicine	Codes		Adult dose	Frequency	Duration
	AZT + 3TC + DTG[**]	**C**	**V**	1 tablet of AZT/3TC and DTG in the morning and 1 tablet each of AZT/3TC in the evening		life
or	**AZT + 3TC + LPV/r**	**C**	**V**	1 tablet of AZT/3TC and 2 tablets of LPV/r in the morning and evening		life

C. AZT + 3TC + EFV

Preferred Second Line Regimen

Medicine	Codes		Adult dose	Frequency	Duration
TDF (or TAF) + 3TC + DTG[***]	**C**	**V**	1 tablet	once a day	life

If TDF + 3TC or ABC + 3TC (or FTC) was used in the failing first-line regimen, AZT + 3TC should be used in second-line ART and vice versa

For HIV/TB coinfection on rifampicin-based regimen, use LPV/R (super booster) instead of ATV/r and DTG twice daily instead of DTG once daily Maintain TDF in the second line for patients with chronic HBV coinfection

Main Considerations:

- Patients failing first line (ref to ART Guidelines) should be switched to an effective second line regimen.
- Precautions in the use of DTG also apply for second- and third-line ARV regimens

THIRD-LINE TREATMENT RECOMMENDATION FOR ADULTS AND ADOLESCENTS

In adolescents older than 12 years and adults; the preferred 3rd line ART can include Dolutegravir (50mg), Darunavir (600mg)/Ritonavir (100mg) and 2NRTIs.

Main Considerations:

- **GENOTYPING TESTING IS RECOMMENDED PRIOR TO SWITCHING PATIENTS FAILING SECOND LINE ART** with clinicians required to actively rule out poor adherence before genotypic testing.
- In PI experienced patients; Darunavir (600mg)/Ritonavir (100mg) should be given twice daily

3rd line patients with a history of integrase strand transfer inhibitor (INSTI) use e.g. DTG or Raltegravir, DTG should be given twice daily.

USE OF ARVS IN PATIENTS WITH TB

(Refer to the latest national TB guidelines or TB/HIV guidelines)

TB is the most common OI encountered among people with HIV infection in Zimbabwe. Since the advent of the pandemic of HIV infection, TB has remained a serious public-health problem. Studies have shown that up to 50% of people with HIV infection develop TB and that up to 85% of patients with TB have HIV infection. In addition, TB accounts for a third of HIV-related deaths. There is a need to integrate the HIV and TB services, as TB and HIV coinfection is common. ***All patients living with HIV should be screened for TB at every visit using the standard TB screening tools.*** Rifampicin interacts adversely with some antiretroviral agents such as PIs therefore,

- TB patients on Rifampicin should receive DTG 50mg twice a day
- Efavirenz 400mg can be co-administered with rifampicin containing anti-TB treatment; is well tolerated and plasma concentrations were maintained above the levels considered to be effective.
- For HIV/TB coinfection on rifampicin-based regimen, use LPV/R (super booster) instead of ATV/r

PATIENTS WITH TB WHO ARE NOT YET ON ART

In patients who have HIV-related TB but are not yet on ART, treatment of TB takes priority. ART should be started at least two weeks after the start of TB therapy i.e. during the intensive phase when the patient has stabilised on TB treatment regardless of their CD4 count status. Cotrimoxazole prophylaxis

should be provided with the commencement of the TB therapy if the patient is not on it already.

Patients who develop TB when already on ART

Treat TB as per national TB guidelines.

USE OF ARVS IN PATIENTS WITH CRYPTOCOCCAL MENINGITIS

Prevention of Cryptococcal Disease

Patients initiating ART with undiagnosed cryptococcal disease are at higher risk of early mortality than patients who are pre-emptively diagnosed and treated for cryptococcal disease. All patients initiating ART should be clinically screened for evidence of symptomatic cryptococcal disease – headache, neck stiffness, fever, focal neurologic signs, confusion, and altered mental status. All those who screen positive should be referred for further diagnostic work up for meningitis. Screening of asymptomatic ART naïve individuals with CD4 count <100cells/mm3 is recommended and should be done with a Cryptococcal neoformans antigen test (CrAg) using latex agglutination tests (LA) or lateral flow assays (LFA) on serum, plasma or CSF. A lumbar puncture should be offered to individuals who screen positive for cryptococcal antigen, as a positive cryptococcal antigen may precede the onset of clinical cryptococcal meningitis by many weeks.

Individuals who are screened for cryptococcal disease should be managed as indicated in Table 9.2.

Table 9.2: Treatment decisions for asymptomatic cryptococcal disease

Serum CrAg negative	No LP necessary. No fluconazole required. Initiate ART.
Serum CrAg positive	If available recommend LP:
	If CSF CrAg positive, manage for cryptococcal meningitis
	If CSF CrAg negative treat with Fluconazole 800mg orally once daily for 2 weeks, then Fluconazole 400mg orally daily for 8 weeks, followed by maintenance therapy with Fluconazole 200mg orally daily until CD4>200 cells/mm^3 for 6 months

Timing of ART for individuals with asymptomatic cryptococcal antigenemia is unknown. We recommend initiation of ART 2-4 weeks after initiation of

antifungal therapy in individuals who screen positive for serum CrAg without any evidence of disseminated cryptococcal meningitis.

Timing of ART in cryptococcal meningitis

The timing of the initiation of ART in patients with cryptococcal meningitis is still uncertain. Early initiation of ART is recommended for all OIs except for intracranial OIs such as TB meningitis and cryptococcal meningitis. In cryptococcal meningitis ART can be initiated 4- 6 weeks after initiation of antifungal therapy with amphotericin B based regimens. In patients who are predominately treated with fluconazole monotherapy ART should be initiated at least 4 weeks after initiation of antifungal therapy.

ART should not be commenced at the same time that amphotericin B and/or fluconazole therapy is commenced for cryptococcal meningitis.

USE OF ARVS IN CHILDREN

More than 90% of HIV-infected children acquire their infection through mother to child transmission of HIV (vertical transmission). **Thus, elimination of new HIV infections among children through effective PMTCT interventions should be prioritized**. HIV disease progression occurs very rapidly in the first few months of life in infants acquiring HIV in utero, often leading to death. The importance of early infant diagnosis (EID) of HIV infection and early initiation of ART can therefore not be overemphasised.

EARLY INFANT DIAGNOSIS

Birth PCR where available will be done within 48hrs of birth ONLY for high MTCT risk infants. ART initiation is recommended as soon as birth PCR results are available. For babies who test HIV positive at birth ALWAYS retest and confirm results with repeat PCR but retesting should not delay ART initiation. Babies who test negative at birth (birth PCR) or not tested MUST be tested at 6 weeks. Infants at high risk of transmission will receive dual ARVs (AZT and NVP) for 12 weeks as prophylaxis if breastfeeding and 6 weeks if not breastfeeding. Cotrimoxazole must be started from 6 weeks of age even in babies on longer duration of prophylaxis and continued through adolescence.

All infants with unknown or uncertain HIV exposure being attended to at health-care facilities at or around birth or at the first postnatal visit (usually 4–6 weeks) or other child health visit should have their HIV exposure status ascertained. This can be done in by: • Asking if the mother knows her HIV status or is on ART • Checking the hand held child health card for information on maternal HIV status • Performing a rapid HIV test on the mother • Performing a rapid HIV test on the baby- N.B. this can be used to

assess HIV exposure only in infants less than 4 months of age. HIV-exposure status in infants and children 4–18 months of age should be ascertained by undertaking HIV serological testing in the mother

Where virological testing is not available for children under 18 months of age, a presumptive diagnosis of severe HIV disease should be made if the infant is confirmed HIV antibody positive and:

1. Diagnosis of any AIDS-defining condition(s) can be made, or
2. The infant is symptomatic with two or more of the following:
    1. Oral thrush
    2. Severe pneumonia
    3. Severe sepsis

Infants under 18 months of age with clinically diagnosed presumptive severe HIV should be started on ART. Confirmation of HIV diagnosis should be obtained as soon as possible.

RECOMMENDATIONS FOR ANTIBODY TESTING IN INFANTS

Antibody tests (rapid and laboratory-based ELISA) are the preferred method of diagnosis for HIV infection for children over 18 months of age.

In a child under 18 months who has *never been* breastfed and HIV antibody tests are *negative*, this child is uninfected and virological testing is indicated only if clinical signs or subsequent events suggest HIV infection.

In a child under 18 months who has not breastfed for more than six weeks, HIV antibody tests that are *negative* mean the child is uninfected.
HIV antibody tests that are *positive* at any age under 18 months identify those infants who need virological tests (i.e., the child is HIV exposed but needs definitive test with HIV DNA PCR to confirm HIV infection).

CARE OF AN HIV-EXPOSED INFANT

Initial care

Care for HIV-exposed infants should include the following:

- Make sure HIV-exposed infants are entered into the “HIV exposed follow-up register”.

- All HIV-exposed infants should have a HIV DNA PCR testing performed from six weeks of age or at the earliest possible time thereafter if 6 weeks testing is missed.

- Cotrimoxazole prophylaxis should be given from six weeks of age until the HIV status of the infant is known. If HIV infection is confirmed, continue cotrimoxazole and commence on ART.

- Monthly follow up visits are recommended, but more frequent visits may be needed if problems are detected.

During these visits the following services should be provided:

- *Growth monitoring and promotion*
- *Developmental assessment*

Counselling on infant and young child feeding:

- Counselling and support for the HIV infected mother to adhere to ART is crucial.
- Weaning should not be abrupt, but rather should be gradual over a one month period.
- HIV-infected infants diagnosed by virological testing or infants with symptoms suggestive of HIV should continue breastfeeding for as long as possible.
- *Immunisations* should be given according to the national guidelines. The BCG vaccination should still be given at birth, but BCG should not be given to children with symptomatic HIV infection.
- Always look for and treat *opportunistic infections.*

MANAGEMENT OF AN HIV-INFECTED CHILD USING ARVS

Infants and young children have an exceptionally high risk of poor outcomes from HIV infection.
The goal of ART for children is to increase survival and decrease HIV-related morbidity and mortality.

Criteria to initiate ART in children
Test earlier, test closer (using early infant diagnosis POC where available) and treat earlier. ART should be initiated in ALL children living with HIV, regardless of WHO clinical stage and CD4 count. Children under 5 years or with WHO clinical stage III/IV or CD4 < 25% (< 5 years) or ≤ 350 (>5 years) should be a priority.

Issues to consider in initiating ART in children

Psychosocial factors: It is important to identify and counsel at least one dedicated caregiver who can supervise and/or give medicines. *Disclosure:* The process of disclosure to the child should be initiated as early as possible, usually from as early as 5 – 7 years of age. *Adherence is good in children who know their status and are supported to adhere to medicines.*

Table 9.3: Recommended first-line treatment for children

	Preferred First line treatment	**Alternative first line treatment**	**Special circumstances**
Neonates (up to 6 weeks)	Zidovudine (AZT) + Lamivudine (3TC) + Raltegravir (Ral)*	AZT + 3TC + NVP	AZT + 3TC + Lopinavir/ritonavir (LPV/r)
Children > 6 weeks	AZT + 3TC + Lopinavir/ritonavir (LPV/r)	AZT + 3TC + NVP ABC + 3TC + LPV/r ABC + 3TC + NVP	
Children and adolescents >25kg	ABC + 3TC + Dolutegravir (DTG)**	ABC + 3TC + LPV/r	ABC + 3TC + Efavirenz (EFV)[U] AZT + 3TC + Lopinavir/ritonavir (LPV/r)∞

*For the shortest time possible (ideally for 2 weeks with transition to LPV/r syrup or granules). To allow for convenience and to align with the EPI schedule, RAL in neonates can be given for the first 6 weeks of life with substitution to LPV/r at 6 weeks of age until dosage formulations of DTG become available.

** For age and weight groups with DTG approved dosing and where LPV/r is not available

[U] From 3 years of age

∞ In cases where no other alternatives are available

Monitoring children on ART

- Check haemoglobin after at least 6-8 weeks if on Zidovudine
- Use urine dipsticks to check for glycosuria and estimated glomerular filtration rate (eGFR) and/or serum creatinine when on Tenofovir
- Check for alanine aminotransferase (ALT) when on Nevirapine
- Check CD4 count every 6 months
- Conduct viral load testing once every year or when clinical signs are suggestive of treatment failure

RECOMMENDED SECOND-LINE TREATMENT FOR CHILDREN

Definition of treatment failure in children

Clinical Failure:
New or recurrent clinical event indicating advanced or severe immunodeficiency (WHO clinical stage 3 and 4, clinical condition with exception of TB) after 6 months of effective treatment

Immunological failure:
In children younger than 5years: - CD4 levels persistently below 200 cells/mm^3 or CD4 percentage <10%

Children older than 5 years - CD4 levels persistently below 100cells/mm^3

Virological failure:
Plasma viral load above 1000 copies/ ml based on two consecutive viral load measurements after 3-months, with adherence support.

OR If using dry blood spot technology, a viral load above 3000 copies/ml based on two consecutive viral load measurements after 3 months, with adherence support.

Table 9.4: Recommended 2nd and 3rd Line ART r regimens

Failing first line	Second line	Third line
ABC +3TC + LPV/r	AZT +3TC +DTG	DRV/r + 2NRTIs
ABC + 3TC + DTG	TDF +3TC +LPV/r	DTG+DR V/r + 2NRTIs
ABC + 3TC + EFV	TDF + 3TC + DTG	
TDF + 3TC + DTG	AZT + 3TC + ATV/r or LPV/r	

Where dosage guidelines and appropriate formulations are available, DTG is preferred as first line in children
DTG can also be used in 1st, 2nd and 3rd line
EFV should not be used in children less than 3 years of age
DRV should not be used for children younger than 3 years of age. DRV should be used with ritonavir boosting in those above 3 years of age

Discuss the child with your mentor IF NOT SURE OF SECOND LINE TREATMENT

Starting ART in children using FDCs

Refer to dosing table. Keep the following factors in mind regarding dosing:

- Medicine doses must be adjusted as the child grows.
- Dosing is by weight.
- Overdosing up to 10% is acceptable.
- Scored tablets may be divided into two equal halves
- Tablets may be crushed and mixed with a small amount food or water and administered immediately.

	Strength of tablet or sprinkle sachet or capsule	No. of tablets or sprinkle capsule/sachets by weight band											
		3-5.9kg		6 -9.9kg		10-13.9kg		14-19.9kg		20-24.9kg		25-34.9kg	
		AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	
AZT/3TC/NVP	60mg/30mg/50mg	1	1	1.5	1.5	2	2	2.5	2.5	3	3	4	4
Raltegravir: tablet (chewable):	25 mg;												
Raltegravir: tablet	400 mg												
Raltegravir: granules for oral suspension:	100 mg in sachet												
LPV/r solid oral dosages	40mg/10mg	2	2	3	3	4	4	5	5	6	6		
ABC/3TC/LPV/r	30mg/15mg/ 40mg/10mg	2	2	3	3	4	4	5	5	6	6		
AZT/3TC/LPV/r	30mg/15mg/ 40mg/10mg	2	2	3	3	4	4	5	5	6	6		
DRV/r	240/40mg	-	-	-	-	1	1	1	1	2	1		
ATV/r	100/33mg	-				1		1		2			
ABC/3TC	120/60mg	1		1.5		2		2.5		3			
TDF/3TC	75mg/75mg					1.5		2		2.5		3-3.5	
TDF/3TC/EFV	75mg/75mg/150mg					1.5		2		2.5		3-3.5	

TDF/3TC adult double scored	300mg/300mg			one third	one half	two thirds	1
TDF/3TC/EFV adult double scored	300mg/300mg/ 600mg			one third	one half	two thirds	1

Table 9.5: Recommended Paediatric ARV medicines (adopted from WHO 2013)
3 tablets for 25-29.9kg and 3.5 tablets for 30-34.9kg
TDF tablets are scored to break into half or third.

PRE-EXPOSURE PROPHYLAXIS (PrEP)

Pre-exposure prophylaxis (PrEP) is the use of ARVs by people who are not infected with HIV before HIV exposure in order to prevent the acquisition of HIV. With optimum adherence, oral PrEP is more than 90% effective in reducing the risk of HIV infection.

Eligibility criteria for oral PrEP

Oral PrEP should be offered to individuals who are HIV negative and are at substantial risk of HIV infection. Individuals at high risk have:

- Multiple sexual partners
- Inconsistent and incorrect use of condoms
- Engage in transactional sex
- Use or abuse of injectable drugs and alcohol
- Episode(s) of STI within the last six months
- Discordant couples, especially if the HIV positive partner is not on ART or has been on ART for less than six months or those with high viral load
- Recurrent users of PEP

In addition, individuals should commit and be supported to adhere to PrEP. Sub-populations considered to be at high risk for HIV infection include: people in sero-discordant relationships, sex workers, and long distance truck drivers, men who have sex with other men (MSM), adolescent girls and young women and pregnant and breastfeeding women.

Recommended regimens for oral PrEP

	Medicine	Codes		Adult dose	Frequency	Duration
	tenofovir (TDF) 300mg + emtricitabine (FTC) 200mg	**C**	**V**	1tablet FDC	once only	period of substantial risk
or	**tenofovir (TDF) 300mg + lamivudine (3TC) 300mg**	**C**	**V**	1tablet FDC	once only	period of substantial risk

NB: In cases where TDF/FTC or TDF/3TC are both not available, TDF single formulation can be used

NB It takes about **7 days** of daily dosing PrEP to be effective. During this period, other HIV preventive options such as abstinence and condoms must be used.

- PrEP medications should be continued for **28 days** after the last potential HIV exposure in those wanting to stop taking PrEP.
- PrEP may be used intermittently during periods of perceived HIV acquisition risk, rather than continually and lifelong, as is the case with antiretroviral treatment.

- Other regimens and formulations for PrEP will be introduced in the future

Contraindications for PrEP

- HIV positive status
- Unknown HIV status
- Recent exposure (in the past 72 hours)
- Evidence or suspicion of HIV primary infection (characterised by a flu-like illness)
- Allergy to any of the PrEP medicines
- Unwilling/unable to adhere to PrEP
- Known renal impairment
- Estimated creatinine clearance of <60 cc/min

Follow up and Monitoring of PrEP clients

- After initiating PrEP, the client should be reviewed after one month to monitor adherence and side effects as well as resupply of medicines, subsequent clinic visits should be every three months
- Perform an HIV antibody test every three months and document negative HIV status
- For women, perform a pregnancy test based on clinical history. Pregnancy is not a contraindication for PrEP use
- Review the client's understanding of PrEP, any barriers to adherence, tolerance to the medication as well as any side effects
- Review the client's risk exposure profile and perform risk reduction counselling
- Evaluate and support PrEP adherence at each clinic visit
- Evaluate the client for any symptoms of STIs at every visit and treat as needed
- Provide risk assessment and risk reduction counselling at every visit

Discontinuing PrEP

PrEP can be discontinued in the following circumstances:

- On seroconversion (HIV positive)
- Intolerable toxicities and side effects associated with PrEP use
- Changed life situations resulting in lowered risk of HIV acquisition
- Social adverse events associated with PrEP
- Poor adherence despite efforts to improve daily pill taking
- When a personal choice is made to stop PrEP. Such individuals should be linked to other preferred HIV prevention options

- In sero-discordant couples when HIV infected partner on ART has achieved viral suppression (VL<1,000 copies/ml) with at least 6 months of ART

NB It is important to ensure that the client continues to take the medicines for at least 28 days after the last exposure.

POST-EXPOSURE PROPHYLAXIS (PEP)

In people who have been exposed to HIV through needle-stick inoculation or through contamination of mucous membranes by secretions, it has been shown that administration of ARVs within 72 hours of exposure reduces the likelihood of HIV infection being transmitted. There are also similar benefits of reduction of HIV transmission following use of PEP within 72 hours for those who have been sexually assaulted (rape, intimate partner violence or sexual abuse) or had a high risk unprotected sexual encounter. In these situations, ART needs to be continued for one month. The following guidelines should be followed in the event of accidental occupational exposure to material (i.e., blood, secretions, and excretions) that may contain HIV, and also after sexual assault or high risk sexual encounter. Occupational exposure to potentially infectious material may occur through an injury with a sharp object that has been used on a patient or through the contamination of mucous surfaces with patients' blood or secretions.

The following types of exposures should be considered for post-exposure prophylaxis:

- Needle-stick injury or injury with a sharp object used on a patient
- Mucosal exposure of the mouth or eyes by splashing fluids
- Broken skin exposed to a small volume of blood or secretions such as may occur with sexual assault (rape, intimate partner violence or sexual abuse)

Occupational exposure can be classified as high risk or low risk for HIV infection, as follows:

Low risk:

- Small volume (e.g., drops of blood) on mucous membranes or non-intact skin
- Source patient asymptomatic or with VL less than 1,500 copies/ml

High risk:

- Large-bore needle, deep injury
- Large-volume splash on mucous membranes or non-intact skin
- Source patient symptomatic or with high VL levels

Adults/Adolescents:

Preferred Regimen	**TDF /3TC/ DTG[a] OD**
Alternative Regimen	**TDF /3TC/ ATV/r[b] OD**
[a,b] Available at all health facilities from clinic upwards as starter pack and one-month course.	

Main Considerations:

There should be no delay in starting the best available starter pack in situations where resistance is suspected. Start the best available starter pack and then get expert advice on way forward.

10. USE OF ARVS FOR PREVENTION OF MOTHER-TO-CHILD TRANSMISSION OF HIV (PMTCT)

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GENERAL NOTES

Mother-to-child transmission is responsible for more than 90% of HIV infection in children and at least two thirds of such infections occur during pregnancy and delivery whilst the remainder occur during breastfeeding. It is therefore critical to identify HIV-positive pregnant and lactating women and manage them appropriately.

When to start ART in HIV positive pregnant and breastfeeding women

- All HIV infected pregnant and breastfeeding women should be initiated on lifelong antiretroviral treatment (ART) irrespective of their CD4 count or WHO clinical stage (Option B+).
- Women who are not yet ready for lifelong ART should be initiated on triple ARVs (ART), which should be continued at least for the duration of breastfeeding to prevent further risk of mother-to-child transmission of HIV through breast milk.

Being on lifelong ART will necessitate ongoing counselling of HIV positive pregnant and breastfeeding women to support retention and adherence and to minimize loss to follow-up.

- Emphasise modes of HIV transmission and prevention, PMTCT, and access to care and treatment.
- Encourage partner HIV testing and counselling
- Encourage the importance of skilled birth attendance, clean and safe delivery, and newborn care.
- Counsel on infant and young child feeding and maternal nutrition.
- Counsel on sexual and reproductive health including family planning and the need for dual contraception (reliable hormonal contraceptive plus barrier method like male or female condoms)
- Make an appointment for family planning at six weeks postpartum.
- Stress the need for condom use for prevention of STIs and HIV during pregnancy and in the postpartum period.
- Retest previously negative women: during 3rd trimester of pregnancy and/ or at delivery, 6 weeks post natally and 6monthly thereafter.
- Stress the importance of follow-up for the HIV exposed infant
  - Commence cotrimoxazole prophylaxis from 6 weeks of age
  - Collect Dried Blood Spot (DBS) for HIV DNA PCR test at 6 weeks of age i.e.Early Infant Diagnosis (EID).
  - Infants should be re-tested at the end of the breast-feeding period

When using ARVs in pregnant women, certain precautions should be kept in mind:

Dolutegravir (DTG)

Exposure to DTG at the time of conception may be associated with an increased risk of neural tube defects (NTDs) among infants although NTD risk has been further reduced compared to when first reported.

Efavirenz (EFV)

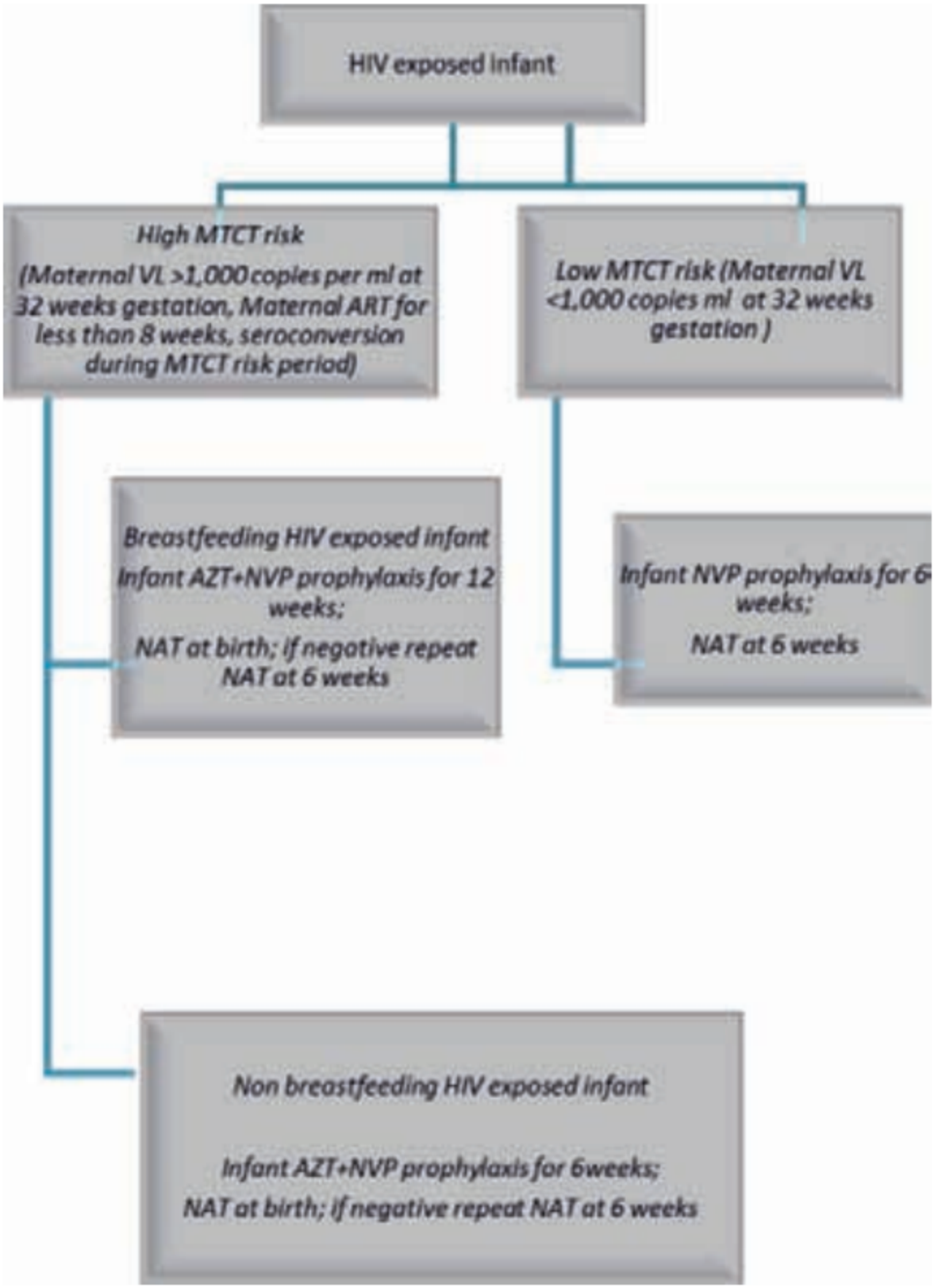
Previously there was a recommendation **not** to use Efavirenz during the first trimester and in women at risk of becoming pregnant. However, WHO issued evidence-based update on Efavirenz safety in pregnancy in 2011 which recommends it to be safe for use even in the first trimester.

Efavirenz 400mg is safe for use among pregnant women. Pharmacokinetic and pharmacodynamics studies suggest that the drug concentrations decline slightly during pregnancy; however, remain within therapeutic range and unlikely to reduce the drug efficacy.

INFANT AND YOUNG CHILD FEEDING RECOMMENDATIONS

All mothers whether known to be infected with HIV or not should exclusively breastfeed their infants (no mixed feeding) for the first 6 months of life, introducing safe, adequate and nutritious complementary foods thereafter, with continued breastfeeding up to 24 months and beyond.

ARV PROPHYLAXIS IN AN HIV-EXPOSED INFANT



11. TUBERCULOSIS

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GENERAL NOTES

Tuberculosis (TB) is a chronic, infectious, debilitating disease, caused by Mycobacterium tuberculosis bacterium. It is a public health problem and all cases must be notified to the Provincial/City Medical Director in terms of the Public Health Act.

CONTROL OF TUBERCULOSIS - TB POLICY

More information on National Policy and the organisation of TB services is available in various TB resource documents, including but not limited to: Tuberculosis and Leprosy Management Guidelines, Clinical Guidelines for the Management of Drug Resistant Tuberculosis (DR-TB) and the Zimbabwe National TB Strategic Plan.

The essential points of the TB policy are:

- Rapid molecular diagnostics (Xpert MTB/Rif / Xpert MTB/Rif Ultra) are the preferred diagnostic test for all patients undergoing TB investigation.
- TB medicines are provided free of charge in the public health sector.
- TB services are available and integrated at all levels of the health delivery system.
- Collaborative TB/HIV activities are to be ensured at all levels.

An important emphasis of the TB programme is the **direct observation of treatment (DOT)**, which is the practice of a treatment supervisor watching the patient taking their daily doses. A supervisor can either be a Health Care Worker or a trained member of the community. Notification, registration, record keeping and contact tracing activities - in addition to treatment - are key to the success of the programme.

TB first line fixed dose combinations (FL FDCs) are to be available at all levels from C through to A. Single formulations are B level medicines. TB medicines are accorded V level of priority.

TUBERCULOSIS PREVENTION

Primary prevention

BCG vaccination should be given to all babies at birth - or at first contact with the child after birth – according to national guidelines. While BCG does not offer complete immunity to tuberculosis, it offers protection from the severe forms of tuberculosis such as miliary TB and TB meningitis.

- BCG vaccine should be given to all babies at birth or at first contact with the child after birth, **except** babies with clinical signs of HIV infection and/or in infants born to a mother with sputum positive TB.
- BCG is given intradermally on the right upper arm, above the insertion of the deltoid muscle.
- The batch number of the vaccine and the date must be recorded on the child's health card.
- No booster dose should be given.

Dosage is as recommended by the EPI (see the chapter on Immunisation).

Problems associated with BCG vaccination remain uncommon and are mainly due to faulty technique.

Abscesses or ulcers should be treated with local hygienic care. Abscesses should be aspirated not incised. Secondary infections can be treated with antibiotics. Non-healing ulcers, (ulcers of duration > 8 weeks) or regional lymphadenopathy can be treated as follows, (*see table10.1)*.

BCG related regional lymphadenopathy treatment

Medicine	Codes	Dose	Frequency	Duration
isoniazid po	**B V**	10mg/kg	once a day	2 months

SECONDARY PREVENTION

TB PREVENTIVE THERAPY (TPT)

TPT priority target groups are PLHIV and household contacts of bacteriologically confirmed TB index cases including child (<15 years) and adult (>15 years) contacts. See table 10.2 for the current TPT options.

Table 10.1: Preferred LTBI Treatment Options

Population Group	Preferred Treatment	Alternative
Adults		
PLHIV on EFV and DTG based regimen	Rifapentine plus isoniazid [3HP]	Isoniazid alone [6H]
PLHIV on TAF-based regimen, or PIs	Isoniazid alone	-

	[6H]	
HIV negative contacts (adults and adolescents >15 years)	Rifapentine plus isoniazid [3HP]	Isoniazid alone [6H]
Children		
CLHIV on EFV-based regimen (Adolescents, children >2yrs)	Rifapentine plus isoniazid [3HP]	Isoniazid alone [6H]
CLHIV on DTG -based regimen, PIs and NNRTIs	Isoniazid alone [6H]	
HIV negative contacts (children under 15s)	Isoniazid plus rifampicin (RH) [3RH]	Isoniazid alone [6H]
Special Groups		
*MDR-TB Contacts	Levofloxacin [6LFX]	-
Pregnant women	Isoniazid alone [6H]	

* The preventive treatment for MDR contacts should be individualized after a careful assessment of the intensity of exposure, the certainty of the source case, reliable information on the drug resistance pattern of the source case and potential adverse events. The preventive treatment should be given only to household contacts at high risk in whom active disease has been ruled out (e.g. children 5 years and below, people receiving immunosuppressive therapy and people living with HIV). Levofloxacin should be selected according to the drug susceptibility profile of the index case. Confirmation of infection with LTBI tests is required.

Table 10.2: Recommended TPT doses by Regimen

Regimen	Dose	Maximum Dose
Rifapentine plus isoniazid [3HP]	Weekly for 3 months (12 doses) **Isoniazid** Individuals aged ≥ 12 years: 15 mg/kg Individuals aged 2–11 years: 25 mg/kg **Rifapentine:** 10.0–15.0 kg = 300 mg 15.1–23.0 kg = 450 mg 23.1–30.0 kg = 600 mg >30.1= 900 mg	Isoniazid, 900mg Rifapentine, 900mg
Isoniazid alone [6H]	Daily for 6 months Adults: 5 mg/kg Children: 10mgkg (range 7–15 mg)/kg	300 mg
Isoniazid plus rifampicin [3RH]	Daily for 3 months **Isoniazid:** Children: 10 mg/kg (range, 7–15 mg/kg) **Rifampicin:** Children, 15 mg/kg (range, 10–20 mg/kg)	Isoniazid, 300 mg Rifampicin, 600 mg

More guidance on TB preventive therapy, especially on new approaches, may be found in the Tuberculosis and Leprosy Management Guidelines, Clinical Guidelines for the Management of Drug Resistant Tuberculosis and the Guidelines for Antiretroviral Therapy for the Prevention and Treatment of HIV in Zimbabwe.

Approach to new-born and under five TB contacts

An infant born to a mother with sputum positive TB should not be given BCG at birth:

- Give the child the appropriate TPT regimen preferably 3HR, for two months .
- After two months, perform a Tuberculin Skin test.

- If the Tuberculin skin test is positive give full TB treatment.
- If the Mantoux test is negative continue with TPT regimen 1 month for 3HR and 4 months for 6H.

- Follow with BCG vaccination if not contraindicated (refer to Immunization Chapter)

For all contacts of a sputum positive TB case, evaluate for signs of active TB; for children check the BCG vaccination status and vaccinate if not already done. Commence on the appropriate TPT regimen see Tables 10.3 and 10.4.

Contact investigation should be conducted to screen and manage all household and close contacts of the index (initial TB case).

Refer to the Zimbabwe Tuberculosis and Leprosy Management guidelines for additional information.

TUBERCULOSIS CASE MANAGEMENT

Diagnosis of TB

The presence of pulmonary tuberculosis should be suspected in individuals presenting with one or more of the following complaints:

- Cough for 1 week or longer,
- Night sweats,
- Fever,
- Loss of weight,
- a BMI <17kg/m^2 or failure to thrive among children.

Laboratory Investigations

Every effort should be made to bacteriologically confirm the diagnosis of TB, with rapid molecular test such as the Xpert MTB/Rif test being the preferred diagnostic test for patients being evaluated for tuberculosis. A specimen should be submitted **for all cases being investigated for pulmonary TB** as per TB diagnostic algorithm, in order to confirm the diagnosis of Tuberculosis. (see the National Tuberculosis and Leprosy Control Guidelines)

Chest X-Rays

Chest X-ray is recommended as a priority **SCREENING** test for persons classified as being at high risk for tuberculosis. The following persons are classified as being at high risk for tuberculosis:

- Children under the age of 5 years.
- People living with HIV.
- Those who are malnourished.
- People above 60 years of age.
- People with diabetes mellitus.
- People who drink alcohol excessively.
- Miners and ex-miners.
- People in congregate settings.
- Inmates and correctional facility communities.
- Health care workers.

Note: In the presence of clinical improvement, it is not necessary to monitor the response of pulmonary TB to treatment by chest x-rays.

Tuberculin Testing

Table 10.3: Tuberculin Skin Testing

Medicine	Codes	Dose	Frequency	Duration
tuberculin, purified (PPD) 1:1000 intradermal	**B E**	0.1ml (=5TU)	-	-

Examine induration at 48-72 hours.

- A positive tuberculin skin test (person with normal immunity: induration > 10 mm, person with defective immunity: induration > 5 mm) may indicate active infection (especially if strongly positive), previous infection or previous BCG.
- Absence of a response does not exclude TB because individuals with HIV may not have sufficient immunity for a positive skin test despite active TB.
- If a child under 3 years of age has not had BCG, the Mantoux test may be useful.

TREATMENT REGIMENS FOR TB

One treatment regimen is now used in Zimbabwe for the treatment of drug sensitive TB, regardless of the treatment history. The regimen consists of a combination of the four first line medicines HRZE:

H= isoniazid **E=** ethambutol

R= rifampicin **Z=** pyrazinamide

These medicines are available as Fixed Dose Combination (FDC). See tables on the next page for dosing.

The intention of these combination tablets is to improve compliance by reducing the number of tablets a patient takes, and to reduce the possibility of medicine resistance developing. The number of FDC tablets is determined by a weight range of each patient at the start of treatment

- Treatment is the same for HIV infected people as for non-HIV infected.

Treatment of Drug-Sensitive TB

All **drug sensitive cases** of TB regardless of site, severity **or previous treatment history** are treated using the regimens summarised below (*see table 10.8*).

Table 10.4: Treatment of Rifampicin Sensitive TB

	Regimen	Intensive Phase	Continuation Phase
ADULTS (DOTS)	**2HRZE/4HR**	2 months HRZE	4 months HR OR 6 months HR (for TB of meninges, bone, joint, pericardium, disseminated spinal disease, the continuation phase is extended
CHILDREN (DOTS)	**2HRZE/4HR**	2 months HRZE	4 months HR OR 10 months HR (for patients with TB of the meninges, bone joint, pericardium, military TB or TB spine the continuation phase is extended

***General notes**:*

- *In all pulmonary tuberculosis cases, sputum smear examination is done at the end of two months, five months and at the end of treatment. Refer to the National Tuberculosis and Leprosy Management Guidelines for the management of a positive smear at any stage in the monitoring of treatment.*
- *Children weighing less than 25kg receive paediatric FDC HRZ plus additional isoniazid and ethambutol.*
- *Children weighing 25kg and above receive adult formulations and additional isoniazid.*
- *The total duration of treatment is 6 months (exceptions noted in this chapter).*
- *Children with tuberculous meningitis or pericarditis, disseminated or spinal disease with neurological complications should be given 10HR (continuous phase) i.e. 10 months of isoniazid and rifampicin under direct observation.*
- *Adults with TB of meninges, bone, joint, pericardium, disseminated, or spinal disease should be given 6 HR (continuous phase) i.e. 6 months of isoniazid and rifampicin under direct observation.*

FIXED DOSE COMBINATION OF ANTI-TB MEDICINES

The essential anti-TB medicines are available as FDCs such that each tablet has a combination of 2 (2-FDC), 3 (3-FDC), or 4 (4-FDC) medicines. The FDCs available in Zimbabwe are:

- **RHZE:** Rifampicin, Isoniazid, Pyrazinamide and Ethambutol
- **RHZ:** Rifampicin, Isoniazid and Pyrazinamide
- **RH**: Rifampicin and Isoniazid

The number of FDC tablets is determined by a weight range of each patient at the start of treatment as shown in table 10.7 and table 10.9.

Table 10.5: Paediatric medicines FDC dosing by weight band

Weight Band	Recommended Regimen		
	Intensive Phase		Continuation Phase
	RHZ (75/50/150)	E (100)	RH (75/50)
4-7kg	1	1	1
8-11kg	2	2	2
12-15kg	3	3	3
16-24kg	4	4	4
25kgs and above	Use adult dosages and formulations		

All patients receiving isoniazid containing regimens should receive supplemental pyridoxine

Table 10.8: Supplemental pyridoxine dosing

Medicine	Codes	Dose	Frequency	Duration
pyridoxine po	**C E**	25mg -Adults; 12.5mg Peads	once daily	for the duration of treatment with INH

**All patients receiving isoniazid containing regimens should receive supplemental pyridoxine*

Table 10.6: Adult FDC Dosing by weight bands

Weight Band	**Intensive phase - 2 months** 2(RHZE) daily (Isoniazid 75mg + Rifampicin 150mg + pyrazinamide 400mg + Ethambutol 275mg).	**Continuation phase - 4 months** 4 (HR) daily (Isoniazid 75mg+ Rifampicin 150mg)
25-39 kg	2	2
40-54 kg	3	3
55-70 kg	4	4
70 kg +	5	5

ADVERSE MEDICINE REACTION

All suspected adverse drug reactions (ADR) must be reported to the Medicines Control Authority of Zimbabwe (MCAZ) using spontaneous Adverse Drug Reaction reporting forms or the MCAZ online reporting platform: https://e-pv.mcaz.co.zw/

In the event of an adverse reaction to anti-TB medicines, stop all TB medicines and assess. If necessary, evaluate the liver function then reintroduce one medicine at a time and build up gradually. Start with isoniazid at 25mg – the least likely to cause a reaction and end with the most likely toxic e.g. pyrazinamide in jaundice/hepatoxicity. When the required dose has been achieved without any reaction, another medicine should be re-introduced in a similar manner - slowly, increasing the dose daily, for example Table 10.12 details the management of anti-TB induced hepatitis

Table 10.7: Approach to the management of Anti-TB induced hepatitis

Drug	Day
Day 1	INH 25mg
Day 2	INH 50mg
Day 3	INH 100mg
Day 4	INH 300mg
Day 5	INH 300mg + R 150mg
Day 6	INH 300mg + R, 300mg
Day 7	INH 300mg + R 450mg
Day 8	INH 300mg +R 600mg (depends on weight)
Day 9	INH 300mg + R 600mg + E 400mg
Day 10	INH 300mg +R 600mg + E 800mg
Day 11	INH 300mg +R 600mg + E 1.2g (depends on weight)
Day 12	INH 300mg +R 600mg + E 1.2g + Z 400mg
Day 13	INH 300mg + R 600mg + E 1.2g + Z 800g
Day 14	INH 300mg + R 600mg + E 1.2g + Z 1.2g
Day 15	INH 300mg + R 600mg + E 1.2g + Z 1.6g (depends on weight)

Refer to the National TB Guidelines and leprosy for further guidance on management of adverse event.

TB and HIV Co-infection

Refer to the current national ARV guidelines as well as the TB manual. Also refer to the ARV chapter in this EDLIZ

Drug Resistant Tuberculosis

Drug resistant TB (DR-TB) is the presence of bacilli resistant to one or more anti-tuberculosis medicines. Resistance patterns are defined as follows:

Mono-resistance	Resistance to one first line drug only (H, R, Z, E or S)
Poly-resistance	Resistance to more than one first line drug, excluding combination of H and R

Multidrug resistance (MDR-TB)	Resistance to at least both H and R
Fluoroquinolone resistant tuberculosis	Resistance to fluoroquinolones with or without resistance to other anti-TB drugs.
Rifampicin Resistance (RR)	Resistance to rifampicin with or without resistance to other anti-TB drugs, including any resistance to Rifampicin (i.e. including mono- and poly-resistance.)

In Zimbabwe, most of patients are enrolled into the DR-TB treatment programme following an Xpert MTB/Rif test confirming resistance to rifampicin (MTB Detected/ Rif Resistance Detected.) Such patients receive the MDR-TB treatment regimen recommended (refer to Clinical Management of Drug Resistant Tuberculosis Guidelines).

While patients may have documented risk factors that predispose them to DR-TB, patients may also present with a primary episode of DR-TB with no apparent risk factors. Risk factors for developing DR-TB (or worsening the pattern or resistance) include the following:

- Patients who remain (or again become smear positive) during or after completing a TB treatment regimen.
- Improper treatment of TB/DR-TB which includes treatment interruptions, incorrect doses for the patient's weight
- Contact with a DRTB patient
- HIV infection
- Residence in high burden DRTB regions

The management of MDR-TB or XDR-TB cases is rapidly changing with emerging evidence on more patient friendly and effective regimens. The drugs and drug grouping used in the treatment of DR-TB is shown in table 10.12. For the latest guidance and practice recommendations on the management of DR-TB, please refer to the Clinical Management of Drug Resistant Tuberculosis Guidelines.

LIST OF DRUG RESISTANT TB (DR-TB) MEDICINES USED IN ZIMBABWE

Second-line medicines are B level medicines with V level of priority. However, second-line medicines are also to be found at primary health facilities for specific managing DRTB

Table 10.8: DR-TB medicines used in Zimbabwe

Drug Grouping and Rationale	Medications
Group A Drugs associated with improved outcomes and lower mortality in Individual Patient Data/ meta-analysis	Bedaquiline
	Levofloxacin or Moxifloxacin Linezolid
Group B Drugs associated with improved outcomes in IPD/meta-analysis,	Clofazimine Cycloserine
Group C Remaining agents for regimen construction listed in order of priority for use	Ethambutol Delamanid Pyrazinamide Carbapenems plus clavulanic acid Amikacin, streptomycin Ethionamide/prothionamide PAS

12. TROPICAL DISEASES

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ANTHRAX (CUTANEOUS)

Case definition: an acute bacterial disease caused by Bacillus anthracis (Gram-positive). It is manifested at first by itching of an exposed skin surface, followed by a painful lesion which becomes papular, then vesiculated and eventually develops into a depressed black eschar in 2-6 days.

***NB** Do not take any laboratory specimens, treat on clinical and epidemiological basis.*

Initial treatment, in severe cases:

	Medicine	Codes		Adult dose	Frequency	Duration
	benzylpenicillin im/iv	**C**	**V**	1-2 MU	4 times a day	initially, then
then	**procaine penicillin im**	**C**	**V**	3gm	once daily	7-10 days

Less severe cases:

	Medicine	Codes		Adult dose	Frequency	Duration
	doxycycline* po	**C**	**V**	200mg first dose, then 100mg	once daily	7 days

****avoid use of doxycycline in pregnant women and children***

NB: Pulmonary form of Anthrax- refer to designated Infectious Disease Hospital

TICK TYPHUS (AFRICAN)

***Case definition**: a rickettsial disease (spread usually by tick bites) that has a variable onset but most often marked by sudden headache, chills, prostration, fever and general pains. A maculopapular eruption appears on the 5th – 7th day, initially on the upper trunk followed by a spread to the entire body but usually not to the face, palms or soles. Chancre, local erythema develops on bite site with local lymphadenopathy.*

	Medicine	Codes		Adult dose	Frequency	Duration
	doxycycline po	**C**	**V**	200mg first dose, then 100mg	once daily	7 days

If no improvement - refer

RABIES

Pre-amble

Rabies is a preventable disease. Strategies to prevent rabies include dog vaccination (through the veterinary department) and human pre- or post-exposure vaccination.

Human vaccination

Vaccination for adults and older children (>5yrs) use the deltoid area for younger children(<5yrs) the outer aspect of the thigh can be used. Vaccine should never be used in the gluteal area.

Prevention of Rabies in Humans

- **Pre-exposure prophylaxis**

Individual pre-exposure immunisation should be offered to persons at high risk of exposure, such as animal handlers, veterinarians, National Parks and Wildlife personnel.

Preferred Pre-exposure prophylaxis schedule intradermal (ID) regimen:

i) 2-2* vaccination schedule

Medicine	*Codes*	*Adult dose*	*Frequency*	*Duration*
rabies vaccine, human diploid cell intradermal (ID)	**B V**	0.1ml (>0.5 IU)	once	day 0 and 7

***2-2: Dose and Site(s)**

Alternative Pre-exposure immunisation schedule intramuscular (IM) regimen :

ii) 1-1 vaccination schedule

Medicine	*Codes*	*Adult dose*	*Frequency*	*Duration*
rabies vaccine, human diploid cell im	**B V**	0.5ml (>2.5IU/IM dose)	single doses on Day 0 and 7	

Give a booster every 2-3 year if serological testing is not available to monitor antibody titre which should be >0.5IU/ml

Post-exposure Prophylaxis (PEP)

In dog and other animal bites, the wound should be thoroughly cleaned with povidone-iodine or soap and water as soon as possible.

Exposure Categories and Appropriate Management

Category I	Feeding, touching or licks to intact skin	No PEP

Category II	Nibbling of skin, minor abrasions, scratches without bleeding	give PEP
Category III	Transdermal bites, scratches, saliva mucous membranes contamination	give immunoglobin (RIG)and PEP*

* If RIG (rabies immunoglobin) not available proceed with PEP

Prophylaxis:
In an individual where there is a high risk of rabies, i.e.:

- Category II and III exposure
- Uncertain animal vaccination history or strong suspicion of rabid animal give:

Preferred cheaper and shorter vaccination using the 7day ID multi-site regimen:

2-2-2 vaccination schedule:

Medicine	Codes	Adult dose	Frequency	Duration
rabies vaccine (human diploid cell) intradermal (ID) deltoid area	B V	0.1ml	once only	day 0,3,7

Alternative vaccination using the abbreviated IM (>2.5IU/IM dose) 21 day multi-site regimen:

2-1-1 vaccination schedule:

Medicine	Codes	Adult dose	Frequency	Duration
rabies vaccine (human diploid cell) im	**B V**	0.5ml in **each** arm	one dose	on day 0
(upper arm site)	**then**	0.5ml in **one** arm	one dose	on days 7 and 21

Use a separate syringe and needle for each dose; store vials at 4-8°C after reconstitution and use as soon as possible. Opened vials should be used within 6-8 hours

Use of Human Rabies Immunoglobin (RIG) for passive immunization

- In case of category III exposure, human RIG should be infiltrated at the wound site after thorough washing with soap and water or with betadine.

	Medicine	Codes	Adult dose	Frequency	Duration
	human rabies immunoglobulin (RIG) (instilled and infiltrated locally around the wound)	**B V**	10 IU/kg	once only	**-**
and	**human rabies immunoglobulin im** (gluteal)	**B V**	10 IU/kg	once only	**-**

Notes

- In case of bite from domestic animal **WITH LAPSED** immunisation against rabies
  - Follow the above recommended vaccination schedule, but without giving immunoglobulin.
- In previously vaccinated individuals give one site intradermal (ID) or one-site intramuscular (IM) vaccine on day 0,3 only .
- Rabies vaccines labelled for IM use can be used safely via the ID route, even if this constitutes off-label use
- In the case of exposure to confirmed rabid animals vaccine should be given regardless of the time since exposure even years afterwards
- A change in route of administration during PEP or PreP is acceptable if such a change is unavoidable.

GENERAL GUIDELINES FOR BILHARZIA, INTESTINAL WORMS, LYMPHATIC FILARIASIS AND BLINDING TRACHOMA

GENERAL NOTES

Zimbabwe is annually instituting Mass Drug (Medicine) Administration (MDA) for bilharzia, intestinal worms, lymphatic filariasis and blinding trachoma to Pre and School Aged Children (Pre-SAC and SAC) as well as adults in endemic districts using WHO guidelines for preventive chemotherapy.

BILHARZIA (SCHISTOSOMA MANSONI & HAEMATOBIUM)

Proper diagnosis can only be made by microscopy of urine and stools. Antibody tests alone are insufficient basis for treatment.
Health Facility without microscopy diagnosis can treat *Schistosoma haematobium* infection in children and adolescents on the basis of visible

haematuria or positive urine strip test for blood and or protein. Refer all suspected cases of *Schistosoma mansoni* for further investigations, particularly in the older patient.

NB. In female patients exclude haematuria caused by menstruation

S. Mansoni

Most patients with *S. Mansoni* infection have minimal or no symptoms unless there is heavy infestation. Infection should be suspected in young patients with unexplained iron deficiency anaemia, hepatosplenomegaly or non-resolving chronic salmonella infections.

Occasionally patients may present with dysentery like symptoms when colonic polyps due to *S. Mansoni* ulcerate and bleed.

Treatment:

S. Haematobium

Medicine	Codes	Children and Adult dose	Frequency	Duration
praziquantel po	**C E**	40mg/kg	one dose only	

S. Mansoni:

Medicine	Codes	Adult dose	Frequency	Duration
praziquantel po	**C E**	40 mg/kg	once a day	repeat at 4 weeks

General notes:

- Do not give praziquantel in pregnancy. Treat after delivery.
- Praziquantel is generally available as a double-scored 600mg tablets. Using a 40mg/kg body weight dose, the patient should be given a dose to the nearest quarter tablet (150mg).

  Example: The dose for a 70 kg person is 2800 mg (70kg x 40mg). The patient should be given four- and three-quarter tablets (2850 mg, the closest convenient dose).

Treatment with praziquantel will also eliminate any roundworm infestation.

In Mass Drug Administration (MDA campaign) a dose pole is used for administration of praziquantel.

KATAYAMA SYNDROME

This is a severe immunological reaction to recent heavy infection with *Schistosoma mansoni* or *haematobium* causing fever and acute serum sickness. Treat with:

Medicine	Codes	Adult and children dose	Frequency	Duration

	Medicine	Codes		Adult and children dose	Frequency	Duration
	praziquantel po	**C**	**E**	40mg/kg	one dose	repeat after 2 weeks
and	**prednisolone po**	**B**	**V**	50mg, once a day, reducing by 5mg per day according to response.		

HELMINTHIASIS

General Notes

Prevention: transmission of helminths can be reduced by measures such as thorough cooking of meat and fish, use of latrines, wearing shoes, washing hands. Attention to the hands and nails is particularly important in the case of pinworm. Health promotion to prevent re-infection is very important. Endemic districts can conduct Mass Drug/medicine Administration (MDA) once a year.

The **diagnosis** should be confirmed by examination of stool for helminths and stool microscopy for eggs; peri-anal swab placed in saline for pinworm.

In the case of pinworm, threadworms (enterobius), the whole family should be treated. The first-choice treatment for all of the above infestations is albendazole, a broad-spectrum anthelmintic. Note also that treatment of bilharzia with praziquantel would also have eliminated roundworms.

Caution: Safety in pregnancy has not been established for albendazole; do NOT use in the first trimester of pregnancy. In most cases, treatment can be given AFTER delivery.

- **All Roundworms except Strongyloides**

Medicine	Codes		Adult dose	Frequency	Duration
albendazole po	**C**	**E**	400mg <2yrs = 200mg	one dose only	

- **Tapeworm and Strongyloides**

Medicine	Codes		Adult dose	Frequency	Duration
albendazole po	**C**	**E**	400mg <2yrs = 200mg	once a day	3 days*

**Note: If not cured after 3 weeks, repeat the course.*

- **Cutaneous larva migrans ("sandworm")**

Medicine	Codes		Adult dose	Frequency	Duration
albendazole po	**C**	**E**	400mg <2yrs=200mg	once a day	7 days

- **Cysticercosis and Neurocysticercosis**

  Specialist inpatient treatment is required.

Medicine	Codes		Adult dose	Frequency	Duration
praziquantel po	**C**	**E**	17mg/kg	3 times a day	15 days

and	**prednisolone po**	**B**	**V**	15mg	2 times a day	18 days*

** Note: prednisolone therapy must start 2-3 days before praziquantel.*

- **Hydatid Disease**

Refer to central hospital. Serological confirmation is required before treatment commenced.

Do **not** aspirate the cysts. Surgery is the treatment of choice. If inoperable:

Medicine	Codes		Adult dose	Frequency	Duration
albendazole po	**C**	**E**	3mg/kg	3 times a day	30 days, then wait 15 days (medicine free). Then repeat the cycle 4 times.

Monitor progress with ultrasound.

LYMPHATIC FILARIASIS (ELEPHANTIASIS)

Case Definition: Hydrocoele, lymphoedema, elephantiasis or chyluria in a resident of an endemic area for which other causes of these findings have been excluded.

Causative organisms:

Lymphatic filariasis is caused by the following nematodes

1. *Wuchereria Bancrofti* (most common)
2. *Brugia Malayi*
3. *Brugia Timori*

The infection is transmitted by mosquitoes of the anopheles and culicine species. The disease is prevalent in 39 of 63 districts in Zimbabwe which require at least 7 rounds of Mass Drug Administration (MDA) using Albendazole and Diethylcarbamazine (DEC). The use of triple therapy Albendazole, DEC and Ivemerctin can shorten the MDA rounds to only 2 or 3.

Clinical Manifestations:

There are three stages of the disease:

Early stage:

Due to infective larvae comprising a triad of eosinophilia, lymphadenopathy and a positive intradermal test. Some patients may be asymptomatic.

Acute Filarial Manifestation: patients have fever, lymphangitis, lymphadenitis and relapsing lymphoedema of various body parts e.g. epididymo-orchitis in males.

Chronic stage: gross persistent lymphoedema of limbs, scrotum, breast or vulva in females.

Diagnosis: this is based on a combination of a clinico-epidemiological information and sometimes demonstration of microfilariae in a blood or fluid smear.

Treatment of the acute phase involves use of Diethylcarbamazine (DEC).

	Medicine	Codes	Adult dose	Frequency	Duration
	diethylcarbamazine po	**B E**	100mg-300mg*	single dose	
and	**albendazole po**	**C V**	400mg	single dose	

**Weight dependent*

Patients should be referred for specialist management.
Drug therapy for chronic elephantiasis does not alter the eventual clinical outcome. Surgery for hydrocoele is indicated with local care of the limbs through daily cleaning/hygiene, elevation, exercise and use of foot ware.

BLINDING TRACHOMA

Refer to Common Eye condition chapter

PLAGUE (BUBONIC)

- *Case definition: Any person with rapid onset of fever, chills, headache, severe malaise, prostration with extremely painful swelling of lymph nodes, or cough with blood-stained sputum, chest pain and difficulty in breathing in an area known to have plague.*

Treat with:

	Medicine	Codes	Adult dose	Frequency	Duration
	streptomycin im	**B V**	1g	first dose	then
			0.5g	6hourly	10 days
			Paed = 5-10mg/kg		
or	**chloramphenicol im/iv**	**B V**	12.5-25mg/kg	6-hourly	10 days
			Paed = 6.25-12.5mg/kg		

- Prophylaxis whilst nursing & contacts:

	Medicine	Codes	Adult dose	Frequency	Duration
	doxycycline po	**C V**	100mg	2 times a day	10 days

LEPROSY

All patients should be referred to the Provincial TB/Leprosy Co-ordinator (PTBLCO) or specialist for confirmation of diagnosis. Notification is mandatory.

Classification of Leprosy
Knowledge of the classification of leprosy is important for choosing the appropriate Multi Drug Therapy (MDT) regimen. The classification can be

based on clinical manifestations and/ or skin smear results. In the classification based on skin smear results, patients showing negative smears at all sites are grouped as *paucibacillary* leprosy (PB), while those showing positive smears at any site are grouped as having *multibacillary* leprosy (MB).

The clinical system of classification for the purpose of treatment includes the use of the number of lesions and nerves involved as the basis for grouping leprosy patients into MB and PB. The clinical classification is shown below:

Classification of leprosy

SITE	PAUCIBACILLARY LEPROSY	MULTIBACILLARY LEPROSY
Skin Lesions	1-5 lesions asymmetrically distributed with definite loss of sensation	More than 5 lesions. Distributed more symmetrically. With or without loss of sensation
Nerve enlargement	Only one nerve trunk involved	Many nerve trunks involved

Any patient showing a positive skin smear should be treated with the MDT regimen for multibacillary (MB) leprosy, irrespective of the clinical classification. When classification is in doubt, the patient should be treated as MB leprosy.

Primary Prevention

Screening of family contacts should be performed.

	Medicine	Codes	Adult dose	Frequency	Duration
	BCG vaccine	**C V**	see section on Immunisation		

Treatment of Paucibacillary Patients

	Medicine	Codes	Adult dose	Frequency	Duration
	dapsone po	**B V**	100mg Paed = 1-2mg/kg	once a day	6 months
and	**rifampicin po** supervised dose	**B V**	600mg Paed = 10-15mg/kg*	once a month	6 months

* *but not less than 150 mg of rifampicin*

Treatment of Multibacillary Patients

Duration of therapy is now reduced to 12 months, with adequate education and follow up.

- At the time of stopping treatment, it is important to educate the patients about the signs and symptoms or relapse and reaction and request them to come back immediately.

- Lepromatous or borderline lepromatous patients who return not showing any improvement or with evidence of deterioration will need an additional 12 months of MDT for multibacillary leprosy.
- Review patients regularly for 12months to diagnose deterioration as early as possible.

Treat with:

	Medicine	Codes		Adult dose	Frequency	Duration
	dapsone po	**B**	**V**	100mg Paed =1-2mg/kg	once a day	12 months
and	**clofazimine po**	**A**	**N**	50mg Paed = 0.5-1mg/kg	once a day	12 months
and	**clofazimine po** supervised dose	**A**	**N**	300mg Paed = 5-10mg/kg	once a month	12 months
and	**rifampicin po**	**B**	**V**	600mg Paed =10-15mg/kg*	once a month	12 months

**Not less than 150 mg of rifampicin.*
MDT should be supplied in 28-day blister packs for ease of ordering and to avoid medicine wastage. Specific blister packs are available for children.

Reversal Reaction (Type I Reaction)

This is a cell-mediated immune reaction to *mycobacterium leprae*. It is characterised by swelling of skin lesions that become oedematous, red and tender. New lesions may appear. Peripheral nerves may become swollen and tender, with loss of sensation and paralysis in the distribution of the nerves involved. The reactions can occur before MDT is commenced or after completion of MDT, but they are commonest during the first 3 months of MDT. The full dose of anti-leprosy medicines must be continued in addition to treatment of the reaction.

Mild Reversal Reaction
A reaction in which only the skin, not the nerves, are involved:

Medicine		Codes	Adult dose	Frequency	Duration
aspirin po	**C**	**V**	600mg	4 times a day	1-2 weeks

If there is no improvement, consider treatment with corticosteroids. If there is evidence of neuritis (tender nerves, nerve deficit) use corticosteroids as below. Do not wait for nerve damage to appear as it may be too late for function to return.

Severe Reversal Reaction

A reaction in which there is also new nerve damage with loss of sensation and /or motor function in hands, feet or eyes.

'New' implies additional to what the patient already had at registration or developed within the last 6 months.

Admit to hospital. Treat with corticosteroid:

Medicine	Codes	Adult dose	Frequency	Duration
prednisolone po	**B V**	40mg (or 1mg/kg)	once a day	**-**
	then	reduce slowly by 5mg each week, once nerve tenderness subsides		
then maintain at		20mg	once a day	2-3 months
	then	reduce slowly over 1-2 months		total 6 months

Patients can be discharged at the dosage of 20 mg daily for subsequent outpatient review.

Erythema Nodosum Leprosum (ENL) Type II reaction

In this reaction immune complex formation and deposition occurs with the activation of complement. This type of reaction is characterised by crops of tender subcutaneous nodules on the face, trunk and extensor surfaces of the limbs. It may include systemic features such as fever, lymphadenitis, orchitis, arthritis, nephritis, iridocyclitis and peripheral neuritis. Severe ENL may also present with ulcerating and pustular lesions. The full dose of anti-leprosy medicines should be continued in addition to the treatment of the reaction.

Mild Type II Reaction

Medicine	Codes	Adult dose	Frequency	Duration
aspirin po	**C V**	600mg	4 times a day	1-2 weeks

If there is no improvement or the patient develops nerve damage, corticosteroids are indicated.

Severe Type II Reaction

Admit for corticosteroid therapy and refer to specialist urgently:

Medicine	Codes	Adult dose	Frequency	Duration
prednisolone po	**B V**	40-60mg	once a day	1-2 weeks
	then	reduce slowly by 5mg-10mg each week, over a period of 4-6 weeks; *total duration = 6-10weeks		

Recurrent Type II Reaction

Use clofazimine in anti-inflammatory dosage in addition to prednisolone. Attempt to taper prednisolone while maintaining clofazimine as below:

Medicine	Codes	Adult dose	Frequency	Duration
clofazimine po	**A N**	100mg	3 times a day	3 months
	then	100mg	2 times a day	3 months
	then	100mg	once a day	6 months

Refer all patients developing abdominal complaints (pain, constipation, distension).

It may take 4 to 6 weeks for clofazimine to take effect in controlling ENL.

Steroid side-effects

- Be on the alert for new onset of diabetes or exacerbation of known diabetes. Diabetes will need careful monitoring – ideally as an inpatient.
- Blood pressure should also be monitored.
- Also watch for tuberculosis or gastrointestinal parasitic infections that might be revealed by the use of steroids.
- If difficulties arise in balancing treatment of reactions and side effects, refer for specialist care.

All patients should be managed at primary care level under the guidance of District and Provincial TB/Leprosy Co-ordinators. Complicated cases should be referred to the Tropical Diseases Unit at Harare Central Hospital. Advice can be obtained from the Leprosy Mission on telephone Harare +263(4) 251647.

HUMAN AFRICAN TRYPANOSOMIASIS

General notes

Human African Trypanosomiasis (HAT) is caused by the protozoa of the genus *trypanosoma* that is transmitted by the bite of tsetse fly in sub-Saharan Africa. The disease is also known as sleeping sickness and has been reported from remote areas, mainly from the game parks in Mashonaland Central, Mashonaland West and Matebeleland North.

There are two forms of HAT:

- *Trypanosoma brucei rhodisiense* – found in East and Southern Africa
- *Trypanosoma brucei gambiense* – found mainly in Central and West Africa.

Clinical Presentation has 2 phases

Acute haemolymphatic phase: presentation is with episodic bouts of fever, headache, joint pains, pruritis and anorexia. An eschar, "bite site" may be present together with local lymphadenopathy.
Delayed Neurological phase: when the parasite crosses the blood brain barrier it causes neurological signs and symptoms of sleep cycle disturbance, confusion, behavioural changes and poor coordination.

Refer all cases of Human African trypanosomiasis for specialist care. *Acute haemolymphatic phase cases are to be referred to the two Provincial hospitals Chinhoyi and Bindura, for management of. All cases should be referred to Harare Central Hospital for further management.*

Suramin is the medicine of choice for the acute haemolymphatic phase.

Medicine	Codes	Adult dose	Frequency	Duration
suramin iv	**A V**	4-5 mg/kg	Once	on day 1 as test dose
then		20 mg/kg	on day 1,3,7,14,21	

Melarsoprol is required if the patient progresses to the neurological phase.

Medicine	Codes	Adult dose	Frequency	Duration
melarsoprol iv	**S V**	2.16 mg/kg/day for 10 consecutive days		

TYPHOID FEVER

Typhoid fever is caused by *Salmonella typhi,* a Gram-negative bacterium. A very similar but often less severe disease is caused by the *Salmonella* serotype *paratyphi A.*

Humans are the only natural host and reservoir. The infection is transmitted by ingestion of faecally contaminated food or water.

Case Definition
Any person with gradual onset of steadily increasing and then persistently high fever, chills, malaise, headache, sore throat, cough, and sometimes abdominal pain and constipation or diarrhoea.

Clinical features

The clinical presentation of typhoid fever varies from a mild illness with low grade fever, malaise and dry cough to a severe clinical picture with abdominal discomfort, altered mental status and multiple complications.
Clinical diagnosis is difficult to make as it is confused with many similar conditions. In the absence of laboratory confirmation, any case of fever of at least 38 °C for 3 or more days is considered suspect if the epidemiological context is suggestive.
Depending on the clinical setting and quality of available medical care, some 5–10% of typhoid patients may develop serious complications, the most frequent being intestinal haemorrhage or peritonitis due to intestinal perforation.

Laboratory Testing

In Zimbabwe, blood culture samples, stool/rectal swab and bone marrow aspirate have been used to culture for isolation of *S typhi*.
Blood culture is the usual diagnostic test with a sensitivity of 90% (60% to 80%) in the first week of onset of fever. Stool and rectal swabs yield positive results in up to 40% of the cases.

Case Management

More than 90% of patients can be managed at home with oral antimicrobials, minimal nursing care, and close medical follow-up for complications or failure to respond to therapy.

ANTIMICROBIAL THERAPY FOR TREATMENT OF TYPHOID FEVER

UNCOMPLICATED TYPHOID DISEASE

i) Susceptibility: Fully Sensitive

	Medicine	Codes		Adult dose	Frequency	Duration
	ciprofloxacin po	**B**	**V**	500mg	twice a day	5-7days
or	**ofloxacin po**	**S**	**E**	400mg	once a day	5-7days

ii)Susceptibility: Multidrug Resistant TB

	Medicine	Codes		Adult dose	Frequency	Duration
	azithromycin po	**C**	**V**	250 – 500mg	once a day	7 days
or	**cefixime po**	**B**	**V**	500 – 750mg	once daily	7-14days

COMPLICATED TYPHOID DISEASE

i) Susceptibility: Fully Sensitive

	Medicine	Codes		Adult dose	Frequency	Duration
	ciprofloxacin po	**B**	**V**	500mg	twice daily	10-14days
or	**ofloxacin po**	**B**	**N**	400mg	once daily	10-14days

ii) Susceptibility: Multidrug Resistant

	Medicine	Codes		Adult dose	Frequency	Duration
	azithromycin po	**C**	**V**	250-500mg	once daily	10-14days
or	**cefixime po**	**B**	**V**	500-750mg	once daily	10-14days

Alternative Medicines

	Medicine	Codes		Adult dose	Frequency	Duration
	ceftriaxone iv	**C**	**V**	1g	once daily	10-14 days

Dehydration is uncommon in Typhoid fever; however, electrolyte imbalance, hypoglycaemia and hypokalaemia and hyponatremia frequently occur and need to be corrected using appropriate electrolyte solution. In cases where intestinal perforation is suspected surgery and parenteral nutrition may be required. In cases of moderate to severe dehydration, follow the guideline for treatment of dehydration.

A. Treatment of Carriers

An individual is considered to be a chronic carrier if he or she is asymptomatic and continues to have positive stool or rectal swab cultures for *S. typhi* a year following recovery from acute illness:

Medicine	Codes		Adult dose	Frequency	Duration
ciprofloxacin po	**B**	**V**	750mg	twice daily	4 weeks

Ciprofloxacin can be used in children if the benefits outweigh the potential harms.

And/or:

- Cholecystectomy if lithiasis is present
- Treat schistosomiasis if present
- Vi (virulence) antibody test useful to screen carriers

NOTIFIABLE DISEASES AND EVENTS OF PUBLIC HEALTH IMPORTANCE

According to the Public Health Act (PHA) Chapter 15:09, there are infectious diseases that have to be immediately notified to health authority in an area by either District Medical Officer, or Provincial Medical Director, or City Health Director. These diseases can spread rapidly and cause outbreaks. They need closer monitoring if they are to be controlled. It is important that the health authority knows what action has been taken to control the spreading of the diseases. It is also a requirement that Zimbabwe reports cases and deaths from these diseases to the WHO (World Health

Organization). While there is a longer list of diseases in the PHA, health workers are encouraged to notify the following using the T1/T2 forms:

1. Acute flaccid paralysis (AFP/polio)
2. Anthrax
3. Brucellosis
4. Cholera
5. COVID-19
6. Diphtheria
7. Hepatitis (all forms)
8. Human Influenza A caused by a new subtype (e.g. H1N1, H1N5)
9. Meningococcal Meningitis
10. Noma
11. Plague
12. Poliomyelitis/ Acute Flaccid Paralysis
13. Rabies
14. SARS
15. TB (Tuberculosis) and Leprosy are also notifiable, but they continue to be notified on TB Form A and TB Form B for TB, and the Leprosy form for leprosy.
16. Trypanosomiasis
17. Typhoid
18. Typhus
19. Viral Haemorrhagic fever (e.g. Ebola, Marburg, Crimean Congo)
20. Yellow fever
21. All such other infectious/ communicable diseases and events of public health importance as the Minster of Health & Child Care may declare by statutory instrument, to be infectious diseases throughout or in any part of Zimbabwe. These events of public health importance include maternal deaths, disasters such as chemical spillage, floods and others.

How to notify: Any healthcare worker, including those in private sector, who comes into contact with any of the notifiable diseases and all suspected and laboratory confirmed cases of the above should be notified immediately to the District Medical Officer or City Health Director by the fastest means possible (telephone if available). The notifying healthcare worker should then complete a T1 form in triplicate. These forms can be obtained from the offices of District Medical Officer or City Health Director upon request.

13. MALARIA

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GENERAL NOTES:

- The pattern of malaria varies geographically. *Plasmodium falciparum* causes almost all the malaria in Zimbabwe, with a few cases due to *P. vivax, P.ovale* and *P.malariae* may be seen.
- Complications occur mainly with *P.falciparum* and usually in young children, pregnant women, adults in epidemic prone areas and people moving from areas of no malaria to areas with malaria including immune compromised patients and sicklers.
- Malaria usually occurs 1-6 weeks after a bite by an infected female anopheles mosquito. So, it is important to take a good history and to always ask about travel and self-medication.

MALARIA PREVENTION

Social and behaviour change and communication on non-pharmacological means of prevention is extremely important. Communities must be encouraged to use preventive methods such as indoor residual spraying, use of mosquito coils, repellents, long lasting insecticide-treated mosquito nets and wear, appropriate protective clothing.

MEDICINE PROPHYLAXIS

Due to lack of evidence of efficacy on antimalarial prophylaxis in Zimbabwe coupled with suspected poor performance of the previously used medicines, personal protection is highly recommended. This is to avoid giving a false sense of protection to those visiting malarious areas.
Personal protection can be achieved by sleeping under a net, use of repellents when visiting a malarious area, putting on long sleeved clothes during dusk or dawn and getting indoors early. Where medicines are used, it is important to note that no medicine gives 100% protection against malaria, but medicines do reduce the risk. However, chemoprophylaxis is recommended in pregnant women as indicated below:

Malaria prophylaxis for:

Intermittent Preventive Treatment (IPTp)

- **Pregnant women in regions of moderate to high transmission.**

Chemoprophylaxis in this group in based on an assumption that every pregnant woman in a malaria-endemic area is infected with malaria and has malaria parasites in the blood or in the placenta. The medication is given at treatment doses and at prescribed intervals.

- Three tablets of SP (each SP tablet contains Sulphadoxine 500 mg and Pyrimethamine 25 mg) are given at booking (after quickening).
- Give SP to all pregnant women at each scheduled ANC visit up to time of delivery
- The doses should be given at least 4 weeks apart
- SP should ideally be given as directly observed therapy (DOTS) of three tablets
- SP can be given on either an empty stomach or with food
- SP should NOT be administered to women receiving Co-trimoxazole prophylaxis due to an increased risk of adverse effects
- It is recommended that weekly folic acid also be given to pregnant woman taking IPTp. (This is done in conjunction with the Reproductive Health Department).

Malaria prophylaxis for:

- **Visitors from outside the country**

They may continue with the prophylaxis recommended to them before coming to Zimbabwe, but personal protection should be emphasized.

TREATMENT OF MALARIA

All antimalarial medicines should be administered only to confirmed cases (Confirmation is done by RDT or Malaria Blood Slide). However, in children less than five years treatment may be initiated whilst awaiting blood results provided other causes of fever have been clinically excluded.
Malaria blood slides **MUST** be taken in the following cases:

- Patients with severe/ complicated malaria,
- Patients with treatment failure,
- All referrals,
- All cases where Co-artemether has been used in the preceding 2 weeks
- All RDT confirmed cases in malaria elimination areas

*Note: Pregnant women diagnosed with malaria **must** receive medicine therapy immediately. Although quinine is potentially teratogenic, the benefit of giving quinine therapy far outweighs any risk.*

Uncomplicated malaria

The first line treatment of uncomplicated malaria is the artemisinin combined therapy Artemether-lumefantrine (Co-artemether).

Medicine	Codes	Dose	Frequency	Duration
artemether-lumefantrine po	**C V**	*see table below*		

(Co-artemether) Artemether-Lumefantrine (1.5mg/12mg/kg):

To be given as a 6-dose course of tablets twice a day for 3 days as follows:

Dosage		**Day 1**		**Day 2**		**Day 3**	
Weight (kg)	Age (yrs)	Stat Dose	After 8hrs*	AM	PM	AM	PM
5- 14	<3	1	1	1	1	1	1
15-24	3-8	2	2	2	2	2	2
25-34	9-14	3	3	3	3	3	3
>35	>14	4	4	4	4	4	4

Note:

- *Strictly after 8 hours.
- Parasitological proof of malaria by blood slide or rapid diagnostic test (RDT) is desirable whenever Artemisinin based combination is used
- Tablet of Co-artemether- is a fixed dose formulation of Artemether 20mg/Lumefantrine120mg

N.B:

1. If the initial dose of Coartemether is vomited within 30 minutes repeat dose.
2. If vomiting is persistent treat as severe/complicated malaria.
3. If no improvement within 48 hours change to oral Artesunate/amodiaquine.
4. To ensure compliance it is desirable to give the STAT doses as Directly Observed Therapy (DOT).
5. Malaria in the 1st trimester of pregnancy should be treated with a 7-day course of oral quinine and clindamycin.

TREATMENT IN SPECIAL GROUPS

Uncomplicated malaria in infants under 5kg body weight.

Children less than 5kg body weight should be given Co-artemether (Artemether-Lumefantrine) as the first line treatment for uncomplicated malaria. Children less than 2kg body weight should be treated as severe malaria cases.

The dosing schedule is as shown below

Treatment Schedule for co-artemether children less than 5kg body weight							
Weight in kgs	Equivalent dose ACT 20mg/120mg	Dosage(mls) Dissolve 1tab Artemether-Lumefantrine (ACT) (20mg/120mg) with 10mls of clean water-dispersible tablets					
		Day 1		Day 2		Day 3	
		AM	PM	AM	PM	AM	PM
2kg-<3kg	½ tab	5ml	5ml	5ml	5ml	5ml	5ml
3kg-<4kg	1 tab	10ml	10ml	10ml	10ml	10ml	10ml
4kg-<5kg	1 tab	10ml	10ml	10ml	10ml	10ml	10ml

**Remember treat children <2kg as severe malaria

Uncomplicated malaria in pregnancy

- **First Trimester**

	Medicine	Codes	Dose	Frequency	Duration
	quinine po	**C V**	see table below	three times	7 days
Plus	**clindamycin po**	**B V**	see table below	three times	7 days

- **Second Trimester up to delivery**

	Medicine	Codes	Dose	Frequency	Duration
	artemether - lumefantrine 20/120mg Po	**C V**	see table below		

<table>
<tr><th colspan="8">TRIMESTER/APPROXIMATE GESTATION</th></tr>
<tr><th colspan="2">1st trimester-before quickening</th><th colspan="6">2nd and 3rd trimester –after quickening</th></tr>
<tr><th rowspan="2">Medicine</th><th rowspan="2"></th><th rowspan="2">Medicine</th><th colspan="2">DAY 1</th><th colspan="2">DAY 2</th><th colspan="2">DAY 3</th></tr>
<tr><th>STAT</th><th>After 8 hrs</th><th>AM</th><th>PM</th><th>A M</th><th>P M</th></tr>
<tr><td>quinine po</td><td>600mg every 8 hrs for 7 days</td><td>Co-artemether (No. of tablets)</td><td>4</td><td>4</td><td>4</td><td>4</td><td>4</td><td>4</td></tr>
<tr><td>clindamycin po</td><td>300mg every 8 hours for 7 days</td><td colspan="6">Twelve hours apart from day 2 to day 3</td></tr>
</table>

TREATMENT FAILURE

Treatment failure, should be suspected clinically if there is no response after 48 hours of correct therapy, and a change to second line therapy made immediately.

Early treatment failure is formally diagnosed if a patient is still febrile 72hrs after initial therapy and has more than 25% of initial asexual parasitaemia.

Late treatment failure is the recurrence of fever and asexual parasitaemia 7-14 days after initial successful treatment.

Treatment failure may be due to:

- Inadequate therapy, e.g. medicine being vomited within 1/2 hour, under dosing or failure to complete the treatment
- Presence of undetected severe and complicated malaria
- Malaria parasite resistance (known or suspected) to the given medicine.

If a patient returns to the health facility still feeling unwell:

- Check for other conditions e.g. meningitis, ARI, gastro-enteritis
- Check for signs of severe and complicated malaria
- Take a blood slide

If there are no signs of severe/complicated malaria give the following treatment immediately:

Second Line Therapy –

Medicine	Codes	Dose	Frequency	Duration
artesunate/amodiaquine po	**C V**	as per table below	once daily	3 days

Each tablet of AS-AQ may contain Artesunate 25mg and Amodiaquine 67.5mg OR Artesunate 50mg and Amodiaquine 135mg OR Artesunate 100mg and Amodiaquine 270mg
Dosage is 4mg/kg body weight Artesunate and 10mg/kg Amodiaquine base taken once daily orally for three days.

Weight range (approximate age range)	Dosage	Day 1	Day 2	Day 3
≥5kg to <9kg (2 - 11 months)	25mg Artesunate + 67.5 mg Amodiaquine	1 tablet	1 tablet	1 tablet
≥9kg to <18kg (1 year- 5years)	50mg Artesunate + 135mg Amodiaquine	1 tablet	1 tablet	1 tablet
≥18kg to 36kg (6-13 years)	100mg Artesunate + 270mg Amodiaquine	1 tablet	1 tablet	1 tablet
≥36kg (14 years and above)	100mg Artesunate + 270mg Amodiaquine	2 tablets	2 tablets	2 tablets

SECOND LINE TREATMENT OF UNCOMPLICATED MALARIA IN ADULTS UNABLE TO TOLERATE ARTESUNATE-AMODIAQUINE IS ORAL QUININE WITH DOXYCYCLINE OR CLINDAMYCIN

Each Quinine tablet contains quinine sulphate 300mg

Treatment schedule for second line therapy: Adults

	Medicine	Codes		Dose	Frequency	Duration
	quinine po	**C**	**V**	600mg	every 8 hours	7 days
	doxycycline po	**C**	**V**	100mg	once daily	7days
or	**clindamycin po**	**B**	**V**	300mg	every 8hrs	7 days

N.B:-

1. **Doxycycline is contraindicated in children below 8 years and in pregnancy and these patients should complete the 7 day quinine course.*
2. *Clindamycin is used in place of Doxycycline in pregnancy during the first trimester and children under the age of eight years. (see Treatment in Special Groups: Uncomplicated Malaria in Pregnancy)*
3. *If for any reason Quinine is given as monotherapy (without Doxycycline or Clindamycin), it should be given for a total of seven days.*

SEVERE MALARIA

This is a life-threatening condition, and the goal of management is to prevent death. Therapy should be initiated without delay.

Check for signs of:

- prostration, i.e. if the patient is unable to stand or sit or feed independently, (children will be unable to breastfeed)
- persistent vomiting
- the slightest sign of alteration in consciousness which may indicate cerebral malaria (refer to the Coma Scale).

Complications include any of the following:

- Cerebral malaria
- Bleeding tendencies
- Severe anaemia (Hb< or=6g/dl); (Hb < 7.5g/dl for non-immune patients)
- Hyperpyrexia
- Jaundice
- Shock
- Severe haemoglobinuria
- Hyperparasitaemia (>5% in non-immune patients)
- Acute renal failure
- Respiratory distress
- Hypoglycaemia

Treatment of severe/complicated malaria must be parenteral, and the medicine of choice is artesunate while quinine will remain a usable option.

Treatment at Health Centre

At primary level, parenteral therapy with artesunate injection must be commenced by IM administration or, if it is practical, by IV infusion before the patient is referred. Treatment is initiated by a loading dose of artesunate or quinine.

Medicine	Codes	Dose	Frequency	Duration
artesunate im/iv	**C V**	2.4mg/kg	Dose 1: stat Dose 2: after 12hrs Dose 3: after 24hrs Dose 4 onwards: daily	minimum 3 doses before switch to oral upon improvement

Dosage at 2.4 mg/kg (comprehensive dosage schedule).

Weight	5kg-25kg	26kg-50kg	51kg-75kg	76kg-100kg
60mg vial	1	2	3	4

Instructions for reconstitution and dilution of parenteral Artesunate for intravenous (IV) use.

Reconstitute the artesunate powder with the 1ml of sodium bicarbonate ampoule provided. The solution will initially look cloudy. Wait for 1 minute for it to clear. Discard the solution if it does not clear. Add 5 mls of 5% dextrose in water or normal saline to the reconstituted solution. The resultant 6ml solution will contain 10mg per ml Artesunate. Check the dose from table below to administer.

Dosing Schedule

- Give a minimum of 3 parenteral doses of Artesunate before changing to oral treatment, even if the patient is able to take oral medication early
- Prepare a fresh solution for each injection
- Intravenous injection is given as slow bolus, about 4 mls per minute.
- Discard any unused solution.

Dosing schedule

Day 1	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7
Stat Dose 1	12 hrs Dose 2	24 hrs Dose 3	Daily Dose 4	Daily Dose 5	Daily Dose 6	Daily Dose 7	Daily Dose 8

Check the dose to give intravenously on table below:

Weight	Dose (mg)	Volume (ml)
5-8 kg	20	2
9-12 kg	30	3
13-16 kg	40	4
17-20 kg	50	5
21-25 kg	60	6
26-29 kg	70	7
30-33 kg	80	8
34-37 kg	90	9
38-41 kg	100	10
42-45 kg	110	11
46-50 kg	120	12
51-54 kg	130	13
55-58 kg	140	14
59-62 kg	150	15
63-66 kg	160	16
67-70 kg	170	17
71-75 kg	180	18
76-79 kg	190	19
80-83 kg	200	20
84-87 kg	210	21
88-91 kg	220	22
92-95 kg	230	23
96-100 kg	240	24

- Once the patient is able to take oral medication (and has received at least 3 doses) switch to oral Co-artemether for a full three-day course (*see Table for Co-artemether course*).

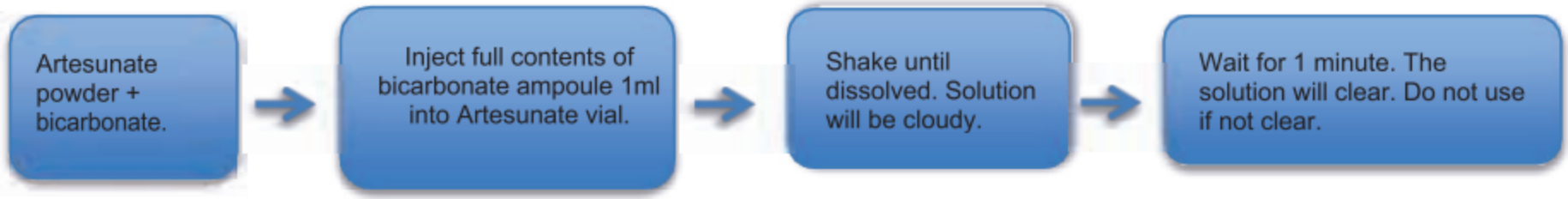
- If the patient is unable to take any oral medication continue with intravenous Artesunate for a total of seven days (*see Table above*).

- Continue to evaluate the patient regularly for improvement or deterioration

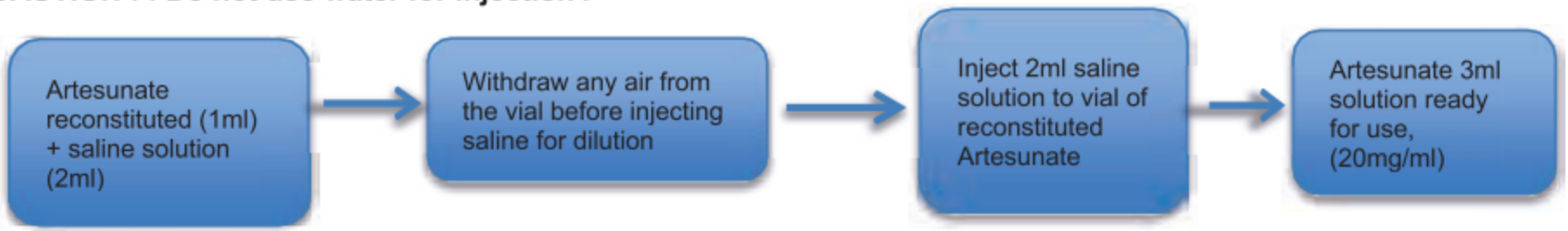
- Continue supportive treatment and monitoring as required in all patients with severe malaria.

PREPARING ARTESUNATE FOR IM USE:

1. RECONSTITUTE (Activate the Artesunate powder by mixing with 1ml of bicarbonate provided)



2. DILUTE (Add 2mls normal saline solution or 5% dextrose to each vial of Reconstituted Artesunate)
CAUTION ! : Do not use water for injection !



3. CHECK THE INTRAVENOUS DOSE TO GIVE ON TABLE BELOW:

Weight (KG)	<5	5-8	9-12	13-16	17-20	21-25	26-29	30-33	34-37	38-41	42-45	46-50	51-54	55-58	59-62
Dose (mg)	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150
Volume (ml)	1	1	2	2	3	3	4	4	5	5	6	6	7	7	8

Weight	63-66kg	67-70kg	71-75kg	76-79kg	80-83kg	84-87kg	88-91kg	92-95kg	96-100kg
Dose (mg)	160	170	180	190	200	210	220	230	240
Volume (ml)	8	9	9	10	10	11	11	12	12

- Administer artesunate injection slowly.

- Intramuscular Injection volumes greater than 5mls should be spread over different injection sites.

OR

- **IN ADULTS** administer **Quinine** intravenously:

Medicine	Codes	Dose	Frequency	Duration
quinine iv	**C V**	20mg/kg (500ml infusion) 10mg/kg	loading dose: (do not exceed 1200mg) dose 2: after 8hrs	over 4 hours

- Intravenous Quinine loading dose of 20mg per kg body weight diluted in 500ml of Normal saline or 5% dextrose water infused over 4 hours. Do not exceed 1200mg of loading dose. After 8 hours subsequent doses should be administered at 10mg per Kg body weight diluted in Normal Saline or 5% dextrose water.

Additional Supportive measures for patients with severe malaria awaiting transfer:

- Maintain airway by appropriately positioning the patient in a left lateral position with the chin extended if patient is in a coma or convulsing. Administer oxygen if available. Patients with pulmonary oedema should be propped up and given IV diuretics.

- Give IV 25% dextrose water for hypoglycaemia in children as 1ml 50% dextrose per kg body weight diluted 1:1 with water for injection. This can also be given orally or via nasogastric tube if IV access is not readily secured. Continue to breastfeed where the child is still able to do so.

- Parenteral anti-emetics can be administered in adults with persistent vomiting.

- Address hyperpyrexia through physical means such as tepid sponging and fanning. Antipyretics such as Paracetamol may be given where appropriate.

- Treat convulsions with either intravenous or rectal diazepam where available.

A CLEAR LEGIBLE REFERRAL LETTER STATING THE DATE, NAME OF PATIENT, BRIEF HISTORY, DIAGNOSIS AND THE PRE-

REFERRAL TREATMENT GIVEN SHOULD ACCOMPANY THE PATIENT TO THE NEXT LEVEL OF CARE. COMPLETE THE MALARIA REFERRAL FORM

If IV Artesunate is unavailable, IV Quinine is the alternative for patients with severe malaria.

TREATMENT OF SEVERE MALARIA in children weighing less than 5kg.

Children less than 5kg should receive iv/im artesunate as first line treatment for severe malaria. Reconstitute the artesunate as per treatment guidelines. Children in this category will receive 3mg/kg body weight according to the dosing schedule below;

Treatment Schedule for iv and im artesunate for children less than 5kg				
	Intravenous(IV)		*Intramuscular(IM)*	
	mg	ml	mg	ml
<2.5kg	*Calculate dose for each patient. Use 3mg/kg body weight*			
2.5kg-<4kg	10	1	10	0.5
4-<5kg	15	1.5	15	0.8

TREATMENT OF SEVERE MALARIA in pregnant women

Pregnant women with severe malaria should receive iv/im artesunate as first line treatment for severe malaria. The dosage is 2.4mg/kg body weight. Use the dosing schedule in the severe malaria section (treatment at health facility)

General measures

- Coma: maintain airway, nurse on side, and exclude other causes of coma, 2 hourly turns.
- Convulsions: treat appropriately and check for hypoglycaemia.
- Hypoglycaemia: monitor blood glucose, correct with dextrose 50% 1ml/kg (diluted 1 to 1) in children, 20-50ml in adults followed by dextrose 10% infusion.

- Severe anaemia: transfusion of packed cells if HB < 6g/dl.
- Acute pulmonary oedema: review fluid balance. Monitor infusion rates carefully. If over-hydrated give IV frusemide.
- Acute renal failure: exclude pre-renal causes, check fluid balance, dialyse early.
- Check carefully for meningitis - do a lumbar puncture if necessary.

TREATMENT OF SEVERE MALARIA AT COMMUNITY LEVEL

When a patient presents with signs and symptoms of severe malaria as a referral from the community health worker, he/she may have received rectal artesunate if they were unable to take any medication orally and time to get to the referral centre is more than 6 hours.

Medicine	Codes	Dose	Frequency	Duration
artesunate suppositories PR	**C V**	see table below		

- **Rectal artesunate is given as follows**:

The dose of rectal artesunate is 10mg per Kg Body weight.

Where the weight of the patient is not immediately known use the table below:

AGE	ARTESUNATE DOSE	ROUTE
6 months-1 year	50MG STAT	Per Rectum
>1 -3 years	100MG STAT	Per Rectum
>3 -5 years	200MG STAT	Per Rectum
>5-13 years	300MG STAT	Per Rectum
14-15 years	400MG STAT	Per Rectum
≥16 years	600MG STAT	Per Rectum

The weight of patients above 16yrs and all fully grown up adults has been assumed to be an average of 60kg. When artesunate is given according to known body weight do not exceed 1200mg.

- Do not give rectal artesunate to children weighing less than 5kg (less than 6 months).
- Artesunate suppositories come in doses of 50mg, 100mg, 200mg and 400mg per suppository.

- To get to the required dose, 1 or more suppositories can be given in combination to get to the total dose required being considerate not to exceed three suppositories.
- If the suppository is expelled within 30 minutes, the dose should be repeated by insertion of another suppository.
- In children the buttocks can be held together for ten minutes to ensure retention.
- Once the rectal artesunate has been given the patient is immediately referred to the nearest health centre for further management without further delay.

TREATMENT OF UNCOMPLICATED MALARIA IN ELIMINATION AREAS

In malaria elimination areas the appropriate treatment of uncomplicated malaria is

Medicine	Codes		Dose	Frequency	Duration
artemether/lumefantrine po	**C**	**V**	1.5mg/12mg/kg	Dose 1: stat dose, Dose 2: after 8hours Dose 3: after 12hours Dose 4 onwards: every 12 hours	3 days
primaquine* po	**C**	**V**	0.25mg/kg	single dose	

*Gametocyte clearance

WHO recommends a low dose primaquine to minimise the chances of clinically significant haemolysis where G6PD assay has not been done. The following patients should be given Primaquine 0.25 mg base/kg body weight with first dose of ACT for uncomplicated malaria:

• Above one year old
• Body weight above 10kg
• Not pregnant

Primaquine comes as 26.3 mg Primaquine phosphate equivalent to 15 mg and Primaquine base or 13.2 mg Primaquine phosphate equivalent to 7.5 mg Primaquine base tablets. The dosage tables below use the 15mg tablet as reference. Titrate the dosage based on the available strength of product;
Dilution instruction for primaquine tablet:
• Mix 15 ml water with one crushed tablet of 15 mg Primaquine base, making a suspension of 1 mg/ml.

NOTE: DO NOT GIVE PRIMAQUINE TO THE FOLLOWING;

- Patients with severe malaria *(see Severe Malaria for definition)*
- Pregnant and breastfeeding patients
- Known history of G6PD deficiency
- Pallor or existing anaemia, haemoglobin < 8gm/dl
- Patients on medications likely to cause haemolysis
- Patients on medicines likely to cause bone marrow suppression
- Patients taking Zidovudine or any medicines containing Zidovudine

14. RESPIRATORY CONDITIONS

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ACUTE RESPIRATORY INFECTIONS IN ADULTS

Outpatient management

For acute respiratory infections in children see the paediatrics chapter.

Common cold, influenza and acute bronchitis ('cough')
No antibiotics are required. Treat symptomatically.

Other respiratory infections (Including pneumonia and other severe lower respiratory infections)

- The approach to management may be influenced by the patient's HIV status. Always exclude TB and PCP. Loss of weight, productive cough for > 3 weeks, night sweats and a fever require TB screening i.e. sputum tests and/or CXR. Take a history of the duration of symptoms, sputum production (colour, haemoptysis and volume), constitutional symptoms of anorexia, weight loss, night sweats, and pyrexia. Ask for pleuritic chest pains.
- If tuberculosis **is unlikely** and the patient's condition does not warrant admission, treat the infection with:

	Medicine	Codes	Adult dose	Frequency	Duration
	amoxicillin po	**C V**	1g stat, then 500mg	3 times a day	7 days+review (Return earlier if symptoms worsen)
or	**If allergic to penicillin use: erythromycin po**	**C V**	500mg	4 times a day	7 days

- If tuberculosis is **likely** arrange a sputum examination (2 sputum smear tests) and plan a review within one week.

On re-assessment, if there is no clinical improvement **refer** to district level. The three most common diagnosis are:

- **Pneumonia -** non-responding segmental/lobar (See section on inpatient management)
- **Tuberculosis**
  Repeat sputum smear tests. Refer to the chapter on tuberculosis for treatment protocols.
- **Pneumocystis Pneumonia** (PCP)
  Patients are usually breathless, may be breathless only on exertion early in the illness, may be cyanosed; and may have negligible chest signs. The chest x-ray typically reveals bilateral fine perihilar mid-zone reticular-nodular infiltrates (ground grass). There may be cystic change. Frequently there are other signs of immuno- suppression.

- Manage with:

	Medicine	Codes	Adult dose	Frequency	Duration
	cotrimoxazole po	**C V**	1920mg (4 tabs)	3 times a day	21 days

- or in sulphonamide allergy:

	Medicine	Codes	Adult dose	Frequency	Duration
	clindamycin po	**B V**	600mg	3 times a day	**21 days**
and	**primaquine po**	**C V**	15mg	once a day	

- If tachypnoea or cyanosis is present, **add:**

	Medicine	Codes	Adult dose	Frequency	Duration
	prednisolone po	**B V**	40mg	twice a day	5 days
then	**prednisolone po**	**B V**	40mg	once a day	5 days
then	**prednisolone po**	**B V**	20mg	once a day	11 days

- **After PCP has been treated give cotrimoxazole prophylaxis and refer to the OI/ART clinic**. If there is sulphonamide allergy, cotrimoxazole desensitization may be considered.

Medicine	Codes	Adult dose	Frequency	Duration
cotrimoxazole po	**C V**	960mg	once a day	indefinitely
		< 6mths = 120mg		
		6-12mths = 240mg		
		>1 year = 480mg		

- If no improvement occurs, consider malignancies such as, Kaposi's Sarcoma and consider referral to a Specialist.

In-patient management

Consider admission if patient is obviously unwell, or in severe pain. Admission and close monitoring are mandatory if any of these signs are present:

- respiratory distress
- cyanosis
- pulse >124/min
- hypotension (systolic pressure < 90mmHg)
- temperature > 40°C or < 35°C
- altered mental state
- if elderly >65 years
- if patient has chronic lung disease (e.g. chronic obstructive pulmonary disease), chronic renal failure, chronic cardiac failure, chronic liver disease
- Scoring for pneumonia severity (CURB-65) (the presence of any of the following merits admission)
  - C= confusion
  - U= urea greater than 7 mmol/L

- R= respiratory rate > or equal to 30
- B = blood pressure less than 90/60
- 65= age of 65 or more

- Always try to obtain sputum for MCS to establish the aetiological pathogen and its sensitivity to guide antibiotic treatment after empiric therapy.

Pneumonia - segmental/ lobar (usually pneumococcal)

	Medicine	Codes		Adult dose	Frequency	Duration
	benzylpenicillin iv or im	**C**	**V**	1.5gm (=2.5MU)	6hourly	7 days
or	**ceftriaxone iv**	**C**	**V**	1gm	daily or twice daily	7 days
+/-	**erythromycin po**	**C**	**V**	500mg	4 times a day	7 days

A stat dose may be given at primary care level prior to transfer.

Note: Switch to oral amoxicillin to complete the course

- If no improvement within 48 hours, review diagnosis (consider tuberculosis or a complication of pneumonia e.g. lung abscess)

Pneumonia - Staphylococcal

	Medicine	Codes		Adult dose	Frequency	Duration
	cloxacillin iv*	**B**	**V**	1-2 gm	6hourly	14 days
or	**clindamycin iv*** in penicillin allergy	**B**	**N**	600mg	3-4 times a day	14 days

**iv for at least 7 days, then consider changing to oral route*

Pneumonia – Klebsiella, other gram negative

	Medicine	Codes		Adult dose	Frequency	Duration
	gentamicin iv	**C**	**V**	120mg	12hourly	10-14 days
and	**ceftriaxone iv**	**C**	**V**	1gm	2 times a day	10-14 days

or based on culture and sensitivity.

Lung abscess

- Postural drainage and physiotherapy are mandatory**. Patients with very large abscesses should lie in the lateral decubitus position with the abscess side down, plus**

	Medicine	Codes		Adult dose	Frequency	Duration
	benzylpenicillin iv	**C**	**V**	1.5gm (=2.5MU)	6hourly	4-8weeks*
and	**metronidazole po**	**C**	**V**	400mg	3 times a day	4-8weeks

Alternatively (alone)

	Medicine	Codes		Adult dose	Frequency	Duration
	amoxicillin-clavulanic acid po	**B**	**V**	625mg	3 times a day	

continue until no longer toxic +/- 7 days, then complete treatment as outpatient for 4-8 weeks with oral **amoxicillin 500mg three times a day. Be on the lookout for C. difficile diarrhoea due to long course of antibiotics. Repeat the CXR at 6 weeks. If no significant resolution/response, refer to a Specialist to consider possibility of MRSA (if patient was previously hospitalised), TB or other pathologies such as malignancy.*

EMPYEMA

- Institute pleural drainage with a **large intercostal tube and underwater seal**.

	Medicine	Codes	Adult dose	Frequency	Duration
	benzylpenicillin iv	**C V**	2.5MU	6hourly	10-14 days
and	**metronidazole po**	**C V**	400mg	3 times a day	10-14 days

Alternatively (alone)

Medicine	Codes	Adult dose	Frequency	Duration
amoxicillin-clavulanic acid po	**B V**	625mg	3 times a day	10-14days

Also institute thromboprophylaxis with heparin/warfarin (refer to Haematology section).

Note: If pus still drains after two weeks refer for surgical opinion.

- If preceded by a suspected *staphylococcal* pneumonia use:

	Medicine	Codes	Adult dose	Frequency	Duration
	cloxacillin iv	**B V**	1gm	6hourly	10-14 days
and	**metronidazole po**	**C V**	400mg	3 times a day	10-14 days

- **In HIV infection, also consider TB empyema especially**

HEALTHCARE ASSOCIATED INFECTIONS (NOSOCOMIAL)

- Pneumonia presenting 3 days after admission:

	Medicine	Codes	Adult dose	Frequency	Duration
	gentamicin iv	**C V**	120mg	12hourly	7-10 days
and	**benzylpenicillin iv**	**C V**	1.5gm (=2.5MU)	6hourly	7-10 days

OTHER COMMON RESPIRATORY INFECTIONS

Chronic Obstructive Pulmonary Disease (COPD)

This term has replaced “chronic bronchitis and emphysema”.
There are many aspects of management:

- All patients with a clinical diagnosis of COPD should have a spirometry lung function testing. This is done to assess for obstruction, assess the severity of the disease and to exclude asthma by demonstrating reversibility or non-reversibility of the obstruction.
- Stop smoking and/or remove from hazardous (dusty) environment.
- Prompt treatment of infective exacerbations (or as for pneumonia):

Treatment of COPD exacerbation

Give antibiotics if sputum colour has changed to purulent, fever or new chest Xray infiltrates.

	Medicine	Codes		Adult dose	Frequency	Duration
	amoxicillin po	**C**	**V**	500mg	3 times a day	7 days
or	**doxycycline po**	**C**	**V**	100mg	once a day	7 days

- For airway obstruction and dyspnoea add:
- Mild /Moderate Disease and patient able to use inhaler (check technique):

	Medicine	Codes		Adult dose	Frequency	Duration
	salbutamol inhaler	**C**	**V**	100-200mcg	6hourly	review
plus	**ipratropium inhaler**	**A**	**V**	40mcg	6hourly	review

- If dyspnoea is severe:

	Medicine	Codes		Adult dose	Frequency	Duration
	salbutamol nebulised	**B**	**V**	5mg	6hourly	review
plus	**ipratropium nebulised**	**A**	**V**	500mcg	6hourly	review
and	**prednisolone po**	**B**	**V**	30mg	once a day	7 to 14days

- Preferably drive the nebuliser with air rather than oxygen.
- Controlled oxygen therapy - 2 litres/minute by nasal prongs or 28% ventimask (Avoid higher concentrations of oxygen unless there is access to blood gas analyser). If it is possible to monitor oxygen saturation aim for SPO_2 88-92%
- Provide pulmonary rehabilitation to prevent respiratory muscle wasting and deconditioning.
- Provide nutritional support.

Management of stable COPD

- Overall management of patients with stable COPD is individualised.
- Use of bronchodilators
- If the patient has mild symptoms and infrequent exacerbations (1 or nil per year) use:

	Medicine	Codes	Adult dose	Frequency	Duration
	salbutamol Inhaler	**C V**	200mcg	PRN	

- If no improvement add:

	Medicine	Codes	Adult dose	Frequency	Duration
	ipratropium inhaler	**A V**	400mcg	PRN	

- If the patient has frequent to persistent symptoms of breathlessness and frequent exacerbations (more than 1 per year) refer to a specialist whilst trying the following:

	Medicine	Codes	Adult dose	Frequency	Duration
	beclomethasone inhaler	**B V**	200mcg	twice a day	PRN
plus	**salbutamol Inhaler**	**C V**	200mcg	PRN	

- Alternatively adding Theophylline SR 250-500mg PO once daily may be helpful if patients remain symptomatic.
- Provide pulmonary rehabilitation
- Provide nutritional support
- Vaccinations: Influenza and pneumococcal vaccines
- Enquire about symptoms of gastroeosophageal reflux disease (GERD) and treat.

Bronchiectasis (Non cystic fibrosis)

The hallmark of treatment are:

- Prompt treatment of infective exacerbations with broad spectrum antibiotics. Exacerbations are characterized by an increase in volume of sputum, change in sputum colour from white to yellowish or green plus a fever.
- Referral to physiotherapist for postural drainage and physiotherapy.
- Always send sputum to the laboratory for microscopy, culture and sensitivity together with ZN stain.
- To prevent exacerbations, patients should get an annual flu vaccine and a five yearly pneumococcal vaccine.
- Frank haemoptysis warrants referral to a Specialist.

Acute Exacerbations of Bronchiectasis

- Infectious aetiology includes *S. pneumonia, H. influenza, P. aeruginosa, Moraxella, Mycobacteria and sometimes fungi.*
- Antibiotics should be chosen to empirically cover pathogens. Adjust treatment when microbiology results are available.
- Inhaled bronchodilators
- Good hydration
- Chest physiotherapy and postural drainage

- Persistent haemoptysis requires cardiothoracic surgeon's attention.

Long Term care for Bronchiectasis

- Improve lung function if patient has proven airway obstruction

	Medicine		Codes	Adult dose	Frequency	Duration
	salbutamol inhaler	**C**	**V**	200mcg	PRN	
+/-	**beclomethasone inhaler**	**B**	**V**	200mcg	PRN	

- Sputum clearance: nebulise with 0.9% Saline together with chest physiotherapy
- Pulmonary rehabilitation: inspiratory muscle training, improve exercise tolerance and endurance.

ASTHMA

General measures in Asthma

Asthma education should be viewed as a continuous process with regular re-enforcing during patient visits to the care giver. All patients should be treated with maintenance inhaled steroids unless the patient has mild intermittent asthma as evidenced by the odd chest tightness once in every 4 months or so. Any patient with asthma who requires hospital emergency treatment or admission should be prescribed an inhaled steroid for maintenance therapy.

Attention should be paid to the following:

- Domestic allergens e.g. house dust mite (carpets), cats, cockroaches
- Environmental aero-allergens
- Allergic rhinitis and sinusitis
- Gastro-oesophageal reflux disease (GERD)
- Emotional problems
- Smoking
- Work related dusts, fumes, vapours and gases

The aim of asthma management is total control of symptoms as indicated by:

- Normal activities of life (work, school, sports)
- Normal sleep with no waking up at night (i.e. no nocturnal cough)
- Normal lung function

If the above are not achievable, partial control is second best. Uncontrolled asthma is not acceptable and warrants referral to a Specialist

Two aspects of the management of asthma in adults and children are considered here:

- maintenance therapy;
- treatment of acute attacks.

The management of asthma in children is similar to that in adults. However, children under 18 months may not respond well to bronchodilators. Details of asthma medicine treatment in children are given below.

Inhalers

- All patients with chronic asthma will require inhalers. Therefore, give careful advice and check inhalation technique. Technique can be improved in most asthmatics, particularly children, by a spacer device.
- The device can be improvised as follows: cut a hole at the bottom of a 750 –1000ml plastic bottle and insert the open end of the inhaler to ensure a tight (snug) fit. Deliver one puff into the spacer and allow normal breathing for 30 seconds through the other end. All healthcare staff should be instructed in these techniques.

Asthma Score

- The scoring system shown below can help to assess the severity of asthma. Peak flow meters, when available, must always be used to assess the progress. Antibiotics are indicated only if there is evidence of chest infection or a fever.
- **Partially controlled asthma:**
  - Day time symptoms more than twice a week
  - Limitation of daily activities
  - Nocturnal symptoms
  - Peak expiratory flow/FEV1 less than 80% of predicted
  - Exacerbations >1 per year
  - Use of relieving medicines (e.g. salbutamol inhaler) more than twice per week
- **Uncontrolled asthma:**
  - Any 3 of the above features under partially controlled asthma

Mild Intermittent Asthma (symptoms once in 3 to 4 months)

Medicine	Codes	Adult dose	Frequency	Duration
salbutamol inhaler	**C V**	100-200mcg	as needed, or before exercise	

Mild Chronic Asthma

	Medicine	Codes	Adult dose	Frequency	Duration
	beclomethasone inhaler 100mcg/puff	**B V**	200-400mcg	twice a day	continual
and	**salbutamol inhaler**	**C V**	100-200mcg	as required	continual

Moderate Chronic Asthma

	Medicine	Codes	Adult dose	Frequency	Duration
	beclomethasone inhaler	**B V**	200mcg	twice a day	-
	salbutamol inhaler	**C V**	200mcg	as required	-

Severe Chronic Asthma

If response is still not adequate and the inhaler technique is adequate:

	Medicine	Codes	Adult dose	Frequency	Duration
	beclomethasone inhaler	**B V**	400mcg	2-4 times a day	continual
and	**prednisolone po***	**B V**	2.5-10mg*	once a day (morning)	continual
and	**salbutamol inhaler**	**C V**	100-200mcg	as required	as required
or	**salmeterol/fluticasone inhaler**	**S E**	50/250mg	once/twice a day	continual
+/-	**theophylline slow release po**	**B E**	200mg	2-3 times a day	continual

* using the lowest effective dose possible (prednisolone can also be usefully given on an alternative day regimen of 10mg)

Acute Asthma Attacks – Adults

Acute asthma attacks are features of uncontrolled disease and are associated with mortality. Careful monitoring of the patient's condition is essential to assess severity, and to detect improvement or deterioration. In the absence of blood gas facilities, this will depend on close assessment of physical signs such as paradoxical breathing, the use of accessory muscles, colour, altered mental state, etc.

1. Assess the severity of asthma.
   Take a careful history and examine the patient.
   - Observe breathing, talking and alertness, use of accessory muscles, colour, and mental status
   - Measure the pulse, respiratory rate,
   - Auscultation of the chest (assess wheezes). Measure lung function by peak flow or spirometer (PEF or FEV_1) and arterial blood gases if available).
2. Grade the asthma according to severity (mild, moderate, severe or imminent respiratory arrest)
3. Use medicines and interventions that are appropriate to degree of severity.

Humidified oxygen by mask at high concentration (6 litres/min) is important.

Give:

	Medicine	Codes		Adult dose	Frequency	Duration
	salbutamol nebulised (in saline or sterile water)	**B**	**V**	5mg	repeat at ½ - 1 hr intervals, then every 2-4 hours until recovered	
+/-	**ipratropium inhaler**	**A**	**V**	500mcg		
and	**Oxygen**	**B**	**V**	6 litres/min		
or	**adrenaline 1:1000 sc** useful when no nebuliser available	**C**	**V**	0.5ml	1-2 hourly as required	
and	**prednisolone po** in all but the mildest cases	**B**	**V**	40mg	once a day (mornings)	10-14 days

1. Note: There is no need to taper the dose of prednisolone if the duration is not more than 14 days
2. If poor response to initial nebuliser therapy, SpO_2 not improving, risk of near fatal asthma or attack severe admit to HDU/ICU and add:

Medicine	Codes		Adult dose	Frequency	Duration
hydrocortisone iv	**C**	**V**	200mg	once only	
magnesium sulphate iv	**C**	**V**	1.2-2g	slow iv over 20-30mins once	

Consider ventilation in severe cases.

Criteria for ICU admission:

- Patient getting tired
- Confusion, drowsiness
- Rising pCO_2 >45mmHg
- Persistent hypoxia < 60mmHg
- Inability to complete short sentences
- Acidosis

Consider the following management for very severe cases requiring ICU care:

- Continuous high flow oxygen.
- Nebulised salbutamol and ipratropium bromide.
- Intravenous Beta 2 agonist.
- Intravenous hydrocortisone or methylprednisolone.
- Possible intubation and mechanical ventilation.

ASTHMA IN CHILDREN

Acute Attacks - Children

- The same general measures apply as in adults.

Give:

	Medicine	Codes		Paed dose	Frequency	Duration
	salbutamol nebulised (in saline or sterile water) - flow rate 6L/min	**B**	**V**	<5yrs = 2.5mg/2ml >5yrs = 5mg/2ml	repeat 2 times in the first hour, then every 4 hours until recovered.	
or	**salbutamol inhaler** through a spacer	**C**	**V**	100-200mcg (1-2 puffs)	as required	-

Give oxygen between nebulisations.

- If nebulisation facilities are not available, or response is poor:

	Medicine	Codes		Paed dose	Frequency	Duration
+/-	**adrenaline 1:1000 sc**	**C**	**V**	0.01ml/kg	may be repeated twice at 20 minute intervals	
and	**prednisolone po**	**B**	**V**	1-2mg/kg	once a day	3-5 days

Severe Acute Attack in Children

- If response to the above is inadequate, give intravenous fluids at 80-100 ml/kg/day, and:

	Medicine	Codes		Paed dose	Frequency	Duration
	hydrocortisone iv/im	**C**	**V**	4-8mg/kg	once only, then	
				2-4mg/kg	6 hourly	then:
then	**prednisolone po**	**B**	**V**	1-2mg/kg	once a day	5 days

- Using an inhaler via a spacing device may be effective. A spacer can be improvised by using a plastic cup/ tumbler:

Medicine	Codes		Paed dose	Frequency	Duration
salbutamol inhaler	**C**	**V**	200mcg-400mcg		as required

Maintenance Therapy

1. Do not keep children on long term beta-2 stimulant medicines (e.g. salbutamol) if they are mostly asymptomatic.
2. Do not use antibiotics routinely in treating known asthmatics with wheeze.

The choice of medication depends on the frequency and severity of symptoms, as well as the cost and availability of medication. Aerosol sprays in conjunction with a large volume spacing device can be effectively used in children as young as 3 years old.

Mild asthma - children

Mild or intermittent asthma mainly associated with respiratory infections:

	Medicine	Codes		Paed dose	Frequency	Duration
	salbutamol inhaler	**C**	**V**	100-200mcg	as required	intermittent
or	**theophylline po**	**B**	**E**	5mg/kg	< 4 times a day	intermittent

Moderate asthma - children

These may be triggered by infections, allergies, exercise etc. Treatment is for mild asthma, but continual therapy may be required. It may also be used in combination with theophylline.

Severe asthma - children

Severe, persistent asthma, persistent wheeze, and failure to respond to the above: **add** to the above

	Medicine	Codes		Paed dose	Frequency	Duration
add	**beclomethasone inhaler**	**B**	**V**	50-100mcg	3-4 times a day	continual
or	**prednisolone po***	**B**	**V**	1-2mg/kg	once in the morning	until control, then reducing to the lowest, effective dose on alternate days

**long term prednisolone should be avoided in children, unless there is no alternative.*

15. CARDIOVASCULAR DISEASE

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MANAGEMENT OF HYPERTENSION

Non medicine treatment: All patients with hypertension or high normal blood pressure should be given advice on regular exercise, stopping smoking, reducing obesity and limiting intake of alcohol, salt and saturated fat.

Screening and diagnosis of hypertension: Screening programmes should be established to ensure that office BP is measured in all adults, at least every 5 years and more frequently in people with a high normal BP or risk factors for hypertension (such as strong family history, co-morbidities such as diabetes mellitus, chronic kidney disease). When hypertension is suspected the diagnosis of hypertension should be confirmed either by repeated office BP measurements.

The clinical assessment of a newly diagnosed hypertensive patient should establish the following:

- Establish diagnosis (repeated BP measurements) and classify/grade the severity of hypertension
- Assess for hypertension mediated organ damage/dysfunction
- Assess for existing cardiovascular disease/s, and co-morbidities
- Assess global cardiovascular risk

Classification of hypertension stages according to BP levels, presence of CV risk factors, HMOD, or comorbidities

Staging	Previous CV events, Associated risk factors, Asymptomatic HMOD	Classification of BP			
		High normal SBP 130-140 mmHg DBP 85-90 mmHg	Grade 1 SBP 140-159 mmHg DBP 90-99 mmHg	Grade 2 SBP 160-179 mmHg DBP 100-109 mmHg	Grade 3 SBP ≥180 mmHg DBP ≥ 110 mmHg
Stage 1 Uncomplicated	No concomitant risk factors		Low risk	Moderate risk	High risk
	1-2 risk factors	Low risk	Moderate risk	Moderate to high risk	High risk
	≥3risk factors	Low to moderate risk	Moderate to high risk	High risk	High risk
Stage 2 Asymptomatic disease	eGFR 30-49 ml/min/mg, Diabetes of recent diagnosis Organ damage	Moderate to high risk	High risk	High risk	High to very high risk
Stage 3 Symptomatic disease	CV/cerebrovascular disease, eGFR < 30 ml/min/mg, Long-standing diabetes	Very high risk	Very high risk	Very high risk	Very high risk

Principles of pharmacological management of hypertension

Monotherapy is usually inadequate therapy for most people with hypertension. Initial therapy with a combination of two drugs (**at low to**

medium range doses) should now be considered usual care for hypertension.

Exceptions: those patients with mild (Grade I) hypertension and no additional cardiovascular risk factors/comorbidities, or in some frailer old or very old patients, in whom more gentle reduction of BP may be desirable.

Note: Methyldopa and propranolol are no longer recommended for the treatment of hypertension except in special circumstances.

A simplified drug treatment algorithm: A combination of a thiazide/thiazide-like diuretic and calcium channel blocker is the preferred initial therapy for most patients. Other combinations: Calcium Channel Blocker (CCB) and ACEi/ARB or thiazide/thiazide-like diuretic and ACEi/ARB are alternative first line combinations.
For those requiring three drugs, a combination of a thiazide-like diuretic with CCB and ACEi/ARB. Beta blockers should be used when there is a specific indication for their use, e.g. angina, post myocardial infarction, heart failure with reduced ejection fraction, or when heart rate control is required.

Resistant hypertension: Identify resistant hypertension, defined as poorly controlled hypertension despite three drug combination therapy including a diuretic. Inadequate compliance and suboptimal dosing should always be considered and excluded.

GUIDELINES FOR TREATMENT OF HYPERTENSION:

- start with first line medicine
- start with the lowest recommended doses
- if ineffective or not tolerated change the medicine or add a medicine from another class.

First line combination therapy

- Thiazides/thiazide like diuretics and calcium channel blockers

	Medicine	Codes		Adult dose	Frequency	Duration
	hydrochlorothiazide po[1]	**C**	**V**	12.5-25mg (max 25mg)	once daily	long term
and	**amlodipine po**	**C**	**V**	5-10mg	once daily	long-term
or	**nifedipine slow release po**	**C**	**V**	20-40 mg	once daily	long-term

[1]*Unfavourable effect in patients with gout*

- **Calcium channel blockers and ACE inhibitors/angiotensin receptor blockers:**

	Medicine	Codes		Adult dose	Frequency	Duration
	amlodipine po	**C**	**V**	5-10mg	once daily	long term
or	**nifedipine slow release po**	**C**	**V**	20-40mg	once daily	long term
	enalapril po	**B**	**V**	5-40mg	twice daily	long term
and						
or	**lisinopril po**	**B**	**V**	5-10mg	once daily	long term
or	**losartan po**	**B**	**V**	25-100mg	once daily	long term

- **Thiazides/thiazide like diuretics and ACE inhibitors/angiotensin receptor blockers:**

	Medicine	Codes		Adult dose	Frequency	Duration
	hydrochlorothiazide po	**C**	**V**	12.5-25mg	once a day	long term
	enalapril po	**B**	**V**	5-20mg	twice daily	long term
and						
or	**lisinopril po**	**B**	**V**	5-10mg	once daily	long term
or	**losartan po**	**B**	**V**	25-100mg	once daily	long term

Second line combination therapy

- Thiazide/thiazide-like diuretics, calcium channel blockers and ACE inhibitors/angiotensin receptor blockers:

	Medicine	Codes		Adult dose	Frequency	Duration
	hydrochlorothiazide po	**C**	**V**	12.5-25mg	once daily	long term
and	**amlodipine po**	**B**	**V**	5-10mg	once a day	long term
or	**nifedipine slow release po**	**B**	**V**	20-40 mg	twice daily	long term
and	**enalapril po**	**B**	**V**	5-20mg	twice daily	long term
or	**lisinopril po**	**B**	**V**	5-10mg	twice daily	long term
or	**losartan po**	**B**	**V**	25-100mg	once daily	long term

Side effects profile

Agent	Side effects
Diuretics e.g. HCT	*Unwanted side effects for diuretics include raised plasma glucose, uric acid, cholesterol and reduced plasma potassium and magnesium; sinus congestion*
CCB	*Unwanted side effects include vasodilator effects such as headache and facial flushing in up to 20% of patients, peripheral oedema (usually due to a local action rather than an effect on the heart or kidney).*
ACE inhibitors	*Unwanted side effects include cough in 10-25% of patients, angioedema, postural hypotension and occasionally syncope, particularly in patients with a low plasma volume due to diuretic treatment. All ACE inhibitors can cause excessive hypotension and renal failure.* *A useful alternative to ACE inhibitor when cough develops are Angiotensin-receptor blockers such as Losartan.* *Caution: concomitant potassium supplements or potassium retaining medicines should be avoided, or used only with careful monitoring of serum potassium.*

Resistant hypertension

- If BP remains above goal/poorly controlled, consider poor compliance, inadequate medicine doses (and optimize), drug-interactions (eg with NSAIDs, steroids, tricyclic antidepressants) and secondary causes of hypertension (esp renal, endocrine)
- Refer patients with resistant hypertension for specialist care
- The preferred fourth medicine is spironolactone, alternatives are beta blockers, alpha blockers, then other vasodilators such as oral hydralazine

- Mineralocorticoid antagonist:

Medicine	Codes	Adult dose	Frequency	Duration
spironolactone po	**B V**	25-100mg	1-2 times a day	long term

Monitoring of potassium levels is recommended with spironolactone treatment

- **Beta-blockers**

Medicine	Codes	Adult dose	Frequency	Duration
atenolol po	**B V**	50mg	once a day	long term

Unwanted side effects include precipitation or exacerbation of asthma, heart failure, impaired glucose control, fatigue and peripheral vascular disease.

- Alpha-blockers:

	Medicine	Codes		Adult dose	Frequency	Duration
	prazosin po	**B**	**V**	0.5-5mg	2-3times a day	long term
or	**doxazocin po**	**B**	**V**	4-16mg	once daily	long term

Total cardiovascular risk reduction

Those patients at high cardiovascular risk should be treated with a statin (for primary and secondary prevention), and anti-platelet therapy (for secondary prevention)

- Statins:

	Medicine	Codes		Adult dose	Frequency	Duration
	atorvastatin po	**B**	**V**	20-80mg	once daily	long term
or	**rosuvastatin po**	**B**	**V**	10-40mg	once daily	long term

- Anti-platelet agents:

	Medicine	Codes		Adult dose	Frequency	Duration
	aspirin po	**B**	**V**	75-150mg	once daily	long term
or	**clopidogrel po**	**B**	**V**	75 mg	once daily	long term

MANAGEMENT OF SEVERE HYPERTENSION

Definition: diastolic blood pressure >120mmHg

Emergency intravenous therapy or sublingual nifedipine is rarely required and is potentially dangerous (may result in stroke, renal failure or myocardial infarction).

Indications for emergency treatment:

- Left ventricular failure with pulmonary oedema (also see section on treatment of acute pulmonary oedema).
- Hypertensive encephalopathy.
- Acute aortic dissection.
- Severe pre-eclampsia (see chapter on Obstetrics & Gynaecology).
- Recent stroke requires caution as rapid lowering of blood pressure may worsen neurological deficit. Treat if diastolic blood pressure >120mmHg after 48 hours. Long term treatment indicated if diastolic blood pressure >100mmHg after 3 months.
- Frequent blood pressure monitoring
- Sub-lingual nifedipine should be restricted in its use for hypertension. The only remaining major indication for it is severe hypertension with aortic dissection.

Medicines

- Beta-blocker, with alpha activity:

Medicine	Codes	Adult dose	Frequency	Duration
labetalol iv	**S V**	20 mg IVI stat over 2 mins, then 10-80 mg IVI every ten minutes until desired BP level achieved		
labetalol continuous infusion	**S V**	**2 mg IVI per minute by continuous IV infusion		

* *Total dose should not exceed 300 mg

- Calcium channel blocker:

Medicine	Codes	Adult dose	Frequency	Duration
nicardipine iv (nicardipine continuous infusion)	**S V**	Initial infusion rate 3-5 mg/hour Reassess every 10-30 minutes and transition to oral treatment once emergency stabilized		

The maximum infusion rate is 1.6 mcg/kg/min. The initial infusion rate of intravenous nicardipine is 5 mg/h. The maximum infusion rate is 30 mg/h, it is advisable not to exceed 15 mg/h.

- Direct acting vasodilator:

Medicine	Codes	Adult dose	Frequency	Duration
dihydralazine iv/im	**B V**	6.25-25mg	PRN until desired BP level achieved	

BP should be measured every 5-10 minutes

Parenteral anti-hypertensives should be used under specialist supervision and where facilities for continuous BP monitoring are available

CARDIAC FAILURE

Usually presents with shortness of breath on exertion or at rest, swelling of ankles, ascites and easy fatiguability.

General guidelines:

- Precipitating factors should be sought and treated e.g.:
  - hypertension
  - infections such as sub-acute bacterial endocarditis, chest infection
  - arrhythmias
  - hypokalaemia
  - anaemia
  - medicines, e.g. digoxin overdose, NSAID's, beta-blockers
  - pulmonary embolism
  - thyrotoxicosis
  - myocardial infarction

- Daily weights and fluid balance (intake/output) should be recorded as a simple measure of response to treatment. Ideal weight loss should be 1 kg per day.
- Restrict salt in diet.
- Encourage bed rest.
- Check blood pressure daily.
- **Potassium** supplements are to be stopped and levels monitored regularly when using ACE inhibitors (e.g. captopril and enalapril).
- Monitor serum potassium levels.
- **Digoxin** toxicity may be a problem especially in the elderly and in patients with hypokalaemia and hypomagnesaemia.

Medicine Management:

The medical management of heart failure discussed below is evidence based for heart failure with reduced left ventricular systolic function.
Heart failure in the setting of valvular heart disease requires surgical management as the definitive treatment, some of the medications below can be used to control symptoms of congestion or heart rate control

	Medicine	Codes	Adult dose	Frequency	Duration
	frusemide po[1]	**B V**	40-80mg	1-2 times a day	long term
and	**enalapril po**	**B V**	5-20mg	once daily	long term
and	**carvedilol po**	**B V**	3.125-25mg	twice daily	long term
or	**bisoprolol po**	**B V**	1.25-10mg	once daily	long term
or	**metoprolol succinate XL po**[2]	**B V**	25-100 mg	1-2 times/day	long term
and	**spironolactone po**	**B V**	25-50mg	once daily	long term
+/-	**potassium chloride po**[3]	**B V**	600mg-1.2g	1-2 times a day	long term
+/-	**digoxin po**	**B E**	0.25-0.5mg	3 times a day	first 24hrs
		then	0.125-0.25mg	once a day	long term
			Paed = 0.01mg/kg		

[1]give intravenous treatment for severely oedematous patients
[2] control release metoprolol
*[3]if using ACE inhibitors, losartan or spironolactone discontinue or use **cautiously***
**ACE inhibitors are of benefit in all stages of heart failure*
Selective Beta blockers such as carvedilol are of benefit in all stages of heart failure

For oedematous and bed-ridden patients:

	Medicine	Codes	Adult dose	Frequency	Duration
	enoxaparin sc	**B V**	40-80mg	once daily	as required
or	**heparin sc**	**B V**	5000 units	3 times a day	as required

Acute pulmonary oedema:

- Prop up in bed.
- 40% ***oxygen*** by mask (2 – 4L/min)
- **and:**

	Medicine	Codes	Adult dose	Frequency	Duration
	morphine iv	**B E**	5-10mg	slowly over 1-2 mins; Repeat every 15mins if required.	
plus	**metoclopramide iv**	**B E**	10 mg	when required for vomiting	
plus	**frusemide iv**	**B V**	40-80mg	repeat as required	

- Subsequent treatment includes ACE inhibitors as for heart failure.

ANGINA PECTORIS

Change in lifestyle measures. Minimise risk factors with particular attention to:

- cessation of smoking;
- weight reduction if obese;
- control of hypertension.
- control of hypercholesterolaemia
- control of diabetes
- encouragement of exercise
- minimise stressful lifestyle

Stable angina/ infrequent attacks:

	Medicine	Codes	Adult dose	Frequency	Duration
	aspirin po[1]	**C V**	75-150mg	once a day	long term
and	**glyceryl trinitrate sub-lingual**[2]	**A E**	500mcg	not more than 3 tablets every 15 mins	
and	**atorvastatin po**	**B V**	20-80mg	once daily	long term
or	**rosuvastatin po**	**B V**	10-40mg	once daily	Long term

[1]*aspirin is contraindicated in bleeding peptic ulcers*

[2]*glyceryl trinitrate deteriorates on storage - tablets should be kept in original container and discarded 3 months after opening.*

Frequent attacks of angina:

	Medicine	Codes	Adult dose	Frequency	Duration
	aspirin po	**C V**	75-150mg	once daily	long term
and	**isosorbide dinitrate po**	**A E**	10-40mg	3 times a day	long term

- If no response, add:

	Medicine	Codes		Adult dose	Frequency	Duration
	atenolol po	**B**	**V**	50-100mg	once a day	long term
and	**amlodipine po**	**B**	**V**	2.5-10 mg	once daily	long term
or	**nifedipine slow release po**	**B**	**V**	10-20mg	twice daily	long term

- If pain continues in spite of above treatment, **refer** for further investigation and treatment.

Unstable Angina:
Angina of new onset or brought on by minimum exertion. Admit to hospital for:

	Medicine	Codes		Adult dose	Frequency	Duration
	aspirin po	**C**	**V**	75-150mg	once daily	long term
and	**isosorbide dinitrate po**	**A**	**E**	10-40mg	3 times a day	as required
or	**glyceryl trinitrate iv**	**A**	**E**	10-20mcg /min infusion		as required
and	**heparin iv**	**B**	**V**	5000iu	6hourly	as required
and	**atenolol po**	**B**	**V**	25-100mg	once daily	as required
and	**nifedipine slow release po**	**B**	**V**	10-20mg	twice a day	as required
or	**amlodipine po**	**B**	**V**	2.5-10 mg	once daily	as required
and	**atorvastatin po**	**B**	**V**	20-80mg	once daily	long term
or	**rosuvastatin po**	**B**	**V**	10-40mg	once daily	long term

ACUTE MYOCARDIAL INFARCTION

General Measures

- Bed rest
- Oxygen administration
- Set up an intravenous line (**dextrose 5%** or **sodium chloride 0.9%**)
- Give aspirin at the earliest possible opportunity

Where possible, avoid intramuscular injections as this interferes with the measurement of cardiac enzymes and results in haematomas with thrombolytic agents.

Management of Acute Myocardial Infarction:

	Medicine	Codes		Adult dose	Frequency	Duration
	aspirin po	**C**	**V**	300mg	once only as a single dose, then	
				75-150mg	once a day	long term
or	**clopidogrel po**	**B**	**E**	300mg	once only	
				75mg	once daily	
and	**morphine iv**	**B**	**E**	2-5mg	every 10–15min	as required
and	**isosorbide dinitrate po and low molecular weight heparins**	**A**	**E**	10-40mg	3 times a day	as required
and	**streptokinase (or preferably urokinase) iv Useful for MI with ST segment elevation**	**A**	**N**	1.5MU in 100ml sodium chloride 0.9% or dextrose 5% run over one hour, once only		
and	**atenolol po**	**B**	**V**	50-100mg	once a day	long term
and	**enalapril po**	**B**	**E**	5-20mg	twice daily	long term
or	**lisinopril po**	**B**	**E**	5-20mg	twice daily	long term
and	**atorvastatin po**	**B**	**V**	20-80mg	once daily	long term
or	**rosuvastatin po**	**B**	**V**	10-40mg	once daily	long term

- *Thrombolytic agents should be administered early preferably in infarcts of less than 12 hours duration.*
- ***CAUTIONS:** DO **not** give **digoxin** in acute infarction unless there is a supra-ventricular arrhythmia that requires it.*
- *DO **not** use inotropic agents such as **isoprenaline** or **adrenaline** as they may be counter-productive and cause an extension of the infarction.*

ARRHYTHMIAS AFTER MYOCARDIAL INFARCTION:

Ectopic beats

Give reassurance about the condition, but if troublesome:

	Medicine	Codes		Adult dose	Frequency	Duration
	atenolol po	**B**	**V**	50-100mg	once daily	as required

Atrial fibrillation and atrial flutter

	Medicine	Codes		Adult dose	Frequency	Duration
	atenolol po	**B**	**V**	25-50mg	once to twice a day	review
or	***verapamil po**	**A**	**V**	40-120mg	3 times a day	review

****Verapamil is contraindicated in heart failure patients.***

If poor control of ventricular response, cautiously add:

Medicine	Codes	Adult dose	Frequency	Duration
digoxin po	**B V**	0.25-0.5mg	3 times a day	first 24hrs
	then	0.125-0.25mg	once a day	long term

For chronic atrial fibrillation:

Medicine	Codes	Adult dose	Frequency	Duration
warfarin po	**B V**	10mg	once a day	for 3 days
		then adjust according to INR		

For atrial flutter, synchronised D.C. cardioversion (50-200 joules) can be tried.

Paroxysmal supraventricular tachycardia

Carotid sinus massage/valsalva manoeuvre or prompt squatting.
Consider synchronized D.C. cardioversion (50-200 joules) if patient distressed.

Medicine	Codes	Adult dose	Frequency	Duration
verapamil iv	**A V**	5-10mg	bolus, can be repeated after 10 min	

For long term therapy:

Medicine	Codes	Adult dose	Frequency	Duration
verapamil po	**A V**	40-120mg	3 times a day	long term

Caution: avoid intravenous verapamil in patients treated with beta-blockers.

If poor response, refer for specialist management.

Ventricular tachycardia

- Consider D.C. cardioversion if patient distressed.

Medicine	Codes	Adult dose	Frequency	Duration
lignocaine iv	**B N**	75-100mg	stat, then 4mg/min for 30 mins, then 1-2mg/min for 12-24 hours	

Medicine	Codes	Adult dose	Frequency	Duration
amiodarone iv	**A E**	150 mg over first 30 min (5mg/min), followed by 360 mg over next 6 hr (1 mg/min), THEN 540 mg over remaining 18 hr (0.5 mg/min), Maintenance: 0.5 mg/min for a total 720 mg/24hr		

- **In general, maintenance with amiodarone infusion should be limited to 24 hours or less, unless if the patient cannot tolerate oral medication, or the tachyarrthymia is recurrent.**

- **The same regimen should also be used for refractory atrial fibrillation or SVT**
- If ventricular arrhythmias are troublesome disopyramide (specialist-only) may be used **– refer.**

HIGH DEGREE AND SYMPTOMATIC HEART BLOCK (STOKES ADAMS ATTACK)
REFER **TO SPECIALIST FOR PACEMAKER INSERTION.**

ENDOCARDITIS

Consult a microbiologist where possible. Alpha-haemolytic streptococci are the most common causes of native valve endocarditis, but *Staphylococcus aureus* is more likely if the disease is rapidly progressive with high fever, or is related to a prosthetic valve (*Staphylococcus epidermidis).* Three sets of blood cultures should be taken before starting treatment.

Native valve endocarditis

Empirical treatment:

	Medicine	Codes		Adult dose	Freq.	Duration
	benzylpenicillin iv	**C**	**V**	5MU	6hourly	2-6 weeks
or	**ceftriaxone 1g iv**	**C**	**V**	1g	12hourly	2-6 weeks
and	**gentamicin iv**	**C**	**V**	80-120mg	12hourly	2 weeks

*Total duration of antibiotic therapy should be 4 – 6 weeks if there is evidence of improvement.

*Treatment can be changed to oral therapy after at least 2 weeks of IV antibiotics if there is marked improvement.

Prosthetic valve endocarditis

Initially:

	Medicine	Codes		Adult dose	Freq.	Duration
	cloxacillin iv	**B**	**V**	2g	6hourly	4-6 weeks
and	**gentamicin iv**	**C**	**V**	80-120mg	12hourly	4 weeks

It is important to measure serum gentamicin levels every 3-4 days. One-hour peak concentration should not exceed 10mg/l and trough concentration (2hour pre-dose) should be less than 2mg/l.

Treatment of culture positive endocarditis

Streptococcal infection (e.g. *Strep. viridans*):

	Medicine	Codes		Adult dose	Frequency	Duration
	benzylpenicillin iv	**C**	**V**	5MU	6hourly	4-6 weeks
and	**gentamicin iv**	**C**	**V**	80-120mg	12hourly	4 weeks

Enterococcal infection (e.g. *Enterococcus faecalis*):

	Medicine	Codes	Adult dose	Frequency	Duration
	benzylpenicillin iv	**C V**	5MU	6hourly	4-6 weeks
and	**gentamicin iv**	**C V**	80-120mg max-120mg	12hourly	4 weeks

Staphylococcal infection (for example, *Staph. aureus* & *Staph. epidermidis*):

	Medicine	Codes	Adult dose	Frequency	Duration
	cloxacillin iv	**B V**	2g	6hourly	4-6 weeks
and	**gentamicin iv**	**C V**	80-120mg	12hourly	4 weeks

At any stage, treatment may have to be modified according to:

- detailed antibiotic sensitivity tests
- adverse reactions
- allergy
- failure of response

Endocarditis leading to significant cardiac failure or the failure to respond to antibiotics may well require cardiac surgery.

Prophylaxis against endocarditis – no special risk:

Dental procedures, upper respiratory tract, obstetrics and gynaecological procedures under **local or no** anaesthesia (no special risk):

	Medicine	Codes	Adult dose	Frequency	Duration
	amoxicillin po	**C V**	3g Paed = 50mg/kg	one dose only – one hour before procedure	
or	**clindamycin po** in penicillin allergy or recent penicillin administration (< one month)	**B V**	600mg <5yrs = 150mg 5-10yrs = 300mg	one dose only, one hour before procedure	

Dental procedures, upper respiratory tract, obstetrics and gynaecological procedures under **general** anaesthesia (no special risk):

	Medicine	Codes	Adult dose	Frequency	Duration
	ampicillin iv	**B E**	1g at induction, then 500mg after 6hrs		
or	**amoxicillin po**	**C V**	3g 4hrs before anaesthesia, then 1g 6 hours post-op.		

If penicillin allergy or recent administration of penicillin within the previous month see under special risk groups below.

Prophylaxis against endocarditis – special risk:

Prosthetic valve *in situ*, or previous endocarditis or genitourinary procedures (special risk groups)

	Medicine	Codes	Adult dose	Frequency	Duration
	ampicillin iv	**B E**	1g	at induction	single dose
and	**gentamicin iv**	**C V**	120mg	at induction	single dose

If penicillin allergy or administration of penicillin in the past month:

	Medicine	Codes	Adult dose	Frequency	Duration
	clindamycin iv*	**B N**	300mg	at induction	single dose
and	**gentamicin iv**	**C V**	120mg	at induction	single dose

**Do not use clindamycin for urological/gynaecological procedures because it will not prevent enterococcal infection. In these cases replace clindamycin with vancomycin iv 1g over at least 100 minutes 1- 2 hours before procedure.*

RHEUMATIC FEVER

Treatment of acute attack:

	Medicine	Codes	Adult dose	Frequency	Duration
	benzathine penicillin im 1.44g = 1.2MU	**C V**	0.6MU(0.72g) Paed: <5 yrs =0.15MU(0.18g) 5-10 yrs= 0.3MU(0.36g) >10 yrs=0.6MU(0.72g)	once dose only	single dose
or	**amoxycillin po**	**C V**	500mg Paed: <5 yrs=125mg 5-10 yrs=250mg >10 yrs=500mg	3 times a day	10 days
or	**erythromycin po –** in penicillin allergy	**C V**	500mg	4 times a day	10 days

Treatment of acute arthritis and carditis:

	Medicine	Codes	Adult dose	Frequency	Duration
	aspirin po	**C V**	25mg/kg*	4 times a day	as required

**dose should be reduced if tinnitus or other toxic symptoms develop.*

Aspirin should be continued until fever, all signs of joint inflammation and the ESR have returned to normal, and then tapered gradually over 2 weeks. If symptoms recur, full doses should be restarted.

In severe carditis with development of increasing heart failure or failure of response to aspirin, add:

Medicine	Codes	Adult dose	Frequency	Duration
prednisolone po	**B V**	1-2mg/kg	once a day	3-4 weeks, then review

Gradual reduction and discontinuation of prednisolone may be started after 3-4 weeks when there has been a substantial reduction in clinical disease.

Heart failure should be managed in the usual way.

All patients with carditis should be kept on strict bed rest until all evidence of active carditis has resolved and the ESR has returned to normal. Activity can then be gradually increased.

Antibiotic prophylaxis after rheumatic fever:

- Prophylaxis should be given to all patients with a history of rheumatic fever and to those with heart valve lesions thought to be of rheumatic origin. The optimum duration of prophylaxis is controversial but should be continued up to at least 21 years of age. If at that age there are any significant heart murmurs, prophylaxis should be life-long.
- Specific situations requiring prophylaxis for longer periods (can be lifelong):
  - definite carditis in previous attacks
  - high risk of exposure to streptococcal infection at home or work (crowded conditions, high exposure to children)

	Medicine	Codes	Adult dose	Frequency	Duration
	benzathine penicillin im (1.44g =2.4MU)	**C** **V**	2.4MU(1.44g <12yrs = 1.2MU(0.72g)	monthly	up to 21-30yrs
or	**amoxicillin po**	**C** **V**	250mg	once a day	lifelong
or	**erythromycin po** in penicillin allergy	**C** **V**	250mg <12yr=125-250mg	2 times a day	up to 21-30yrs

Note

The need for continuing prophylaxis should be reviewed at 21-30 years and patients with rheumatic heart disease must take prophylaxis life long.