EDLIZ 2015

7th Essential Medicines List
and
Standard Treatment Guidelines
for
Zimbabwe

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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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FOREWORD

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

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

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

I 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.

Hon. Dr. P.D. Parirenyatwa

Minister of Health & Child Care

THE ESSENTIAL MEDICINES LIST FOR ZIMBABWE – EDLIZ 7TH EDITION

This 7th 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 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 take into account medicine developments and new healthcare problems. Thus this latest edition has included more essential medicines.

The essential medicine list is based on the Essential Medicines Concept. 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

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
- ✓ available as single ingredient items

Safe
Efficacious
Quality
Available
Affordable
Accessible
Rationally used

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. 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; 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 is 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.

Bio-equivalence 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 each 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.

- ✓ easier 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

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.

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

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

Improved effectiveness and efficiency in patient treatment leads 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.

- ✓ more competition
- ✓ lower prices

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.

Additionally, with improved medicine availability changes to chronic medication regimens are less likely and as a consequence patients have a better understanding of their disease, their medication and the need for compliance.

- ✓ focused education efforts
- ✓ reduced confusion & increased adherence to treatment

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 on their own 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 taken to ensure cost-effective prescribing and patient care. It is therefore necessary for every hospital to have a forum where medicine issues can be discussed. Ideally, a separate hospital medicine

and therapeutics committee (HMTC) should be formed. 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 developed by the NMTPAC is available.

EXPLANATIONS & CHANGES FROM THE PREVIOUS VERSION

This edition is essentially the same in format and layout, categorisation 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

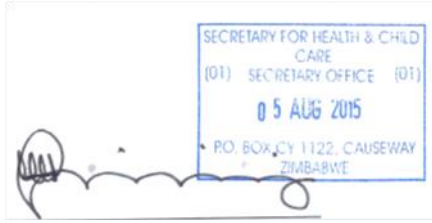
All medicines are also classified according to their priority. This is mostly a tool to assist in giving priority to medicines based on economic considerations. Thus **V** medicines are **vital,** they are considered

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.gov.zw or nmtpac@gmail.com with your comments.



Brigadier General (Dr) G. Gwinji
Permanent Secretary
Ministry of Health & Child Care
Republic of Zimbabwe

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 for use in their hospital using the EDLIZ.

New chapter
There is one new chapter – Overview of Surgical Conditions. We welcome any comments on the utility of this chapter. Your comments will be used in future revisions.

Antibiotics

A new cephalosporin, Cefixime, has been added to the treatment of sexually transmitted illnesses. Azithromycin has also been added for the treatment of gonococcus.

Immunisation

Rotavirus immunisation has now become routinely available. Human Papilloma Virus (HPV) vaccination is currently being used in a limited setting but it is hoped that it will be rolled out nationally in 2016.

Asthma Treatment

Given that salbutamol inhalers are more accessible, **oral** salbutamol has been phased out completely. You will need to ensure that your patients are aware of this change. Use of steroids as an inhaler should be encouraged in place of regular oral Salbutamol. Health care workers will need to always check that their clients can use the inhalers appropriately.

ART Guidelines (use latest ART guidelines)

Stavudine containing regimens are being phased out and will not be available except for a limited number of patients who will still need them. For first line therapy, tenofovir/lamivudine and efavirenz will be used in most instances for adults, adolescents and children as well as pregnant women.

Third line antiretroviral medicines will be available in selected hospitals. These third line medicines will include raltegravir and darunavir. Please

familiarise yourself with the dosing of these new medicines and the algorithm for their use.

Malaria Treatment

The malaria medicines have also been revised. The first line therapy remains the same as before i.e. Artemether + Lumefantrine (AL). However, where oral quinine would have been used, we now recommend oral artesunate and amodiaquine as a combined medicine. For pre-referral use, rectal artesunate will be used instead of IM quinine. This new combination of antimalarial therapy is given orally and should simplify the management of patients with severe malaria. Instead of using parenteral quinine for complicated malaria, intravenous artesunate will be used. Unlike with IV quinine use, there will be no need to worry about hypoglycaemic effects with the use of artesunate.

Tropical Diseases

You will need to familiarize yourself with the recognition and management of Ebola which is currently causing a huge epidemic in West Africa. Hence, our healthcare delivery centres are on the lookout for such Ebola infections.

TB recommendations (use latest TB guidelines)

Isoniazid prophylaxis has been adopted and hence you should familiarise yourself with the protocol for its use. Isoniazid (INH), like any other medicines, can cause side effects. Look out for gastrointestinal symptoms, hepatitis, skins reactions and peripheral neuropathy. Stopping the INH as soon as possible will help to save lives. Thus patients will need to be informed about the need to look out for these adverse events. Some of the adverse events are rather idiosyncratic and hence not dose related. Use the usual adverse medicines reporting forms and send forms through to the Pharmacovigilance and Clinical Trials (PVCT) Unit at the Medicine Control Authority of Zimbabwe (MCAZ) offices.

Metabolic and Endocrine Conditions

The use of the Basal Bolus regimen has been introduced and we hope to phase out the reference to using Sliding Scale insulin. The Basal Bolus Regimen is more physiological as it uses an underlying intermediate or long acting dose of insulin once a day as well as pre-meal (prandial/bolus) short acting or rapid acting insulin doses. By checking pre-meal glucose, extra correctional doses can be added to the calculated prandial doses of insulin. Thus you will need to read and familiarize yourself with these new recommendations for diabetes therapy.

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GUIDELINES ON ANTIMICROBIAL TREATMENT AND PROPHYLAXIS

General guidelines

Antimicrobials are the most over-used class of medicines worldwide and in Zimbabwe. 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. Antimicrobials should be used **only** in patients with likely bacterial illness requiring systemic therapy. In many cases anti-microbial medicines will initially be given “blind” or “empirically”, the choice being based on clinical suspicion without microbiological confirmation. Positive identification of the pathogen and anti-microbial susceptibility testing should be sought wherever possible as this will result in better and more cost-effective treatment.

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 will be 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 is most likely 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. Maintain a database of susceptibility profile in order to guide intelligent choice of empirical antibiotic therapy at 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 superinfection.

5. **Choice of route** should be determined by the site and severity of infection. It is 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 resistant micro-organisms and to cause sensitisation; topical antiseptics are preferred in most situations.

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).

Notes on Specific Antimicrobials

Note that some antibiotics are becoming ineffective because micro-organisms are generally resistant to them. Antimicrobial susceptibility testing should therefore 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 lower cost. However, the same is **not** true of the injectable preparations that have similar efficacy.

Chloramphenicol must be limited to serious infection such as typhoid, *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 a broad-spectrum antibiotic is required and there is a problem with availability. 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. Except for duration less than 3 days use or when lower doses are used, as with TB therapy, they require peak and trough serum levels (where available), careful monitoring of serum urea and/or creatinine, and checking for complaints of auditory or vestibular symptoms (adverse effects).

Patients with true **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 such newer medicines as imipenem. Macrolides are suitable alternatives. Persons with a history of co-trimoxazole allergy may be offered desensitisation (see Chapter on HIV infections).

Pyrexia/Fever of unknown origin

Fever is a common presenting symptom at all ages, but in adults there will usually be some localising symptoms or signs, 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 a district hospital laboratory. If possible, send a *blood culture* to the nearest reference laboratory. *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 the 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 - **chloramphenicol**, staphylococcal septicaemia - **cloxacillin**, etc), anaerobes (metronidazole).

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

	Medicine	Codes		Adult dose	Frequency	Duration
	ampicillin iv	**B**	**E**	2g	4 times a day	Review
and	**gentamicin iv**	**C**	**V**	4–5mg /kg	once a day	max 2 weeks

Alternative:

	Medicine	Codes		Adult dose	Frequency	Duration
	chloramphenicol iv	**B**	**E**	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 prophylaxis of infection

There are some instances where the use of prophylactic antibiotics is well established. However, the use of antibiotics for prophylaxis of infection 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

- **Vaginal operations:**

Medicine	Codes		Adult dose	Frequency
chloramphenicol iv	**B**	**E**	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

Also refer to Obstetrics and Gynaecology/Surgical Conditions Chapters for further guidance.

- **Urinary tract surgery e.g. prostatectomy:**

Medicine	Codes	Adult dose	Frequency
ciprofloxacin po	**B V**	500mg	single dose

Other prophylaxis

- **Skull base fracture with liquorrhoea (rhino/otorrhoea):**

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

- **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	

- **Cotrimoxazole Prophylaxis (see HIV chapter):**

Medicine	Codes	Adult dose	Frequency	Duration
cotrimoxazole* po	**C V**	960mg	every day	for life or until CD4>500 for 3 months with ARVs

If there is a history of cotrimoxazole allergy and it was **not Stevens-Johnson syndrome then it is likely that the person can be desensitised.*

BASIC INFECTION PREVENTION AND CONTROL MEASURES

General Notes

(See National Infection Control Guidelines)
Transmission of infections in healthcare facilities can be prevented and controlled through the application of basic infection control prevention and control practices. The 2 tiers or categories of infection control prevention and practices are A) **standard precautions** and B) **transmission based** precautions. The goal of this two- tier/category system is to minimise risk of infection and maximise safety level within our healthcare facilities.

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

Categories of Infection Control Practices:

a. Standard Precautions (previously known as Universal Precautions) - must be applied to all patients at all times, regardless of diagnosis or infectious status.
b. Transmission based precautions - are specific to modes of transmission e.g. airborne, droplet or contact.

A) 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 substances excretions and secretions.
- Appropriate handling of patient care equipment and soiled linen.
- Prevention of needle stick/sharp injuries.
- Environmental cleaning and spills management.
- Appropriate handling of waste.

Hand Hygiene

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

NB: Hand washing or hand antisepsis is the simplest and most cost-effective way of preventing the transmission of infection and thus reducing the incidence of healthcare associated infections.

Types of Hand Hygiene

1. Hand washing is usually limited to hands and wrists, the hands are washed for a minimum 10-18 seconds with hand washing soap and water.
2. **Hand antisepsis/Decontamination**
    - Decontaminate hands with a waterless alcohol based hand gel or rub for 15-30 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 minimum 2-3 minutes and dried with a sterile towel. This is required before performing invasive procedures.

NB: Hands should be dried with 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 infective 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 however should not replace hand washing.***

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.) After removing gloves, wash hands thoroughly.

A. Important points to remember when using 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

1. A surgical mask protects healthcare providers from inhaling respiratory pathogens transmitted by the droplet routes. It prevents the spread of infectious diseases such as varicella (Chicken pox) and meningococcal diseases (meningococcal meningitis.)
2. A N95 mask 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.

NB: In order to prevent the spread of infection, the appropriate mask 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 isolation room to prevent spread of infection.
Disposable masks are for single use only and should only be discarded after 4-6 hours use.

Precautions

a) Masks should not be worn around the neck
b) Masks cannot be worn with beards or unshaven faces.
c) Masks should completely seal the face at all times 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, if soiling of clothes with blood or other potentially infectious material is likely, is highly recommended.

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.

Protective eyewear/Goggles

- Should be worn at all times 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.

G. 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 ***colour-coded or labelled leak-proof puncture resistant container***.

B) 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

A. 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

B. Droplet Precautions:

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

C. Airborne Precautions:

- Designed to provide protection from extremely tiny airborne bacteria or dust particles 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

PAEDIATRIC CONDITIONS

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, immunisable diseases. Some of the paediatric conditions may have underlying HIV infection.

Other paediatric conditions have been described in the relevant chapters in EDLIZ, and where possible paediatric doses have been given.

- Note: doses are also given by age and weight wherever possible, and volumes of liquids or injections to be administered are indicated. **Always check** the concentration of the preparation however, as preparations may change. This should not be seen as 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 3.1 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 3.2*

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 12hours, whilst a 2kg term baby 5 days old would receive 200,000u every 8 hours.

Routine Management at Birth

- Do not suction mouth routinely, 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 1minute is recommended for all normal births except in IUGR, infants of diabetic mothers and asphyxia.
- To prevent neonatal ophthalmia, instil into **both eyes**:

Medicine	Codes	Paed dose	Frequency	Duration
tetracycline eye oint. 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 tetratcycline 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**

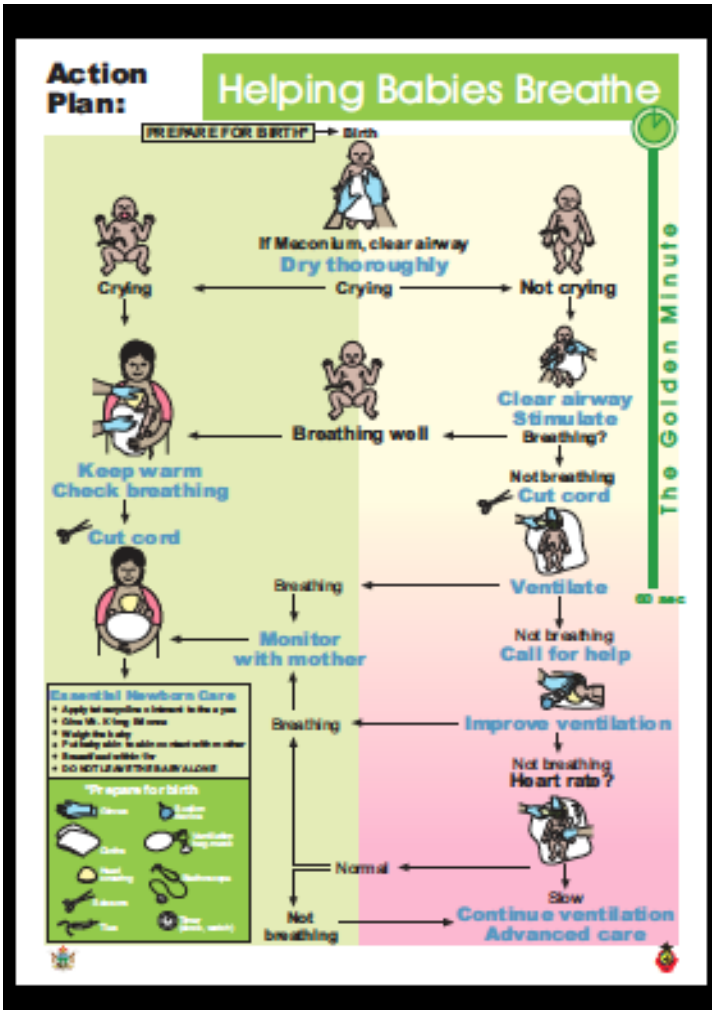


Figure 3.1 Action plan to help babies breathe

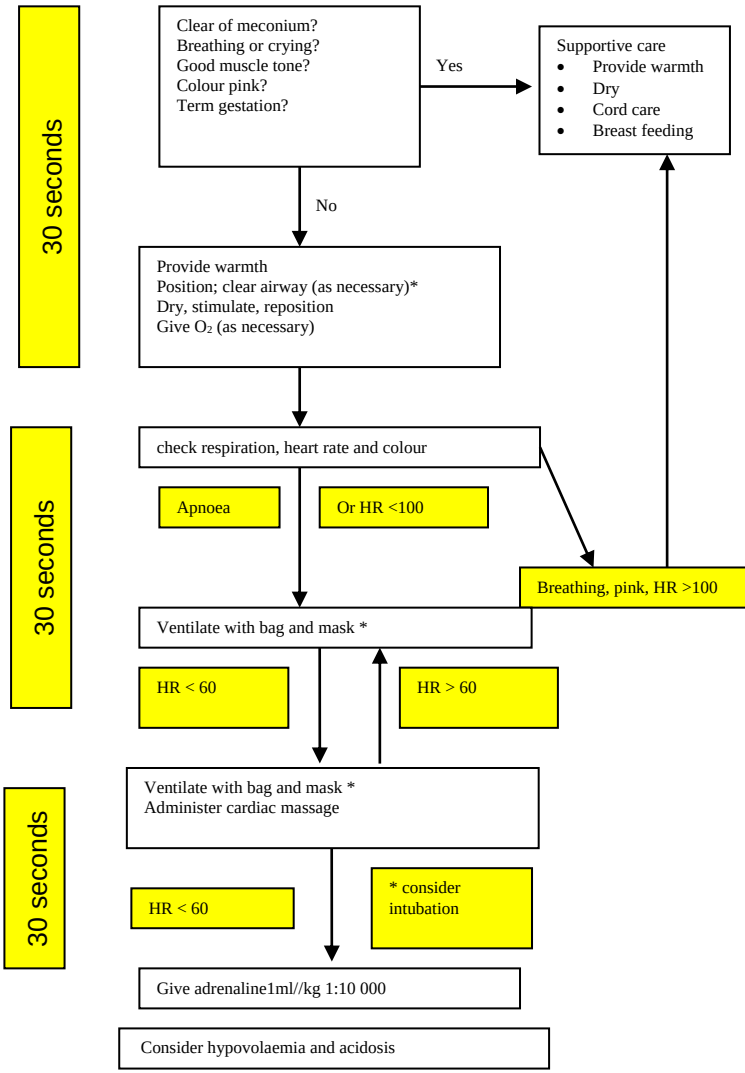


Figure 3.2: Essential steps for newborn care

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: Note 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 slow iv 4.2%	**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. Such care is essential for preventing and managing common illnesses in the first 24hrs of life when newborn mortality is highest.

See management algorithm on the next page

Feeding and Fluids

In general, babies should breast-feed on demand from birth. There is no need for supplemental water or other feeds.

For babies requiring special care (low birth weight, birth asphyxia, infection, etc) the following fluid regimen based on birth weight is recommended:

Oral feeds

- Day 1: 60ml per kg per 24 hrs. [40ml/kg/24hrs in severe birth asphyxia and meningitis].

- Day 2 and subsequently: Increase by 20-30ml per kg per 24hrs depending on the general condition, to 150ml/kg/24hrs. If this is well tolerated increase further to 180-200ml/kg/24hrs.

Intravenous Fluids

If intravenous not possible, try nasogastric feeding.

- Day 1

	Medicine	Codes		Paed dose	Freq.	Duration
	dextrose 10% iv infusion	**A**	**N**	60ml/kg/24hrs		

- Days 2-4 or when otherwise required:

	Medicine	Codes		Paed dose	Freq.	Duration
	darrows half strength / dextrose 2.5% iv with 10% dextrose infusion*	**C**	**V**	Same as for oral fluids up to a max. of 150ml/kg/24hrs – inclusive of all fluids administered – oral, nasogastric and intravenous.		
or	**neonatalyte iv infusion**	**B**	**N**			

**This can be made up by withdrawing 30 ml from a 200 ml bag of half strength Darrows/dextrose 2.5% and replacing with 30 ml of 50% dextrose.*

- 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)

Neonatal Infections

Table 3.2 Gentamicin dosages:

Premature or full term neonates up to 7days old			
Weight	**Age**	**Dose**	**Frequency**
less than1000gm	28 weeks	2.5mg/kg	once every 24hrs
more than 1000gm	>28weeks	2.5mg/kg	every 12hrs
Neonates more than 7 days old			
less than 1200gm		2.5mg/ kg	every 12hrs
more than 1200gm		2.5mg/ kg	every 8hrs

*consider -once daily gentamicin dosing in neonates <35 weeks gestation: 3mg/kg every 24 hours, >35 weeks gestation: 4mg/kg every 24hours and >37 weeks: 5mg/kg

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 2.1*	5 days
and	**gentamicin im/iv**	**C**	**V**	2.5mg/kg	*Table 2.2*	5 days

Suspected sepsis after 48hrs:

	Medicine	Codes		Paed dose	Freq.	Duration
	gentamicin im/iv	**C**	**V**	2.5mg/kg	*Table 2.2*	5 days
and	**cloxacillin im/iv**	**B**	**V**	30mg/kg	*Table 2.1*	5 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 2.1*	14-21 days
and	**gentamicin im/iv**	**C**	**V**	2.5mg/kg	*Table 2.2*	
and	**chloramphenicol iv**	**B**	**V**	12.5mg/kg	*Table 2.1*	

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 2.1*	10 days
and	**gentamicin im/iv**	**C**	**V**	2.5mg/kg	*Table 2.2*	10 days
and	**metronidazole iv**	**A**	**N**	7.5mg/kg	*Table 2.1*	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	12 hourly	5-7days
or	**procaine penicillin im**	**C**	**V**	50mg/kg	Once a day	5 -7 days
and	**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**

Medicine	Codes	Paed dose	Freq.	Duration
procaine penicillin	**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

Convulsions

- **Always** check for hypoglycaemia. If dextrose <2.2mmol/l (45mg%) 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		

Medicine	Codes	Paeds Dose
dextrose 10% iv infusion	**A N**	4ml/kg per hour

- recheck blood sugar (dextrostix) 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.

Anticonvulsants:

	Medicine	Codes	Paed dose	Freq.	Duration
	phenobarbitone iv	**B E**	10mg per kg repeat in 30 minutes if still convulsing	over 5-10mins	
Or	**diazepam iv/pr ***	**C V**	0.3mg per kg	once	

**Do not give diazepam with phenobarbitone or if jaundiced*

- Perform lumbar puncture.

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 3mths
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 3mths

Table 3.3 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 240mg tablet	po	24mg/kg/dose	2
Dexamethasone 5mg/ml injection	im	O.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	iv/im	Loading: 10mcg/kg at 8 hour intervals for total of three doses	
50mcg/ml syrup	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	iv/im	0.5 to 2mg/kg/dose	1 to 2
40mg tablet	Po	1 to 4mg/kg/dose	2
Gentamicin	im/iv	≥ 1500 g = 2.5mg/kg/dose	2
10mg/ml injection		<1500g = 2,5 mg/kg/dose	once
Hydrocortisone 100mg injection	iv/im	10mg/kg/dose	3
Isoniazid	Po	10mg/kg/24hrs	once

50mg/5ml syrup			
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 15mg/ml injection	iv/im	0.1 to 0.2 mg	-
Naloxone 0.02mg/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	Iv	10 to 20mg stat over 10mins	-
200mg/ml injection 15mg/5ml syrup	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 (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 2.6 and 2.7 (Neonatal doses are given separately in Table 2.3)

- 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 falciparum malaria area:

- take a blood slide
- treat for malaria (see chapter on Malaria)

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

*In areas with falciparum malaria, 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 3.4: 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 3.5: 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** ➢ **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 check for the neonatal doses.

- 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	6 hourly	10 days
and	**Gentamicin**	**C**	**V**	5-7mg/kg	Once daily	10 days

Note: change to oral amoxicillin when possible

If less than 6 months add high dose cotrimoxazole for 21 days and check HIV status

Table 3.6: Cotrimoxazole dosage per age group

Age or weight	*adult tablet*	*Paediatric tablet*	*Syrup*
2-6 months (4-<6kg)	*¼*	*1*	*2.5mls*
6m-3yrs (6-<14kg)	*½*	*2*	*5mls*
3-5yrs (14-19kg)	*1*	*3*	*1ml*

All HIV positive children should continue with cotrimoxazole prophylaxis at same 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
procaine penicillin im	**C**	**V**	<1yr 1-3yrs 3-5yrs	½ ml (= 150mg) 1ml (= 300mg) 1 ½ ml (- 450mg)	once a day	5 days

Supportive measures

- Prevent low blood sugar:
- If the child is able to breast feed ask the mother to breast feed the child

- If the child cannot breast feed, 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		Freq.	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		Freq.	Duration
or	**procaine penicillin im**	**C**	**V**	<1yr 1-3yrs 3-5yrs	= 150mg = 300mg = 450mg	once a day	5 days

- 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	Freq.	Duration
paracetamol po	**C**	**E**	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 3.7: 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^{o}C:

Medicine	Codes	Paed dose	Freq.	Duration
paracetamol po	**C E**	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 the 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 and **refer**.

Children with first episode 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	Give oral bronchodilator; Send home on treatment as "pneumonia": Follow up in 2 days
➢ If no fast breathing	Give oral bronchodilator; Send home on treatment as "no pneumonia, cough/ cold"; Follow up in 7 days

Children with <u>Previous</u> Episodes of Wheezing

- **child under 1 year**

➢ If chest indrawing; or any danger sign	Give oral bronchodilator; Give first dose of antibiotic 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	Give oral bronchodilator; Send home on treatment as "no pneumonia, cough / cold"; Follow up in 7 days

Children with <u>Previous</u> 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	Freq.	Duration
	prednisolone po	**B**	**V**	<1yr = 10mg >1yr = 20mg	Once	repeat in 6hrs if reqd.

- If a rapid acting bronchodilator is required:

	Medicine	Codes		Paed dose	Freq.	Duration
	salbutamol nebulised 5mg/ml in 2ml sterile water	**B**	**V**	<1yr = 2.5mg >1yr = 5mg	as required	
Or	**salbutamol po**	**B**	**V**	2-12mnths = 1mg 1-5yrs = 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 **and** cloxacillin:

	Medicine	Codes	Paed dose	Freq.	Duration
	chloramphenicol iv	**B V**	12.5mg/kg	6hourly	7 days
and	**cloxacillin iv**	**B V**	12.5-25mg/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	Freq.	Duration
	cloxacillin im/iv	**B V**	25mg/kg/dose	6 hourly	7 days
and	**gentamicin im/iv**	**C V**	6mg/kg	24 hourly	7 days

Empyema / lung abscess

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

or	**kanamycin im**	**C**	**V**	7.5mg/kg	12hrly	14 days

Empyema –should also insert a chest drain

Diphtheria

- Give antitoxin and:

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

Pertussis

Medicine	Codes		Paed dose	Freq.	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	Freq.	Duration
	benzylpenicillin im	**C**	**V**	0.05-0.1MU/kg	6 hrly	10days
and	**gentamicin im** **or kanamycin im**	**C**	**V**	5-7 mg/kg 7.5mg/kg	24hrly 12 hrly	
and	**paracetamol po**	**C**	**E**	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		Freq.	Duration
	amoxicillin po	**C**	**V**	4-<6kg 6 - <14kg 14-19kg	=62.5mg =125mg =250mg	12 hrly	5 days
and	**paracetamol po**	**C**	**E**	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	Freq.	Duration
	procaine penicillin im	**C**	**V**	< 1yr 1/2mls(=150mg) 1 to 3yrs 1ml(= 300mg) 3 to 5yrs 11/2mls(450mg)	once a day	5 days then penicillin V for 5 days
or	**Amoxicillin po**	**C**	**E**	<3yrs = 125mg >3yrs = 250mg >12yrs = 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	Freq.	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 6 months 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?
- Eyes sunken?
- Able to drink or drinking poorly
- 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 3.4

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

Table 3.8 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: **½ strength Darrow's solution in 2.5% dextrose iv**
- OR Ringers lactate 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 more than 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
- foods rich in vitamin A, folic acid and zinc should be given – 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	Freq.	Duration
	nalidixic acid po	**B**	**V**	4-<10kg = 125mg >10kg = 250mg 5 –12yrs = 375mg	4 times a day	5 days
or	**ciprofloxacin po**	**B**	**V**	5-17yrs 20mg/kg (max 1.5gm/day	Twice a day	3 days

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

	Medicine	Codes		Paed dose	Freq.	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 notify the Provincial Medical Director **immediately**, 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 (ii). 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	Freq.	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 10-14days with every bout of diarrhoea. Give 10mg/day in infants below 6 months.

Acute malnutrition
(Marasmus and Kwashiorkor)

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 on child health card.

- 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 3.9: Classification of acute, moderate and severe 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 or feeble to suckle effectively • Mother reports breastfeeding failure AND infant is not gaining weight at home		
Children 6 to 59 Months	Weight for Height (W/H)	≤3 SD (WHO)	≤2 & ≥3 SD (WHO)
	Mid-upper Arm Circumference (MUAC)	<115 mm	≥ 115 mm&<125 mm
	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(See latest National Protocols)

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 hypoglycemia in Severe Acute Malnutrition

Hypoglycemia and hypothermia usually occur together and are signs of infection. Check for hypoglycemia whenever hypothermia (axillary<35.0^{o}C; rectal<35.5^{o}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 Or 10% sucrose solution	**C E**	50ml bolus	Once	
Then F-75	**C E**	3ml/kg/Feed	Every 30 minutes	2 hours
		11ml/kg/Feed	2 hourly	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 Severe malnourished children

The usual signs of infection, such as fever, and infections 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	**C**	**E**	BW ≥4kg BW<4kg	5ml 2.5ml	Twice daily	5 days
or	**Amoxicillin**	**C**	**E**	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 benzylpenicillin 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	6 hourly	2 days
then	**Amoxicillin po***	**C**	**V**	15mg/kg	8 hourly	5 days
and	**Gentamicin im/iv**	**C**	**V**	7.5mg/kg	Once daily	7 days
If the child fails to improve after 48 hours						
ADD	**Chloramphenicol IM/IV**	**B**	**V**	25mg/kg	8 hourly	5 days
If the child has chronic diarrhoea						
ADD	**Metronidazole po**	**C**	**V**	7.5mg/kg	8 hourly	7 days

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

NOTE: Avoid steroids as these depress immune function.

For parasitic worms, give albendazole.

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) to severely malnourished children as it

contains too much sodium and too little potassium. Give special Rehydration Solution for Malnutrition (ReSoMal).

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

When ReSoMal is not available prepare as follows:

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, 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. Aadd 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 po	**C V**	<6mnths	50,000iu	once at the clinic and one dose at home -2 doses only	
			6– 12mths	100,000iu		
			1-5yr	200,000iu		
and	**ferrous sulphate po**	**C E**	4-<6kg	6mg Fe	once a	14 days

				6 - <10kg	12mg	day	
				1-3yrs	18mg		
				3-5yrs	24mg		
and	**folic acid po**	**C**	**E**	<6kg	2.5mg	once a day	14 days
				>6kg	5mg		
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	50,000 iu	once at the clinic and one dose at home -2 doses only	
				6– 12mths	100,000 iu		
				1-5yr	200,000 iu		

- In all 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		

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 3.9 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 F75 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 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 F75 to make sure the child's needs are met. Transfer to F100 formula as soon as appetite has returned (usually within 7days) and oedema has subsided.

Table 3.10 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 F75 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/d. 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 F75 to F100 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 F75 and F100 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, breastfeeding up to two years. For young children, continue breastfeeding on demand.
- RUTF is a food and medicine for children with Kwashiorkor or Marasmus only. It should not be shared.
- Children with 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 for children's hands and face before feeding. Wash hands with soap and water after visiting the toilet.
- Children with 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		Freq.	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 kwashiorkor or marasmus should be assumed to be severely anemic. However, oral iron supplementation should be delayed until the child regains appetite and starts gaining weight, usually after 14 days.

Paediatric HIV infection

See Latest National Guidelines on Antiretroviral Therapy.Also refer to Chapters 8 and 9 here.

Paediatric HIV infection can be significantly reduced by implementing an effective 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. Prior to the age of 18 months, a DNA polymerase chain reaction (PCR) test for HIV is now being used i.e. DBS testing.

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) is indicated.

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

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

Table 3.11 Dose by age and weight for commonly used medicine:

Age	Weight	**benzylpenicillin** 0.05-0.1MU/kg 6 hourly	**Gentamicin** 7.5mg/kg 12hourly	**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 3.1,3.2 and 3.3;*
- *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;*
- *For antibiotics, 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.*

Table 3.12 Dosages for Children and Infants Over 2 Months

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

Medicine	Route	Dose	Frequency
Codeine Phosphate 30mg tab	O	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 400mg 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 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	-
Isoniazid 100mg tab; 50 mg/5ml syrup	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
Metronidazole 200mg tab / 1gm suppository 5mg/ml inj	pr / iv	severe anaerobic inf. 7.5mg/kg	8hrly
	Po	intestinal amoebiasis 10mg /kg	
	Po	giardiasis 5mg/kg	
Morphine Sulphate 15mg/ml injection; 5mg/5ml syrup	im/o	Up to 0.25mg/kg per dose	-

Table 3.14 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
Streptomycin 5 g injection	Im	20mg/kg	Daily
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

IMMUNISATION

General Notes

The terms immunisation and vaccination will be used interchangeably in this chapter. Further information on immunisation, the cold chain etc, 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.*

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.

Diseases Preventable by Immunisation

- Diphtheria
- Measles
- Rubella
- Hepatitis B
- Pertussis (whooping cough)
- Poliomyelitis
- Rabies
- Tetanus
- Tuberculosis
- 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.

Open vial policy

- Open vials of DPT, DPT-HepB-Hib (Pentavalent), DT, TT, OPV, HPV and HepB may be used in subsequent sessions for a maximum of 28 days (ZEPI Policy) provided the vaccine has not expired, the VVM has not reached the discard point, the vial has not been contaminated, the vaccine has been kept in appropriate cold chain condition.
- Reconstituted vials of measles, BCG **and HPV** vaccines must be discarded as per manufacturer's instructions or at the end of the session 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.

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: BCG 11 months, Rotavirus 32 weeks, and Pentavalent 23 months).

- 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 4.1: 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
OPV1	6 weeks	Oral	Oral	2-3 drops
DPT-HepB-Hib1	6 weeks	Intramuscular	Right anterolateral aspect of mid-thigh	0,5 ml

Name of Vaccine	Age of administration	Route	Site	Dosage
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
Inactivated Polio vaccine	14 weeks	Intramuscular	2,5cm from PCV site	
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

Name of Vaccine	Age of administration	Route	Site	Dosage
Measles and Rubella 2 (MR)	18 months	Subcutaneous	Left deltoid muscle	0.5ml
DPT Booster	18 months	Intramuscular	anterolateral aspect of mid-thigh	0,5 ml
OPV Booster	18 months	Oral	Oral	2-3 drops

NB:

- ***IPV and MR vaccines will be introduced in 2015***
- ***MR second dose at 18 months will be introduced in 2015***
- ***HPV Vaccine Demonstration runs 2014/15 in Marondera and Beitbridge for 10 year olds with full national scale up to 9-13 year old girls planned for 2016***
- ***IPV is administered about 2,5cm from PCV site.***
- ***All vaccines should be kept at temperatures of +2°C to +8°C.***
- ***EPI Unit shall update all service providers on new trends regarding vaccines.***

Integrating Routine Immunization with other Interventions

A strategy commonly known as *EPI plus* provides a platform for delivery of other health interventions such as Vitamin A supplementation, deworming, distribution of Insecticide Treated Nets for malaria prevention and early infant diagnosis (DBS) of HIV infection. Currently ZEPI has integrated vitamin A supplementation into the routine EPI program. Any immunization contact is an opportunity to screen mothers and infants for eligibility to receive Vitamin A.

Table 4.2: Vitamin A schedule (Every six (6) months)

Target for Vitamin A	Immunization contact	Vitamin A dose
Infants 6 – 11 months	Routine Immunization Measles/Polio NIDs/Campaigns	100 000IU
Children 12 – 59 months	Routine Immunization Measles/Polio NIDs/Campaigns	200 000 IU

Tetanus Immunisations for Adults

An adult woman with a complete course of childhood immunisations including boosters should need **only** one booster dose of tetanus toxoid vaccine, (recommended at first pregnancy) which should protect for life.

Table 4.3 Tetanus Immunisation

TT	Minimum interval	Protection
TT 1	**At first contact with a person of > 15 years or at first ANC visit**	**None or uncertain**
TT 2	At least 28 days after TT 1	3 years
TT 3	At least 6 months after TT 2	5 years
TT 4	At least 1 year after TT 3	10 years
TT 5	At least 1 year after TT 4	Lifelong

For any adult with incomplete course, see Table 4.4.

Table 4.4 Catch up – tetanus

Doses received as a child	Doses needed as an adult
No DPT immunisation	5 dose according to schedule (Table 4.3)
3 primary course DPT	2 doses one month apart plus 1 dose one year later. In pregnancy TT3 to be given at least 6months after TT2.
3 primary course DPT + 1 booster DPT (18 months)	2 doses one year apart
3 primary course DPT + 1 DPT booster + 1 DT booster (5 years)	1 dose

NB: WHO has recommended that countries switch from tetanus toxoid containing vaccines (TT) to tetanus-diptheria vaccine (Td), but Zimbabwe has not adopted this policy yet.

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 between 6 and 9 months can be vaccinated. However the measles vaccination must be repeated again after 9 months and another dose at 18 months.
- The minimum interval for HB2 and HB3 is 5 months, if given as a mono dose.

CONTRAINDICATIONS TO VACCINATIONS

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.
- 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 (Note DTP because of the whole cell Pertussis may cause severe anaphylaxis, collapse, or convulsions). DT should be given instead.
- A child with an evolving neurological disease such as uncontrolled epilepsy or progressive encephalopathy should not be given Pentavalent or DTP. Give DT instead.

NB: The current DPT contains whole cell pertussis.

INTERVAL BETWEEN MULTI-DOSES OF THE SAME ANTIGEN

- The minimum interval between doses is 28 days.
- If any dose of an antigen for subsequent doses 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 improved.

Obstetric and Gynaecological Conditions

General Note:

Medicines should be avoided if at all 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.

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.

Hormonal contraception only is covered in brief here. Comprehensive guidelines are provided by the Zimbabwe National Family Planning Council (ZNFPC); follow these wherever possible. Instructions for use, contraindications etc, are also found in the manufacturers' package inserts.

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 headache 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 have an extra pack of pills always available. 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. Those with oestrogen content 30-35 micrograms (as ethinyloestradiol) are 'low dose' while those containing 50 micrograms of oestrogen are referred to as 'high dose'. Taken daily they inhibit ovulation.

'Triphasic pills' contain phased levels to more closely mimic normal cyclical hormonal activity.

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

If the medicine is only going to be used for a short time the woman should be advised to take extra contraceptive precautions for the duration of the therapy, and seven days after treatment, for example, condoms or abstinence from intercourse. 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: In hypertension and in women without proven fertility do not administer medroxyprogesterone [Depo-provera ®]. Side effects of medroxyprogesterone are similar to 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 (reversible by surgical removal). It is suitable for women who have probably completed their family but are not yet ready for sterilisation. It may also be suitable for some women who cannot take oestrogen-containing contraceptives.

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 pill	**C**	**V**	2 tablets	repeat after 12 hours	
	50mcg ethinyloestradiol + 150-250mcg levonorgestrel					
or	**combined oral contraceptive pill**	**C**	**V**	4 tablets	repeat after 12 hours	
	30-35mcg ethinyloestradiol + 150-250mcg levonorgestrel					
	Levonorgestrel 750mcg	**C**	**V**	1 tablet	Repeat after 12 hours	

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 centre level.

- **First line:**

	Medicine	Codes		Adult dose	Frequency	Duration
	amoxicillin po	**C**	**V**	500mg	3 times a day	*7 days
or	**ciprofloxacin po**	**B**	**V**	500mg	2 times a day	7 days

- **Second line:**

	Medicine	Codes		Adult dose	Frequency	Duration
	norflocaxin	**B**	**N**	400mg	2 times a day	*7 days
or	**nalidixic acid po**	**B**	**V**	500mg	4 times a day	*7 days

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

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

Positive RPR or 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 diseases for further information

Vaginal discharge during pregnancy

The discharge can be due to candidiasis, bacterial vaginosis or trichomoniasis. A clinical diagnosis should be made before treatment.

	Medicine	Codes		Adult dose	Frequency	Duration
	miconazole vag pessary	**C**	**N**	100mg	once a day	3 days
or	**clotrimazole pessary**	**C**	**V**	500mg	Once daily	3 days
and	**metronidazole po**	**C**	**V**	400mg	3 times a day	7days

Creams of miconazole and clotrimazole 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 what is thought to be post-miscarriage sepsis is in reality fever from malaria causing abortion.*

Post-miscarriage sepsis will need a laparotomy if the patient does not respond to antibiotic therapy and evacuation of uterus.

- **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
	Amoxicillin po	**C**	**V**	500mg	3 times a day	7 days
and	**doxycycline po**	**C**	**V**	100mg	2 times a day	7 days
and	**metronidazole po**	**C**	**V**	400mg	3 times a day	7 days

- **Second line:**

	Medicine	Codes		Adult dose	Frequency	Duration
	norfloxacin po	**C**	**E**	800mg	once a day	single dose
and	**doxycycline po**	**C**	**V**	100mg	2 times a day	7 days
and	**metronidazole po**	**C**	**V**	400mg	3 times a day	7 days

- **Alternative** in penicillin allergic patients

	Medicine	Codes		Adult dose	Frequency	Duration
only	**erythromycin po**	**C**	**V**	500mg	4 times a day	10 days

Severe pelvic inflammatory disease

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

	Medicine	Codes		Adult dose	Frequency	Duration
	benzylpenicillin iv	**C**	**V**	2.5MU	6 hourly	48-72hrs
and	**chloramphenicol iv**	**B**	**V**	500mg	6 hourly	48-72hrs
and	**metronidazole pr**	**B**	**V**	1g	12 hourly	72hrs

** Note: Duration as determined by patient's response. Switch to oral after review. Avoid use of chloramphenicol for greater than 7 days.*

- **Alternative**

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

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

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

Prolonged Rupture of Membranes

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

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

- If >12 hours or pyrexial in labour. Early delivery should be effected:

	Medicine	Codes		Adult dose	Frequency	Duration
	benzylpenicillin iv	**C**	**V**	2MU	6 hourly	until delivery
and	**chloramphenicol iv**	**B**	**V**	500mg	6 hourly	
and	**metronidazole iv**	**A**	**N**	500mg	8 hourly	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	**chloramphenicol iv**	**B**	**V**	1g	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

If during the first trimester and 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	**C**	**N**	25mg	once at night*	as required
or	**chlorpheniramine po**	**C**	**E**	4mg	once at night*	5 days
or	**metoclopramide**	**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

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

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.*

Treatment of Microcytic Anaemia

Before 36 weeks gestation:

	Medicine	Codes		Adult dose	Frequency	Duration
	ferrous sulphate po	**C**	**E**	200	3 times a day	-
and	**folic acid po**	**C**	**E**	5mg	once daily	-

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 Blood).

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 by a specialist obstetrician and physician together, and should be seen more frequently than usual.

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 in the chapter on cardiovascular conditions.

Anticoagulants for patients on long term anticoagulation (e.g. valve replacement) - warfarin should be avoided in the first trimester. Use heparin or low molecular weight heparin 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	**C**	**V**	10units	once at delivery of the anterior shoulder	

- Post-natally keep the woman in high care for 24 hours.

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

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 SR 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 past 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 SR 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 proteinuric PIH. 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 SR po	**B**	**V**	20mg	Twice a day	review
plus	**hydralazine im**	**B**	**V**	10mg	every 4 hours	review

Severe Pre-Eclampsia (Proteinuric pregnancy-induced hypertension)

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

- Monitor blood pressure 4 hourly.
- Check urine for protein daily (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	**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	**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 regimen. Once competence is achieved in its administration, the regimen 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

Pregnant diabetics 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 preconceptually 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 going to theatre for caesarean sections, or any pregnant woman about to have a general anaesthetic, 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	4-6 hourly	max. 3 doses
or	**morphine im**	**B**	**V**	5mg	4 hourly	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 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**	12mg for 2 doses 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.

Cervical ripeners: Prostaglandins are powerful medicines, although classed as cervical ripeners they are better called labour initiators, only to be used on a good indication. The higher the parity, the higher the chances of uterine rupture.

- The safest and simplest method of ripening the cervix:

Medicine	Codes		Adult dose	Frequency	Duration
misoprostol pv	**B**	**V**	50 mcg	Once daily	Max 1 dose
misoprostol po	**B**	**V**	25mcg	4 hourly	Max 3 doses

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 before delivery in highly parous women; avoid in obstructed labour. Oxytocin does not work very well in the case of induction 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.					
	misoprostol pv	**B**	**V**	50 mcg	every 24 hrs (max 2 doses)	
or	**misoprostol po**	**B**	**V**	25 mcg	every 4 hours (max 4 doses)	

Augmentation of Labour

Membranes already ruptured and labour 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	**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 there is a substantial threat to the woman's health or life in continuing the pregnancy (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 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 13 weeks)

Cervical ripening pre instrumentation

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

***Induced* abortion**

Medicine	Codes	Adult dose	Frequency	Duration

misoprostol pv	**B**	**V**	600mcg	12 hourly	Max 2 doses

Missed abortion

Medicine	Codes		Adult dose	Frequency	Duration
misoprostol pv	**B**	**V**	600mcg	12hourly	Max 2 doses

Incomplete abortion

Medicine	Codes		Adult dose	Frequency	Duration
misoprostol po	**B**	**V**	600mcg	Single dose	

SECOND TRIMESTER (14 TO 27 WEEKS)

Induced abortion

Medicine	Codes		Adult dose	Frequency	Duration
misoprostol pv	**B**	**V**	200mcg	12 hourly	Max 4 doses

Intra uterine fetal death (13-17 weeks)

Medicine	Codes		Adult dose	Frequency	Duration
misoprostol pv	**B**	**V**	200mcg	12 hourly	Max 4 doses

Intra uterine fetal death (18-27weeks)

Medicine	Codes		Adult dose	Frequency	Duration
misoprostol pv	**B**	**V**	100mcg	12 hourly	Max 3 doses

Third trimester (28-40weeks)

Intra uterine fetal death (27-43weeks)

	Medicine	Codes		Adult dose	Frequency	Duration
	misoprostol po	**B**	**V**	25mcg	4 hourly	max 4 doses
or	**misoprostol pv**	**B**	**V**	50mcg	24 hourly	max 2 doses

Induction of labour

	Medicine	Codes		Adult dose	Frequency	Duration
	misoprostol pv	**B**	**V**	50mcg	24 hourly	max 2 doses
or	**misoprostol po**	**B**	**V**	25 mcg	4 hourly	max x3 doses

Rape and Sexual Assault: Prophylaxis against infections and pregnancy

STI prophylaxis for sexual assault survivors (see STI/ART guidelines):

- should be given STI prophylaxis/post exposure prophylaxis:

	Medicine	Codes		Adult dose	Frequency	Duration
	amoxicillin po	**C**	**V**	500mg	8 hourly	7 days
and	**doxycycline po**	**C**	**V**	100mg	twice a day	7 days
and	**zidovudine, lamivudine, lopinavir/ritonavir**	**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 pill 50mcg ethinyloestradiol + 150-250mcg levonorgestrel	**C**	**V**	2 tablets	repeat after 12 hours	-
or	**combined oral contraceptive pill** 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	

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 5.1 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 5.2: 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.
Cotrimoxazole	All	Avoid	Risk of teratogenicity and methaemoglobinaemia.
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	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 & 3	Avoid	Give with folic acid.
	2	Caution	
Quinine	All	Caution	High doses teratogenic. Benefit outweighs risk
Reserpine	All	Avoid	
Sulphonamides	3	Avoid	Risk of teratoenicity, methaemaglobinaemia, 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.

SEXUALLY TRANSMITTED INFECTIONS

General Guidelines

Accurate laboratory-proven diagnosis of sexually transmitted infections (STI) is 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 contacts of persons with STI be traced and treated).

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 gonorrhoea* and *chlamydia trachomatis and* the two often co-exist. *Trichomonas vaginalis* 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 symptoms and signs. **Any sexual partners in the preceding three months should be treated presumptively for the same infections and any other conditions found on examination.**

- **First Line:**

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

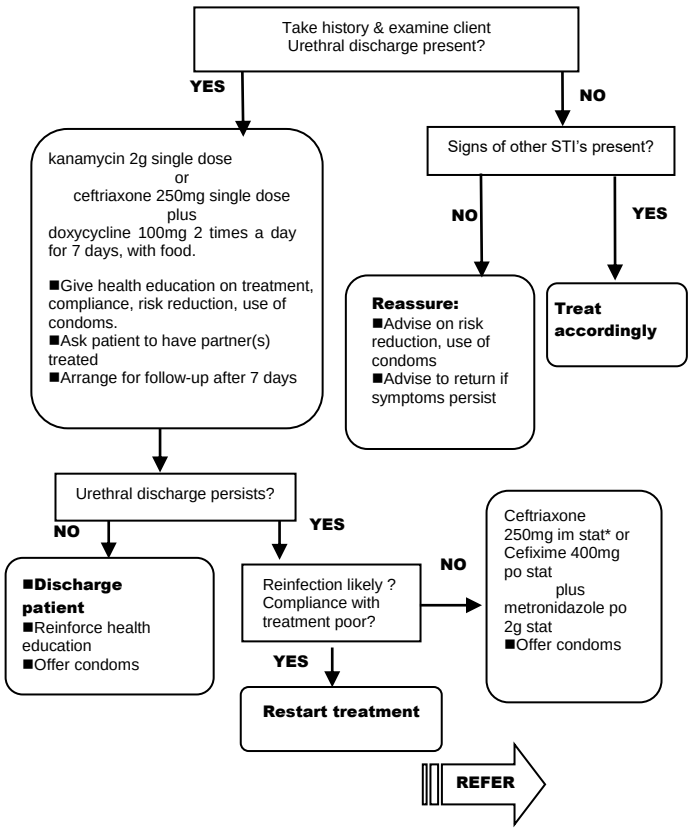
- If the patient still has a urethral discharge, or evidence of urethritis 7 days after start of treatment, suspect re-infection, poor treatment compliance or antimicrobial resistance in *Neisseria gonorrhoeae*. If reinfection is suspected re-start first line treatment. Otherwise refer the patient for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

- **Second Line:**

	Medicine	Codes	Adult dose	Frequency	Duration
	ceftriaxone im	**C V**	250mg	one dose only	
or	**cefixime po**	**B V**	400mg	one dose only	
and	**metronidazole po**	**C V**	2g	one dose only	

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

Figure 6.1: First line 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 the Ceftriaxone 250mg IM stat is appropriate.

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 should receive treatment for bacterial vaginosis and trichomoniasis. Additional treatment for yeast infection is indicated only when clinically apparent (curd-like discharge, redness of the vulva and vulva itching). Yeast infection is a common cause of vaginitis in pregnancy.

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 and trichomoniasis

	Medicine	Codes		Adult dose	Frequency	Duration
	metronidazole po	**C**	**V**	400mg	3 times/day	7 days
or	**clindamycin po**	**B**	**E**	300mg	2 times/day	7 days
and	**metronidazole po**	**C**	**V**	2g	Once only	

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**	**B**	**E**	100mg	Once a day	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
	kanamycin im	**C**	**V**	2g [1g into each buttock]	One dose only	
or	**ceftriaxone in**	**C**	**V**	250mg im	One dose only	
AND	**doxycycline po**	**C**	**V**	100mg	Twice a day	7 days
or	**azithromycin**	**C**	**V**	1g	One dose only	

Second line treatment vaginal discharge:

Check for compliance and re-infection.

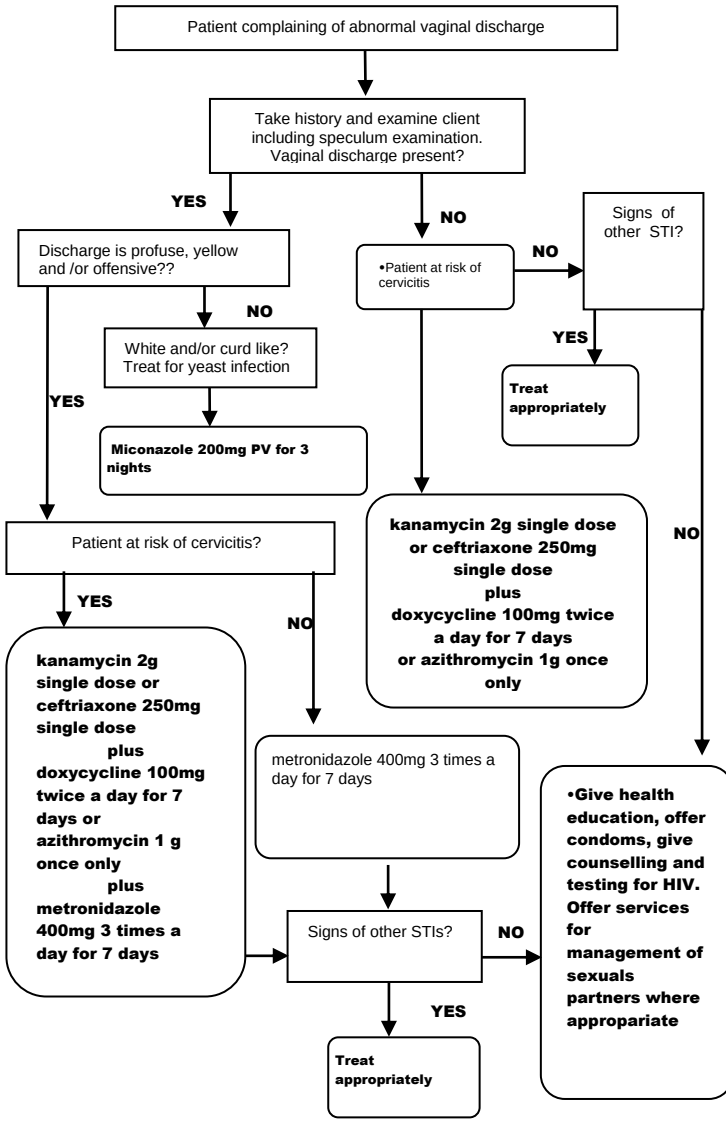
- **Second Line:**

	Medicine	Codes		Adult dose	Frequency	Duration
	ceftriaxone im	**C**	**V**	250mg	one dose only	
or	**cefixime po**	**C**	**V**	400mg	one dose only	
and	**metronidazole po**	**C**	**V**	2g	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 (if not available) while kanamycin should be used for gonococcal infection.*

Figure 6.2: First line management of vaginal discharge using a speculum



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 infection. Syphilis and chancroid also cause genital ulcers but their prevalence has dropped significantly. 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, although rare nowadays, 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 persist and require treatment with acyclovir. Hence it is important to bear in mind all these three diagnoses whenever managing persons with genital ulcers syndromically.

First Line treatment of genital ulcers:

Advice on local hygiene such as washing 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**	2.4Megaunits(1.44gm)	Once only night	
and	**ciprofloxacin**	**C**	**V**	500mg	Twice a day	3 days
And	**acyclovir**	**C**	**V**	400mg	Three times a day	5 days
or	**acyclovir**	**C**	**V**	200mg	Five times a day	5 days

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

CAUTION IN PREGNANCY: see chapter on Obsteric and Gynaecological Conditions. ***Doxycycline*** *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 14 days or 30 days depending on stage of syphilis (<2yrs or > 2yrs)*

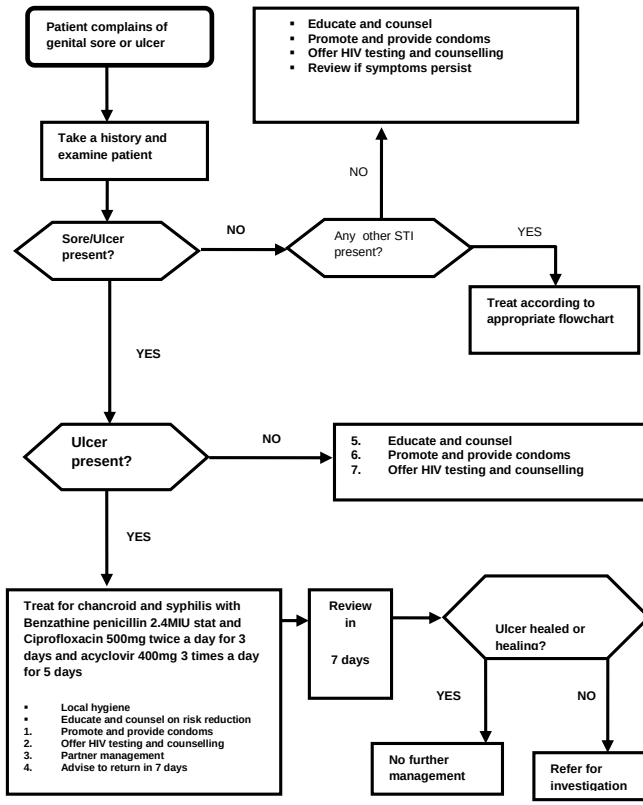
Recurrent or vesicular genital lesions

Recurrent herpes in HIV negative people will almost always heal spontaneously without treatment. Lesions seen early in the episode (when still vesicular) or that are failing to heal should be treated as herpes simplex virus infection as follows:

Medicine	Codes	Adult dose	Frequency	Duration

acyclovir po	**B**	**V**	400mg	Three times a day	7 days

Figure 6.3: 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	2 times 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. 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	14 days

Second line, or in pregnant women:

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

First Line:

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

Second Line:

	Medicine	Codes	Adult dose	Frequency	Duration
	ceftriaxone im	**C V**	250mg	one dose only	
	cefixime po	**C V**	400mg	One dose only	

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	2 times 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	2 times a day	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 partner treated and 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:

	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
	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
	procaine penicillin im	**C V**	600mg [=1ml in each buttock]	once a day	21 days

Pelvic Inflammatory Disease

See chapter Obstetrics & Gynaecology

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

CAUTIONS: *For **external use only**. Do NOT use podophyllin in pregnancy. Do not apply to the cervix, urethra or anal mucosa.*

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

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

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.

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 VCT, 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
benzyl benzoate 25% emulsion * [irritant]	**B** **N**	apply from neck down	once at night wash off next morning	3 nights, repeat if necessary
*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. Caution: Do **not** use G.B.H in pregnancy and lactation - refer mothers to district level for benzyl benzoate.*

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.	

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
	kanamycin im	**C V**	25mg/kg	Once	single dose
or	**ceftriaxone im**	**C V**	50mg/kg	Once	Single dose
and	**erythromycin po**	**C V**	16mg/kg	3 times a day	14 days

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

HIV Related Disease

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. The majority of 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 (PITC). 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 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. 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 (Refer to the national guidelines):

- counselling: pre-testing, post-test, crisis/support;
- health education for prevention of further transmission of HIV, positive living;
- Maintenance of good nutrition, vitamin and mineral supplements**.**

- Prevention, diagnosis and treatment of OIs
- Use of antiretroviral medicines

Cotrimoxazole prophylaxis:

Cotrimoxazole has been shown to prolong life and reduce hospital admissions in those with symptomatic HIV or AIDS.

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.

Medicine	Codes	Adult dose	Frequency	Duration
cotrimoxazole po	C V	960mg	Once a day	for life or until CD4>350 for 6 months for patients on ART

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

Table 7.1 Cotrimoxazole Prophylaxis in Children

Age	**Dose (ml)**		
	Suspension (240 mg / 5 ml)	**Adult tablets (480 mg)**	**Paediatric tablets (120 mg)**
up to 6 months	2.5	¼	1
6 months to 3 years	5	½	2
Over 3 years	10	1	3

If allergic to cotrimoxazole, try desensitization

- Cotrimoxazole prophylaxis should be commenced at least one to two weeks before the commencement of ART. This allows time to identify those who might be allergic to cotrimoxazole.
- This prophylaxis should be continued indefinitely.
- For patients who are allergic to cotrimoxazole, 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

Isoniazid Preventative Therapy (IPT):

Isoniazid preventative therapy is the provision of the medicine isoniazid to people at high risk of developing active tuberculosis (TB). People living with HIV are 20 to 37 times more likely to develop active TB from latent TB 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, IPT 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, IPT programs decrease the rate of TB in the community and improve TB control.

Note: Isoniazid, like any other medicines, can cause side effects. Look out for gastrointestinal symptoms, hepatitis, skins reactions and peripheral neuropathy.

Contraindications to IPT:

- Active TB (confirmed or suspected)
- Known or suspected hypersensitivity to INH
- Self-reported chronic liver disease or symptoms suggesting active hepatitis(jaundice, nausea, vomiting, right upper quadrant pai, dark urine, pale stools)
- Excessive alcohol use
- History of convulsions and psychosis
- Moderately severe peripheral neuropathy

- Other medications e.g. phenytoin, carbamazepine, warfarin[1]

Inclusion Criteria for Children for IPT

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 and 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 IPT 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 Woment for IPT (≥15 years):

Inclusion Criteria:

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

2. No signs or symptoms of Tuberculosis (*Based on the adult TB screening criteria*)

Good understanding of IPT and willingness to adhere

[1] Isoniazid preventive therapy in HIV infected adults and children: Questions and Answers for clinicians, AIDS & TB Unit,MOHCC, April 2014

Exclusion Criteria:

- Being on Nevirapine containing regimen. Switch to Efavirenz
- plus see previously mentioned contraindications

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:

Table 7.2: 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

Pyridoxine dosage for adults and children:
Adults: pyridoxine (vitamin B6): **25mg/day**
Children: 25mg/day

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.

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 heralds the development of AIDS. Oesophageal thrush is an indicator of more severe cellular immunodeficiency.

CAUTION: Neither of these conditions occurs exclusively in patients with HIV infection. For example, oral thrush may follow treatment

with broad spectrum antibiotics or be associated with any 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. **Anti-diarrhoeals should NOT be used in the initial treatment of acute diarrhoea, especially in the case of children or with bloody diarrhoea.**

If no improvement after 5 days, attempt to identify pathogen: stool microscopy; culture and sensitivity. Treat according to result.

- **If no diagnosis:**

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

- **If no improvement OR very ill/toxic:**

	Medicine	Codes		Adult dose	Frequency	Duration
	metronidazole po	**C**	**V**	400mg	3 times a day	7 days
And	**chloramphenicol po**	**B**	**V**	500mg	4 times a day	7 days

If bloody diarrhoea:

	Medicine	Codes		Adult dose	Frequency	Duration
	nalidixic acid	**B**	**V**	500mg	4 times a day	5 days
Or	**ciprofloxacin po**	**B**	**V**	500mg	Twice a day	5 days

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.
- Initial treatment of diarrhoea with blood in stool and/or fever as for 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
codeine phosphate po	**B**	**V**	30 – 60mg	≤ 4 times a day	7 days

CAUTION: *Only use if diarrhoea is disabling. Before constipating agents are given, treatment for helminth infection may be tried.*

- If diarrhoea continues or recurs within 3 weeks, and no pathogen identified: repeat microscopy and C/S.
- If diarrhoea persists and the patient is severely immunocompromised, start ART as soon as possible.

HIV Related Wasting Syndrome

DEFINITION:

Weight loss of more than 10%, plus either unexplained chronic diarrhoea 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.
- **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

- alternative:

Medicine	Codes		Adult dose	Frequency	Duration
vitamins, multi po	**C**	**E**	2 tablets	once a day	continual

Further Management

- Treat according to results of investigations. Keep referrals to a minimum and only refer if alternative diagnosis is suspected.
- Prepare for and initiate antiretroviral therapy

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 is preferred wherever possible in adults. Only severe cases requiring investigations and inpatient admission should be referred.

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**	500	4 times a day	7 days
or	**doxycycline po** (in penicillin allergy)	**C V**	100mg	2 times 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
benzylpenicillin iv or im	**C V**	1.5gm (=2.5MU)	6 hourly	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 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	every day	for life or until CD4 >350

Pneumocystis jiroveci pneumonia (PCP)

An opportunistic infection caused by Pneumostis jiroveci. Patients present with progressive shortness of breath and possibly cyanosed 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

If they are allergic, try cotrimoxazole desensitisation

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.

- or in sulphonamide allergy:

	Medicine	Codes		Adult dose	Frequency	Duration
	clindamycin po	**C**	**V**	450-600mg	6 hourly	21 days
and	**primaquine po**	**C**	**V**	50mg	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

Give folic acid 5mg daily whenever a person is taking high dose cotrimoxazole

- **After PCP has been treated give cotrimoxazole prophylaxis indefinitely especially for children (Follow current ART Guidelines). This also applies to any other patients with AIDS defining disease**.

Medicine	Codes		Adult dose	Frequency	Duration
cotrimoxazole po	**C**	**V**	960mg < 6mths = 120mg 6-12mths = 240mg >1 year = 480mg	once a day	Indefinitely

- If still no response, consider malignancy, for example, Kaposi's sarcoma.

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. Refer for lumbar puncture and other investigations if duration is more than 7 days or if the headache is associated with fever, vomiting, neck stiffness, seizures, confusion and not responding to pain killers. 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.

Cryptococcal Meningitis

Cryptococcal meningitis is caused by Cryptococcus Neoformans and is less acute in onset than bacterial meningitis. Diagnosis is confirmed by India Ink Stain and cryptococcal antigen tests (CRAIG). May occur as part of the Immune Reconstitution Syndrome (IRIS). Treatment of cryptococcal disease must be with amphotericin B based regimens. Ideally **amphotericin B** must be combined with **flucytosine**. However in our setting, combination therapy with **amphotericin B and fluconazole is recommended**. In the absence of amphotericin B, **high dose of fluconazole can be used as alternative therapy**. 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.

	Medicine	Codes		Adult dose	Frequency	Duration
	amphotericin B iv (*infusion*)	**B**	**V**	0.7mg/kg	Once a day	2 weeks
plus	**fluconazole po**	**B**	**V**	800mg	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	Until CD4 count >200 cells/mm3 for 6 months

If iv Amphotericin B 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	Until CD4 count >200 cells/mm3 for 6 months

For neonate, infant or c**hild** 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

Fluconazole (Oral):
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.

Prevention of relapse of cryptococcal meningitis in AIDS patients after completion of primary

Mortality and morbidity from cryptococcal meningitis is high with a significant proportion attributable to raised intracranial pressure (ICP). Management of raised ICP is critical to ensure good clinical outcomes. If the ICP is > 25cm of water, remove 10-30ml of CSF and continue with daily lumbar punctures until CSF pressures have normalised (< 25cm of water). A repeat lumbar puncture at 2 weeks after initiation of appropriate induction of antifungal therapy is not necessary except in the setting of persistently elevated ICP and evidence of poor clinical response.

Management of Amphotericin B associated toxicities

Amphotericin B, particularly amphotericin 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, amphoterin B **must be administered slowly** over 4 hours. **Initial therapeutic doses** should be given as Amphotericin B **0.7-1mg/kg/day.**
- **Prehydration** with 500ml -1000ml (1L) of normal saline with 20mEq of potassium chloride 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.

If the creatinine doubles, a dose of amphotericin B can be omitted and prehydration increased to 1L of normal saline every 8 hours and creatinine rechecked. If creatinine normalises, prehydrate with 1L normal saline with 20mEq KCl and restart at amphotericin B (0.7mg/kg/day) given over 4 hours. Monitor renal function weekly.

If repeat creatinine remains elevated or continues to increase, amphotericin B should be discontinued and high dose fluconazole 1200mg orally once daily initiated.

AIDS dementia complex

Characterized by progressive impairment in cognitive function that is accompanied by behavioural changes and motor abnormalities. Exclude other causes of dementia.
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. (See the chapter on Psychiatric Conditions).

HIV Related Skin Conditions

Skin manifestations of HIV infection may be the result of opportunistic infections or HIV itself. The usual treatment regimens are valid, but often a more aggressive application is required: duration of treatment may need to be longer and relapse is common when treatment is stopped.

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; 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.

Medicine	Codes	Adult dose	Frequency	Duration
acyclovir po	**B E**	800mg	5 times a day	7days

- Give analgesia:

Medicine	Codes	Adult dose	Frequency	Duration
indomethacin po	**B E**	25mg	3 times a day	review

- Add :

Medicine	Codes	Adult dose	Frequency	Duration
amitryptiline 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		

Avoid gentian violet as repeated use in this condition may cause keloids. Keep the affected area warm.

Patients should be started on Cotrimoxazole prophylaxis

Refer immediately if there is ophthalmic/pulmonary involvement. Acyclovir is needed and therapy should be started early. Generally, five days after presentation acyclovir is ineffective in altering the course of the infection.

Secondary infection (bacterial) may require treatment.

Post-Herpetic Neuralgia

After the rash is fully resolved:

	Medicine	Codes	Adult dose	Frequency	Duration
	amitriptyline po	**B E**	25 mg-75mg	every night	as required
			increased to 150mg if required.		
or	**carbamazepine po**	**B V**	100 - 200mg	every night	
			increased over 10 days to a max of 400mg (dose divided in 3).		

Folliculitis

See the chapter on Skin Conditions. If severe treat for Impetigo (see the chapter on Skin Conditions).

Herpes Simplex

- Counsel regarding infectivity of genital herpes.
- Local lesion care: keep clean with regular washing with soap and water.
- In very severe cases or patients with low CD4 count ***acyclovir*** should be considered.(See STI chapter)
- Bacterial superinfection may complicate lesions and will require antibiotics
- Suppressive therapy may be required for recurrent HSV infections:

Medicine	Codes	Adult dose	Frequency	Duration
acyclovir po	**B E**	400mg	2 times a day	4 weeks then review

Seborrheic Dermatitis

- Consider hydrocortisone 1% topically as well as an antifungal cream such as miconazole cream 2%.
- Coal tar preparations may be helpful.

Prurigo or papular pruritic dermatoses

Caused by scratching and excoriation. Can be very disabling.

- Oral antihistamines e.g. chlorpheniramine **or** promethazine.
- Calamine lotion.

Medicine Reactions

These are frequently caused by cotrimoxazole, nevirapine, efavirenz, TB medicines and many others.
Non- severe rashes

- Do not stop medicines
- Educate the patient
- Review frequently until rash resolves
- Provide symptomatic relief with antipruritics or emulsifying ointment

If reaction is severe,

- Withdraw medicine.
- Decide on alternative medicine if needed.

Kaposi's Sarcoma (KS)

Patients with KS are in WHO clinical stage 4 and should be initiated on ART as soon as possible irregardless of the CD4 count. Antiretroviral medicines are indicated, but chemotherapy may also be required. If possible, refer patients for specialist opinion prior to starting ART (this might avoid IRIS which may occur with extensive KS) and get a tissue diagnosis before referral. KS patients (good general health, early KS, ≤5 lesions) may respond to ART alone but most patients will need chemotherapy. Assess for signs and symptoms of inner organ involvement.

Early or trivial KS may respond to ART alone but many patients present late and with a heavy tumour burden. Thus these patients need chemotherapy to reduce the tumour burden and then ART. Immune reconstitution with ART occurs and may worsen the KS dramatically.

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).

Palliative Care in HIV

See the chapter on Pain Management & Care of the Terminally Ill.

ANTIRETROVIRAL THERAPY

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 ***Antiretroviral Therapy for the Prevention and Treatment of HIV in Zimbabwe.*** Attempts should be made to train healthcare workers in HIV management

Comprehensive HIV/AIDS care requires that there be provision of counselling; either VCT or PITC, 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 will also be 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 mother-to-child transmission of HIV (vertical transmission), and
- 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'.

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 and the importance of medicine adherence and regular follow up care.

People taking ARVs should also be regularly asked on whether they are taking other medicines including herbal remedies that may interfere with the efficacy of ARVs.

Early treatment initiation is associated with clinical and HIV prevention benefits, improving survival and reducing the incidence of HIV infection at the community level. Increasing evidence also indicate 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. Recent results from the HPTN 052 Study strongly support the use of ART to prevent HIV transmission among sero-discordant couples.

Medical Criteria for initiating ART in adolescents/ adults

ART should be provided to all people with confirmed HIV diagnosis and with a CD4 count of ≤ 500cels /mm3.

As a priority, initiate ART in all individuals with severe/advanced HIV disease (WHO clinical stage 3 or 4) or CD4 count less or equal to 350 cells/ mm^3. It is also recommended to initiate ART in the following categories of patients regardless of CD4 cell count:

- Active TB disease
- Pregnant and breast-feeding women with HIV
- Individuals with HIV in sero-discordant relationships
- HBV co-infection with severe chronic liver disease

Patients with CD4 <100

Patients with low CD4 below 100 should be fast-tracked for treatment initiation. They should be screened for symptomatic TB and cryptococcal disease. They should receive Cotrimoxazole and INH prophylaxis like all other patients and should be closely monitored for 3 months as this is their highest risk period for bacterial infections and TB or cryptococcal 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.

Adults and Adolescents with a documented positive HIV test and meeting any one of the following criteria:	
Criteria	**Treatment Decision**
Severe or advanced symptomatic HIV infection (WHO clinical stage 3 or 4)	Treat all regardless of CD4 cell count
Asymptomatic/mild HIV disease	Treat CD4 ≤ 500 cells/mm^3 (CD4 ≤ 350 cells/mm^3 as a priority)
HIV sero-discordant couples	Treat infected partner regardless of CD4 cell count
TB co-infection	Treat all HIV Positive TB patients regardless of CD4 cell count
Hepatitis B co-infection	Treat regardless of CD4 count in presence of chronic severe liver disease
HIV positive Pregnant and lactating women	Treat all regardless of CD4 cell count

The revised medical criteria of initiating ARVs at CD4 count ≤ 500 cells/ mm^3 means that many more PLHIV will be eligible for ART and that will include many healthier people

Psychosocial criteria for initiating ART

Consider the following psychosocial criteria when initiating ART:

- Has the patient completed the prescribed counselling session(s)?
- 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 medications 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 counselling (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 FDC medicines is strongly encouraged.

A large number of medicines and medicine combinations have been used in the treatment of persons with HIV infection. 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:

Dual combinations:

- tenofovir (TDF) 300mg + lamivudine (3TC) 300mg zidovudine (AZT) 300mg + lamivudine (3TC) 150mg
- The above dual FDC should be used in combination with single formulation of:
- Efavirenz (EFV) 600mg once daily
- Nevirapine (NVP) 200mg twice a day (after the 2 weeks of once a day nevirapine)

Triple combinations:

- Tenofovir 300mg+ Lamivudine 300mg+Efavirenz(EFV) 600mg

- Zidovudine 300mg + Lamivudine 150mg + Nevirapine(NVP) 200mg

Please note that the national ART programme has phased out Stavudine-based regimens.

Tenofovir (TDF) plus Lamivudine (3TC) plus Efavirenz (EFV) is the preferred first-line regimen, which obviously would necessitate a change in the currently used second-line regimens.

Preferred First-line regimen

Initiation and Maintenance
Triple combination of Tenofovir (300mg) + Lamivudine (300mg)+ Efavirenz (600mg) once a day.

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. 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: $\frac{1.23 \times (140-age) \times wt\ in\ Kg}{Creatinine\ (in\ micromols/L)}$

Female: $\frac{1.04 \times (140-age) \times wt\ in\ kg}{Creatinine\ (in\ micromols/L}$

Where there is need for a starter pack when using nevirapine, prescribe as follows:

Two Weeks Starter Pack	
Morning Dose	**Evening Dose**
Dual combination of Tenofovir (300mg) + Lamivudine (300mg)	Nevirapine (200mg)

After the starter pack has been completed, if there are no adverse events such as rashes, “step up” the dose of the Nevirapine. “Stepping up” means giving Nevirapine twice a day plus FDC Tenofovir + Lamivudine once daily as in the table below**.**

Step Up After the First Two Weeks	
Morning Dose	**Evening Dose**
Dual combination of Tenofovir 300mg + Lamivudine 300mg	nil
Nevirapine 200mg	Nevirapine 200mg

Caution: When Nevirapine is used as 1st line ART; introduce the Nevirapine gradually (i.e., a *leading-in* dose). Patients are more likely to develop adverse medicine reactions such as Stevens-Johnson syndrome or hepatitis if started on the full regimen including nevirapine twice a day. *If the patient has been using Efavirenz and needs to change to Nevirapine, just start using the Nevirapine at twice-a-day dosing (i.e., no need for the leading-in dose)*

Alternative Starter pack:

- Dual Zidovudine 300 mg plus Lamivudine 150 mg orally twice a day

plus

- Nevirapine 200 mg orally once a day

- Stepping up, after the first two weeks:

Give triple combination of Zidovudine (300mg) + Lamivudine (150g) + Nevirapine (200mg) twice a day.

Alternative First-Line Regimen, Two-Week Starter Pack	
Morning Dose	**Evening Dose**
Zidovudine 300mg + Lamivudine 150mg	Zidovudine 300mg + Lamivudine 150mg plus Nevirapine 200mg

B. Stepping up, after the first two weeks:

Step Up After the First Two Weeks	
Morning Dose	**Evening Dose**
Zidovudine 300mg + Lamivudine 150mg + plus Nevirapine 200mg	Zidovudine 300mg + Lamivudine 150mg + plus Nevirapine 200mg

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.
- If a patient reacts to Nevirapine, substitute with Efavirenz 600 mg orally once daily at night.
- 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 that contains medicines that were *not* included in the first regimen. The second-line regimen will still consist of two NRTIs but with a PI. 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 8.1: Preferred second line regimens for adults and adolescents including pregnant and breastfeeding women

Target Population	**Preferred second line regimens**	
Adolescents ≥10 years, Adults, Pregnant and Breastfeeding women	If TDF was used in first line ART	AZT + 3TC + ATV/r or LPV/r
	If AZT was used in first line ART	TDF + 3TC + ATV/r or LPV/r
HIV and TB co-infection	Patients receiving Rifampicin	Same NRTI backbone as recommended for adults and adolescents plus double dose LPV/r (800mg/200mg BD
HIV and HBV co-infection	AZT + TDF +3TC + ATV/r or LPV/r*	

Note: * ATV/r is the preferred PI in all cases

- Those patients with Hepatitis B infection will always need Tenofovir and Lamivudine among their medicines.

- Patients currently on abacavir plus didanosine plus a PI should be transitioned to the above regimens.
- For adults who cannot tolerate both TDF and AZT use ABC/3TC and ATV/r or LPV/r
- Abacavir /Lamuvudine 600 mg /300mg orally once daily
- plus
- Atazanavir/ritonavir one daily or Lopinavir/ritonavir twice daily

Third-line treatment recommendation for adults and adolescents

Those failing second-line therapy will need to be referred for specialist assessment which may include viral load and genotype testing prior to recommending the third-line medicines. Adherence needs to be reinforced all the time. in adults, raltegravir (400mg) twice a day and darunavir (600mg) twice daily and ritonavir (100mg) twice daily will be used as well as any other medicines as determined by the laboratory tests where available.

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 and Nevirapine. The preferred regimen for HIV positive TB patients is Tenofovir plus Lamivudine and Efavirenz.

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. TB/HIV co-infected patients with severe immunosuppression such as CD4 count less than 50 cells/mm3, should receive ART early i.e. within the first 2 weeks of initiating TB treatment. 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 8.2.

Table 8.2: 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 2- 4 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
All infants should have their HIV-exposure status established at their first contact with the health system, ideally before six weeks of age. Check for HIV exposure status on the child health card, or inquire from the mother or caregiver. Where the mother is available and was not tested during pregnancy, perform a rapid HIV test on the mother and if she is positive, then her infant is HIV exposed and needs to have a DBS collected for HIV DNA PCR.

At 9 months of age, most infants (93%) no longer possess maternally transferred antibodies. Prior to the age of 18 months, a DNA polymerase chain reaction (PCR) test for HIV is more reliable. A DNA PCR test should be offered to all exposed infants from six weeks of age. If the DNA PCR test is negative before the age of 18 months, the infant does not have HIV infection but is at risk of infection if breastfeeding is continued.

In an infant, *outside* the window period (three months after last exposure - labour/delivery, or breastfeeding) and rapid HIV test is negative, then the infant has not been infected with HIV and can be considered definitively negative.
If an infant is still *within* the window period, and rapid HIV test is negative then the infant is still considered to be HIV *exposed* and may be infected and should be managed as an HIV-exposed infant.

Where virological testing is not available for children less than 18 months, 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 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 the 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

1. All children below 5 years of age MUST be commenced on ART irrespective of their CD4 count.
2. All children 5 years and above with paediatric WHO clinical stage 3 or 4 disease MUST be commenced on ART irrespective of CD4 percentage.
3. Children≥5 years with WHO clinical stage 1 or 2 and a CD4 count less than 500 should be commenced on ART (see Appendix II for clinical staging)

Table 8.3: Recommendations on when to start ART in children (Adopted from WHO 2013 HIV guidelines)

Age	When to start
Infants (<1yr)	Treat all individuals
1 year to less than 5 years	Treat all individuals (children ≤2 years or with WHO stage 3 or 4 or CD4 count ≤750 or CD4 %<25% as a priority)
5 years and above	WHO stage 3 or 4 or CD4 ≤500 (CD4 ≤350 as 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 8.4: Recommended first-line treatment for children

First line treatment		Alternative first line treatment
Children < 3years	AZT + 3TC + LPV/r	AZT + 3TC + NVP ABC + 3TC + LPV/r ABC + 3TC + NVP
Children 3 - <10 years and adolescents <35kg	AZT + 3TC + NVP	ABC + 3TC + EFV
Special circumstances*	d4T+ 3TC + LPV/r d4T+ 3TC + NVP	

* use d4T for children with anaemia or other contraindication to use AZT

Monitoring children on ART

- Check haemoglobin if on Zidovudine after at least 6-8 weeks
- Urine dipsticks for glycosuria and estimated glomerular filtration rate (eGFR) and/or serum creatinine when on Tenofovir
- Alanine aminotransferase (ALT) for Nevirapine

- CD4 count every 6 months

- Viral load 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 or clinical condition with exception of TB) after 6 months of effective treatment

Immunological failure:
Younger than 5 years - Persistent CD4 levels below 200 cells/mm^3 or CD4 percentage <10%

Older than 5 years - Persistent CD4 levels below 100 cells/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 8.5: Recommended second line ART regimens

Second line ART			Preferred	Alternative
Children	If AZT used for 1st line then use ABC containing 2nd line, if ABC is used then use AZT		ABC+3TC+LPV/r	
	If PI based first line regimen used	<3yrs	No change from first line regimen used	ABC +3TC + NVP
		3yrs to <10yrs	ABC +3TC + EFV	TDF+ 3TC NVP ABC+3TC+NVP

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 with regard to 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.

Table 8.5: Recommended Paediatric ARV medicines (adopted from WHO 2013)

	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	
PABC/3TC/NVP	60mg/30mg/50mg	1	1	1.5	1.5	2	2	2.5	2.5	3	3	4	4
LPV/r sprinkles	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/1 50mg					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	

3 tablets for 25-29.9kg and 3.5 tablets for 30-34.9kg
TDF tablets are scored to break into half or third.

USE OF ARVS FOR PREVENTION OF MOTHER-TO-CHILD TRANSMISSION OF HIV (PMTCT)

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 initiate 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.
- HIV infected lactating women meeting treatment eligibility criteria (CD4 500 or less) should continue lifelong ART according to criteria for adult non-pregnant populations as it would be inappropriate for them to discontinue ART after the breastfeeding period**.**

N.B. Pregnant and breastfeeding women who were initiated on Zidovudine prophylaxis should be discontinued and commenced on lifelong ART (Option B+).

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 in 3rd trimester of pregnancy and/ or at delivery, 6 weeks post natally and 6 monthly 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

Table 9.1: Timing of Initiation of ART for Mother and ARV Prophylaxis for Infant (PMTCT)

Pregnancy	**Labour**	**Post delivery (breastfeeding and non breastfeeding)**
Maternal		**Infant (Birth to six weeks)**
Preferred first line		
Tenofovir + Lamivudine +Efavirenz		BW<2500: NVP 10mg daily BW ≥2500: NVP 15mg daily
Alternative First line		
Zidovudine +Lamivudine + Efavirenz		BW<2500: NVP 10mg daily BW≥2500: NVP 15mg daily

When using ARVs in pregnant women, certain precautions should be kept in mind:

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.

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

HIV-exposed infants whose mothers are on lifelong ART should be commenced on Nevirapine prophylaxis for six weeks.

Table 9.2: Infant Nevirapine prophylaxis

Age	Nevirapine dosage
Birth to six weeks	BW <2500*: 10mg once daily BW ≥ 2500: 15mg once daily

- Always remember to change the dose when baby gains weight.
- *For very low birth weight babies below 2000g dose of NVP is 2 mg/kg once daily for 6 weeks
- If any contraindications to NVP use 3TC 4mg per kg 12hourly for 6 weeks
- For non-breastfeeding infants NVP as above or AZT 4mg/kg 12 hourly for 6 weeks

TUBERCULOSIS

General Notes

Tuberculosis is a chronic, infectious, debilitating disease, caused by Mycobacterium tuberculosis. 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. Due to the association between TB and HIV infection, the prevalence of TB is increasing, and patients are often more seriously ill than before.

Control of Tuberculosis - TB Policy

For more information on National Policy and the organisation of the TB services refer to the Ministry of Health & Child Care's ZIMBABWE TUBERCULOSIS CONTROL PROGRAMME MANUAL.

The essential points of the TB policy are:

- Sputum microscopy for diagnosis and follow up provided free of charge in the public health sector
- Short-course chemotherapy provided free of charge in the public health sector
- Treatment of Drug Resistant TB(DRTB) provided for free of charge in the public sector
- **TB services available at all levels of the health delivery system, being integrated into the primary health care system to ensure efficient case finding, particularly for sputum smear positive patients**
- Collaborative TB/HIV activities at all levels

An important emphasis of the TB programme is the **direct observation of treatment (DOTS)**, which means that a treatment supervisor watches the patient actually swallowing the tablets. A supervisor can either be a healthcare worker or a trained member of the community.

TB control is administered in a standardised way from the Central level to Health Centre level. Within this system notification, registration, record keeping and contact tracing activities in addition to treatment are carried out. It is essential that all patients requiring TB treatment be referred for management in the National TB Programme.

TB fixed dose combinations are to be available at all levels from C through to A. Single formulations' level of availability is B level medicines. TB medicines are accorded V level of priority.

Prevention

Primary prevention

- BCG vaccination is given at birth or at first contact with the child after birth (except in babies with clinical signs of HIV infection and/or in infants born to a mother with sputum positive TB).
- *BCG vaccine should be given to all babies, even those born to mothers known to be HIV positive.*
- BCG is given intradermally on the right upper arm, above the insertion of the deltoid muscle.
- No booster dose should be given.

The batch number of the vaccine and the date must be recorded on the child's health card. Dosage is as recommended by EPI Programme (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 with:

Medicine	Codes		Dose	Frequency	Duration
isoniazid po	**B**	**V**	10mg/kg	once a day	2 months

Secondary prevention

An infant born to a mother with sputum positive TB should not be given BCG at birth

- Give the child isoniazid 10mg/kg day prophylaxis for two months
- After two months perform a mantoux test.
  - If the Mantoux test is positive give full TB treatment.
  - If the Mantoux test is negative continue with isoniazid prophylaxis for four more months.
  - Follow with BCG vaccination if not HIV infected

If parents are found to be sputum positive and the child has no signs of active TB, check the child's BCG status and vaccinate if not already done.

In addition give isoniazid prophylaxis for 6 months to children less than three years of age:

Medicine	Codes		Paed Dose	Frequency	Duration
isoniazid po	**B**	**V**	10mg/kg	once a day	6 months

*Note: For prophylaxis and treatment in **neonates** give isoniazid 5mg/kg/day*

Prevent further transmission of tuberculosis by health education and counselling on the importance of completing TB treatment, contact tracing, case finding and prevention of HIV infection.

IPT for HIV positive patients in whom active TB has been excluded, refer to IPT under HIV related diseases and National TB Guidelines

Case Management

Diagnosis

Clinical Diagnosis of TB

The presence of pulmonary tuberculosis should be suspected in individuals presenting with one or more of the following complaints:

- Cough for 2 weeks or longer
- Production of sputum, which may be bloodstained
- Loss of appetite
- Night sweats
- Fever
- Loss of weight
- Shortness of breath

Sputum

The diagnosis of TB is made by demonstrating alcohol acid-fast bacilli (AAFB) in the sputum by direct smear microscopy (DSM). DSM is repeated at the end of the intensive and continuation phases to confirm sputum conversion and cure.

Due to the concerns of medicine resistance the following patients **MUST** submit sputum specimens for Gene Xpert test, culture and medicine sensitivity testing to the TB Reference Laboratory

- All relapses
- Patients on category 1 treatment who are sputum positive at 3/5 months
- Patients on category 2 treatment who are sputum positive at 3/4 months (at end of prolonged intensive phase).
- Patients on category 2 treatment who are sputum positive at the end of treatment
- Patients who are sputum-smear positive and have been in contact with MDR-TB case.
- Gene-Xpert screening for all HIV positive patients
- Residence in DRTB high burden zones
- Return after treatment default

Chest X-Rays

Indications for chest x-rays

- A child suspected of TB
- HIV positive patient who is sputum negative
- Non-response to broad-spectrum antibiotics for correct duration in sputum negative and HIV negative patient
- Non-response to broad spectrum antibiotics in a sputum negative patient.
- When suspecting complications, e.g., pneumothorax, or pleural effusion
- When frequent and severe haemoptysis occurs
- When other lung diseases are suspected by the medical officer
- Pericardial effusion

Chest x-rays should **NOT** be routinely used for diagnosing pulmonary TB. In sputum positive patients a chest x-ray is not necessary.

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

Use Mantoux test only:

Medicine	Codes	Dose	Frequency	Duration
tuberculin, purified (PPD) 1:1000 intradermal	**B E**	0.1ml (=5TU)	-	-

Examine induration at 48-72 hours.

- A positive Mantoux (person with normal immunity: induration > 10 mm, person with defective immunity: induration > 6 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.
- All TB suspects should be offered HIV counselling and testing (Provider initiated testing and counselling i.e. PITC) at the same facility where the sputum is examined.

Medicine Regimens for Tuberculosis

Two main treatment categories, Category 1 and Category II are now used in Zimbabwe for medicine sensitive TB. The regimens consist of a combination of five first line medicines. These medicines are available as oral Fixed Dose Combination (FDC) and an injectable, streptomycin.

The intention of these combination tablets is to improve compliance by reducing the number of tablets a patient has to take, and to reduce the

possibility of medicine resistance developing. The number of FDC tablets is determined by a weight range for each patient at the start of treatment

- Treatment is the same for HIV infected people as for non-HIV infected.
- There are specific differences between regimes for adults and children in each category.

NOTE: If any signs of a reaction occur, the treatment should be stopped immediately and the patient seen by a doctor.

Key to Medicine Abbreviations

H= isoniazid **Z/PZA= pyrazinamide**
R= rifampicin **S= streptomycin**
E= ethambutol

No streptomycin should be given to children less than 12 years old except for meningitis, or to pregnant women, or those whose body weight is below 30kgs)*. Recent evidence has shown that it is safe to use ethambutol in children as it has less ocular toxicity in children of all ages than previously thought. Thus ethambutol has been reintroduced in paediatric regimens.* WHO (2006). Ethambutol efficacy and toxicity: literature review and recommendations for daily and intermittent dosage in children,

Treatment of new cases of TB

(Category I)

All **new cases** of TB regardless of site, bacteriology or severity

Adults:

. Intensive phase: 2 months HRZE (DOT)

Continuation phase: 4 months HR (DOTS) OR (6 months HR in TB of meninges, bone, joint, pericardium, disseminated spinal disease)

2HRZE/4HR (DOT)

The use of the combination of isoniazid and ethambutol (HE) in the continuation phase has been phased out in Zimbabwe.

Children:

- Intensive phase: Two months HRZE (DOT)
- Continuation phase: Four months HR (DOT) (or 10HR for patients with TB of the meninges, bone joint, pericardium, military TB or TB spine)

In children under 12 years, no streptomycin should be given except for TB meningitis.

General notes: Category I

- In smear positive cases, repeat sputum smear exam at end of two months. If the sputum is still positive at the end of two months the extension of the intensive phase is no longer necessary. Start continuation phase irrespective of sputum results at end of two months.
- If the sputum is still smear positive at the end of two months repeat sputum smear exam at the end of month three. Sputum smear should be sent to the National TB Laboratory for culture and sensitivity testing if still smear positive after three months of treatment. A sputum sample should be collected for Gene Xpert test at the local laboratory.
- Sputum testing should be collected for Gene Xpert testing and another one sent to the National TB Laboratory for culture and sensitivity testing if still smear positive after five or six months of treatment. If the patient's sputum remains smear positive after five months of treatment (treatment failure) Category II treatment should be commenced.
- Children weighing less than 11kg receive paediatric FDC HRZ plus additional isoniazid and ethambutol.
- Children weighing 11kg and above receive adult formulations and additional isoniazid.
- The total duration of treatment is six months.
- 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.

All previously treated cases of any form of TB (Category II)

Adults:

- Intensive phase: 2 SHRZE daily for two months followed by HRZE daily for one month
- Continuation phase: 5 HRE daily for 5 months [DOT]

Children:

- Intensive phase: 3 months RHZE daily
- Continuation phase: 5 months of HRZ daily

General notes: Category II

- Duration of TB Course: 8 months
- If at the end of the initial 3 months the sputum is smear negative or positive the continuation phase is started.
- If the sputum is smear positive at three months (12 weeks), take sputum for Gene Xpert,and for culture and DST. Start the continuation phase. Consult the District/Local MDR TB Team when DST results available. Further extension of the continuation phase will not increase the chances of cure.
- **If a patient is still smear positive at the end of 4 months, all medicines should be stopped for 3 days and a sputum specimen sent for Gene Xpert testing and another sputum specimen sent to the National TB Reference Laboratory(NTBRL) in Bulawayo or National Microbiology Reference Laboratory in Harare(NMRL) for culture and susceptibility. The patient should then be started on the continuation phase.**
- Patients who remain smear positive after the end of the fully supervised continuation phase will derive no benefit from another re-treatment regimen. They are termed chronic TB cases and are at high risk for medicine resistant TB. Collect sputum for Gene Xpert as well as for culture and sensitivity. **Refer to DR-TB guidelines**

Drug Resistant TB (DR-TB)

Drug resistant TB (DR-TB) is the presence of bacilli resistant to one or more anti-tuberculosis medicines and includes multidrug-resistant tuberculosis (MDR-TB) and extensively drug-resistant TB (XDR-TB).

These are patients who remain (or again become smear positive) after completing a fully supervised re-treatment regimen. The management of MDR or XDRTB cases is problematic; health workers should consult the MDR TB team.

Note: Although smear negative PTB and extra-pulmonary cases may also be treatment failures, relapses and DR-TB, this is a rare event and should be supported by pathological and /or bacteriological evidence.

MDR TB: Following preliminary results of rifampicin resistance by gene-xpert, patients must be put on standardised Category 4 treatment of MDR-TB whilst waiting for full DST results.

Fixed Dose Combination of Anti-TB Medicines

The essential anti-TB medicines now come in fixed dose combinations (FDCs) such that each tablet has 2 (2-FDC), 3 (3-FDC), or 4 (4-FDC) medicines.

Fixed dose combination tablets
Fixed dose combination tablets improve compliance by reducing the number of tablets a patient has to take, and reduce the possibility of medicine resistance developing. The FDCs available in Zimbabwe are:

- Rifampicin, Isoniazid, Pyrazinamide and Ethambutol: (RHZE)
- Rifampicin, Isoniazid and Ethambutol: (RHE)
- Rifampicin and Isoniazid: (RH)

The number of FDC tablets is determined by a weight range for each patient at the start of treatment and this is shown in the Table 10.1 to Table 10.8.

Adverse Medicine Reaction

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. 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.

e.g *Day 1 Isoniazid 25mg*
Day 2 Isoniazid 50mg
Day 3 Isoniazid 100mg
Day 4 Isoniazid 300mg
Day 5 Isoniazid 300mg + Rifampicin 150mg
Day 6 Isoniazid 300mg + Rifampicin 300mg
Day 7 Isoniazid 300mg + Rifampicin 450mg, etc(Refer to the National TB Guidelines)

TB and HIV Co-infection
Refer to the current national ARV guidelines as well as the TB guidelines. Also refer to the ARV chapter in this EDLIZ

Recommended doses of TB medicines in Children

- Rifampicin: 15 mg/kg/day (10 to 20 mg/kg/day)
- Isoniazid: 10 mg/kg/day (10 to 15 mg/kg/day)
- Pyrazinamide: 35 mg/kg/day (30 to 40 mg/kg/day)
- Ethambutol: 20 mg/kg/day (15 mg to 25 mg/kg/d).

Daily doses by weight – Category I

Table 10.1: Paediatric Intensive Phase weight band (2 months RHZE)

Weight bands in kg	Rifampicin Isoniazid (H) Pyrazinamide (Z) 60/30/150mg	Additional INH 100mg tab	Ethambutol tabs 100mg
3 - 5.9	1 ½ tabs	¼ tab	1 tab
6 - 10.9	2 tabs	½ tab	2 tabs

Table 10.2: For children in the 11-30.9 kg weight band use adult kits with additional INH

Weight bands in kg	Rifampicin Isoniazid (H) Pyrazinamide (Z Ethambutol tabs 150mg:75mg:400mg:275mg	Additional INH 100mg tab
11 - 15.9	1 tab	1 tab
16 - 20.9	2 tabs	1 tab
21 - 30.9	2 tabs	2 tabs

Table 10.3: Paediatric Continuation Phase (RH) 4 months daily

Weight bands in kg	Rifampicin Isoniazid 60mg/30mg	Additional INH 100mg tab
3 - 5.9	1 ½ tabs	¼ tab
6 - 10.9	2 tabs	½ tab

Table 10.4: Continuation phase (RH) 4 months daily (except TB meningitis, TB spine where (RH) 10 months

Weight bands in kg	Rifampicin Isoniazid 150mg:75mg	Additional INH 100mg tab
11 - 15.9	1 tab	1 tab
16 - 20.9	2 tabs	1 tab
21 - 30.9	2 tabs	2 tabs

Table 10.5: New adult Number of FDC tablets per day for each Weight band (2RHZE/4HR)

Regimen	Initial phase (2 months)	Continuation Phase (4 months)
	2(RHZE) daily	4(HR) daily
Patient's Weight	(Isoniazid 75mg+ Rifampicin 150mg + Pyrazinamide 400mg + Ethambutol 275mg)	(Isoniazid 75mg + Rifampicin 150mg)
30 - 39 kg	2	1.5
40 - 54 kg	3	2
55 - 70 kg	4	3
70 kg +	5	3

Daily doses by weight – Category II

Table 10.6: Paediatric Intensive Phase 3 months (RHZE)

Weight bands in kg	Rifampicin (R) Isoniazid (H) Pyrazinamide (Z) 60/30/150mg	Additional INH 100mg tab	Ethambutol (E) tabs 100mg
3 - 5.9	1 ½ tabs	¼ tab	1 tab
6 - 10.9	2 tabs	½ tab	2 tabs

Weight bands in kg	Rifampicin (R) Isoniazid (H) Pyrazinamide (Z) Ethambutol (E) tabs 150mg:75mg :400mg:275mg	Additional INH 100mg tab
11 -15.9	1 tab	1 tab
16 - 20-.9	2 tabs	1 tab
21 - 30.9	2 tabs	2 tabs

Table 10.7: Paediatric Continuation Phase 5 months (RHE)

Weight bands in kg	Rifampicin(R) Isoniazid (H) 60:30mg	Ethambutol (E) tabs 400mg
3 - 5.9	1 tab	1/4 tab
6 - 10.9	2 tabs	1/2 tab

Weight bands in kg	Rifampicin(R) Isoniazid (H) Ethambutol(E) tabs 150mg:75mg:275mg	Additional INH 100mg tab
11 - 15.9	1 tab	1 tab
16 - 20.9	2 tabs	1 tab
21 - 30.9	2 tabs	2 tabs

Table 10.8: Category II : Retreatment in Previously treated adult

Regimen	Initial Phase (3 months)		Continuation Phase (5 months)
Patient's Weight	2(RHZE)S / 1(RHZE) daily		5HRE
	(Isoniazid 75 mg + Rifampicin 150mg + Pyrazinamide 400mg + Ethambutol 275mg)	5(HRE) daily Streptomycin (IM) 2 months	(Isoniazid 75 mg + Rifampicin 150 mg + Ethambutol 275mg)
30 - 39 kg	2	0.50 g	2
40 - 54 kg	3	0.75 g	3
55 - 69 kg	4	1 g*	4
70 kg +	5	1 g*	5

- *0.75 g if 60 years or over.

TROPICAL DISEASES

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 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

Prevention of Rabies in Humans

- **Pre-exposure immunisation**

Individual pre-exposure immunisation should be offered to persons at high risk of exposure, such as animal handlers, veterinarians, National Parks and Wild Life personnel.

- **Pre-exposure immunisation schedule:**

	Medicine	Codes	Adult dose	Frequency	Duration
	rabies vaccine, human diploid cell im	**B V**	0.5ml	single doses on Day 0, 7 and 28 only	

Give a booster every 2-3 years.

Post-exposure Treatment
In dog and other animal bites, the wound should be thoroughly cleaned with povidone-iodine or soap and water as soon as possible.

Treatment: High Risk
In a previously unvaccinated or incompletely vaccinated individual, where there is a high risk of rabies, i.e.:

- broken skin
- uncertain animal history or strong suspicion of rabid animal give:

	Medicine	Codes	Adult dose	Frequency	Duration
	human rabies immunoglobulin (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	-

Vaccinate using the abbreviated 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 4-8ºC after reconstitution and use as soon as possible.

Low Risk

Where the risk of rabies is low, i.e.:

- skin not broken or other contact (e.g. with infected meat)
- bite from domestic animal WITH LAPSED immunisation against rabies

Follow the 2-1-1 vaccination schedule, but without giving immunoglobulin.

Minimal – no risk

- Bite from a domestic animal FULLY immunised against rabies
- In previously vaccinated individuals give a single booster dose of rabies vaccine.

General guidelines for NTDs

Neglected Tropical Diseases (NTDs) include Bilharzia, intestinal worms, lymphatic filariasis and blinding trachoma

Zimbabwe is instituting Mass Drug (Medicine) Administration (MDA) for bilharzia, intestinal worms, lymphatic filariasis and blinding trachoma to children aged 5 to 15 years in endemic districts annually using WHO guidelines for preventative 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.

Clinics without microscopes can treat *Schistosoma haematobium* infection on the basis of visible haematuria or positive urine strip test for blood and or protein in children and adolescents. 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**	60 mg/kg	once a day	3 Days

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 have eliminated any roundworm infestation.

In Mass drug/medicine administration (MDA) campaigns, 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
	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. Education to prevent re-infection is very important.

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 will require MDA.

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).

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	6 hourly	10 days
			Paed = 5-10mg/kg		
or	**chloramphenicol im/iv**	**B V**	12.5-25mg/kg Paed = 6.25-12.5mg/kg	6 hourly	10 days

- 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.

- It is important to educate the patients at the time of stopping treatment about the signs and symptoms of 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 antileprosy 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 corticosteriods 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 antileprosy 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 clofazime 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 Matebeland 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.
Suramin is the medicine of choice for the acute haemolyphatic phase.
Melarsoprol is required if the patient progresses to the neurological phase.

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 in 10% of cases.*

Humans are the only natural host and reservoir. The infection is transmitted by ingestion of faecally contaminated food or water and through direct contact with infected persons and formites (contaminated items).

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 locally with a sensitivity of up to 90% in the first week of onset of fever. Stool and rectal swab cultures yield positive results in up to 40% of the cases.

Case Management
More than 90% of patients can be managed at home with oral antimicrobial, minimal nursing care, and close medical follow-up for complications or failure to respond to therapy.

Antimicrobial therapy for treatment of Typhoid fever

i) Susceptibility: Fully Sensitive

	Medicine	Codes		Adult dose	Frequency	Duration
	ciprofloxacin po	**B**	**V**	500mg	Twice a day	5-7days

Alternative Medicines

	Medicine	Codes		Adult dose	Frequency	Duration
	chloramphenicol po	**B**	**V**	1g	4 times a day	14–21days
or	**amoxicillin po**	**C**	**V**	2g	3 times a day	14days

ii)Susceptibility: Multidrug Resistant

	Medicine	Codes		Adult dose	Frequency	Duration
	ciprofloxacin po	**B**	**V**	500mg	Twice a day	7-14days
or	**cefixime po**	**B**	**V**	500-750mg	Twice a day	7days

Alternative Medicines

	Medicine	Codes		Adult dose	Frequency	Duration
	azithromycin po	**C**	**V**	1gm	Once a day	5
	Cefixime po	**B**	**V**	500-750mg	Twice a day	7-14

iii) Susceptibility: Quinoline Resistant

	Medicine	Codes		Adult dose	Frequency	Duration
	azithromycin po	**C**	**V**	250-500mg	once a day	7
or	**ceftriaxone iv**	**C**	**V**	2gm	once a day	10-14

Alternative Medicines

	Medicine	Codes		Adult dose	Frequency	Duration
	Cefixime po	**C**	**V**	600mg	Twice a day	7-14

SEVERE TYPHOID DISEASE

i) Susceptibility: Fully Sensitive

	Medicine	Codes		Adult dose	Frequency	Duration
	ciprofloxacin po	**B**	**V**	500mg	Twice a day	7-10

Alternative Medicines

	Medicine	Codes		Adult dose	Frequency	Duration
	chloramphenicol po	**B**	**V**	500mg	4 times a day	14
or	**amoxicillin po**	**C**	**V**	500mg	3 times a day	14

ii) Susceptibility: Multidrug Resistant

	Medicine	Codes		Adult dose	Frequency	Duration
	ciprofloxacin po	**B**	**V**	500mg	Twice a day	10-14
or	**Cefixime**	**C**	**V**	600mg	Twice a day	10-14

Alternative Medicines

	Medicine	Codes		Adult dose	Frequency	Duration
	ceftriaxone iv	**C**	**V**	2gm	once a day	7-14

iii) Susceptibility: Quinolone Resistance

	Medicine	Codes		Adult dose	Frequency	Duration
	ceftriaxone iv	**C**	**V**	2gm	once a day	7-14
or	**azithromycin po**	**C**	**V**	Igm	once a day	5

Dehydration is uncommon in Typhoid fever; however, electrolyte imbalance, e.g. hypoglycaemia, hypokalaemia and hyponatremia frequently occur and need to be corrected using appropriate electrolyte solutions. 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**	500mg	Twice a day	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. Diphtheria
6. Hepatitis (all forms)
7. Human Influenza A caused by a new subtype (e.g. H1N1, H1N5)
8. Meningococcal Meningitis
9. Noma
10. Plague
11. Rabies
12. SARS
13. 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.
14. Trypanosomiasis
15. Typhoid
16. Typhus
17. Viral Haemorrhagic fever (e.g. Ebola, Marburg, Crimean Congo)
18. Yellow fever
19. 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 health worker, including those in private sector, who comes into contact with any of the notifiable diseases. 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 health 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.

MALARIA

General Notes:

- The pattern of malaria varies geographically. *Plasmodium falciparum* causes almost all the malaria in Zimbabwe. A few cases of malaria 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 communication on non-pharmacological means of prevention is extremely important e.g. indoor residual spraying, use of mosquito coils, repellents, long lasting insecticide-treated mosquito nets, 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 providing 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 at 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.**

Chemoprophilaxis 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 as treatment doses 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 not be less than 4 weeks apart
- SP should ideally be given as directly observe therapy 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 a higher risk of adverse effects
- It is recommended that weekly folic acid also be given to pregnant woman taking IPTp. (This is done in conjuction with the Reproductive Health Department).

Malaria prophylaxis for:

- **visitors from outside the country**

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

*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 arteminisinin 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)	Start 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 Arteminisin 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 Co-artemether 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/amiodiaquine.
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 not eligible for treatment with Co-artemether

Treatment of infants under 5kg body weight

Medicine	Codes	Dose	Frequency	Duration
quinine po	**C V**	10mg per Kg body weight	Every 8 hours	7 days

Uncomplicated malaria in pregnancy

TRIMESTER/APPROXIMATE GESTATION								
1st trimester-before quickening		**2nd and 3rd trimester –after quickening**						
Medicine		**Medicine**	DAY1		DAY2		DAY 3	
			STAT	After 8 hrs	AM	PM	AM	PM
Quinine tab	600mg every 8 hrs for 7 days	**Co-artemether** (No. Of tablets)	4	4	4	4	4	4
Clindamycin tab	300mg every 8 hours for 7 days							

- Twelve hours apart from day 2 to day 3

Treatment failure

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.

Treatment failure however should be suspected clinically if there is no response after 48 hours of correct therapy, and a change to second line therapy made immediately.

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 30 minutes, 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, 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- 5 years)	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
	doxycline po	**C V**	100mg	Once daily	30 days
or	**clindamycin po**	**B V**	300mg	Every 8hrs	7 days

7 Day Quinine Course

Medicine	Codes	Dose	Frequency	Duration
quinine po	**B V**	Adults 600 mg	Every 8 hours	7 days
	Children	10 mg/kg body weight	Every 8 hours	7 days

Short Course Quinine plus Doxycycline or Clindamycin (Adult)

Medicine	Codes	Dose	Frequency	Duration
quinine po	**B V**	600 mg	Every 8 hours	5 days
clindamycin po	**B V**	300mg	Every 8 hours	5 days
doxycycline po*	**C V**	100 mg	Once daily	7 days

N.B:-

1. *Duration of quinine may be shortened to 5 days if doxycycline is also given.*
2. **Doxycycline is contraindicated in children below 10 years and in pregnancy and these patients should complete the 7 day quinine course.*

Severe malaria

This is a life threatening condition, and the goal of management therefore 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≤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

Parenteral therapy with artesunate injection must be commenced at primary level using 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.

Artesunate 60mg injection (V, C) is used as follows:

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 dilution of parenteral Artesunate for 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 water or N/saline to the reconstituted solution. The resultant 6ml solution will contain 10mg per ml of Artesunate. Check the dose to administer on the table below.

Dosing Schedule

- Give a minimum of 3 parenteral doses of Artesunate once started before changing to oral treament, even if the patient is able to take oral medication early
- Prepare a fresh solution for each injection
- IV 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

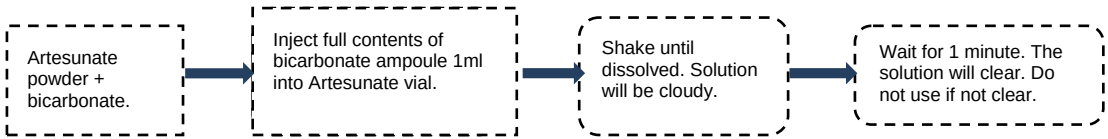
- Once the patient is able to take oral medication switch to oral Co-artemether for a full three day course (*see Table for Co-artemether course*).

- 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 DOSE TO GIVE ON TABLE BELOW:

Weight	<5kg	5-8kg	9-12kg	13-16kg	17-20kg	21-25kg	26-29kg	30-33kg	34-37kg	38-41kg	42-45kg	46-50kg	51-54kg	55-58kg	59-62kg
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 injection slowly.**

- **IM Injection volumes greater than 5 mls should be spread over different injection sites.**

OR

- **IN ADULTS** administer quinine intravenously:

- IV 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. Where the child is still able to; continue to breastfeed.

- 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.

- Where available treat convulsions with either intravenous or rectal diazepam.

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.

NOTE: Intravenous quinine is the medicine of choice to treat **SEVERE MALARIA in children weighing less than 5kg and pregnant women in the first trimester**.

Note: Do not use a loading dose if the patient has taken quinine in the preceding 24-48 hours (or mefloquine in the preceding 7 days).

Medicine	Codes	Adult dose	Frequency	Duration
quinine infusion in 5% dextrose *(max loading dose = 1200mg)*	**B V**	20mg/kg	over 4 hours, monitor infusion rate carefully,	
then after 8hrs: **then** *(max maintenance dose = 600mg)*		10mg/kg	over next 4 hours, repeat every 8 hours until able to tolerate oral therapy.	
then reduce to		5mg/kg	every 8 hrs	*

**Note: Change to oral therapy if the patient can swallow. Give the equivalent dose of quinine salt orally to complete 7 days of treatment.*

Cautions: *Quinine may have toxic effects even at this dosage - headache, confusion, nausea, tinnitus, tremors, abdominal pain, rashes, temporary visual disturbances and reversible deafness. Hypersensitivity reactions may occur rarely. Attention should therefore be paid to the dose per body weight, and the change to oral therapy made as soon as possible.*

- Full size adults are generally assumed to weigh 60kg. The loading dose is therefore 1200mg and maintenance 600mg. Never exceed this dose **even if** the patient weighs more than 60kg.
- All efforts should be made to weigh adolescents or "small adults" to avoid overdosing those who might be far less than 60kg. If weighing is not possible assume to be 45 kg.
- Hypoglycaemia is an important problem with IV quinine. Monitor blood glucose 4hrly. If there is any deterioration of consciousness, hypoglycaemia should be considered. The infusion fluid (Dextrose 5%) is NOT for the specific correction of hypoglycaemia. Hypoglycaemia should be treated with the appropriate agents.

When an IV line cannot be established:

Medicine	Codes	Adult dose	Frequency	Duration
quinine im *	**B V**	10mg/kg	every 4 hrs	for 3 doses, then
		10mg/kg	every 8hrs	7 days

- Patients referred to the district hospital after receiving a loading dose of IM quinine should be commenced on IV quinine 8 hours after the last dose of IM quinine was given.

The duration of the quinine course may be shortened to 5 days if doxycycline is added to the therapy – see under Treatment Failure previous pages.

**IM quinine should be diluted as follows:*

> *Dilute the quinine with water for injection. Draw 8ml of water for injection into a 10ml syringe, and then draw 2ml of quinine injection into the same syringe. The syringe now contains 10ml of a concentration of 60mg of quinine salt per ml. If the volume to be injected is greater than 3ml then give half into each thigh*

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 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 been given rectal artesunate if they were unable to take any medication orally and time to get to the referral centre was more than 6 hours.

- **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.

RESPIRATORY CONDITIONS

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 requires 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 sensitive 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 no clinical improvement **refer** to district level. The three commonest diagnoses 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 only breathless 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**	**B**	**N**	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 sulpha allergy, cotrimoxazole desensitization may be considered.

Medicine	Codes		Adult dose	Frequency	Duration
cotrimoxazole po	**C**	**V**	960mg < 6mths = 120mg 6-12mths = 240mg >1 year = 480mg	once a day	Indefinitely

- If no improvement ensures, 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 is mandatory if any of these signs are present:

- respiratory distress
- cyanosis
- pulse >124/min
- hypotension (systolic < 90mmHg)
- temperature > 40^{o}C or < 35^{o}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)	6 hourly	7 days
or	**ceftriaxone IV**	**C**	**V**	1gm	Daily or twice	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 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	6 hourly	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	12 hourly	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 is mandatory**. Patients with very large absesses should lie in the lateral decubitus position with the absess side down, plus**

	Medicine	Codes		Adult dose	Frequency	Duration
	benzylpenicillin iv	**C**	**V**	1.5gm (=2.5MU)	6 hourly	4-8weeks*
and	**metronidazole po**	**C**	**V**	400mg	3 times a day	4-8weeks

	Alternatively (alone)					
	Medicine	Codes		Adult dose	Frequency	Duration
	Co-amoxiclavulanic acid po	**S**	**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 look out for C. dificille diarrheoa 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	6 hourly	10-14 days
and	**metronidazole po**	**C**	**V**	400mg	3 times a day	10-14 days
	Alternatively (alone)					
	Medicine	Codes		Adult dose	Frequency	Duration
	Co-amoxiclavulanic acid po	**S**	**V**	625mg	3 times a day	

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	6 hourly	10-14 days
and	**metronidazole po**	**C**	**V**	400mg	3 times a day	10-14 days

- **Also consider TB empyema especially in HIV infection**

Hospital Acquired Infections (Nosocomial)

- Pneumonia presenting 3 days after admission:

	Medicine	Codes		Adult dose	Frequency	Duration
	gentamicin iv	**C**	**V**	120mg	12 hourly	7-10 days
and	**benzylpenicillin iv**	**C**	**V**	1.5gm (=2.5MU)	6 hourly	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 spirometric 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-reversibilty 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

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	6 hourly	review
plus	**ipratropium inhaler**	**S**	**N**	40mcg	6 hourly	review

- If dyspnoea is severe:

	Medicine	Codes		Adult dose	Frequency	Duration
	salbutamol nebulised	**B**	**V**	5mg	6 hourly	review
plus	**ipratropium nebulised**	**S**	**N**	500mcg	6 hourly	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 access to blood gas analyser). if able to monitor oxygen saturation aim for SPO_2 88-92%
- Pulmonary rehabilitation to prevent respiratory muscle wasting and deconditioning.
- 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	**S N**	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
+ salbutamol Inhaler	**C V**	200mcg	PRN	

- Alternatively adding Theophylline SR 250-500mg PO once daily may be helpful if patients remain symptomatic.
- Pulmonary rehabilitation
- Nutritional support
- Vaccinations: Influenza and pneumococcal
- Enquire about symptoms of gastroeosophageal reflux disease (GERD) and treat.

Bronchiectasis (Non cystic fibrosis)

The hallmarks 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 cover pathogens empirically. 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**	**C**	**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-eosophageal reflux disease(GERD)
- Emotional problems
- Smoking
- Work related dusts, fumes, vapours and gases

The aims of asthma management are 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	2 times 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 100mcg/puff	**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	**Salmetarol/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**	**S**	**N**	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	**B**	**V**	200mg	once only (unless oral dosing not possible)	
	magnesium sulphate iv	**S**	**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.
- IV Beta 2 agonist.
- IV 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	**B**	**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.*

CARDIOVASCULAR DISEASE

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	Frequency	Duration
	benzylpenicillin iv	**C**	**V**	5MU	6 hourly	2-6 weeks
or	**ceftriaxone 1g iv**	**B**	**V**	1g	12 hourly	2-6 weeks
and	**gentamicin iv**	**B**	**V**	80-120mg	12 hourly	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	Frequency	Duration
	cloxacillin iv	**B**	**V**	2g	6 hourly	4-6 weeks
and	**gentamicin iv**	**B**	**V**	80-120mg	12 hourly	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 (2 hour 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	6 hourly	4-6 weeks
and	**gentamicin iv**	**B**	**V**	80-120mg	12 hourly	4 weeks

Enterococcal infection (e.g. *Enterococcus faecalis*):

	Medicine	Codes		Adult dose	Frequency	Duration
	benzylpenicillin iv	**C**	**V**	5MU	6 hourly	4-6 weeks
and	**gentamicin iv**	**B**	**V**	80-120mg Max-120mg	12 hourly	4 weeks

Staphylococcal infection (for example, *Staph. aureus* & *Staph. epidermidis*):

	Medicine	Codes		Adult dose	Frequency	Duration
	cloxacillin iv	**B**	**V**	2g	6 hourly	4-6 weeks
and	**gentamicin iv**	**B**	**V**	80-120mg	12 hourly	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**	**E**	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**	**B**	**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**	**B**	**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 [Specialist-only medicine] 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(0.72 g) 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.

Treatment of chorea:

	Medicine	Codes	Adult dose	Frequency	Duration
	haloperidol po	**A N**	1.5-3mg Paed = 25-50mcg/kg	3 times a day	as required
or		**B V**	200-400	2 divided doses	
	Sodium valproate po			1-2 times a day	As required

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	**amoxycillin po**	**C V**	250mg <12yr = 125-250mg	2 times a day	up to 21-30yrs
or	**erythromycin po** in penicillin allergy	**C V**	250mg <12yr=125-250mg <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.

Treatment 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.

Medicine treatment
Methyldopa and propranolol are no longer recommended for the treatment of hypertension except in special circumstances.

Guidelines for treatment of hypertension:

- start with first line medicine
- start with the lowest recommended dose
- if ineffective or not tolerated change the medicine or add a medicine from another class.

First line agents = shown to reduce mortality

- Thiazides

	Medicine	Codes	Adult dose	Frequency	Duration
	hydrochlorothiazide po	**C V**	12.5 – 25mg (max 25mg)	once a day	long term

Unwanted side effects include raised plasma glucose, uric acid, cholesterol and reduced plasma potassium and magnesium; sinus congestion.

- Calcium channel blockers:

	Medicine	Codes	Adult dose	Frequency	Duration
	nifedipine slow release po	**B V**	10 - 40mg	1-2 times a day	long term
Or	**amlodipine po**	**B E**	5 – 10mg	once a day	long term

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).

Second line agents

- ACE inhibitors:

	Medicine	Codes	Adult dose	Frequency	Duration
	Enalapril	**B V**	5 - 40mg	Once a day	long term
Or	**Lisinopril**	**B E**	5-40mg	Once a day	long term

*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.*

- Angiotensin receptor-blockers:

	Medicine	Codes		Adult dose	Frequency	Duration
	losartan po	**B**	**V**	25-100mg	1-2 times a day	long term

- 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	2-3 times a day	long term
or	**Doxazocin**	**B**	**V**	4-16mg	Once a day	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

- 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 fatigueability.

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, eg. 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.
- The role of digoxin in systolic heart failure patient who are in sinus rhythm (as compared to atrial fibrillation) has diminished over the years. Digoxin does not improve mortality in such patients, and be harmful in some patients and should therefore be used with great care
- Low dose aspirin should be considered in most patients with severe systolic heart failure (very low ejection fraction) who have not had a stroke

Medicine Management:

Chronic heart failure management (heart failure secondary to left ventricular systolic dysfunction)

	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	**Metoprolol Succinate Xl**	**B**	**V**	12.5 – 200 mg	Once daily	long term
	Carvedilol					
OR		**B**	**V**	3.125 – 25mg	Twice daily	long term
	Bisoprolol					
OR		**B**	**V**	1.25 – 10 mg	Once daily	long term

and	**Spironolactone**	**B**	**V**	25-50 mg	Once daily	long term
+/-	**potassium chloride po**[2]	**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 Paed = 0.01mg/kg	once a day	long term
+/-	**Spironolactone po**	**B**	**E**	**25-50mg**	Once daily	Long term

[1]*give intravenous treatment for severely oedematous patients*
[2]*if using ACE inhibitors, losartan or spironolactone discontinue or use* ***cautiously***
**ACE inhibitors are of benefit in all stages of heart failure*
Selected beta blockers such as carvedilol, metoprolol succinate XL or bisoprolol are of benefit in all stages of heart failure

For oedematous and bed-ridden patients:

	Medicine	Codes		Adult dose	Frequency	Duration
	Enoxaparin	**B**	**V**	40 mg	Once daily	As required
add	**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	**prochlorperazine iv**	**B**	**E**	12.5mg	when required for vomiting	
Plus	**frusemide iv**	**B**	**V**	40-80mg	repeat as required	

- Subsequent treatment includes ACE inhibitors as for heart failure.
- Beta blockers should not be introduced in patients with acute heart failure which has not been stabilized (in contrast, patients with acutely decompensated heart heart who are already taking a beta blocker should be continued on their current dose – dose escalation should be deferred until the acute episode has been controlled)

Resistant cardiac failure

Exclude advanced renal failure as a cause of resistant heart failure.

A progressive increase of frusemide is valuable. A single daily dose, at first, up to 160mg.Then hydrochlorothiazide 50mg may be added to advantage. After which the frusemide can be further increased up to 240mg. A second dose of frusemide before 4.00pm may be useful for nocturnal breathlessness.
The use of IV frusemide confers little advantage over the oral preparation.
If still unsatisfactory consider **referral** for further management under specialist care.

Aim to optimize medical therapy, i.e. maximum tolerated doses of ACE inibitors (or ARBs), spironolactone or beta blockers in addition to diuretic therapy titrated to severity of symptoms

Refractory cardiac failure due to documented systolic heart failure, may represent ‘end stage’disease – medical therapy is only palliative, with a goal of relieving symptoms and quality of life rather than prolonging life

Heart failure due to specific causes such as rheumatic heart disease needs to be considered separately, and patients should be referred for surgical intervention as early as possible

Cor Pulmonale
Treat as above but ACE inhibitors are not recommended.

Care should be taken with higher doses of diuretics as patients with cor pulmonale are prone to overdiuresis and subsequent pre-renal azotaemia
Anticoagulation should be considered in patients with cor pulmonale, pulmonary venous thromboembolic disease should be sought if the cause of the cor pulmonale is not obvious

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 life style

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	

[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 a day	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
+/-	**nifedipine slow release po**	**B**	**V**	10-20mg	2 times a day	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 a day	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	6 hourly	as required
and	**atenolol po**	**B**	**V**	25-100mg	once a day	as required
and	**nifedipine slow release po**	**B**	**V**	10-20mg	twice a day	as required

Acute Myocardial Infarction

General Measures

- Bed rest
- Oxygen administration
- Set up an intravenous line (**dextrose 5%** or **sodium chloride 0.9%**)

Avoid intramuscular injections where possible 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
	Clopidogrel	**B**	**E**	300mg 75mg	Once only 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	**captopril po**	**B**	**E**	12.5-25mg	2 times a day	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 a day	as required

Atrial fibrillation and atrial flutter

	Medicine	Codes		Adult dose	Frequency	Duration
add	**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	**A E**	75-100mg stat, then 4mg/min for 30 mins, then 1-2mg/min for 12-24 hours		

- 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.

GASTROINTESTINAL CONDITIONS

Acid Related Conditions

Gastroeosophageal disease (GERD)

Presenting as heartburn, acid regurgitation and sometimes difficulty or pain on swallowing, also as asthma and with a hoarse voice.

General measures:

- Life style modifications are important: weight reduction, elevation of head of bed, avoidance of tight clothes, stooping, large meals, and food triggers that patient suspects (chocolate, colas, coffee). No meals or drink for 3 hours preceding bedtime.

Mild symptoms:

	Medicine	Codes	Adult dose	Frequency	Duration
	magnesium trisilicate & aluminium hydroxide po	**C N**	20ml or 2 tablets	at least 4 times a day	as required

Moderate symptoms:

	Medicine	Codes	Adult dose	Frequency	Duration
add	***omeprazole po**	**B E**	20mg	twice daily	2 months

* Omeprazole to be taken 30 minutes BEFORE meals.

Severe symptoms: If no response to above, give:

	Medicine	Codes	Adult dose	Frequency	Duration
	ranitidine po	**B E**	150mg	Twice a day	6-8 weeks

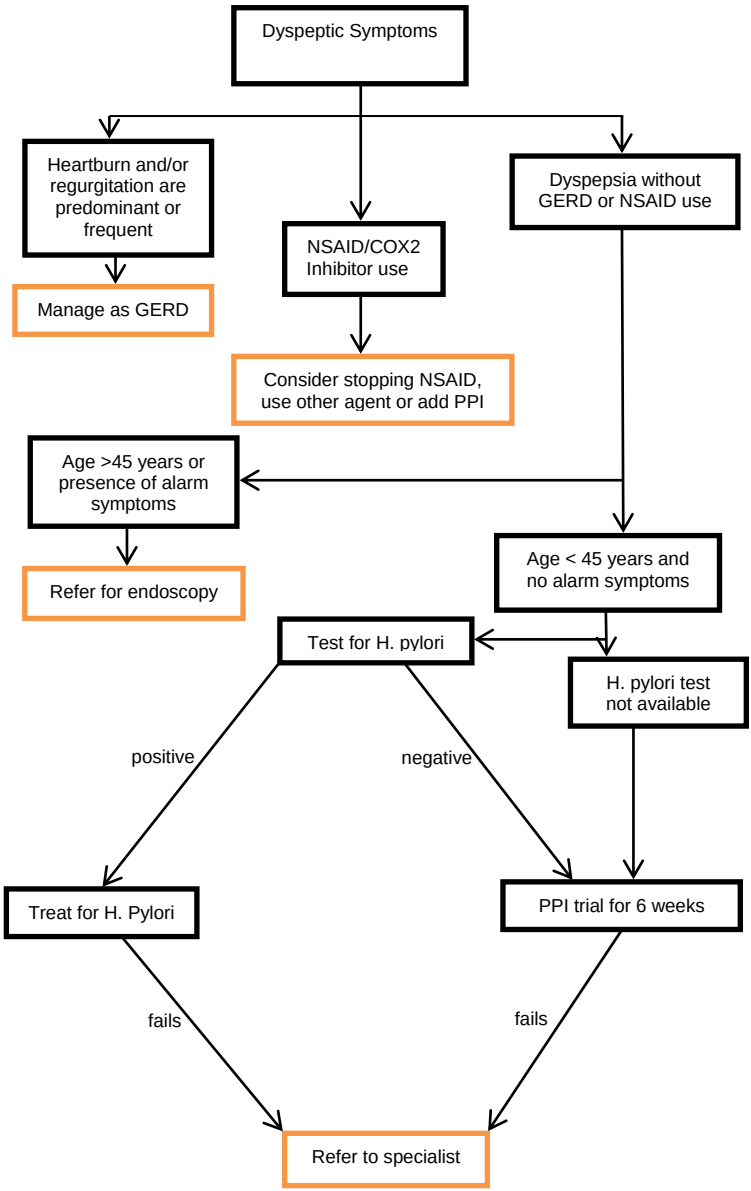
Note: Heartburn or pain on swallowing unresponsive to treatment, presence of dysphagia, weight loss should be referred to specialist.

Odynophagia: (Pain on swallowing)

When pain on swallowing is recent in onset and with no heartburn consider oesophagitis from pill ingestion, HIV complicated by candidiasis, viral oesophagitis and malignancy. Empirical anti-fungal agent when appropriate. Early referral for intractable cases.

Dyspepsia:

Includes chronic pain in upper abdomen, fullness, bloating and nausea. Peptic ulceration accounts for about 10% of uninvestigated dyspepsia, and gastric cancer is a concern. The majority of patients have functional dyspepsia. Uninvestigated patient are best managed according to the algorithm below:


Dyspeptic Symptoms
Heartburn and/or regurgitation are predominant or frequent
NSAID/COX2 Inhibitor use
Dyspepsia without GERD or NSAID use
Manage as GERD
Consider stopping NSAID, use other agent or add PPI
Age >45 years or presence of alarm symptoms
Refer for endoscopy
Age < 45 years and no alarm symptoms
Test for H. pylori
H. pylori test not available
positive
negative
Treat for H. Pylori
PPI trial for 6 weeks
fails
fails
Refer to specialist

General measures for established peptic ulcer

Treatment of peptic ulcer disease begins with exclusion of aetiologic factors such as NSAIDs and eradication of Helicobacter pylori. Acid suppression therapy is also required. Cigarette smoking must be avoided. "Ulcer diets" are unnecessary. Avoid foods that exacerbate pain in individual patients. Antacid may give temporary relief of symptoms.

Alarm features: The presence of alarm features are an indication for immediate referral to a specialist i.e. patient of any age with overt bleeding, iron deficiency anaemia, progressive unintentional weight loss, progressive difficulty swallowing, persistent vomiting, epigastric mass or suspicious barium meal. Gastric ulcer at barium meal requires referral for endoscopic biopsy.

For H. pylori eradication:

	Medicine	Codes		Adult dose	Frequency	Duration
	amoxicillin po*	**C**	**V**	1g	2 times a day	2 weeks
and	**clarithromycin po**	**C**	**V**	400mg	2 times a day	2 weeks
and	**omeprazole po***	**C**	**V**	20mg	Twice a day	2 weeks
*****	**metronidazole po** for penicillin allergic patient	**C**	**V**	400mg	2 times a day	2 weeks

ALTERNATIVELY

	Medicine	Codes		Adult dose	Frequency	Duration
	amoxicillin po*	**C**	**V**	500mg	3 times a day	2 weeks
and	**metronidazole po**	**C**	**V**	400mg	3 times a day	2 weeks
and	**omeprazole po**	**C**	**V**	20mg	2 times a day	2 weeks

*** This regime may be more poorly tolerated, affecting compliance**

Note: Omeprazole must be taken half hour before meals. Incomplete or abbreviated courses risk development of antibiotic resistance. Persistence of H. pylori infection is indication for referral to a specialist. Preferred test for H. pylori is stool antigen test; antibody test is unreliable unless locally validated, Endoscopy-based tests are unsuitable for routine use.

NSAIDs-associated ulcers

When an ulcer develops, NSAID should be withdrawn wherever possible. Omeprazole at 20 mg b.d. or ranitidine 300 mg b.d. for 4 weeks. If continued use of NSAID is necessary, refer to specialist.

Non-Ulcer (functional) dyspepsia

Symptoms suggestive of ulceration but in absence of organic, metabolic or systemic disease and with negative findings on endoscopy. Symptoms typically present for 6 months presenting either as post-prandial distress syndrome, irritable bowel syndrome or epigastric pain syndrome. If symptoms persist despite treatment as per algorithm, refer for specialist evaluation.

	Medicine	Codes		Adult dose	Frequency	Duration
	hyoscine po*	**C**	**V**	10mg	3 times a day	4 weeks
	metoclopramide po	**C**	**V**	10mg	3 times a day	4 weeks

*Contraindicated in angle closure glaucoma, prostatic hypertrophy, paralytic ileus

Acute Diarrhoea & Associated Conditions in Adults

See also the sections on HIV-related diarrhoea and diarrhoea in children.

Stools should be examined microscopically and cultured. Pus cells suggest an infective cause.

Acute Gastro-Enteritis (Food Poisoning)

Acute diarrhoea +/- vomiting: rehydration and correction of electrolyte disturbance is primary intervention, especially in infants, elderly and the very sick. Oral fluids in mild cases. IV fluids in more severe cases or when vomiting is pronounced. Give anti-emetics when necessary (adults only):

	Medicine	Codes		Adult dose	Frequency	Duration
	prochlorperazine im	**B**	**E**	12.5mg	one dose	Review
or	**metoclopramide iv**	**B**	**V**	10mg	one dose	Review
then	**prochlorperazine po**	**B**	**E**	5mg	3 times	Review
or	**metoclopramide po/iv**	**B**	**E**	10mg	3 times	Review

Antibiotics <u>are not</u> required except in the special circumstances given below. Anti-diarrhoeals (codeine and loperamide) may be used for uncomplicated acute diarrhoea, but NOT recommended in children. Antispasmodics (hyoscine) may be useful for abdominal cramps.

	Medicine	Codes		Adult dose	Frequency	Duration
	codeine phosphate po	**C**	**V**	30 mg	3 times	Review
or	**loperamide po**	**C**	**V**	2mg	<8mg/day	Review

Bacillary Dysentery (bloody diarrhoea)

Always send stool for microscopy and culture to guide your antibiotic choice and to exclude amoebiasis. Empirical choice of antibiotic as below:

Rehydration as for gastro-enteritis above.

	Medicine	Codes		Adult dose	Frequency	Duration
	nalidixic acid po	**B**	**V**	1gm	4 times a day	5 days
or	**ciprofloxacin**	**B**	**V**	500mg	Twice a day	5 days
or	**ceftriaxone iv**	**C**	**E**	1g	Twice a day	5 days

Avoid antimotility drugs. Persistent culture negative bloody diarrhoea beyond 6 weeks must be referred for evaluation for inflammatory bowel disease.

Cholera

*CASE DEFINITION: Rice water diarrhoea with or without vomiting, causing **severe dehydration or death.***

*In suspected cases, notify Provincial Medical Director **immediately**.*

- In the area, where cholera is not known to be present – a patient aged 5 and above develops severe dehydration or dies from acute watery diarrhoea
- In the area where cholera epidemic is present a patient aged 2 years or more develops acute watery diarrhoea with or without vomiting
- Every child in cholera affected area who presents with acute watery diarrhoea with/without vomiting and has signs of some/severe dehydration – Collect stool samples for confirmation

For **confirmation** at the beginning of an outbreak, take rectal swab or stool specimen, handle properly and transport carefully to laboratory. Treat on site without referral wherever possible.

- **Incubation period:** commonly 2-4 days (range 1-7 days).
- **Management:** Rehydration is the **most** important step- orally in moderate cases, IV (using Ringer lactate) in more severe cases.

Quick Identification of Cholera Cases Using Standard Case Definition

A patient who is suffering from acute watery or rice watery diarrhoea with or without vomiting and with signs of dehydration and is above 2 years of age should be suspected as a case of cholera during an outbreak. (*In an Epidemic children below 2 years can also be affected).* Acute watery diarrhoea – passage of watery or liquid stools ≥ 3 times in last 24 hours.

Management of patients presenting with acute watery diarrhoea

Patient with acute watery diarrhoea

Look for other associated symptoms e.g., swelling of legs, respiratory difficulty, anemia etc.

Urgently Inform Doctor

Assessment for dehydration- Dhaka Method

	Condition*	Normal	Irritable/Less active*	Lethargic / Comatose*
Assess	Eyes	Normal	Sunken	
	Tongue	Normal	Dry	
	Thirst*	Normal	Thirsty (drinks eagerly)	Unable to drink*
	Skin pinch*	Normal	Goes back slowly*	Goes back very slowly*
	Radial pulse*	Normal	Reduced*	Uncountable or absent*
Diagnosis		**No sign of dehydration**	If at least 2 signs including one (*) sign is present, diagnose **Some Dehydration**	If some dehydration plus one of the (*) signs are present, diagnose **Severe Dehydration**
Management		A	**B**	**C**

A. No sign of dehydration – ORS

- 50 ml ORS per kg body weight over 6 hours *plus* ongoing losses
- Send patient to home with 4 packets of ORS
- Feeding should be continued

B. Some dehydration – ORS

- 80 ml ORS per kg body weight over 4 – 6 hours *plus* ongoing losses
- Patient should be kept under observation for 6 - 12 hours
- Feeding should be continued
- Reassess the dehydration status frequently - hourly.
- In case of frequent vomiting (>3 times in 1 hour): Treat with I/V fluid

C. Severe dehydration – I/V Ringer's lactate

- Start I/V fluid immediately (100 ml / kg)

Children < 1 year

30 ml / kg in first 1 hour
70 ml / kg in next 5 hours

Adult and Children > 1 year

30 ml / kg in first $^1/_2$ hour
70 ml / kg in next $2^1/_2$ hours

- Encourage the patient to take ORS solution as soon as he/she is able to drink

Antibiotics in a Cholera Epidemic

- Antibiotics should be given to all cases of severe dehydration
- The choice of antibiotics depends on local sensitivity pattern

First line medicine (except in pregnancy)

For adults

Medicine	Codes	Adult dose	Frequency	Duration
ciprofloxacin po	**B V**	1g	Single dose	after correction of severe dehydration

For children

Medicine	Codes	Paed Dose	Frequency	Duration
ciprofloxacin po	**B V**	20mg/kg	Single dose	after cessation of vomiting (if any)

Second line medicine

For adults:

Medicine	Codes	Adult dose	Frequency	Duration
azithromycin po	**C V**	1g	Single dose	after correction of severe dehydration

For children:

Medicine	Codes	Dose	Frequency	Duration
azithromycin po	**C V**	20mg/kg	Single dose	after cessation of vomiting (if any)

Alternative medicine

Medicine	Codes	Adult dose	Frequency	Duration
doxycycline po	**C V**	300mg	single dose	after food

except in pregnancy

Medicine	Codes	Adult dose	Frequency	Duration
erythromycin po	**C V**	500mg	6 hrly	3 days

for all only if sensitive

Medicine	Codes	Paed dose	Frequency	Duration
erythromycin po	**C V**	12.5mg/kg	6 hrly	3 days

Acute Intestinal Disease - Amoebic Dysentery

Medicine	Codes	Adult dose	Frequency	Duration
metronidazole po	**C V**	800mg	3 times a day	5 days
		(Paed = 10mg/kg)		

Liver Abscess

Consider when there is right upper quadrant pain, fever and hepatomegaly. Could be a pyogenic liver abscess or amoebic abscess. Surgical or percutaneous drainage should be part of treatment, together with antibiotics. If use of antibiotics without drainage is unavoidable, long course of antibiotics with serial scans and close supervision will be required.

- For abscesses threatening to rupture through lobe of liver, skin or diaphragm, aspirate in conjunction with medicine therapy.

Pyogenic Abscess:

	Medicine	Codes		Adult dose	Frequency	Duration
	metronidazole iv	**A**	**N**	500mg	3 times a day	4 – 6 weeks
plus	**ampicillin iv**	**B**	**E**	1g	4 times a day	4 - 6 weeks
or	**ceftriaxone iv**	**C**	**V**	1g	once a day	
or	**ciprofloxacin po**	**B**	**V**	500mg	twice a day	

Amoebic Abscess:

	Medicine	Codes		Adult dose	Frequency	Duration
	metronidazole po	**C**	**V**	400mg	3 times a day	7-10 days

Chronic Bowel Disorders

Investigations to establish cause are essential. See also chapters on HIV Related Disease and Paediatrics.

General Measures

It is necessary to exclude malignancy. Individual symptoms require treatment. Adequate hydration appropriate diet and drugs are indicated.

Irritable Bowel Syndrome

Presents with abdominal pain, diarrhoea and or constipation. There is no weight loss or abnormal laboratory results. Reassurance and anti-depressants may be effective. Laxative for constipation, and anti-motility drugs for diarrhoea (loperamide) may be used. Antispasmodic agents are used for pain. Codeine and related centrally-acting opiods risk dependency and should be avoided.

Medicine	Codes		Adult dose	Frequency	Duration
loperamide	**B**	**V**	2-8mg	2 times a day	Review

In refractory cases use:

	Medicine	Codes		Adult dose	Frequency	Duration
	morphine po	**B**	**V**	5mg increase to 50mg	every 4 hrs	Review

Constipation

Encourage high fibre diet and adequate fluid intake.
Give laxatives as required but avoid chronic use.
Rectal stimulant:

	Medicine	Codes		Adult dose	Frequency	Duration
	glycerine suppository rectal	**C**	**N**	one suppository	as required	-
or	**liquid paraffin po** [faecal softener]	**B**	**N**	10-30ml	as needed	-
or	**bisacodyl po** [only if no abdominal tenderness]	**C**	**N**	5 – 10mg	at night	-

Pernicious Anaemia

- Suspect diagnosis in macrocytic anaemia. Need to confirm the deficiency. Folic acid supplementation is **not** required.
- Give life-long vitamin B12 every 3 months.
- See section in chapter on blood.

Giardiasis

	Medicine	Codes		Adult dose	Frequency	Duration
	metronidazole po	**C**	**V**	400mg	3 times a day	5 days

Malabsorption Syndromes

Correction of electrolyte and nutritional deficiencies is important. Individual conditions require specific treatment: lactase deficiency, coeliac disease, pancreatic insufficiency and pernicious anaemia have specific management. Specialist referral recommended.

Chronic Pancreatitis

- Exclude gallstones, hypercalcaemia, hypertriglyceridaemia and alcohol as causes
- Pain control must be tailored to each patient and often requires opiates.
- Treat diabetes as necessary. Give enzyme supplements and acid suppression for malabsorption.
- Cessation of alcohol intake is imperative.
- Referral to a specialist is recommended.

Other Gastrointestinal Problems

Peritonitis

Get a definitive diagnosis. Always exclude the need for surgical intervention. Manage with:

	Medicine	Codes		Adult dose	Frequency	Duration
	ampicillin iv	**B**	**E**	1g	4 times a day	5-10 days
and	**gentamicin iv**	**C**	**V**	4mg/kg	once a day	5-10 days
and	**metronidazole iv**	**A**	**N**	400mg	3 times a day	5-10 days

Haemorrhoids (and other painful peri-anal conditions)

- Encourage high fibre diet and adequate fluid intake.
- Avoid constipation.
- Careful anal hygiene plus saline baths.
- Compound preparations with steroids are suitable for short term use after exclusion of infection.

Medicine	Codes		Adult dose	Frequency	Duration
benzyl benzoate with 0,25% hydrocortisone ointment rectally	**B**	**N**	one application	twice a day	as required

Liver Disease

Acute Liver Failure/ Hepatic Encephalopathy

- Identify and eliminate precipitating causes (electrolyte derangements, toxins, septicaemia, alcohol, upper GI bleeding).
- Stop all unnecessary medicines including diuretics and sedatives.
- Intensive support, including fluid management, assessment for infection and metabolic parameters and detect bleeding.
- Give high calorie diet (2000 kcal/day), and low protein diet.
- Manage with:

	Medicine	Codes		Adult dose	Frequency	Duration
	doxycycline po	**C**	**V**	100mg	twice a day	until recovery
or	**neomycin po**	**A**	**N**	1g	every 6 hrs	until recovery

- Give sufficient laxatives to induce diarrhoea:

	Medicine	Codes		Adult dose	Frequency	Duration
	magnesium trisilicate po	**C**	**N**	40ml	every 6 hours, until diarrhoea is induced	
or	**lactulose po**	**A**	**N**	30 -50ml	3 times a day	

or high bowel washout performed once

	Medicine	Codes		Adult dose	Frequency	Duration
	dextrose 10% iv	**A**	**N**	3litres/day	added to every litre bag if renal function is satisfactory	
with	**potassium chloride iv**	**B**	**V**	2g (26mmol)		

- Screen for infection (urine, chest, blood), and treat vigorously.
- If bleeding is evident or invasive procedure is planned, give:

	Medicine	Codes		Adult dose	Frequency	Duration
	vitamin K iv	**C**	**V**	10mg	once	review
and	**fresh frozen plasma**	**B**	**V**	3 bags	initially	-
and	**platelets***	**A**	**E**	6 packs	-	-

***if count <20 x 10^9/L **and** patient actively bleeding.*

If ethanol aetiology is suspected, give:

Medicine	Codes		Adult dose	Frequency	Duration
thiamine iv slow	**A**	**N**	250mg	before dextrose infusion and daily for 3 days	

Bleeding Oesophageal Varices

Commence treatment immediately, before confirmation of diagnosis by endoscopy/barium meal. Resuscitate completely, and only refer when patient is stable:

- Insert large IV cannula to transfuse and to replenish blood volume. Avoid saline unless no alternative.
- Correct raised INR/PT with fresh frozen plasma and vitamin K
- Routinely give 3rd generation cephalosporin (ceftriaxone) during acute bleeding.
- Sedate [**avoid opiates**]:

Medicine	Codes		Adult dose	Frequency	Duration
diazepam iv	**C**	**V**	5-15mg	as necessary	
ceftriaxone iv	**C**	**V**	1g	Twice daily	5 days

- Treat concurrent encephalopathy as above.
- Aspirate nasogastric tube hourly.
- If bleeding persists **refer**: Sengstaken tube should be inserted to arrest bleeding. **Refer to specialist**.
- Give Propranolol prophylactically indefinitely:

Medicine	Codes		Adult dose	Frequency	Duration
propranolol po	**B**	**E**	40mg	2-3 times a day	Indefinitely

Ascites of Chronic Liver Failure

Perform diagnostic paracentesis if possible. Check for serum ascitic-albumin gradient (SAAG), white cell count.

- Restrict salt intake and fluid intake to 1 litre/day. Give potassium supplements if hypokalaemic. This regimen plus bed rest is enough to induce a diuresis in some patients.
- Aim for weight loss of 0.5 kg per day. Any more could lead to hypovolaemia and precipitate liver failure.

- Polymorph cell count in ascitic tap >500 cells/µL defines **spontaneous bacterial peritonitis** irrespective of other results of microscopy and culture. IV ceftriaxone is indicated. Alternatively, oral ciprofloxacillin may be given in absence of vomiting, shock and prior exposure to quinolones
- Resistant patients:

Medicine	Codes	Adult dose	Frequency	Duration
spironolactone po	**A N**	100-400mg	once a day	Review

Note: Do not give potassium supplements with these diuretics.

- Only if above fail, **add:**

Medicine	Codes	Adult dose	Frequency	Duration
frusemide po	**B V**	Start at 40mg	once a day	increase gradually

Stop if encephalopathy or uraemia develop.

Massive intractable ascites

Consider possible decompensation of liver function. ?development of hepatoma; Refer. Perform large volume paracentesis.

RENAL TRACT CONDITIONS

Urinary Tract Infections (UTI)

Cystitis

Usually presents with dysuria, frequency, urgency and suprapubic pain but note that in men dysuria more commonly indicates a sexually transmitted infection (STI). Always exclude an STI. With UTI, urine is often cloudy and smelly. Where possible diagnosis, should be made with leucocyte dipstick, microscopy or culture.

- **Treat with:**

	Medicine	Codes		Adult dose	Frequency	Duration
	norfloxacin* po	**C**	**V**	400mg	2 times a day	3 days
or	**amoxicillin po**	**C**	**V**	500mg	3 times a day	3 days

- If still symptomatic after 3 days, **refer**.

Acute pyelonephritis

Diagnosed when a UTI is accompanied by nausea, vomiting, fever, rigors and loin pain. Dysuria may be absent. Treat for 2 weeks.

- Mild acute pyelonephritis

Medicine	Codes		Adult dose	Frequency	Duration
norfloxacin po	**C**	**V**	400mg	2 times a day	2 weeks

- Acutely ill patients: use IV antibiotics until apyrexial, and then change to oral therapy.

	Medicine	Codes		Adult dose	Frequency	Duration
	ceftriaxone iv	**C**	**V**	1g	Once a day	review
or	**gentamicin* iv**	**C**	**V**	4-7mg/kg	once a day	review

**Remember gentamicin toxicity is manifested after 7-10 days of use. Check gentamicin levels where possible. Avoid nephrotoxic medicines such as gentamicin and nitrofurantoin in renal dysfunction.*

Acute Kidney Injury

What is causing the kidney injury? Try and classify by cause. The majority of cases of acute renal failure (or acute kidney injury) are due to ischaemic or toxic injury to the kidney and <u>are reversible if treatment is instituted promptly i.e. within hours not days</u>.

Pre-Renal Cases

Most common cause of acute kidney injury and most amenable to therapy. Usually have a history of hypovolaemia or hypotension e.g. bleeding, vomiting, diarrhoea and are usually oliguric. Rapid recovery of renal failure is to be expected with prompt treatment.

Acute Renal Failure

Consider sepsis, malaria, acute glomerulonephritis, acute tubular necrosis, myeloma, nephrotoxic medicines such as gentamicin and NSAID's, and other causes such as acute -on-chronic renal failure. As a minimum, get urine microscopy and an ultrasound of the kidneys for size. Are the kidneys normal sized, small, enlarged or obstructed?

Obstructive Uropathy

Continuous bladder catheterisation is required until the obstruction is relieved. Relief of obstruction can result in polyuria. Therefore, rehydrate with IV fluids. Aim to keep up with the urine output. Sodium and potassium supplements may be required. Scan kidneys to exclude hydronephrosis. Refer to a urologist for definitive management.

Exclude prostatic enlargement in males and cancer of the cervix in women.

Management of Renal Failure

- **First line:** Exclude dehydration in all cases. Give adequate rehydration. Try fluid challenge with sodium chloride 0.9%. Should show response within hours (not days). Aim for a visible jugular venous pressure (JVP) first and then consider giving IV frusemide to encourage diuresis.

- **Second line:** If the patient fails to respond to adequate rehydration and fluid challenge with sodium chloride 0.9% [**not** dextrose 5%] within 24 hours and condition is deteriorating, referral for dialysis is indicated. If this is not possible, then aim to support patient until the kidneys recover [may take up to 6-8 weeks or more]. Monitor fluid (input and output charting) carefully. Check electrolytes regularly and maintain nutrition. Watch for infections.
- **Third line:** Start dialysis or consult dialysis team sooner rather than later so that they can help monitor the patient. *Late referrals contribute to the mortality of acute kidney injury (acute renal failure) and end-stage renal disease.* Selection criteria are applied for the chronic dialysis programme and hence, each individual patient should be discussed with the dialysis team.

Fluid balance: Daily weights before breakfast. Aim for no weight gain. Previous day's losses (urine, vomit etc) +500mls =day's fluid intake.

Electrolytes: Ideally measure urea and electrolytes at least on alternate days. Monitor potassium levels.

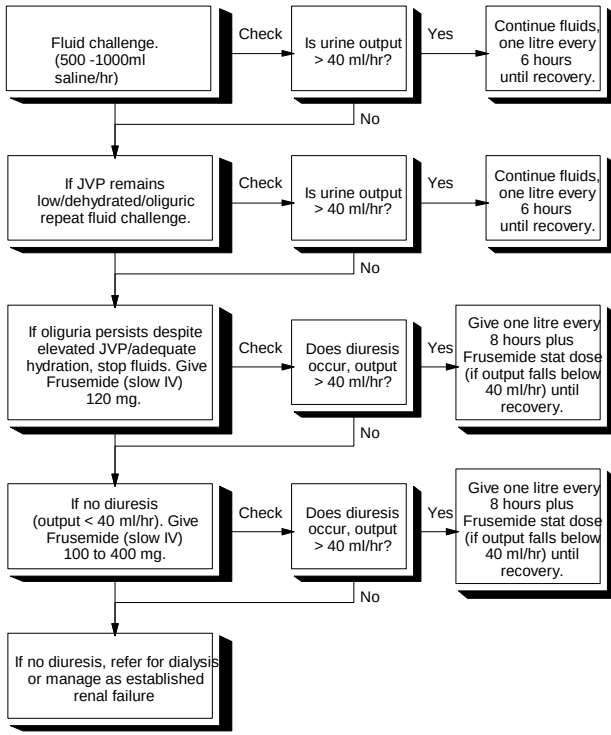
To lower potassium levels in acute hyperkalaemia, give:

	Medicine	Codes		Adult dose	Frequency	Duration
	calcium gluconate (or chloride) 10% IV	**B**	**V**	10mls	Once	
plus	**insulin with glucose**	**B**	**V**	50mls of 50% glucose + 10 units of short acting insulins	over 10 min	
/or	**salbutamol nebulised**	**B**	**V**	10mg	2 times a day	Review
plus	**insulin with dextrose**	**B**	**V**	50mls of 50% dextrose + 10 units of short acting insulin		
or	**Calcium Resonium®**	**A**	**N**	45gm as enema. Leave enema in for as long as possible		

General measures in the management of acute renal failure

- **Catheter:** Insert a urinary catheter but remove it once sustained diuresis has occurred or if oliguria persists and the patient is started on dialysis or conservative treatment. Avoid long catheterisation periods.
- **Urine:** Ward urinalysis test - check for haematuria, proteinuria and glycosuria. Send urine for microscopy (for cells, casts), culture and sensitivity.
- **Diet:** High calorie and normal or high protein diet with low sodium and low potassium. Ask for dietician's help. For low potassium diet, avoid e.g. oranges, bananas, mangoes.
- **Anaemia:** If oliguric do not transfuse unless there is significant bleeding, as there is a high risk of fluid overload. Wait to transfuse until patient is on dialysis.
- Monitor BP regularly(e.g. 4 hourly)
- Monitor fluid input/output strictly.
- Avoid nephrotoxic medicines such as gentamicin and NSAIDs
- Watch for and treat underlying infections.
- Check weight daily.

Management of Pre-renal failure



Note:
Make sure that patient has been fully hydrated before starting on dialysis. If dehydrated, do not give frusemide until patient is rehydrated (until JVP is clearly visible or central venous pressure is at least 10 to 12 cm).

Acute Nephritic Syndrome

Usually presents with facial or generalised oedema plus oliguria and hypertension. There may be a recent history of tonsillitis, arthralgia, skin rashes/ infection.

- Promote a diuresis with small doses of oral frusemide (40-80mg once daily). If response obtained put on a regular dose.
- If post-streptococcal aetiology is suspected give:

Medicine	Codes		Adult dose	Frequency	Duration
amoxicillin po	**C**	**V**	500mg	3 times a day	10 days

- **Do not give steroids**.
- Treat hypertension conventionally. Children need early intervention for elevated blood pressure.
- Restrict fluid if oliguric and carefully maintain fluid balance.
- If no diuresis within one week, and renal function is deteriorating, refer to nephrologist /specialist physician or paediatrician for dialysis.

Nephrotic Syndrome

Diagnosed where there is generalised oedema, hypoalbuminaemia and proteinuria (>3gm/day). Dipstick should show at least protein ++. To quantify the proteinuria, you can request a urine albumin: creatinine ratio. Estimate the GFR (creatinine clearance). See section on ART for calculation of GFR.. Check urine microscopy and U&Es. Weigh patient at each review. Exclude SLE, HIV and Hepatitis B or C or even diabetes.

- Promote diuresis using:

Medicine	Codes		Adult dose	Frequency	Duration
frusemide po	**B**	**V**	40 – 80mg	once a day,	5 days
then refer if no response:					
frusemide po or iv	**B**	**V**	40 – 200mg	twice a day	until resolution

Caution: Excessive use of frusemide may precipitate renal failure and large doses of frusemide may cause hearing loss. Therefore, check U&Es regularly.

Measure urea and electrolytes. Restrict fluid to 1 litre per day until diuresis occurs. If oedema is gross and no response, consider adding: prednisolone as a trial particularly if the urine sediment is benign (i.e. no red cells or casts).

	Medicine	Codes		Adult dose	Frequency	Duration
	prednisolone po	**B**	**V**	1mg/kg	once a day [mornings]	2 months
Plus	**enalapril po**	**B**	**V**	5-10mg	Once a day	review

- Aim to tail off dose to zero during the 3rd month. Stopping early may result in a relapse.
- Give an ACEI for the proteinuria even if BP is normal e.g. a small dose of enalapril early unless contraindicated.This may be increased as the condiction allows.
- **Refer** if there is failure to reduce oedema within two weeks on high dose steroids.
- Anticoagulate if immobile:

	Medicine	Codes		Adult dose	Frequency	Duration
	heparin sc	**B**	**V**	5000 units	3 times a day	until mobile

- Search for underlying cause -e.g. Diabetes, SLE, Hepatitis B/C, HIV, syphilis.
- Restrict dietary salt intake, but leave on normal protein intake.
- If oedema is not resolving after 2 weeks of treatment, refer to Central Hospital/Specialist.

Prescribing in Renal Impairment / Renal Failure

Avoid medicines that are eliminated via the kidneys or reduce the dose of the medicine if no alternative available. In most cases reducing the dose by half should be adequate.

Table 16.2 Medicines in Renal Impairment

Medicine	Comments
Analgesics	
aspirin indomethacin	Avoid, use paracetamol
codeine phosphate pethidine	Reduce dose by 25-50%
Anti-TB Medicines	
ethambutol streptomycin	Avoid
pyrazinamide	Reduce dose by 50%
isoniazid	Maximum daily dose 200mg

Table continued overleaf…/

Table 16.2 Medicines in Renal Impairment [contd.]

Antibiotics	
penicillins /cephalosporins	Reduce doses by 50% in advanced failure
aminoglycosides (gentamicin)	Use with extreme caution if no alternative. Use loading dose of 1mg/kg gentamicin, then use maintenance dose of 1mg/kg as well, once daily in moderate renal failure and once on alternate days for advanced renal failure.
nitrofurantoin nalidixic acid trimethoprim sulphonamides cotrimoxazole tetracycline	Avoid
doxycycline	May be used safely
Cardiovascular	
atenolol	Reduce dose by 50% [propranolol = safe]
captopril /enalapril	Reduce dose by 50%, but if creatinine is >300μmol/L avoid
digoxin	Use smaller loading/maintenance doses (125micrograms daily). Consider alternate day dosing. Measure digoxin levels.
Diuretics	
spironolactone	Avoid
Thiazides	Ineffective – avoid
frusemide	High doses usually required (250mg – 400mg) if renal failure is severe
potassium supplement	Avoid
Hypoglycaemics	
Insulin	Requirements tend to fall with worsening renal function, therefore use smaller doses of insulin
Metformin	Avoid. Risk of lactic acidosis
Glibenclamide	Use with caution.
Other	
allopurinol	Reduce dose (maximum 200mg daily)
phenobarbitone	Use 25% of normal dose or avoid if possible
benzodiazepines	Use 25% of normal dose or avoid
Antiretroviral Medicines	
Abacavir	Use usual dose
Zidovudine	Reduce dose especially if on dialysis
Lamivudine	Reduce dose (maximum of 150mg daily)
Nevirapine	Usually no dose adjustment but an additional 200mg is recommended after haemodialysis
Efavirenz	No need to adjust doses
Tenofovir	300mg following dialysis once a week
Stavudine	Reduce dose or increase dosing interval
Lopinavir/Ritonavir	Use usual dose

Medicines and Dialysis

Dialysis may remove significant quantities of some medicines e.g. penicillins, aminoglycosides, cephalosporins, chloramphenicol, metronidazole, methyldopa, anti-TB therapy, quinine. Therefore, give supplementary doses following a haemodialysis session. The dialysis team will advise on supplementary doses.

End Stage Renal Disease/Chronic Dialysis

End Stage Renal Disease: This is said to have occurred if a patient needs dialysis for at least 3 months and thus the need for chronic dialysis may be more likely.

Chronic dialysis clients have to be selected carefully as renal replacement therapy is expensive. Clinical and psychosocial selection criteria for the chronic dialysis programme are applied and each individual patient should be discussed with the dialysis team. Psychosocial issues may exclude the patient from the chronic dialysis programme. The goals of providing this therapy should be addressed adequately with patient and relatives. Currently dialysis entails out of pocket expenses for the patient and family. Thus ensure there has been precounselling prior to starting patient on chronic dialysis.

Chronic peritoneal dialysis and haemodialysis may be available in the nearest city or town but discuss with the specialist before transferring patient.

Renal transplantation

There is currently no renal transplantation in Zimbabwe but some patients have had living related donor kidney transplantation outside this country at their own expense or that of their medical aid society.

RHEUMATOLOGICAL AND JOINT CONDITIONS

Infections

Septic arthritis, and Acute osteomyelitis

Surgical drainage is recommended in all cases presenting with a greater than 24 hours history.

	Medicine	Codes		Adult dose	Frequency	Duration
	cloxacillin iv	**B**	**V**	1-2g	4 times a day	4-6 weeks
or	**clindamycin iv**	**B**	**V**	600mg	3 times a day	4-6 weeks

Culture and sensitivity should guide antibiotic choice where available. Erythrocyte Sedimentation Rate (ESR) is useful in monitoring response. Duration of therapy may be reduced if fever and toxicity have resolved, and if X-ray is normal. Switch to oral therapy when a good response is achieved.

Chronic osteomyelitis

Surgery is recommended. Antibiotics alone are not generally recommended.

Compound fractures

General management as for simple fractures below. Careful debridement of the site is required.

	Medicine	Codes		Adult dose	Frequency	Duration
	cloxacillin iv	**B**	**V**	1-2g	4 times a day	5 days
or	**clindamycin iv**	**B**	**V**	600mg	3 times a day	5 days

Simple fracture

Pain relief. Splinting and reduction. Consider circulation to areas beyond the fracture site. Nil by mouth at appropriate point in referral chain prior to manipulation under anaesthetic.

Tuberculosis of bones - see chapter on Tuberculosis

Metastatic Bone Disease - see chapter on Pain

Back and neck pain

Exclude serious pathology (fractures, neurological complications, infection)

Acute pain:

	Medicine	Codes		Adult dose	Frequency	Duration
	aspirin po	**C**	**V**	600mg	4 times a day	Review
Or	**paracetamol po**	**C**	**V**	1gm	3 times a day	Review
Or	**ibuprofen po**	**C**	**N**	200 -400mg	3 times a day	Review
Or	**diclofenac po**	**B**	**E**	25-50mg	3 times a day	Review

Chronic pain:
Use the lowest effective dose analgesia with increased dosages for flare-ups.

Gout (urate crystal synovitis)

Acute gout

The possibility of septic arthritis should always be considered. Allopurinol should **not** be given during or within three weeks following an acute attack unless if patient is currently on it. Aspirin should be avoided. Use:

	Medicine	Codes	Adult dose	Frequency	Duration
	indomethacin po	**B E**	50mg	4 times a day	first 24 hrs
	then reduce by 25mg daily to		25mg	3 times a day	review
Or	**colchicine po**	**S N**	0.5-1mg	Up to 6 times a day	2 days

Chronic gout

Treat acute attacks as they occur. Stop thiazide diuretics, avoid dehydration.

	Medicine	Codes	Adult dose	Frequency	Duration
	allopurinol po	**B E**	300mg	once a day	continual

Note: 300 mg allopurinol orally once daily is the average dose but some patients need more to reduce the serum uric acid to normal levels.

- In the elderly patients, those on diuretics, or those with impaired renal function, allopurinol should be started at the lower daily dose of 100 mg and increased cautiously if necessary.
- Allopurinol should not be introduced during or immediately after an acute attack.
- During the period when allopurinol is being introduced an active drug for acute gout, like colchicine or NSAIDs, should be used until a normal level of uric acid is attained:

	Medicine	Codes	Adult dose	Frequency	Duration
	colchicine po	**S N**	0.5mg	2 times a day	7 days
Or	**indomethacin po**	**B E**	25mg	3 times a day	7 days

- Concurrent anti-inflammatory therapy should be given for the first 3 months of allopurinol therapy:

	Medicine	Codes	Adult dose	Frequency	Duration
	indomethacin po	**B E**	25-50mg	3 times a day	3 months

Dietary management of gout
Choice of foods aims to control the amount of purine in the diet.
- Reduce weight (limit fats and refined carbohydrates).
- Alcohol should be avoided or reduced drastically

- Avoid dehydration.

These foods should be avoided:
- offals, red meat especially goat meat.

These foods are permissible:
- eggs, milk products, carbohydrates, fruit, vegetables, chicken and fish.

Rheumatological Conditions

General Guidelines

- The first line treatment for most of these conditions is a non-steroidal anti-inflammatory drug (NSAID). This group includes aspirin, indomethacin, diclofenac and ibuprofen, but does NOT include paracetamol.
- NSAID's should be used cautiously in pregnancy, the elderly, and in patients with asthma
- NSAID's should be avoided in patients with a history of peptic ulcer disease.
- Refer patients with serious rheumatic disease and peptic ulceration for specialist help.
- Indomethacin, used as a bed time suppository, may be very useful to alleviate morning stiffness.
- NSAIDS should be taken with food.
- If dyspeptic symptoms develop in a patient on NSAIDs, try adding magnesium trisilicate mixture. If dyspepsia persists and NSAID use is considered essential, refer for specialist help. Addition of paracetamol for control of pain especially in the elderly is useful.
- Physiotherapy or occupational therapy is a useful adjunct treatment especially after acute inflammation has subsided.

Systemic Connective Tissue Diseases

All cases of chronic polyarthritis should be referred for a definitive diagnosis. This group shares a number of pathogenic and aetiological factors related to autoimmunity.

Rheumatoid Arthritis and Juvenile Chronic Arthritis (Juvenile Rheumatoid Arthritis)

To avert the erosive damage of progressive rheumatoid arthritis, early diagnosis and initiation of treatment with NSAIDs, Disease Modifying Anti-Rheumatic Medicines (DMARDs) (chloroquine, methotrexate and sulphasalazine), and low dose steroids in the presence of severe inflammation or vasculitis is necessary. Disease modifying medicines are the mainstay of treatment to minimise erosions and deformities

- Manage with:

	Medicine	Codes		Adult dose	Frequency	Duration
	aspirin po	**C**	**E**	600mg (Paed 12.5mg – 25mg/kg)	4 times a day	Review
or	**indomethacin po** +/- an additional night time dose of	**B**	**E**	25-50mg 75mg	3 times a day at night	Review
or	**ibuprofen po**	**C**	**N**	200-400mg (Paed 7-14mg/kg)	3 times a day	Review
or	**diclofenac po**	**B**	**E**	25 -50mg	3 times a day	Review

Notes: A high dose of aspirin may cause tinnitus in an adult and Reye's Syndrome in children. Maximum daily dose for indomethacin = 200mg, for ibuprofen = 2.4g

- Disease modifying anti-rheumatic medicines should be started early:

	Medicine	Codes		Adult dose	Frequency	Duration
	methotrexate po	**S**	**E**	5- 25mg	Once a week	Review
or	**chloroquine po**	**S**	**N**	150mg base	once a day	continual/ review

Referral to an ophthalmologist is strongly advised after 9 months of continuous treatment with chloroquine. Such continuous treatment should never exceed 2 years. Treatment should be discontinued if a patient complains of visual disturbance on chloroquine. Methotrexate should be monitored with FBC and LFTs at 3 monthly intervals.

- Oral, low maintenance dose prednisolone can be **added** where indicated for a limited period:

Medicine	Codes		Adult dose	Frequency	Duration
prednisolone po	**B**	**V**	2.5 – 10mg	once a day	limited period

Note: Best results are achieved with combination of medicines.

Systemic Lupus Erythematosus (SLE)

Refer to a higher level for diagnosis and initial treatment. Sun-exposure should be avoided as much as possible particularly with the use of broad-brimmed hats and umbrellas.

Manage with aspirin or indomethacin as for Rheumatoid arthritis as above.

- If severe skin or joint lesions, **add**:

Medicine	Codes		Adult dose	Frequency	Duration
chloroquine po	**S**	**N**	150mg base	once a day	continual/ review

- In severe disease with complications e.g. renal, neurological, vascular or haematological **add** prednisolone in high doses as well as immunosuppressive medicines:

Medicine	Codes		Adult dose	Frequency	Duration
prednisolone po	**B**	**V**	1mg/kg	once a day	review, then reduce

- Reduce dose after crisis is over to smaller maintenance dose, enough to suppress activity. Steroids should be started early and closely monitored for side effects.
- Additionally **azathioprine** can be used to spare the high dose of prednisolone. It requires specialist monitoring for side effects, especially haematological ones. Refer for specialist care.

Degenerative Osteoarthritis & Spinal Spondylosis

Manage with:

	Medicine	Codes		Adult dose	Frequency	Duration
	aspirin po	**C**	**E**	300-600mg	4 hourly	review
or	**indomethacin po**	**B**	**E**	25-50mg	3 times a day	review
or	**ibuprofen po**	**C**	**N**	200-400mg	3 times a day	review
or	**diclofenac po**	**B**	**E**	25 -50mg	3 times a day	Review

Rheumatoid factor negative spondyloarthropathies

Reiter's disease and Post Infective Arthritis
Treat as for osteoarthritis as above. Exclude UTI/ bowel infection and HIV infection.

METABOLIC & ENDOCRINE CONDITIONS

Diabetes Mellitus

There are two main types of diabetes mellitus:

Type 1

- Usually under 30 years but can present at any age, present acutely, with weight loss and ketonuria: treated with diet and insulin.

Type 2

- Usually over 30 years, insidious onset, frequently obese: treated with diet and oral anti-diabetic agents. 40% will eventually require insulin treatment. Weight reduction is crucial.

Dietary control and weight loss plays an important part in the management of diabetes mellitus. Many type 2 diabetics are overweight. Reducing body weight through careful control of energy intake and physical activity like walking helps to control the symptoms of diabetes.

Most people with diabetes who are properly informed and managed soon become experts in their own care.

Types of Insulin(Table adapted from www.uptodate.com)

	Insulin type	Onset	Peak activity [hrs]	Duration [hrs]	Type of insulin e.g.
Bolus Insulin (Rapid and Short acting insulins)	Rapid Acting	5-15 mins	1-1.5	2-4	Aspat, Lispro Glulisine
	Short acting	30mins	2 – 4	5-8	Actrapid
Basal Insulin (Intermediate and long-acting insulins)	Isophane Insulin	2-4 hrs	4 – 12	12- 24	Protaphane
	Human Insulin Analogue	2 hrs	3-9	6-24	Detemir
	Human Insulin Analogue	2hrs	None	20->24	Glargine
	Biphasic		2-12	± 24	Soluble(30%)/ Isophane(70%) e.g. Actraphane

General Insulin dosage guidance and monitoring:

- In **Type I** diabetes, when initiating treatment the starting dose of insulin is **0.5-1.0units /kg/day**. In most patients this was being as a combination of soluble and isophane insulin given twice daily, giving 2/3 of the total daily dose in the morning and 1/3 in the evening. 2/3 of the insulin dose should be isophane and 1/3 soluble. Doses should be given about 30 minutes before meals.

- Ideally a **"basal/bolus" regimen** should be used where basal (intermediate acting) insulin is taken at bedtime and 6-8u of soluble insulin (bolus) taken 3 times a day before meals. This regimen allows more flexibility with meals as the soluble insulin dose can be varied according to what is to be eaten and can be given at different times.
- Self monitoring of blood glucose is recommended and the patient can be taught to adjust doses appropriately based on results.
- **A physiologic insulin regimen can be conceptualized as having 3 separate components: basal insulin, nutritional (or prandial/meal/bolus) insulin and a correctional dose or supplementary insulin.** A patient's total daily dose (TDD) of insulin is a sum of these, and represents the sum of insulin a patient needs. Roughly 50% of TDD is made up of Basal Insulin and the other 50% makes up Prandial or Bolus insulin. If the nutritional intake is interrupted, or severely reduced, this portion of insulin (prandial/meal/bolus) must be proportionately reduced. The correctional dose or supplementary dose is what needs to be added to the patient's calculated pre-meal insulin boluses based on the glucose readings(see Correction doses Table below)

Basal Insulin (50% of TDDI):

- Long acting insulin subcutaneously once at bedtime or morning
- Or Intermediate acting insulin subcutaneously twice a day (50%/50% or 2/3 am and 1/3 pm)

Nutritional Insulin (Prandial/Meal/Bolus): (50% of TDDI)

Can use the rapid acting or regular type insulins:

- Rapid acting insulin before breakfast, lunch and dinner
- Regular insulin 30- 45 mins before breakfast and dinner +/- lunch

correctional doses as per table below:

CORRECTIONAL DOSE SCALES:
Having calculated the total daily dose of insulin, classify your patient into the following categories i.e. low/medium/high dose. What is the pre-meal glucose and how much extra insulin should be added to the calculated pre-meal given the recorded glucose?

	LOW DOSE <40 units/day	MEDIUM DOSE 41-80 units/day	HIGH DOSE >80 units/day
Premeal BG	Rapid or Short Acting Insulin		
8.5-11.1	1	2	3
11.2-14	2	4	6
14.1-17	3	6	9
17.1-22	4	8	12
>22	5	10	15

- **In insulin treated type II** diabetes, the total daily dose of insulin is **0.2units/kg/day**. In the elderly, this is usually given as a once daily dose of an intermediate acting insulin.
- Biphasic [pre-mixed] insulin is available. It is simple to give and is recommended for most type 1 diabetic patients. These preparations contain a fixed mixture of soluble and isophane insulin.

Additional management guides:

- Insulin treatment often leads to weight gain.
- Combined treatment of insulin + metformin can improve glycemic control in type 2 diabetes.
- Do not change dietary and medicine regimens simultaneously.
- Select an insulin schedule best suited to the individual patient's eating pattern, physical activity and general lifestyle.
- Insulin doses should be adjusted according to blood glucose levels (where available), and to avoid recurrent episodes of symptomatic hypoglycaemia.
- Ideally, blood sugar should be maintained in the range 5-7mmol/litre.
- Where blood glucose measurements are not available, urinary sugar levels give a guide to overall glycaemic control.
- When stable, review at a minimum every 3 months.

Oral anti-diabetic agents

See flow chart below for treatment approach. Apparent treatment failure is frequently due to poor compliance with diet: Monitor as for Type I diabetes but less strict glycaemic control is expected, especially in the elderly.

Caution:

- *Oral anti-diabetics must not be used in pregnancy.*
- *Glibenclamide can accumulate in the elderly and cause prolonged hypoglycaemia*

• *Do not use metformin if renal failure, severe heart failure or liver failure (increased risk of lactic acidosis)*

Obese Type 2 diabetic:

	Medicine	Codes		Adult dose	Frequency	Duration
	metformin po	**B**	**V**	500mg to 1000mg [max 2g/ day]	2 times a day	gradual increase

▪ if poorly controlled with strict adherence to diet, **add**:

	Medicine	Codes		Adult dose	Frequency	Duration
add	**glibenclamide po**	**B**	**V**	5mg-10mg	Once to twice a day	-
or	**Gliclazide po**	**B**	**E**	80-160	Once to twice daily	

*if poorly controlled despite diet: **change** to insulin or **add** a daily dose of intermediate acting insulin to the oral hypoglycaemics. **Please discontinue sulphonylureas (glibenclamide and gliclazide) before adding insulin.**

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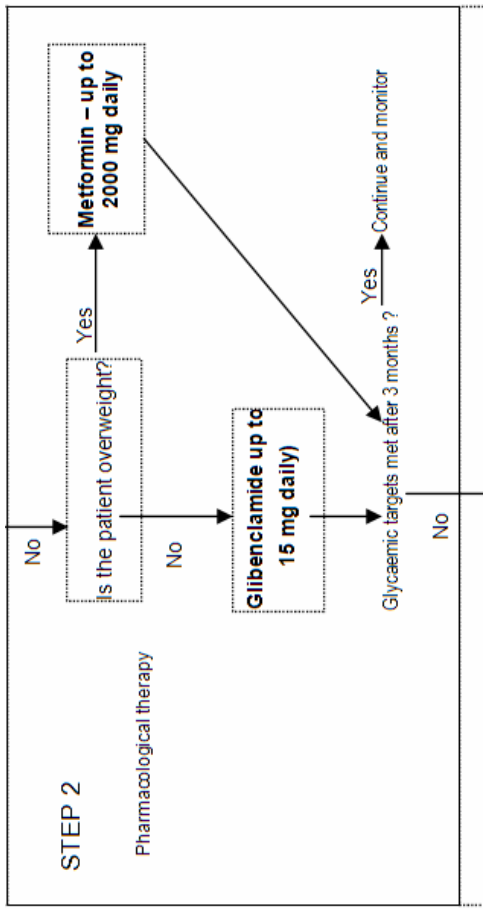

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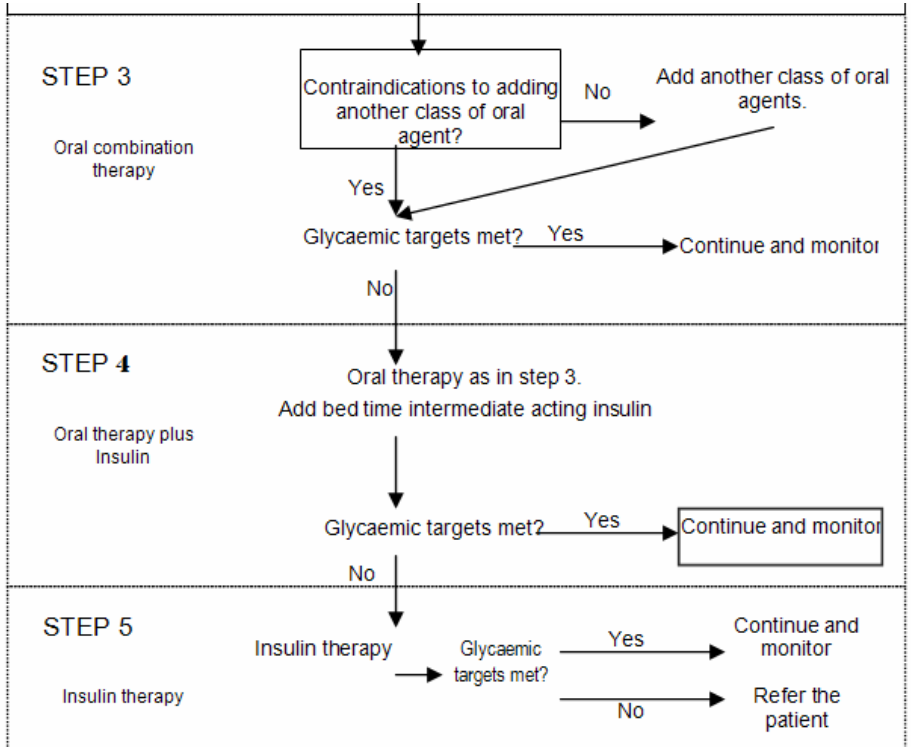

STEP 3
Oral combination therapy
Contraindications to adding another class of oral agent?
No
Add another class of oral agents.
Yes
Glycaemic targets met?
Yes
Continue and monitor
No
STEP 4
Oral therapy as in step 3.
Add bed time intermediate acting insulin
Oral therapy plus Insulin
Glycaemic targets met?
Yes
Continue and monitor
No
STEP 5
Insulin therapy
Insulin therapy
Glycaemic targets met?
Yes
Continue and monitor
No
Refer the patient

Normal weight Type 2 diabetes:

Medicine	Codes		Adult dose	Frequency	Duration
metformin po	**B**	**V**	500-850mg	2-3 times a days	indefinitely
glibenclamide po	**B**	**V**	2.5mg	once to twice a day	Indefinitely
			increase to a max of 10mg twice a day		

- if poorly controlled despite diet and oral hypoglycaemics, **change** to insulin or add insulin to current therapy.

Diabetic Diet

Ideally a dietician should calculate dietary requirements for individual patients.

Aim of diet: to reduce the blood sugar to normal and to maintain a constant blood sugar level.

- 45-50% of energy intake should be in the form of carbohydrates; the amount of carbohydrates should be consistent from day to day.
- Complex carbohydrates are preferable to simple sugars.
- Carbohydrates and calories should be evenly distributed through the day. Meals must not be missed. A diabetic on insulin may have snacks between meals.
- An adequate intake of fibre is important.
- Alcohol is NOT RECOMMENDED in Diabetics.
- Sugar and sugar-containing food/drinks should be totally avoided. The only exceptions are when a patient feels faint, or is ill and cannot eat normally.
- Exercise should be encouraged. A snack should be taken before and after playing sport.
- Unrefined carbohydrate, e.g. Roller Meal, wholemeal flour, is preferable to refined starches.
- Special preparations for diabetics are safe but not “diet” drinks. **100% fruit juices and diet sodas should be totally avoided in Diabetics.**

General Advice for Diabetics

All diabetic patients should have a "medic-alert" bracelet or necklace, and should be advised to join the Zimbabwe Diabetic Association.

Syringes / Insulin Storage:

- Reuse 1ml disposable syringes for 2-3 weeks.
- Store syringes dry.
- Sterilisation is not necessary.
- Change the needle when blunt.

- Insulin should be stored in a cool place.

Injection technique

- Clean and dry skin. Inject subcutaneously **not** intradermally.
- The site of injection should be varied (abdomen and thighs are the most suitable sites).

Foot Care for Diabetics:

- Advice about foot care is important: keep feet clean and dry, wear well-fitting shoes, and take care to avoid burns. Healthcare service provider to screen for diabetic foot at each review visit.

Ophthalmological Examinations:

- At least annually from time of diagnosis; monitor and record acuities (each eye separately). If acuity drops, look for cataracts. Refer to eye hospital.

Blood pressure control:

- Good BP control is essential and is more effective at preventing complications than good glycaemic control. Use combinations of medicines, preferably including an ACEI, target BP <140/80

Aspirin and diabetes

- To all diabetics with hypertension and any with documented vascular disease, add:

Medicine	Codes	Adult dose	Frequency	Duration
Aspirin po	C E	75mg	Once a day	

For those that are allergic to Aspirin or have an intolerance:

Medicine	Codes	Adult dose	Frequency	Duration
Clopidogrel po	B E	75mg	Once a day	

Lipid control

- Early and aggressive management of hyperlipidemia is desirable. For primary prevention treat if 10 year risk >30%. For secondary prevention following any vascular event aim for total cholesterol <4.8 mmol/l.

Smoking:

- Patients with diabetes should stop smoking.

Sexual Dysfunction:

- Patients (Males and Females) MUST always be asked about sexual dysfunction and referred accordingly, since it is a marker of vascular disease.

Oral Care:

- Good oral Hygiene should always be encouraged and patients should have annual dental check ups.

Gastrointestinal upset:

- **e.g. vomiting** diarrhoea or constipation must be sought as they are an indicator of complications.

Diabetic Clinics

- Are useful to focus care even at District Hospital level. Six monthly reviews should include eye checks, checking for peripheral neuropathy, checking for foot problems, oral care, sexual dysfunction and BP.

Special Problems in Diabetics

Pregnancy

- Oral anti-diabetic agents should **not** be used and very strict glycaemic control is necessary. See the chapter on Obstetric and Gynaecological conditions.

Infections and Other Major Illnesses

- Both types of diabetics (Type I and Type II) may need to be given an increased dose of infusion or Basal Bolus Insulin (see insulin therapy in adults). In Type 1 diabetes NEVER stop insulin, even if the patient is unable to eat.
- Insulin is the anti-hyperglycaemic agent of choice in patients admitted to Hospital. Insulin acts rapidly, responds in a timely fashion to dose titrations, & can be used effectively in all patients and clinical situations. However clinically stable patients with normal nutritional intake; normal blood glucose and stable renal and cardiac function may continue oral antidiabetic medications.

Hypoglycaemia and Hypoglycaemic Coma

- Educate patients about hypoglycaemic symptoms (hunger, sweating, irritability, etc).

Clinical presentation:

Adrenergic features:

- Sweating, pallor, palpitations and tachycardia, hunger

Neuroglycopaenic features

- Confusion, Seizures & Coma

- Patients on oral hypoglycaemic agents and insulin must carry sweets or glucose tablets. The patient's close relatives must also be instructed in management of hypoglycaemic attacks. Metformin cannot cause hypoglycamia.

Definition of hypoglycaemia

Venous plasma glucose < 3.0 mmol/L

Management of hypoglycaemia:

50% dextrose: if normal awake, give 25 mL by bolus intravenous injection (preferably through a large bore cannula). If level of consciousness is depressed, give 50 mL of 50% dextrose by bolus intravenous injection. Check blood glucose every 20 minutes. Repeat 25 mL of 50% dextrose intravenously, every 20 minutes until blood glucose is > 3.3 mmol/L.

5% dextrose: infused slowly (50-60 mL per hour) after injection of 50% dextrose and titrated according to capillary plasma glucose levels. Sulphonylurea-induced hypoglycaemia may be prolonged and glucose infusions may be needed for 2-3 days. The patient should take oral carbohydrate as soon as possible after the initial management with 20% dextrose.

- In the event of confusion or coma in a diabetic on treatment and in the absence of reliable blood sugar readings, there should be no hesitation in administering a trial injection of intravenous dextrose.
- If the above are unavailable, small quantities of sugar or preferably glucose, may be placed inside the cheeks and will be eventually swallowed or absorbed through the buccal mucosa.

Surgery

Diabetic patients requiring surgery SHOULD ALWAYS BE THE FIRST ONES ON THE SURGERY LIST and are best cared for by specialists. **Refer wherever possible.**

In the case of diabetic patients on **oral agents**, stop the oral medicines and commence Basal Bolus Regimen.
If NIL BY MOUTH

- **Basal: 50% of TDDI**
    - Long acting insulin at bedtime or morning
    - Or Intermediate insulin twice a day (50/50 or 2/3 am and 1/3 pm)
    - Or Insulin INFUSION (preferred if prolonged NPO, ICU or ketosis prone)
- **Prandial/Nutritional: N/A**
- **Correction**
    - Rapid acting insulin sc every 4 hours
    - Or Regular insulin sc every 6 hours

- check blood sugar - if less than 5 mmol/L set up 5% dextrose infusion to run slowly,
- check blood sugar post-operatively and if nil per mouth administer Basal and Correction Insulin only. Do not give Prandial/Nutritional Insulin.

Hyperglycaemic Coma & Pre-coma (Adults)

Pass a nasogastric tube and allow free drainage in the unconscious or semiconscious patient. Search for and treat infections promptly.

Fluid Replacement (Adults)

- Sodium chloride 0.9% is the recommended fluid; as much as 8 litres may be required in 24 hours:

Medicine	Codes	Adult dose– fluid rate	
sodium chloride 0.9% iv infusion The schedule given is a guide. Be flexible.	**C V**	first litre	over 1 hour
		second litre	over 2 hours
		third litre	over 4 hours
		fourth litre	over 6 hours
		fifth litre	over 8 hours

Give subsequent litres of sodium chloride 0.9% every 8 hours. Monitor closely during the period of infusion and modify accordingly, e.g. take into account skin turgor, peripheral perfusion and urine output.

CAUTION: Fluid overload is dangerous in elderly patients.

- The above regimen may need to be modified depending on the state of hydration or the cardiovascular status of the patient.
- Beware of hypernatraemia by monitoring electrolytes and be prepared to change to a hypotonic solution, e.g. 5% dextrose if appropriate, or half sodium chloride 0, 9% (prepared by diluting normal saline by 50% with water for injection).
- When blood sugar falls to 13mmol/L change to dextrose 5% (or if urinary ketones can be measured), set up 5% dextrose infusion if ketones moderate or strong and blood sugars <13mmol/L.

Potassium Replacement

- In conditions where blood potassium levels **cannot** be determined, **add** to intravenous fluid:

	Medicine	Codes	Adult dose
add	**potassium chloride iv infusion**	**B V**	20mmol with every litre after the first litre. Increase to 40mmol / litre given over 8hrs.

- Where serum potassium levels are available start **replacement**:

Medicine	Codes	Adult dose
potassium chloride iv infusion	**B V**	20mmol / litre as soon as insulin has been started.

- Assess serum potassium regularly and adjust replacement as needed to maintain potassium at 4.0-5.0mmol/per litre.
- Continue with **oral replacement** for one week if not in renal failure:

Medicine	Codes	Adult dose	Frequency	Duration
potassium chloride po	**B V**	600 – 1200mg	twice a day	7 days

Insulin Therapy (Adults)

Patients preferentially to be managed with protocol 1 in a High Care ward, with appropriate monitoring.

PROTOCOL 1:- continuous intravenous infusion:

- Give a bolus intravenous injection of 0.15 units/kg rapid acting or short acting (regular) insulin followed by a continuous intravenous infusion. This initial bolus should not be given to patients < 20 years of age
- Mix 50 units rapid or short acting (regular) insulin in 200 mL isotonic saline - thus 4 mL solution contains 1 unit of insulin
- Initial infusion: 0.1 unit/kg/hr (usually 5-7 units per hour: 20-28 mL/hr)
- If plasma glucose does not fall by 3 mmol/L in the first hour, the insulin infusion may be doubled (hourly) until a steady reduction of plasma glucose (at 3.0 to 4.0 mmol/L per hour), is achieved
- When plasma glucose < 14 mmol/L, reduce the insulin infusion rate to 0.05 units/kg/hr and adjust subsequently according to hourly bedside capillary glucose level (Glucometer)

NOTE: Ketonaemia takes longer to clear than hyperglycaemia and combined insulin and glucose (and K^+) are needed to ensure clearance of ketonaemia. Avoid focusing on glycaemia alone!

PROTOCOL 2 :- hourly intramuscular or subcutaneous bolus injections:

- Loading dose: 0.4 – 0.6 units rapid or short acting insulin/kg (half the dose is given as an intravenous bolus injection and half is given intramuscularly)
- Subsequent hourly doses: 0.1 unit/kg either by intramuscular or subcutaneous injection and titrated against the bedside capillary glucose level

PROTOCOL 3:

- **Initially give by <u>intramuscular injection</u>** (be careful not to inject into subcutaneous fat, use intramuscular needles and in very obese patients use the deltoid region), see below:

Medicine	Codes	Adult dose	Frequency	Duration
soluble insulin im	**B V**	10units	immediately, **then**	
		5units	hourly until blood sugar down to 14mmol/L	

- When the blood sugar is 14mmol/L or less and the clinical condition shows clear improvement, change to subcutaneous administration but continue to monitor blood sugar hourly until the level ceases to fall (the intramuscular injection may continue to act for some hours through a depot effect).Then give insulin according to Basal Bolus and correctional dose regimen.

Common problems with using the Sliding Scale Only:

1- Is reactive rather than proactive
2- Often mismatched with changes in patient's insulin sensitivity
3- It does not meet the physiologic needs of the patient
4- Leads to insulin stacking

↳ Blood Sugar [mmol/L]	Soluble Insulin
>16	12 units
>12-16	8 units
>8-12	4 units
<8	0.5 units

Use **blood sugar** reagent strips or glucometer readings. Do not rely totally on these readings- also use clinical judgement.

Sliding scales using URINE glucose tests are unreliable - avoid.

Hyperglycaemic Coma and Pre-coma (Children)

Priorities:

Fluid replacement
Electrolyte / acid-base monitoring
Insulin therapy
Blood glucose monitoring

Fluid Replacement

- Approximately 200 ml/kg in 24 hours is required for rehydration.
- Start with rapid infusion of:

	Medicine	Codes	Rate
	sodium chloride 0.9% iv infusion Total volume = 200ml/kg in 24 hours	**C V**	20ml/kg fast, **then** ½ the remaining volume in 8hrs, then ½ the remaining volume in 16hrs.
and	**potassium chloride infusion**	**B V**	add 20mmol/L after the initial 20mg/kg fast infusion.

- Monitor glucose levels hourly: when the blood sugar is less than 15mmol/l change to:

	Medicine	Codes	Rate
	half strength Darrows with 5% dextrose iv infusion *	**C V**	*see section on iv fluid replacement*
and	**potassium chloride iv**	**B V**	20mmol per litre of the ½ Darrows/ dextrose solution

** Made up by adding 50mls of 50% dextrose to 1 litre ½ Darrows with 2.5% dextrose.*

- Monitor U/E 2-4 hourly watching the potassium levels.

Insulin Therapy (Children)

	Medicine	Codes	Dose	Rate
	soluble insulin iv (initial – continuous infusion)* *(*e.g. make up infusion of insulin in normal saline)*	**B V**	0.1units/ kg/ hr 0.05units/ kg/ hr	until blood sugar falls below 15mmol/L, then until condition stabilises, then
	soluble insulin sc (maintenance)	**B V**	0.75 – 1unit/kg/day in 3 divided doses before meals for one day, then	
	soluble + isophane sc	**B V**	apply the rule of thirds, (2/3 of the total daily dose in the morning and 1/3 in the evening).	

e.g. 30kg child

Initial fluid requirement = (20 x 200mls) = 6Litres
- *initial bolus of 600mls normal saline fast*
- *followed by (5.4L / 2) = 2.7L in next 8hrs and 2.7L in next 16hrs*

Initial insulin = (30 x 0.1) = 3units iv continuous infusion,
- *slowing to (30 x 0.05) = 1.5units/hr when glucose < 15mmol/L*
- *when stable (± 0.75 – 1 unit x 30kg / day) e.g. 24 units per day*
  (24/3) = 8 units 3 times a day before meals
- *then after 24hrs, 24 units isophane and soluble insulin/day:*
  2/3 isophane: 10units am;6units am
  1/3 soluble: 6 units am; 4 units am

Honeymoon period
In the months after initial diagnosis insulin requirements may decline to less than 0.5 unit/kg/day as the pancreas continues to produce some endogenous insulin. Requirements invariably revert to higher doses as endogenous insulin levels decline. Explain the concept to the patient or relatives.

*Note: **Diet** is important in children but attempts at too rigid control may prove to be counter-productive. The diabetic child should be allowed to indulge in normal **activities** at school. Teachers need to be informed about the condition.*

Thyroid Disease

Goitre

Compulsory iodisation of all salt for human consumption was commenced in 1995. As a result the iodine intake of the population has increased tenfold or more and iodine deficiency has been eliminated in Zimbabwe. Goitre is much less common than in the past, and can no longer be assumed to be due to iodine deficiency, although long standing cases will only resolve slowly if at all. Iodine therapy is now rarely indicated.

Points in Management

- Exclude hyper/hypo-thyroidism by careful clinical examination and thyroid function testing if necessary.
- Thyroid cancer should be considered in patients with nodular goitre, or a single thyroid nodule, if there are suspicious features. (Rapid growth, fixation, unusual firmness, enlarged lymph nodes, hoarse voice: **refer**)
- Otherwise treatment is not necessary, but if the goitre causes cosmetic embarrassment or pressure symptoms, thyroxine 100mcg daily should be given for an initial period of at least 6 months and response observed. In severe or unresponsive cases, consider surgery.
- After subtotal thyroidectomy, thyroxine 100mcg should be administered indefinitely. The dose should be adjusted according to tests of thyroid function.
- Iodine is unlikely to be of benefit unless the subject does not have access to iodised salt. Supplemental iodine is contra-indicated in those with nodular goitre due to the risk of hyperthyroidism.

Hyperthyroidism

- Accurate diagnosis and identification of the underlying cause is essential; if not possible, **refer**. In clinically obvious cases either refer or start treatment while awaiting laboratory results.

- In severe cases refer early for possible radio-iodine. In all cases hyperthyroid symptoms may be relieved by propranolol unless contraindicated (e.g. by asthma):

Medicine	Codes	Adult dose	Frequency	Duration
propranolol po	**B** **E**	40 – 240mg	3 times a day	-

Graves' disease

- Treat initially with anti-thyroid medicines:

Medicine	Codes	Adult dose	Frequency	Duration
carbimazole po	**B** **E**	20 -60mg [0.5 mg/kg]	daily until euthyroid, then reduce to 5-20mg [0.125-0.5mg/kg] daily.	

CAUTION: May induce bone marrow suppression; advise patient to report sore throat or other signs of infection. Stop medicine immediately if neutropenic. Minor rashes are not an indication to stop treatment.

Check thyroid function at 5-6 weeks and if normalised, gradually reduce the dose to the lowest that will maintain euthyroidism. Continue carbimazole for one year from time of stabilisation. If poor response, relapse or clinically very severe, refer for radio-iodine or surgery.

NB: after radio-iodine therapy for Graves disease, long-term follow up is essential to detect late hypothyroidism that might otherwise remain neglected and untreated.

Toxic Nodular Goitre [including toxic adenoma]

- Carbimazole should normally be given only for short-term treatment prior to surgery or radioiodine. Give as for Graves' Disease, but higher doses may be needed.
- Radioiodine is recommended, particularly in older patients and those with other medical problems. Radio-iodine (I-131) treatment is available at the Radiotherapy Centres at Parirenyatwa and Mpilo Central Hospitals.
- Surgery is particularly suitable for those with a large goitre. As radioiodine may take three months or longer to produce a clinical effect, propranolol may be continued uninterrupted and carbimazole may be restarted. Patients must be rendered euthyroid prior to thyroidectomy by use of anti-thyroid medicines
- Aqueous iodine oral solution may be administered for 10-14 days before thyroidectomy:

Medicine	Codes	Adult dose	Frequency	Duration
Aq. iodine solution (Lugol's iodine) 130mg iodine/ml	**A** **N**	0.1 – 0.3ml diluted in water	3 times a day	10-14 days before surgery

Hypothyroidism

Except in iodine deficient areas, this is treated by thyroid hormone replacement whatever the cause:

Medicine	Codes	Adult dose	Frequency	Duration
thyroxine po	**B V**	50 -100mcg initially	once a day	4 weeks, then
increase by 25 - 50mcg every four weeks as necessary until euthyroid				

- Start at 25mcg/day in the elderly or those with heart disease.
- Typical adult replacement dose is 2mcg/kg/day [i.e. 150mcg daily].
- Larger doses are needed in infancy [10 - 15mcg/kg/day] and childhood [4mcg/kg/day].
- Close monitoring of clinical response and thyroid function tests (T4, TSH) is essential.

Hypoadrenalism

May be primary (Addison's disease) or secondary to pituitary failure, e.g. as a result of surgical or irradiation ablation of the pituitary gland.

Requires **specialist** investigation and advice on how to treat the patient..

Surgery or illness necessitates an increase in corticosteroid cover generally in the form of hydrocortisone parenterally in the acute phase, followed by oral prednisolone in a higher than usual dosage as the condition improves. Patients on long term corticosteroid who develop infection or are subjected to surgery also require additional steroid cover as above.

NEUROLOGICAL CONDITIONS

Infections of the nervous system

The usual presentation is with:

- headache and fever
- and/or altered level of consciousness
- and/or neck stiffness
- and/or focal neurological signs
- and/or seizures.

In infants **lethargy and failure to suck are important signs**. Neck stiffness is an unreliable sign under one year of age, but the detection of a bulging fontanelle supports the diagnosis.

Differential diagnosis

Headache and fever only: look for cause of fever in other systems (for example, chest, respiratory tract; urinary tract, etc.). **Always** do malaria slides.

If altered level of consciousness, neck stiffness, focal signs or seizures in the presence of fever, or fever with lethargy and failure to suck in infants:

- Give:

Medicine	Codes	Adult dose	Frequency	Duration
benzylpenicillin iv/im	**C V**	3g (5MU)	one dose	**refer**

Note: for dose in children see chapter on Paediatric conditions

- Transfer urgently to a secondary care centre.

Meningitis

Management of suspected meningitis (fever +headache+ neck stiffness) at District level (or higher):

- Urgent lumbar puncture (18G cannula adequate in adults if spinal needle unavailable) , measure opening pressure using an IV giving set if manometer unavailable. If pressure greater than 20cm, remove CSF until less than 15cm.
- Blood slide for malaria parasites.
- **If diagnosis is in doubt DO NOT perform a lumbar puncture. Refer to a higher level.**
- **Contraindications to lumbar puncture**: deeply unconscious + focal signs; one pupil large and unresponsive; papilloedema (if fundoscopy available); rapidly falling level of consciousness. These are indications for referral to a tertiary care centre.
- Lumbar puncture should be considered mandatory, and, preferably, when the condition is first suspected since Cryptococcal meningitis must always be excluded.
- Tuberculous meningitis should always be remembered. It may have no special distinguishing features, and can present acutely.

- If symptoms present less than one week:

	Medicine	Codes		Adult dose	Frequency	Duration
	benzylpenicillin iv	**C**	**V**	3g (5MU)	6-hourly	Until CSF results out
	chloramphenicol iv	**B**	**V**	500mg	6-hourly	

- Spinal fluid microscopy, (protein, glucose; Gram stain India ink stain, Ziehl-Neelsen stain and cultures if possible) and blood glucose.

Treatment for bacterial meningitis**:**

	Medicine	Codes		Adult dose	Frequency	Duration
	benzylpenicillin iv	**C**	**V**	3g (5MU)	6 hourly	14 days
and	**chloramphenicol iv**	**B**	**V**	500mg	6 hourly	14 days
or	**ceftriaxone iv**	**C**	**V**	1g	12 hourly	14 days

Note: for paediatric doses see chapter on Paediatric conditions

In patients who can swallow, and are fully cooperative, chloramphenicol can be given orally after 5 days, and amoxicillin 750mg 8 hourly can replace benzylpenicillin

Chemoprophylaxis for close contacts (meningococcal meningitis only):

- Give as soon as diagnosis made in index case.

	Medicine	Codes		Adult dose	Frequency	Duration
	ceftriaxone im	**C**	**V**	500mg	once only	single dose

Further management

The combination of fever and focal neurological signs is an indication for **referral** to a central hospital and CT scan of the head.

The differential diagnosis includes cerebral abscess, cryptococcal meningitis tuberculoma, toxoplasma encephalitis, and other parasitic infection.

If a focal contrast-enhancing lesion or multiple lesions are present on scan and the patient is known to be HIV infected or is suspected to be infected on clinical grounds, start treatment for **toxoplasmosis:**

	Medicine	Codes		Adult dose	Frequency	Duration
	sulphadiazine po	**S**	**E**	2g	4 times a day	6 weeks
and	**pyrimethamine po**	**S**	**E**	200mg loading dose and then 50mg	once a day	6 weeks
or	**clindamycin po**	**B**	**E**	600mg	4 times a day	6 weeks
and	**pyrimethamine po**	**S**	**E**	200mg loading dose and then 50mg	once a day	6 weeks

or	**co-trimoxazole po**	**C**	**V**	1920mg	3 times a day	6 weeks

*alternative to sulphadiazine

If there is no response (clinically and on CT scan), in two weeks, or if lesion appears atypical, consider antituberculous treatment and neurosurgical intervention. (May need biopsy)

Neurocysticercosis

Focal seizures without fever may be caused by *neuro-cysticercosis* (typical CT scan appearance).

	Medicine	Codes		Adult dose	Frequency	Duration
	albendazole po	**C**	**E**	800mg	Twice a day	14 days
and/ or	**praziquantel po**	**C**	**E**	40mg/kg	once a day	14 days
add*	**prednisolone po**	**B**	**V**	1mg/kg	once a day	review

**If drowsiness, seizures or focal signs develop.*

Headache

This may be primary or secondary:

- In secondary headache or facial pain treat specifically for the underlying cause (e.g. meningitis, sinusitis, malaria) and use aspirin 600mg every 4 hours as analgesic.
- Primary headache is either of tension type (muscle contraction headache), migraine, or a combination or atypical.

Treatment of primary headache

Tension

- Bilateral; dull; band-like, worse as the day wears on; no nausea; frontal or occipital in site; often daily; can continue activities.

Medicine	Codes		Adult dose	Frequency	Duration
aspirin po	**C**	**V**	600mg	4 hourly prn	no longer than one week continuously (risk of analgesic rebound headache)

- Social circumstances may precipitate these headaches; counselling in relaxation therapy (muscle relaxation) will help. Lifestyle changes may help (lunchtime rest, more sleep), and physiotherapy if local muscle spasm and tenderness.
- **Avoid** opiates (e.g. codeine compounds) and benzodiazepines as they particularly can cause rebound headache and habituation.
- If headache persists for more than six weeks, add

	Medicine	Codes		Adult dose	Frequency	Duration
	amitriptyline po	**B**	**E**	25-150mg	at night	3 months

Migraine

- Unilateral; (occasionally bilateral); throbbing attacks; last hours to days; with nausea ± vomiting; photophobia, sometimes preceeded by visual aura; often have to lie down.

	Medicine	Codes		Adult dose	Frequency	Duration
	aspirin po	**C**	**V**	600mg	4 hourly	as required
or	**paracetamol po**	**C**	**V**	1g	6 hourly	as required
and	**metoclopramide po**	**B**	**V**	10mg	at onset	one dose

- If ineffective:

	Medicine	Codes		Adult dose	Frequency	Duration
	metoclopramide po	**B**	**V**	10mg	at onset	-
and	**ergotamine po**	**A**	**N**	1mg	at onset. Repeat once only after 1hr if needed.	

Ergotamine is contraindicated in complicated migraines (these include hemiplegia as an aura symptom).

- Look for and avoid precipitating factors: Not enough sleep, alcohol, cheese, chocolate, menarche, menstrual cycle, oral contraceptive pills may all influence migraine frequency.
- If two or more disabling migraines a month (leave work, off school);

	Medicine	Codes		Adult dose	Frequency	Duration
	propranolol po	**B**	**N**	20mg	3 times a day	minimum 3 months
				If ineffective increase gradually to a max of 120mg 3 times a day, if side effects allow.		
or	**amitriptyline po**	**B**	**E**	25mg	at night	minimum 3 months

Note: propranolol contraindicated in asthma – use amitriptyline.

Cluster Headaches

This is a sub-group of migraine with characteristic features of hemicrania, and periodicity (occurring about the same time for days or weeks). It shows a predilection for males.

Combination

A variable mixture of above two types of headache is common. Treat both. As prophylaxis, amitriptyline 25mg at night may be a good choice.

General Notes

- Ergotamine should not be taken more than twice in 24 hours, with a minimum of two days before the next dose, and not as a prophylactic treatment (excess ergotamine causes ergotism – severe headache, vomiting, gangrene of extremities and rebound headache). It should be avoided in pregnancy.
- Patients commonly abuse analgesics: headache diaries with a record of the daily number of tablets consumed will reveal this.
- Paracetamol 5OOmg 4-hourly should be used in children aged 7-12 years instead of aspirin.
- Ergotamine should not be used in children under 12 years
- Propranolol doses in children should be half of adult doses.

Epilepsy

This is defined as a tendency to recurrent (unprovoked) seizures. **A single seizure is NOT epilepsy.** One or more seizures in the presence of fever, brain infection, medicine intoxication (including alcohol), at the time of trauma and during an episode of metabolic derangement (hypoglycaemia, uraemia, liver failure) is not epilepsy, although the brain damage caused by some of the above may lead to epilepsy. Look for provoking factors like the ones listed above when faced with a patient with a first seizure.

Seizures are distinguished from other transient neurological episodes by the history, especially the description provided by an eyewitness. **Do not start anticonvulsant treatment without an eyewitness description of a seizure.**

A typical generalised seizure has a sudden onset with abrupt loss of consciousness. There are often involuntary movements of the limbs, urinary incontinence or tongue biting. Afterwards the patient is often confused, sleepy and complains of headache. Partial seizures do not involve loss of consciousness but present as recurrent twitching or abnormal sensations in one body part. Complex partial seizures include reduced awareness, aimless movements and memory loss for the event afterwards.

First line treatment

Health workers who have undergone training in the recognition and management of epilepsy may initiate treatment at primary care (C) level. Otherwise refer to District level.

- If two or more typical seizures in the past 12 months in a patient over 2 years

plus

- normal physical examination, no neurological signs, start:

Medicine	Codes	Adult dose	Frequency	Duration
phenobarbitone po	**C V**	120mg	once a day,	2 weeks

Paed = 5mg/ kg	at night	until review

Review after 2 weeks. Check compliance and side effects (very sleepy, loss of balance, rash, poor concentration, hyperactive). If side-effects, reduce phenobarbitone dose by 30mg. Review again after 4 weeks.

Second line treatment

For the patient with persistent seizures despite phenobarbitone check the diagnosis, compliance, medicine interactions, and intercurrent illness.

- Increase:

Medicine	Codes	Adult dose	Frequency	Duration
phenobarbitone po	**C V**	120mg	every night	4 weeks then review

- If seizures persist (one or more in four weeks):

	Medicine	Codes	Adult dose	Frequency
add	**phenytoin po**	**B V**	300mg	bedtime

- If seizures persist, increase:

Medicine	Codes	Adult dose	Frequency	Duration
carbamazepine po	**B V**	400mg Paed = 10mg/kg	twice a day	4 weeks, then review

- Review in 4 weeks
- If seizures persist, intolerable side effects, patient maintained on more than one anticonvulsant: refer for **tertiary level care or specialist care.**
- Other indications for referral to **tertiary level / specialist care**: neonatal epilepsy, progressive neurological deficit, absence seizures (momentary loss of consciousness without involuntary movements)

Tertiary/Specialist care

Decisions will include whether further investigations (EEG, CT scan) are indicated, and the use of phenytoin sodium, sodium valproate, ethosuximide, diazepam or clonazepam.

Status epilepticus

A seizure or a series of seizures continuing for more than 30 minutes, or recurrent seizures without regaining consciousness in-between, for more than 30 minutes. Many cases do not occur in known epileptic patients – always consider possible underlying causes such as stroke or brain abscess.

The above description should be strictly adhered to. **The practice of prescribing diazepam 10mg i.v. every time a seizure occurs should be resisted.** It is preferable to use a regular anti-convulsant during the in-patient stay.

Adults:

Management at primary level:

- Protect the airway and give oxygen if available,
- Give 50ml bolus of *dextrose 50%* intravenously (children: 10-20ml)
- While making arrangements to transfer the patient to a hospital, **give:**

	Medicine	Codes		Adult dose	Rate
	diazepam slow iv (or pr) <u>(not im</u>)	**C**	**V**	10mg May be repeated **once** after 5mins.	Given over 2-3 minutes.

Management at district level:

- Diazepam as above may be repeated twice (max dose 40 mg) if seizures persist, but watch for respiratory depression (ambu-bag must be available).
- **If seizures persist after 30 minutes, give:**

	Medicine	Codes		Adult dose	Frequency	Duration
	phenobarbitone iv/im	**B**	**E**	10-15mg/kg	30-50mg per minute infusion(iv over 10 mins)	

- Commence oral medicines as soon as fully conscious: by naso-gastric tube if unrousable for more than 6hrs.
- If seizures persist, **transfer** to provincial or central level for:

	Medicine	Codes		Adult dose	Frequency	Duration
	phenytoin sodium iv	**A**	**E**	15-20 mg/kg then 100mg	At a rate of 50mg/min, 6 hourly	

- If seizures still persist after 30 minutes, and ICU facilities and anaesthetist available, give:

	Medicine	Codes		Adult dose	Frequency	Duration
	thiopentone sodium iv	**B**	**V**	7mg/kg	assess/review	
and	**suxamethonium chloride iv**	**B**	**V**	100mg	assess/review	

- intubate and ventilate; consider thiopentone infusion.

Children:

- Protect the airway and give oxygen if available.
- At primary level (C) give:

	Medicine	Codes		Paed dose	Frequency	Duration
	dextrose 50% iv	**C**	**V**	10-20ml	once only	-
and	**diazepam pr** *	**C**	**V**	5mg	may be repeated once	

**use a syringe without a needle*

- Further management at district (B) level:

Medicine	Codes	Paed dose	Frequency	Duration
diazepam iv slow	**C V**	1mg/year of age	May be repeated once	

Febrile convulsions should be treated with tepid sponging, paracetamol and diazepam as above if necessary. They do not require long-term anticonvulsants unless recurrent and with neurological deficit.

Acute confusional states

(including delirium)

Cardinal features are disorientation, short-term memory loss and fluctuating lowered level of consciousness. In delirium there are also hallucinations ± illusions. This indicates organic brain dysfunction and NOT a psychiatric condition.

- Possible causes include: meningitis, encephalitis, malaria, pneumonia, septicaemia. Less commonly: HIV (seroconversion), typhoid, intracranial bleeding, metabolic disorder, liver or other organ (especially renal) failure and medicine abuse (e.g. alcohol withdrawal).
- Management should focus on identification and treatment of the underlying cause, usually by looking for infections e.g. malaria and treating empirically (see section on antibiotics).
- If sedation is required give:

Medicine	Codes	Adult dose	Frequency	Duration
chlorpromazine im	**C V**	25-50 mg	4 hourly as required	

Stroke

Acute management in Zimbabwe focuses on prevention of complications. Fibrinolysis is not practical.

Prevent complications such as:

- chest infection (especially aspiration of vomitus or food because of dysphagia)
- urinary tract infection
- deep venous thrombosis and pulmonary embolus
- pressure sores

Rehabilitation:

- physiotherapy from the day of admission.
- occupational therapy and speech therapy (if available) is required
- vocational training

Manage precipitating causes:

- treat hypertension, but only start 2 weeks after the stroke, or if diastolic BP is >120. Use small doses of hydrochlorothiazide **(avoid).**
- stop smoking
- treat arrhythmias, e.g. atrial fibrillation
- treat cardiac failure
- treatment of cerebral oedema may at times be necessary. Use mannitol (if available), 20mg IV frusemide, and 30 degree head tilt.

Prevention of stroke recurrence:
Thromboembolic stroke is difficult to differentiate from intracranial haemorrhage clinically without a CT scan.
For thromboembolic stroke shown on scan, or if no CT scan but stable stroke, start after 2-4 weeks:

Medicine	Codes	Adult dose	Frequency	Duration
aspirin po	**C V**	150mg	once daily	long term

For patients with atrial fibrillation who have access to facilities for regular blood monitoring (weekly INR for 1month, then monthly):

Medicine	Codes	Adult dose	Frequency	Duration
warfarin po	**B V**	10mg	2 times a day	2 days, then adjust
Usual maintenance dose INR range 1.5 and 2; 2.5 – 5mg once a day				

Refer the following patients to tertiary level:

- aged under 50 years
- diagnosis in doubt
- progressive deterioration

Progressive generalized weakness

Patients who become weak without other signs of illness may have a neurological disease. This is usually at spinal cord, root, peripheral nerve, neuromuscular junction or muscle level.

Rapid onset of weakness of the lower limbs with urinary retention or incontinence and sensory loss in the legs and trunk - patient may have a compressive lesion of the spinal cord and requires **URGENT** transfer to a central hospital level.

Ascending weakness of the legs and later arms with paraesthesia in the feet and hands – patient may have acute post infectious polyneuropathy (Guillain-Barre syndrome) and need to be hospitalized. If unable to lift the arms and head off the bed transfer urgently to tertiary care for ventilation. Treatment does NOT include steroids (can worsen outcome) but may

involve plasma exchange or intravenous immunoglobulins (0.4g/kg daily for 5 days) for severe cases.

Gradual onset of weakness with double vision, ptosis or difficulties with speech and/or swallowing suggests myasthenia gravis and referral to tertiary care for diagnosis is required.

Peripheral sensory symptoms

(burning or numb hands and feet)

Pain and/or numbness in a glove and stocking or just a stocking distribution is likely to be due to peripheral neuropathy. Treatment involves:

- recognizing (and eliminating if possible) likely causes: vitamin B12 deficiency, alcohol, diabetes, HIV infection, chronic renal disease and medicines including ARVs, isoniazid, anticonvulsants, and allopurinol.
- For **pain** give:

Medicine	Codes	Adult dose	Frequency	Duration
amitriptyline po	**B** **E**	25-75mg*	at night	review

**the lower dose is usually sufficient*

- If ineffective or intolerable side effects, add:

Medicine	Codes	Adult dose	Frequency	Duration
carbamazepine po	**B** **V**	100mg	2 times a day	2 days
	increasing to	200mg	2 times a day	2 days
	increasing to	400mg	2 times a day	review

- A small proportion of patients require opiates:

	Medicine	Codes	Adult dose	Frequency	Duration
	codeine phosphate po	**B** **E**	30-60mg	6 hourly	as required
If codeine ineffective	**morphine sulphate po**	**B** **V**	10-100mg	4hourly	As required

Pain in the hands only may be due to carpal tunnel syndrome or cervical root compression: refer to secondary/ tertiary level care for diagnosis.

Involuntary movements

The commonest is tremor, (which is usually essential, (familial) tremor, Parkinsonism or cerebellar), and the tremor of heavy metal poisoning like mercury. Is it a resting, postural or action (intention) tremor?

Tremor of the elderly – older people can develop a tremor consisting of titubation or nodding of the head, it may strongly simulate a tic. NO TREATMENT is usually required beyond assurance of their benign nature.

Essential tremor

Fine, bilateral, postural (occurs on maintaining posture) (stops when the hand is held), there is no increase in muscle tone. Treat with:

Medicine	Codes	Adult dose	Frequency	Duration
propranolol po	**B E**	20mg	3 times a day	review, then
	increase by 20mg per dose until satisfactory response or unacceptable side effects, up to 120 mg tds.			

Parkinsonism

Coarse resting tremor with increased muscle tone. Treatment is complicated and the diagnosis should be confirmed at a tertiary care centre.

Exclude medicine-induced Parkinsonism(antipsychotics, methyldopa)
Once motor symptoms interfere with normal household chores, treatment should be commenced.
Initial treatment of tremor usually consists of:

Medicine	Codes	Adult dose	Frequency	Duration
benzhexol po	**B E**	2-5mg	3 times a day	review

Note: Avoid in over 60yrs. Side effects = warn about dry mouth, urinary symptoms, sedation, and confusion.

Patients usually require treatment with levodopa at some time:

Medicine	Codes	Adult dose	Frequency	Duration
levodopa 250mg + carbidopa 25mg po (levocarb 275)	**A N**	¼ tablet*	3 times a day	review, then
	increase to ½ tablet after one week			

**Note: Increase number of doses and decrease interval to 3 or even 2 hours if necessary*

Cerebellar tremor

An intention tremor often associated with gait ataxia and sometimes nystagmus. Patients should be **referred** to central hospital level for CT or MRI scanning.

MENTAL HEALTH

General guidelines

Treatment of the mentally ill person does not always require medicines. Other forms of treatment, that is, social [identification and removal of precipitating factors] and psychological [counselling, psychotherapy and behaviour therapy] are important in all cases, and rehabilitation is frequently required.

- Whenever possible involve the relatives in understanding the nature of illness and the importance of medicine compliance.
- Do a thorough physical examination, laboratory work, or any other necessary investigation to exclude other cause of mental illness.
- Emphasise the importance of adhering to the prescriber's instructions.
- Patients on psychotropic medication should be reviewed frequently.

CAUTION is required when prescribing psychotropic medicines during pregnancy and lactation, children, HIV/AIDS patients and the elderly.

Psychoses

People with psychoses may present with hallucinations, delusions, loss of contact with reality. They may be violent; some may be withdrawn and mute.

Medicine Potency Relationships

Potency Relationship	
Medicine	Dose equivalent 100mg Chlorpromazine
Haloperidol	2 - 3 mg
Olanzapine	5mg
Risperidone	2mg
Sulpiride	200mg
Trifluoperazine	10mg

Non-organic psychosis

- *This refers to conditions where there are problems in functioning of the brain. Major psychiatry conditions that may present with psychoses include schizophrenia group of disorders such as brief psychotic disorders, schizophreniform disorders and schizophrenia, mood disorders such as bipolar affective disorder and major depression, substance induced psychoses from substances such as cannabis, Zed, cough mixtures such as bronchleer, heroine, cocaince, inhalants and alcohol related disorders.*Keep the patient in a safe place: prevent harm to self or others. If uncooperative or difficult to manage, refer to a psychiatric institution.
- Give anti-psychotic medicines: In all cases start at lower dose and increase gradually.

- For a first episode of psychosis the first line medicines should be used. For a patient who has previously been stabilised on an alternative medicine may be continued on the same.

Rapid Tranquillisation

For the violent or agitated patient there may be a need for rapid tranquillisation. The following is recommended:

	Medicine	Codes	Adult dose	Frequency	Duration
	chlorpromazine inj	**C V**	50-100mg IMI	Initially then can be repeated after 6 hours	Until calm and/or can be given oral medication
or	**haloperidol inj**	**C V**	2-6mg IMI (Total max 18mg daily)	Initially, then can be repeated after 6 hours	Until calm and/or can be given oral medication
or	**Diazepam inj**	**C V**	5-10mg IMI/IVI	Initially then can be repeated after 6hrs	Until calmand/or can be given oral medication
or	**lorazepam inj**	**C V**	1-2 mg IMI (diluted with equal amount of water of injection or normal saline)	Initially then can be repeated after 6hpurs	Until calm and/or can be given oral medication

When giving Lorazepam, or any other Benzodiazepine, by IMI or IVI, resuscitation equipment and facilities for cardio-respiratory support should be available

NB: Chlorpromanize should not be given IVI under what ever circumistance.

First line medicines

	Medicine	Codes	Adult Dose	Frequency	Duration
	Chlopromazine po	**C V**	50-200 mg	2-3 times daily	Continual
or	haloperidol po	B V	1.25-5 mg	2-3 times daily	Continual
or	**sulpiride po**	**C V**	50-200 mg	2-3 times daily	Continual

Second Line therapy

	Medicine	Codes	Adult dose	Frequency	Duration
	trifluoperazine po	**B E**	5 – 10mg	2 times a day	continual
or	**olanzopine po**	**B E**	5-10 mg	2 times a day	continual
or	**Risperidone po**	**B E**	1-3 mg	2 times a day	continual
or	**clonapine po**	**S E**	50-100mg	1-2 times a day	continual

Note: The First Line Medicines, chlorpromazine may cause postural hypotension. Use of Chlorpromazine should be avoided in Epilepsy. ***Olanzapine***

is associated with metabolic syndrome and ***Clonapine*** *is associated with reduction in white cell count, so FBC should be done regularly.*

In general poly-pharmacy i.e. the use of two or more antipsychotics should be avoided. However there may be a place for an additional sedative medicine at night**.**
Caution: Use chlorpromazine with caution as it lowers seizure threshold in organic pyschosis.

Organic Psychosis

HIV/AIDS

- Psychosis in HIV/AIDS may be caused by virus, ART and OIs.
- Patients who are HIV infected are more susceptible to antipsychotic side effects therefore, use lower doses and observe for the side effects.

Other causes of organic psychosis

- Infections such as malaria, syphilis,tuberculosis and others
- Traumatic Brain Injury and tumours.
- Systemic, Endocrine and Metabolic Conditions such as kidney diseases, thyroid disease, diabetes mellitus, electrolyte imbalance and others.

HIV infected patient preferably require use of atypical antipsychotic medicines such as risperidone.

Identify the cause and treat whenever possible. Use lower doses of antipsychotics as patients with organic psychosis are generally more prone to side effects

Depot Medications

Adequate health education should be given to the patient on the importance of compliance and adherence. Where patients have difficulty in adherence, they should be offered the choice of depot preparations.

	Medicine	Codes		Adult dose	Frequency Duration
	Risperidone po	**B**	**V**	5mg	As a test dose then after monthly
or	**fluphenazine decanoate im**	**B**	**V**	12.5mg	as a test dose*, followed after 2 weeks by
	adjust dose according to response			25 – 50mg	once every 4 weeks, continual
or	**flupentixol decanoate im**	**B**	**E**	20mg	as a test dose*, then after at least 1 week
				20 – 40mg	Every 2 – 4 weeks depending on response

Duration of therapy:

First or single psychotic episode

Most patients have to be maintained on a reduced dose of medication for 12 months after disappearance of psychotic symptoms. Then the medicine should be gradually tapered off. The patient must be reviewed regularly by medical staff and relatives for signs of relapse such as social withdrawal or strange behaviour.

Repeated relapses of psychoses
These patients require long term maintenance medication to prevent future relapses. Search for the cause of relapses [for example, continuing stress or non-compliance] and remedy if possible.

Side effects and adverse reactions of anti-psychotic medicines

Early side effects:

- Chlorpromazine and sulpiride may cause drowsiness, dizziness, postural hypotension, dry mouth, blurred vision and galactoria: usually in early stages of treatment and may be self-limiting. These should be discussed with patients and a change to a first line medicine considered if such side effects are limiting compliance and adherence.
- Extra pyramidial side effects which include acute dystonia [common features are body stiffness, tongue protrusion, grimacing, writhing, twisting of neck or body, torticollis, and oculogyric crisis], Parkinsonism and akathesia.

Treat with:

	Medicine	Codes		Adult dose	Frequency	Duration
	Orphenadrine po	**C**	**V**	50mg	Once a day	1 week
or	**benzhexol po**	**C**	**V**	5mg	1-2 times a day	1 week
or	**diazepam po**	**C**	**V**	5-10mg	1-2 times a day	1 week

If severe give:

	Medicine	Codes		Adult dose	Frequency	Duration
	biperiden im/ iv	**A**	**N**	2 – 4mg	once only	

And then continue with benzhexol as above. Reduce the dose of the anti-psychotic therapy.

Medium term side effects:
Medicine-induced Parkinsonism, stiffness of arms and legs, muscle cramps, internal restlessness [akathisia] require addition of:

	Medicine	Codes		Adult dose	Frequency	Duration
	Orphenadrine po	C	V	50mg	Once a day	review
	benzhexol po	**C**	**V**	5mg	1-2 times a day	Review
and/ or	**diazepam po**	**C**	**V**	5mg	1 – 2 times daily	Review

Note: Avoid long-term use of benzhexol because there is a risk of developing dependence.

Avoid benzhexol in the elderly, use orphenadrine.

Hypothermia: keep the patient warm; refer to next level as medical emergency if body temperature cannot be raised.

Photosensitivity i.e. being more prone to skin damage from sunlight is common. Advice should be given on hats and sun block creams.

Appetite increase and weight gain are common. Consider regular monitoring of blood glucose to detect early diabetes

Long term side effects:

Tardive dyskinesia: reduce medicine gradually and eventually stop and refer for specialist opinion. Use benzodiazepine and switch to atypical antipsychotics.

	Medicine	Codes		Adult dose	Frequency	Duration
	Clonazepam po	A	V	0.25-0.5mg	In divided doses upto 1mg per day	Continual

Neuroleptic Malignant Syndrome is characterized by hyperthermia, fluctuating level of consciousness, muscle rigidity and autonomic dysfunction with pallor, tachycardia, labile blood pressure, sweating and urinary incontinence.
This is a **rare but potentially fatal side effect**. Discontinuation of the antipsychotic is essential and an emergency referral made to a physician at a central hospital. During the transferring of patient, there is need to take care of rehydration of the patient, nutritional and fever control. Renal failure, hypoxia and acidosis should be managed at a referral centre. Bromocriptine may be use in doses of 2-3mg/kg body weight maximum 40mg/day and not for more than 10days.

Mood (Affective) Disorders

Bipolar Disorders

It is a condition characterised by elation (mania) and low mood (depression).

Treatment is as for other psychoses i.e. with antipsychotics but add mood stabilisers.

Use:

	Medicine	Codes		Adult dose	Frequency	Duration
	carbamazepine po	**B**	**E**	100-400mg	3 times daily	continual
or	**Sodium valproate**	**B**	**V**	200-500mg	2 times daily	continual
	lithium carbonate po	**B**	**V**	250mg-1g	At night	continual
or	**Lamotrigine po**	**B**	**E**	50-200mg	2 times a day	continual

For HIV/AIDS patients use:

	Medicine	Codes		Adult dose	Frequency	Duration
	sodium valproate po	**B**	**E**	200 – 500mg	2 times daily	Continual
or	**Lamotrigine po**	**B**	**E**	50-200mg	2 times daily	continual

Note: Avoid carbamazepine in HIV and AIDS patients.

In manic patients with psychoses,

Medicine	Codes		Adult dose	Frequency	Duration
olanzapine po	**S**	**E**	2.5 – 5mg	2 times a day	Continual
Quietiapine po	**S**	**E**	50-200mg	Once a day	Continual

HIV Induced Mood Disorders
For rapid tranquilisation, avoid chlorpromazine, use benzodiazepines

Medicine	Codes		Adult dose	Frequency	Duration
Diazepam IM/IV	**C**	**V**	5-10mg	Intially then can be repeated after 6hours	Till Calm
lorazepam IM	**B**	**V**	1 – 2mg	Initially then can be repeated After 6 hours	Till calm

Blood tests for FBC, U&E, Thyroid function and Pregnancy test are essential before commencing mood stabilizers. These medicines should be used with caution during pregnancy especially within the first trimester. Lithium levels are mandatory for pregnant patients.

Carbamazepine may induce liver enzymes and hence causing more rapid metabolism, and therefore reduced efficiency of co-administered medicines e.g. ARV's and Oral Contraceptives.

Lamotrigine is associated with skin rashes- discontinue treatment if this occurs.

Lithium toxicity can occur with dehydration, diarrhoea and vomiting. Hence the need to discontinue. At toxic levels this may cause tremor, in-coordination, ataxia, coma and death. If toxicity occurs Lithium should be stopped immediately and a saline drip started – 1 litre fast then 4 hourly - and the patient should be referred to a central hospital.

Depression

Assess severity and duration, identify stressoers, and carry out risk assessment for suicide.

- **Depressive Episode (Mild)**
  Counsel, follow up and help individual to deal with stressors. Commence on antidepressants preferably with Selective Serotonin Re-uptake Inhibitors (SSRIs).
- **Major Depression**
  As for depressive episodeUse of anti-depressants and admission very important to allow monitoring of the patient.

First Line Medicines:

	Medicine	Codes		Adult dose	Frequency	Duration
	amitriptyline po	**C**	**V**	Start at 50mg and increase by 25mg every 2 nights up to 150mg	Once at night 1 hour before sleep	Assess progress after 2 weeeks
	imipramine po	**C**	**V**	Start at 50mg and increase by 25mg every 2 nights up to 150mg	Once at night 1 hour before sleep	Assess progress after 2weeks

Second line Medicines

	Medicine	Codes		Adult dose	Frequency	Duration
	fluoxetine po	**A**	**V**	20-80mg	Once daily in morning with food	Assess response after 2 weeks
or	**Citalopram po**	**B**	**V**	10-40mg	Once daily morning	Assess response after 2 weeks

Third Line Medicines:

	Medicine	Codes		Adult dose	Frequency	Duration
	Venlafaxine po	S	E	75mg	Once daily in the morning with food	continual
or	Duloxetine po	S	E	30mg	Once daily in the morning with food	continual
or	Mianserin po	S	E	15-40mg	Once at bedtime	continual

Caution: History of Epilepsy, history of Mania, cardiac disease, Diabetes Mellitus, close angle glaucoma, bleeding tendency or anticoagulant therapy, hepatic or renal impairment and breast feeding.

Side Effects: "First flood effect" with increased restlessness or agitation (This may be managed by reduced dosage or with short term usage of a Benzodiazepine.

Gastro-intestinal upsets and appetite reduction. Reduced Libido. Some patients may have a hypersensitivity reaction with skin rash and, in general, medicine should be stopped if this occurs.

"Serotonin Syndrome" is a toxic over-activity of serotonin which may rarely occur with therapeutic dosage of an SSRI but occurs more commonly as a result of usage of more than one medicine acting on the serotonin system. Symptoms of varying severity include:

Autonomic effects – shivering, sweating, raised temperature, high blood pressure, tachycardia, nausea and diarrhoea.

Motor effects – myoclonus or muscle twitching, brisk tendon reflexes and tremor.

Cognitive effects – restlessness, hypomania, agitation, headache and coma.

Management involves immediate cessation of the offending medicine/s, usage of a Benzodiazepine for agitation and supportive care.

Medicines may cause reduced libido.

SSRIs cause insomnia - always take the dose in the morning; where there is sleep disturbance, limited use of benzodiazepines like clonazepam 1- 2mg at night or lorazepam 0.5 – 1mg can be given at night for a maximum of 2 weeks.

Patients with Bipolar Affective Disorder in the depressive phase may need both an antidepressant and a mood stabiliser (Refer to section under mania above)

For depression with psychomotor agitation give:

	Medicine	Codes		Adult dose	Frequency	Duration
	amitriptyline po	**B**	**E**	50 –75mg	once at night	*14- 21days
or	**imipramine po**	**A**	**E**	50 –75mg	once at night	then review

**It may take up to 14 - 21 days before therapeutic effect occurs.*

For depression with psychomotor retardation use:

Medicine	Codes		Adult dose	Frequency	Duration
fluoxetine po	**A**	**E**	20 – 60mg	once only	Continual

Do not issue large quantities of antidepressant medicines; tricyclic antidepressants can be fatal in overdose!

CAUTIONS: Avoid both amitriptyline and imipramine in patients with history of heart disease, urinary retention; glaucoma and epilepsy [refer

such patients to a specialist]. In elderly patients, start with 25-50 mg/day. Imipramine is less sedating than amitriptyline.

Side effects: Common side effects include dry mouth, blurring of vision, postural hypotension, appetite increase and constipation.
With Venlafaxine usage an EEG is recommended prior to initiating the medicine and blood pressure needs careful monitoring.

Anxiety Disorders

- **Mild**
  Psychotherapy; identify cause and treat.
- **Severe**
  In addition to counselling, give:

Medicine	Codes		Adult dose	Frequency	Duration
diazepam po	**C**	**V**	5mg [up to 10-15mg]	once a day	Max 2 weeks
clonazepam po	**S**	**E**	0.5mg	Up to 3 times a day	Max 2 weeks

Caution: Do not prescribe for more than two weeks. If severe anxiety persists refer to specialist or consider trial of an antidepressant.

Treatment of Alcohol Dependence

Mild to Moderate
Counsel; involve family or others as appropriate. The person must stop alcohol use OR reduce consumption to not more than 21 units per week [men] or not more than 14 units per week [women].

1 unit of alcohol = 200ml of beer (5% weight/volume), or one glass of wine, or one tot of any spirit.

Severe Alcohol Dependence

Treat physical and social complications. Counsel, with family involvement. Alcohol use must be stopped: refer to a support organisation. If severe withdrawal symptoms occur e.g. severe tremors, insomnia, confusion, hallucinations, give:

	Medicine	Codes	Adult dose	Frequency	Duration
	diazepam iv	**C V**	10mg	once only	then
	diazepam po	**C V**	20-40mg [reduce by 5mg every other day]	once a day	discontinue within 7 – 14days
and	**multivitamins po**	**C N**	2 tablets	once a day	review
or	**thiamine po**	**A N**	50mg	once a day	review
and	**Vit B Complex im**	**C V**	1ml	Daily for 3 days	

These vitamin replacements protect against the development of Wernicke's encephalopathy (ophthalmoplegia, ataxia, confusion and altered level of consciousness)

Attention Deficit Hyperactivity Disorder

	Medicine	Codes	Adult dose	Frequency	Duration
	methylphenidate po	**S E**	10-60mg	Daily in 2 – 3 divided doses	Continuous with regular reviews

COMMON EYE CONDITIONS

Prevention of Blindness

80% of blindness can be prevented by:

- proper diet (Vitamin A and proteins)
- personal and environmental hygiene
- measles immunisation
- early treatment of eye diseases by qualified health personnel including cataract surgery and early diagnosis and treatment of glaucoma.
- appropriate management of STIs in pregnant mothers and their sexual partners.
- early referral of serious eye diseases and injuries
- tetracycline eye ointment in the new-born child's eyes (Crede Prophylaxis)
- early detection and appropriate management of diabetes – stringent control of blood sugar
- early detection and appropriate management of hypertension
- creation of community awareness on the dangers of using herbal medicines in the eye

"Healthy bodies, healthy eyes!"

Organic headaches such as migraine and cluster headaches do NOT occur because of eyestrain. See the chapter on Nervous System Conditions for management of these conditions.

Excessive use of eyes does NOT harm them, and "bad eyes" do NOT result from overuse.

Management of Eye Conditions

Diagnose and **refer urgently** most of the following conditions:

- unexplained vision loss; or visual disturbance.
- glaucoma: high pressure in the eye.
- any perforating eye injury.
- any white pupil in children (retinopblastoma or retinopathy of prematurity or congenital cataract).
- eye burns.
- orbital cellulitis.
- red eye.
- retinal detachment.
- congenital or developmental squint.
- conjunctivitis persisting after one week of treatment.
- trachoma if eyelashes touching cornea.
- proptosis : (protrusion of the eye ball)

***Important: Avoid** the use of steroid eye preparations; conditions requiring them need confirmation by a specialist - **refer**. Steroids may lead to worsening of infective processes like trachoma, increased intra-ocular pressure, cataracts, delayed healing and worsening of corneal ulcers of viral origin. **Never** use local anaesthetic drops for painful corneal conditions. Only specialists should prescribe atropine eye drops/ointment.*

Diagnosis of Eye Conditions

Testing vision is the single most important test and every health worker must know how to use an eyesight-testing chart e.g. Snellen Chart or LOGMARChart for both adults and children.

With a simple torch, most of the external eye diseases can be diagnosed.

Atraumatic Eye Conditions

See table 19.1 for differential diagnosis

Acute Glaucoma

- Refer immediately to hospital (delay increases risk of visual loss).
- At hospital: Patient suspected of having acute angle closure glaucoma must be started on pilocarpine 2% or 4% drops in both eyes four times a day.

	Medicine	Codes		Adult dose	Frequency	Duration
and	**acetazolamide po**	**A**	**N**	250-500mg	stat, then 8 hourly	review

- Refer to eye specialist within 24 hours.

Xerophthalmia/ Vitamin A deficiency

Preventive measures include promotion of breast-feeding, measles immunisation, Vitamin A supplementation, foods rich in Vitamin A [carrot, mango, pumpkin, and paw-paw].To all children with signs and symptoms of xerophthalmia and/or measles, give and refer:

Medicine	Codes		Adult dose	Frequency	Duration
vitamin A po	**C**	**V**	200,000 iu [<1yr = 100, 000iu]	single dose	Day 1, Day 2 and repeat after 2 weeks

- Nutritional rehabilitation is indicated.

Table 21.1 Differential Diagnosis of a Red Eye (Atraumatic)

Condition	Redness	Pain	Blurred vision	Discharge	Pupil size/ shape/ reaction to light	Visual acuity	Refer
Acute glaucoma	Yes Max. around limbus one or both eyes	Yes. Severe + headaches + nausea + vomiting.	Yes. Severe + haloes around lights	No	Dilated. Fixed.	Decreased	Yes
Conjunctivitis	Yes Generalised both eyes usually	Yes Gritty Photophobia	No	Yes. Maybe copious.	Normal	Normal	Only if no response Or copious discharge
Corneal ulcer	Yes Max. around limbus more near site of ulcer, usually one eye.	Yes. Pricking. Photophobia. Stains with fluorescein strips.	Yes	Yes, in bacterial /fungal ulcers No, in viral / traumatic ulcers	Normal	Decreased. Depends on the site / size of the ulcer	Refer
Iritis/uveitis	Yes Max. around limbus, one or both eyes	Yes. Deep pain worse on moving eye. Photophobia	Yes	No	Irregular, small, sluggish reaction to light	Decreased	Yes

Conjunctivitis (including trachoma)

Table 21.2: Differential Diagnosis: Causes of conjunctivitis

Signs/ symptoms	Acute bacterial	Viral	Allergic	Chronic, endemic trachoma
Discharge?	✓**Purulent**	✓**Watery / none**	Mucoid	None / purulent
Itching?	None	None	✓**Marked**	None
One or both eyes?	One or both	One or both	Both	Usually both
Recurrences?	Unusual	Unusual	Usually	✓**Chronic**

Note: ✓Bold lettering indicates distinguishing feature.

Treatment of conjunctivitis:

- **Acute bacterial conjunctivitis**:

Medicine	Codes	Adult dose	Frequency	Duration
tetracycline 1% eye ointment	**C V**	apply	3 times a day	one week
Chloramphenicol 1% eye ointment	**C V**	Apply	4 times a day	One week

- **Viral conjunctivitis:**

No medicine treatment as this is a self-resolving infection. If in doubt treat as for acute bacterial and refer.

- **Allergic conjunctivitis:**

Educate/ reassure. Apply cold compresses and wear a sun hat whenever outdoors. If no relief of symptoms refer. A night-time dose of an antihistamine may relieve symptoms.

NB: Steroids are contraindicated in allergic conjunctivitis

Medicine	Codes	Adult dose	Frequency	Duration
Olopatadine (patanol) 1%) eye drops	**C V**	Apply	2 times a day	2 weeks

If no improvement in the three conjunctivitis - refer

Trachoma:

- If left untreated, the cornea becomes permanently and irreversibly damaged. Apply:

Medicine	Codes	Adult dose	Frequency	Duration
tetracycline 1% eye ointment	**C V**	apply	4 times a day	for 6 weeks

- If inturned eye lashes (trichiasis, entropion) present, perform epilation (pull out the lashes) and **refer** the patient to the eye hospital.
- Provide education in personal and environmental hygiene for prevention of trachoma, with emphasis on face washing, not sharing towels, hand washing, provision of safe water supplies and basic sanitation.

Conjunctivitis of the Newborn

(Ophthalmia Neonatorum)

See also the section on Sexually Transmitted Diseases and the STI Module.

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 and the new born acquires this infection from an infected birth canal during delivery. The condition is preventable by detecting and treating maternal and partner gonococcal and chlamydial infection during pregnancy and by swabbing with normal saline wet cotton swab both eyes as soon as the baby's head is out followed by instilling 1% tetracycline eye ointment (Crede Prophylaxis) carefully into the conjunctival sacs of every new born baby as soon as possible after birth.

Ophthalmia Neonatorum is treated as follows:

- Collect pus swab for culture and sensitive before initiation of antibiotic treatment
- Eye(s) Irrigation with with warm Normal Saline until all the pus is removed and intermittently as long as pus is still present.

Instilling Antibiotic Eye Drops (Ofloxacillin / Fortified Gentamicin 0.3%) hourly as long as the eye are still discharging and red during the day and 1% Tetracycline eye ointment at night until infection is cleared.

Treatment:

	Medicine	Codes	Paed dose	Frequency	Duration
	kanamycin im	**C V**	25mg/kg	once	single dose
and	**erythromycin po**	**C V**	16mg/kg	6 hourly	14 days

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

Traumatic eye conditions

Penetrating Injury

Treatment: Put on eye shield and ensure NO pressure. Refer urgently to an eye hospital.
Administer the following medicines before referral:

	Medicine	Codes		Adult dose	Frequency	Duration
	tetanus toxoid im	**C**	**V**	0.5mls	once	single dose
and	**paracetamol po**	**C**	**E**	500mg	4 times a day	if required
and	**amoxicillin po**	**C**	**V**	500mg	3 times a day	5 days

Corneal Foreign Bodies

Gently attempt removal of foreign body with cotton wool tipped orange stick.If unsuccessful – **refer to eye hospital**.

If successful:

	Medicine	Codes		Adult dose	Frequency	Duration
	tetracycline 1% eye ointment	**C**	**V**	apply under an eye pad for 24hrs, then	3 times a day	1

Chloramphenicol 1% eye ointment may be used instead of tetracycline eye ointment above.

If worse after 24 hours – **refer to eye hospital.**

Corneal Abrasion

Apply an eye pad with tetracycline eye ointment or chloramphenicol 1% eye ointment stat and advise bed rest for 24 hours, then review.If worse, refer to eye hospital

If improving, continue with:

	Medicine	Codes		Adult dose	Frequency	Duration
	tetracycline 1% eye ointment	**C**	**V**	apply	3 times a day	4 days
or	**Chloramphenicol 1% eye ointment**	**C**	**V**	Apply	4 times a day	5 days

Chemical Burns

Refer after doing the following:
Consider this to be a **medical emergency** - prompt action can save vision.

Irrigate the eye and surrounding areas thoroughly using tap water and a 10ml syringe (without the needle) for 30 minutes. Remove any debris or foreign bodies from the eye if present.

Then:

	Medicine	Codes		Adult dose	Frequency	Duration
	tetracycline 1% eye ointment	**C**	**V**	apply under an eye pad for 24hrs, then review		
	Chloramphenicol 1% eye ointment	C	V	Apply, pad eye and refer		

Iritis/ Uveitis

Refer to eye specialist.

Corneal Ulcers

(**Refer**) NB: corneal sensation must always be tested with a cotton tip to exclude herpetic cause of corneal ulcer which would be treated with antiviral drugs like acyclovir

Treatment:

	Medicine	Codes		Adult dose	Frequency	Duration
	tetracycline 1% eye ointment	**C**	**V**	apply	3 times a day	5-7 days
or	Chloramphenicol 1% eye ointment	C	V	Apply	4 times a day	5 days

Glaucoma (Chronic Open Angle)

A specialist must first confirm the diagnosis of glaucoma. The treatment can then be repeated according to the specialist's prescription, provided the patient is referred back to the specialist every 3 months for review. Chronic Glaucoma

At hospital: Chronic open angle glaucoma:

	Medicine	Codes		Adult dose	Frequency	Duration
	pilocarpine 4% eye drops	**B**	**V**	1 drop in each eye	6 hourly	Continual
	Timolol maleate 0.5% eye drops	**B**	**V**	1 drop in each eye	Twice a day	Continual as per recommendation by specialist

If intra-ocular pressure is more than 40mmHg:

	Medicine	Codes		Adult dose	Frequency	Duration
	Timolol Maleate	**B**	**V**	**1 drop**	12 hourly	Continual
or	**Xalatan eye drops**	**B**	**V**	1 drop	Daily	continual
or	**Xalacom (latanoprost 5micrograms, timolol maleate 5mg/ml)**	**A**	**V**	1 drop	Daily	continual
or	**Levobunolol hydrochloride 0.5% eye drops**	**A**	**V**	1 drop	12 hourly	Continual
and	***Acetazolamide po**	**A**	**V**	0.25-1g	Divided doses/day	Few weeks

NOTE: This medicine should **NOT be used for more than 3 continuous months without review by a specialist and potassium chloride 600mg/day orally should be given when patient is on acetazolamide.*

Timolol should not be prescribed in Asthma and other Chronic Obstructive Airway Diseases (COAD)

Cataract

Cataract is defined as opacity of the lens. Causes may be classified as acquired and congenital. Aging, trauma, inflammation, drugs and metabolic disorders like diabetes mellitus are the leading acquired causes while intrauterine infections, inheritance and congenital abnormalities are the leading congenital causes of cataracts. Treatment for cataract is surgical except for galactocaemic cataract which reverses when the neonate is given lactose free diet. Cataract present with a white pupil in children, loss of vision of various degrees, squint and rarely painful blind eye if neglected and complicated with glaucoma and lens induced uveitis.

Mydriatic Drugs**:**

Medicine		Codes		Adult dose	Frequency	Duration
	Tropicamide 0.5% or 1% eye drops	**B**	**V**	1-3 drops	stat	Pre-op
Or	**Cyclopentolate 0.5% or 1% eye drops**	**B**	**V**	1-3 drops	stat	Pre-op
And	**Phenylepherine 2.5% eye drops**	**B**	**V**	1-3drops	stat	Pre-op
	Atropine 0.5% or 1%	**B**	**V**	1-2 drops	2-3 times/day	1 week

Corticosteroid drugs used post cataract surgery:

	Medicine	Codes	Adult dose	Frequency	Duration
	Dexamethasone 0.1% neomycin 0.35%, polymyxin B sulphate 6000units/L and ointment	**B V**	1 drop	6 hourly	6 weeks
Or	**Dexamethasone 0.1%, neomycin 0.35% eye drops and ointment**	**B V**	1 drop	6 hourly	6 weeks
Or	**Dexamethasone 0.1% eye drops**	**B V**	1 drop	6 hourly	6 weeks
Or	**Betamethasone 0.1% eye drops**	**B V**	1 drop	6 hourly	6 weeks
Or	**Prednisolone acetate 1% eye drops**	**A E**	1 drop	1-2 hourly	2-3 weeks

Antibacterial drugs for eye infections

	Medicine	Codes	Adult dose	Frequency	Duration
	Gentamicin 0.3% eye drops	**C V**	1 drop	2-6 hourly	14 days
or	**Ciprofloxacin 0.3% eye drops**	**B V**	1 drop	1-2 hourly	2 days then reduce dose to 4 hourly for 12 days
or	**Ofloxacin 0.3% eye drops**	**A V**	1 drop	2-4hourly	2 days then reduce to 4 hourly for 10 days

Antivirals agents for eyes

	Medicine	Codes	Adult dose	Frequency	Duration
	Acyclovir eye ointment (For corneal ulcers)	**A V**	1 cm ointment	5 times a day	14 days
	Acyclovir 200mg tablet (For herpes zoster ophthalmicus)	**A V**	800mg	5 times a day	7 days
Or	**Famcivlovir 250mg tablet (For herpes zoster ophthalmicus)**	**A V**	500mg	3 times/day	7 days

Treatment for Cytomegalovirus retinitis:

	Medicine	Codes	Adult dose	Frequency	Duration
	Ganciclovir 500mg vial	**A V**	5mg/kg infusion	12 hourly	14-21 days
And	**Forscanet 24mg/ml IVI**	**A V**	90mg/kg infusion	12 hourly	2-3 weeks

Topical anaesthetics and diagnostic preparations:

	Medicine	Codes	Adult dose	Frequency	Duration
	Oxybuprocaine hydrochloride 0.4% eye drops	B V	1 drop	Stat	Repeat if necessary
Or	Tetracaine hydrochloride 0.5% eye drops	B V	1 drop	Stat	Repeat if necessary

Diagnostic preparations

Fluorescein strips

Medicine	Codes	Adult dose	Frequency	Duration
Fluorescein strips	C V	1 strip	Single use	Single use
Fluorescein solution 1% or 2%	A V	1 Vial	Single use	Single use

Eye consumables:

Medicine / item	Codes	Adult dose	Frequency	Duration
Intra-ocular lenses (various powers)	**B V**	N/A	Single use	N/A
Eye pads	**C V**	N/A	Single use	N/A
Methylene Blue	**A V**	N/A	Single use	N/A
Arrow swabs / spears eye swabs	**B V**	N/A	Single use	N/A
Eye shields	**C V**	N/A	Single use	N/A
Viscoelastic	**B V**	N/A	Single use	N/A
BSS (Balance salt solution vacolitres) for cataract surgery	**B V**	N/A	Single use	N/A
Fluid giving sets	**B V**	N/A	Single use	N/A
Micropore	**C V**	N/A	Single use	N/A
Surgical gloves (sterile)	**C V**	N/A	Single use	N/A

Suture materials (10.0, 11.0, 9.0 nylon, 8,0 vircyl, 4.0 nylon or silk)	**B**	**V**	N/A	Single use	N/A

COMMON ORAL CONDITIONS

Oral problems

Oral lesions are quite common especially amongst HIV positive patients. At any encounter with a healthcare worker, the patient should have their mouth examined for various lesions such as the following:

- Oral thrush or candidiaisis/angular cheiltis
- Herpes simplex labialis
- Kaposi's sarcoma
- Gum infections
- Salivary gland disorders e.g. parotid gland enlargement
- Dental caries
- Cancrum oris
- Enlarged nodes such as submandibular, submental and cervical lymphadenopathy
- Ranula- bluish sublingual swelling especially in children
- Oral hairy leucoplakia

Some of these lesions will need referral to a dentist for biopsy if one is worried about malignancy e.g. with Kaposi sarcoma and lymphoma or infections such as histoplasmosis.

Management of Oral thrush/Oral candidiasis

This will be one of the commonest abnormalities found in the mouth. Diagnosed when whitish patches or reddening of the oral mucosa is noted. The condition may be associated with a feeling of not tasting food well plus odynophagia (pain in the chest on swallowing). Angular cheilitis is ulceration and occasional bleeding at the corner of the mouth. Apart from suspecting HIV related disease, exclude the current use of antibiotics, steroids or the presence of diabetes mellitus. Offer HIV testing and counselling (HTC).

Treat with topical therapy such as:

	Medicine	Codes		Adult dose	Frequency	Duration
	nystatin suspension	**B**	**E**	200 000 units	5 times a day	7- 14days
	nystatin lozenges	**B**	**E**	Sucked	5 times a day	7- 14 days
or	**miconazole oral gel 2%**	**C**	**V**	Topically	4 times a day	7 – 14days-

If there is odynophagia, treat as oesophageal candidiaisis as follows:

Oesophageal Candidiasis

This is an AIDS defining illness (WHO Stage 4 disease) and hence the patient would need to be worked up for referral to the OI Clinic for ARV therapy. Offer HTC and consider giving Cotrimoxazole prophylaxis.

Treat oesophageal candidiaisis with systemic medicines such as:

	Medicine	Codes		Adult dose	Frequency	Duration
	fluconazole po	**C**	**V**	200mg	Twice a day	7 – 14days

- Nutritional rehabilitation is indicated.
- Exclude other OIs such as TB/KS
- Refer to OI Clinic.

Herpes Simplex labialis

Usually the lesions are found on the lips, buccal mucosa and hard palate. They may prevent the patient from eating or swallowing well. If lesions are extensive e.g. covering all the lip areas**,** consider the following:

	Medicine	Codes		Adult dose	Frequency	Duration
	acyclovir po	**C**	**E**	400mg	3 times a day	5 days

Kaposi Sarcoma

The purple coloured lesions or nodules should be easy to see especially when they are on the palate but may be more difficult to diagnose if they are underneath the tongue. Check for similar lesions elsewhere. The patient should be offered HTC. Assess for Cotrimoxazole prophylaxis and refer to your nearest OI clinic.

Gum infections

These are most common in those who do not brush their teeth regularly. Oral hygiene should be emphasised.

Necrotizing gingivitis/periodontitis/stomatitis There may be spontaneous bleeding of the gums as well as loosening of the teeth

	Medicine	Codes		Adult dose	Frequency	Duration
	metronidazole po	**C**	**V**	200mg	3 times a day	5 days
plus	**amoxicillin po**	**C**	**V**	500mg	3 times a day	5 days

Dental Caries

The teeth will have multiple decays. Oral hygiene is needed and brushing twice a day with fluoride toothpaste should be encouraged. Limit sweet foods. Regular dental examination is required.

Persistent Generalized Lymphadenopathy (PGL)

The commonest cause of generalized enlarged lymph nodes (> 1cm) is underlying HIV. Thus the patient should be considered for HTC.

Oral Ulcers

These are painful ulcers that may occur anywhere in the buccal mucosa. They may prevent the patient from eating properly. Apart from herpes simplex, most are treated symptomatically by using simple analgesics. Large ulcers may need biopsy to exclude malignancy.
The following applied to the mouth area may help:

	Medicine	Codes	Adult dose	Frequency	Duration
	0.2% chlorhexidine mouth rinse	**C E**	2 – 4 times a day		
or	**1% povidone iodine**	**C E**		4 times a day	
or	**triamcinolone acetonide in orabase**	**A N**		3 times a day	

Histoplasmosis

This may present as a nodule on the palate and sometime a penetrating lesion i.e. a hole in the palate. Biopsy should confirm the diagnosis.

	Medicine	Codes	Adult dose	Frequency	Duration
	ketoconazole po	**A N**	200mg	Twice a day	Months

EAR NOSE AND THROAT DISORDERS

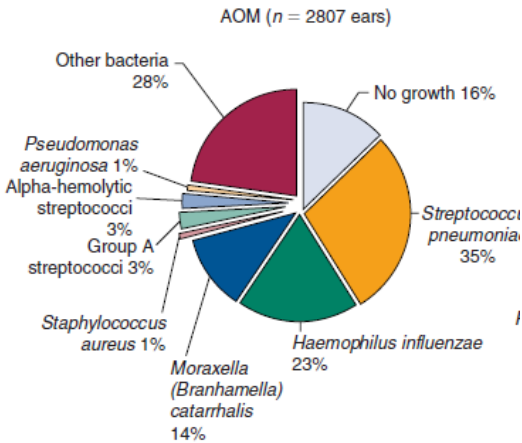
Acute Otitis Media (AOM)

Patient presents with fever, chills and irritability. Most common under 2 years of age. Examination shows irritable child, tympanic membrane inflamed and bulging.

Natural history

- 60% resolve in 24hrs
- 80% by 48hrs
- 88% 4-7 days
- OME 63% resolve after 2 weeks 40% remaining after one month
- 20% remaining by 3 months

Organisms that are involved in Acute Otitis Media



Streptococcus pneumonia (35%), Haemophilus influenza (23%), Moraxella catarrhalis (14%) form the majority.

Treatment

- Avoid risk factors-breastfeed more than 6 months; prevent parental smoking, encourage vaccination, provide good nutrition and encourage early attendance to day care.
- Analgesia and supportive care

Indications for giving antibiotics

- AOM under 6 months
- Severe AOM-temperature (axillary) > 39.5ºC

- Associated comorbidity-malnutrition, HIV
- Failure of resolution of symptoms in 48-72 hrs.
- Patients who might not return to hospital

First line medicine

Medicine	Codes	Adult dose	Frequency	Duration
amoxicillin po	**C V**	500mg 40mg /kg in paeds	3 times a day	2

Caution: Use erythromycin in patients with penicillin allergy, patients who received amoxicillin in the last thirty days (move to second line as the risk of resistance is high)

Second line medicine

Medicine	Codes	Adult dose	Frequency	Duration
Amoxicillin and clavulinic acid po	**B V**	80mg/kg; 6.4mg/kg	2 times a day	10 days (severe & <6mnths) 5-7 days (less severe)

Recurrent Acute Otitis Media

More than four episodes per year –**REFER**

Acute Mastoiditis

Patient presents with fever, chills. Examination reveals tenderness over mastoid and retroauricular swelling. Anterior displacement of auricle. Bulging and unhealthy tympanic membrane.

- Initiate intravenous antibiotics and **REFER**

Medicine	Codes	Adult dose	Frequency	Duration
Benzyl penicillin iv/im	**C V**	0.1MU/kg	stat	
Ceftriaxone iv/im	**C V**	80mg/kg	stat	

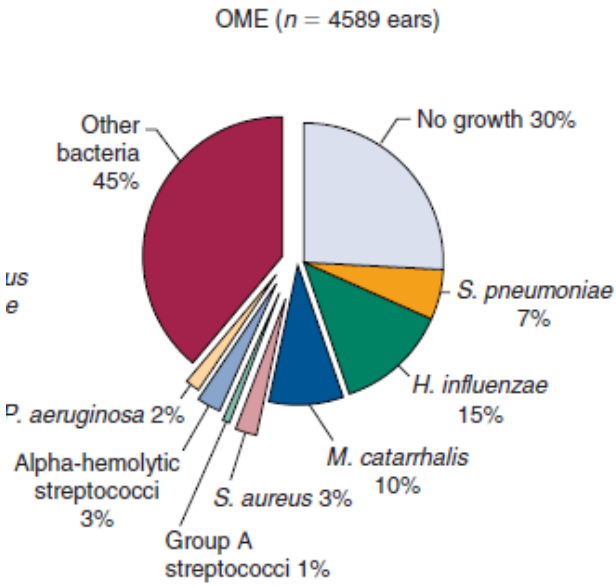
Otitis Media with Effusion

- Follows AOM or can present without any history of AOM
- Hearing loss most common presentation and aural fullness
- 5-7 years most common age group affected

- Otoscopy reveals brownish fluid behind intact tympanic membrane. Retraction of bulging of tympanic membrane with no signs of acute inflammation.

Otitis media with effusion in an adult **needs referral** to an ENT specialist for exclusion of nasopharyngeal carcinoma.

Organisms that are involved in Otitis Media Effusion



For management **REFER** to Specialist

Chronic suppurative otitis media

Presentation

- Otorrhoea for more than 14 days, hearing loss, usually no otalgia
- Otoscopy -mucopurulent discharge, ossicular chain erosion, Hearing loss
- Organisms-Staphylococcus aureus, Proteus spp, Klebsiella, Enterobacteriacie

Treatment

Ear syringing with saline or acidifying agent such as 1% boric acid, acetic acid and continued aural toilet

If ear is clear of discharge prescribe the following:

Medicine	Codes	Adult dose	Frequency	Duration
Ciprofloxacin ear drops	**B V**	3 drops	Twice daily	7 days
Amoxicillin po	**C V**	500mg	3 times a day	7 days

- Keep ears dry
- Avoid swimming
- **REFER** immediately to Ear Nose throat surgeon

Cholesteatoma

Presentation

- Keratin debris in the middle ear.

REFER immediately

Otitis Externa

- Presentations vary depending on cause
- Itchiness of canal, ulcers on the externa auditory canal, inflamed canal, occasional discharge from canal
- Otoscopy to assess the canal and tympanic membrane. Inflamed external ear (auricle and external auditory canal)

Bacterial otitis externa

Aural toilet with boric acid and acetic acid

	Medicine	Codes	Adult dose	Frequency	Duration
	Ciprofloxacin and dexamethasone ear drops	**B V**	3 drops	Twice daily	7 days
or	**Chloramphenicol and dexamethasone ear drops**	**B V**	3 drops	Twice daily	7 days
or	**Boric acid 1% ear drops**	**B E**	3 drops	Twice daily	7 days
or	**Acetic Acid ear drops**	**B N**	3 drops	Twice daily	7 days

Systemic Antibiotics are indicated for severe Otitis Externa

Medicine	Codes	Adult dose	Frequency	Duration
Amoxicillin po	**C V**	500mg	3 times a day	7-10 days

Ciprofloxacin po	**B**	**V**	500mg	Twice daily	7-10 days

Malignant Otitis Externa

This is a necrotising infection of the ear canal in patients who are immunosuppressed. Often the first presentation and should alert the physician of immunosuppression from any cause e.g. diabetes, HIV etc.

Initiate IV antibiotics with a penicillin as above

Medicine	Codes		Adult dose	Frequency	Duration
Ciprofloxacin po	B	V	500mg	2 times a day	12 weeks

Add: Intravenous fluids

Debridement

REFER immediately

Fungal otitis externa

After routine ear toilet as above

Medicine	Codes		Adult dose	Frequency	Duration
Clotrimazole ear drops	B	V	3 drops	Once daily	7 days

Acidifying agents like boric acid and acetic acid can be used as well

Keratosis Obliterans

- Clear the ear canal of all debris
- Inspect the canal and tympanic membrane

Allergic Otitis Externa

Medicine	Codes		Adult dose	Frequency	Duration
1% hydrocortisone cream	C	V	Apply	Once daily	7 days

Inner Ear

Vertigo-

- Viral Labyrinthitis
- Benign Paroxysmal Positional Vertigo
- Meniere Syndrome

REFER

Sensorineural Hearing Loss-**REFER**

Cerebrospinal Fluid Otorrhoea-**REFER**

Rhinology

Acute Rhinosinusitis

Clinical presentation

- Nasal blockage, rhinorrhoea, anosmia facial pressure/pain are common symptoms
- Examination reveals clear nasal discharge initially and discharge turns mucopurulent when bacterial superinfection occurs.
- Majority are caused by viral infections such as rhinovirus, Adenovirus, respiratory syncytial virus, Para influenza virus

Treatment

- Observation and supportive care
- Analgesia and plenty of oral fluids

Indications of antibiotics

- Failure of resolution of symptoms in 48-72 hrs.
- Discharge turns mucopurulent
- Patients with comorbidities e.g. malnutrition, immunosuppression

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

Chronic Rhinosinusitis

If above symptoms persist for 90 days.

REFER

Allergic Rhinosinusitis

Presentation

- Acute rhinorrhoea- clear nasal discharge, Nasal obstruction, and anosmia

Treatment

- Avoid allergens

First line

Medicine	Codes	Adult dose	Frequency	Duration
Fluticasone diproprionate nasal spray	B V	One puff	1-2 times a day	1 month
Fluticasone furoate spray	A E	One puff	Once a day	1 month

- Duration of treatment varies according to response. Minimum one month of spray.
- Nasal sprays are efficacious as they control nasal symptoms and are less systemically absorbed hence have low side effect profile

Second line

Oral antihistamines

Medicine	Codes	Adult dose	Frequency	Duration
Chlopheniramine po	**C V**	4mg	3 times a day	7 days

- Cause sedation, prostatism and should be used with caution in patients with glaucoma. They cause dryness of secretions and tachyphylaxis. Medications should not be taken for more than seven days without referral

Second generation antihistamines

Medicine	Codes	Adult dose	Frequency	Duration
Cetirizine po	**B V**	10mg	Once at bedtime	7 days

NB: They do not have CNS penetration hence do not cause sedation and tachyphylaxis.

Patients with persistent symptoms despite nasal steroids need referral for further investigations

Fungal Rhinosinusitis-Invasive

- Invasive fungal sinusitis-common in immunosuppressed such as diabetic (uncontrolled, Ketoacidosis).
- This is an aggressive soft tissue infection with high mortality rate and needs a high index of suspicion. Early referral to Ear Nose and Throat Surgeon is required
- Presentation- nasal blockage, necrosis of mucosa of nasal cavity. Orbital signs include proptosis and opthalmoplegia. Patients also present with intracranial extension

Management-Refer for:

- Correct underlying cause
- Aggressive surgical debridement
- Microscopy and culture to identify the fungal
- Systemic antifungal treatment

Non Invasive fungal Rhinosinusitis

Refer

Obstructive sleep apnoea from adenotonsillar hypertrophy

- Children present with snoring, stertor (a respiratory sound characterized by heavy snoring or gasping caused by partial obstruction of airway), mouth breathing
- Treatment depends on severity of symptoms.

Refer for persistent symptoms

Tonsillitis-Acute

- Patients present with fever, chills, odynophagia and dysphagia
- On examination the tonsils are inflamed and often have exudates. Unilateral exudate and tonsillar asymmetry indicate a peritonsillar abscess

Management
Analgesia and antibiotics

First line

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

Second line

Medicine	Codes	Adult dose	Frequency	Duration
Amoxicillin/clavulinic acid po	**A V**	80mg/kg;7mg/kg	2 times a day	7 days

Third line
Cephalosporin under specialist care
Recurrent Tonsillitis - Refer
Chronic tonsillitis - Refer
Peritonsillar abscess-Initiate antibiotics as above and refer

Epistaxis

Predisposing factors include upper respiratory tract infection, habitual nose picking, nasal sprays, haematological malignancies and patients on anticoagulants,
Patients with hypertension often have severe epistaxis
Management
Expel clots and examine nose with good light
Identify the bleeding points
Children-bleeding on Little's area is common
Adults –may have a posterior bleed
Anterior epistaxis- Pack anteriorly bilaterally with ribbon gauze soaked in oily antiseptic solution such as Proflavin gel or glycerine and icthymol.
Posterior packing. Use Foley's catheter with 5cc of saline to pack posteriorly
Reinforce with anterior packing bilaterally
Refer as soon as pack is in situ
The use of adrenaline is discouraged as it may cause severe rebound epistaxis.
Initiate Amoxicillin if pack is to last for more than 48 hrs.
Indications for referral in epistaxis
Patients with posterior bleed
Patients with comorbidities-hypertension, anticoagulation use, elderly, severe anterior epistaxis
Anterior epistaxis not responding to initial management
Deranged blood chemistry or deranged full blood count
Suspicion of malignancy

CSF rhinorrhoea

CSF rhinorrhoea should be suspected in a patient who presents with clear rhinorrhoea after head injury or nasal surgery. It can also be spontaneous
Patient's reports worsening of rhinorrhoea on leaning forward. They have a headache post draining.

This can be mistaken as allergic Rhinosinusitis with lethal consequences.
If there is suspicion of CSF leak, refer

Croup

Low grade fever, backing cough, stridor.
Management
Grade the upper airway obstruction
Grade 1 Inspiratory stridor
Grade 2 Inspiratory/expiratory stridor
Grade 3 Inspiratory/expiratory stridor with pulsus paradoxus
Grade 4 Silent chest
Always beware of a silent chest in airway obstruction as this indicates impending respiratory failure. Reduction in the loudness of stridor should be regarded as a dangerous sign and needs urgent securing of airway.
Management
Grade 1 and 2:

Medicine	Codes	Adult dose	Frequency	Duration
Racemic adrenaline nebulizer	**C V**		Every 2hrs	PRN
Dexamethasone IV	**B V**	0.1-0.6mg/kg	6 hourly	

Strict monitoring with continuous pulse oximetry. Of note is that pulse oximetry might give a false sense of security as it is a late marker of hypoxia and is affected by cold extremities and vasoconstriction.
Refer if no change or as soon as poor response is noted.
Grade 3 and 4:
Need airway to be secured. Treat as above and refer

Acute cervical lymphadenitis

Painful neck mass. Usually follows a history of upper respiratory infection.
Treatment

Medicine	Codes	Adult dose	Frequency	Duration
Amoxicillin po	**C V**	500mg	3 times a day	7 days
Paracetamol po	**C E**	500mg	3 times a day	5-7 days

Skin Conditions

Bacterial Infections

Impetigo

A superficial bacterial infection causing rapidly spreading blisters and pustules. It occurs commonly in children, usually starting on the face, especially around the mouth or nose. Often due to Staphylococcus aureus.

Keep infected areas clean and prevent spread to others (care with towels, clothes, bedding; change frequently and wash clothes separately).
Bathe affected parts/soak off the crusts with soap and water,

If severe, or systemic symptoms present **use**:

	Medicine	Codes	Adult dose	Frequency	Duration
	erythromycin po	**C V**	250-500mg [Paed = 125-150mg]	4 times a day	7-10days
or	**cloxacillin po**	**B V**	250-500mg [Paed = 125-150mg]	4 times a day	7-10days

Folliculitis

Superficial infection causing small pustules, each localised around a hair. Deep follicular inflammation often occurs in hairy areas.

Bath and remove crusts using soap and water,

Treat as for impetigo, above.

Furunculosis

These are painful boils, most frequently caused by Staphylococcus aureus.Usually resolves on its own, but improved by placing frequent hot compresses over the boil until it breaks.

Review after 2 days; if not improving, consider surgical incision and drainage. If the boil causes swollen lymph nodes and fever, consider systemic antibiotics:

Medicine	Codes	Adult dose	Frequency	Duration
cloxacillin po	**B V**	250-500mg [Paed = 125-250mg]	4 times a day	5-7 days

Erysipelas

A superficial cellulitis with lymphatic vessel involvement, due to streptococcal infection.

Begins at a small break in the skin or umbilical stump (children). Area affected has a growing area of redness and swelling, accompanied by high fever and pains.
Treat with:

Medicine	Codes	Adult dose	Frequency	Duration
erythromycin po	**C E**	250-500mg	4 times a day	7 days

		[Paed = 125-250mg]		

Erysipelas has a tendency to recur in the same area. If recurrent episode, increase duration of antibiotic to 10-14 days.

Acute Cellulitis

Inflammation of the deeper, subcutaneous tissue most commonly caused by Streptococci or Staphylococci.

Acute cellulitis [indistinct borders] should be differentiated from erysipelas [raised, sharply demarcated margins from uninvolved skin]. Give antibiotics:

Medicine	Codes	Adult dose	Frequency	Duration
cloxacillin po	**B V**	250-500mg	4 times a day	5-7 days
	[Paed = 125-250mg]			

Paronychia

Painful red swellings of the nailfolds which may be due to bacteria or yeast.

Acute Paronychia

Tenderness and presence of pus indicates systemic treatment with antibiotics is required:

Medicine	Codes	Adult dose	Frequency	Duration
erythromycin po	**C E**	250-500mg	4 times a day	5 days
	[Paed = 125-250mg]			

If ineffective:

Medicine	Codes	Adult dose	Frequency	Duration
cloxacillin po	**B V**	250-500mg	4 times a day	5-7 days
	[Paed = 125-250mg]			

Chronic Paronychia

Often fungal - due to candida. Avoid excessive contact with water, protect from trauma and apply:

Treat secondary infection with antibiotics as above.
For both acute and chronic, incision and drainage may be needed.

Acne

Comedones, papulopustules and eventually nodular lesions on the face, chest and back.

Seek underlying cause if any e.g. overuse of oils on skin, stress, anticonvulsant medicines, and use of topical steroids. Topical hydrocortisone or betamethasone must **not** be used.

Use ordinary soap and water 2-3 times a day. In cases with many pustules, use:

	Medicine	Codes		Adult dose	Frequency	Duration
	benzoyl peroxide 5%gel	**C**	**N**	apply	every night	Review

In severe cases of nodular acne, treat with oral antibiotic:

	Medicine	Codes		Adult dose	Frequency	Duration
	doxycycline po	**C**	**V**	100mg	once a day	2-4 months

Patients should be encouraged to persist with treatment. If not improved refer**.**

Fungal Infections

Body Ringworm (Tinea Corporis)

Round, expanding lesions with white, dust-like scales and distinct borders; on the body or face.

- Responds to any of the topical antifungal agents.

	Medicine	Codes		Adult dose	Frequency	Duration
	miconazole cream 2%	**C**	**V**	topically	2-3 times a day	for 7 more days after resolved
or	**clotrimazole cream 1%**	**C**	**E**	Topically	2-3 times a day	for 7 more days after resolved

First line:

Tinea Pedis (Fungal / Athlete's Foot)

This is a very common fungal infection and is often the source of infection at other sites. Keep the feet as **dry** as possible, and as far as possible avoid wearing socks / closed-in shoes.

Treat any bacterial superinfection first:

	Medicine	Codes		Adult dose	Frequency	Duration
	miconazole cream 2%	**C**	**V**	Topical	2-3 times a day	for 7 more days after resolved
or	**clotrimazole cream 1%**	**C**	**V**	topical	2-3 times a day	for 7 more days after resolved

- In severe infections use griseofulvin:

	Medicine	Codes		Adult dose	Frequency	Duration
	griseofulvin po	**B**	**N**	500mg [Paed = 10mg/kg]	once a day	8 weeks
Or	**terbinafine cream**	**B**	**N**	apply	Twice a day	6-8 weeks

Take with food or milk. Do not crush tablet tablets.

Pityriasis Versicolor (Tinea Versicolor)

Common fungal infection caused by a yeast. Hypopigmented patches of varying size on the chest, back, arms and occasionally neck and face.
Griseofulvin is **not** effective. Apply:

	Medicine	Codes		Adult dose	Frequency	Duration
	Selenium sulphide 2,5%	**B**	**N**	apply	daily	5 days

Scalp Ringworm (Tinea Capitis)

In this case the fungus has grown down into the hair follicle.

Topical antifungal therapy may work but if ineffective; treat with:

	Medicine	Codes		Adult dose	Frequency	Duration
	griseofulvin po	**B**	**N**	500mg [Paed = 10mg/kg]	once a day	14 days

Take with food or milk. Do not crush tablet tablets.

Scabies

Caused by mites, transmitted by skin-to-skin contact. The lesion is a "burrow" (a whitish ziz-zag channel), the resting place of the female mite.

Main sites: between the fingers, on the wrists, in the axilla, around the navel, genitals and inner sides of feet.
Treat all close contacts, especially children in the same household. Wash clothing and bedding and leave in the sun to dry.
After normal bathing, apply:

	Medicine	Codes		Adult dose	Frequency	Duration
	Permethrin 5% cream	**C**	**N**	apply from neck down	once and wash off after 8-12hrs*	once only
or	**gamma benzene hexachloride 1% lotion**	**C**	**N**	apply from neck down	once and wash off after 24hrs	once only

**CAUTION: In prepubertal children the gamma benzene hexachloride is washed off after 12 hours. Hot baths and scrubbing should be avoided to prevent systemic absorption.*

Alternative in pregnancy, lactating mothers or children < 6 months:

Medicine	Codes		Adult dose	Frequency	Duration
benzyl benzoate 25% emulsion * [irritant] *Dilute with one part water (1:1) for children. *Dilute with three parts water (1:3) for children.	**B**	**N**	apply from neck down	once at night wash off next morning	for 3 nights, repeat if necessary within 10 days

or	**sulphur ointment 5-10%** [in children]	**B**	**N**	apply	2 times a day	1-2 weeks

If there is secondary bacterial infection ("septic sores"), treat as for impetigo for 4-5 days. Only apply scabicide once lesions are closed.

Advise that the itch may continue for several weeks. This can be relieved by applying:

	Medicine	Codes		Adult dose	Frequency	Duration
	calamine lotion	**C**	**N**	apply	as needed	as required
and	**chlorpheniramine po**	**C**	**E**	4mg [Paed = 0.1mg/kg]	3 times a day	3 days

Cutaneous Larva Migrans

['Creeping Eruption, Sandworm'] see chapter on Tropical Diseases

Viral infections

Herpes Simplex

Virus causing vesicles, usually around the lips or around the mouth (but also occurring elsewhere e.g. genitals).

May recur often during times of decreased well-being (incubation time of infectious diseases, menses, mental stress). No specific medication; keep the lesions dry.

Chickenpox

Caused by the varicella-zoster virus. The virus often persists and may later cause Herpes Zoster (Shingles).

Incubation period is 12-21 days. Patches appear first on the trunk, then spread to the face and scalp. Within a few days there are papules, vesicles and crusts.

Keep the lesions dry with saline baths or zinc oxide preparation.

For itching:

	Medicine	Codes		Adult dose	Frequency	Duration
	calamine lotion	**C**	**N**	apply	as needed	as required
and	**chlorpheniramine po**	**C**	**E**	4mg [Paed = 0.1mg/kg]	3 times a day	3 days

Herpes Zoster

See the chapter on HIV Related Diseases.

Other Dermatological Conditions

Eczema

An inflammatory condition of the skin whose feature include redness, itching weeping (oozing) vesicular lessions which become scaly,crusted or hardened and may sometimes become secondarily infected.

Allergic Contact Dermatitis

Results from an acquired allergy after skin contact with particular chemicals (dyes, perfumes, rubber, chromium, nickel) or medicines (skin preparations containing lanolin, iodine, antihistamines, neomycin, vioform etc).

Atopic Dermatitis / Eczema

Often a personal or family history of atopic disease (asthma, hay fever or atopic dermatitis). Cause not known. These persons are also more susceptible to herpes simplex and vaccinia (but not varicella-zoster).

The clinical form may differ according to age.

Infantile eczema / cradle cap

Usually appears at 3 months with oozing and crusting affecting the cheeks, forehead and scalp.

IMPORTANT: If generalised exfoliative dermatitis develops, refer to a specialist at once.

Flexural eczema

Affects the flexor surfaces of elbows, knees and nape of neck. In <u>adults</u> any part or the whole of the skin may be affected with intense itching, particularly at night.

Management of Eczema

Remove any obvious cause e.g. skin irritants or allergens.
As a soap substitute use:

	Medicine	Codes		Adult dose	Frequency	Duration
	emulsifying ointment	**B**	**N**	as a soap substitute		
or	**aqueous cream****	**B**	**N**	as a soap substitute		

**1% Hydrocortisone in an ointment for dry eczema and as a cream for 'weepy' eczema

Second Line

Use soap substitute as above and add Betamethasone) 0.1% in an ointment base for dry eczema and a s a cream for weepy eczema. If this fails refer for specialist management.

Treat itching with an oral antihistamine. **Never** use topical antihistamines:

	Medicine	Codes	Adult dose	Frequency	Duration
	chlorpheniramine po	**C E**	4mg [Paed = 0.1mg/kg]	3 times a day	3 days
or	**promethazine po***	**B N**	25-50mg	at night	as needed

** Not to be used in children under the age of 2 yrs. Promethazine causes drownsiness which may be aggravated by simultaneous intake of alcohol*

Treat any infection. Choice of skin preparations depends on whether lesions are wet (use cream) or dry (use ointment)

Where large areas are involved give a course of systemic antibiotics

	Medicine	Codes	Adult dose	Frequency	Duration
	erythromycin po	**C V**	250-500mg [Paed = 125-150mg]	4 times a day	7-10days
or	**cloxacillin po**	**B V**	250-500mg [Paed = 125-150mg]	4 times a day	7-10days

After the lesions have healed, apply a bland preparation such as aqueous cream or emulsifying ointment to moisturise the skin.

CAUTIONS: Never use corticosteroid preparations stronger than 1% hydrocortisone on the face. Systemic Steroids should be avoided except in severe conditions under specialist supervision.

Urticaria

Urticaria is the result of leakage of plasma from the dermal vasculature, presenting with itchy raised patches of skin (wheals) due to dermal oedema. These wheals are sometimes known as 'hives', and are usually a sign of an allergic reaction. Hives can be rounded or flat-topped but are always elevated above the surrounding skin.

Allergic urticaria *may be caused by: medicines (e.g. penicillin) infection, contact with plants, pollen, insect bites, or foodstuffs (e.g. fish, eggs, citrus fruits, nuts, strawberries, tomatoes.)*

Physical urticaria *may be caused by mechanical irritation, cold, heat, sweating.*

Exclude medicine reaction (e.g. penicillin), or infection (bacterial, viral or fungal).

Give antihistamine by mouth [never use topical antihistamines]:

	Medicine	Codes	Adult dose	Frequency	Duration
	chlorpheniramine po	**C E**	4mg [Paed = 0.1mg/kg]	3 times a day	as required
or	**promethazine po***	**C E**	25mg	once at night	as required

or	**Cetirizine po**	**B**	**E**	10mg	Once a day	As required

** Not to be used in children under the age of 2 yrs. Promethazine causes drownsiness which may be aggravated by simultaneous intake of alcohol*

If no improvement after 1 month or chronic problem, refer.

Psoriasis

A condition of the skin characterised by thickening and scaling; usually symmetrical.

Exclude precipitating factors e.g. alcohol, deficiencies of B12 or folate, stress, infections.

Avoid using steroids.

To reduce scaling use a keratolytic:

	Medicine	Codes		Adult dose	Frequency	Duration
	salicylic acid 2% oint.	**B**	**N**	apply	once at night	as needed

Sun exposure to the lesions for half an hour or one hour daily may be of benefit.

In resistant cases **add**:

	Medicine	Codes		Adult dose	Frequency	Duration
	coal tar ointment 5% in salicylic acid 2%	**B**	**N**	apply	twice a day	as needed
or	**zinc oxide ointment**	**B**	**N**	apply	twice a day	as needed

If not responding, **refer**.

Pellagra

Syndrome caused by deficiency of a variety of specific factors, nicotinic acid being the most important. Cardinal signs: diarrhoea, dermatitis (sites exposed to sun and pressure) and dementia.

Treat both adult and child with:

	Medicine	Codes		Adult dose	Frequency	Duration
	nicotinamide po	**B**	**E**	100mg	once a day	2 weeks or review

Advise on diet: should be rich in protein (meat, groundnuts, beans.)

Albinism/ Vitiligo

Albinism is generalised loss of pigmentation (congenital). Vitiligo is patchy loss of pigmentation (acquired in later life).

There is no causal therapy for albinism and vitiligo. Advise yearly examination for skin cancer and protective clothing (long/sleeved garments, wide-brimmed hat, long skirts /trousers, sunglasses)

Use a sunscreen–and sun blocker on lips. An effective and cheap preparation with a sun protection factor of 15 (SPF=15) is “PABA”:

Medicine	Codes	Adult dose	Frequency	Duration
para-amino-benzoic acid cream / lotion	**C V**	apply	daily in the morning	as required

Warts

Warts should usually be left to resolve spontaneously. If extensive, refer.
Plantar warts - are self-limiting and should **not** be excised or treated with podophyllin.

Molluscum contagiosum and Genital Warts -

Refer to the chapter n Sexually Transmitted Diseases

BURNS

Assessment

Burns caused by heat

Immediate cooling by immersion in water at approximately 25°C for 15mins to 30mins; then apply simple dry dressings (remove clothing if not adherent to burn and wrap in a clean cloth).

Chemical Burns

If there is dry powder present brush off the excess and then wash preferably with running water in large amounts for at least 20 minutes. Seal with soft paraffin (Vaseline) only what cannot be extracted with water.

Remove contaminated clothing, shoes, socks, and jewellery as the wash is applied. Avoid contaminating skin that has not been in contact with the chemical.

For burns due to sulphur or phosphorus a copper sulphate solution can be used to neutralise the chemicals.

Electrical Burns

Cool burns as above. A patient unconscious from electrical or lightning burns will need urgent cardiac assessment and resuscitation. Defibrillation or external cardiac massage may be lifesaving.

Smoke Inhalation Burns

If occurred in an enclosed area - may need 100 % oxygen.

Resuscitation takes first precedence over any other management. This is followed by a quick history of the burn and then an estimation of the extent of the burn. Obtain information as to time of occurrence and circumstances of the burn. Other injuries are often seen with burns and may need management.

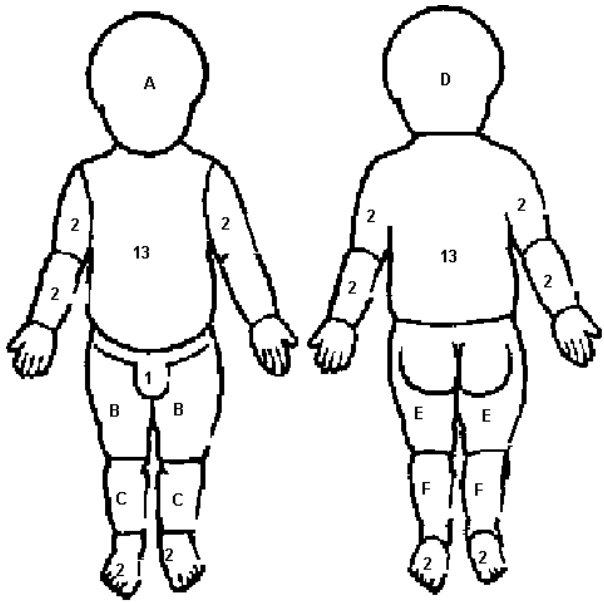
Evaluation of Burnt Surface Area

Resuscitation is initially based on surface area burned.

- In **children** use the Lund & Browder chart (Figure 25.1).
- In **adults** use the rule of nine's (Fig 25.2).

In children the head, thigh and legs account for different percentages according to the age of the child. Use the table below.

Figure 25.1 Estimating the Body Surface Area for Burns in Children (modified Lund & Browder)



	Age < 1yr	1 year	5 years	10 years
Head (A or D)	10%	9%	7%	6%
Thigh (B or E)	3%	3%	4%	5%
Leg (C or F)	2%	3%	3%	3%

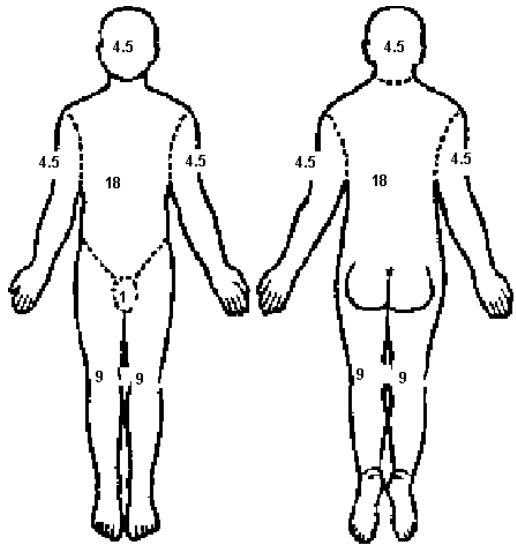
Note:

The Wallace Rule of Nines (fig. 25.2) is ***inaccurate*** *in children.*

Children compensate for shock very well, but then collapse rapidly – beware the restless, irritable child.

Do not over-estimate burn size – this will lead to over-hydration.

Fig 25.2 Estimating the Body Surface Area of the Burn in Adults: Rule of 9's.



Note: In adults, the outstretched palm and fingers approximates to 1% of body surface area. If the burned area is small, find out how many times the 'hand' covers the area. (Hand Rule)

Severity of burn is determined by the area of body surface burned and the depth of the burn.

Burns are either deep or superficial. Superficial burns (partial skin thickness) are sensitive all over. With deep burns (full thickness) there is sensation at the edges only. Depth of burn influences later treatment in particular.

NB: Pain is a poor guide to burn depth in children.

General Management Guidelines

Depends upon extent and nature of burn. Any burn affecting greater than 10% of the body surface area is considered extensive and serious because of fluid loss, catabolism, anaemia and the risk of secondary infection.

Hospital admission is required for:

- Adults with 10% burns or more
- Children with 8-10% burns or more.
- Burns of special regions: face, neck, hands and feet, perineum and joints.
- Circumferential burns (right around / both sides of a limb /region)
- Electrical, lightning, and chemical burns
- Lesser burns associated with inhalation injury, concomitant mechanical trauma, or significant pre-existing medical disorders (e.g. epilepsy, diabetes, malnutrition).
- Very young/very old patients, psychiatric patients/ para-suicidal, suspected abuse.

Transferring burns patients
Severe burns will require long term special care and should be managed in a suitable hospital (burns unit). Always endeavour to transfer the above cases within 24hrs of the burn. Transfer with the following precautions:

- Short, easy journey - commence resuscitation, make clear summary of records and send with medical attendant.
- Prolonged or delayed journey - resuscitate and transfer when patient stable. Keep the patient warm and covered during journey and continue management already started.

Management of Moderate Burns

Small Surface Area Burns

Reassurance. 1st to 2nd degree burns are the most painful. Give adequate analgesia – see the section on pain management:

	Medicine	Codes	Adult dose	Frequency	Duration
	paracetamol po	**C** **E**	500mg-1gm Paed = 10mg/kg	4-6hrly	as required
+/-	**codeine phosphate po**	**B** **E**	Adults: 15-60mg	4 hourly	as required

- Give an anti-tetanus booster:

	Medicine	Codes	Adult dose	Frequency	Duration
	tetanus toxoid im	**C** **V**	0.5ml*	one dose only	

**check manufacturer's instructions*

- Apply simple dry or non-adherent dressings.
- Elevate the burned part.

Follow up as outpatient. Expect healing within 10-14 days if clean. Any burn unhealed within 21-28 days needs reassessment.

Antibiotics are indicated for contaminated burns and inhalation burns.

	Medicine	Codes	Adult dose	Frequency	Duration
	benzylpenicillin iv	**C V**	0.05MU per kg	every 6hrs	reassess after culture
or	**erythromycin po**	**C V**	500mg Paed = 12.5mg/kg	every 6hrs	reassess after culture

Change regimen if indicated by culture and sensitivity tests. Gram negative organisms are usually implicated later on, and a more appropriate blind therapy before results are obtained.

Large Surface Area Burns

Emergency Measures
Reassurance is an essential part of therapy.

Establish IV line. For all adults with burns greater than 15% and children with burns greater than 10%, start:

	Medicine	Codes	Rate
	ringers lactate iv	**B V**	10mls /kg/ hr for 12hrs, then reduce to 8mls /kg /hr.

Analgesia. Do not use oral or intra-muscular route in first 36hrs unless peripheral circulation is re-established.

Analgesia in adults:

	Medicine	Codes	Adult dose	Frequency	Duration
	morphine iv slow	**B E**	2.5 – 5mg increasing as required	every 4hrs	review
or	**pethidine im (or iv in small diluted doses)**	**B V**	1mg/kg	every 4hrs	review

Analgesia in children:

	Medicine	Codes	Paed dose	Rate
	morphine iv	**B E**	0.05-0.06 mg/kg	per hour continuous iv infusion
or	**morphine iv bolus**	**B E**	0.1mg	every 2 hrs

Use nasogastric tube to <u>empty</u> stomach in large burns; the tube may later be used for feeding if not possible orally after 48 hours.

Resuscitation of Large Surface Area Burns: Adults

Fluid required in the first 24 hours:

***Total amount (ml) = 4 x weight in kg x area of burn %**

Medicine	Codes	Rate

	ringers lactate iv	**B**	**V**	Give ½ the total amount in the first 8hrs.
or	**normal saline iv**	**C**	**V**	Then ¼ the total in the next 8hrs, and the other ¼ in the remaining 8hrs.

** Parkland Formula*

Resuscitation of Large Surface Area Burns: Children

For the child in shock or with large burns:

	Medicine	Codes		Paed dose
	ringers lactate iv	**B**	**V**	15-25ml/kg over 1-2 hrs

then calculate:

***Total amount in mls = 3.5 x weight in kg x area of burn %**

	Medicine	Codes		Rate
	ringers lactate iv	**B**	**V**	Give 1/3 the total amount every 8hrs
and	**darrows half strength with dextrose 2.5%**	**C**	**V**	Normal daily requirement (see section on IV fluids)

Example: for a 9 Kg child with 20% burn, initially give 135-225 ml (9 X 15-25 ml) plus the first 24 hour requirement by calculation, using the formula:

3.5 X Weight (kg) x BSA burn (%) = volume required
3.5 X 9 X 20 = 630 ml Ringer Lactate
Plus NDR at 100ml/Kg = 900 ml half DD
Total requirement = 1530 ml

Give 210 ml Ringer Lactate every 8 hours.
Give 900 ml half Darrows/Dextrose continuously over 24 hours.

NOTE: In calculating replacement fluid, do not exceed BSA (burned) of 45% for adults and 35% for children. However, to prevent over (or under) transfusion the best guide is "Monitoring" (see below).

General Notes:

If isolation facilities are available, then nurse trunk, face and neck exposed, reapplying a thin layer of burn cream (see below) as often as needed. Exposed patients lose heat rapidly, so ensure that the room is kept warm (above 28°C, preferably 31-32°C); this helps conserve calories and protein.

If forced to use a crowded ward, dress whole burn area. Cover loosely with a bandage. Do not wrap limbs; allow movement, especially at the flexures, to prevent contractures. Unless infection ensues, the first dressing should be left undisturbed for 3 days (review daily).

Preferably never mix "old" and "new" burns cases.

Cleaning - small burns

- Normal saline/ sitz baths

- Povidone solution
- Sitz baths with Povidone

Cleaning - large burns

depending upon facilities and resources:

- shower
- sitz bath or
- sitz bath and povidone iodine solution

Apply to the burns:

	Medicine	Codes	Dose	Frequency	Duration
	silver sulphadiazine 1% topical cream	**B** **V**	Apply daily (not to the face)		
or	**povidone-iodine** 5% topical cream	**B** **E**	Apply daily		

Give antitetanus booster:

	Medicine	Codes	Adult dose	Frequency	Duration
	tetanus toxoid im	**C** **V**	0.5ml	one dose only	

Give antacids routinely every 6 hours:

	Medicine	Codes	Adult dose	Frequency	Duration
	magnesium trisilicate po	**C** **N**	20ml	6 hourly	review

Antibiotics are required only if/when wounds contaminated. Gram positive organisms (notably B-haemolytic *streptococcus*) predominate early on (first 5 days):

	Medicine	Codes	Adult dose	Frequency	Duration
	benzylpenicillin iv	**C** **V**	2.5MU	6 hourly	change to oral *
*then	**Amoxicillin po**	**C** **E**	500mg	6 hourly	review

Change regimen if indicated by culture and sensitivity tests. Gram negative organisms are usually implicated later on, and a more appropriate blind therapy before results are obtained is:

	Medicine	Codes	Adult dose	Frequency	Duration
	benzylpenicillin iv	**C** **V**	2.5MU	6 hrly	review based on c/s
and	**gentamicin iv**	**C** **V**	80mg	8 hrly	

Monitoring

- Basic observations and clear records including input/output are essential.
- Mental responsiveness of patient (confusion can correspond to fluid imbalance).
- Pulse, BP (if possible), temperature.
- Breathing rate/depth; colour of nail beds and mucous membranes.
- ECG after electric shock or lightning injury
- Urine: colour, volume (should be at least 1ml/minute) and specific gravity; catheterise only if essential (predisposes to infection).

Later investigations:

- full blood count and haematocrit;
- electrolytes plus serum proteins;
- urine electrolytes;

Nutrition

- High protein, high energy diet, burns drink as per patient's weight.
- Give vitamin supplementation, high dose (dietary) Vitamin C:

Medicine	Codes	Adult dose	Frequency	Duration
(multi)-vitamins po	**C N**	4 tablets	3 times a day	review

NB: This does not apply in first 48 hours for large burns or non-motile GI tract (start feeding when bowel sounds return).

Physiotherapy

It is very important to prevent disability and disfigurement. Physiotherapy also serves to prevent hypostatic pneumonia. Start physiotherapy early.

Special regions/problem burns

Area	Notes
Circumferential burns of trunk, limbs or digits	Can constrict when swelling develops. This is particularly a feature of deep burns.
Eyes	Saline irrigation plus tetracycline or chloramphenicol eye ointment 4 hourly. Refer to eye hospital for specialist care.
Lips	Apply soft paraffin (Vaseline) three times a day.
Face	Apply burn cream daily; SSD not to be used on the face as it causes damage to the eyes.
Neck	Keep neck extended and head up (i.e. nurse half-seated).
Hands / feet	Elevate limbs. Dress with burn cream. Hands may be nursed free in a plastic bag with burn cream*, changed daily. Splint wrists.
Perineum	Catheterise early using sterile preparation. Apply burn cream* twice daily.

** burn cream is the term used to denote either silver sulphadiazine or povidone iodine cream*

Pain Management & Care of the Terminally Ill

Pain Management

General Principles

A full assessment of the pain is essential.

- Pain may be either acute (e.g. fractures, post-operative), or chronic (e.g. malignancy) and in each case should be graded as mild, moderate or severe.
- Pain may occur at more than one site and the cause at each site may differ, and therefore may require different treatment.
- The psychological state of the patient should be assessed. Anxiolytic and anti-depressant medication is seldom needed – the opportunity for discussion is more effective. If overlooked, underlying conditions –like anxiety, depression, social and spiritual distress - may aggravate pain, making control more difficult.
- In acute pain, careful and frequent assessment is needed to determine the period for which medicines should be given. As the pain lessens, analgesics should be reduced and ultimately discontinued.
- In chronic pain, long term analgesia is required. Frequent assessment is needed to establish the correct dose and minimise side effects of the medicines. Wherever possible analgesics should be given orally. Analgesics should be given at regular intervals to prevent recurrence of pain. Most preparations should be given every four hours. They should never be given on an "as required" basis – except when 'break through' doses are added to an existing dose. [See management of severe pain in this chapter.]

Mild Pain in Adults

The medicine of first choice for analgesic and antipyretic action is paracetamol. If anti-inflammatory action is required aspirin is the medicine of choice unless there is a definite contra-indication (peptic ulceration, coagulation defects, low platelet count, prior to surgery or breast feeding*.

	Medicine	Codes	Adult dose	Frequency	Duration
	paracetamol po	**C V**	500mg-1g (≤ 4g/day)	every 4-6hrs	as long as required
or	**aspirin po**	**C V**	300-900mg (≤4g/day)	every 4-6hrs	as long as required
or	**ibuprofen po**	**C E**	200-400mg (≤ 2.4g/day)	every 4-6hrs	as long as required

*****Use of aspirin as a regular pain and anti-inflammatory medicine raises safety issues so must be used with caution.

Moderate Pain

Treat as for mild pain. If inadequate control:

	Medicine	Codes		Adult dose	Frequency	Duration
add	**codeine phosphate po**	**B**	**E**	15-60mg	every 4 hrs	As long as effective
or	**Tramadol po**	**B**	**E**	50mg	6 hourly	5-7 days

Severe Pain

- Morphine is the medicine of choice. It should be given orally wherever possible and only rectally or parenterally (s.c., i.m., i.v.) in patients who cannot swallow.
- Codeine should be discontinued but a mild analgesic given with morphine may be useful. (largely because of the anti-inflammatory effect of WHO Pain Ladder level 1 analgesics
- An anti-inflammatory – or other adjuvant analgesic - may be needed.
- Patients should remain on the level of analgesia that controls pain. If there is inadequate pain control, treatment should be moved up to a medicine on the next step of the ladder. Patients with severe pain should be STARTED at the top level (i.e. morphine)
- Morphine is always given 4 hourly, and a "breakthrough pain" dose may be added at ANY time, the dose added being 60 – 100% of the current 4-hrly dose.

	Medicine	Codes		Adult dose	Frequency	Duration
	morphine im*	**B**	**E**	10mg	every 4 hrs	review
or	**morphine po**	**B**	**V**	5-10mg	every 4 hrs	review, then
				Increase dosage by approximately 50% increments until pain control is achieved		

**when calculating parenteral dose, use one third of estimated or existing oral dose.*

- Increments should be made quite rapidly i.e. after 24 hours at a particular level have failed to control the pain.
- Patients may be safely advised to increase the dose of morphine if pain control is not achieved. Tolerance does not occur. Psychological addiction does NOT occur, but physical dependence does and so an opiod analgesic must never be withdrawn abruptly. Respiratory depression is very unlikely if the dose of morphine is adjusted gradually to the needs of the individual patient.
- It is unusual for patients to require more than 200 mg per dose although there is no "ceiling" on the individual dose required, For acute pain smaller doses are usually adequate.

- If pain control is not achieved on morphine, a complex pain syndrome should be suspected and appropriate adjuvant analgesics added. Additional psycho-social counselling may also be indicated.
- Long term usage of morphine is usually reserved for cancer patients, but may be required for non-malignant chronic neuropathic pain syndromes.

Side-effects of morphine

These are mostly transient and treatable and should **not** contraindicate the continued use of morphine. They include:

Nausea and vomiting:
This is usually transient. An antiemetic should be offered, or given prophylactically for the first three days.

	Medicine	Codes		Adult dose	Frequency	Duration
	metoclopramide po	**B**	**V**	10-20mg	3 times a day	3-5 days
or	**prochlorperazine po**	**B**	**N**	5-10mg	3 times a day	3 – 5 days
or	**haloperidol po**	**A**	**N**	1.5-4.5mg	at night	3 – 5 days

**If vomiting is severe, antiemetics may need to be given parenterally or rectally.*

Drowsiness, dizziness, confusion:
Occurs especially in the elderly or dehydrated, but improves within 3 days. Do **not** discontinue morphine.

Allergy:
Morphine allergy is v**ery rare**. Initial vomiting, or transient pruritis are NOT signs of allergy. An alternative is pethidine, but it is short-acting and less potent than morphine. Pethidine is better suited for acute pain than chronic.

Medicine	Codes		Adult dose	Frequency	Duration
pethidine im	**B**	**V**	50-100mg	2-3 hourly	As long as there is pain

**Not suitable for long term use.*

Constipation:
This is an INVARIABLE side-effect of opioid analgesics and all patients should receive regular laxatives. Encourage high roughage diet and high fluid intake.

Special Types of Pain

In certain situations other medicines may be useful in controlling pain. These medicines may be used alone or with an analgesic.

Nerve Compression

Medicine	Codes		Adult dose	Frequency	Duration
dexamethasone po	**B**	**V**	8 mg	Once daily	see below

Reduce dose of steroids progressively to minimal maintenance level once clinical improvement occurs.

Raised Intracranial Pressure

Manage with codeine or morphine analgesia and:

	Medicine	Codes		Adult dose	Frequency	Duration
	dexamethasone po	**B**	**N**	12-16mg	once a day	review
or	**prednisolone po**	**B**	**V**	90-120mg	once a day	review

Reduce dose of steroids progressively to minimal maintenance level once clinical improvement occurs

Joint / Bone Pain

See also chapter on Bone & Joint Conditions

	Medicine	Codes		Adult dose	Frequency	Duration
	aspirin po	**C**	**V**	600-900mg	every 4-6hrs	review
or	**Ibuprofen* po**	**C**	**E**	400mg	every 4hrs	review
or	**indomethacin** po**	**B**	**E**	25 – 50mg	every 4-6hrs	review

** consider providing Ibupfrofen for facilities where staff is trained in PC*

*** if a rectal form of indomethacin or other anti-inflammatory is available it should be considered for use*

Metastatic Bone Pain

Use analgesic as per level of pain assessed . Note: regular long term addition of a non-steroidal anti-inflammatory medicine **is** effective and often allows lower doses of analgesics to be used.

Neuropathic Pain

Trigeminal Neuralgia, Post Herpetic Neuralgia & Peripheral Neuralgia

- ALWAYS start with analgesics and then consider adding

	Medicine	Codes		Adult dose	Frequency	Duration
	carbamazepine po	**B**	**V**	100mg	1-2 times a day	Increasing every 3 days
				to max of 400mg	3 times a day,	review
+/-	**amitriptyline po**	**B**	**E**	25mg	Not later than 8pm at night	increasing
				to 75mg*	Before 8pm at night,	review

**Pain relief is achieved at lower doses than for antidepressant effect*

In severe cases specific nerve block may be needed (using local anaesthetic or neurolytic agents).

Phantom Limb Pain

Treat as for neuralgia; if severe, nerve block may be required.

Management of Pain in Children

See also the section in the Cancer module.

- Pain in children needs careful and regular assessment as children may not complain of pain. Babies also experience pain and may require analgesics. Parents are good judges of their child's pain.
- When available/ necessary suppositories should be used.
- If pain is intractable refer for specialist management e.g. regional block or wound infiltration.

Mild Pain

	Medicine	Codes		Paed dose	Frequency	Duration
	paracetamol po	**C**	**V**	10-15mg/kg	every 4hrs	review

Moderate Pain

	Medicine	Codes		Paed dose	Frequency	Duration
	paracetamol po	**C**	**V**	10-15mg/kg	every 4hrs	review
and	**codeine* phosphate po**	**B**	**V**	0.5-1mg/kg	every 4hrs	review

**Prevent constipation by increased fluid intake and high fibre diet where feasible and laxative regimen*

Severe Pain

	Medicine	Codes		Paed dose	Frequency	Duration
	paracetamol po	**C**	**V**	10-15mg/kg	every 4hrs	review
and	**morphine po**	**B**	**V**	<6months = 0.02mg/kg >6months = 0.04mg/kg	every 4hrs	
or	**morphine sc/iv**	**B**	**E**	0.025 mg/kg	per 4 hour as continuous sc/iv infusion	
or	**Tilidine hydrochloride drops**	**B**	**V**	1 drop per year age (max. 5 drops)	6 hourly as drops	

Nausea and vomiting

	Medicine	Codes		Paed dose	Frequency	Duration
	metoclopramide po	**B**	**V**	0.1-0.2mg/kg	3 times a day	review
or	**promethazine po***	**B**	**N**	0.025-0.05mg/kg	3 times a day	review

**not for use in children under the age of 2yrs*

Care of the Terminally Ill

Good palliative care can greatly relieve the mental and physical suffering of terminally ill patients.

Psychological support

A full explanation of the illness, the treatment and expected physical symptoms should be discussed (often on several occasions). It is important that health workers be available to provide continuing support. Fear and anxiety about dying, pain and other distressing symptoms are common, and patients may become depressed.

Management includes:

- Honest answers should be provided to all questions asked about the illness, and delivered with compassion
- taking time to allow patients and their family to share their problems and concerns
- proper control of pain and other symptoms

Management of physical symptoms

Pain control – see text above

Nausea and vomiting – see text above

Loss of appetite - may be due to many causes including medications. Identify and treat cause if possible. Good oral care and adequate hydration should be ensured, using simple mouthwashes.

Difficulty in swallowing – may be due to pharyngeal or oesophageal obstruction, or thrush. Identify & treat the cause if possible. A feeding tube might help. Good oral hygiene and hydration.

Diarrhoea – may be due to constipation with overflow, or excessive use of laxatives. Use loperamide, codeine or morphine.

Shortness of breath – may be due to infections or pleural effusions. This is one of the **most** feared symptoms and every effort should be made to alleviate it. The cause should be established and treated if possible. A calming presence of a relative/carer, propping the patient up, and the use of low-dose morphine (2,5mg 4hrly – or a 25% increase in dose currently being given for analgesia) and mild sedatives may help. Oxygen is only indicated if there is cyanosis.

During the last hours of a person's life, carers should focus on minimising pain, reducing respiratory secretions (e.g. atropine 0,6mg sc 4hrly) and observing for urinary problems (retention or incontinence). Medicines should be rationalised, stopping all but those relevant to terminal symptoms/signs. IV fluids should be discouraged (or discontinued) as they aggravate terminal respiratory problems. If symptoms and distress are not easily controlled it may be appropriate to use terminal sedation. Families should always be informed about the dying process, and consulted on medicine and fluid rationalization.

MEDICINES AND THE ELDERLY

General Notes

Due to physiological changes and altered pharmacodynamic response of target organs the elderly are more susceptible to adverse Medicine reactions.

Elderly patients may require multiple medicine therapies. Therefore medication should be reviewed frequently (every 3 months).

- Provide simple, once or twice daily regimens wherever possible.
- Give clear instructions on how medicines are to be taken.
- Where possible ask relatives to supervise medicine taking.
- Suppositories or liquid formulations should be prescribed where swallowing is difficult.
- Use reduced doses
- Avoid nephrotoxic medicines

Anti-hypertensives

Prescribe with caution due to increased risk of postural hypotension, side effects, cognitive dysfunction and falls. The general treatment guidelines on hypertension should be followed but it is appropriate to start with lower doses and build up. Re-evaluate therapy every 6-12 months because blood pressure may decrease as a result of progression of atherosclerotic disease.

Diuretics

Since the elderly have a decreased plasma volume and lower levels of aldosterone, aggressive diuretic therapy to reduce BP is not indicated. Even low doses may precipitate hypotension, falls, hyponatraemia and hypokalaemia. Gravitational oedema will respond to simple mechanical measures such as raising legs and does not usually warrant use of diuretics.

Digoxin

Lower maintenance doses e.g. 0.625 to 1.25 mg (paediatric elixir formulation) should be used owing to reduced renal function and increased sensitivity. Signs of digoxin toxicity are nausea, vomiting, anorexia, visual disturbances and headache.

Where there is no evidence of heart failure and if the heart is in normal sinus rhythm digoxin may be safely withdrawn but the patient should be monitored for atrial fibrillation if discontinuation is attempted.

Oral hypoglycaemics

(see diabetes section in Metabolic and Endocrine Conditions Chapter)

The elderly are at increased risk of hypoglycamia with glibenclamide.

Hypnotic / Sedatives

Benzodiazepines (e.g. diazepam) significantly impair cognitive function and should not be used. Hypnosis or sedation should be achieved with:

	Medicine	Codes		Adult dose	Frequency	Duration
	amitriptyline* po	**B**	**E**	12.5mg	at night	intermittently

**Caution: advise of 'hangover' effect in the morning.*

Major tranquillisers

It is essential to define and remove the underlying cause of agitation e.g. infection or hypoxia. Once this is done and if tranquillisation is still considered necessary, the options are:

	Medicine	Codes		Adult dose	Frequency	Duration
	haloperidol po	**A**	**N**	0.5-2mg	bd	review
or	**haloperidol im**	**A**	**N**	1-5mg	bd	review

Always start with the lower dose if possible. 0.5 mg bd is often enough. Avoid chlorpromazine and fluphenazine decanoate where possible as major irreversible side effects may occur.

Antidiarrhoeals

The elderly are prone to spurious, or overflow diarrhoea from chronic faecal impaction. No diarrhoea in the elderly should be treated with anti-diarrhoeal medicines before an adequate physical examination has excluded impaction. In such cases a high fibre diet, regular enemas and a stimulant such as senna or bisacodyl will relieve the problem.

Non-steroidal Anti-inflammatory medicines

These should be used with caution as the elderly are particularly susceptible to gastrointestinal complications (erosions and bleeding) and renal complications (e.g. interstitial nephritis). Paracetamol is a more appropriate analgesic in older adults.

	Medicine	Codes		Adult dose	Frequency	Duration
	aspirin po	**C**	**V**	300-600mg	$\leq$ 3 times a day	as required
or	**ibuprofen po**	**C**	**N**	200mg	$\leq$ 3 times a day	as required

**add magnesium trisilicate as required for gastrointestinal side effects.*

Steroids

The known side effects of steroids occur more rapidly and are accentuated in the elderly. Use with caution and monitor for side effects.

HAEMATOLOGY AND BLOOD PRODUCTS

Anaemia

This is defined as a decrease in the concentration of haemoglobin (<13.5 g/dl in men and <11.5 g /dl in women) and haematocrit (<0.42 in men and <0.36 in women). Use of red blood cell indices and careful examination of a peripheral blood smear may indicate the likely cause of anaemia. If in doubt contact a central hospital laboratory for assistance (peripheral blood films and where possible bone marrow films can be sent for comment).

Avoid blood transfusion before knowing the cause of anaemia or at least taking samples for doing appropriate investigations. Further, avoid transfusions in cases correctacble by hematinics or other therapy, unless patient has life threatening symptoms. Avoid poly-pharmacy (giving multiple haematinics without knowing the cause of the anaemia).

Iron deficiency anaemia

*Note: parenteral iron, which is neither faster acting nor more effective than oral iron, is **rarely** indicated. The cause of Iron deficiency anaemia must be elucidated as much as possibleas correcting the primary cause should be the most single important objective. The typical blood picture is that of hypochromia microcytosi (MCV <75fL).*

Medicine	Codes	Adult dose	Frequency	Duration
ferrous sulphate po	**C E**	200mg [60mg iron]	3 times a day	Review
Paed = 12mg iron, <1yr = 6mg iron				

Expected response rise is haemoglobin 1g/dl/week. Continue treatment for 3 months after haemoglobin has normalised to replenish body iron stores.

Megaloblastic Anaemia

This is due to deficiency of vitamin B_{12} and/or folic acid. It is important to establish the cause of the deficiency for appropriate treatment. The typical blood picture is that of macrocytosis with or without reduced platelet count (MCV >105 fL). Until or unless blood levels are available, it is mandatory to give both vitamin B_{12} (parenteral) and folic acid to prevent precipitation of neuropathy.

Avoid blood transfusion if possible

Macrocytosis also occurs in liver disease, alcohol excess, hypothyroidism, some haemolytic anaemias and myelodysplastic syndromes. In the presence of these conditions vitamin B_{12} /folate deficiency must be excluded. Macrocytosis is physiological in the neonate.

Vitamin B_{12} Deficiency
Lifelong replacement is mandatory in pernicious anaemia, post-gastrectomy or illeal resection.

Medicine	Codes	Adult dose	Frequency	Duration
hydroxocobalamin (vitamin B_{12}) im	**B V**	1mg then weekly for 3 weeks, and monthly for 3 months and then every 3 month for a year and then twice a year.	daily	3 days

Folic Acid Deficiency
Occurs in most prolonged haemolytic anaemias, pregnancy, and seasonally in dry areas with no access to fresh vegetables, in malabsorption up to 15mg daily may be required.

Medicine	Codes	Adult dose	Frequency	Duration
folic acid po	**C E**	5mg	once a day	3 months and review

Sickle Cell Anaemia

Management:

Medicine	Codes	Adult dose	Frequency	Duration
folic acid po	**C E**	5mg	once a day	for life
penicillin V po	**C E**	250mg	once a day	for life

For **malaria prophylaxis** in endemic areas:

Medicine	Codes	Adult dose	Frequency	Duration
pyrimethamine/dapsone po 12.5mg/100mg	**C E**	one tablet	once a week	Continual

In **painful crisis**, intravenous rehydration, regular and adequate analgesia, oxygen by mask where available and possibly in some cases antibiotics are required.

Morphine is necessary to control **severe pain**. Weaker opiates (codeine) or non-steroidal anti-inflammatory medicines (e.g. aspirin) may be used for less severe pain. See chapter on Pain.

Antibiotic therapy:

Medicine	Codes	Adult dose	Frequency	Duration
amoxicillin po	**C V**	500mg	3 times a day	5 days

Other antibiotics may be required according to site of infection/causative organism.

Osteomyelitis: see chapter on Bone and Joint Conditions.

Other types of crises:

In aplastic and haemolytic crisis, red cell transfusion may be required to treat anaemic heart failure. Sequestration or splenic pooling requires splenic massage and less often, blood transfusion. **Note** that over transfusion worsens the sickling crisis and may cause iron overload. Special precautions must be taken during anaesthetizing sickle cell disease patients. Adequate hydration and oxygen exposure are essential to avoid red cell sickling.

Avoid debridement of leg ulcers as these are due poor circulation rather than mere dead tissue.

Treat priapism conservatively with hydration and analgesia before resorting to surgery.

Patients with frequent crises need to be started on hydroxy urea where possible, refer to provincial central hospital. The objective is to increase the HbF to at least 20%, levels which do not lead to haemolysis.

Medicine	Codes	Adult dose	Frequency	Duration
hydroxyurea po	**B V**	500mg	once a day	indefinitely

Note: Use hydroxyurea 500 mgs daily indefinitely, titrate against HbF. Monitor white cell and platelets counts.

Sickle cell trait requires no treatment, and does not cause anaemia.

G6PD deficiency

Glucose-6-phosphate dehydrogenase (G6PD) deficiency is common in Zimbabwe. **All patients should have a "Medic-alert" bracelet or necklace.**

Severe anaemia occurs with intravascular haemolysis and haemoglobinuria on exposure to oxidant medicines (e.g. primaquine, dapsone, sulphonamides, quinolones, nitrofurantoin and in some cases quinine and chloroquine) and be worsened by acute infections e.g. malaria. Treat these episodes with intravenous fluids, oral iron and folate supplement; treat or remove the underlying cause.

Prescribers must always check complete list.

The risk of malaria outweighs the risk of haemolysis, so quinine should be used if indicated for malaria treatment unless the specific patient is known to sensitive to the specified anti-malaria in question.

Avoid blood transfusion unless clinically indicated.

Other Anaemias

HIV anaemia is a common finding with HIV and AIDS patients. Transfusion is only indicated in treating severe anaemia and cardiac failure. The causes of the anaemia include medicines such as zidovudine, and infections.

Other cytopaenias: refer to next section on Blood Products.

Aplastic anaemia presents as pancytopaenia. Diagnosis needs confirmation by bone marrow examination. Refer to central hospitals for specialist care after confirmation.

Myelodysplastic syndromes: refer to Central Hospital for specialist management.

Sideroblastic anaemia may occur in alcoholism, malignancy, hypothyroidism and particularly during TB treatment. Some respond to vitamin B_6, but refer to central hospital for specialist care.

Leukaemias: refer to central level.

Hereditary Bleeding Disorders

Never use intramuscular injections and aspirin (paracetamol is safe). All patients should have a "Medic-alert" bracelet or necklace.

Refer early for specialist management.

All haemophiliac patients should be registered with the Haemophilia Association/Centre, Department of Haematology, P.O. Box A 178, Avondale, Harare. Clinics are held at Parirenyatwa Hospital every month.

For haemarthrosis - do not aspirate joint. Treat by replacement of specific factor, joint support and analgesia e.g. paracetamol, codeine, morphine. Rest the joint during the acute period, give aprpropiate replacement factor and start physiotherapy as soon as the bleed resolves. *Some Haemophilia A and B patients are on a home therapy programme. They have written instructions on recommended dosage but may require assistance from health personnel.*

Haemophilia A (factor VIII deficiency)

The amount of factor VIII given depends on assessment of severity of bleed. Use the table below to determine dosage, for both children and adults according to body weight.

Ice compression should be applied as soon as possible, as this reduces the bleed.

Dosage of Factor VIII – Adults – per dose

	Severity of bleed	Required FVIII level	FVIII Concentrate [500 IU/bottle]	Cryoprecipitate [80 IU/bag] (=20mls)
1.	Mild bleed (nose, gums etc.)	14 IU/kg	1-2 bottles	6 bags
2.	Moderate bleed joint, muscle, GIT, minor surgery	20 IU/kg	2-4 bottles	12 bags
3.	Major bleed (e..g.. cerebral)	40 IU/kg	4-6 bottles	12 bags
4.	Prophylaxis for major surgery	60 IU/kg	6-10 bottles	18 bags

Note: For 1 and 2 above, repeat the dose 12 hourly if bleeding persists or swelling is increasing. With more severe bleeds it is usually necessary to continue treatment with half of total daily dose 12 hourly for 2 -3 days, occasionally longer.

*Note: For 3 and 4 above, treatment and surgery should be done **with specialist supervision only**. Measure levels, (if possible), otherwise give immediately before surgery. Continue 12 hourly therapy for 48 hours post-operatively and if no bleeding occurs, scale down gradually over next 3 -5 days.*

Note: cryoprecipitate or of fresh frozen plasma should only be used in the absence of safe treated factor products.

- As adjunct to factor replacement in mucosal or gastro-intestinal bleeding and surgery, give fibrinolytic inhibitor [tranexamic acid]. Do not use for haematuria.
- If viral-inactivated treated Factor VIII is unavailable: see previous table for cryoprecipitate doses.

Haemophilia B (factor IX deficiency)

- Ice compression should be applied as soon as possible, as this reduces the bleed.

Mild bleed:

	Medicine	Codes		Adult dose	Frequency	Duration
	factor IX concentrate	**A**	**V**	2 x 500 IU	daily	Review
or	**fresh frozen plasma**	**B**	**V**	4-6 bags	every 24hrs	if bleeding continues

For children use appropriate dosage.

Major bleeding

	Medicine	Codes		Adult dose	Frequency	Duration
	factor IX concentrate	**A**	**V**	3-6 x 500 IU	daily	Review
or	**fresh frozen plasma**	**B**	**V**	8 – 12bags	every 24hrs	if bleeding continues

For children use appropriate dosage.

Factor VIII concentrate and cryoprecipitate are **not** useful for Haemophilia B, so accurate diagnosis is essential.

von Willebrand Disease (vWD)
The currently available FVIII concentrate from the National Blood Transfusion Service contains vW factor (but always check the insert).

Using this ***FVIII concentrate*** treat as for mild or moderate bleed of Haemophilia A. Repeat haemostatic dose every 24-48 hours since therapeutic response is more sustained in vWD.

If viral inactivated Factor VIII concentrate not available use:

Medicine	Codes	Adult dose	Frequency	Duration
cryoprecipitate	**A E**	6 bags per dose	every 24-48 hrs	if bleeding continues

Tranexamic acid (specialist medicine) is very useful in vWD mucosal and other bleeding.

Acquired Bleeding Disorders/ Platelet Disorders

Disseminated Intravascular Coagulation (DIC)

Monitor prothrombin time (PT), international normalized ratio (INR), activated partial thromboplastin time (APTT), platelet count and fibrinogen.

Identify if possible, and treat /remove cause of DIC.

If PT/APTT prolonged and patient is bleeding, give:

Medicine	Codes	Adult dose	Frequency	Duration
fresh frozen plasma	**B V**	4 bags	every 12-24hrs	if bleeding continues

- If platelet count <30x10^9/L and patient is bleeding:

Medicine	Codes	Adult dose	Frequency	Duration
platelet concentrate	**A E**	1 unit/kg		

- If fibrinogen is low and/or APTT prolonged give (to supply fibrinogen and FVIII):

Medicine	Codes	Adult dose	Frequency	Duration
cryoprecipitate	**A E**	6 bags per dose	review	Review

- The use of heparin is NOT recommended in bleeding patients with DIC, except under specialist supervision.

Liver Disease

Medicine	Codes	Adult dose	Frequency	Duration

	vitamin K iv *	**C**	**V**	10mg**	once a day	3 days

**Avoid intra muscular vitamin K.*

***The dose is adjusted depending on the INR.*

For immediate haemostasis if bleeding and INR>3 give:

	Medicine	Codes		Adult dose	Frequency	Duration
	fresh frozen plasma	**B**	**V**	4 bags	review	review

Haemorrhagic disease of the new-born

The policy is to give vitamin K routinely to all new-borns as a preventive measure. However, if there is active bleeding give FFP and:

	Medicine	Codes		Paed dose	Frequency	Duration
	vitamin K im	**C**	**V**	1mg	once a day	3 days

Idiopathic Thrombocytopaenic Purpura (ITP)

	Medicine	Codes		Adult dose	Frequency	Duration
	prednisolone po	**B**	**V**	1mg/kg then according to response – see notes below	once a day	2 weeks,
or	**immunoglobin iv**	**S**	**E**	Img/kg	once a day	3 days

Duration of therapy:

No response after 2 weeks - stop.

Complete response - reduce gradually over 8-10 weeks

Partial response; - reduce slowly and refer for alternate management.

Intravenous immunoglobulin given at 1 mg/kg daily for 3 days works quicker when available. Consider splenectomy for those in whom steroids fail to achieve adequate control or who relapse after treatment.

Anticoagulation

Oral

	Medicine	Codes		Adult dose	Frequency	Duration
	warfarin po	**B**	**V**	10mg (loading dose) then check the INR on Day 3 and adjust	once a day	2 days,

Note: To be taken at same time each day. Reduce loading dose in elderly and in-patients with renal/hepatic impairment.

- Monitor INR regularly, initially alternate days then increase interval gradually to a maximum of 8 weeks. Therapeutic range: DVT/PE = INR 2-3; Heart valve prosthesis = INR 3-4.5.

- There is great individual variation in dose required (average daily dose 2.5-10mg).
- Caution: medicine interactions are common and can be dangerous. Below are a few examples:

Warfarin Inhibition	Warfarin Potentiation
Barbiturates	Alcohol
Oral contraceptives	Chloramphenicol
Griseofulvin	Cimetidine
Rifampicin	Erythromycin
Carbamazepine	Cotrimoxazole
Vitamin K	Aspirin

Warfarin Overdose

- If INR 4.5-7 without haemorrhage - withhold warfarin for 1-2 days then review.
- If INR >7 without haemorrhage - withhold warfarin and check INR daily. Consider giving:

	Medicine	Codes		Adult dose	Frequency	Duration
	vitamin K slow iv	**C**	**V**	0.5 – 1mg	once a day	Review

Note: higher doses vitamin K will prevent adequate anticoagulation for up to 2 weeks

INR > 7 with haemorrhage give:

	Medicine	Codes		Adult dose	Frequency	Duration
	fresh frozen plasma	**B**	**V**	4 units	-	-
and	**vitamin K iv**	**C**	**V**	0.5 – 1mg	once a day	Review

Parental anticoagulation.

Unfractinated heparin is given subcutaneously or intravenously. The dose is dependent on the activated partial thromboplastin time ratio (aPTTR). It has a short half-life and needs laboratory facilities.

Low molecular weight heparin is given subcutaneously with a fixed dose. No laboratory monitoring facilities are required.

Prophylaxis for Deep Vein Thrombosis (DVT)

This is indicated for all patients who have high risk factors for thrombosis before and after surgery. These conditions include:

- Obesity
- Prolonged immobility
- Hereditary thrombophilia states (antithrombin III, factor V Leiden deficiency, protein C & S deficiency etc.)
- Paroxysmal nocturnal haemoglobinuria
- Previous history of DVT
- Various malignances
- Other pro-thrombotic states such as artificial cardiac valves and atrial fibrillation need lifelong anticoagulation.

Methods of prophylaxis available
Physical methods include stockings. Early mobility must be encouraged in all surgical patients.

Medicine management (targeting an INR of 2 to 2.5):

	Medicine	Codes		Adult dose	Frequency	Duration
	warfarin po	**B**	**V**	10mg then review based on INR level	once a day	2 days
or	**heparin sc (unfractionated)**	**B**	**V**	5000 units	8 hourly	Review

Treatment of DVT

	Medicine	Codes		Adult dose	Frequency	Duration
	heparin sc (unfractionated)	**B**	**V**	17500 units	Twice a day	see below*
or	**Low molecular heparin**	**B**	**V**	40mg	Once daily	

*Duration is 4-6 months except in pregnancy, or if there is another reason for prolonged treatment;

- Pulmonary embolism: 4-6 months.
- Atrial fibrillation: lifelong treatment.
- Heart valve prostheses: lifelong treatment.

Continue heparin until warfarin effective - usually 3-5 days.

Deep Vein Thrombosis in pregnancy

Continue throughout pregnancy, aiming for APTT 2-3 times normal:

	Medicine	Codes		Adult dose	Frequency	Duration
	Low molecular heparin	**B**	**V**	40mg	once a day	1 month post-partum
or	**warfarin po** after 12 weeks up to 37 weeks	**B**	**V**	keep INR in range 2-3		to 37 weeks, then change to heparin

CAUTION: Warfarin may harm the foetus and should not be used under 12 weeks. Monitor closely whichever method is used. Specialist supervision is recommended.

Heparin may cause thrombocytopaenia, and with prolonged use osteoporosis.

Life Threatening Pulmonary Embolism/ Arterial Embolism

See also section in Cardiovascular conditions.

	Medicine	Codes		Adult dose	Frequency	Duration
	hydrocortisone iv [for allergic reactions]	**B**	**V**	100mg	once only	-
and	**streptokinase iv**	**A**	**N**	loading dose of 250 000 units over 30minutes, then		
				100 000 u	every hour	24 – 72 hrs

Haematological malignancy: Refer all patients to a Central Hospital.

Use of Blood and Blood Products

General Principles
Efforts should be made to avoid transfusions wherever possible because of:

- The need to conserve scarce and expensive blood products.
- The risk of Transfusion Transmitted Infections e.g. HIV and Hepatitis C (window period) and other transmissible agents.
- The risk of transfusion reactions.

There are limited and specific indications for transfusion. Use the appropriate blood fraction to treat specific defects. Transfuse patients during normal working hours: avoid night-time transfusion whenever possible.

Note: Anaemia - The correct management of a patient with anaemia is to identify and treat the cause. Blood transfusion is required only when the anaemia is life-threatening e.g. cardiac failure or when it prohibits other necessary treatment e.g. chemotherapy or surgery. A slow rise of haemoglobin in response to haematinics is ***not*** *an indication for transfusion.*

Note: The routine use of frusemide is ***not*** *necessary. When needed, e.g. in cardiac failure, give small doses (e.g. 20mg). Intra-venous frusemide is rarely required.*

Blood must be kept at appropriate temperature as much as possible

Specific Indications for Use of Blood and Blood Products

RED CELL CONCENTRATE (PACKED CELLS)

Medicine
Give packed cells in the following situations:

- Acute major haemorrhage.
- Chronic anaemia-when patient has symptoms of cardiac failure due to low haemoglobin (<5g/dl);
- Anaemic patient (<5g/dl) due to have haemodialysis; (Elderly patients may require Hb levels higher than 8g/dL)Prior to, and following aggressive cytotoxic programmes, maintain haemoglobin at/or above 8g/dl;
- Low haemoglobin (<8g/dl) in presence of severe and persistent infections and septicaemia;
- Acute haemolysis where patient has symptoms of cardiac failure.

Paediatrics
Small packs (100mls) are available. Indications are as for adults (see above list). Where transfusion is given on appropriate

indication to children with protein-energy malnutrition, they should be transfused slowly (not more than 2.5 ml/kg body weight/hour).

The presence of anaemia and safety of procedures must be evaluated on a patient to patient basis. There is no single safe haemoglobin level, patient haemodynamics must be evaluated against the procedure to be performed.

Patients are generally haemodynamically stable at haemoglobin levels above 8 gm/dL for several procedures, but anticipation of blood loss must be assessed before each procedure.

PLATELET CONCENTRATES

Note: this product is often used inappropriately

This section applies to all disciplines.

Indications for Use of Platelet Concentrates

- Acute bleeding in a patient with a low platelet count less than 30 x 109/L
- Disseminated intravascular coagulation (DIC) with active generalised bleeding and platelets <20 x 109/L
- Operations with platelets<30 x 109/L
- Cranial operations and eye operations need platelets above 100 x 109/L).

No justification for use of platelets in:

- Low platelet count in patient with no evidence of bleeding, [most transfused platelets will be eliminated within 24 hrs.]
- Autoimmune thrombocytopenia.
- HIV thrombocytopenia without bleeding.
- Aplastic anaemia without bleeding.

Guidelines for platelet transfusion in surgical patients.

>100x10^9/L	All surgical proceedures including eye and brain	No platelet transfusion required.
>50x10^9/L	All surgical proceedures with the exception of eye and brain.	No platelet transfusion required.
>30x10^9/L	Safe for minor procedures such as non-traumatic lumbar puncture, bone marrow aspirates, GIT scopes etc.	No platelet transfusion required.

** Not to be used in children under the age of 2 yrs.*

FRESH FROZEN PLASMA

*Note: Currently this is **the most inappropriately** used product in Zimbabwe.*

This section applies to all disciplines. The risks of transmission of infection are no less than with packed red cells or whole blood.

Indications for Use of FFP

- Severe acute disseminated intravascular coagulation (DIC) with active generalised bleeding
- In presence of bleeding and disturbed coagulation in patients with liver disease, or following massive transfusion
- In presence of disturbed coagulation in patients requiring liver/renal biopsy, or surgery
- If immediate reversal of warfarin effect essential (combined with Vitamin K administration)
- Replacement of single coagulation factor deficiencies where specific factor concentrate not available e.g. haemophilia B
- Thrombotic thrombocytopaenic purpura

No justification for use of FFP in:

- Hypovolaemia
- Acute haemorrhage with minimal disturbance of coagulation
- As nutritional support
- Obstructive jaundice with disturbed coagulation (vitamin K should be given).

WHOLE BLOOD

To be used in cases where fractionated blood is not available. The indication is as for red cell concentrate, and never as source of plasma.

EXCHANGE TRANSFUSION IN NEONATES STRICTLY USE WHOLE BLOOD. BLOOD MUST BE LESS THAN 5 DAYS OLD.
Indications:

- Definite clinical jaundice on Day 1 of life
- Clinical signs of kernicterus
- Total Serum Bilirubin levels as shown in the table below [23.3], depending on gestational and postnatal age of the baby.

Table 26.3 Serum Bilirubin Levels and Exchange Transfusion

Gestational Age (Weeks)	Day 1 of Life Serum Bilirubin (umols/l)	Day 2 of Life Serum Bilirubin (umol/l)
>37	80	350 (300 if sick and/or acidotic)
34 to 37	80	350 (270 if sick and/or acidotic)
31 to 34	70	290(240 if sick and/or acidotic)
29 to 31	70	250 (200 if sick and/or acidotic)

Birth weight	Volume of aliquots
< 1000 – 1490g	5ml
1500 – 2499g	10ml
>2500g	20ml
Withdrawal of blood	1 minute
Injection of blood	4 minutes

LEUKOCYTE-POOR BLOOD

Occasionally required in patients who need regular transfusion over prolonged periods, in order to prevent febrile reactions due to white cell antibodies and provision of CMV negative blood from un-screened blood. Bedside leukocyte reducing filters, supplied by the Blood Transfusion Service, may be used to attain the same product.

ALBUMIN 4%

Can be used as a volume expander and is HIV free. Must not be used if solution appears turbid or contains a deposit. Protect from light and do not freeze.

ANTI-D

To be given post-delivery to Rhesus D negative patients to prevent immunization.

INTRAVENOUS IMMUNOGLOBULIN.

Can be used in several auto immune diseases to include ITP, Guillain Barre and in selected infections.

SALT-POOR ALBUMIN

May be indicated for correction of chronic hypoalbuminaemia; in special circumstances of organ failure and fluid overload e.g. liver disease and resistant ascites.

FACTOR VIII PREPARATIONS

Products available: (1) freeze dried anti-haemophilic factor (AHF). (2) cryoprecipitate. To be used in patients with haemophilia A with mild, moderate or severe bleeds. See notes above.

FACTOR IX CONCENTRATE

For patients with haemophilia B who are bleeding. See notes above.

CRYOPRECIPITATE

Indications include DIC, von Willebrand Disease, haemophilia, and bleeding associated with renal failure.

INTRAVENOUS FLUID REPLACEMENT

NB: Repeated clinical evaluation of patients receiving IV fluid therapy is necessary in order to avoid the dangers of over-transfusion or inadequate rehydration. Formulae and biochemical estimations are no substitute for clinical evaluation.

Special Notes

- Only give intravenous fluids when they are strictly necessary. It is wasteful and dangerous to give iv fluids to a patient who can drink oral fluids.
- Small packs of intravenous fluids (e.g. 200 ml) are much more expensive volume for volume than litre containers.
- For fluid replacement in burns see relevant chapter.
- For use of blood and blood products see relevant chapter.

Electrolyte content of various body fluids

Electrolyte content of various body fluids should be taken into account. For practical purposes replacement is with Normal Saline or Ringer Lactate with added potassium, except for diarrhoea, particularly in children, where the sodium content is proportionately lower and the potassium higher.

FLUID	SODIUM mmol/litre	POTASSIUM mmol/litre
Plasma	140	4
Gastric	60	10
Biliary & Pancreatic	140	5
Small Intestine	110	5
Ileal	120	5
Ileostomy	130	15
Diarrhoea	60	40
Sweat	60	10

Normal daily requirements

Substance	Weight	Dose
Water	0 to 10kg 11 to 20kg 21 kg or more	100ml/kg/24hrs 1000ml + 50ml/kg/24hrs 1500ml + 25ml/kg/24hrs (for an adult this is 30 – 40ml/kg/day)
Sodium		1 to 1.5mmol/kg/24hrs
Potassium		1mmol/kg/24hrs

Maintenance

- **Adults** [and Children > 10 years]:

- The following in combination, adjusted so that total volume is 2-3 litres/24 hours in adults:

	Medicine	Codes		Adult dose	Frequency	Duration
	sodium chloride 0.9% iv	**C**	**V**	0.5 – 1 litre		
or	**ringer lactate iv**	**C**	**V**	0.5 – 1 litre		
and	**dextrose 5% in water iv**	**C**	**V**	1.5 – 2 litre		
and	**Potassium chloride iv**	**B**	**V**	20 mmol added to each litre		

- Children: 1 Month - 10 years(refer to Paediatrics Chapter)

Medicine	Codes		Paed dose	Frequency	Duration
half strength Darrow's solution with dextrose 2.5% iv	**C**	**V**	0-10kg = 5-10yrs=	100ml/kg/24hrs 75ml/kg/24hrs	

- Infants: (Up to 30 days old)

Medicine	Codes		Paed dose	Frequency	Duration
neonatal multi electrolyte maintenance solution ('neonatalyte')	**B**	**N**	up to 150ml / kg per 24 hours*		

**Do not exceed 60 ml/kg/24 hrs in the first 24 hours of life - see section on neonates in paediatric chapter.*

Replacement of Abnormal Losses

Dehydration

- Oral rehydration alone should be carried out wherever possible in addition to intravenous fluids. In severe cases, IV fluid replacement will be needed.

Intravenous Rehydration (Adults)

	Medicine	Codes		Adult dose	Frequency	Duration
	sodium chloride 0.9% iv	**C**	**V**	In severe dehydration the first litre may be infused in 15-20 minutes. Thereafter the drip rate should be progressively slowed down. Six or more litres may be required in the first 24 hours, of which the first 3-4 litres will be a replacement fluid after which a maintenance regimen of approximately 3 litres/24 hrs should be used (see "maintenance" above).		
or	**ringer lactate iv**	**C**	**V**			

Intravenous Infusion Rehydration (Children)

	Medicine	Codes		Adult dose	Frequency	Duration
	half strength Darrow's with dextrose 2.5% iv	**C**	**V**	Severely dehydrated infants and children may be rehydrated at a maximum rate of 30 ml/kg body weight/hour for the first hour. This rate should be progressively reduced over the next few hours to a maintenance regime (see "maintenance" above)		

Rehydration: Infants

See section on Neonatal Conditions.

Rehydration: Paediatrics

See section in Management of Diarrhoea in Children

Nasogastric Suction

- Replace losses with:

	Medicine	Codes		Adult dose	Frequency	Duration
	sodium chloride 0.9% iv	**C**	**V**	replace losses		
and	**potassium chloride iv**	**B**	**V**	1g (13mmol) added to each litre		

Surgical Losses (<u>not</u> Minor Surgery)

- Trauma to tissues causes shift of extracellular fluid (so-called "third-space" loss). It is justifiable to replace this with a solution having similar ionic composition to plasma. A reasonable formula is:

	Medicine	Codes		Adult dose	Frequency	Duration
	ringer lactate iv	**C**	**V**	10 ml/kg for the first hour of surgery 5 ml/kg during subsequent hours to a maximum volume of 3 litres (adult) OR to a maximum equivalent to 40-50 ml/kg in children.		

Fever

- For temperature 38ºC and above, increase maintenance fluids by 5-10%.

Haemorrhagic Shock

- Use the table below [Table 27.1] to estimate blood loss and replace total volume lost as shown. A physician should ideally supervise management of class 3 and 4 haemorrhage.

Septic Shock

- Initial management - see intravenous rehydration of an adult above. See also section on Blood Transfusion.

Table 29.1 Clinical estimate of Blood Loss in Haemorrhagic Shock in Adults

	Blood loss [mls]	Blood loss % blood volume	Pulse rate	Blood press.	Resp. rate [per minute]	Urine output [mls/hr]	Treatment : [replace total volume lost] *
Class 1	up to 750	up to 15%	< 100	norm	14-20	>30	crystalloid
Class 2	1250	20 to 25%	100 – 120	norm	20-30	20-30	crystalloid + colloid
Class 3	1500 to 2000	30 to 35%	> 120	decreased <100	30-40	5-15	crystalloid + colloid + blood
Class 4	> 2000	> 40%	>140	decreased < 60/40	>40	nil	crystalloid + colloid + blood

**Note: Rules for adequate volume replacement:*

***crystalloid alone**: 2 – 3 times the volume deficit is required*

***colloid or whole blood**: just the volume deficit is required.*

Available Intravenous Solutions

These can be divided into two groups: CRYSTALLOIDS and COLLOIDS.

Crystalloids

The composition of the crystalloid solutions is shown in Table 27.2.

Sodium chloride 0.9% (normal saline)

Suitable for fluid replacement in the initial therapy of haemorrhagic shock and severe dehydration. The sodium content sustains the circulating blood volume and the absence of potassium allows rapid infusion. Contains no calories. May be given as part of maintenance regimen.

If normal saline is being given as part of maintenance requirement care must be taken not to overload the patient particularly in the postoperative period when sodium and water requirements are decreased - as little as 10mmol of sodium may be required in 24 hours after major surgery /trauma.

Ringer lactate solution

Suitable for the same purposes as Sodium Chloride 0.9%. In addition to sodium it contains potassium and calcium in physiological amounts, and provides bicarbonate. Use with caution in diabetes mellitus and renal failure and severe diarrhoea with alkalosis.

Maintelyte

Suitable for maintenance, but MUST NOT BE USED FOR RESUSCITATION as the sodium content is too low to sustain blood volume and the potassium content is too high for safe rapid infusion. Avoid in renal failure. Since this

solution is very hypertonic it may damage vascular endothelium. It should be avoided in hyperosmolar states. It is currently suggested that hyperglycaemia is detrimental to patients at risk of cerebral ischaemia (owing to anaerobic production of lactic acidosis). If maintelyte is used, monitor blood glucose levels regularly. It cannot be used for replacing potassium deficits unless more potassium is added as maintelyte contains basic requirements of potassium only.

Half strength Darrow's solution with dextrose 2.5%
An all-purpose solution with an electrolyte content intermediate between the replacement and maintenance solutions; the recommended solution for both initial (replacement) therapy and subsequent (maintenance) therapy of dehydrated infants. Use with caution in renal failure. For classes I and II (mild-moderate) blood loss use normal saline as crystalloid replacement fluid of choice. Darrow's contains too little dextrose to maintain the blood sugar level in neonates. It contains too little sodium to be used in the postoperative period or replacement of upper gastro-intestinal and small bowel losses. Its use is mainly confined to rehydrating children with diarrhoea and vomiting.

Dextrose 5% in water
Contains no electrolytes; it may be used:

- as part of maintenance regimen;
- as a replacement fluid where pure water loss predominates (as in febrile illness, pneumonia and asthma);
- as full maintenance in acute renal failure, where no electrolytes are being lost in urine;
- as a vehicle for administration of some medicines.

It should **not** be used in patients with head injuries (cerebral oedema may result).

Dextrose 10% in water
Used for peri-operative management of diabetic patients (undergoing surgery) and for patients with hepatitis, hypo-glycaemia.

Dextrose 2.5% and sodium chloride 0.45%
Used as a maintenance solution and as a vehicle for administration of some medicines.

Dextrose 5% and sodium chloride 0.9%
A special purpose solution useful for certain surgical patients with hyponatraemia and impaired renal function.

Maintenance solution neonatal multi-electrolyte 'neonatalyte'
Used as a maintenance solution for neonates. It contains phosphate 3.75 mmol/L (as HPO_4). Use with caution in renal failure.

Sodium chloride 0.45% (half normal saline)
Used in cases of sodium overload and in patients with hyperosmolar, non-ketotic diabetic coma/precoma.

Colloids

Indication for colloids includes resuscitation in severe hypovolaemia, treatment of circulatory collapse, and emergency treatment of shock due to fluid loss or blood loss as a plasma substitute. Colloids should be used when crystalloids do not improve volume or when crystalloids are not expected to improve volume. Examples of colloids include albumin, plasma protein fraction, dextran, gelatin and etherifiedetherified starches (hetastarch, pentastarch and tetrastarch).

Fresh frozen plasma (FFP) should not be used as a general colloid, but only when specifically indicated. See section on Blood and Blood related Products.

Dextran 70
Used to reduce viscosity and prevent venous thrombosis.

Modified gelatin
Used to expand and maintain blood volume in hypovolemic shock.

Table 29.2: Composition of Available IV Solutions

	Sodium chloride 0.9% (normal saline)	Ringer lactate	MaintelytbeMaintelytbe	Half strength Darrows with dextrose 2.5%	Dextrose 5% in water	Dextrose 10% in water	Dextrose 2.5% Sodium chloride 0.45%	Neonatalyte	Sodium chloride 0.45% (half normal saline)
Na+ mmol/L	154	131	35	61	0	0	77	20	77
K+ mmol/L	0	5	25	17	0	0	0	15	0
Ca++ mmol/L	0	2	0	0	0	0	0	2.5	0
Mg++ mmol/L	0	0	2.5	0	0	0	0	0.5	0
Cl- mmol/L	154	111	65	51	0	0	77	21	77
HCO3 mmol/L	0	29	0	0	0	0	0	0	0
Lactate mmol/L	0	0	0	27	0	0	0	20	0
Dextrose g/L	0	0	100	25	50	100	25	100	0
Calories per L	0	0	400	100	200	400	100	400	0
Level	C	C	B	C	C	A		B	
VEN	V	V	N	V	V	N		N	

ANAPHYLAXIS

General Notes

Severe anaphylaxis is a life threatening immunological response to a substance to which an individual is sensitised. It is a medical emergency (life and death situation) in which seconds count. Prompt treatment is required for acute airway obstruction, bronchospasm and hypotension.

Triggers

Common triggers of anaphylaxis are medicines, (notably: antibiotics, non-steroidal anti-inflammatory medicines, antiarrhythmics, heparin, parenteral iron, desensitising preparations and vaccines), blood transfusions, bee and other insect stings, anaesthetic medicines and certain foods. Latex allergy may be delayed in onset, taking up to 60minutes to manifest. Some anaesthetic medicines are also associated with anaphylactoid reactions (urticaria, flushing and mild hypotension). Food allergen triggers may have a delayed onset. Such as nuts may have a delayed onset and are commonly associated with urticaria.

Clinical Presentation of Anaphylaxis

Anaphylactoid reactions range from minor to life-threatening. The major presenting features are commonly cardiovascular. It is important to recognise and address the following:

Cardiovascular (hypotension, tachycardia, arrhythmias, ECG may show ischaemic changes even cardiac arrest)

Respiratory system (oedema of the glottis, tongue and airways, stridor and airway obstruction and bronchospasm)

Gastrointenstinal (abdominal pain, diarrhoea or vomiting)

Cutaneous (flushing, erythema, urticaria)

Note: It is imperative to establish a causative allergen source and it is essentially that the patient is advised in writing of the allergy and advised to wear a medic-alert bracelet indicating the sensitivity: repeat exposure may be fatal.

Treatment

Discontinue administration of any suspect agent (for example medicine, blood, diagnostic agent)

Lay the patient flat and elevate the legs.

Follow the ABC of resuscitation

A- Airway

- Give Adrenaline im 0.5- 1mg (0.5 – 1ml of 1:1000 solution) repeated each ten minutes as required
- Ensure a clear airway; give 100% oxygen, if available.

B- Breathing

- Ensure adequate breathing (intubate and ventilate as required)
- Nebulised bronchodilators (for example, 5mg salbutamol) or iv aminophylline may be required if bronchospasm is refractory (loading dose of 5mg/kg followed by 0.5mg/kg/hr).

C- Circulation

- Monitor pulse, blood pressure, bronchospasm and general response/condition every 3-5 minutes.
- Start CPR if cardiac arrest has occurred

Give:

Medicine	Codes	Adult dose	Frequency	Duration
adrenaline 1 in 1000 im	**C V**	0.5 – 1ml [= 10mg/kg]	Repeat as necessary every 10mins until improvement occurs.	
	children >5yrs	0.5ml		
	4 years	0.4ml		
	3 years	0.3ml		
	2 years	0.2ml		
	1 year	0.1ml		

In **severe** allergic reaction give:

Medicine	Codes	Adult dose	Frequency	Duration
adrenaline 1 in 10 000 iv [Add 9ml normal saline / water to 1ml of 1in 1000 adrenaline]	**C V**	1ml slow [1-5yr =0.1ml/kg]	repeat every minute	until satisfactory clinical response

Start IV volume expansion with normal saline (or Ringer lactate) adjusting rate according to blood pressure:

	Medicine	Codes	Adult dose	Frequency	Duration
	normal saline iv	**C V**	First litre run in over 15-20mins, then review.		

- **Add:**

	Medicine	Codes	Adult dose	Frequency	Duration
	promethazine slow iv	**B V**	25-50mg **Paed:** 1-5yr = 5mg 6-12yr =12.5mg	8 hourly	up to 48hrs
or	**chlorpheniramine iv (slowly)**	**B V**	10mg	6 hourly	up to 24hrs
and	**hydrocortisone iv**	**B V**	200mg **Paed:** < 1yr = 25mg 1-5yrs = 50mg 6-12yrs = 100mg	6 hourly	as required

Monitor pulse, blood pressure, bronchospasm and general response/condition every two minutes.

If **no improvement**, the following may be necessary:

	Medicine	Codes	Adult dose	Frequency	Duration
	aminophylline slow iv - bolus dose	**B V**	6mg/kg over 20 minutes	unless the patient has taken aminophylline in the past 8 hours	
then	**aminophylline** in **dextrose 5%** slow infusion	**B V**	12mg/ kg	in one litre over 24 hours	

Ventilation and/or tracheostomy

If after 20 minutes of treatment, acidosis is severe (arterial pH<7.2):

	Medicine	Codes	Adult dose	Frequency	Duration
	sodium bicarbonate 8.4% iv	**B V**	50mmol	as required (15-30min intervals)	

POISONING

General Notes

Poisons include medicines, plants, traditional medicines, snake and insect bites, chemicals used in agriculture, industry and at home.

Additional information on the treatment and prevention of poisoning may be obtained by telephone (24-hour service) or by post from:

The Drug & Toxicology Information Service
University of Zimbabwe, College of Health Sciences
P O Box A178 Avondale, Harare.
Telephone Harare 2933452 direct or 791631 ext 172.
datis@gmail.com
www.datis.co.zw

The following information should be obtained before contacting the poison information centre:

- Name of product and manufacturer or plant/animal/insect.
- Type of contact with poison (ingestion, inhalation, bite, or absorption through the skin).
- Age of patient.
- Time lapsed since contact.
- Size of container or estimate of the quantity ingested.
- Any obvious signs or symptoms.
- Any treatment given.
- Existing illnesses and current medication.

Prevention of Poisoning

Continuous education of the community is required to prevent poisoning:

- Store medicines and poisons out of reach of children; do NOT store in areas or containers used for food storage.
- Do NOT transfer medicines or chemicals from their original containers (especially hazardous when pesticides are transferred into containers such as “Coca-cola” or “Mazoe” orange bottles).
- Use the appropriate protective clothing to prevent accidental poisoning with industrial or agricultural poisons such as pesticides.

General Treatment Measures

In most cases of poisoning there is no specific antidote, but general treatment measures will minimise the effects.

Aim to slow down, reduce, or prevent further absorption of the poison, and to counteract the effects of poison already absorbed.

First Aid

- Remove patient from further exposure to poison. Remove contaminated clothing and wash contaminated skin with soap and large amounts of water. Wear gloves and take necessary precautions as needed.
- Follow ABC rule
- Maintain respiration; use artificial respiration if necessary.
- Keep the patient warm.
- Maintain blood pressure; place patient lying down with feet elevated and if required, give fluids.
- Maintain fluid balance (sodium chloride 0.9%); monitor fluid intake and output (urine, faeces, vomit, etc).

Swallowed Poisons

- *Inducing emesis, gastric lavage and use of activated charcoal apply only if the time since ingestion is 4 hours or less, except for salicylates and tricyclic antidepressants (8 hours).*

Emesis

Emesis is of no clinical benefit unless done within the first few minutes (maybe 10) after ingestion of a poison)

- CAUTION: It is essential to prevent vomit from entering the lungs. Do not induce vomiting if the patient is, or may soon become, drowsy, or unconscious, or convulsive.
- Do not induce vomiting if the patient has swallowed a corrosive (acid, alkali, bleach) or a petroleum product See "Corrosive Substances", and "Paraffin, Petrol and Petroleum Products" below.
- Only induce emesis in potentially severe poisoning.

Gastric Lavage

- Should only be performed by personnel familiar with the procedure, since incorrect use is dangerous.
- CAUTION: Do not attempt gastric lavage in the drowsy or comatose patient unless there is adequate cough reflex or a cuffed endotracheal tube is inserted.
- The bore of the lavage tube should be large enough to enable large particles such as tablets to be removed from the stomach.

Adults and children over 2 years:

300ml tap water (adult dose) for each washing, and repeat until the aspirated fluid is clear.

Reduce the amount of water used for each washing in children to 100 – 200 ml.

Children under 2 years:

Medicine	Codes	Paed dose	Frequency	Duration
half strength darrows with dextrose 2.5%	**C V**	100 ml for each washing, and repeat until aspirated fluid is clear.		

IMPORTANT: Sodium chloride solutions and water must not be used as they are hazardous to children under 2 years.

Activated Charcoal

Binding effect reduces absorption from the gastrointestinal tract; it is specially prepared for use in poisonings. Ordinary charcoal should not be used as it does not prevent absorption of poisons.

Do not give charcoal at the same time as ipecacuanha syrup as they inactivate each other.

Wait for vomiting to occur, and then give:

Medicine	Codes	Adult dose	Frequency	Duration
activated charcoal 50g added to 400 ml water *	**B E**	400ml slurry **children** 0.25 – 0.5 g/kg	administration may be repeated after 4-6 hours	

**Mix well, and administer via the lavage tube (unless patient agrees to drink the charcoal slurry).*

Laxatives

To avoid constipation or impaction following administration of activated charcoal, give a laxative. This speeds up the removal of toxic substances from the gastrointestinal tract, thereby reducing absorption.

Corrosive Substances

e.g. battery acid, drain cleaners, oven cleaners, laundry powders, strong hypochlorite or ammonia solutions, carbolic acid and phenols, pool acids, dish washing detergent.

- Immediately dilute by the administration of fluid. Water or milk (for acids) may be used. Avoid excessive oral fluid to prevent vomiting.
- Do **not** induce vomiting since the corrosive agent will cause further damage.
- Note: with hydrofluoric acid (HF):t

(a) Systemic poisoning may cause circulatory failure associated with hypocalcaemia, hypomagnesemia and/or hyperkalaemia (*may require rigorous supportive and symptomatic therapy; monitor CVS especially the heart)*

(b) For topical exposure (*note that systemic poisoning can occur after topical exposure to HF)*, after flushing skin with water, put **calcium gluconate gel** on affected area and massage it continuously until pain goes (about 15 minutes). If calcium gluconate is not available, soak affected area in solution of magnesium sulphate (Epsom salts)

- [Immediate use of salts MAY PREVENT deep burns, but once the acid has gone below the skin they are less effective].

Inhaled Poisons

e.g. liquid polishes, chloramine (produced by mixing hypochlorite and ammonia), chemical gases, chemical sprays

- Remove patient from further exposure by carrying to fresh air immediately.
- If breathing is impaired give artificial respiration.
- Follow first aid measures listed above.

Skin Contamination

Many chemicals can be absorbed through skin or cause direct injury to the skin.

- Wash with large quantities of cold water. Avoid hypothermia.
- Do not delay in removing clothing - this can be done while the skin is being washed.
- After removal of any contaminated clothing continue thorough washing with large amount of cold water and soap (including hair if contaminated).
- Avoid contaminating yourself.

Eye Contamination

See also chapter on Common Eye Conditions.

- The eyelids should be held apart and the eye washed with a gentle stream of water (e.g. from tap, hose pipe, or jug) for 15 minutes.
- Protect the unaffected eye.

Treatment of Specific Poisonings

Antidepressants

E.g. amitriptyline and imipramine (tricyclic antidepressants). Signs of poisoning with these medicines are CNS stimulation and cardiac arrhythmias.

- Establish airway and maintain respiration. Monitor ECG until the patient is free of arrhythmia for 24 hours.
- Remove ingested medicine by gastric lavage followed by activated charcoal. Do not induce emesis since patients may become comatose rapidly.
- Maintain blood pressure by giving intravenous fluid. Avoid vasoconstrictor agents.
- Control convulsions by giving:

Medicine	Codes	Adult dose	Frequency	Duration
diazepam slow iv	**C V**	0.05 – 0.1mg/kg	as required	as required

Control arrhythmias appropriately

Medicine	Codes	Adult dose	Frequency	Duration
lignocaine 2% iv preservative free	**B N**	500mg over 2-4mins, then 1-2mg/min by infusion		

For metabolic acidosis, if arterial pH < 7.2:

Medicine	Codes	Adult dose	Frequency	Duration
sodium bicarbonate iv in dextrose 5%	**B V**	continuous infusion		

Aspirin / Salicylate Poisoning

Aspirin (acetylsalicylic acid) is present in many analgesic preparations, and may also be found in herbal medicines. The toxic dose of any salicylate is estimated to be 0.2-0.5 g/kg.

Emergency Measures

- Delay absorption of the poison by giving activated charcoal. If respiration is depressed, use airway-protected gastric lavage (lavage is effective up to 8 hours after ingestion).
- If blood pressure is low, treat appropriately.
- Treat respiratory depression by administering oxygen. Artificial ventilation may be necessary.
- If convulsions occur **and** hypoglycaemia is not a contributing factor, give anticonvulsant medicine.

Caution: Central nervous system depressants, such as barbiturates or diazepam must be administered cautiously.

General Measures

- Monitor serum bicarbonate, chloride, potassium, sodium, glucose and arterial pH.
- If there is adequate urine output and no vomiting.
- In severe poisoning, hydration with intravenous fluids must be initiated in the **first hour**:

Medicine	Codes	Adult dose	Frequency	Duration
dextrose 5% with **sodium bicarbonate** 75mmol/L	**B** **V**	continuous infusion		

Alkaline diuresis is an option under specialist guidance.

In the presence of fluid retention, give:

Medicine	Codes	Adult dose	Frequency	Duration
frusemide iv	**B** **V**	0.25-1mg/kg	once	review

Carbon Monoxide Poisoning

Carbon monoxide poisoning commonly occurs as a result of burning coal or charcoal in a confined space with inadequate ventilation. Signs and symptoms include headache, weakness, dizziness, tachycardia, tachypnoea and, in severe cases, respiratory failure and coma.

- Remove patient from further exposure.
- Give 100% oxygen by mask for several hours. If respiration is depressed give artificial respiration with 100% oxygen.
- Maintain blood pressure and normal body temperature. If hyperthermia is present reduce body temperature by cooling the skin.
- To reduce cerebral oedema give:

	Medicine	Codes	Adult dose	Frequency	Duration
	frusemide iv	**B** **V**	0.25-1mg/kg	once	Review
and	**hydrocortisone iv/ im**	**B** **V**	4mg/kg	4 hourly	

Control convulsions or hyperactivity with:

Medicine	Codes	Adult dose	Frequency	Duration
diazepam <u>slow</u> iv [max =30mg]	**C** **V**	0.05-0.1mg/kg	as required	as required

If recovery occurs, symptoms disappear gradually.

In severe cases tremors, mental deterioration and abnormal behaviour may persist or reappear after 1-2 weeks. These symptoms of central nervous system damage may be permanent. Complete recovery is unlikely if symptoms of mental deterioration persist for 2 weeks.

Chloroquine Poisoning

(DO NOT induce vomiting as this may trigger cardiac arrhythmias)

Acute chloroquine poisoning occurs following ingestion of as little as 2 g and may be lethal. Signs and symptoms of acute poisoning include severe difficulty in breathing, drowsiness, progressive tinnitus, blurring of vision, fall in blood pressure, cardiac irregularities, respiratory arrest and convulsions.

Because chloroquine is rapidly absorbed following ingestion:

- Prompt insertion of an orogastric tube followed by
- gastric lavage
- Use activated charcoal
- Extensive supportive therapy, cardiac monitoring and use of mechanical ventilation is indicated.
- For convulsions and cardioprotective effect give:

	Medicine	Codes	Adult dose	Frequency	Duration
	diazepam <u>slow</u> iv [max =30mg]	**C V**	0.5mg/kg	as required	as required
+/-	**Adrenaline iv**				

Paracetamol Poisoning

Liver damage can occur within hours of ingestion of paracetamol overdose. This may only become evident 3-4 days later.

Emergency Measures

Activated charcoal given within 4 hours of ingestion is the preferred method of gastric decontamination, with or without gastric lavage.

General Measures

- Keep the patient warm and quiet. Observe for at least 3 to 4 days.
- Monitor liver function tests and prothrombin times as indications of liver damage and success of therapy.
- Give:

Medicine	Codes	Adult dose	Frequency	Duration
dextrose 5% iv	**C V**	continuous infusion		first 48 hrs

Antidote

The antidote is effective if given up to 24hrs after ingestion.

If it is suspected that the person has taken in excess of 10 g (20 tablets of 500 mg each) or if the 4 hour plasma paracetamol level exceeds 150 mg/ml administration of antidote is recommended:

	Medicine	Codes	Adult dose	Frequency	Duration
	acetylcysteine iv infusion in dextrose 5%	**A V**	150mg/kg in 200ml over 15mins, then 50mg/kg in 500ml over 4hrs, then 100mg/kg in 1000ml over 16hrs		

Ethanol (Alcohol) Poisoning

- Remove unabsorbed ethanol by gastric lavage (*note that activated charcoal does not absorb alcohol)* if performed soon after ingestion
- Maintain adequate airway. Give artificial respiration if necessary.
- If patient is in coma and there is suspicion of co-ingestion with an opiate, give:

	Medicine	Codes	Adult dose	Frequency	Duration
	naloxone iv	**B V**	0.01mg/kg	as required	as required

- Maintain normal body temperature.
- Correct acidosis as it arises. For metabolic acidosis, if arterial pH < 7.2:

	Medicine	Codes	Adult dose	Frequency	Duration
	sodium bicarbonate iv in dextrose 5%	**B V**	continuous infusion		

Correct hypoglycaemia if present by:

	Medicine	Codes	Adult dose	Frequency	Duration
	dextrose 50% iv	**C V**	20ml bolus dose, then		
and	**dextrose 5% iv**	**C V**	Infusion		

Avoid administration of excessive fluids and depressant medicines and give:

	Medicine	Codes	Adult dose	Frequency	Duration
	thiamine po	**A N**	200mg	once a day	Review

In acute alcoholic mania (following ethanol withdrawal after chronic ingestion) give:

	Medicine	Codes	Adult dose	Frequency	Duration
	diazepam slow iv	**C V**	10mg	one dose immediately	
		then	5mg	every 5-10mins until controlled,	
		then	5-10mg	8 hourly	as required

In ethanol withdrawal, patients with a history of seizures give:

	Medicine	Codes	Adult dose	Frequency	Duration
	diazepam slow iv [max = 30mg]	**C V**	0.05-0.1mg/kg	as required	-

For encephalopathy:

	Medicine	Codes	Adult dose	Frequency	Duration
	thiamine iv/im	**A N**	250mg	once	-
then	**thiamine po**	**A N**	200mg	one a day	7 days

Pesticides

Poisoning with insecticides can occur following ingestion, inhalation, or absorption through the skin.
Solvents: The main hazard of most commercial preparations is the solvent.
With liquid preparations containing paraffin or petroleum products:

- do not induce vomiting
- do not perform gastric lavage
- activated charcoal may be given.

Organochlorine Pesticides

Common names: aldrin, "Bexadust", BHC, chlordane, DDT, dicofol, dieldrin, endosulfan, gammabenzene hexachloride, "Gammatox", lindane, toxaphene.

Signs and symptoms of poisoning include CNS excitation, seizures and respiratory depression.

- Observe general measures for poisoning (activated charcoal and gastric lavage may be useful).
- CAUTION: Do not give milk, fats or oils as they will increase absorption of the insecticide if ingested.
- Control of convulsions, hyperactivity, or tremors:

Medicine	Codes	Adult dose	Frequency	Duration
diazepam slow iv [max = 30mg]	**C V**	0.05-0.1mg/kg	as required	-

If convulsions are unresponsive consider:

Medicine	Codes	Adult dose	Frequency	Duration
phenytoin ivi	**C V**	15mg/kg	as required	-

Pyrethrum and Synthetic Pyrethroids

Common names: alfamethrin, cypermethrin, deltamethrin, fenvalerate, permethrin.

Generally pyrethroids are of low toxicity and no treatment is required. (Caution: solvents).

Organophosphate and Carbamate Insecticides

Common names (organophosphates): "Azodrin", chlorfenviphos, diazinon, dichlorvos, dimethoate, disulfoton, fenitrothion, malathion, mevinphos, monocrotophos, parathion, pichloram, "Rogor", thiometon.

Common names (carbamates): aldicarb, carbaryl, carbofuran, EPTC, methiocarb, pirimicarb, propxur, zineb, 'rat poison' (black granules bought from markets and vendors). May contain carbamates and warfarin.

The effects of organophosphate poisoning are generally more severe, and last longer than the effects of carbamate poisoning. Signs and symptoms include increased secretions, contracted pupils, muscle weakness, sweating, CNS depression, and confusion.

- Remove patient from the source of poisoning and quickly remove any contaminated clothing.
- Establish airway and start artificial respiration with air or oxygen if necessary (this may be required at any stage during the first 48 hours after poisoning). Remove excess bronchial secretions by suction.
- Stomach contents may be decontaminated by administering activated charcoal (see general notes). Inducing emesis is **not** recommended due to the risk of the patient becoming unconscious or convulsing.
- Wash skin, hair and mucous membranes with large amounts of cold water and soap. Do NOT rub the skin. If hair is heavily contaminated shaving may be necessary.
- Rubber gloves should be worn to prevent contamination.
- Give antidote:

	Medicine	Codes	Adult dose	Frequency	Duration
	atropine iv /im	**B V**	2-4mg [Paed=0.02 -0.05mg/kg	every 10 mins [Paed every 10-15mins], until signs of atropinisation appear	
			repeat to maintain atropinisation* [hot dry skin, dry mouth, widely dilated **pupils, fast pulse**]		

**High doses of atropine may be required for many days. The effects of carbamates are short lived, and atropine may be stopped sooner.*

Pralidoxime may be given once the patient is fully atropinised, but is **not** necessary in mild cases. It must **not** be used in carbamate poisoning.

	Medicine	Codes	Adult dose	Frequency	Duration
add*	**pralidoxime iv**	**A N**	8-10mg/kg/hr continuous infusion until recovery [18hrs or more]		
			Paed: 25mg/kg iv over 15-30mins, then 10-20mg/kg/hr continuous infusion until recovery.		

**Atropine therapy must continue.*

If adequate respiration and atropine do not control convulsions, **refer.**

Paraquat and Related Herbicides

Common names: "Avenge", chlormequat, "Cycocel", difenzoquat, diquat, "Gramoxone", mepiquat, morfamquat, "Pix", "Weedol".

These compounds cause multiple organ toxicity and pulmonary fibrosis. Death from paraquat poisoning may occur up to 3 weeks after poisoning, and is due to lung dysfunction.

CAUTION: Oxygen makes these insecticides more toxic.

If oral poisoning [swallowed]:

- Perform gastric lavage.
- Give Fuller's Earth (aluminium silicate) if available.
- Activated charcoal may be given as an absorbent
- Monitor and maintain fluid balance, urea and electrolytes.
- If respiratory difficulty occurs, **delay** the use of oxygen for as long as possible. NB: Oxygen makes paraquat more toxic.
- In severe cases, especially if the patient is in shock, use of a corticosteroid may be helpful if started **early**:

Medicine	Codes	Adult dose	Frequency	Duration
hydrocortisone iv	**B V**	200mg	4 times a day	early in therapy

Paraffin, Petrol & Other Petroleum Products

(including paint thinners, organic solvents, etc)

- These can lead to aspiration pneumonitis where the solvent enters the lungs and causes tissue damage.
- CAUTION: Do **not** give ipecacuanha; do **not** perform gastric lavage.
- Pulmonary oedema and pneumonia will require appropriate therapy.
- Monitor for CNS depression and cardiac arrhythmia.

Other Medicines and Chemicals

see table on next page

Table 31.1 - Antidotes for Poisoning by other specific medicines and chemicals

Medicine/ poison	Antidote	Dosage	Notes
atropine	**physostigimine iv**	1-2mg in 1-2ml 0.9% sodium chloride over 2min	May be repeated every 5mins to a total dose of 6mg for adults (2mg for children) every 30mins.
arsenic compounds	**dimercaprol im then**	3mg/kg im every 4hrs for 2 days	Should be given within 4hrs of poisoning
	penicillamine po	Up to 25mg/kg 4 times a day (max 1g/day) for 7 days	Start after 2 days of dimercaprol therapy.
copper salts	**calcium disodium edetate iv**	15-25mg/kg iv in 250 – 500ml dextrose 5% over 1-2hrs, twice a day for 5 days, and 12.5mg/kg orally 4 times a day for 7 days	
	or		
	penicillamine po	Up to 25mg/kg 4 times a day (max 1g/day) for 7 days	
Cyanides	**sodium nitrite 3% iv and**	10ml iv over 3min	Stop if systolic BP drops below 80mm Hg
	sodium thiosulphate	25ml of 50% injection (or 50ml of 25%) over 10min	Give after sodium nitrite using same needle and vein.
		Repeat BOTH injections at half the initial dose if symptoms reappear.	SPEED IS ESSENTIAL

Table 31.1 - Antidotes for Poisoning by other specific medicines and chemicals (cont.)

Medicine/ poison	Antidote	Dosage	Notes
heparin	**Protamine 1% iv**	0.5ml/min to a total single dose of 5ml. May be repeated after 10min.	1mg protamine (0.1ml) will antagonise 100units heparin.
hydrogen sulphide	**sodium nitrite iv 3%**	10ml over 3min iv	
hypochlorite solutions ('bleach')	**sodium thiosulphate and** **magnesium hydroxide mixture po**	5-10g po in 100-200ml water 30-50ml orally	
iron salts	**desferrioxamine po/ iv**	10g in 50ml sodium bicarbonate 5% in water after emesis / lavage, then iv 15mg/kg/hr (max 80mg/kg in each 12hr period)	Only use iv for serious poisoning. Continue until patient free of symptoms for 24hrs.
Lead	**dimercaprol im and** **calcium disodium edetate im**	4mg/kg im every 4hrs for 30 doses 12.5mg/kg im every 4hrs for 30 doses	 Start 4hr after starting dimercaprol. Use separate injection sites.
Mercury	**dimercaprol im or** **penicillamine po**	3mg/kg im every 4hrs for 2 days, then 2mg/kg im every 12hrs for 10 days. Up to 25mg/kg 4 times a day (max 1g/day) for 7 days	

Table 31.1 - Antidotes for Poisoning by other specific medicines and chemicals (cont.)

Medicine/ poison	Antidote	Dosage	Notes
methanol (methyl alcohol)	**ethanol 50% diluted 1:10 with water**	1.5ml/kg orally then 0.5-1ml/kg iv / po every 2hrs for 4 days	
opiates e.g. codeine, morphine, pethidine	**naloxone iv**	0.01mg/kg	repeat as necessary
phenothiazines (e.g. chlorpromazine, prochloperazine)	**biperiden iv or im, and** **phenytoin slow iv**	2-4mg/kg im or iv (adult) 1mg/kg slow iv (<50mg/min). Can be repeated every 5min to a total dose of 10mg/kg	Repeat if extrapyramidal symptoms appear. To control cardiac arrythmias. Do not use lignocaine.

Snake Bite

First Aid for Snake Bite

- Calm and reassure the patient. Get them to lie down.
- If venom has been spat in the eye, wash liberally with water for at least 15 minutes.
- Apply a pressure bandage (not a tourniquet) firmly around the limb, starting from the bite site and moving upwards. This allows blood flow to the limb but prevents lymph return and absorption of poison.
- Splint the limb to prevent movement that would increase absorption of poison.
- Get the patient to a hospital with facilities to give antivenom. Reassure them on the way and be prepared to give artificial respiration if required.
- Do **NOT:**
  - × cut the wound
  - × use a tourniquet
  - × give electric shock to the site
  - × rub or massage the wound site.

In hospital

- Remove the pressure bandage
- Give analgesia and:

Medicine	Codes	Adult dose	Frequency	Duration
tetanus toxoid	**C V**	see chapter on immunisation		

- If no signs of envenomation, observe for 24 hours (5 days if boomslang bite) then discharge.
- **Only** if signs of envenomation (bleeding, signs of neurotoxicity) give antivenom:

Medicine	Codes	Adult dose	Frequency	Duration
***snake antivenom, polyvalent iv**	**B E**	Test dose of 0.5ml. If no reaction, then 40ml [all ages]. Repeat as required.		

***Caution:** Antivenom wrongly used can be more dangerous than snake bite.

- Polyvalent antivenom covers all the main venomous snakes found in Zimbabwe except the boomslang, for which specific antivenom is necessary. Antivenom can prevent tissue necrosis after adder bites, but only if given early: it will have no effect once gangrene has set in.
- The decision to use antivenom should be based on the 20WBCT (20 minute Whole Blood Clotting Test. I.e. A few millilitres of blood taken by venepuncture is placed in a new,

clean, dry, glass vessel, left undisturbed at room temperature for 20 minutes; then tipped once to see if the blood has clotted or not. **The vessel must be glass rather plastic in order to activate blood coagulation via Hageman factor (FX11). Glass vessels may not activate coagulation if they have been cleaned with detergent or are wet.**

Scorpion Sting

Most scorpions are small and their stings, whilst locally painful, are not life-threatening. Analgesics and reassurance should suffice, except in small children and anaphylaxis.

The *Parabuthus* scorpions are large (8-15cm long), are dark or yellow in colour, and tend to have small pincers and thick tails. They are found mostly in the south-eastern lowveld and southern Zimbabwe.

Systemic signs of a sting include neurotoxic (agitation, hypersalivation, respiratory distress) and cardiotoxic effects.

Give:

Medicine	Codes	Adult dose	Frequency	Duration
scorpion anti-venom	**B N**	Check the manufacturer's instructions carefully		

- Monitor for cardiac irregularities and manage appropriately.
- If cholinergic signs evident e.g. hypersalivation, excessive sweating, give atropine (as for organophosphate poisoning).
- Manage symptomatically and refer if poisoning is severe – with neurological signs.
- Respiratory support may be required.

Mushrooms

- If the patient presents within 4 hours of ingestion, with or without symptoms induce emesis and/or give activated charcoal.
- If gastro-intestinal symptoms appear within 1-2 hours after ingestion: treat symptomatically.
- If gastro-intestinal symptoms appear after 6-12 hours, suspect *Amanita phalloides* poisoning. Then:
- Admit to hospital for observation and contact others who may have eaten the same food.
- Monitor for hepatic damage, acidosis, renal failure and hypoglycaemia.
- There is no effective antidote.

"Elephant Ear"

- causes a local reaction, not poisonous
- reassure the patient

MEDICINES USED IN ANAESTHESIA

General Notes:

Only persons trained to administer them should use the medicines in this section and in an institution where there are adequate facilities for the delivery of safe anaesthesia and resuscitation.

Standards of Anaesthetic Care *have been developed by the Zimbabwe Anaesthetic Association and should be referred to by all persons practising anaesthesia.*

General principles

- All patients should be **assessed** pre-operatively by the anaesthetist who will give the anaesthetic, in order to identify conditions that may influence the outcome of the anaesthesia and treat them appropriately.
- Before the patient's arrival in the operating theatre all **equipment** must be checked and be in working order. A protocol is useful here.
- Check of **patient identity** must be made in every case.
- An adequately trained Anaesthetic Assistant is essential and should be present on the operating theatre at all times. Training of such personnel should include the management of common emergencies.
- The Anaesthetist should be present in the theatre throughout the duration of the anaesthetic (general, regional or sedation).
- Pre-, intra-, and post-operative **records** should be made on every patient. These should be checks of patient's condition at appropriate and regular intervals. The records should be part of the patient's case file.
- The management of the patient in the **Recovery Room** is the responsibility of the Anaesthetist. Continuous individual observation is required. Transfer of information to the recovery staff should include the patient's name, type of anaesthetic, surgical procedure, patient's condition including significant disease, airway or circulation problems. The post-operative orders and analgesia should be detailed and the recovery staff must be satisfied with the condition of the patient before accepting responsibility for his/her care.

General Anaesthesia

At least 30% oxygen should be administered to every patient receiving general anaesthesia.

Intravenous Anaesthetics

Thiopentone Sodium

A thiobarbiturate (intravenous use only) which produces anaesthesia, but **no** analgesia, within one arm-brain circulation time.

Medicine	Codes	Dose	Onset	Duration
thiopentone sodium slow iv	**B V**	3-5mg/kg repeat if necessary after 20-30secs	10-15secs	5-10mins

Indications

- Induction of general anaesthesia;
- May be used alone to produce anaesthesia for very short, minor surgical procedures;
- May be used as an anticonvulsant in status epilepticus.

Contraindications

- Porphyria
- Patients in whom maintenance of the airway by the anaesthetist is in doubt.

Cautions

- Severe tissue damage may occur if thiopentone is given extra-vascularly or intra-arterially; minimise this risk by always using a 2.5% solution.
- Use with caution in hypertensive patients, asthmatics and fixed cardiac output states.

Etomidate

Produces anaesthesia but **no** analgesia in one arm-brain circulation time.

Medicine	Codes	Dose	Onset	Duration
etomidate iv	**B N**	0.2 - 0.4mg per kg	30-60sec	3-10min

Indications

- Anaesthetic induction agent of choice in those with cardiovascular instability.

Contraindications

- Avoid repeated dosages or infusions as it leads to adrenal suppression

Caution

- May cause pain on injection, abnormal muscle movement.

Produces anaesthesia but **no** analgesia in one arm-brain circulation time. Recovery is rapid with minimal post-op nausea and vomiting.

Medicine	Codes	Dose	Onset	Duration
propofol iv	**A V**	2-2.5mg/kg	40sec	5-10min

Indications

- Induction of general anaesthesia
- Conscious sedation
- Maintenance of anaesthesia.

Caution

- Store in fridge above freezing temperature
- Reduce dose in the elderly and high risk patients.
- Minimize pain by injecting into large vein and/or mixing with Lignocaine
- Avoid in children less than one year and epileptic patients
- In patients for Caesarean Section
- Discard unused solutions
- Contraindicated in people allergic to eggs and soyasoya bean oil

Ketamine

Produces dissociative anaesthesia gradually, in high risk or hypovolaemic patients.

Medicine	Codes	Dose	Onset	Duration
ketamine iv	**B V**	1-2mg/kg iv 4-8mg/kg im	30-90sec	10-20min
		maintenance = serial doses 50% of induction iv dose or 25% of im dose. **analgesic** dose = 0.25 – 0.5mg/kg im		

Indications

- Induction and maintenance of anaesthesia;
- Subanaesthetic dosage may be used to provide analgesia for painful procedures, e.g. dressing of burns.
- Induction agent of choice in shocked patients

Contraindications

- Hypertension,
- Raised intracranial pressure,
- Psychiatric disorders.

Cautions

- Hallucinations may complicate recovery, particularly when ketamine is given for maintenance; this problem can be reduced by use of diazepam or midozolam.

- There may be excessive salivation, so use of atropine should be considered.
- Respiratory obstruction and depression may occur, though less commonly than with other anaesthetics.

Inhalational Anaesthetics

Nitrous Oxide

This anaesthetic gas reduces the requirement for more potent anaesthetics and is also analgesic, given in a concentration of 50-70% in oxygen.

Medicine	Codes	Dose
nitrous oxide	**B V**	Titrate to effect for analgesia, induction or maintenance of anaesthesia

Contraindications

- Patient with an air-containing closed space, (e.g. pneumothorax, middle ear abnormalities, bowel obstruction) since nitrous oxide will expand such space with deleterious effect.

Cautions

- The main danger in the use of nitrous oxide is hypoxia; at least 30% oxygen must be used.

Medical Air

Used in conjuction with Oxygen on anaesthetic machines capable of delivering it.

Halothane

Volatile liquid - always administer via a calibrated vaporiser.

Medicine	Codes	Dose	Onset	Duration
halothane	**B V**	Titrate to effect	Dose dependent	Dose dependent

Contraindications

- History of malignant hyperthermia.
- Repeated exposure within 3 months is not recommended.
- Not recommended for obstetric anaesthesia, except when uterine relaxation is required.

Cautions

- Halothane crosses the placental barrier.

Isoflurane

A volatile anaesthetic agent for maintenance of general anaesthesia. Causes less cardiovascular instability compared to Halothane

Medicine	Codes	Dose	Onset	Duration
I**soflurane**	B V	Titrate to effect	Dose dependent	Dose dependent

Contraindications

- In patients with Malignant Hperthermia

Cautions

- Its pungent smell limits its use in inhalational induction
- In patients with coronary artery disease, raised intracranial pressure, pre-existing liver disease

Sevoflurane

Medicine	Codes	Dose	Onset	Duration
Sevoflurane	S V	Titrate to effect	Dose dependent	Dose dependent

Soda Lime

Used in **circle** carbon dioxide absorber system with low fresh gas flow anaesthesia.

Medicine	Codes
soda lime	**B V**

Muscle Relaxants/Cholinesterase Inhibitors

- **Only** personnel who are skilled in managing the patients' airway through intubation and ventilation must administer these medicines.
- Ventilation must be mechanically assisted until the medicine has been inactivated.
- Sedation, analgesia or anaesthesia must be provided when paralysing patients, as these are not produced by muscle relaxants.

Suxamethonium Chloride (depolarising)

Given by the iv route, suxamethonium produces fasciculations followed by flaccid paralysis.

Medicine	Codes	Dose	Onset	Duration
suxamethonium chloride iv	**B V**	0.5-1.5mg per kg	$\leq$ 30secs	up to 5min

Ave. for intubation: 1mg/kg

Indications

- Laryngoscopy and intubation
- Muscle relaxation of short duration

Contra-indications:

- moderate/severe burns
- crush injuries
- spinal cord transaction e.g. paraplegia or quadriplegia
- division of a major nerve e.g. sciatic, brachial plexus
- tetanus
- history of malignant hyperthermia
- scolene apnoea

Caution

- Repeat doses will cause bradycardia; this can be prevented by atropine (10-20 micrograms/kg body weight intravenously).

Atracurium Besylate (non-depolarising)

An intermediate acting benzylsoquinolium non-depolarizing muscle relaxant that undergoes Hofmann elimination and non specific enzymatic ester hydrolysis. Thus safe to use in patients with significant renal or hepatic failure.

Medicine	Codes	Dose	Onset	Duration
atracurium besylate iv	**B V**	0.3-0.6 mg per kg	3-5mins	30-40mins
maintenance dose		0.1-0.2mg/kg	As required	
infusion		0.3-0.6mg/kg/hr		

Caution

- Mild histamine release in higher doses
- Neuromuscular blockade potentiated by aminoglycosides, loop diuretics, hypokalaemia, hypothermia, acidosis and volatile anaesthetic agents

Vercuronium

An intermediate acting aminosteroid, with cardiovascular stability and no histamine release

Medicine	Codes	Dose	Onset	Duration
vecuronium iv	**B V**	0.08-0.1mg/kg	3-5 mins	30-45mins
maintenance		0.02-0.03mg/kg		

Caution

- Neuromuscular blockade potentiated by aminoglycosides, loop diuretics, hypokalaemia, hypothermia, acidosis and volatile anaesthetic agents
- hypersensitvity

Neostigmine bromide (Cholinesterase inhibitor)

Provides reversal of non-depolarising neuromuscular blockade.

Medicine	Codes	Dose
neostigmine bromide	**B V**	2.5-5 mg after/with 1-1.8mg atropine sulphate. [Paed =50mcg/kg with/after 20mcg/kg atropine]

Caution: Neostigmine causes the following if administered without atropine-

- Bradycardia
- Possible cardiac arrest
- Diarrhoea and vomiting
- Abdominal pain.

Local Anaesthesia & Conduction Anaesthesia

This includes local infiltration, peripheral nerve block, spinal and epidural anaesthesia and analgesia.

- Equipment for resuscitation should be readily available and intravenous access must be established before administering a local anaesthetic
- Factors influencing the safe dosage of local anaesthetics include patient's age, weight, physical status, vascularity of the area to which the medicine is applied.
- Adrenaline should not be added to local anaesthetic applied to digits and appendages.
- Spinal and epidural blocks should only be attempted by persons trained in these techniques.
- Spinal and epidural blocks should only be conducted where a vasopressor medicine (e.g. ephedrine) is available to treat possible hypotension.
- Preservative-containing solutions should not be used for spinal anaesthesia.

Bupivacaine Hydrochloride

Medicine	Codes		Dose	Onset	Duration
bupivacaine hydrochloride 5mg/ml (plain)	**A**	**E**	max = 2mg/kg	10-15 min	3-6 hours

Indications

- Local infiltration
- Epidural anaesthesia
- Epidural analgesia(labour & post-operative)

Bupivacaine Hydrochloride (Heavy)

Intrathecal (spinal) anaesthesia for abdominal surgery expected to last 45-60mins, or lower limb surgery of 2-3hrs duration

Medicine	Codes		Dose	Onset	Duration
bupivacaine hydrochloride 5mg/ml with glucose 80mg/ml (heavy)	**B**	**V**	1.5-3ml	10 min	2-3hrs

Synonyms-Heavy, Spinal Grade, Hyperbaric Bupivicaine

Contraindications

- Hypersensitivity to the medicine

Contraindications to spinal anaesthesia

- Patient refusal
- Hypovolaemia/hypotension
- Septicaemia/local skin infections
- Coagulation disorders
- Fixed cardiac output states

Lignocaine Hydrochloride

Medicine	Codes		Dose	Onset	Duration
lignocaine HCl 2% plain	**C**	**V**	max = 3mg/kg	2-10 min	1-2 hours
lignocaine HCl 2% + adrenaline 1: 200 000	**B**	**E**	max = 7mg/kg	2-10 min	1-2 hours

Other Peri-Operative Medicines

Antimuscarinic Medicines

Atropine Sulphate

	Medicine	Codes	Dose	Onset	Duration
	Atropine sulphate iv	**B V**	0.6-1.2mg (paeds: 10-20mcg/kg)	2-10 min	1-2 hours

Indications:

- Used with neostigmine for reversal of non-depolarising neuromuscular block: 0.6-1.2mg iv [Paed=10-20mcg/kg]
- Used in children where a bradycardia may occur when Halothane and suxamethonium are used.
- Bradycardia; 0.5-0.6mg IV. May repeat to a total dose of 3mg if necessary.

Glycopyrrolate

Medicine	Codes	Dose
glycopyrrolate iv	**S V**	200mcg/1mg of neostigmine

Indications:

- For use with neostigmine for reversal of non-depolarising neuromuscular blockade
- Causes less tachycardia compared to atropine hence medicine of choice for the elderly and those with cardiac disease

Sedatives

Diazepam (sedative)

Indications:

- Anxiolysis and sedation with amnesia: 5-10mg orally 1-2hrs before surgery, or 0.2mg/kg slow iv (adults and over 8yrs)

	Medicine	Codes	Dose	Onset	Duration
	Diazepam iv/po	**B V**	5-10mg po 0.2mg/kg slow iv		

Caution

- May cause circulatory depression
- May cause respiratory depress

Midazolam

	Medicine	Codes	Dose	Onset	Duration
	midazolam po	**B E**	7.5 -10mg	Less than 10 minutes	2 – 6 hours
or	**midazolam iv**	**B V**	0.025 – 0.1mg/kg	30 -60seconds	15 – 80 minutes

or	**midazolam (ICU sedation)**	**B**	**V**	1-15mg/hr	30-60 seconds

Indications:

- Premedication
- Adjunct to general anaesthesia
- Conscious sedation and sedation in ICU

Caution:

- Causes respiratory depression when used in conjunction with opiods and other sedatives
- Contraindicated with acute angle glaucoma or open angle glaucoma unless patients are receiving appropriate therapy
- Care in elderly and COAD patients

Promethazine

Antihistamine with sedative, antiemetic and anti-cholinergic properties. Useful for the pre-operative preparation of the asthmatic patient.

Indications:

Premedication one hour before surgery:

Medicine	Codes		Dose	Onset	Duration
promethazine	**B**	**V**	25-50mg im 1-5yr = 15-20mg po >5yrs = 6.25-12.5mg im		

Severe anaphylaxis during anaesthesia:

Medicine	Codes		Dose	Onset	Duration
promethazine	**B**	**V**	50mg (Paed 0.4mg/kg) slow IV		

Trimeprazine tartrate

Medicine	Codes		Dose
trimeprazine tartrate	**B**	**N**	2mg/kg 1-2hrs before surgery

Indications

Pre-operative sedation of children

Cautions

- May cause excessive sedation.
- May cause hyperactivity postoperatively.

Antacids

Sodium Citrate

Medicine	Codes	Dose
sodium citrate 0.3molar solution	**B N**	30ml immediately before induction

Indications

Neutralization of gastric contents to prevent acid aspiration syndrome where this is a risk, e.g. obstetrics.

Antiemetics

Metoclopramide

Dopamine antagonist; accelerates gastric emptying.

Medicine	Codes	Adult dose	Frequency	Duration
metoclopramide po	**B V**	Premedication: 10 mg po/im/iv 1hr before surgery, then		
	Further Treatment:	10mg po	8 hourly	as required

Indications

Prevention of post-operative nausea and vomiting, reduction of gastric contents preoperatively.

Cautions

Oculogyric crisis can follow.

Avoid in porphyria.

Prochlorperazine

Indications:

Prophylaxis (Adult 12.5mg po/im) and treatment of post-operative nausea and vomiting (12.5mg po/im 6hourly) (Paed: 0.1 - 0.2mg/kg im).

Medicine	Codes	Dose	Onset	Duration
Prochlorperazine po/im	**B V**	12.5mg po/im	2-10 min	1-2 hours
		For post-operative nausea and vomiting		
		12.5mg po/im (paeds: 0.1-0.2mg/kg im)	6 hourly	

Caution

Extrapyramidal symptoms may occur, particularly in children.

Analgesics

POST-OPERATIVE PAIN

Post operative pain needs to be treated adequately as severe postoperative pain and stress response to surgery increases perioperative morbidity and mortality

Medicine	Codes		Dose
morphine im	**B**	**V**	5-15mg 4hrly

Indications

- Postoperative pain
- For Patient Controlled Analgesia (PCA) and epidural infusions refer to local protocols.
- Analgesic effect needs to be reviewed regularly

Caution/Side Effects

- Patient should be closely monitored for side effects mainly respiratory depression
- Pruritis
- Vomiting
- Constipation
- Urinary retention

	Medicine	Codes		Dose	Onset	Duration
	Pethidine im	**B**	**V**	1-2mg/kg	3 hourly	
				Post-operative shivering 10-25mg iv/im		
or	**tramadol im**	**B**	**V**	50mg/ml		
or	**tramadol po**	**B**	**V**	50-100mg 4 - 6hrly		review

Indications

- Post-operative pain 1-2mg/kg IM 3hrly
- Post-operative shivering 10-25mgIV/IM

Caution/Side Effects

Include tramadol SEs

- See under Morphine

A synthetic phenylpiperidine derivative opiod analgesic

Medicine	Codes		Dose	Onset	Duration
fentanyl inj	**S**	**N**	1-10mcg/kg		

Indications

- IntraIntra-operative use at a dose of 1 to 10 mcg/kg
- For post-operative pain as an infusion in an ICU or HDU at 1-3mcg/kg/hr

Tilidine Hydrochloride

A synthetic opioid painkiller. Vital for pain management in paediatrics post-operative

Medicine	Codes	Dose	Frequency	Duration

Tilidine hydrochloride drops	**B**	**V**	1 drop per year of age. Max 5 drops	6 hourly	

NSAIDS

Used as adjuncts or alternative to opiods in the post op period

Medicine	Codes		Adult dose	Frequency	Duration
diclofenac	**B**	**E**	25-50mg po	3 times a day	
			25-100mg pr	Twice a day	
Indomethacin	**B**	**E**	25-100mg po	2 times a day	
			50-100mg pr	Twice a day	
Ibuprofen	**C**	**E**	200-400mg po	3 times a day	

Indications

- A potent NSAID analgesic for mild to moderate pain

Cautions

- Renal impairment
- Aspirin sensitivity
- Peptic ulceration
- Asthma

LOCAL ANAESTHETIC AGENTS

These are used for local infiltration or regional analgesia

Lignocaine

Medicine	Codes		Adult dose	Frequency	Duration
lignocaine hydrochloride Inj	**C**	**V**	3mg/kg without adrenaline 7mg/kg with adrenaline		

Rapid onset. Duration of action 30-90mins. Action prolonged by adrenaline

Caution

- use of adrenaline containing solutions should be avoided for peripheral infiltration of the ear, finger and penis

Bupivicaine

Medicine	Codes		Adult dose	Frequency	Duration
bupivacaine hydrochloride Inj	**A**	**E**	2mg/kg local infiltration For Epidural infusion follow local protocols		200-400mins

Slower onset than lignocaine.

Caution

- cardiotoxicity

Medicines Used in Shock

Shock could be caused by the following:

- Acute pump failure – myocardial infarction, arrhythmias, valve rupture
- Volume loss (hypovolaemia) –haemorrhage, dehydration
- Loss of vascular tone- septic shock, neurogenic shock, endocrine failure, anaphylactic shock

It is important to make an accurate aetiologic diagnosis for appropriate treatment. Ideally CVP monitoring is required.

General Principles of Management of Shock

- Treat underlying cause
- Restore adequate perfusion by
  - Restoring blood pressure
    - Use of fluids, vasoppressors or vasodilators
  - Increasing cardiac output
    - Use of fluids, inotropes, vasopressors
  - Improving oxygenation
    - Blood transfusion, Supplemental Oxygen, Mechanical ventilation as appropriate
- Diligent monitoring (BP, Pulse, Respiration, Pulse oximetery, Urine output)

Adrenaline 1 in 10 000

Add 9ml normal saline / water to 1ml of 1 in 1000 adrenaline

Severe anaphylaxis in anaesthesia

Medicine	Codes	Adult dosage		
adrenaline 1 in 10 000 iv	**C V**	1ml slow [1-5yr =0.1ml/kg]	repeat every minute	until satisfactory clinical response

Cardiac arrest during anaesthesia:

Medicine	Codes	Adult dosage
adrenaline 1 in 10 000 iv	**C V**	5ml for fine / low amplitude ventricular fibrillation persisting after defibrillation [or 10ml of 1 in 1000]; 10ml for asystole [or20ml of 1in 1000]

Dopamine

A naturally occurring catecholamine

Medicine	Codes	Dose
dopamine inj	**S V**	2 to 20mcg/kg/min

Caution

- Use via a central line
- Make sure patient is adequately volume filled before starting dopamine therapy
- Do not mix with Sodium bicarbonate

Noradrenaline/Norepinephrine

A vasoconstrictor sympathomimetic, the **first line medicine** of choice for septic shock with infusion via central line

Medicine	Codes	Adult dosage
adrenaline iv	**C V**	40mcg/ml base running at initial rate of 0.16-0.33ml/min titrated to effect

Dobutamine

$ß_1$ adrenergic agonist with positive inotropic and chronotropic effects

Indications

Inotrope of choice for patients in Cardiac Failure

Medicine	Codes	Dose
Dobutamine inj	**S V**	2 to 20mcg/kg/min

Caution

- May cause Tachyarrythmias, fluctuations in Blood Pressure, Headache, Nausea
- Elderly patients may have a decreased response

Ephedrine sulphate

Indications

This is the medicine of choice in obstetrics

- **Hypotension due to spinal or epidural anaesthesia**
- **acute hypotension secondary to vasodilation**

Medicine	Codes	Adult dosage
ephedrine sulphate iv	**B E**	increments of 5 mg iv until BP has been restored

If many increments are needed a larger dose may be given intramuscular or by intravenous infusion.

Phenylephrine hydrochloride

Medicine	Codes	Adult dosage
Phenylephrine hydrochloride iv	**B E**	100 – 500mcg repeated as necessary after every 5 - 15min (IV Infusion) 180mcg/min reduced to 30-60mcg/min titrating to effect (sc/im) 2-5mg followed if necessary after 15 min by doses of 1-10mg

Hydrocortisone

Peri-operative cover for patients on corticosteroid therapy:

Medicine	Codes	Adult dosage	
hydrocortisone iv	**B V**	100mg	with premedication, then
		100mg	6 hourly for 24hrs, then decrease

Severe anaphylaxis during anaesthesia: refer to Chapter on Anaphylaxis for comprehensive management

Medicine	Codes	Adult dosage	
hydrocortisone iv	**B V**	200mg [Paed: < 1yr = 25mg 1-5yrs = 50mg 6-12yrs = 100mg	6 hourly as required

Lignocaine hydrochloride [preservative-free]

Cardiac arrest as an alternative to amiodaronein in VF/VT arrest

Medicine	Codes	Adult dosage
lignocaine HCl preservative-free **iv**	**B N**	100mg iv [or 200mg endotracheal tube], and repeat DC shock 360joules.

If defibrillation is successful, to maintain a stable rhythm: (stable VT, significant ectopy, wide complex tachycardias)

Medicine	Codes	Adult dosage
lignocaine HCl preservative-free **iv infusion**	**B N**	4 mg/minute for 1 hour, then 2 mg/minute for 2 hours, and 1 mg/minute thereafter

Caution

- Prophylactic use in Acute MI contraindicated
- Reduce maintenance dose if there is impaired liver function
- Discontinue if signs and symptoms of toxicity develop

Antihypertensives in anaesthesia

For patients with pregnancy induced hypertension due for induction of anaesthesia

Medicine	codes	Dose	onset	Duration
Magnesium Sulphate IV	**B V**	4g in 500 mls normal saline run over 10 to 20min titrating to effect		

Reassure if patient develops hot flashes and dizziness. Stop infusion if patient becomes normotensive or hypotensive

Medicine	codes	Dose	onset	Duration
Labetalol IV **Labetalol continuos infusion** ***Total dose should not exceed 300 mg**	**B V**	20 mg IVI stat over 2 mins, then 10-80 mg IVI every ten minutes until desired BP level achieved 2 mg IVI per minute by continuous IV infusion		

- Direct acting vasodilator:

Medicine	codes	Dose	onset	Duration
Hydralazine IV/IM	**B V**	**5-10mg every 20-30 mins**		

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

Oxytocin guidelines during a caesarean section

All Caesarean section cases:

1) Small dose ivi oxytocin (e.g. 2.5 iu) over 30 seconds after delivery of the baby and confirming with obstetrician no second baby present
2) Dose to be repeated at 3 minutes if no adequate contraction
   a) *Oxytocin induced hypotension can be counteracted with ivi phenylephrine (50 to 100 mcg) bolus (preceding oxytocin may be beneficial if initial concerns about effects of vasodilation)*
3) Immediate initiation of an infusion of oxytocin and to continue for at least eight hours. (20 units of oxytocin/1000 mls over eight hours)

High risk cases:

- Prolonged augmented labour (oxytocin resistance)
- Preoperative anaemia
- Prolonged labour: esp. long 2nd stage
- Uterine distension: multiple pregnancy, big baby or polyhydramnios
- Grand-multiparity: >5
- Clotting Dysfunction

- PPH in the past

Above treatment plus:

a) Increase oxytocin infusion rate (add 40 iu/1000 mls over eight hours)
b) Add Ergometrine 0.2 mg ivi (repeat per 15 minutes up to 1 mg total ivi)
    i) *(Beware of Hypertensive complications)*

Actively Haemorrhaging Cases:

Above High Risk Management plus:

1) Ensure total misoprostol dose is 600 mcg in the last eight hours (top up previously administered doses either rectally or sublingually)
2) Add cyclokapron 1g ivi
    a) Repeat 8hrly whilst ongoing haemorrhage
3) Ensure standard resuscitation, transfusion and coagulation factor management
4) Consider intramyometrial Prostaglandin F2 alpha (250 mcg) (off label use)

Alternatives for resource constrained environments:
Controlled ivi oxytocin infusion could be replaced with Intramuscular Syntometrine (5iu/0.5 mcg) *(hypertensive diseases must be excluded)* (repeat 6 hrly)

or

Intramuscular Oxytocin 10 iu (repeat 4 hrly)

SURGICAL CONDITIONS

General Note

The field of surgery is diverse with many specialties covering specific clinicopathological areas. The EDLIZ guidelines will attempt to cover basic essentials of surgical care. Detailed information should be obtained in literature of the appropriate specialties. The ability to identify patients needing surgical intervention should be of paramount importance.

General surgical conditions

1. Acute Abdomen

    - Appendicitis
    - Intestinal obstruction
    - Cholecystitis
    - Perforated duodenal ulcer

2. Breast conditions

3. Thyroid condition

4 Ulcers

Acute Abdomen

This is defined as severe sudden onset of pain of less than 7 to 10 days duration. The causes of an acute abdomen can be localized to the abdomen but sometimes can be from a systemic non-surgical cause. It is very important to be able to quickly assess and decide whether it is a surgical acute abdomen or medical acute abdomen.

The usual presentation of a surgical acute abdomen is sudden abdominal pain (colicky or sharp piercing) associated with vomiting and/or constipation. Other features might include abdominal distension and failure to pass flatus. The main causes of a surgical acute abdomen are acute appendicitis, acute perforated duodenal ulcers, acute intestinal obstruction, acute cholecystitis, pancreatitis, ectopic pregnancy and ovarian torsion. Non abdominal causes of pain that mimic an acute abdomen are numerous and may include myocardial infarction, pericarditis, pneumonia or pleurisy.

EVALUATION

- History and physical examination will help narrow down the differential diagnoses and also determine whether the patient requires emergency surgery. Special attention should be paid to the nature of pain, location, onset, duration, intensity, recurrent nature, aggravating and alleviating factors.
- Physical exam should note the general state of the patient, abdominal distension, surgical scars, tenderness, guarding, rebound tenderness, presence of a mass, rectal, cervical or adnexal tenderness.
- Initial tests might include an FBC, U&Es, amylase, lipase, pregnancy test, urinalysis and LFTs.
- Imaging studies may be necessary:

Plain abdominal x-rays may reveal obstruction, perforation (free air under the diaphragm) and other pathology.

Ultrasound is indicated especially for biliary tract disease, pelvic and urinary system pathology.

TREATMENT

- Haemodynamically unstable patients might need immediate resuscitation with Normal saline or Ringers lactate, possible transfusion, nasogastric tube for obstruction or persistent vomiting, urinary catheter for monitoring output, broad spectrum empirical antibiotic for peritonitis, suspected perforated viscus or intra-abdominal injection.
- Direct treatment towards the specific condition should be instituted by the specialist after diagnostic workup.

Acute Appendicitis

This is the commonest acute abdominal surgical emergency. Typical symptoms are shifting abdominal pain (starting as vague periumbilical pain then shifting to the right iliac fossa) associated with nausea and occasional vomiting. On evaluation, uncomplicated appendicitis has right iliac tenderness ellicited maximally at McBurney's point with possible positive Rovsing sign. The white blood count may be elevated. The diagnosis of appendicitis should be made on clinical grounds but other investigations especially

ultrasound scan and CT scan might be necessary in females and where the history is not typical. The other tests are especially useful to exclude other pathologies that might mimic appendicitis. Straightforward appendicitis needs emergency surgery as delays are associated with complications and poor outcome. The treatment of appendicitis is surgical. Laparascopic appendicectomy is now popular among surgeons with special interest and is particularly useful in females where the advantage of visualising pelvic viscera is important. The cosmetic advantages are additional to the less pain, reduced hospital stay and earlier recovery noted with laparascopic surgery.

The use of antibiotics in appendicitis and its complications can be summarized as below:

CONDITION TREATMENT

- **Acute appendicitis**: Emergency appendicectomy and prophylaxis:

	Medicine	Codes		dose	Frequency	Duration
	Ceftriaxone IV	**C**	**V**	1g	Once only	
and	**Metronidazole IV**	**B**	**V**	500mg	Once only	

- **Appendiceal mass.** Clinical assessment of size of mass and institution of IV antibiotics and analgesia

	Medicine	Codes		dose	Frequency	Duration
	Benzyl penicillin IV	**C**	**V**	2.5MU	4 times a day	
and	**Gentamicin IV**	**C**	**V**	120mg	Once a day	
and	**Metronidazole IV**	**B**	**V**	500mg	3 times a day	
Alternatively:						
	Ceftriaxone IV	**C**	**V**	1g	2 times a day	
and	**Metronidazole IV**	**B**	**V**	500mg	3 times a day	

This can be done while serial examinations (daily) for clinical improvement of size of mass. are instituted Serial FBC and USS monitoring for improvement is also important. Failure to improve or deterioration in condition might warrant surgical intervention. If the patient improves elective surgery (six weeks after initial presentation) is advised as operating early is fraught with higher risk of complications.

- **Appendiceal abscess.** Emergency incision and drainage (with or without appendicectomy) or USS guided pus drainage plus antibiotics as follows:

	Medicine	Codes		dose	Frequency	Duration
	Benzyl penicillin IV	**C**	**V**	2.5MU	4 times a day	
And	**Gentamicin IV**	**C**	**V**	120mg	Once a day	
Alternatively:						
	Ceftriaxone IV	**C**	**V**	1g	2 times a day	
and	**Metronidazole IV**	**B**	**V**	500mg	3 times a day	

These treatments are continued till clinical improvement is satisfactory. Interval elective appendicectomy might or might not be necessary.

- **Appendiceal rupture/perforation**. Generalised peritonitis is typical and prognosis is poor. Aggressive fluid resuscitation, IV antibiotics and urgent laparatomy are all necessary. The IV antibiotic regime is as for appendiceal abscess above.

Intestinal Obstruction

History and examination is of paramount importance. While the different causes and types of obstruction are beyond the scope of the EDLIZ the important symptoms to look for are colicky abdominal pain, vomiting, abdominal distension and absolute constipation or obstipation (not passing stool and flatus). These symptoms are present in different degrees depending on the cause and level of obstruction. Remember to exclude previous abdominal surgery which makes adhesions the likely cause of obstruction and assess the potential hernia sites to exclude obstructed hernia.

Aggressive resuscitation and monitoring is important once intestinal obstruction is suspected or confirmed. Initial FBC, U+Es and possible X-match is important. IV fluids in the form of Normal saline and Ringers lactate are given as guided by degree of dehydration but aiming to achieve a urine output of 1ml/kg/hr as guided by the urine output monitoring with a urinary catheter. NGT insertion and monitoring of the effluent type and amounts is vital. The NGT losses should be replaced ml per ml with Normal Saline in addition to the normal daily requirements estimated at 40mls/kg/24hrs.

Antibiotic use in intestinal obstruction is necessary where bacterial translocation is suspected especially with longer history of obstruction or where a closed loop obstruction with possible gangrene/perforation of bowel is suspected e.g. in sigmoid volvulus or at surgery where unprepared bowel is opened.

FIRST LINE

	Medicine	Codes		dose	Frequency	Duration
	Benzyl penicillin IV	**C**	**V**	2.5mg	4 times a day	
and	**Gentamicin IV**	**C**	**V**	120mg	Once a day	
and	**Metronidazole IV**	**B**	**V**	500mg	3 times a day	

SECOND LINE

	Medicine	Codes		dose	Frequency	Duration
	Ceftriaxone IV	**C**	**V**	1g	2 times a day	
and	**Metronidazole IV**	**B**	**V**	1g	3 times a day	

NB. Gentamicin should not be used where renal impairment is likely or confirmed.

Cholecystitis

Acute cholecystitis is a condition which is becoming more frequent in our population as major lifestyle changes occur with dietary shifts towards a western diet. This has increased the incidence of cholesterol related illness of which gallstone disease is one. Calculous cholecystitis (gallstone-related cholecystitis) is the commonest indication for cholecystectomy in Zimbabwe. In young patients exclusion of haemolytic anaemia especially sickle cell anaemia is important.

While the definitive treatment for cholecystitis is surgery i.e. open cholecystectomy or laparascopic cholecystectomy it is necessary to give antibiotics for acute cholecystitis. While acute cholecystitis typically presents in a forty year old, fat, fertile, flatulent and fair female it can also occur in males, in a younger or older age group. The symptoms are mainly acute right upper quadrant pain usually at night after a fatty meal with some milder previous episodes of colicky upper abdominal pains. On examination tender right upper quadrant is typical with a positive Murphy sign (catch of breath on inspiration while the palpating hand is advancing up from the right iliac fossa to the right costal margin).

TREAMENT OF ACUTE CHOLECYSTITIS

Antibiotics and analgesia are important.

FIRST LINE

	Medicine	Codes		dose	Frequency	Duration
And	**ampicillin IV**	**C**	**V**	500mg	4 times a day	
and	**Metronidazole IV**	**B**	**V**	500mg	3 times a day	
Alternative to ampicillin (if not available):						
and	**Benzyl penicillin IV**		**V**	2.5mg	4 times a day	

SECOND LINE

	Medicine	Codes		dose	Frequency	Duration
	Ceftriaxone IV	**C**	**V**	1g	2 times a day	
and	**Metronidazole IV**	**B**	**V**	500mg	3 times a day	

Patients are managed as above and if symptoms and signs improve can be discharged on oral, amoxicillin 500mg tds x for 7 days and scheduled for elective cholecystectomy after six weeks.

Advances in laparascopic surgery have however made it possible to do early or “hot” cholecystectomy when certain criteria are met based on expertise of the surgeon.

Perforated Duodenal Ulcer.

Peptic ulcer disease is generally a medical condition where advances in diagnosis and treatment have made surgical intervention only reserved for its complications. Perforated duodenal ulcers remain a feared and relatively common complication.

While a reasonable number of patients who present with acute perforated duodenal ulcer have had a diagnosis of peptic ulcers before, the majority have no prior diagnosis or investigations done. Presentation is usually of sudden severe epigastric pain which rapidly spreads to the whole abdomen associated with fear of movement. Examination findings are typically those of generalized tenderness with board-like rigidity of the abdomen and rebound

tenderness. The erect chest X-ray shows free air under the diaphragm in 75% of cases.

This is surgical emergency but resuscitation with Normal Saline, NGT insertion, analgesia and urinary catheterization should be done. FBC and U+Es are done in preparation for surgery. The prognosis is poor if surgery is delayed. The adage of "the sun should not rise and set' before surgery is done is appropriate for this condition. IV antibiotics should be given as soon as signs of peritonitis are picked.

FIRST LINE

	Medicine	Codes		dose	Frequency	Duration
	Benzyl penicillin IV	**C**	**V**	2.5MU	4 times a day	
and	**Gentamicin IV**	**C**	**V**	120mg	Once a day	
and	**Metronidazole IV**	**B**	**V**	500mg	3 times a day	

NB. Gentamicin should not be used if renal assessment is not satisfactory.

SECOND LINE

	Medicine	Codes		dose	Frequency	Duration
or	**Ceftriaxone IV**	**C**	**V**	1g	2 times a day	
and	**Metronidazole IV**	**B**	**V**	500mg	3 times a day	

Breast Conditions

While the breast can be affected by many conditions practitioners should take all efforts to exclude malignancy. History and examination is of value in this regard. Common breast conditions are:

- Breast abscess especially in breastfeeding or pregnant women
- Mastitis
- Breast fibroadenomas especially in young women age (15-35years).
- Breast cancer especially above the age of 35.
- Ductal papilloma
- Duct ectasia
- Nipple/ breast eczema
- Paget's disease of the breast
- TB of the breast

Breast Abscess

Typically occurs in a young lactating or pregnant women who has pain and swelling of the breast with an area of maximal tenderness or fluctuancy. Once the diagnosis is made, incision and drainage in theatre under general anaesthesia should be done as they are generally deep abscesses and adequate drainage is advisable under general anaesthesia. Analgesia and antibiotics should be instituted once diagnosis is made.

Preferred therapy:

	Medicine	Codes	dose	Frequency	Duration
	cloxacillin IV	**B V**	500mg	4 times a day	2 days
then	**cloxacillin po**	**B V**	500mg	4times a day	5 days

Alternative therapy:

	Medicine	Codes	dose	Frequency	Duration
	clindamycin IV	**B V**	300-600mg	3 times a day	2 days
then	**clindamycin po**	**B V**	300-600mg	3times a day	5 days

The wound should be cleaned with saline or povidone iodine and packed or dressed with glycerin and ichthamol daily until healing occurs. The mother should be advised to continue breastfeeding or to express the breast frequently.

Mastitis

This also occurs commonly in breastfeeding or pregnant mothers. The symptoms are similar to the breast abscess except that there is no “pointing” area of maximal tenderness or fluctuancy.

If mild symptoms

	Medicine	Codes	dose	Frequency	Duration
	cloxacillin po	**B V**	500mg	4 times a day	7 days
or	**clindamycin po**	**B V**	450mg	3 times a day	7 days

If severe then admission and IV treatment as in breast abscess discussed above.

Breast Eczema

This is a common condition which is usually confused with cracking nipples in breastfeeding mothers. However, exclusion of breast cancer is important as in Paget's disease. Where appropriately diagnosed, breast eczema can then be managed as per guidelines in the skin conditions chapter. Where there is doubt of diagnosis a biopsy of the affected skin is important.

Thyroid Conditions

Patients who present with a goitre need to be assessed properly. The assessment should focus on assessing their thyroid state (thyrotoxicosis, euthyroid or hypothyroid) and exclude complications which might be linked to malignant change e.g upper air ways compression, hoarse voice in recurrent nerve invasion, retrosternal extension or superior vena cava compression, rapid growth, fixation, enlarged lymph nodes.

Treatment for thyrotoxicosis is laid out in the endocrine conditions chapter.

Surgical intervention is indicated in thyrotoxicosis if

- Not responding to medical therapy.
- Thyrotoxicosis not responding to radioiodine.
- Thyrotoxic patients where antithyroid drugs and radioiodine are contraindicated.
- Confirmed malignancy.
- Suspected malignancy where confirmation is not possible before surgery e.g. in follicular carcinoma.
- Goitre causing compressive complications on the airway, major vessels and nerves.

Patients scheduled for surgical intervention should be rendered euthyroid before the surgery with oral anti-thyroid drugs. Emergency cases might need IV propranolol as there is no time to bring the thyroid hormones down.

SKIN ULCERS

Chronic ulcers are a common condition. Unless the cause of the ulcer is known exclusion of malignancy is important. Exclusion of malignancy should be done by taking a biopsy for histological analysis. The common cutaneous malignancies are squamous cell carcinoma, malignant melanoma and basal cell carcinoma. These malignancies are more common in albinos who are sun exposed without ultraviolet protection. Use of sun protective clothes and sunscreen lotions is important in this group of people. However everyone is prone to developing skin cancers. Chronic non-healing ulcers (eg after burns) can develop squamous cell carcinoma, referred to as a Marjolin ulcer. Malignant melanoma of the acral lentiginous type is common on the soles of the feet in Zimbabwe and all suspicious lesions should be biopsied and referred to the general surgeon for further management.

Where malignancy has been ruled out or is not suspected exclusion of peripheral vascular disease, diabetes mellitus and venous stasis (eg in varicose veins) is also important. The management of non-malignant chronic ulcers involves different disciplines. The guiding principle, however, is reducing inflammation on the wound by avoiding irritating substances on the wound and limiting frequent change of dressings. In this regard simple normal saline or equivalent salt solution would be preferred for cleaning the wound and then applying long staying dressings (which can be changed less often eg once every third day). Wound care products are varied and the state of the wound would guide the most appropriate product to use. In the absence of these specialized products cleaning the wound with simple saline and dressing it with glycerine and icthamol solution would suffice.

ANTINEOPLASTIC AGENTS

General Notes

A wide variety of antineoplastic agents are generally available. These agents should be strictly used under the supervision of a specialist in oncology, be it for the treatment of malignant or other conditions.

The role of antineoplastic agents in the management of cancer is expanding. Chemotherapeutic and other medicines are used during treatment of most patients with cancer. One of the most important developments in cancer therapy over the last few decades is the increased recognition of the role of chemo-radiation in the curative management of cancer.

Chemotherapy medicines fall into the following classes

- Alkylating medicines,
- Cytotoxic antibiotics,
- Antimetabolites,
- Vinca alkaloids,
- Other medicines.

Recent times have however, seen the development of an array of other antineoplastic medicines including biological and immune therapy drugs.

Chemotherapy can be used in a number of ways. The criteria for use differ for each tumour type, stage morphologic and biologic characteristics. Combination chemotherapy is more commonly used than single agent chemotherapy.

Principles of Combination Chemotherapy

1. Only those agents proven effective should be used.
2. Each agent used should have a different mechanism of action
3. Each agent should be used at maximum dose
4. Agents with similar dose – limiting toxicities can be combined safely only by reducing doses, resulting in decreased effects.
5. Combination chemotherapy should be administered according to protocol, based on evidence-based medicine with intervals between therapy cycles allowing for the recovery of normal tissue.

Guidelines of handling chemotherapy medicines

- Trained personnel should reconstitute the medicines.
- Reconstitution should be done in designated areas, preferably under lamina air flow.

- Protective clothing including eye protection should be worn at all times whilst reconstituting the medicines. This includes eye protection.
- Gloves should always be worn when administering the medicines.
- Pregnant health care workers should not handle chemotherapy medicines.
- Waste disposal should be meticulously handled. All contaminated disposables should be incinerated.

Adjuvant Chemotherapy

Adjuvant Chemotherapy is use of chemotherapy medicines in patients who remain at high risk of recurrence after the primary definitive treatment of the tumour with surgery or by means of radiation treatment. Cancers effectively treated by adjuvant chemotherapy includes, Wilm's tumour, breast cancer, osteosarcoma and colorectal cancer.

Principles of Adjuvant Chemotherapy

1. Effective chemotherapy must be available
2. Known tumour should have had primary definitive treatment either surgically or with radiation treatment
3. Chemotherapy should be started as soon as possible after primary treatment.
4. Chemotherapy should be given in maximally tolerated doses
5. Chemotherapy should continue to the maximum period defined by the protocol.

Neoadjuvant Chemotherapy

In this instance, chemotherapy is administered before surgery or radiotherapy. The advantage of this method is that it exposes potential micrometastases to chemotherapy much earlier. Also significant regression of the primary tumour may allow easier management and permit organ and function preservation. Cancers effectively treated by neoadjuvant chemotherapy include soft tissue sarcomas, ostesarcoma, anal cancer, bladder cancer, larynx cancer, oesophageal cancer and locally advanced breast cancer.

Chemoradiation

Chemotherapy is increasingly being administered concurrently with radiotherapy in most tumours. The result of chemoradiation in these tumours is superior to that of radiotherapy alone. The improved outcome outweighs the slightly increased toxicity of the combined treatment. Cancers effectively treated by chemoradiation include,

cervical cancer, oesophangeal cancer, nasopharyngeal cancer and other head and neck cancers

Maintenance Chemotherapy

In certain specific conditions patients may need to continue on chemotherapy for a defined period. Examples include tamoxifen for ER/PR positive breast cancer.

Palliative Chemotherapy

Chemotherapy can be used in advanced disease for palliation where there is no alternative therapy or where local therapies have failed. A positive response with acceptable toxicity must be expected to justify the use of palliative chemotherapy.. Cancers that may be effectively treated with palliative chemotherapy include advanced ovarian cancer, germ cell tumours of the testis, small cell lung cancer and metastatic breast cancer.

Cancers that may be curable with Chemotherapy Alone

*Some of the examples of cancers that maybe curable with chemotherapy alone**

- Gestational choriocarcinoma
- Hodgkin's disease
- Germ cell cancer of testis
- Acute lymphoid leukemia
- Non-Hodgkin's lymphoma (some subtypes)
- Hairy cell leukemia (probable)
- Small cell lung cancer

**Depending on stage at presentation*

Selection of Chemotherapy Agents

Many chemotherapy regimens for a wide variety of cancers exist. Patients who are to receive chemotherapy are to be well assessed prior to prescription and administration of these medicines. Assessment needs vary according to the medicines that may be selected for use. The following are to be considered prior to this:

Physiologic Age of the Patient

Whilst age alone is not a valid criterion for excluding patients from receiving chemotherapy, age related alterations in organ function may result in unacceptable toxicity. Treatment decisions must however take into account the likelihood of benefit.

Performance Status

Patients with poor Karnofsky performance status (KPS) do not tolerate chemotherapy well. Patients with KPS of 30 percent or less are not usually candidates for chemotherapy.

Patient Performance Score Using the Karnofsky Scale

Karnofsky (%)	Definition
100	Asymptomatic
80 – 90	Symptomatic, fully ambulatory
60 – 70	Symptomatic, in bed < 50% of day
40 – 50	Symptomatic, in bed > 50% of day but not bedridden
20 – 30	Bedridden

Nutritional status

Ingestion of 1500 to 2000 cal/day is necessary to allow for satisfactory tumour response. This is an important consideration in the setting of advanced malignancy.

Obesity

Over dosage can occur if dosage is calculated per kilogram rather than per surface area. Ideal body weight should be used for palliative therapy rather than actual body weight. For curative cases if ideal body weight is used, dose escalations should be considered if treatment well tolerated.

Prior Therapy

The first chemotherapy treatment protocol usually gives best response and hence the need for optimum timeous management by knowledgeable team. Failure to respond to first line therapy lessens the probability to respond to second line therapy. This is most likely due to the development of multi drug (medicine) resistance.

Organ Function

Altered bone marrow, renal, hepatic, cardiac or pulmonary function may render it impossible to use some agents or make it necessary to modify dosage. The oncologist will need to determine baseline function according to the medicines being administered.

Coexisting Illness

Choice of agents to be used may have to be modified e.g. adriamycin in congestive cardiac failure and steroids in diabetes mellitus

Requirements for chemotherapy/referral to tertiary level

All patients needing chemotherapy should be referred for treatment to a referral or tertiary treatment institute, unless there are suitable facilities and well trained staff in another facility.

All patients suspected of having cancer should also be referred for further evaluation to institutes with appropriate recourses.

Patients on chemotherapy can be seen at any level of care since they are just like any other patient and may need basic non-oncological care for common diseases and pain control. However the attending practitioners should be very alert since chemotherapy side effects can mimic or mask signs of other conditions.

Common side effects of chemotherapy

Chemotherapy medicines have a variety of toxicities. Only the common ones will be highlighted.

Nausea and vomiting; this is one of the most common side effects. The different medicines have different emetogenic potential. Treatment of these side effects is therefore tailored to suit the emetogenic potential of the medicines used. This has to be done prophylactically. Nausea and vomiting can be acute, delayed or anticipatory.

Bone marrow suppression; Most medicines will cause bone marrow suppression, especially neutropenia. This is worst 7 to10 days after administration of the medicine. Check the FBC not more than a week before the administration of chemotherapy for each cycle.

Alopecia: This is a distressing side effect that is difficult to prevent for certain medicines. It is however reversible.

Extravasation reactions: This is a serious side effect resulting from the medicine leaking out into the soft tissues into extravascular spaces and causing irritation and tissue necrosis. The damage can be extensive and permanent. Treatment is prevention. This emphasizes the need for chemotherapy to be administered by trained staff within an oncology specialty.

Teratogenicity/effects on the embryo: Chemotherapy is contraindicated in pregnancy especially the 1st trimester. Should a pregnant woman need chemotherapy treatment, discussion is necessary to weigh out possible options of treatment. Contraceptive advice should be given prior to starting chemotherapy treatment.

Fertility; Permanent sterility with certain medicines is a possibility for both male and female patients. Germ cell banking should be considered as appropriate.

Dose Modification

Dose modification may be necessary if unacceptable toxicity results e.g. neurotoxicity from vinca alkaloids and mucositis from methotrexate. Medicine doses are routinely modified for changes in renal or hepatic functions. The extent of acceptability of modifications varies according to individual protocols. Modification for decrease in blood counts is still the norm in resource poor settings unlike in settings where growth factor support is routinely available.

Follow up

Adjuvant chemotherapy is usually given for a set number of cycles. In other situations the patient should be evaluated after two or three cycles of therapy. If there is a clear response and the treatment is well tolerated, the treatment can be continued to the set number of cycles or two cycles beyond complete response.

If disease progression is noted during treatment, therapy must be discontinued and other treatments evaluated. In the case of stable disease, treatment can be continued as long as the side effects are tolerable. In this situation disease progression becomes inevitable at some stage

REPORTING ADVERSE MEDICINE REACTIONS

General Notes

Since the thalidomide disaster, voluntary reporting of adverse drug reactions (ADRs) has become important in monitoring the safety of medicines. ADR reporting can also help to identify irrational presenting, bad batches of a medicine and problems specific to particular patient groups.

For the purpose of reporting an adverse drug reaction (ADR), a medicine is defined as:

Any substance administered to man for the prophylaxis, diagnosis or therapy of disease, or the modification of physiological function.

An adverse reaction to a medicine is defined as:

A reaction which is noxious and unintended, and which occurs at doses normally used in humans for the prophylaxis, diagnosis, or therapy of disease, or for the modification of physiological function.

This includes herbal and traditional medicines.

All **suspected** adverse reactions are of interest, ranging from well-known 'side effects' to **dangerous and serious** reactions.

Examples include anaphylaxis to penicillin, Steven- Johnson syndrome in HIV patients given cotrimoxazole, itching due to chloroquine, etc. Reactions to vaccines specially imported unregistered medicines, congenital abnormalities and lack of therapeutic effect should also be reported.

Suspected ADR's should be reported on the standard form shown on the next page. TEAR OUT THE PAGE TO SEND.

Additional forms can be obtained from the Medicines Control Authority of Zimbabwe, 106 Baines Avenue, Harare, Tel +263-4-708255/2901327-317, Fax +263-4-736980, E-mail: mcaz@mcaz.co.zw.

The forms can also be downloaded from the MCAZ website: www.mcaz.co.zw

Report of a Suspected Adverse Drug Reaction

Identities of Reporter, Patient and Institute will remain confidential

Patient Details (to allow linkage with other reports)

Family Name:	OR Patient Clinic/Hospital Number:		
Forename(s):			
Date of Birth:		Weight	Sex:
Age:		kg	M/F

Adverse Reaction

Date of onset:			
Duration:	Less than one hour	Hours	Weeks
		Days	Months
Description:			
Outcome:	Recovered	Fatal	Unknown
	Not yet recovered		

Suspected Medicine(s)

Medicine:	Generic Name:		
	Brand Name:		
Indication medicine was given for:			
Daily dose/route:			
Date begun:		Date stopped:	
Concomitant (Other) medicines taken & Dates/period taken:	Name of medicine:	Date started:	Date stopped:
Laboratory test results			

Reported by

Family Name:			
Forename(s):			
Status:	Doctor	Pharmacist/Pharmacy Technician	Nurse
Address:			
Signature:		Date:	

Send to:	The Director-General Medicines Control Authority in Zimbabwe 106 Baines Avenue, P O Box 10559, Harare Fax:+263-4-736980, email:mcaz@mcaz.co.zw, website:www.mcaz.co.zw

Adverse Medicine Reaction Report

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Family Name:	OR Patient Clinic/Hospital Number:		
Forename(s):			
Date of Birth:		Weight	Sex:
Age:		kg	M/F

Adverse Reaction

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Duration:	Less than one hour	Hours	Weeks
		Days	Months
Description:			
Outcome:	Recovered	Fatal	Unknown
	Not yet recovered		

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Age:		kg	M/F

Adverse Reaction

Date of onset:			
Duration:	Less than one hour	Hours	Weeks
		Days	Months
Description:			
Outcome:	Recovered	Fatal	Unknown
	Not yet recovered		

Suspected Medicine(s)

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	Brand Name:		
Indication medicine was given for:			
Daily dose/route:			
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Forename(s):			
Date of Birth:		Weight	Sex:
Age:		kg	M/F

Adverse Reaction

Date of onset:			
Duration:	Less than one hour	Hours	Weeks
		Days	Months
Description:			
Outcome:	Recovered	Fatal	Unknown
	Not yet recovered		

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Medicine:	Generic Name:		
	Brand Name:		
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Daily dose/route:			
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Adverse Medicine Reaction Report

Medicines Control Authority of Zimbabwe

PVF 05

REPORT ON MEDICINAL (PHARMACEUTICAL) PRODUCT DEFECT OR PROBLEM

To be completed by Pharmacists, Pharmacy Technicians, Medical Practitioners, Nurses, Veterinary Surgeons and other Distributors of Medicines.

1. Product Name (Brand and Generic)			
2. Description of the Device	3. Intended Use	4. Size/Type of Container	5. Registration No.
6. Batch Number		7. Expiry Date	
8. Name and Address of Manufacturer			
9. Name and Title of Reporter			
10. Your Practice Location and Address of Hospital, Clinic, Retail Surgery etc.			
11. Phone Number		12. Date Problem Occurred or Observed	
13. If requested will the actual product involved be available for examination by MCAZ. YES NO			
14. Signature of Reporter		15. Date	
16. Defects/Problem Noted or Suspected (see a-j below)			

NATURE OF DEFECT OR PROBLEM

a) Presence of foreign material
b) Unusual odour
c) Colour changes
d) Fungal growth
e) Suspected contamination
f) Parenteral solution - leaks, particulate matter, discoloration etc.
g) Wrong label, wrong packaging, wrong strength
h) Lack of therapeutic response
i) Leakages
J) Other (specify)

Return To: The Director-General
Medicines Control Authority of Zimbabwe
106 Baines Avenue
P O Box 10559
Harare
Fax: 736980 Tel: 736981-5
E-mail: mcaz@africaonline.co.zw

For Office Use Only
Report Number:
Date Received:

Rev 0_ November 2009

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Report on Medicinal (Pharmaceutical) Product Defect or Problem

Medicines Control Authority of Zimbabwe

PVF 05

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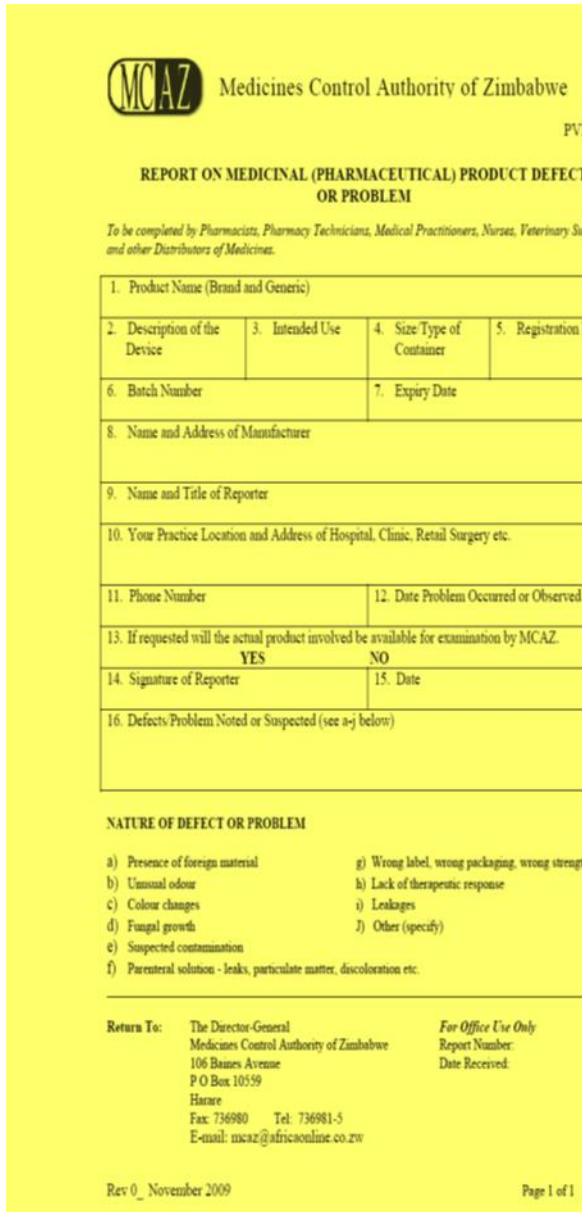

Medicines Control Authority of Zimbabwe

PVF 05

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Rev 0_ November 2009

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Report on Medicinal (Pharmaceutical) Product Defect or Problem

Medicines Control Authority of Zimbabwe

PVF 05

REPORT ON MEDICINAL (PHARMACEUTICAL) PRODUCT DEFECT OR PROBLEM

To be completed by Pharmacists, Pharmacy Technicians, Medical Practitioners, Nurses, Veterinary Surgeons and other Distributors of Medicines.

1. Product Name (Brand and Generic)			
2. Description of the Device	3. Intended Use	4. Size/Type of Container	5. Registration No.
6. Batch Number		7. Expiry Date	
8. Name and Address of Manufacturer			
9. Name and Title of Reporter			
10. Your Practice Location and Address of Hospital, Clinic, Retail Surgery etc.			
11. Phone Number		12. Date Problem Occurred or Observed	
13. If requested will the actual product involved be available for examination by MCAZ. YES NO			
14. Signature of Reporter		15. Date	
16. Defects/Problem Noted or Suspected (see a-j below)			

NATURE OF DEFECT OR PROBLEM

a) Presence of foreign material
b) Unusual odour
c) Colour changes
d) Fungal growth
e) Suspected contamination
f) Parenteral solution - leaks, particulate matter, discoloration etc.
g) Wrong label, wrong packaging, wrong strength
h) Lack of therapeutic response
i) Leakages
J) Other (specify)

Return To: The Director-General
Medicines Control Authority of Zimbabwe
106 Baines Avenue
P O Box 10559
Harare
Fax: 736980 Tel: 736981-5
E-mail: mcaz@africaonline.co.zw

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Medicine Interactions & Incompatibilities

Additional information on interactions and incompatibilities may be obtained from your pharmacy department. If further information is required, it may be obtained by telephone or by post from:

The Drug and Toxicology Information Service
Medical School
P O Box A178, Avondale, Harare
Tel.: +263 4 2933452 or 791631 (ext. 172),

datis@gmail.com

www.datis.co.zw

General notes

When two medicines are administered to a patient they may either act independently of each other, or interact with each other. Interaction may increase or decrease the effect of the medicines concerned, and may cause unexpected toxicity. As newer and more potent medicines are available to us, the number of serious medicine interactions occurring is likely to increase.

Remember that interactions may involve non-prescription medicines and social drugs (such as alcohol, mbanje), plants and traditional remedies.

Medicine interactions can be the result of interference with another medicine's absorption, displacement of the medicine from a plasma protein binding site, resulting in a similar, or additive effect, increasing or decreasing the other medicine's metabolism or excretion, or interference at receptor sites.

Potentially hazardous interactions

*What follows is **not a comprehensive list:** refer to the British National Formulary (BNF) or other reference source for detailed information.*

Key: ↑ increased / enhanced effect ↓ decreased effect

Medicine affected	Effect	Medicines causing effect
ACE inhibitors ↑	enhanced hypotensive effect	Anaesthetics diuretics
ACE inhibitors ↓	decreased hypotensive effect	non-steroidal anti-inflammatory medicines
alpha blockers (prazosin) ↑	enhanced hypotensive effect	Anaesthetics antidepressants beta blockers calcium channel blockers diuretics
amiloride / spironolactone ↑	raised potassium levels	captopril
aminoglycosides ↑	ototoxic & nephrotoxic effects increased	high dose frusemide
anticoagulants ↑	increased risk of bleeding	aspirin
anticoagulants ↓	increased metabolism	Carbamazepine
anticoagulants /warfarin ↑	increased anticoagulant effect	Alcohol imidazole antifungals
antidepressants (tricyclics) ↑	enhanced sedative effect	Alcohol other antidepressants anti-epileptics
anti-epileptics ↓	lowered threshold	antidepressants (tricyclics)
anti-epileptics ↓	inhibited metabolism	isoniazid
benzodiazepines ↑	increased action	Cimetidine
beta blockers (atenolol/ propranolol) ↑	enhanced hypotensive effect	Anaesthetics
calcium channel blockers ↓	reduced effect	Phenobarbitone rifampicin phenytoin
calcium channel blockers ↑	enhanced effect	Anaesthetics
calcium channel blockers ↓	increased metabolism	rifampicin
carbamazepine ↑	increased action of carbamazepine	erythromycin isoniazid cimetidine
carbamazepine ↓	reduced anti-epileptic effect	chloroquine
CNS depressants ↑	increased action	Alcohol sedative medicines phenobarbitone
corticosteriods ↓	increased metabolism	Phenobarbitone
digoxin ↑	enhanced toxicity	Thiazides frusemide quinine

Potentially hazardous interactions (contd.)

doxycycline ↓	increased metabolism	Carbamazepine

imidazole antifungals ↓	increased metabolism reduced plasma conc.	rifampicin phenytoin
indinavir (antiviral) ↑	inhibited metabolism	imidazole antifungals
indinavir (antiviral) ↓	enhanced metabolism	rifampicin
ketoconazole ↓	reduced absorption	antacids anti-muscarinic medicines cimetidine
lithium ↑	increased toxicity	diuretics
metronidazole ↓	reduced plasma conc.	phenytoin
metronidazole •	antabuse reaction	alcohol
neuromuscular blockers ↑	enhanced effects	aminoglycosides
non-steroidal anti-inflammatory medicines ↑	increased risk of renal damage	ACE inhibitors
oral contraceptives ↓	reduced contraceptive effect	rifampicin 'broad spectrum' antibiotics phenobarbitone carbamazepine phenytoin
oral hypoglycaemic /insulin ↑	increased hypoglycaemic effect	alcohol
phenytoin ↑	enhanced effect	imidazole antifungals
phenytoin ↑	action increased	chloramphenicol cimetidine cotrimoxazole isoniazid metronidazole
sulphonylureas ↑ (glibenclamide / metformin)	increased action	chloramphenicol cotrimoxazole fluconazole miconazole
theophylline ↑	increased theophylline levels	cimetidine erythromycin oral contraceptives calcium channel blockers

Incompatibilities between Medicines and IV Fluids

This section only intended as a general guide. Many other incompatibilities exist. Always check for compatibility before adding any medicine to an IV fluid (look at the package insert of the medicine, or ask your local pharmacy department for advice).

Medicines should **not** be added to blood, amino acid solutions, or fat emulsions.

Certain medicines, when added to IV fluids, are inactivated by pH changes, precipitation, or chemical reaction. Most simple IV fluids are acidic pH (3.5-6.0).

Medicine	Effect	Solution/ incompatibility
Benzylpenicillin Ampicillin	↓ lose potency after 6-8hrs (due to acidity)	dextrose solutions – use within 1 hour
Diazepam Insulin	↓ effect due to binding	plastic containers, tubing – titrate against response
Aminoglycosides (gentamicin)	incompatible	Penicillins heparin
Hydrocortisone	incompatible	heparin chloramphenicol tetracycline
Oxytocin		at high doses dilute with dextrose, not normal saline
Potassium Chloride		mix thoroughly to avoid 'layering'
Ceftriaxone	Incompatible	Use different IV line from those of calcium containing IV fluids

Categorisation of Medicines on the 7th Essential List for Zimbabwe

Medicines used in Anaesthesia
Analgesics and Antipyretics (incl. narcotics & anti-migraine)
Anti-inflammatory Medicines & Medicines for Rheumatism and Gout
Antihistamines (anti-allergic medicines)
Antidotes & Substances used in Poisoning Management
Anti-infective Medicines (antibiotics & other anti-microbials)
Medicines affecting the blood & Blood Products/ Substitutes
Cardiovascular Medicines
Central Nervous System Medicines
Dermatological Agents
Gastrointestinal Medicines
Hormones
Immunological agents (incl. vaccines & sera)
Ophthalmological Medicines
Respiratory System Medicines
Medicines Used in Labour & Delivery
Intravenous (& other) Solutions
Vitamins & Minerals

Medicine name	Form	Level	VEN
1. Medicines used in Anaesthesia			
Atracurium	Inj	B	V
Bupivacaine hydrochloride	Inj	A	E
Etomidate	Inj	B	N
Halothane	Gas	B	V
Isoflurane	Gas	B	V
Ketamine	Inj	B	V
Lignocaine + adrenaline	Inj	B	E
Lignocaine hydrochloride	Inj	C	V
Lignocaine no preserv 2%	Inj	B	N
Lignocaine spray	Top	B	N
Medical air	Gas	B	V
Neostigmine bromide	Inj	B	V
Nitrous oxide	Gas	B	V
Oxygen	Gas	C	V
Propofol	Inj	A	V
Soda lime	-	B	V
Suxamethonium chloride	Inj	B	V
Thiopentone sodium	Inj	B	V
Trimeprazine tartrate	Po	B	N
Vecuronium	Inj	B	N
2. Analgesics, Antipyretics, Narcotics, Anti-migraine			
Aspirin	Po	C	E
Codeine	Po	B	V
Ergotamine	Po	A	N
Morphine	Inj	B	E
Morphine	Po	B	V
Paracetamol	Po	C	E
Paracetamol	Syr	C	E
Pethidine	Inj	B	V
Tramadol	Inj	B	V
Tramadol	Po	B	V
3. Anti-inflammatory, Rheumatism, Gout			
Allopurinol	Po	B	E
Colchicine	Po	A	N
Ibuprofen	Po	C	N
Indomethacin	Po	B	E
Diclofenac	Po	B	E

Medicine name	Form	Level	VEN
4. Antihistamines			
Chlorpheniramine	Po	C	E
Promethazine	Po	B	N
5. Antidotes, Poisoning			
Acetylcysteine	Inj	A	E
Atropine	Inj	B	V
Charcoal activated	Po	B	E
Naloxone neonatal 20mcg/ml	Inj	B	V
Pralidoxime	Inj	A	N
Scorpion antivenom	Inj	B	N
Snake antivenom polyvalent	Inj	B	E
6. Anti-infectives, Antibiotics, Antimicrobials			
Acyclovir	Po	B	E
Albendazole	Po	C	E
Amoxicillin	Po	C	V
Amoxicillin	Susp	C	E
Ampicillin	Inj	B	E
Artemether/Lumefantrine 20/120mg	Po	C	V
Artesunate	Pr	C	V
Benzathine penicillin	Inj	C	V
Benzyl benzoate	Top	B	N
Benzylpenicillin	Inj	C	V
Ceftriaxone	Inj	C	V
Chloramphenicol	Inj	B	V
Chloramphenicol	Po	B	V
Chloramphenicol	Susp	B	E
Ciprofloxacin	Po	B	V
Clindamycin	Po	B	V
Clindamycin	Inj	B	N
Clofazimine	Po	A	N
Clotrimazole pess	Vag	B	E
Clotrimazole cream 1%	Top	B	E
Cloxacillin	Inj	B	V
Cloxacillin	Po	B	V
Cloxacillin	Susp	B	E
Cotrimoxazole	Po	C	V
Cotrimoxazole	Paed	C	V
Cotrimoxazole	Susp	C	V
Dapsone	Po	B	V
Doxycycline	Po	C	V
Erythromycin	Po	C	V

Medicine name	Form	Level	VEN
Erythromycin	Susp	C	V
Ethambutol	Po	B	V
Fluconazole	Po	B	V
Gentamicin	Inj	C	V
6. Anti-infectives (contd.)			
Gentian violet	Top	C	V
Griseofulvin	Po	B	N
Isoniazid	Po	B	V
Isoniazid	Paed	B	E
Kanamycin	Inj	C	V
Ketoconazole	Po	A	N
Metronidazole	Inj	A	N
Metronidazole	Pr	B	V
Metronidazole	Po	C	V
Metronidazole	Paed	B	E
Miconazole cream 2%	Top	C	E
Miconazole pess	Vag	C	V
Miconazole oral gel	Po	C	V
Nalidixic acid	Po	B	V
Neomycin	Po	A	N
Nitrofurantoin	Po	B	N
Norfloxacin	Po	C	V
Nystatin	Po	B	N
Nystatin pessaries	Vag	B	E
Penicillin V	Po	C	E
Praziquantel	Po	C	E
Primaquine	Po	B	E
Procaine penicillin	Inj	C	V
Proguanil	Po	B	N
Pyrimethamine + dapsone	Po	C	E
Pyrazinamide	Po	B	V
Quinine	Po	B	V
Quinine infusion	Inj	B	V
Rifampicin	Po	B	V
Rifampicin/Isoniazid/Pyrazinamide 60/30/150mg	Paed	C	V
Rifampicin/Isoniazid 60/30mg	Paed	C	V
Rifampicin/Isoniazid 150/75mg	Po	C	V
Rifampicin/Isoniazid/Ethambutol 150/75/275mg	Po	C	V
Rifampicin/Isoniazid/Pyrazinamide/Ethambutol 150/75/400/275mg	Po	C	V

Medicine name	Form	Level	VEN
Rifampicin	Paed	B	E
Streptomycin	Inj	B	V
6. Anti-infectives (contd.)			
Selenium sulphide 2%	Top	C	N
Sulphadoxine + pyrimethamine	Po	B	E
7. Medicines affecting the blood, Blood products			
Cryoprecipitate	Inj	A	E
Factor IX conc.	Inj	A	V
Factor VIII con.	Inj	A	V
Ferrous sulphate	Po	C	E
Ferrous sulphate	Paed	B	E
Folic acid	Po	C	E
Heparin	Inj	B	V
Plasma	-	B	V
Platelet conc	-	A	E
Red cell conc.	-	B	V
Streptokinase	Inj	A	V
Vitamin B12 (hydroxocobalamin)	Inj	B	V
Vitamin K	Po	A	N
Vitamin K	Inj	C	V
Warfarin	Po	B	V
8. Cardiovascular Medicines			
Amiloride	Po	A	N
Amlodipine	Po	B	V
Atenolol	Po	B	V
Captopril	Po	B	E
Digoxin	Po	B	V
Digoxin	Inj	B	E
Ephedrine	Inj	A	V
Enalapril	Po	B	V
Frusemide	Po	B	V
Frusemide	Inj	B	V
Glyceryl trinitrate	Inj	A	E
Hydrochlorothiazide	Po	C	V
Hydralazine	Inj	B	V
Isosorbide	Po	A	E
Lisinopril	Po	B	N
Lorsartan	Po	A	E
Magnesium sulphate	Inj	C	V
Methyldopa	Po	C	E

Medicine name	Form	Level	VEN
Nifedipine sr	Po	B	E
Potassium chloride	Po	B	V
Potassium chloride	Inj	B	V
8. Cardiovascular Medicines (contd.)			
Prazosin	Po	B	E
Propranolol	Po	B	E
Spironolactone	Po	A	N
Verapamil	Inj	A	N
Verapamil	Po	A	N
9. Central Nervous System Medicines			
Amitriptylline	Po	C	V
Benzhexol	Po	C	V
Biperiden	Inj	A	E
Carbamazepine	Po	B	V
Carbidopa-levodopa	Po	A	N
Chlorpromazine	Po	C	V
Chlorpromazine	Inj	C	V
Diazepam	Po	C	V
Diazepam	Inj	C	V
Fluexitine	Inj	B	V
Fluphenazine deconoate	Inj	B	V
Flupenthixol decanoate	Inj	B	E
Haloperidol	Po	C	V
Haloperidol	Inj	C	V
Imipramine	Po	A	E
Lorazepam	Po	B	E
Lorazepam	Inj	C	V
Midazolam	Inj	A	E
Olanzapine	Po	B	E
Phenobarbitone	Inj	B	E
Phenobarbitone	Po	C	V
Phenytoin sodium	Po	B	V
Phenytoin sodium	Inj	A	E
Risperidone	Po	B	E
Sertraline	Po	B	E
Sulpiride	Po	C	V
Trifluoperazine	Po	B	E
10. Dermatological Agents			
Aqueous cream	Top	B	N
Benzoyl peroxide 5% gel	Top	A	N
Calamine lotion	Top	C	N

Medicine name	Form	Level	VEN
Coal tar 5% ointment	Top	B	N
Compound benzoic acid ointment	Top	C	E
Emulsifying ointment	Top	B	N
Gamma benzene hexachloride 1%	Top	C	V
Para aminobenzoic acid	Top	B	E
Podophyllin paint	Top	B	N
Potassium permanganate	Top	B	N
Povidone iodine	Top	B	E
Salicylic acid 2% ointment	Top	B	N
Silver sulphadiazine	Top	B	V
Sulphur 5% - 10% ointment	Top	B	N
Zinc oxide ointment	Top	B	N
11. Gastrointestinal Medicines			
Bisacodyl	Po	C	N
Bismuth subgallate with 1% Hydrocortisone	Pr	B	N
Glycerine suppositories	Pr	C	N
Hyoscine butylbromide	Po	B	N
Liquid paraffin	Po	B	N
Loperamide	Po	C	N
Magnesium trisilicate	Po	C	N
Metoclopramide	Po	B	V
Prochlorperazine	Inj	B	N
Prochlorperazine	Po	B	N
Promethazine	Inj	B	V
Omeprazole	Po	A	E
Raniditine	Po	B	E
12. Hormones			
Carbimazole	Po	B	E
Combined oral contraceptive pill	Po	C	V
Dexamethasone	Inj	B	V
Dexamethasone	Po	B	N
Glibenclamide	Po	B	V
Hydrocortisone	Inj	B	V
Insulin	Inj	B	V
Iodine solution	Po	A	N
Levonorgestrel implant	Sc	B	N
Medroxyprogesterone acetate	Inj	C	V
Metformin	Po	B	V
Norethisterone enanthate	Po	B	N
Prednisolone	Po	B	V

Medicine name	Form	Level	VEN
Progesterone only pill	Po	C	V
Thyroxine	Po	B	V
13. Immunologicals			
BCG	Vacc	C	V
DPT	Vacc	C	V
DPT+HBV	Vacc	C	V
DT	Vacc	C	V
HB	Vacc	C	V
Measles	Vacc	C	V
OPV	Vacc	C	V
Rabies immunoglobulin	Vacc	B	V
Rabies Vaccine	Vacc	B	V
Tetanus immunoglobin	Inj	B	E
Tetanus toxoid	Inj	C	V
Tuberculin, purified	-	B	E
14. Ophthalmic Medicines			
Acetazolamide	Po	A	N
Pilocarpine eye drops	Eye	B	V
Tetracycline eye ointment 1%	Eye	C	V
15. Respiratory System Medicines			
Adrenaline	Inj	C	V
Aminophylline	Inj	B	N
Beclomethasone inhaler	Inh	B	V
Beclomethasone nasal spray	Spray	A	N
Salbutamol	Po	B	N
Salbutamol inhaler	Inh	B	V
Salbutamol nebulised	Neb	B	V
Theophylline slow release	Po	C	N
16. Medicines used in Labour & Delivery			
Ergometrine	Inj	C	V
Hexoprenaline	Inj	B	N
Misoprostol	Po	A	N
Oxytocin	Inj	C	V
Sodium citrate	Po	B	N
17. Intravenous solutions			
Calcium chloride 10%	Inj	A	E
Calcium gluconate 10%	Inj	B	E
Darrows with dextrose	Inj	C	V
Dextrose 10%	Inj	A	N
Dextrose 5%	Inj	C	V

Medicine name	Form	Level	VEN
Dextrose 50%	Inj	C	V
Maintelyte	Inj	B	N
Neonatalyte	Inj	B	V
Ringer lactate	Inj	C	V
Sodium bicarbonate 4.2%	Inj	B	N
Sodium bicarbonate 8.4%	Inj	B	V
Sodium chloride	Inj	C	V
18. Vitamins & Minerals			
Nicotinamide	Po	B	E
Pyridoxine	Po	B	E
Thiamine	Po	A	E
Thiamine	Inj	A	N
Vitamin A	Po	C	V
Vitamin B Complex (High Potency)	Inj	C	V
Vitamin D	Po	B	V
Vitamins, multi	Po	C	E
Vitamins, multi	Paed	B	E
19. Antiretrovirals			
Single formulations			
Abacavir	Po	B	V
Abacavir 20mg/Ml	Paed	B	V
Didanosine 250	Po	B	V
Didanosine 25mg	Paeds	B	V
Efavirenz	Po	C	V
Efavirenz 50mg	Paed	C	V
Lamivudine	Po	C	V
Nevirapine	Po	C	V
Nevirapine 10mg/mL	Paed	C	V
Stavudine	Po	C	V
Tenofovir	Po	C	V
Zidovudine	Po	C	V
Zidovudine 10mg/Ml	Paed	C	V
Fixed Dose Combinations(FDC)			
Abacavir/Lamivudine	Po	B	V
Atazanavir/Ritonavir 300/100mg	Po	B	V
Lopinavir/Ritonavir 100/25mg	Paeds	B	V
Lopinavir/Ritonavir 200/50mg	Po	B	V
Stavudine /Lamivudine 30/150mg	Po	C	V
Stavudine/Lamivudine /Nevirapine 30/150/200mg	Po	C	V
Stavudine/Lamivudine 6/30mg	Paeds	C	V

Medicine name	Form	Level	VEN
Stavudine/Lamivudine/Nevirapine 6/30/50mg	Paeds	C	V
Tenofovir/Emtricitabine	Po	B	V
Tenofovir/Lamivudine 300/300mg	Po	C	V
Tenofovir/Lamivudine/Efavirenz	Po	C	V
Zidovudine/Lamivudine 300/150mg	Po	C	V
Zidovudine/Lamivudine 30/30mg	Paeds	C	V
Zidovudine/Lamivudine/Nevirapine 300/150/200mg	Po	C	V
Zidovudine/Lamivudine/Nevirapine 60/30/50mg	Paeds	C	V

SPECIALIST ESSENTIAL MEDICINE LIST IN ZIMBABWE

	Medicine	Dosage form	Strength	VEN
1	**Medicines Used in Anaesthesia**			
1.1	**General Anaesthetics/Medical Gases**			
	Sevoflurane	Gas		E
1.2	**Local Anaesthetics**			
	Amethocaine	Gel	4%	N
	Ropivacaine	Injection	2mg/ml	N
1.3	**Muscle Relaxants**			
	Pancuronium	Injection	2mg/ml	N
1.4	**Peri-operative medicines (a)**			
2				
2.1	**Narcotic Analgesics**			
	Alfentanil	Injection	500mcg/ml	N
	Fentanyl	Injection	50mcg/ml	N
2.2	**Nonsteroidal Anti-inflammatory Medicines (NSAID)**			
	Diclofenac	Injection	25mg/ml	N
	Diclofenac sodium	Tablet SR	75mg	N
	Indomethacin	Suppository	100mg	N
2.3	**Disease Modifying Antirheumatic Medicines**			
	Chloroquine	Tablet	150mg	N
	Methotrexate	Tablet	2.5mg	N
	Sulphasalazine	Tablet	500mg	N

	Medicine	Dosage form	Strength	VEN
3	**Antihistamines**			
	Cetirizine	Tablet	10mg	N
4	**ANTIDOTES AND SUBSTANCES FOR TREATMENT OF POISONING**			
	Edrophonium	Injection	10mg/ml	V
	Flumazenil	Injection	0.1mg/ml	V
5	**Antiinfective medicines**			
5.1	**Antibacterial Medicines**			
	Azithromycin	Capsules	250mg	V
	Co-amoxiclav acid	Tablets	250/125mg	V
	Ceftazidime	Injection	500mg	
	Ciprofloxacin	Injection	10mg/ml	V
5.2	**Antitubercular Medicines**			
	Cycloserine	Tablet	250mg	E
	Ethionamide	Tablet	250mg	E
5.3	**Antipneumocystis and antitoxoplasmosis medicines**			
	Primaquine	Tablet	15mg	N
	Pyrimethamine	Tablet	25mg	E
	Sulphadiazine	Tablet	500mg	E
5.4	**Systemic Antifungal Medicines**			
	Amphotericin B	Injection	50mg	E
	Fluconazole	Injection		N
5.5	**Systemic Antiviral Medicines**			
	Acyclovir	Injection	250mg	E
6	**Antimigraine Medicines**			
	Dihydroergotamine mesylate	Injection	1mg/ml	N
	Sumatriptan	Tablet	50 mg	N

	Medicine	Dosage form	Strength	VEN
7	**ANTINEOPLASTIC AND IMMUNOSUPPRESIVE MEDICINES**			
7.1	**Antineoplastic and Immunosuppresives**			
	Actinomycin D	Injection	0.5mg	E
	Azathioprine	Tablet	50mg	E
	Bleomycin	Injection	15mg	E
	Busulfan	Tablet	2mg	E
	Carboplatin	Injection	10mg/ml	N
	Chlorambucil	Tablet scored	3mg, 5mg	E
	Cisplatin	Injection	500ug/ml	E
	Cyclophosphamide	Tablet	50mg	E
	Cyclophosphamide	Injection	200mg, 500mg	N
	Cytarabine	Injection	100mg	E
	Dacarbazine (DTIC)	Injection	200mg	E
	Daunorubicin	Injection	20mg	E
	Docetaxel	Injection	40mg/ml	N
	Doxorubicin	Injection	10mg, 50mg	E
	Etoposide (VP 16)	Tablet	50mg	E
	Fludarabine phosphate	Injection	50mg	E
	Fluorouracil	Injection	25mg/ml	E
	Fluorouracil	Capsule	250mg	E
	Hydroxyurea	Capsule	500mg	E
	Ifosfamide	Injection	1g	N
	Interferon alpha	Injection	Million units	N
	Methotrexate	Injection	1g	E
	Melphalan	Tablet	2mg, 5mg	E
	Mercaptopurine	Tablet	50mg	E
	Mitomycin C	Injection	20mg, 40 mg	E
	Mustine	Injection	10mg	E
	Procarbazine	Capsule	50mg	E
	Thioguanine	Tablet	40mg	E
	Vinblastine	Injection	10mg	E
	Vincristine	Injection	1mg	E

	Medicine	Dosage form	Strength	VEN
7.2	**Complementary Medicines**			
	Aminoglutethimide	Tablet	250mg	N
	Filgrastim	Injection	30million units	N
	Folinic acid	Tablet	15mg	E
	Folinic acid	Injection	3mg/ml	E
	Medroxyprogesterone acetate	Tablet	100mg	N
	Medroxyprogesterone acetate	Injection	50mg/ml	N
	Mesna	Injection	100mg/ml	N
	Tamoxifen	Tablet	10mg	N
8	**MEDICINES AFFECTING THE BLOOD**			
8.1	**Anticoagulants and fibrinolytics**			
	Streptokinase	Injection	250 000 IU	E
8.2	**Antifibrinolytic and Antihaemostatic Medicines**			
	Tranexamic acid	Tablet	500mg	N
9	**BLOOD PRODUCTS/BLOOD SUBSTITUTES**			
9.1	**Plasma Substitutes (a)**			
	Dextran "70"	Infusion	6% in glucose	N
	Dextran "70"	5% or in sodium chloride 0.9%		N
9.2	**Anti-anaemic Medicine**			
	Epoetin alfa and beta	Injection	4000units/ml	N
10	**CARDIOVASCULAR MEDICINES**			
10.1	**Antianginal Medicines**			
	Glyceryl trinitrate	Injection	1 mg/ml	V

	Medicine	Dosage form	Strength	VEN
10.2	**Antiarrythmic Medicines**			
	Adenosine	Injection	3mg/ml	N
	Amiodorone	Injection	50mg/ml	E
	Propranolol	Injection	1mg/ml	V
	Verapamil	Tablet	40mg	V
	Verapamil	Injection	2.5mg/ml	V
	Sotalol	Tablet	10mg	N
10.3	**Antihypertensive Medicines**			
	Sodium nitroprusside	Infusion	10mg/ml	N
	Minoxidil	Tablet	10 mg	N
	Labetolol	Infusion	1mg/ml	N
	Losartan	Tablet	50mg	E
	Nifedipine	Sublingual	10mg	N
10.4	**Diuretics**			
10.5	**Medicines used in Shock or Anaphylaxis (c)**			
	Dobutamine	Injection	12.5mg/ml	V
	Dopamine	Injection	40mg/ml	V
	Noradrenaline	Injection	2mg/ml	V
10.6	**Sclerosing Agents**			
	Ethanolamine oleate	Injection	5%	N
11	**CENTRAL NERVOUS SYSTEM MEDICINES**			
11.1	**Anticonvulsants**			
	Sodium valproate	Tablet	200mg	E
	Sodium valproate	Suspension	40mg/ml	N
	Clobazam	Tablets	10mg	N
	Clonazepam	Tablet	500ugm	E
	Lamotrigine	Tablet	5, 25mg	N
11.2	**Psychotherapeutic Medicines**			
	Methylphenidate	Tablet	10mg	N
	Venlafaxine modified release	Tablet	75mg	E

	Medicine	Dosage form	Strength	VEN
11.3	**Antiparkinsonian Medicines**			
	L-dopa	Tablet	100/25	N
	Orphenadrine	Tablet	50mg	N
11.4	**Medicines used in Spasms and Spastic Conditions**			
	Baclofen	Tablet	10mg	N
11.5	**Myasthenia Gravis**			
	Edrophonium chloride	Injection	10mg/ml	V
	Pyridostigmine	Tablets	60mg	V
11.6	**Other**			
	Oxybutynin	Tablets	2.5mg	N
12	**DERMATOLOGICAL AGENTS**			
12.1	**Anti-inflammatory Agents**			
	Betamethasone	Cream	0.10%	N
12.2	**Antibacterial Agents (Topical)**			
13	**DIAGNOSTIC AGENTS**			
	Tetracosactrin	Injection	250ug/ml	N
	Methylene blue	Injection	10mg/ml	N
	Radiocontrast media			
	Iohexol	Injection “Omnipaque 300”(or Ultravist)		N
	Iohexol	Injection “Omnipaque 350”(or Ultravist)		N
	Barium EZHD			E
	Barium EZ-paque			N
	Pollybar Enema			N
	Conray 280			N
	Urografin 60%			N
	Meglumine/sodium iothalamate	Injection 100ml “Cardio-Conray”		N
	Omniscan or Magnavist			N

	Medicine	Dosage form	Strength	VEN
14	**GASTROINTESTINAL MEDICINES**			
14.1	**Antiemetics**			
	Dolasetron	Injection	12.5mg	E
	Ondansetron	Tablets	4mg	E
	Ondansetron	Injection	4mg	E
14.2	**Gastric/Peptic Ulcer Medicines**			
14.3	**Anti-inflammatory Medicines**			
	Prednisolone	Enema	20mg/100 ml	N
15	**HORMONES**			
15.1	**Corticosteroids**			
	Fludrocortisone	Tablet	100 micrograms	N
	Testosterone	Cream	1%	N
	Methylprednisolone	Injection	500mg	E
15.2	**Androgens**			
	Methyltestosterone	Tablets 5mg		N
	Testosterone	Injection	25mg/ml	N
	Testosterone	Injection SR		N
15.3	**Oestrogens and Progestogens**			
	Stilboestrol (a)	Tablet	1mg	N
	Oestrogens, conjugated	Tablet	0.625 mg	N
	Oestrogens, conjugated	Vaginal cream		N
15.4	**Sulphonylureas**			
	Gliclazide	Tablet	80mg	N
	Glipizide	Tablet	5mg	N

	Medicine	Dosage form	Strength	VEN
16	**OPHTHALMOLOGICAL MEDICINES**			
16.1	**Anti-infectives**			
	Ciprofloxacin	Eye drops	0.30%	E
	Neosporin: Bacitracin+neomycin+polymyxin B	Eye drops	0.35%	E
	Gentamicin	Eye drops	0.30%	E
16.2	**Corticosteroids/Antiallergics**			
	Dexamethasone	Eye drops	0.10%	E
	Prednisolone-forte	Eye drops	1%	N
	Dexamethasone/neomycin	Eye (ear) drops	0. 1 %/0. 35%	N
	Sodium cromoglycate	Eye drops	2%	N
16.3	**Miotics/ beta-blockers**			
	Levobunolol HCl	Eye drops	0.50%	E
	Timolol maleate	Eye drops	0.50%	E
16.4	**Mydriatics**			
	Homatropine	Eye drops	1%	N
	Tropicamide	Eye drops	1%	N
16.5	**Diagnostics**			
	Fluorescein sodium	Eye drops	1%	N
16.6	**Systemic Treatment of Glaucoma**			
	Acetazolamide	Injection	500mg/ml	N
16.7	**Miscellaneous**			
	Methylcellulose (artificial tears)			N
17	**EAR, NOSE AND THROAT PREPARATIONS**			
17.1	**Ear drops**			
	Clotrimazole	Ear drops	1%	N
	Gentamicin	Ear drops	0.30%	N
17.2	**Inhalers**			
	Ipratropium	Inhaler	20mcg dose	N

	Medicine	Dosage form	Strength	VEN
18	**AGENTS CORRECTING WATER AND ELECTROLYTE DISTURBANCES**			
18.1	**Parenteral Nutrition**			
	Parenteral iron	Injection		N
	Aminoacid	Solution		N
	Aminoacid with electrolytes	Solution		N
	Dextrose 20%	Solution		N
	Lipid-solution	Infusion 10% 500ml		N
	Lipid-solution	Infusion 20% 500ml		N
	Trace elements	Injection (additive)		N
	Vitamins (fat soluble)	Injection (additive)		N
	Vitamins, water soluble	Injection (additive)		N
18.2	**Dialysis Solutions**			
	Intraperitoneal dialysis	Solution with 1.5%dextrose		V
	Intraperitoneal dialysis	Solution with 4.5% dextrose		V
	Haemodialysis conc.	Solution		E

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This concludes
the EDLIZ 2015

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or the side cover