

EDLIZ 2006

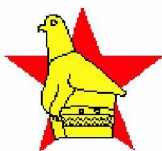


**5th Essential Drugs List
and
Standard Treatment Guidelines**

**for
Zimbabwe**



EDLIZ 5TH EDITION 2006



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FOREWORD

It is the national objective that the health needs of Zimbabweans are provided for through the provision and proper use of essential drugs. Sometimes we do not need to give drugs i.e there is not always a “pill for every ill”. Thus, there is need to use drugs and 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 our Burden of Disease as reflected by the inclusion of antiretroviral drugs and treatment of other opportunistic infections other than 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 new guidelines, to prescribe within the bounds of this book, and to recognise the critical importance of providing a quality service to all health care recipients through the rational use of drugs.

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



Hon. Dr. D P Parirenyatwa Minister of
Health & Child Welfare in Zimbabwe

THE ESSENTIAL DRUGS LIST FOR ZIMBABWE - 5TH EDITION

This 5th essential drugs list and standard treatment guidelines for the most common health conditions in Zimbabwe has been endorsed by the National Drug & Therapeutics Policy Advisory Committee [NDTPAC]. 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 result of its widespread use by our healthcare workers. We continue to revise and take into account drug developments and new healthcare problems such as HIV related diseases. Thus this latest edition has included extra essential drugs. The specialist drugs list has been brought back into this edition.

The essential drug list is based on the need to have drugs that cover the majority of our needs. Many other countries, both industrialised and developing have moved towards using essential drugs lists. For example Australia. Drugs 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 drugs for inclusion

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

relevance to prevalent diseases	Safe
proven efficacy and safety	Efficacious
adequate scientific data in a variety of settings	Quality
adequate quality	Available
favourable cost-benefit ratio	Affordable
desirable pharmacokinetics	Accessible
possibilities for local manufacture	Rationally used
available as single ingredient items	

GENERIC DRUGS

Every drug has a chemical name [for example, N-(4-Hydroxyphenol) acetamide] and an international non-proprietary name (INN) or generic name [paracetamol]. The INN is the drug'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 firm for marketing purposes.

For most common drugs there are several branded products that all contain the same active ingredient and therefore share the same INN. For example, the *African Monthly Index of Medical Specialties* (MIMS) lists over fifteen different brand names of paracetamol. There are 12 different preparations containing aspirin, 13 different brands of amoxicillin, 12 different brands of ampicillin, 8 different brands of chloroquine....

The use of generic names for drug purchasing as well as prescribing carries considerations of clarity, quality, and price. Proponents of generic drug purchasing 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 drug products are often cheaper than products sold by brand name; this is shown very clearly when it comes to antiretroviral drugs
- . generic prescribing also facilitates product

substitution, whenever appropriate. Opponents argue that the quality of generic drugs is inferior to that of brand-name products. Quality control and naming of drugs are completely separate issues.

Generic drugs from reliable suppliers are as safe, effective, and high in quality as drugs with well-known brand names. At the same time, brand-name drugs from a manufacturer with inadequate procedures for quality control can be of poor quality, despite the brand name. Also, although any drug can be counterfeited, there are more incentives for counterfeiting brand-name drugs. In countries with strong drug regulatory systems, drug products sold by generic name have the same low rate of recall as brand-name products. 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 drugs, 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 drugs (and includes frusemide, 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 drugs are:

- ☺ Improved drug supply
- ☺ More rational prescribing
- ☺ Lower costs
- ☺ Improved patient use

IMPROVED DRUG SUPPLY

The regular supply of drugs is difficult in many countries, and the consequent health implications are many. Improved drug

availability should lead to improved clinical outcomes.

With fewer essential drugs being purchased, the mechanisms and logistics for procurement, storage & distribution will clearly be easier. It is not practical for each clinic in

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

Zimbabwe to attempt to procure, transport and store all the hundreds of items in EDLIZ. Conversely, limiting the number of drugs available at the primary level makes a regular supply of drugs more practical and possible.

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

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

MORE RATIONAL PRESCRIBING

In the absence of limited lists the large variety of available on the market contributes products to inconsistent

consequently, variation in clinical practice even within the same health care

facility. Irrational prescribing leads to therapeutic hazards and increased costs.

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

When the number of drugs 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 drugs 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 drug information to be provided on suitable essential drugs.

LOWER COSTS

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

• more competition
• lower prices

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

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

IMPROVED PATIENT USE

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

Additionally, with improved drug availability changes to ■/ focused education efforts ■/ chronic medication regimens are reduced confusion & increased adherence to treatment less likely and as a consequence patients have a better understanding of their disease, their medication and the need for compliance.

IMPLEMENTATION OF EDLIZ / SETTING UP OF HOSPITAL DRUG AND THERAPEUTICS COMMITTEES

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 drugs 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 drug and therapeutic committees(HDTC) have to be taken to ensure cost-effective prescribing and patient care. It is therefore necessary for each and every hospital to have a forum where drug issues can be discussed. Ideally, a separate hospital drug and therapeutics committee(HDTC) should be formed. Given our current manpower constraints, we encourage hospitals to use whatever regular meetings they have e.g Division meetings in Central Hospitals to discuss and address drug related problems. The NDTPAC will be available to help those hospitals that are ready to set up an HDTC. There is a Zimbabwean draft manual(plus a WHO manual) on how to do this.

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 drug recommendations have occurred. This, for instance, occurred when the first line treatment for malaria was changed in the recent past.

All drugs 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, prednisolone is available at District (B) level and is ranked vital (V).

Drug Duration	Codes	Adult dose	Frequency
prednisolone po days	B V	30mg	once a day 14

LEVEL OF AVAILABILITY

C drugs are those required at primary health care level and should be available at all levels of care.

B drugs are found at district hospital level or secondary and higher levels of care. Some B drugs 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 drugs are prescribed at provincial or central hospital levels.

S drugs (specialist only) have been brought back into this edition. These are drugs that require special expertise and /or diagnostic tests before being prescribed.

VEN CLASSIFICATION

All drugs are also classified according to their priority. This is mostly a tool to assist in giving priority to drugs based on economic considerations. Thus **V drugs (vital)** are considered life saving or unavailability would cause serious harm and efforts should always be aimed at making them 100% available.

E drugs are **essential**, and are given second priority. Without E drugs there would be major discomfort or irreversible harm. And **N** drugs are still **necessary** but are lower in priority than V and E drugs.

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 NDTPAC 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 NDTPAC through Directorate of Pharmacy Services on dps@healthnet.org.zw with your comments.

DR E TMABI2A
Permanent Secretary
Ministry of Health & Child Welfare
Republic of Zimbabwe

MAJOR HIGHLIGHTS IN THE LATEST EDLIZ

Need for Hospital formularies and Hospital Therapeutics

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 drug management or supply issues. Ideally each hospital should create its own local drug formulary which shows which drugs are considered very useful in that setting so that you do not have to order drugs that your nurse or doctors will not prescribe use. For instance you should not keep specialist drugs if there is no specialist to prescribe them. Hospital Drug and Therapeutics Committees should select drugs for use in their hospital using the EDLIZ.

New chapters:

There are 3 new chapters – Common Oral Conditions, Ear, Nose and Throat Disorders as well as a chapter on Antineoplastic drugs. The latter has been included to remind healthcare workers that administering chemotherapy agents requires them to be trained in their use.

HIV and AIDS care:

One of the major changes that has happened since the last edition of EDLIZ is the revolutionisation of HIV and AIDS care and management. In particular, we can now offer treatment to those presenting with Cryptococcal meningitis whereas before we could not afford to do so. Inclusion of antiretroviral drugs has obviously improved HIV and AIDS care. Although we have included a chapter on ART here, you should use this together with the latest national Guidelines for Antiretroviral Therapy in Zimbabwe. These ARV guidelines will be reviewed more often than the EDLIZ. Be certain that you are using the most recent recommendation given the rapidly changing therapies in this field. Due to the use of Fixed Dose Combination(FDC) drugs in ART, you will come across some brand names where ART is involved. Generic prescribing is still the norm. Further management of HIV and AIDs related conditions can

be found in greater detail in the HIV and AIDS Quality of Care Initiative(HAQOCI) Guidelines.

Other Antiviral agents:

Apart from the inclusion of ARVs, antiviral agents such as acyclovir are now available in generic form and hence have also been included for use in e.g. disseminated or recurrent herpes simplex infections or severe cases of herpes zoster.

Antifungal Agents:

Fluconazole is available as a generic formulation as well as though the DIFLUCAN PARTNERSHIP PROGRAMME which most hospitals should have access to. In view of the wider usage of ARVs, you will need to be aware of the interaction between Ketoconazole and Nevirapine. Thus we would recommend that Ketoconazole be used sparingly for instance for Histoplasmosis whereas the oesophageal candidiasis is treated with fluconazole.

Antibacterial Agents:

Amoxicillin has been recategorised to C level for first line treatment of moderate pneumonia especially as it is anticipated that patients may already have been on Cotrimoxazole prophylaxis.

You will need to be aware of the revised recommendations for the treatment of bloody dysentery which now includes the use of Ciprofloxacin but Nalidixic acid is still first line therapy. These guidelines are based on the latest studies conducted in this country which showed a growing resistance by shigella dysentery to nalidixic acid.

Antimalarials:

A lot has occurred with malaria treatment and you will need to be aware of the latest guidelines as produced via the National Malaria Subcommittee. Although Zimbabwe has embraced the use of Artemisinin Combined Therapies(ACT) such as Coartem which is a combination of Artemisinin and Lumefantrine, the first line treatment remains as chloroquine together with Sulphadiazine- Pyridoxine(SP). The latter was down graded to a household remedy(HR) and hence should be available to patients without the need for a prescription. You will need to familiarise yourselves with Intermittent

Presumptive Treatment (IPT) guidelines for malaria in pregnancy.

Tuberculosis Treatment:

The new TB manual should soon be available and the use of combined TB drugs will become routine once the drugs become available.

Paediatric Management:

There have been extensive changes in the paediatrics chapter and you will need to read it carefully. Please note the change in the formulation of the Oral Rehydration Solution (ORS). 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. Give Zinc sulphate 20mg/day for 14days with every bout of diarrhoea. Give 10mg/day in infants below 6 months.

Gastrointestinal disease

You will now be able to use a proton pump inhibitor as part of your anti helicobacter therapy. Ranitidine has replaced Cimetidine and hence should be used as part of the H. pylori therapy.

Diabetes Mellitus

Watch out for the new algorithm for the treatment of Type II diabetes. For the type II diabetics who are not well controlled, one can change to insulin therapy totally or add insulin to the oral hypoglycaemics.

Specialist Drugs List:

You may not be aware that there was a Specialist Drug List (SEDLIZ) that was compiled in 2002. Confusion arose among the healthcare workers due to not knowing what was on this list and hence the list is now available for you to see within this new EDLIZ. Specialist drugs are those drugs that require special expertise or diagnosis and hence their prescription will be restricted. Each hospital will therefore have to consider whether or not to include these drugs in their local formulary. Thus we will encourage the use of hospital formularies that are commensurate with the expertise available at a given healthcare delivery centre.

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GUIDELINES ON ANTIMICROBIAL TREATMENT AND PROPHYLAXIS

GENERAL GUIDELINES

Antimicrobials are the most over-used class of drugs 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 drugs will initially be given “blind”, 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 drug 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.

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 i.e. 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, e.g. 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 e.g. in empirical therapy or in mixed infections,
 - to achieve a more rapid and complete bactericidal effect e.g. in enterococcal endocarditis,
 - to prevent the emergence of resistant micro-organisms e.g. 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 should be half the recommended adult dose (see chapter on Drugs 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 **amoxycillin** 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 pneumoniae*, *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.

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** (i.e. a pruritic rash occurring within 48 hours or 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. **Erythromycin** is a suitable alternative although the intravenous route is very poorly tolerated.

If there is a history of **cotrimoxazole allergy**, and it was not Stevens-Johnson type, it is likely that the person can be desensitised (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 e.g. of hepatitis)
- Malaria
- Typhoid
- Urinary tract infection
- Bacteraemia

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: i.e. *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).

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

Drug	Codes	Adult dose	Frequency	Duration
ampicillin iv	B E	2g	4 times a day	review
And gentamicin iv	B 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 drug (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:**

Drug	Codes	Adult dose	Frequency
chloramphenicol iv	B V	1g	single dose

- **Hysterectomy, Caesarean section, or Colorectal surgery e.g. appendicectomy:**

Drug	Codes	Adult dose	Frequency	
benzylpenicillin iv	C V	5MU	single dose	■
and chloramphenicol iv	B V	1g	single dose	

- **If signs of infection after operation, give:**

Drug	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

Urinary tract surgery e.g. prostatectomy:

Drug	Codes	Adult dose	Frequency
chloramphenicol iv	B V	1g	single dose

Other prophylaxis■ **Skull base fracture with liquorrhoea (rhino/otorrhoea):**

Drug	Codes	Adult dose	Frequency
chloramphenicol iv	B V	1g	single dose

Subacute bacterial endocarditis See *Cardiovascular Chapter*

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

Drug	Codes	Adult dose	Frequency
rifampicin po	B V	600mg	2 times a day
		<1yr = 2.5mg/kg	
		>1yr = 5mg/kg	

or ciprofloxacin po
dose

	B V	500mg	once only	single
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Note: Weigh the benefits against the risks when using ciprofloxacin in pregnancy.

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

Drug	Codes	Adult dose	Frequency	Duration
cotrimoxazole* po	C V	960mg	every day	for life or until CD4>200 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.*

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General Notes:

The content of this chapter reflects the major causes of infant mortality and morbidity in Zimbabwe - perinatal asphyxia, acute respiratory infections, diarrhoeal diseases, neonatal sepsis, malnutrition and, immunisable diseases. Many 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

Drug Dosage for Infants Under 1 Month (see pp)

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

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

Table 2.1 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 2.2

For example: Chloramphenicol dose = 12.5mg/kg. Thus a 2kg pre-term baby 5 days old would receive 25mg chloramphenicol every 12hours, whilst a 2kg term baby 5 days old would receive 25mg 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.
- To prevent neonatal ophthalmia, instil into **both eyes**:

Drug	Codes	Paed dose	Frequency
Duration			
tetracycline eye oint. at birth 1%	C	V	instil into both once only eyes

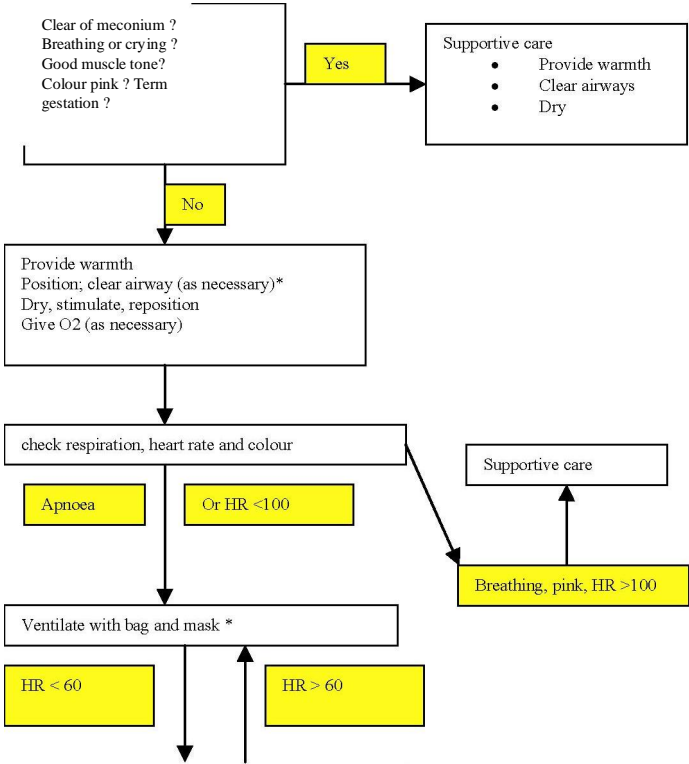
- To prevent haemorrhagic disease of the newborn, give:

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

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

Resuscitation of the newborn

See algorithm on next page:



Ventilate with bag and mask *
Administer cardiac massage

HR < 60

* consider intubation

Give adrenaline 1 ml/kg 1:10 000

Consider hypovolaemia and acidosis

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

The following may be useful:

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

Drug Duration	Codes	Paed dose	Freq.
naloxone neonatal 20mcg/ml im <i>NB: Note strength.</i>	BV	<1kg 10mcg =0.5ml 1-2kg 20mcg =1ml 2-3kg 30mcg =1.5ml >3kg 40mcg =2ml	repeat as necessary
Adrenaline dilute to 1:10	CV	10mcg 1ml/kg	
000			

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

Drug Duration	Codes	Paed dose	Freq.
------------------	-------	-----------	-------

sodium bicarbonate slow iv 4.2%	B N	4-6ml/kg	n
--	------------	----------	---

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

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

Drug	Codes	Paed dose	Freq.	Duration
dextrose 10% iv infusion	BN	60ml/kg/24hrs		

Days 2-4 or when otherwise required:

Drug	Codes	Paed dose	Freq.	Duration
Darrows half strength / dextrose 2.5% iv with 10% dextrose infusion*				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 2.2 Gentamicin dosages:

Premature or full term neonates up to 7days old			
Weight	Age	Dose	Frequency
less than 1000gm	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

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:

Drug	Codes	Paed dose	2.5mg/kg
dose			
benzylpenicillin im/iv	C	V	

0.1MU/kg

and **gentamicin im/iv** **B V**

Freq.

Duration

Table
2.2

Table

5 days

2.1

Suspected sepsis after 48hrs:

	Drug	Codes	Paed dose	Freq.	Duration
	gentamicin im/iv			Table 2.2	5
And	cloxacillin im/iv	B	V 2.5mg/kg 30mg/kg	Table 2.1	5

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

Meningitis:

	Drug	Codes	Paed dose	Freq.	Duration
	benzylpenicillin im/iv			Table 2.1	14-21 days
C	V 0.1MU/kg			Table 2.2	
And	gentamicin im/iv	B	V 2.5mg/kg	Table 2.1	
And	chloramphenicol iv	B	V 12.5mg/kg		

Necrotising enterocolitis

Nil by mouth. Supportive care is vital: oxygen, intravenous fluids, warmth, nasogastric suctioning. Anticipate complications such as bleeding, vomiting, perforation, seizures. **Refer** for specialist diagnosis and care.

	Drug	Codes	Paed dose	Freq.	Duration
	benzylpenicillin im/iv	C	V 0.1MU/kg	Table 2.1	10 days
And	gentamicin im/iv	B	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:

	Drug	Codes	Paed dose	Freq.	Duration
	benzylpenicillin im/iv	C	V 0.05MU per kg	12 h	5-7 days
Or	Procaine penicillin im	C	V 50mg/kg	Once a day	5-7 days
And	tetanus	B	E 500 - 1000 units	Once	

single
immunoglobulin im

only dose

30

Control of muscle spasms:

Drug	Codes	Paed dose	Freq.	Duration
diazepam iv	CV	0.25-1mg/kg according to response max total dose of 10mg	4-8hrly, titrated	n
Or chlorpromazine iv/im/nasogastric	CV	2mg/kg/24hrs in 4-6 divided doses		
And phenobarbitone iv/im/nasogastric	BE	2.5-5mg/kg long as necessary	12hrly for as	

Congenital syphilis

Drug	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.

Convulsions

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

Drug	Codes	Paed dose	Freq.	Duration
Dextrose 50% slow iv for	C V	1ml/kg diluted with equal quantity of water		
		injection as slow bolus		

- , then give:

Drug	Codes	Paed dose	Freq.	Duration
Dextrose 10% iv infusion	B 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:

Drug	Codes	Paed dose	Freq. Duratio n
phenobarbitone iv	B E	10mg per kg repeat in 30 minutes if still convulsing	over 5-10mins
or paraldehyde deep im	A N	0.1ml per kg	once
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:

	Drug Codes	Paed dose	Freq.	Duratio n
vitamin D po		800units 5mg	once a day	to age of 3mths
B V And folic acid po		weekly	Freq.	Duratio n
■ and, starting from the age of		month: Paed		
one Drug		dose		
Codes				
And ferrous sulphate po	C	3-6 mg/kg	once a day	to age 3mths
E (60mg/5mls = 12mg elemental iron /5mls)		elemental iron		

Table 2.3 Dosages for infants under one month:

Drug	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	0.5mg/kg/dose	3 to 4
Dextrose 5% infusion 50% injection	iv	5 to 10ml/kg of 5% repeatable 1 to 2ml/kg of 50% diluted 1:1 over 3 to 4mins	
Diazepam 5mg/ml injection	iv/pr	0.3.mg/kg/dose repeatable	-
Digoxin 0.25mg/ml 50mcg/ml syrup	iv/im	Loading: 10mcg/kg at 8 hour intervals for total of three doses	
	po	Maintenance: 10mcg/kg/24hrs	1
Erythromycin 125mg/5ml syrup	po	40mg/kg/24 hrs	3
Ferrous sulphate 12mg Fe/5ml syrup	po	12mg Fe/24hrs	once

Table 2.3 Dosages for infants under one month: [contd.]

Drug	Route	Dosage	Freq. (per day)
Folic acid 5mg tablet	po	5mg	weekly
Frusemide 10mg/ml injection 40mg tablet	iv/im	0.5 to 2mg/kg/dose	1 to 2
	po	1 to 4mg/kg/dose	2
Gentamicin 10mg/ml injection	im/iv	£ 1500 g = 2.5mg/kg/dose	2
		<1500g = 2,5 mg/kg/dose	once
Hydrocortisone 100mg injection	iv/im	10mg/kg/dose	3
Isoniazid 50mg/5ml syrup	po	10mg/kg/24hrs	once
Kanamycin 1g injection	im	7.5mg/kg/dose	1 to 2
Metronidazole 5mg/ml injection	iv	7.5 mg/kg/dose	2 to 3
Morphine 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 OOOunits/ml	po	100 OOOu/dose	4
Paraldehyde 10ml injection	deep im	0,1 ml/kg	-
	pr	0.3 ml/kg	-
Penicillin procaine 300mg/ml injection	im	50 mg/kg/24hrs [=50 OOOu/kg/day]	once
Phenobarbitone 200mg/ml injection 15mg/5ml syrup	iv	10 to 20mg stat over 10mins	-
	im/po	maintenance = 3 to 5mg/kg/24 hrs	1 to 2
Phenytoin 30mg/5ml syrup 50mg/ml injection	po	4mg/kg/dose	2
	iv	Loading: 15-20mg/kg slow (0.5mg/kg/min)	
Sodium bicarbonate 4.2% infusion (or 8.4%)	iv	5ml/kg of 4.2% slowly	-
Theophylline 200mg tablet	po	Loading: 6mg/kg Maintenance: 5mg/kg/24hrs	3
Thyroxine 100mcg tablet	po	10mcg/kg/24 hrs	once
Vitamin D (calciferol) 50 000u capsule	po	800u/day (age >14days)	once
Vitamin K (phytomenadione) 2mg/ml inj.	im	1mg for ≥2500g, 0.5mg for <2500g	-

PAEDIATRIC CONDITIONS

Common paediatric conditions such as acute respiratory infections (ARI), diarrhoea, child with fever (axillary temperature 37.5°C and above); severe malnutrition (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: e.g. 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.

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.

Management:

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	<ul style="list-style-type: none"> > 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	<ul style="list-style-type: none"> > 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	<ul style="list-style-type: none"> > 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 IMCI. For babies 1-2 months see neonatal doses.

- Well nourished children over 6 months with severe pneumonia can be managed with benzylpenicillin only.
- Give first dose of intramuscular benzylpenicillin and kanamycin and refer child urgently to hospital.
- If referral not possible repeat the benzylpenicillin 6 hourly and kanamycin 12 hourly.

	Drug	Codes	Paed dose	Freq.	Duration
	Benzylpenicillin im 10 days	C V	0.05 -0.1MU/kg		6 hourly
and	kanamycin im	C V	7.5mg/kg	12 hourly	
OR	Gentamicin	B V	5-7mg/kg	Once daily	10 days

Note: change to oral when possible

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

COTRIMOXAZOLE TABLE

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

If benzylpenicillin is not available, substitute with:

Drug	Codes	Paed dose	Freq.
Duration procaine penicillin 5 days im	C	V <1yr ½ ml (= 150mg)	once a day
		1-3yrs 1ml (= 300mg)	
		3-5yrs 1 ½ ml (= 450mg)	

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.
- Oxygen.

Management of moderate pneumonia

- First line:

Drug	Codes	Paed dose	Freq.	Duration
cotrimoxazole po	CV Codes	4-<6kg = 120mg 6 - <14kg = 240mg 14-19kg = 360mg	2 times a day Freq.	5 days
■ Second line: Drug		Paed dose		Duration
amoxycillin po*	C	V 4-<14kg = 125mg 14-19kg = 250mg	3 times a day	5 days
or procaine penicillin im	C	V <1yr = 150mg 1-3yrs = 300mg 3-5yrs = 450mg	once a day	5 days

***Use amoxycillin as first line in children on cotrimoxazole prophylaxis**

Reassess after 2 days of antibiotic treatment.

-
- Treat fever, if present with:

Drug	Codes	Paed dose	Freq.	Duration
paracetamol po	C E	10mg/kg	6hrly	as req'd.

Note: Do not give paracetamol to children under 2 months of age.

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 reassessment, 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**

Monitoring the child with moderate pneumonia:

Child Worse	Child Same	Child better
<ul style="list-style-type: none"> • Not able to drink • Has chest indrawing • Has other danger signs 	<ul style="list-style-type: none"> • Fast breathing 	<ul style="list-style-type: none"> • 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 37.5oC:

Drug	Codes	Paed dose	Freq.	Duration
paracetamol po	C E		6hrly	as req'd.
	10mg/kg			

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 to any danger sign; or if Give first dose of antibiotic, and refer **urgently** hospital fast breathing
- > 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 Previous 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 Previous Episodes of Wheezing ■ child 1 year and over

- > Start with Give a rapid acting bronchodilator
Assess the child's condition 30 minutes later and treat
according to this assessment.
- > If chest indrawing; or prednisolone any danger sign Give first dose of antibiotic and
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:

Drug	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:

Drug	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 = 1 mg 1-5yrs = 2mg	3 times a day	
or adrenaline 20mins	C V	0.01ml/kg up to a max of 0.25ml	repeat after if required	
subcutaneously 1:1000				

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!**
- If referral not possible or there is a delay give chloramphenicol **and** cloxacillin:

Drug	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

- 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
- Antibiotics if there is fast breathing (secondary infection.)

Retropharyngeal Abscess

- Surgical drainage is required. Give:

Drug dose	Codes	Paed	Freq.	Duration
benzylpenicillin im	C V			
And Gentamicin im/iv	0.05-0.1MU/kg	B V	6 hourly days 24 hourly	7 7 days

Empyema / lung abscess

Drug	Codes	Paed dose	Freq.	Duration
Cloxacillin iv/im/po	B V			
And Gentamicin im/iv	12.5-25mg/kg	B V	6hrly 24 hourly	6 weeks 14 days
Or Kanamycin im	C V	7.5mg/kg	12hrly	14 days

Empyema –should also insert a chest drain

Diphtheria

Give antitoxin and:

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

Pertussis

Drug	Codes dose	Paed	Freq.	Duration
erythromycin po	CV	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.

Drug	Codes	Paed dose	Freq.	Duration
benzylpenicillin im And C	V		6 hourly	
kanamycin im	0.05-0.1MU/kg CV		10days	
or gentamycin i.m And	7.5mg/kg 5-7mg/kg C		12 hrly	
paracetamol po	E	10mg/kg	24hrly	

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:

Drug	Codes	Paed dose	Freq.	Duration
cotrimoxazole po	C V	4-<6kg =120mg 6 - =240mg <14kg =360mg	12 hourly	5 days
And C	E	10mg/kg	6hrly	as req'd.

Use amoxycillin 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
- 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:

Drug	Code s	Paed dose	Freq.	Duratio n
procaine penicillin im	CV	< 1yr 1/2mls(=150mg) 1 to 3yrs 1ml(= 300mg) 3 to 5yrs 1 1/2mls(450mg)	once a day 4	5 days then penicillin V for 5 days
or penicillin V po	C E	<3yrs = 125mg >3yrs = 250mg >12yrs = 500mg	a day	10 days

Give paracetamol for pain.

General / home care & feed child as above.

Treatment of oral candidiasis (thrush)

	Drug Duratio	Codes	Paed dose	Freq.	n
	Aqueous gentian violet feeds 0.5%	C	V	apply after	
or	nystatin po	B	E	250 000u after feeds	3- 6 times a day
or	micnazole 2% gel po	B	N	2.5ml after feeds	5 days

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) 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 MOHCW Chart and IMCI 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 drugs.**
- **Zinc sulphate 20mg/day for 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 2.4

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

Table 2.4 Classification of Dehydration:

Signs	Dehydration	Management
Two or more of the following signs: <ul style="list-style-type: none"> ■ 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: <ul style="list-style-type: none"> ■ 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 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.

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

Show the mother how much Sugar Salt Solution to give.

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

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:

Determine amount of oral rehydration therapy to give every hour for the first 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 give 15 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
- 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: $\frac{1}{2}$ strength Darrow's solution in 2.5% dextrose iv
- OR Ringer lactate iv r
- 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.
- 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 5 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 14 days or more **and** dehydrated. Start rehydration and **refer** to hospital.
- **Persistent diarrhoea** is diarrhoea lasting more than 14 days **but** no dehydration. Advise on feeding (below), give vitamin A, and follow up in 5 days.

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, breastmilk, or vitamin supplements.

INDICATIONS FOR ANTIBIOTICS IN DIARRHOEA:

Bloody diarrhoea, cramps and fever (dysentery):

- First line:

Drug	Codes	Paed dose	Freq
nalidixic acid po or Ciprofloxacin po	B V B V	4-<10kg = 125mg >10kg = 250mg 5 -12yrs = 375mg 5-17yrs 20mg/kg (max)	n 4 times day Twice a day
			5 days a day 3 days

- Follow up after 2 days.

- Second line (**intestinal amoebiasis**):

Drug	Codes	Paed	Freq.	Duration
metronidazole po	C	V	10mg/kg	3 times a day 5 days

Cholera:

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

m Rehydration is most important.

- Start antibiotics after the patient is rehydrated and vomiting has stopped - usually after 4-6hrs.

Drug	Codes	Paed dose	Freq.	Duratio n
cotrimoxazole po days	C V	24mg/kg	Twice a day	3

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
- 750ml of clean water measured in any 750ml 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	<i>*Trisodium citrate dihydrate may be replaced by sodium bicarbonate 2.5 grams/litre.</i>
trisodium citrate dihydrate*	2.9g	
potassium chloride	1.5g	
glucose, anhydrous	13.5	
Water	to 1 litre	

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

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

PROTEIN /ENERGY MALNUTRITION (Underweight, Marasmus, Kwashiorkor)

Growth monitoring

Regular growth monitoring is a very important tool 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 on 3rd centile on child health card.

- m** 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.

Classification

Weight*	No Oedema	Oedema
60-80% expected weight for age	Underweight	Kwashiorkor
< 60% expected weight for age	Marasmus	Marasmic-kwashiorkor

Table 2.5(a) Classification of nutritional status:

<ul style="list-style-type: none"> ■ Visible severe wasting or ■ Oedema of both feet 	SEVERE MALNUTRITION	<ul style="list-style-type: none"> > Give first dose of appropriate antibiotic > Give Vitamin A > Treat to prevent low blood sugar > Keep child warm > Refer urgently to hospital
<ul style="list-style-type: none"> ■ Low weight for age or ■ Growth faltering 	LOW WEIGHT or GROWTH FALTERING	<ul style="list-style-type: none"> > Assess the child's feeding and counsel the mother on feeding > If feeding problem, follow-up in 5 days > Positive T.B contact - refer for assessment > If Low weight or growth faltering give Vitamin A > Advise caregiver when to return immediately > If low weight for age, follow-up in 1 month > If growth faltering for 3/12 refer to hospital
<ul style="list-style-type: none"> ■ No low weight for age and ■ No other signs of malnutrition 	NOT LOW WEIGHT	<ul style="list-style-type: none"> > If the child is less than 2 years old assess the child's feeding > If feeding problem follow-up in 5 days > If positive T.B contact, follow-up in 1 month > Advise mother when to return immediately

Table 2.5(b) Classification of anaemia:

■ Severe palmar pallor	SEVERE ANAEMIA	<ul style="list-style-type: none"> > Start anti-malarial if indicated > Treat to prevent low blood sugar > Keep child warm > Refer urgently to hospital
■ Some palmar pallor	ANAEMIA	<ul style="list-style-type: none"> > Assess the child's feeding and counsel the mother on feeding > Give Iron and folate > Give oral anti-malarial if indicated > Advise caregiver when to return immediately > Follow up in 14days
■ No pallor	NO ANAEMIA	<ul style="list-style-type: none"> > If the child is less than 2 years old assess the child's feeding > If feeding problem follow-up in 5 days > Advise mother when to return immediately

Home management

Encourage:

- exclusive breastfeeding up to 6 months (no additional fluids/foods),
- breastfeeding up to two years,
- introducing other foods in addition to breast milk at 6 months,
- frequent high-energy meals,
- hygienic food handling and preparation,
- regular weight and growth checks: <1yr – monthly; >1 yr - every 2 months.

Drug therapy in malnutrition:

Drug	Codes	Paed dose	Freq.	Duration
vitamin A po	C V	<6mths 50,000iu 6-12mths 100,000i u	once at the clinic and one dose at home -2 doses only	
And po	C E	1-5yr 200,000 iu	day once a	14 days
and po	CE	4-<6kg 6mgFe 6- <10kg 12mg 1-3yrs 18mg 3-5yrs 24mg	once a days day	14
	CE	<6kg 2.5mg >6kg 5mg		

Nutritional rehabilitation at the referral level

General guidelines:

- Try not to separate the caregiver from the child; they should share a bed where possible.
- Keep the child in a warm environment;
- Attempt to incorporate an educational message into each intervention.
- Treat any infection present:
- Treat any specific infection (e.g. TB). If seriously unwell give benzylpenicillin and gentamicin or kanamycin. If condition less severe, consider oral broad-spectrum antibiotics (cotrimoxazole or amoxicillin).
- If copious watery diarrhoea consider lactose intolerance
- After rehydration with oral rehydration solution give half-strength fresh milk or half strength high-energy milk until able to tolerate full-strength high-energy milk.
- Correct dehydration, if present, **slowly** with ORS 80-100ml/kg/day (lower than the usual rate).
- Provide a high calorie diet with adequate protein.

The therapeutic diet consists of high-energy milk (HEM) every three hours (starting early in the morning until late at night). If the child has watery diarrhoea, give half strength HEM (half HEM, half ORS).

- In **persistent diarrhoea** give:

Drug	Codes	Paed dose	Freq.	Duration
metronidazole po	C V	10mg/kg	3 times a day	5 days

■

- **Recommended Formula for High Energy Milk (HEM)**

Boiled fresh cows' milk	900 g
sugar	60 g
vegetable oil	50 g

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

If therapeutic feeding regimens available - Use F75 and F100 as recommended.

F75 for initial phase

F100 for transition and maintenance phase

Vitamins and Electrolytes

Drug	Codes	Paed dose	Freq.	Duration
multivitamin syrup po	BE	5-10ml	daily	1 month

<6mths 50,000
iu 6- 12mths

	C	V		
And folic acid po	C	E	5mg	weekly 3 months

And vitamin A po				once at the clinic and one dose at home -2 u 1-5yr 200,000i doses only
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In all kwashiorkor and marasmic-kwashiorkor children give:

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

*Kwashiorkor electrolyte mixture(KEM) formula:

Made in hospital pharmacies as follows:

Ingredient	weight
potassium chloride	75g
magnesium chloride	25g
zinc sulphate	1.125g

Water to 1 litre

KEM - Not necessary if using F75 or F100

Anaemia:

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

Drug	Codes	Paed dose	Freq.	Duration
albendazole po	CE	<2yrs 200mg >2yrs 400mg	one dose only	
And po ferrous sulphate	C E	6 - <10kg 12mg 18mg	1-3yrs 3-5yrs	once a days day 30

PAEDIATRIC HIV INFECTION

See national Guidelines on Antiretroviral Therapy. Paediatric HIV infection can be significantly reduced by implementing an effective PPTCT program. Symptomatic HIV infection may be difficult to distinguish from other childhood conditions such as respiratory infections, diarrhoea and malnutrition. Suspect HIV related disease if two or more of the following signs are present:

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

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

General Guidelines for HIV care in children

- Nutrition: advise the caregiver on high calorie diet and other essential nutrients for the child. Safe food and water practices
- Hydration: oral rehydration, together with dietary advice is most important in the management of persistent diarrhoea. Intravenous fluids may be needed during severe diarrhoeal episodes.
- Immunisation: BCG should be given to all children at birth. Immunisation is contraindicated only where there is symptomatic HIV infection. The current recommendation is to give the other live vaccines, measles and oral poliomyelitis vaccine even in immune-compromised children. [See chapter on Immunisation.]
- Home care: is preferable to hospital admission for chronic care.
- Counselling: the family will require support in facing the emotional and financial demands of the child's chronic ill health as well as those arising from the parents' own HIV status. Facilitate access to OI clinics.

Management of Specific HIV related Conditions

Bacterial infections

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

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

Drug Duratio	Codes	Paed dose	Freq.
cotrimoxazole po for life	C V	< 6mths = 120mg 6-12mths = 240mg day >1 year = 480mg	n once a

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 2.6 Dose by age and weight for commonly used drugs:

Age	Weight	benzylpenicillin 0.05-0.1MU/kg 6 hourly	kanamycin 7.5mg/kg 12hourly	cotrimoxazole 12hourly	paracetamol 10mg/kg 6hourly	amoxycillin 16mg/kg 8 hourly	procaine penicillin 50mg/kg oncedaily
		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	0.3M (0.4ml) U	40mg (0.16ml)	100/20mg (2.5ml)	50mg (2.5ml)	62.5m (2.5ml) g	
4-9 months	6 - <10kg	0.4M (0.5ml) U	50mg (0.2ml)	200/40mg (5ml)	100mg (3-5ml)	125m (5ml) g	
9-12months	10 <12kg -	0.5M (0.6ml) U	75mg (0.3ml)	200/40mg (5ml)	120mg (5ml)	125m (5ml) g	150m (0.5ml) g
1-3 years	12 <14kg -	0.7M (0.8ml) U	100m (0.4ml) g	300/60mg (7.5ml)	120mg (5-7ml)		300m (1.0ml) g
3-5 years		0.8M (1.0ml) U	125m (0.5ml) g	300/60mg (7.5ml)	250mg (10ml)	250m (10ml) g	450m (1.5ml) g
5-12 years		1MU (1.2ml)	200m (0.8ml) g	400/80mg (10ml)	375mg (15ml)	375m (15ml) g	600m (2.0ml) g

PAEDIATRIC DRUG DOSES

Notes on Paediatric Drug Doses:

m for infants under one month see Tables 2.1, 2.2 and 2.3;

m read the “dosage” column carefully in conjunction with the

“doses/day” column; **m** do not exceed the adult dose: the dosage per kg is not applicable for children > 40kg;

Table 2.7 Dosages for Children and Infants Over 2 Months

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

Drug	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 -0.1 MU/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
Cimetidine 400mg tab	po	5 to 10mg/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 2.7 Dosages for Children and Infants Over 2 Months:
[contd.]**

Drug	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	0.5mg 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 hrly
Hydrocortisone 100mg injection	iv	100 to 200 mg/dose depending on indication	-
Isoniazid 100mg tab; 50mg/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 2.7 Dosages for Children and Infants Over 2 Months: [contd.]

Drug	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
Paraldehyde 10ml injection	im	0.1ml/kg	once
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
Propranolol 40mg tab	po /im	1 mg/kg	3 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
Trimeprazine 30mg/5 ml syrup	po	Pre-operatively 2 to 4mg/kg	once

IMMUNISATION

*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.*

GENERAL NOTES

Adverse events

- All adverse events should be reported using the 'Adverse Events Following Immunisation' AEFI form.

Diseases Preventable by Immunisation

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

Open vial policy

- Open vials of DPT, DPT+HB, DT, TT and HB may be used **through the following day** if they have been kept under cold chain and sterile conditions, and not taken on outreach.
- Opened reconstituted measles and BCG must be discarded.
- Opened polio vials which have vaccine vial monitors can be used **if** there is no colour change.
- If in any doubt - **discard**.

Use of Vaccinations in HIV Infected Individuals

- In general, live vaccines are not given to immune compromised individuals. However, the risk of measles and polio in infants not immunised is high, and the risk from these vaccines appears to be low, even in the presence of symptomatic HIV infection.
- Therefore only the use of BCG in an infant with clinical HIV is contra-indicated.

IMMUNISATION SCHEDULE FOR CHILDREN

See Table 3.1. 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.

- 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 drugs.

Table 3.1: Immunisation schedule by age

Minimum Age	Vaccination * not for immune compromised / HIV patients
At birth	*BCG 1 ^a [PC]
3 months	DPT+HB 1 [PC] OPV 1
4 months ^b	DPT+HB 2 [PC] OPV 2
5 months ^b	DPT+HB 3 [PC] OPV 3
9 months	Measles [PC]
18 months	DPT4 Booster 1 OPV4 Booster 1
5 years	DT Booster OPV5 Booster 2

Note [PC]: Primary course is considered complete if the child has all eight vaccinations marked [PC].

Note a: Revaccinate for BCG in the absence of a scar 6 weeks after the vaccination, or next contact after 6 weeks.

Note b: The minimum interval between the consecutive doses of DPT+HB and of OPV is 28 days (check day as well as month).

Catch-Up Schedule

- Immunise a child who is behind schedule according to the following guidelines (Table 3.2).
- Ensure that the child's age is above the mentioned minimum ages for each vaccination type.

Table 3.2 Catch-up schedule

Minimum interval / when to give	Vaccination Type
First contact	BCG ^a , DPT-HB 1 ^b , OPV 1, Measles
After 28 days or more	DPT-HB 2 ^b , OPV 2,
After 28 days or more	DPT-HB 3 ^b , OPV 3

Note a: For a child who has not previously had BCG vaccination, a single dose may be given (maximum to 10 years). *Note b:* A child over 24 months is given DT 1 and DT 2 instead of DPT-HB1 and DPT-HB2. DPT-HB3 is not given.

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 3.3 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 3.4.

Table 3.4 Catch up – tetanus

Doses received as a child	Doses needed as an adult
No DPT immunisation	5 dose according to schedule (table 3.3)
3 primary course DPT	2 doses one month apart plus 1 dose one year later. In pregnancy TT3 to be given at least 6 months 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

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.

The minimum interval for HB2 and HB3 is 5 months, if given as a mono dose.

Table 3.5 Details for available vaccines:

Vaccine	Min. age first dose	Min. interval	Site	Route	Dosage
BCG	Birth [max. age is 10 years for first dose]		Right upper arm	intra-dermal	0.05ml or 0.1ml
DPT-HB	3 months	28 days	Antero-lateral aspect of the thigh	im	0.5ml
OPV	3 months	28 days	Oral	oral	2 – 3 drops
HB1 /2	3 months	28 days	Antero-lateral aspect of the thigh	im	0.5ml
HB3/ 4	same	5mnths		im	0.5ml
Measles	9 months		Left upper arm	im	0.5ml
DT	2 years	28 days	Antero-lateral aspect of the thigh	im	0.5ml
TT	See table 3.3	See table 3.3	Upper arm, deltoid muscle	im	0.5ml

OBSTETRIC AND GYNAECOLOGICAL CONDITIONS

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General Note:

Drugs should be avoided if at all possible throughout pregnancy, and especially during the first trimester. However, drugs may be required for a number of conditions commonly encountered during pregnancy; drugs which are appropriate and safe are covered in the sections that follow. At the end of the chapter is a list of those drugs 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, 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?
- Normal delivery within 6 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 or women with mild or moderate hypertension.

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 manufacturers information sheet.

Drug Interactions with Oral Contraceptives

Drugs reducing the effect of oral contraceptives

Caution is needed when prescribing any of the following drugs 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 drug 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, e.g. condoms or abstinence from intercourse). If the drug is to be used on a long-term basis the woman should be advised to use another suitable method of contraception.

Drugs which are made less effective by oral contraceptives

Doses of particular drugs 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

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

CAUTION: In severe 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 Contraceptive

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.

Drug Duration	Codes	Adult dose	Frequency
levonorgestrel implant	B N	2 rods	once only
			once in 5yrs

CONTRAINDICATIONS: Severe 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

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

Drug Duration	Codes	Adult dose	Frequency
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			

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

- *Progesterone only Pill- 1 tablet 750µg of levonogestrol oral within 72 hours of unprotected intercourse. Take one more tablet in 12 hours. If no menses within 3 weeks - the client should consult the service provider*
- *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, white blood cells, culture and sensitivity where possible.

■ First line:

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

■ Second line:

Drug	Codes	Adult dose	Frequency	Duration
Norfloxacin	B N	400mg	3 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.*

m Third line: as per culture and sensitivity.

Positive RPR or Syphilis during pregnancy

■ Both partners to be counselled and treated with:

Drug	Codes	Adult dose	Frequency	Duration
benzathine penicillin im	C V	2.4MU	once a week	3 doses

(=1.44g)

See chapter on Sexually Transmitted diseases for further information

Vaginal discharge during pregnancy

Often polymicrobial and requires a combination of drugs

Drug	Codes	Adult dose	Frequency	Duration
erythromycin po	C V	500mg	4 times a day	7 days
And metronidazole po	C V	400mg	3 times a day	7days

And miconazole vag

C N

Oneonce a day
3 days

Caution: Avoid metronidazole in 1st trimester.

Post Abortal Sepsis

Pyrexia in a woman who has delivered or miscarried in the previous 6 weeks may be due to puerperal or abortal sepsis and should be managed actively. Abdominal pain in addition to pyrexia is strongly suggestive. The uterus may need evacuation.

Note: Every year a few women die because what is thought to be post-abortal sepsis is in reality fever from malaria causing abortion.

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

m Mild/moderate sepsis:

	Drug	Codes	Adult dose	Frequency	Duration
	amoxycillin po	C	V 500mg	3 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:

	Drug	Codes	Adult dose	Frequency	Duration
	kanamycin im	C	V 2g [1g per buttock]	once	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

■ Second line:

Substitute norfloxacin for kanamycin in above therapy

	Drug	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 doxycycline allergic patients

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

Severe pelvic inflammatory disease

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

	Drug	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**

	Drug	Codes	Adult dose	Frequency	Duration
	ampicillin iv	B E	500mg	6 hourly	48-72hrs
and	gentamicin im	B 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 (PROM)

	Drug	Codes	Adult dose	Frequency
	Duration			
	Oxytocin infusion Then (see induction of labour)	C V	1 unit initially 4 units in 1L sodium chloride 0.9% at 15, 30, 60 drops per minute until regular contractions	
or	dinoprostone in posterior fornix	B V	3mg	6hrly
or	misoprostol po	A N	Depending on the urgency of the situation, the parity of the patient decides on a dose and location.	

Note: Failed termination of early pregnancy with prostaglandin and termination not pressured with other means might result in congenital abnormalities.

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

Drug	Codes	Adult dose	Frequency	Duration
benzylpenicillin iv	C V	2MU	6 hourly	until
and chloramphenicol iv	B V	500mg	6 hourly	delivery
- Switch to oral antibiotics for 7 days after delivery:

Drug	Codes	Adult dose	Frequency	Duration
amoxicillin po	B 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:

Drug	Codes	Adult dose	Frequency	Duration
benzylpenicillin iv	C V	5MU	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:

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

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 pregnancy. Give:

- | Drug | Codes | Adult dose | Frequency | Duration |
|-------------------------------|------------|------------|----------------|-------------|
| promethazine po | B N | 25mg | once at night* | as required |
| or chlorpheniramine po | C E | 4mg | once at night* | 5 days |

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

Hyperemesis Gravidarum (Vomiting and Dehydration)

Admit for intravenous fluids and give:

- | Drug | 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 |

ANAEMIA DURING PREGNANCY

Prophylaxis in Antenatal Care

Drug	Codes	Adult dose	Frequency	Duration
ferrous sulphate po	C E	200-400mg	once a day	5 months
and folic acid po	C E	5mg	once a week	5 months

* Start at 12 weeks or from booking for antenatal care. Continue prophylaxis for 6 weeks after delivery. Also give dietary advice.

Treatment of Microcytic Anaemia

Before 36 weeks gestation:

Drug	Codes	Adult dose	Frequency	Duration
ferrous sulphate po	C E	200-400mg	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). Parenteral iron preparations can be used if Hb is <7 g/dl.

CARDIAC DISEASE IN PREGNANCY

Types of cardiac disease:

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

Antenatal Management

The woman should be managed by a specialist obstetrician and physician together, and should be seen more frequently than normal.

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 for the first 13 weeks, and change back to warfarin between weeks 13 - 37. After 37 weeks change to heparin again 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 delivery, which can be assisted by forceps delivery to avoid stress.

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

Drug Duration	Codes	Adult dose	Frequency
ampicillin iv dose	B E	1g	once only single

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

Drug Duration	Codes	Adult dose	Frequency
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, use the progesterone only oral contraceptive or medroxyprogesterone.

Hypertension in Pregnancy

Women who develop hypertension during pregnancy (later than 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 drugs during pregnancy.

Essential Hypertension

Monitor for development of proteinuria.

Drug Duration	Codes	Adult dose	Frequency
Methyldopa po review	B V	250-500mg	3-4 times a day

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

Drug Duration	Codes	Adult dose	Frequency
Methyldopa po review	B V	250-500mg	3-4 times a day
and Prazosin po review	B E	2 – 4mg	3 times a day

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.
- In moderate pregnancy induced hypertension, the above blood pressure is far more significant in a nullipara under 25 than in a woman of 37 with four earlier pregnancies without problems.

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:

Drug Duration	Codes	Adult dose	Frequency
methyldopa po review	B V	250-500mg	3-4 times a day
and Prazosin po review	B E	2 - 4mg	3 times a day

- At gestation > 37 weeks, plan immediate 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 Nifedipine as follows:

	Drug	Codes	Adult dose	Frequency	Duration
	methyldopa po	B V	250-500mg	3-4 times a day	review
and	prazosin po	B E	2 – 4mg	3 times a day	
plus	nifedipine sublingual	B V	10mg, repeat after 1 hour		If more than 2 – 3 doses are required – urgent delivery is required

Pre-Eclamptic Toxaemia (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 imminent eclampsia.
- If diastolic > 110 mmHg check blood pressure hourly and give:

	Drug	Codes	Adult dose	Frequency	Duration
	hydralazine iv	B V	12.5mg	intermittently	
Or	nifedipine sublingual	B V	10mg, repeat after 1 hour		If more than 2 - 3 doses are required in one day - urgent delivery is required

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:

	Drug	Codes	Adult dose	Frequency	Duration
	diazepam iv infusion	C V	40mg in 1l sodium chloride 0.9%, over 6 hours		

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

Eclampsia

This is pregnancy-induced hypertension with epileptiform fits.

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

	Drug	Codes	Adult dose	Frequency	Duration
	diazepam iv [infusion]	C V	10mg as a single dose- then 40-80mg in 1l sodium chloride 0.9%, over 6 hours - to prevent further convulsions		

Plan urgent delivery, within 6 hours.

Monitor carefully:

- Patellar reflex
- Respiration
- Urine output > 100mls in 4 hours

or

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

Drug	Codes	Adult dose	Frequency	Duration
hydralazine iv	B V	12.5mg	once	
magnesium sulphate* im	B V	5g in each buttock, once only, then: 4g iv slowly (over 2mins), once only, then:		
<i>*arrests and prevents convulsions without producing central nervous system depression</i>		4g in each buttock if at least 30cc/hr urine output, knee-patella reflex present and 15 chest excursions per minute.		

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.

- Good blood sugar control with insulin and diet is essential since oral hypoglycaemics are contraindicated in pregnancy and hyperglycaemia itself may be teratogenic. All known diabetics should be advised to start insulin 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 125 ml per hour. Labour should not be prolonged. After labour, manage the patient on a sliding scale of insulin.

ANAESTHESIA, ANALGESIA, ANTACIDS

■ For indigestion

Drug	Codes	Adult dose	Frequency
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:

Drug	Codes	Adult dose	Frequency
magnesium trisilicate po	C N	20ml	once only -
sodium citrate po	B N	15ml	once only -

or

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

Drug	Codes	Adult dose	Frequency
pethidine im	B V	50-100mg	4-6 hourly
and promethazine im	B V	25mg	once a day

- To reduce vomiting, give intramuscular anti-emetics (see

'Nausea and Vomiting in Pregnancy') at the same time as pethidine.

- Note: To avoid respiratory depression in the neonate the last dose should be longer than 2 hours before delivery and no more than two doses given during labour.

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

Drug	Codes	Adult dose	Frequency
lignocaine 1% local infiltration	C V	Up to max of 10ml	once

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

Steroids in Respiratory Distress Syndrome

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: Drug	Codes	Adult dose	Frequency	Duration
	hydrocortisone iv	B	V 250mg after 24hrs	once, then repeat	
or	dexamethasone im	B	E 12mg for 2 doses (12hrly)	Repeat after 1 week	

CAUTION: Anaemic patients who are receiving beta stimulants and steroids are prone to congestive cardiac failure.

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 already ripe.

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

- The safest and simplest method of ripening the cervix:

	Drug	Codes	Adult dose	Frequency
	Duration			
	dinoprostone po	A E	1-2mg	once only
or	dinoprostone vag tab in posterior fornix	A E	3mg	once only

If the contractions are too strong, the tablet might be retrieved from the vagina.

- Where dinoprostone [PG E2] oral tablets or vaginal tablets are not available and the foetus is alive, use:

Drug	Codes	Adult dose	Frequency
Duration			
dinoprost extra-amniotic once gel [PG F2a]	A E	5mg / 10ml	

Instructions: 5 mg (1 ampoule of dinoprost 5mg/ml) is mixed with 10 ml of sterile gel [KY jelly®] and delivered through a Foley catheter inserted under clean conditions through the cervical os, and the balloon inflated with 40 ml water.

- If the foetus is dead, use:

Drug	Codes	Adult dose	Frequency
Duration			
dinoprost intra-amniotic	A E	5mg	once

Note: with appropriate sterile precautions - only at tertiary level.

Where no drugs are available, the catheter can be inserted through the cervix under clean conditions, 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 :

Drug Duration	Codes	Adult dose	Frequency
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 unit in the litre of sodium chloride 0.9% - each time increasing the delivery rate through 15,30 and 60 drops per minute.

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.

Uterine stimulation after delivery

Drug Duration	Codes	Adult dose	Frequency
Ergometrine im	C V	0.5mg after delivery to cause myometrial contraction and prevent post-partum haemorrhage.	

CAUTION: ergometrine may cause a sharp rise in blood pressure and should therefore be avoided in all hypertensives and patients with heart disease.

- Alternative:

Drug Duration	Codes	Adult dose	Frequency
oxytocin im	C V	5 units after delivery of the infant.	

If the uterus remains relaxed in spite of above measures and manual stimulation, give:

Drug Duration	Codes	Adult dose	Frequency
oxytocin iv infusion 0.9%	C V	20 units in 1L of sodium chloride	running in at 10 – 60 drops per minute.

Uncontrollable post partum haemorrhage

- Post partum haemorrhage is caused by relaxation of the uterus and should be controlled with high doses of oxytocin or external rubbing.
- If not use prostaglandin injected slowly into the uterine muscle:

Drug Duration	Codes	Adult dose	Frequency
dinoprostone inj	A E	5mg slowly intra-myometrial	

The uterus should become as hard as stone, if not and still bleeding do total abdominal hysterectomy.

In cases where there is just trickling,

Drug Duration	Codes	Adult dose	Frequency
Misoprostol po	A N	400mcg	once only

MYOMETRIAL RELAXANTS (BETA-STIMULANTS)

Beta-stimulants are used to relax the uterus in order to:

- perform external cephalic version
- relieve fetal distress immediately prior to LSCS
- stop uterine contractions in premature labour
- prevent uterine rupture. For

immediate relaxation:

Drug	Codes	Adult dose	Frequency
------	-------	------------	-----------

hexaprenaline iv
followed by

B N 12.5mcg over 2minutes,

infusion of 25mcg in 200ml sodium chloride over 1 hour

The pulse rate must be monitored and drip rate titrated to keep pulse rate less than 125 per minute.

For mild contractions or to maintain cessation of contractions after intravenous beta-stimulant therapy:

Drug
Duration

Codes Adult dose Frequency

salbutamol po

B V 4mg 8 hourly review

Beta-stimulants should NOT be used if the patient has had an ante-partum haemorrhage, because uterine relaxation may exacerbate an abruptio placenta. In patients with cardiac disease or severe anaemia in pregnancy, parenteral beta-stimulants are contraindicated.

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 condition, or her mental state is seriously affected by the pregnancy);
- 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

- Up to 7 weeks since last period: routine dilatation and curettage can be performed safely.
- 7-12 weeks since last period: suction termination can be performed safely.
- After 12 weeks since last period: prostaglandin termination is indicated.

Prostaglandins in the Termination of Pregnancy

- Take blood for haemoglobin and grouping and retain serum.
- Start prophylactic antibiotics:

Drug
Duration

Codes Adult dose Frequency

chloramphenicol iv

B V 1g once only

And **metronidazole pr**

B V 1g twice a day

- Antiseptic cleansing of introitus; pass sterile Cusco speculum; antiseptic cleansing of cervix; pass sterile Foley catheter through os; inflate catheter balloon.
- Use specially prepared dinoprost gel mixture:

Drug	Codes	Adult dose	Frequency	Duration
dinoprost [PGF₂-x] (special) gel	A E		10ml of gel into catheter.	
5mg in 10ml gel + 10ml sodium chloride 0.9%			Inject further 2ml special gel every 2 hours until the catheter drops out (ideally)	

or repeat 10mls special gel mixture after 12 hours.

- Give analgesia and anti-emetics as necessary.
- Once catheter has been passed, start infusing:

Drug	Codes	Adult dose	Frequency	Duration
oxytocin iv	C V	20units in 1L dextrose 5%		

Once foetus has been passed, arrange early evacuation of uterus under general anaesthesia.

Send home on oral antibiotics and oral iron if haemoglobin < 10g/dl.

Counsel for family planning and supply contraceptives.

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:

Drug	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

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

For rape victims:

- Rape victims should also be given antibiotic STD prophylaxis:

Drug	Codes	Adult dose	Frequency	Duration
doxycycline po	C V	100mg	twice a day	7 days

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

DRUGS IN PREGNANCY AND LACTATION

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

General principles

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

Table 4.1 Drugs to be avoided/ used with caution during breastfeeding

Drug	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 doses.
Sulphonamides	Caution – significant risk of kernicterus
Thiazides	Caution. Doses are usually too small (25-50mg) to be harmful. Large doses may suppress lactation.

Table 4.1: Drugs to be used with caution or avoided in pregnancy

Drug	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 drug if possible. See individually listed drugs.
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.

Table 4.1: Drugs to be used with caution or avoided in pregnancy (contd.)

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

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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 *gonorrhoea* and *chlamydia trachomatis*. The two co-exist. Rarely, *Trichomonas vaginalis* causes a urethral discharge in men. All males with urethritis 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. **Treat all contacts.**

■ First Line:

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

■ Alternative:

Drug	Codes	Adult dose	Frequency
Duration			
norfloxacin po	C E	800mg	one dose only
and doxycycline po	C V	100mg	twice a day 7 days

If the patient still has a urethral discharge, or evidence of urethritis 7 days after start of treatment, suspect re-infection or poor treatment compliance. If this is the case, re-start first line treatment. Otherwise refer the patient for investigations and appropriate treatment.

Second Line:

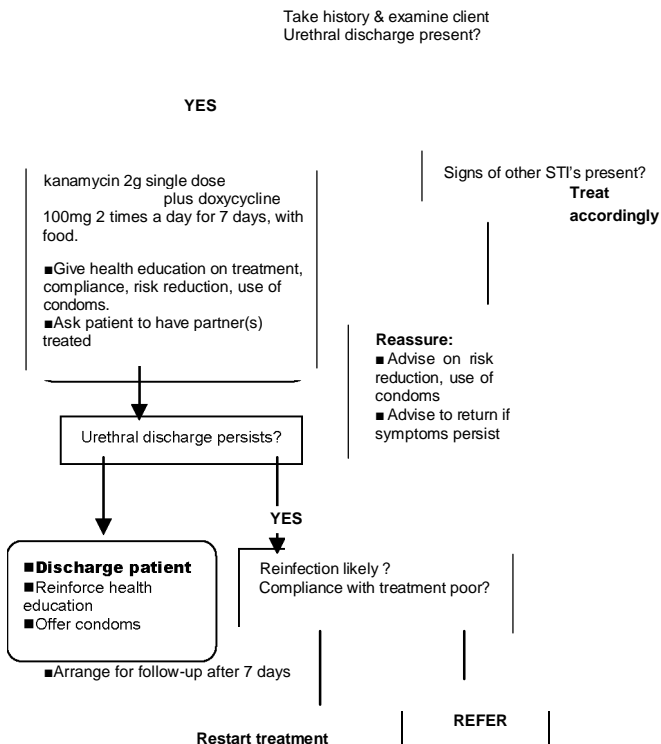
Drug	Dose	Frequency	Duration	Codes	Adult
kanamycin im And					
		CV	2g [1g into each buttock]		one dose
metronidazole po		only			
		CV	2g		

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

Third Line

Drug	Codes	Adult dose	Frequency	Duration
ciprofloxacin po	C V		one dose only	
	500mg			

Flowchart: First line Management of Urethral Discharge in Men



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 with vaginal discharge should be treated for both *gonococcal* and *chlamydial* infection. In addition, depending on the type of discharge, they should be treated for either candidiasis or trichomoniasis.

CAUTION IN PREGNANCY: See chapter Obstetric and Gynaecological Conditions. Doxycycline, norfloxacin and ciprofloxacin should not be used during pregnancy, or in lactating women. In pregnant women chlamydial infection is best treated with erythromycin while kanamycin should be used for gonococcal infection.

First line treatment vaginal discharge

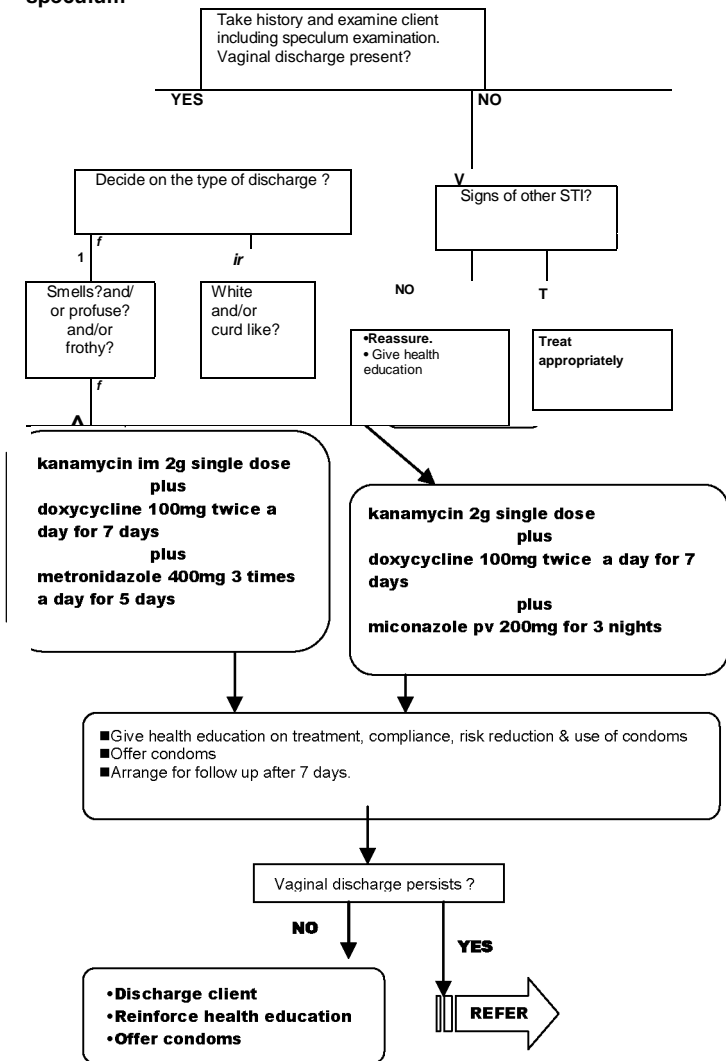
- **Profuse/ purulent/ frothy** vaginal discharge : treat for gonococcal, chlamydial, trichomonal and/or bacterial vaginosis infections:

	Drug Duration	Codes	Adult dose	Frequency
	kanamycin im	C V	2g [1g into each buttock] only	one dose
and	doxycycline po	C V	100mg	twice a day 7 days
and	metronidazole po	C V	400mg	3 times a day 5 days
	alternative to kanamycin is:	(in addition	doxycycline and metronidazole)	
or	norfloxacin po			one dose only
■	White or curd-like	CE	800mg vaginal	patient should be

treated for gonococcal, chlamydial and candidial infections:

	Drug	Codes	Adult dose	Frequency	Duration
	kanamycin im	C V	2g [1g into each buttock] only		one dose
and	doxycycline po	C V	100mg	twice a day	7 days
and	Miconazole pv	C V	200mg	every night	3 days
or	Clotrimazole pv	B E	100mg	Once a day	7 days
	alternative to kanamycin is:				
	norfloxacin po	C E	800mg	one dose only	

Flow chart: First line management of vaginal discharge using a speculum



Second line treatment vaginal discharge:

Check for compliance and re-infection. A speculum examination is necessary, treat accordingly – see flow chart.

Third line treatment vaginal discharge:

Drug	Codes	Adult dose	Frequency
Ciprofloxacin po	C V	500mg	One dose only

Itchy white, flaky vaginal discharge:

- This is due to *Candida albicans* (thrush). Treat with:

Drug	Codes	Adult dose	Frequency
Miconazole cream/pessary	C V	apply	every night 3 nights
or nystatin pessary	B E	100,000U	every night 7 nights
or Clotrimazole pv	BE	100mg	every night 7 nights

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 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 become secondarily infected.

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 soap and water and give the following:

Drug	Codes	Adult dose	Frequency
Duration Erythromycin po days	C V	500mg	4 times a day 14
or Benzathine Penicillin IM	C V	2.4Megauni ts(1.44gm)	Once only night

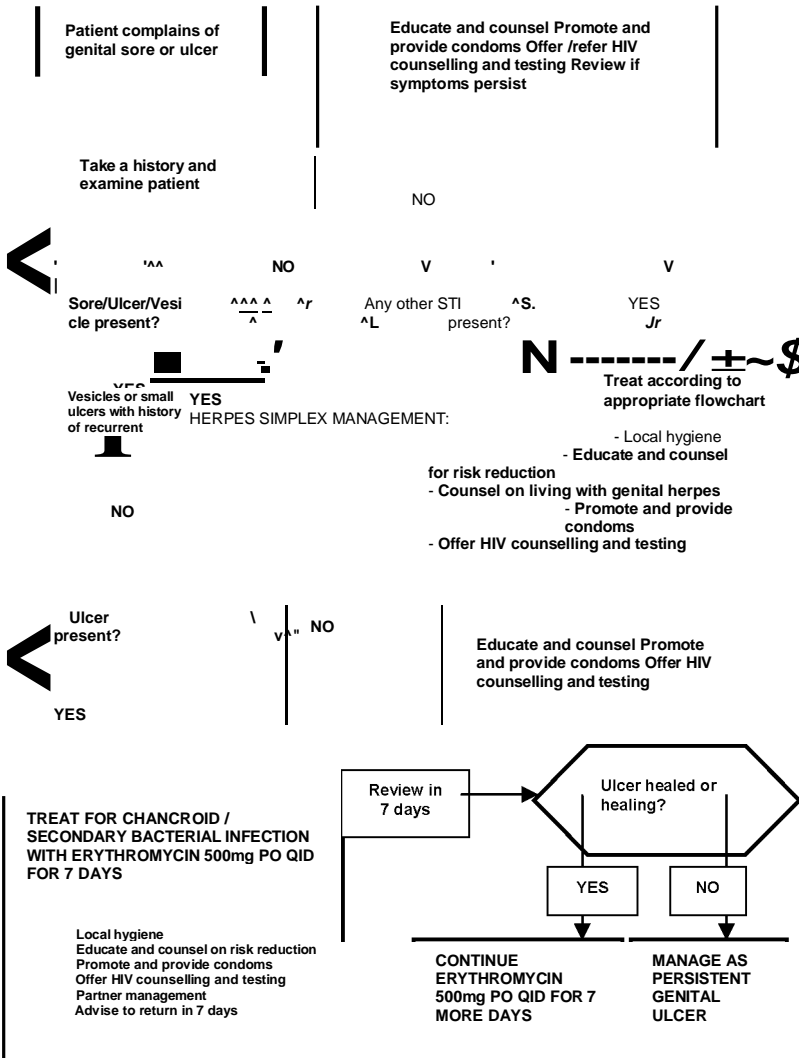
Note: Erythromycin will cover chancroid, syphilis and secondary bacterial infection whereas Benzathine Penicillin covers syphilis only.

Recurrent or vesicular genital lesions

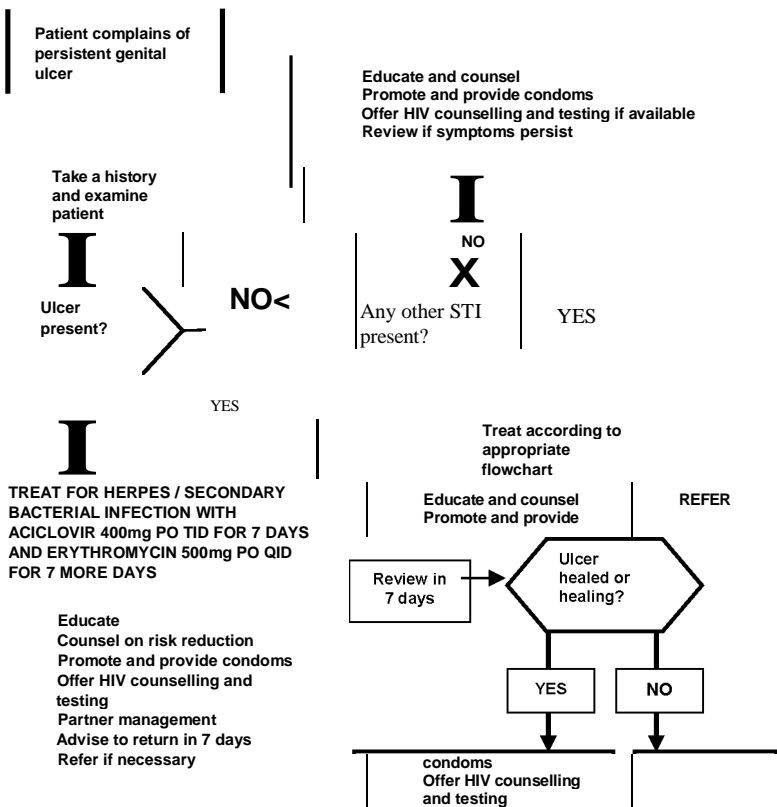
Treat as herpes simplex virus infection as follows:.

Drug	Codes	Adult dose	Frequency
Duration Acyclovir po	B V	400mg	Three times a day 7 days

Flowchart: Management of Genital Ulcers: First Line



Flowchart for the Management of persistent genital ulcers(Men and Women):



Second line: Check for compliance and re-infection.

Third Line:

Drug Duration	Codes	Adult dose	Frequency
ciprofloxacin po	C V	500mg	twice a day 5 days

GRANULATING ULCERS WITHOUT BUBOES

These are most likely to be lesions of granuloma inguinale, a condition also known as Donovanosis and caused by *Calytmato bacterium 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:

Drug Duration	Codes	Adult dose	Frequency
benzathine penicillin im	C V	2.4MU (1.44g) 500mg	one dose only 4 times a day 10 days
and erythromycin po	C V		
■ or, in penicillin allergy	Codes	Adult dose	Frequency
Drug			Duration
erythromycin po	CV		14 days
Second line:	Codes		Duration
Drug		500mg	4 times a day
doxycycline po	C V	100mg	twice a day 10 days

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:	C	V	twice a day	14
Drug	Codes	Adult dose	Frequency	
doxycycline po		100mg	days	

Second line, or in pregnant women:

Drug	Codes	Adult dose	Frequency	
Duration				
erythromycin po	CV	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:

Drug	Codes	Adult dose	Frequency	
kanamycin im	Duration			
and doxycycline	CV	2g [1g in each buttock]	one dose only	
po	CV	100mg	twice a day	10 days

alternative to kanamycin is:

norfloxacin po	C	E	once only	single
	800mg		dose	

Second Line:

Drug	Codes	Adult dose	Frequency	
ciprofloxacin po	C	V	twice a day	5
	250mg		days	

SYPHILIS**Early Syphilis**

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

Drug	Codes	Adult dose	Frequency	
benzathine penicillin im	Duration			
or doxycycline po (in penicillin allergy)	C	V	1.44g [2.4 MU]	one dose
	CV		100mg	2 times a days day
				14

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:

	Drug Duration	Codes	Adult dose	Frequency
	benzathine penicillin im doses	C V	1.44g (2.4MU)	once a week 3
or days	doxycycline po (in penicillin allergy)	C V	100mg	2 times a day 30
or days	erythromycin po (in pregnancy)	C V	500mg	4 times a day 30

RPR diagnosed in pregnant women at clinic level should be referred. 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:

	Drug Duration	Codes	Paed dose	Frequency
	benzathine penicillin im	C V	30mg/kg [=50 000u/kg]	one dose only
or	Congenital Syphilis (babies clinically infected):			
	Drug Duration	Codes	Paed dose	Frequency
	procaine penicillin im 10 days	C V	50mg/kg [=50 000u/kg]	once a day
	erythromycin po (in penicillin allergy)	C V	12.5mg/kg	4 times a day 10

Neurosyphilis:

Drug Duration	Codes	Adult dose	Frequency
procaine penicillin im 21 days	C V	600mg [=1ml in each buttock]	once a day

PELVIC INFLAMMATORY DISEASE

See chapter Obstetrics & Gynaecology

GENITAL WARTS (CONDYLOMATA ACUMINATA)

■ External, Genital, Perianal:

Drug	Codes	Adult dose	Frequency
Duration			
podophyllin paint 20%	B	N	wash off
review		after 4 hrs	once a week

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:

Drug	Codes	Adult dose	Frequency
Duration			
gamma benzene	C V	Wash off	Reapply 7 to 10
days			
hexachloride 1% lotion		after 24hrs	later to kill hatched lice.

*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.*

m Alternative in pregnancy, lactating mothers or children < 6 months:

Drug	Codes	Adult dose
Frequency		
Duration		
benzyl benzoate 25%	B N	apply from once at night 3
nights,		
emulsion *		neck down wash off
next repeat if		
[irritant]		
morning	necessary	
*Dilute with one part water (1:1) for children.		Repeat treatment after
no		
<u>Dilute with three parts water (1:3) for infants.</u>		more than 10 days. ____

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:

Drug	Codes	Paed dose	Frequency
Duration			
kanamycin im	C V	25mg/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

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GENERAL GUIDELINES

These guidelines aim to encourage a consistent clinical management approach and draw a balance between possible interventions and available resources. Further information is available in the HAQOCI standard treatment guidelines as well as in the national Guidelines for the use of Antiretroviral drugs for Zimbabwe. Use the latest guidelines.

Clinical presentation

Presentation 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

The diagnosis of HIV infection should be established beyond doubt by an ELISA test or two rapid tests, wherever possible.

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

Although no cure is available, it is inappropriate for health care personnel to respond to the epidemic of HIV related diseases with helplessness and hopelessness.

The goal should be 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, by helping to delay, prevent and treat (as early as possible) particular life-threatening infections to which people with HIV/AIDS are vulnerable. Antiretroviral(ARV) drugs are now available. Please refer to the HIV/AIDS Quality of Care(HAQOCI) standard treatment guidelines and the national ARV guidelines 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 infected persons continue to lead a normal and productive life. 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 and HAQOCI

management guidelines 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 Clinic is.

The following are fundamental to the management of HIV related illness, but cannot be covered fully here (Refer to the HAQOCI guidelines):

- counselling: pre-testing, post-test, crisis/support;
- health education for prevention of further transmission of HIV, positive living;
- maintenance of good nutrition, vitamin/iron supplements.
- Diagnosis and treatment of OIs
- Use of antiretroviral drugs

Cotrimoxazole prophylaxis:

Cotrimoxazole has been shown to prolong life and reduce hospital admissions in those with symptomatic HIV or AIDS. Prophylaxis should be given to all patients with symptomatic HIV, or who have had an attack of PCP, and to all patients who have had any AIDS defining condition (or have a CD4 count <200), unless allergic.

Drug	Codes	Adult dose	Frequency	Duration
cotrimoxazole* po	C	V	960mg every day	for life
or				until

CD4>200 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.

HIV Related Persistent Generalised Lymphadenopathy (PGL)

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

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

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

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

CAUTION: Neither of these conditions occur exclusively in patients with HIV infection. For example, oral thrush may follow treatment with broad spectrum antibiotics or 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:

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

■ If no improvement OR very ill/toxic:

Drug	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:

Drug	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:

Drug	Codes	Adult dose	Frequency
Duration			
codeine phosphate po	B V	30 - 60mg	≤ 4 times a day
			7 days

Note: codeine phosphate is not considered to be a narcotic, and can be ordered on a regular prescription.

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.

HIV Related Wasting Syndrome (Slim Disease)

DEFINITION: Severe emaciation with recurrent episodes of diarrhoea usually associated with persistent or intermittent fever and positive HIV test. This places the patient in WHO Stage 4 HIV disease and hence patient should be considered for ARVs.

- It is important to exclude treatable conditions, especially TB,

and to treat them appropriately.

- **Emaciation:** encourage a high calorie and protein diet. Add vitamin supplementation:

Drug	Codes	Adult dose	Frequency
nicotinamide po	BE Duration review	50mg	once a day
and pyridoxine po	BE review	25-50mg	once a day
and thiamine po	AN review	50mg	once a day

- alternative:

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

Further Management

- Treat according to results of investigations. Consider trial of TB therapy if clinical suspicion high. Keep referrals to a minimum and only refer if alternative diagnosis is suspected.

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.

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:

Drug	Codes	Adult dose	Frequency
amoxicillin po	C V		3 times a day 7 days
or benzylpenicillin iv/im * (for severe cases)	CV	2.5MU	6 hourly 7 days
or doxycycline po (in penicillin allergy)	CV	100mg	2 times a day 7 days

* Note: May complete course with amoxicillin.

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:

Drug	Codes	Adult dose	Frequency
cotrimoxazole po or	C V	960mg	every day
			for life
			until CD4 >200

HIV Related Headache and Problems of the Nervous System

The symptom of headache is commonly encountered in patients with HIV infection. The cause of this is not clear. Careful evaluation and follow up is required to exclude meningitis and other CNS infections.

Other commonly encountered neurological conditions in HIV infection include AIDS dementia complex, peripheral neuropathy, Guillan-Barré syndrome, facial nerve palsy and stroke.

Headache and meningitis

See the section in Neurological Conditions

AIDS dementia complex

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)

- Give analgesia:

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

- and skin care:

Drug	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

required

Avoid gentian violet as repeated use in this condition may cause keloids.

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:

Drug	Codes	Adult dose	Frequency
Duration			
amitriptyline po	B E	25 mg-75mg	every as required night increased to 150mg if required.
or carbamazepine po	B E	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 **acyclovir** should be considered. (See STI chapter)

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 eg chlorpheniramine **or** promethazine.
- Calamine lotion.

Drug Reactions

These are frequently caused by pyrazinamide, streptomycin, cotrimoxazole and many others.

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

If reaction is severe, give:

Drug	Codes	Adult dose	Frequency
Duration			
prednisolone po	B V	60mg	once a day
then			review,

Reduce slowly as reaction subsides

Kaposi's Sarcoma

Antiretroviral drugs are indicated here but chemotherapy may also be required. Hence KS patients (good general condition, early Kaposi Sarcoma, single lesions) may be referred to central hospital level. Get a tissue diagnosis before referral.

Palliative Care in HIV

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

Antiretroviral drugs(Refer to ARV chapter)

ANTIRETROVIRAL THERAPY

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REFER TO THE NATIONAL ARV GUIDELINES

Appropriate and effective provision of ARVs is complex and needs to be provided by those who have received training in the management of opportunistic infections as well as trained in the use of the antiretroviral drugs. Further details on the use of these drugs is available in the national ARV guidelines. Please refer to those guidelines. Attempts should be made to send healthcare workers to the national OI/ARV training sessions or similar training courses.

In general, it is envisaged that the delivery of ARVs at any hospital will be via their designated OI/ARV clinic or focal person. Comprehensive HIV/AIDS care requires that there be provision of counselling (VCT), laboratory capacity to monitor at least for anaemia, total lymphocyte count (TLC) and liver dysfunction, laboratory capacity to diagnose commonly encountered opportunistic infections such as TB or cryptococcal meningitis. The pharmacy person should also have received the OI/ARV training as they will be required to ensure rational prescribing and proper dispensing of the antiretroviral drugs, taking into account the importance of making certain that their hospital/clinic has adequate ARV drug supplies and that patients receive the appropriate combination of drugs.

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, and
- Improvement of quality of life. Both medical and psychosocial issues need to be addressed prior to starting antiretroviral therapy. Patients should be adequately counseled about appropriate life style measures such as safe sex practices and no alcohol problem, nutrition and adherence prior to commencing

therapy. It has to be clear to the patient that ART is for life and that strict adherence to treatment is necessary for the success of ART.

Medical Criteria for initiating ART in adults/adolescents
The patient should have had a documented positive HIV test and one of the following:

- Patients with WHO clinical stages 3 and 4
- CD4+ lymphocyte count of less than 200
- Patients with a Total Lymphocyte Count (TLC) of less than 1200.

Psychosocial criteria for initiating ART

- demonstration of reliability e.g. compliance with cotrimoxazole prophylaxis, keeping appointments etc
- completion of adherence counselling session(s)
- availability of treatment partner/disclosure to treatment partner
- ease of follow up of the patient

Reasons for deferring ART

Patients may be deferred from starting therapy if:

- They have an intercurrent opportunistic infection e.g. TB
- Patient needs further psychosocial counseling e.g. alcohol problems, needs further information on HIV and AIDS
- First trimester pregnancy
- If they are WHO clinical stages 1 and 2 and have a CD4 count above 200
- Terminal illness

These patients should be offered continued monitoring as well as counseling.

Recommended treatment regimens for adults and adolescents

A large number of drugs and drug combinations have been used in the treatment of persons with HIV infection. The choice of drug regimen has been based on drug availability, cost of medications, side effects and the potential for development of resistance. In the national programme, the following drug combinations are available:

Dual combinations e.g. Stavudine/lamivudine (e.g. Coviro 30 /Coviro 40 /Lamista) Triple or 3-in-1 combination e.g. stavudine/lamivudine/nevirapine e.g. Stalanev 30/40 and Triviro 30/40

First Line Treatment:

For the first 2 weeks:

Drug Duration	Codes	Adult dose	Frequen cy	
Stavudine po 2 weeks	B V	30 -	Twice a	
		40mg*	day	And
Lamivudine po weeks	B V	150mg	Twice a	2
			day	
and Nevirapine po weeks	B V	200mg	Once a	2
			day#	
and Cotrimoxazole**	C V	960mg	daily	2 weeks

***Stavudine 40 mg orally twice daily if body weight is more than 60 kg or 30 mg orally twice daily if body weight is less than 60 kg**

Do not ever start Nevirapine without the gradual introduction. Patients are more likely to develop adverse drug reactions such as Steven Johnson Syndrome or hepatitis if started on the full drug regimen which includes Nevirapine twice a day.

**** Cotrimoxazole prophylaxis should be offered to all starting ART unless they are allergic to it. Ideally it should be started prior to prescribing ART.**

The above should be prescribed as a “starter pack” as follows:

Starter Pack:

Drug Duration	Codes	Adult dose	Frequency	
Dual Stavudine 30 or 40 /Lamivudine po	BV	One tablet	Morning	2 weeks
and Triple Stavudine Evening 30 or 40 /Lamivudine/Nevir apine po	B V	One tablet		
and Cotrimoxazole	C V	960mg daily		2 weeks

After the first 2 weeks, step up as follows (if drugs have been tolerated with no rashes or other adverse effects): Review

Step-up:

Drug	Codes	Adult dose	Frequency	Duration
Triple Stavudine -30 or 40 40mg* /Lamivudine/Nevir apine po	B V	30	Twice a day	2 weeks
and Cotrimoxazole po 960mg	B V		Once a day	Until CD4 above 200

In the event of drug toxicity:

If the patient has drug toxicity, therapy may be altered as follows:

- Change of a single drug in a multi-drug regimen is permitted, i.e., the offending drug may be replaced with an alternative drug of the same class.

If a patient has an adverse reaction to **stavudine**, then this can be replaced with **zidovudine** and vice versa.

If a patient reacts to **nevirapine**, then they can be given **Efavirenz 600mg orally once daily at night**.

For patients with severe peripheral neuropathy:

Consider initiating therapy with zidovudine in place of stavudine.

Second Line Treatment Recommendation for Adults/Adolescents

Treatment failure:

This diagnosis should not be made lightly. Patients that fail to respond to first line treatment should be treated with a different regimen that contains drugs that were **not** included in the first regimen. The second line regimen should only be initiated after consultation with an HIV specialist, as the recommendation will be based on what the patient has already been taking.

Following our current first line therapy, the regimen below is currently recommended

- **Zidovudine 300mg orally twice daily Plus**
- **Didanosine 200mg orally twice daily, Plus**
- **Lopinavir/ritonavir three capsules twice daily**

General Notes about some of the antiretroviral drugs:

1. **Zidovudine and stavudine must not be used together**
2. **Didanosine must be taken on an empty stomach; the patient should not take food two hours before and one hour after taking the medication**
3. **Rifampicin should not be used together with Nevirapine or a protease inhibitor**
4. **Combination products can enhance adherence by reducing the pill burden .**
5. **Women on Efavirenz should avoid pregnancy by using effective contraception.**

Use of ARVs in patients with TB

Tuberculosis is the commonest opportunistic infection encountered among persons with HIV infection in Zimbabwe. Rifampicin interacts adversely with some antiretroviral agents such as protease inhibitors and non-nucleoside reverse transcriptase inhibitors such as Nevirapine.

Patients with TB who are not yet on ART:

In patients with HIV-related TB and who are not yet on ART, TB treatment takes priority. Antiretroviral drug therapy should be deferred until the intensive phase is completed. If the CD4 count is very low (<50), ART should be commenced using an Efavirenz based regimen if rifampicin is being used.

Patients who develop TB when already on ART:

Treat TB in the standard way. Change Nevirapine to Efavirenz during the intensive phase. Switch back to the Nevirapine during the continuation phase.

ART In Paediatrics

Our current fixed drug combinations are not suitable for children as splitting the doses results in inadequate dosing of some of the components. Thus ART in children needs to be carefully thought out and the individual drug component dosages i.e. the stavudine/ lamivudine and nevirapine need to be calculated carefully (See national ARV guidelines).

ART in Pregnancy

Pregnant women should be assessed for ART using the same criteria as for non-pregnant women. If the mother needs therapy herself, she should be treated as per national ARV guidelines. Those who are not yet to be started on ART should undergo the PMTCT programme.

PPTCT

Refer to national guidelines

TUBERCULOSIS

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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 Welfare'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
- 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

■ 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 Health Care Worker or a trained member of the community.

DOTS = Directly Observed Treatment Short Course

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.

PREVENTION

Primary prevention

- BCG vaccination is given at birth or at first contact with the child after birth.
- 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). BCG vaccine should be given to all babies, even those born to mothers known to be HIV positive unless babies have clinical signs of HIV infection.

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:

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

Secondary prevention

If parents are found to be sputum positive, 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:

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

*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.

CASE MANAGEMENT

Diagnosis

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.

The sputum of smear positive PTB patients **MUST** be sent to the TB Reference Laboratory if:

- there is concern that during treatment drug resistance has developed, or
- there is a history of previous treatment, or
- sputum conversion has not occurred after 4 months of treatment for category 1 patients and 5 months of treatment for category II patients.

Chest X-Rays

Indications for chest x-rays

- 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

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

Tuberculin Testing

Use Mantoux test only:

Drug	Codes	Dose	Frequency
Duration			
tuberculin, purified (PPD) 1:1000 intradermal	B N	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.

DRUG REGIMENS FOR TUBERCULOSIS

Two main treatment categories are now used in Zimbabwe, each with its own regimen. The regimens consist of a combination of five first line drugs.

- 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 Drug Abbreviations

H= isoniazid	Z= pyrazinamide
R= rifampicin	S= streptomycin
E= ethambutol	

No ethambutol or streptomycin should be given to children less than 10 years old, or to pregnant women.

Trial of TB treatment

Trial of TB treatment is discouraged as a first intervention. A definitive diagnosis must be made on the basis of history taking and examination. See the TB Manual for more information on trial of therapy, but note that monotherapy (use of only one TB drug) should always be avoided, and trial of TB treatment should only be initiated after treatment with an antibiotic has been given and other tests undertaken.

Adverse Drug Reaction:

Stop all TB drugs and assess. If necessary evaluate the liver function. Then reintroduce one drug 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 drug 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 200mg Day 5
 Isoniazid 300mg
 Day 6 Isoniazid 300mg + Streptomycin 125mg
 Day 7 Isoniazid 300mg + Streptomycin 250mg *etc*

CATEGORY I

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

Adults:

Intensive phase: 2HRZE

- Continuation phase: 4HR if DOTS OR (6HE For patients on a nevirapine-based ARV regimen who cannot wait until the end of treatment)

Children <10 years:

- Intensive phase: 2HRZ
- Continuation phase: 4HR (or 6HE for patients on nevirapine-based ARVs

In children under 10 years, no streptomycin should be given except for TB meningitis. Ethambutol is now recommended for children of all ages on retreatment.

Streptomycin can replace ethambutol in the intensive phase.

General notes: Category I

- In smear positive cases, if the sputum is still smear positive at the end of two months, the intensive phase is extended for a maximum of one more month.
- The continuation phase can be started when the sputum becomes negative before the end of the 4-week period. Commence the continuation phase after four months regardless of sputum status.
- Sputum testing should be sent to the National TB Laboratory for culture and sensitivity testing if still smear positive after five months of treatment. If the patient's sputum remains smear positive after five months of treatment (treatment failure) Category II treatment should be commenced.

- Patients with tuberculous meningitis or pericarditis, disseminated or spinal disease with neurological complications should be given 6HR (continuous phase) i.e. 6 months of isoniazid and rifampicin under direct observation.

CATEGORY II

All **re-treatment** of any form of TB.

Adults:

- Intensive phase: 2SHRZE + 1HRZE (DOTS)
- Continuation phase: 5HRE [DOTS]

Children:

- Intensive phase: 3HRZ (DOTS)
- Continuation phase: 5HR [DOTS]

General notes: Category II

- These patients must be suspected of having drug-resistant strains. **The re-treatment regimen is the last opportunity for the patient to be cured.** It is advisable to admit the patient for supervised treatment at a designated centre (Harare or Bulawayo) A pre-treatment sputum specimen must be submitted for culture and drug susceptibility testing.
- Because of the increased risk of multi-drug-resistance (resistance to at least isoniazid (H) and rifampicin(R)), treatment must be fully supervised for the full course. Duration of course: 8 months.
- Take monthly sputum specimens for monitoring purposes up to the end of treatment (8 months).
- If the sputum is smear positive at three months (12 weeks), the four oral drugs are continued daily for another month.
- If the patient is still smear positive at the end of four months, all drugs should be stopped for three days and a sputum specimen sent to the National Reference Laboratory in Bulawayo for culture and susceptibility testing. The patient should then be started on the continuation phase. Further extension of the continuation phase will not increase the chances of cure.
- Patients who remain smear positive after the end of the fully supervised continuation phase will derive no benefit from

another re-treatment regimen, and should be classified as chronic cases.

Chronic cases

These are patients who remain (or again become smear positive) after completing a fully supervised re-treatment regimen.

No standard regimen exists for these patients. There is every likelihood of multi-drug resistant tuberculosis (MDR-TB). In the best of situations, cure rates for MDR-TB cases are between 40-60%, the same as for untreated sputum positive PTB. So-called second line drugs are very expensive, generally more toxic, and are not as effective as first line drugs. Because their management is so problematic, chronic cases should be referred to designated specialist centres such as Beatrice Road Infectious disease Hospital, Harare or Thorngrove Hospital, Bulawayo.

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

DAILY DOSES BY WEIGHT – CATEGORY I

Table 8.1 Intensive phase (2 months)

(pre-treatment) weight	Ethambutol (E) 400mg tab	Isoniazid (H) 100mg tab or suspension	Rifampicin (R) 150mg tab or 100mg/5ml syrup	Pyrazinamide (Z) 500mg tab or suspension
5-10kg	n/a	50mg	75 mg	250mg
11-20kg	n/a	100mg	150mg	500mg
21-30kg	n/a	200mg	300mg	1000mg
31-<33kg	800mg	200mg	300mg	1000mg
33-50kg	800mg	300mg	450mg	1500mg
> 50kg	1200mg	300mg	600mg	2000mg

Table 8.2 Continuation phase – DOTS assured (4months)

(pre-treatment) weight	Isoniazid (H) 100mg tab or suspension	Rifampicin (R) 150mg cap or 100mg/5ml syrup
5-10kg	50mg	75 mg
11-20kg	100mg	150mg
21-30kg	200mg	300mg
31-<33kg	200mg	300mg
33-50kg	300mg	450mg
> 50kg	300mg	600mg

Table 8.3 Continuation phase - DOTS not assured (6 months)

(pre-treatment) weight	Isoniazid (H) 100mg tab	Ethambutol (E) 400mg tab
31-<33kg	200mg	800mg
33-50kg	300mg	800mg
> 50kg	300mg	1200mg

DAILY DOSES BY WEIGHT – CATEGORY II

Table 8.4 -Adult Intensive Phase (4 months)

	Month 1 only	Months 1, 2, 3 and 4			
	Streptomycin * (S) 1gm injection	Isoniazid (H) 100mg tabs	Rifampicin (R) 150mg caps	Pyrazinamide (Z) 500mg tabs	Ethambutol (E) 400mg tabs
31-<33kg	500 mg	200mg	300mg	1000mg	800mg
33-50kg	750 mg	300mg	450mg	1500mg	800mg
>50kg	750mg	300mg	600mg	2000mg	1200mg

**Do not exceed 750mg streptomycin in pt's over 50years.*

Table 8.5 – Paediatric Intensive Phase (3 months)

	Isoniazid (H) 100mg tabs	Rifampicin (R) 150mg caps	Pyrazinamide (Z) 500mg tabs
5-10kg	50mg	75mg	250mg
11-20kg	100mg	150mg	500mg
21-30kg	200mg	300mg	1000mg

Table 8.6 - Continuation Phase (5 months)

	Isoniazid (H) 100mg tabs	Rifampicin (R) 150mg caps	Ethambutol (E) 400mg tabs
5-10kg	50 mg	75mg	n/a
11-20kg	100mg	150mg	n/a
21-30kg	200mg	300mg	n/a
31-<33kg	200mg	300mg	800mg
35-50kg	300mg	450mg	800mg
>50kg	300mg	600mg	1200mg

Intermittent therapy

It is intended in the future to introduce intermittent therapy for TB. Isoniazid, rifampicin, pyrazinamide and streptomycin are all as efficacious when given intermittently (2-3 times a week) as when given daily. There are however certain precautions that must be ensured before this is implemented, and the TB Control Programme / MoHCW will advise on this change.

Fixed dose combination tablets

Fixed dose combination tablets may soon be available. 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 drug resistance developing.

Doses using these tablets are the same as for separate tablets, but care must always be taken and the labels carefully read. Again, the TB Control Programme will give more advice when these tablets are available, and information is in the TB Manual .

TB and HIV Co-infection

Refer to the current national ARV guidelines as well as the TB manual. Also refer to the ARV chapter in this EDLIZ.

TROPICAL DISEASES

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Anthrax (cutaneous)

Case definition: an acute bacterial disease caused by Bacillus anthracis (Gram-positive). It is manifested at first by itching of an exposed skin surface, followed by a painful lesion which becomes papular, then vesiculated and eventually develops into a depressed black eschar in 2-6 days.

Initial treatment, in severe cases:

	Drug	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
days					7-10

Less severe cases:

Drug	Codes	Adult dose	Frequency	Duration	
doxycycline po	C	V	200mg first dose, then 100mg	once daily	7 days

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 – 6th day, initially on the upper trunk followed by a spread to the entire body but usually not to the face, palms or soles.

Drug	Codes	Adult dose	Frequency	Duration	
doxycycline po	C	V	200mg first dose, then 100mg	once daily	7 days

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:

Drug	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, ie:

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

Drug	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:

Drug	Codes	Adult dose	Frequency
Duration			
rabies vaccine (human diploid cell) im (upper arm site) Days 7	B V	0.5ml in one dose	on Day 0
		each arm	
	then	0.5ml in	one dose on
		one arm	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, ie:

- skin not broken or other contact (eg. with infected meat)
- bite from domestic animal immunised against rabies

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

Minimal - no risk

In previously vaccinated individuals give a single booster dose of rabies vaccine.

BILHARZIA (SCHISTOSOMA MANSONI & HAEMATOBIMUM)

General Guidelines

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.

Treatment:

Drug Duration	Codes	Adult dose	Frequency
praziquantel po	C E	40mg/kg	one dose only

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.

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:

Drug Duration	Codes	Adult dose	Frequency
praziquantel po repeat after	C E	40mg/kg	one dose 2 weeks
and prednisolone po 5mg	B V	50mg, once a day, reducing by	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

Drug Duration	Codes	Adult dose	Frequency
albendazole po	C E	400mg <2yrs = 200mg	one dose only

Tapeworm and Strongyloides

Drug Duration	Codes	Adult dose	Frequency
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")

Drug Duration	Codes	Adult dose	Frequency
albendazole po	C E	400mg	one dose only

Cysticercosis and Neurocysticercosis

Specialist inpatient treatment is required.

Drug Duration	Codes	Adult dose	Frequency
praziquantel po 15 days	C E	17mg/kg	3 times a day
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:

Drug	Codes	Adult dose	Frequency
Duration			
albendazole po	C E	3mg/kg	3 times a day
days, then			30

wait 15 days (drug free). Then repeat the cycle 4 times.

Monitor progress with ultrasound and/or X-ray.

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:

Drug	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	6 hourly 10 days
		Paed = 6.25-12.5mg/kg	

Prophylaxis whilst nursing & contacts:

Drug	Codes	Adult dose	Frequency
Duration			
doxycycline po	C V	100mg	2 times a day
days			10

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

A 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.

Drug	Codes	Adult dose	Frequency
BCG vaccine	C V	see section on Immunisation	

Treatment of Paucibacillary Patients

Drug	Codes	Adult dose	Frequency	Duration
dapsone po	B V	100mg	once a day	6 months
		Paed = 1-2mg/kg		
and rifampicin po - supervised dose	B V	600mg	once a month	6 months
		Paed = 10-15mg/kg*		

* 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 or relapse and reaction, and request them to come back immediately.

- Lepromatous or borderline lepromatous patients who return not showing any improvement or with evidence of deterioration will need an additional 12 months of MDT for multibacillary leprosy.
- Review patients regularly for 12 months to diagnose deterioration as early as possible.

Treat with:

	Drug 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	once a month	12 months

Not less than 150 mg o rifampic =10-15mg/kg n.

MDT should be supplied in 28-day blister packs for ease of ordering and to avoid drug 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 drugs 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:

Drug	Codes	Adult dose	Frequency	Duration
aspirin po	C V	600mg	4 times a day	1-2 weeks

If there is no improvement consider treatment with corticosteroids. If there is evidence of neuritis (tender

nerves, nerve deficit) use corticosteroids as below. Do not wait for nerve damage to appear as it may be too late for function to return.

Severe Reversal Reaction

A reaction in which there is also new nerve damage with loss of sensation and /or motor function in hands, feet or eyes.

'New' implies additional to what the patient already had at registration or developed within the last 6 months.

Admit to hospital. Treat with corticosteroid:

Drug	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. The full dose of antileprosy drugs should be continued in addition to the treatment of the reaction.

Mild Type II Reaction

Drug	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:

Drug	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:

Drug	Codes	Adult dose	Frequency	Duration
clofazimine po	A N	100mg	3 times a day	2 months
	then	100mg	2 times a day	2 months
	then	100mg	once a day	6 months

Refer all patients developing abdominal complaints (pain, constipation, distension).

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 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 251647.

NOTIFIABLE DISEASES

Chicken pox

Diphtheria

Erysipelas

Pyæmia and septicaemia (puerperal)

Scalatina (scarlet fever)

Typhus fever

Plague

Cholera

Typhoid or enteric fever (including para-typhoid fever)

Undulant or Malta fever

Epidemic cerebrospinal meningitis (or cerebrospinal fever or spotted fever)

Acute poliomyelitis (or infantile paralysis)

Leprosy

Anthrax

Glanders

Rabies

Trypanosomiasis (sleeping sickness)

All forms of Tuberculosis

Ebola or any hæmmorrhagic fever diseases

Measles

All such other infectious or communicable diseases as the Minister of Health & Child Welfare may declare by statutory instrument, to be infectious diseases throughout or in any part of Zimbabwe.

MALARIA

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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 only with *F.falciparum* and usually in young children, pregnant women, debilitated persons, adults in epidemic prone areas and people moving from areas of no malaria to areas with malaria including immune-suppressed patients.
- Malaria usually occurs 1-6 weeks after a bite by an infected anopheles mosquito. So it is important to take a good history and to always ask about travel and self-medication.

General notes on drug dosages:

All **chloroquine** doses are expressed as chloroquine base. 150mg of chloroquine base is equivalent to 200mg of chloroquine sulphate and is equivalent to 250mg chloroquine phosphate.

All **quinine** doses are expressed as quinine salt (this is different from chloroquine). Quinine sulphate, quinine dihydrochloride, quinine hydrochloride all contain practically the same amount of quinine- i.e. 600mg of quinine dihydrochloride is equivalent to 600mg of quinine sulphate.

DRUG PROPHYLAXIS

No drug gives 100% protection against malaria, but drugs do reduce the risk. Health education on non-pharmacological means of prevention is extremely important e.g. selective spraying, use of mosquito coils, repellents, insecticide-treated mosquito nets, appropriate protective clothing.

Drug prophylaxis is recommended for the following categories of people:

- All persons travelling from a non-malaria area to a malaria area. (e.g. people from cities or the highveld visiting low-lying areas).
- Persons with sickle cell anaemia or splenectomy living in or visiting a malaria area.
- Pregnant women in regions of potentially year round malaria and essentially seasonal malaria.

Malaria drug prophylaxis should be commenced 1-7 days before entering the malarial area and be continued for 4 weeks after leaving the malarial area, and should be taken same day of the week.

Malaria prophylaxis for:

- persons travelling from a non-malaria area to a malarial area, and
- persons with sickle cell anaemia / splenectomy living in or visiting a malarial area:

Pyrimethamine and dapsone remains the drug combination of choice for malaria prophylaxis in Zimbabwe.

Drug	Codes	Adult dose	Frequency	Duration	
pyrimethamine /dapsone 12.5mg/100mg po	CE	one tablet	once a week		
		Children*		1 week before entering, + duration of stay + 4 weeks after leaving the area.	
		6 weeks - 1 year	2.5ml syrup	once a week	
		1- 5 years	¼ tablet	once a week	
		6 - 11 years	½ tablet	once a week	

**Note: not recommended in infants under 6 weeks.*

Available tablets = 12.5mg pyrimethamine + 100mg dapsone
 tablet and the syrup = 3.125mg pyrimethamine + 25mg dapsone
 5ml. per per

Those intolerant to pyrimethamine and dapsone should take:

Drug	Codes	Adult dose	Frequency	Duration
proguanil po and chloroquine po	B V	200mg	300mg base	once a week
				*1-7 days before entering, + duration of stay + 4 weeks after leaving the area, on <u>same day of the week.</u>

NB: must be given together

Table 10.1: Age specific doses for proguanil/ chloroquine regimen:

	Dose of Chloroquine base per week (150mg base tablets and 50mg base/5ml syrup)	Dose of Proguanil per day (100mg tablets)
Under 1 year	50mg (1/3 tablet or 5ml)	25mg (1/4 tablet)
1-4 years	75mg (½ tablet or 7.5ml)	50mg (½ tablet)
5-8 years	150mg (1 tablet or 15ml)	100mg (1 tablet)
9-12 years	225mg (1 ½ tablets or 20ml)	150mg (1½ tablets)
over 12 years	300mg (2 tablets)	200mg (2 tablets)

Malaria prophylaxis for:

- **pregnant women in regions of potentially year round and essentially seasonal endemicity**

Chemoprophylaxis in Pregnancy -
Intermittent Presumptive Therapy (IPT)

Timing	At ANC Booking	26-28 Weeks	34-36 Weeks
Drugs	3 tablets sulphadoxine-pyrimethamine and a chloroquine course	3 tablets sulphadoxine-pyrimethamine and a chloroquine course	3 tablets sulphadoxine-pyrimethamine and a chloroquine course

N.B: 1. The doses of IPT should be at least 4 WEEKS apart.

2. Use of Pyrimethamine

Pyrimethamine/Dapsone (Malasone) is not recommended in pregnant women

Malaria prophylaxis for:

- **visitors from outside the country**

May continue with the prophylaxis recommended to them before coming to Zimbabwe.

TREATMENT OF MALARIA

Malaria blood slides **MUST** be taken in the following cases:

- Patients with severe/ complicated malaria.
- Patients with treatment failure.
- All referrals.

*Note: Pregnant women diagnosed with malaria **must** receive drug therapy immediately. Although quinine is potentially teratogenic, the benefit of giving quinine therapy far out weighs any risk.*

Uncomplicated malaria

Recent national annual malaria reports in Zimbabwe show that there has been some decrease in the effectiveness of chloroquine. Therefore the recommended initial treatment for uncomplicated malaria is the “free combination” therapy chloroquine(CQ) and sulphadoxine-pyrimethamine (SP).

This is an interim treatment policy. The proposed and preferred long term first line treatment of uncomplicated malaria is the artemisinin combined therapies such as Artemether-lumefantrine.

- Give the following treatment immediately:

First Line Therapy – “Free Combination” Therapy

Age	Stat Doses		After 6 hours	Day 2	Day 3
	SP	CQ	CQ only	CQ only	CQ only
Adult	3 tabs	600 mg (4 tab)	300mg(2 tab)	300mg(2 tab)	300mg (2 tab)
10+yrs &>60k g	3 tabs	600 mg (4 tab)	300 mg (2 tab)	300 mg (2 tab)	300 mg (2 tab)
10 +yrs & <60 kg	2 tabs	450 mg (3 tab)	150 mg (1 tab)	150 mg (1 tab)	150 mg (1 tab)
7 - 10	1½ tabs	450 tab (tab)	150 mg (1 tab)	150 mg (1 tab)	150 mg (1 tab)
4 - 6	1 tab	300 mg (2 tab)	150 mg (1 tab)	150 mg (1 tab)	150 mg (1 tab)
1 - 3	½ tab	150 mg (1 tab) or	75 mg (1/2 tab) or 7.5 ml	75 mg (1/2 tab) or 7.5 ml	75 mg (1/2 tab) or

		15 ml			7.5 ml
< 1 year	1 ½ tab	75 mg (1/2 tab) or 7.5 ml	37.5 mg (1/4 tab) Or 3.75 ml	37.5 mg (1/4 tab) Or 3.75 ml	37.5 mg (1/4 tab) Or 3.75 ml

**Caution: Known to cause serious adverse effects, (although rare) Stevens-Johnson syndrome, in those patients sensitive to sulphur drugs.*

N.B:

1. If the stat dose of SP and CQ 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 quinine.
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.

Coartem -Artemether-Lumefantrine(1.5mg/12mg/kg):

To be given as a 6 dose course twice a day for 3 days as follows:

Dosage	Day 1		Day 2		Day 3	
Weight	Start Dose 8hrs*	After	AM PM	AM PM	AM PM	AM PM
5- 14 kgs	1	1	1	1	1	1
15 - 24kgs	2	2	2	2	2	2
25- 34kgs	3	3	3	3	3	3
35kgs and adults	4	4	4	4	4	4

Note:

- ***Strictly after 8 hours.**
- **Parasitological proof of malaria by blood slide or rapid diagnostic test(RDT) is desirable whenever Artemisinin based combination is used.**

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. drug being vomited within 1/2 hour or failure to complete the treatment.
- Presence of undetected severe and complicated malaria.
- Malaria parasite resistance (known or suspected) to the given drug.

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 – Oral Quinine + Doxycycline

7 Day Quinine Course				
Drug	Codes	Dose	Frequency	Duration
Quinine tablets	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 (Adult)				
Quinine	B V	600 mg	Every 8 hours	5 days

Doxycycline* 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. In children a single dose of S/P is given immediately after completing 5 days of quinine.

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,
- persistent vomiting,
- the slightest sign of alteration in consciousness which may indicate cerebral malaria (refer to the Coma Scale).

Complications include any of the following:

- Cerebral malaria
- Bleeding tendencies
- Severe anaemia (Hb<or=6g/dl)
- 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 drug of choice is quinine.

Parenteral therapy must be commenced at primary level either by IM administration or, if it is practical, by IV infusion before the patient is referred. In both cases treatment is initiated by a loading dose.

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).

Drug Duration	Codes	Adult dose	Frequency
quinine infusion in 5% dextrose <u>(max loading dose = 1200mg)</u>	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 total of 48 hours of therapy from start.
then reduce to		5mg/kg	

**Note: Change to oral therapy if the patient can swallow. Give the equivalent dose of quinine salt orally to complete 7 days of treatment. Or give a full course of e.g Coartem.*

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:

Drug Duration	Codes	Adult dose	Frequency	
quinine im * 3 doses,	B V	10mg/kg	every 4 hrs	for
			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. (An alternative to using doxycycline is to add sulphadoxine /pyrimethamine at the end of the treatment).

**IM quinine should be diluted as follows:*

Dilute the quinine with water for injection. Draw 8ml of water for injection into a 10ml syringe, 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

Alternative dose regimen:

Quinine 20mg salt/kg on admission(IV infusion over 4 hours or IM) and then 10mg/kg 12 hourly.

General measures

- Coma: maintain airway, nurse on side, 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.

RESPIRATORY CONDITIONS

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ACUTE RESPIRATORY INFECTIONS IN ADULTS

Outpatient management

For acute respiratory infections in children see the paediatrics chapter.

Common cold, influenza and acute bronchitis ('cough')

No antibiotics are required. Treat symptomatically.

Other respiratory infections (Including pneumonia and other severe lower respiratory infections)

- The approach to management does **not** depend on HIV status. Take a history of the duration of symptoms, sputum production (colour, blood, volume) night sweats, pyrexia, etc. Consider tuberculosis in the diagnosis if symptoms for more than three weeks. A chest x-ray may be required.
- If tuberculosis is **unlikely** and the patient's condition does not warrant admission, treat the infection with:

Drug	Codes		Adult dose	Frequency	Duration
Amoxicillin	C	V	500mg	Three times a day	7 days + review
If sensitive to Penicillin use Erythromycin	C	V	500mg	Four times a day	

- If tuberculosis **likely** arrange a sputum examination and plan a review in one week.

On re-assessment with no clinical improvement **refer** to district level. The three commonest diagnoses will be:

- **Pneumonia** - non-responding segmental / lobar(See section on inpatient management)
- **Tuberculosis**
Repeat sputum 3 times if necessary. Refer to the chapter on tuberculosis for treatment protocols.
- **Pneumocystis Pneumonia (PCP)**
Patients are breathless and possibly cyanosed with few or no chest signs. Their x-ray typically reveals bilateral fine mid-zone infiltrates. Frequently there are other signs of immuno-suppression.

Manage with:

Drug	Codes	Adult dose	Frequency
Duration cotrimoxazole po 21 days	C V	1920mg (4 tabs)	3 times a day

- or in sulphonamide allergy:

Drug	Codes	Adult dose	Frequency
Duration clindamycin po	B V	600mg	4 times a day
And primaquine po	B N	15mg	once a day

21 days

- If any tachypnoea or cyanosis is present, **add:**

Drug	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 for life or CD4 count >200 with ART. This also applies to any other patients with AIDS defining disease. If they are allergic, try cotrimoxazole desensitisation

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

- If still no response, consider malignancy e.g.Kaposi's sarcoma.

Inpatient management

Consider admission if patient is obviously unwell, or in severe pain.

Admission and close monitoring is mandatory if:

- respiratory distress
- cyanosed
- pulse >125/min
- hypotensive (systolic < 90mmHg)
- temperature > 40oC or < 35oC
- altered mental state

Pneumonia - segmental/ lobar (usually pneumococcal)

Drug	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

m If not improved in 48 hours review diagnosis (consider tuberculosis or a complication of pneumonia e.g. lung abscess) and change to:

Drug	Codes	Adult dose	Frequency	Duration
erythromycin po	C V	500mg	4 times a day	7 days

Pneumonia - Staphylococcal

Drug	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

Drug	Codes	Adult dose	Frequency	Duration
gentamicin iv	B V	120mg	12 hourly	10-14 days
And chloramphenicol iv	B V	500mg	6 hourly	10-14 days

or based on culture and sensitivity.

Lung abscess

■ Postural drainage is mandatory, **plus**

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

continue until no longer toxic +/- 7 days, then complete treatment as out patient for 4-6 weeks with oral **amoxicillin 500mg three times a day.*

Empyema

■ Drain pleural space with a **large intercostal tube and underwater seal.**

Drug	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

Note: If still draining pus after two weeks refer for surgical opinion.

m If preceded by a suspected *staphylococcal* pneumonia use:

Drug	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			

Hospital Acquired Infections (Nosocomial)

- Pneumonia presenting 7 or more days after admission:

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

or based on culture & sensitivity.

OTHER COMMON RESPIRATORY INFECTIONS

Chronic Bronchitis and/ Emphysema

There are many aspects of management:

- Stop smoking and/or remove from hazardous (dusty)

environment.

- Prompt treatment of infective exacerbations:

Drug	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:

Drug	Codes	Adult dose	Frequency
Duration			
salbutamol inhaler	B E	100-200mcg	as needed check technique

- If dyspnoea is severe:

Drug	Codes	Adult dose	Frequency	Duration
salbutamol nebulised	B V	5mg	6 hourly	
and prednisolone po	B V	30mg	once a day	up to 14days

- controlled oxygen therapy - 2 litres/minute by nasal prongs or 28% ventimask (Avoid higher concentrations of oxygen unless

access to blood gas analyser),

- physiotherapy.

Bronchiectasis

- Treat as above. Refer to physiotherapist for postural drainage. Severe and or persistent infections may need gentamycin intravenously and other antibiotics.
- Haemoptysis usually responds to antibiotics.

ASTHMA

Management Guidelines

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. Infants under 18 months, however, may not respond well to bronchodilators. Details of asthma drug treatment in children are given after that of adults below.

The aim of maintenance therapy is to minimise symptoms and to prevent acute attacks. If frequent severe attacks continue to occur, then the maintenance therapy is inadequate. Some patients may have infrequent symptoms. Patients requiring permanent or frequent intermittent therapy with bronchodilators need steroids. They must always have a supply of prednisolone tablets available to restart treatment at the first sign of symptoms returning.

Inhalers

- Some patients with chronic asthma will require inhalers. They are expensive. 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 inhaler making sure it fits tightly. Give one puff into the spacer and allow normal breathing for 30 seconds through the other end. All medical 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.

The asthma score is obtained by adding the 'symptoms score' (A) to the 'frequency of use of bronchodilator' score (B) in the table below. The maximum score that can be obtained is 8.

Degree of severity	Score (A+B):
Mild asthma	0-3
Moderate asthma	4-6
Severe asthma	7-8

Table 11.1: Asthma Score Chart

Score A	Symptoms (Frequency of attacks of tight chest, cough or wheezing)
4	Waking up at night more than twice a week
3	Daily, but not at night
2	Not daily but more than once a week
1	Less than once a week, or on exercise
0	None for 3 months
Score B	Frequency of use of bronchodilator
4	More than 4 times a day
3	1-4 times daily
2	Less than once a day
1	Less than once a week
0	None for 3 months

Maintenance Therapy - Adults

Mild Asthma

- A bronchodilator is the drug of choice. It may be used intermittently as needed or on a regular basis. Salbutamol is generally better than theophylline.
- Mild chest tightness occurring no more than once a day or only with exercise may be relieved by use of a bronchodilator.
- May require prednisolone to be added following 'colds' etc. which may precipitate acute attacks.

	Drug	Codes	Adult dose	Frequency
	salbutamol inhaler	BE	100–200mcg	as needed, or before exercise
or	salbutamol po	B V	4mg	up to 4 times a day
or	theophylline po	CE	100-200mg notes	2-3 times a day see notes

Moderate Asthma

- The ideal treatment should always include inhaled steroids (beclomethasone) with courses of oral steroids (prednisolone) for exacerbations.
- Associated bronchospasm is treated by salbutamol (inhaled and/or oral). If salbutamol is required more than twice a day or there is frequent night-time waking, an increased dose of inhaled steroids is required.
- Combined use of salbutamol and theophylline may be effective in some patients, although side effects sometimes may be troublesome.
- Always check inhaler technique.

	Drug Duration	Codes	Adult dose	Frequency
	beclomethasone continual inhaler 100mcg/puff	B	E 200-400mcg	2 times a day
And	salbutamol Inhaler	B	E 100-200mcg	as required continual
+/-	salbutamol po	B	V 4mg	3 times a day continual
+/-	theophylline po	C	E 200mg	2-3 times a day continual day

- Add a course of prednisolone if required:

	Drug Duration	Codes	Adult dose	Frequency
And week,	prednisolone po	B	V 30mg	once a day one (morning) or at least until chest clears*

**If the course is needed for more than a week, tail off the dose over 10 days.*

- m** If beclomethasone is used and is not controlling the asthma add:

Drug Duration	Codes	Adult dose	Frequency
prednisolone po continuous	B	V 2.5 - 10mg	once, in the morning

Severe Asthma

If response is still not adequate and the inhaler technique is good:

Drug	Codes	Adult dose	Frequency
beclomethasone Duration continual inhaler 100mcg/puff	B E	400mcg	2- 4 times a day
and prednisolone po continual	B V	2.5 - 10mg	once a day
		using the lowest effective dose possible	(morning)
and salbutamol inhaler required	B E	100-200mcg	as required as required
+/- salbutamol po	B V	4mg	3 times a day -
+/- theophylline po	C E	200mg	2-3 times a day continual day

Nocturnal Asthma

- Patients whose sleep is regularly broken should be advised to take their medication on going to bed.
- If oral theophylline has not been used its addition may be highly beneficial.

Repeated Attacks of Asthma Requiring Hospital Treatment

These patients should already be on prednisolone. They should also be given a 5-day course of prednisolone 30-40 mg daily to be started at home as soon as the onset of an attack is felt.

Acute Asthma Attacks – Adults

1. 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 paradox, use of accessory muscles, colour, mental state, etc.
2. Humidified oxygen by mask at high concentration (6 litres/min) is important.
3. Give:

Drug	Codes	Adult dose	Frequency
salbutamol nebulised (in saline or sterile water)	B V	5mg	repeat at ½ - 1 hr intervals, then every 2-4 hours until recovered
or adrenaline 1:1000 sc as required	C V	0.5ml	1-2 hourly
		useful when no nebuliser available	

- and prednisolone po** **B V** 40mg once a day 7 days
in all but the mildest cases (mornings)
4. If poor response to initial nebuliser therapy, or attack severe add:
- | Drug | Codes | Adult dose | Frequency |
|--------------------------|------------|------------|---|
| hydrocortisone iv | B V | 200mg | once only (unless oral dosing not possible) |
- And aminophylline iv slow** **B V** 6mg/kg over 20 minutes,
(unless the bolus dose patient has taken aminophylline in the past 8 hours)
- The aminophylline iv in** **B V** 12mg/kg/24 hours in 1-2
litres
- n** dextrose 5% slow
infusion
- Consider ventilation in severe cases. A short period (5-10 minutes) of ventilation with halothane may end the attack.
 - If chest is clear at 7 days steroids can be stopped without tapering off the dose; otherwise reduce by 5mg/day to maintenance of 5mg daily until next review.
 - After an acute attack all patients should continue with bronchodilators, and after a severe attack all patients should be on inhaled beclomethasone.
 - Except in mild cases follow up is essential.

Use of peak flow meter in acute asthma attack:

If peak flow meter is available, measure the peak flow hourly:

- If <50l/min give ½ hourly salbutamol until peak >50l/min, then
- 1 hourly salbutamol until >100l/min, then 2-4hourly salbutamol.

ASTHMA IN CHILDREN

Acute Attacks - Children

- The same general measures apply as in adults.
- Give:

Drug Duration	Codes	Paed dose	Frequency
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	B E	100-200mcg (1-2 puffs)	as required

- Give oxygen between nebulisations.
- If nebulisation facilities are not available, or poor response:

Drug	Codes	Paed dose	Frequency
Duration +/- adrenaline 1:1000 sc repeated twice at	C	V	0.01ml/kg may be 20 minute intervals
or aminophylline slow iv not if	B	V	4mg/kg over 20-30mins - theophylline given in the last 8 hours
and prednisolone po 3-5 days	B	V	1-2mg/kg once a day

Severe Acute Attack in Children

- If response to the above is inadequate, give intravenous fluids at 80-100 ml/kg/day, and:

Drug	Codes	Paed dose	Frequency
Duration aminophylline iv infusion and hydrocortisone iv/im	B	V	1mg / kg / hour B V
4-8mg/kg once only, then		2-4mg/kg	6 hourly then:
then prednisolone po days	B	V	1-2mg/kg once a day 5

- Using an inhaler via a spacing device may be effective. A spacer can be improvised by using a plastic cup/ tumbler:

Drug	Codes	Paed dose	Frequency
Duration salbutamol inhaler	B	E	200mcg - 400mcg as required

Maintenance Therapy

1. Advise the parents to avoid combination drugs like Franol® and Status®.
2. Do not keep children on long term beta-2 stimulant drugs (e.g. salbutamol) if they are mostly asymptomatic.
3. 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:

	Drug	Codes	Paed dose	Frequency
	salbutamol inhaler	B E	100-200mcg	as required
or	salbutamol po	B V	0.1 – 0.15mg/kg	4 times a day
or day	theophylline po		C E	5mg/kg ≤ 4 times a intermittent

Moderate asthma - children

Triggered by infection, allergy, exercise etc. As for mild asthma, but continual therapy may be required. Inhaled salbutamol is the most effective option of therapy, but if unavailable oral salbutamol may be used. 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

	Drug	Codes	Paed dose	Frequency
	Duration			
Add	beclomethasone inhaler	B E	50-100mcg	3 – 4 times a day
or	prednisolone po*	B V	1-2mg/kg	once in the until control, morning 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

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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:

Drug	Codes	Adult dose	Frequency	Duration
benzylpenicillin iv	C V	5MU	6 hourly	4-6 weeks
and gentamicin iv	B V	1-1.5mg/kg	12 hourly	2 weeks

Prosthetic valve endocarditis

- Initially:

Drug	Codes	Adult dose	Frequency	Duration
cloxacillin iv	B V	2g	6 hourly	4-6 weeks
and gentamicin iv	B V	1-1.5mg/kg	12 hourly	4 weeks

It is important to assay 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 (eg. *Strep. viridans*):

Drug	Codes	Adult dose	Frequency	Duration
benzylpenicillin iv	C V	5MU	6 hourly	4-6 weeks
and gentamicin iv	B V	1-1.5mg/kg	12 hourly	4 weeks

- Enterococcal infection (eg. *Enterococcus faecalis*):

Drug	Codes	Adult dose	Frequency	Duration
benzylpenicillin iv	C V	5MU	6 hourly	4-6 weeks
and gentamicin iv	B V	1-1.5mg/kg	12 hourly	4 weeks

Max-120mg

- Staphylococcal infection (eg. *Staph. aureus* & *Staph. epidermidis*):

Drug	Codes	Adult dose	Frequency
Duration			
cloxacillin iv	B V	2g	6 hourly 4-6 weeks
and gentamicin iv	B V	1-1.5mg/kg	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 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):

Drug	Codes	Adult dose	Frequency
Duration			
amoxycillin 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):

Drug	Codes	Adult dose	Frequency
Duration			
ampicillin iv	B E	1g at induction, then 500mg after 6hrs	
or amoxycillin 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)

Drug	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:

Drug	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 drug] 1g over at least 100 minutes 1-2 hours before procedure.*

RHEUMATIC FEVER

Treatment of acute attack:

Drug	Codes	Adult dose	Frequency	Duration
benzathine penicillin im	C V	0.6MU(0.72g)	once a week	single dose
1.44g = 1.2MU	Paed: <5 yrs =0.15(0.18g)	5-10 yrs= 0.3MU(0.36g)	>10 yrs=0.6MU(0.72g)	
or penicillin V po	C E	500mg	4 times a day	10 days
	Paed: <5 yrs=125mg	5-10 yrs=250mg	>10 yrs=500mg	
or erythromycin po - in	C V	500mg	4 times a day	10 days
	<u>penicillin allergy</u> _____ <u>day</u> _____			

Treatment of acute arthritis and carditis:

Drug	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, 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:

Drug	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:

Drug	Codes	Adult dose	Frequency
Duration haloperidol po	A N	1.5-3mg	3 times a day as required
		Paed = 25- 2 divided 50mcg/kg doses	

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.
- Specific situations requiring prophylaxis for longer periods (up to 30 years as a guide):
 - definite carditis in previous attacks
 - high risk of exposure to streptococcal infection at home or work

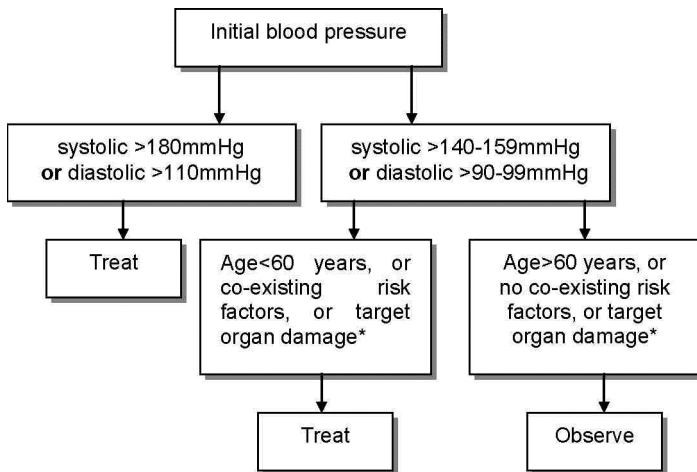
(crowded conditions, high exposure to children)

Drug	Codes	Adult dose	Frequency
benzathine penicillin im (1.44g = 2.4MU) 2.4MU(1.44g)	C V Duration <12yrs = 1.2MU(0.72g)		monthly up to 21-30yrs
or penicillin V 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	2 times a day up to 21-30yrs

HYPERTENSION

*Hypertension should **not** be treated until elevated blood pressure has been confirmed with three consecutive readings.*

Figure 13.1: Interventions in hypertension



* *Examples of target organ damage: left ventricular hypertrophy; nephropathy, retinopathy*

Drugs that might increase blood pressure:

- Sodium-retaining drugs: mineralocorticoids or glucocorticoids, non-steroidal anti-inflammatory drugs
- Sympathomimetics: amphetamines, monoamine oxidase inhibitors, aminophylline, cold cures
- Oral contraceptives

Treatment of hypertension

Non drug 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.

Drug treatment

Methyldopa and propranolol are no longer recommended for the treatment of hypertension except in special circumstances. However, some patients are currently well controlled on these agents and tolerate them well. For these patients these drugs can be continued, but newly diagnosed patients should be commenced on other drugs listed below.

Guidelines for treatment of hypertension:

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

First line agents = shown to reduce mortality

- Thiazides

Drug	Codes	Adult dose	Frequency
Duration hydrochlorothiazide po long term	C	V 12.5 - 25mg	once a day

(max 25mg) *Unwanted side effects*

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

■ Beta-blockers

Drug Duration	Codes	Adult dose	Frequency
atenolol po term	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.

Second line agents

■ ACE inhibitors:

Drug	Codes	Adult dose	Frequency	Duration
Enalapril	B V	5 - 40mg	Once a day	long term
Or Lisinopril		B V	5 - 40mg	Once a day long term
Or Captopril	B E	12.5 - 50mg	2-3 times 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.

Caution: concomitant potassium supplements or potassium retaining drugs should be avoided, or used only with careful monitoring of serum potassium.

m Calcium channel blockers:

Drug Duration	Codes	Adult dose	Frequency
nifedipine slow release po long term	B V	10 - 40mg	1-2 times a day
or Amlodipine po long term	B E	5 - 10mg	once a day

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).

m Alpha-blockers:

Drug Duration	Codes	Adult dose	Frequency
prazosin po term	B V	0.5-5mg	2-3 times a day long term

Unwanted side effects include first dose hypotension, and postural hypotension may also be a problem; this is particularly relevant in the

elderly, in patients with sodium or volume depletion and patients receiving other antihypertensive treatment.

III

Logical combinations:

	Diuretic	Beta-blocker	Calcium antagonist	ACE inhibitor	Alpha blocker
Diuretic (hydrochlorothiazide)		Yes		Yes	Yes
Beta-blocker (atenolol)	Yes		Yes*		Yes
Calcium antagonist (nifedipine SR)		Yes*		Yes	Yes
ACE Inhibitor (enalapril)	Yes		Yes		Yes
Alpha-blocker (prazosin)	Yes	Yes	Yes	Yes	

* **Important:** verapamil (a calcium channel blocker) and beta-blockers are **absolutely** contraindicated.

Follow up

When blood pressure has stabilised, monitor every 1-3 months

Referral

When patients are young (<30 years) or blood pressure is severe or refractory to treatment, referral to a specialist centre should be considered.

Hypertension in the elderly

Treat if blood pressure >160mmHg systolic or >90mmHg diastolic. This includes isolated systolic hypertension. Therapy reduces the incidence of cardiovascular complications substantially.

Give aspirin 150mg/day in elderly patients (>60years) unless contraindicated.

Hypertension in diabetics

Thiazide diuretics can impair glucose tolerance and in diabetics can exacerbate hyperglycaemia and hyperlipidaemia. However, these effects appear unlikely with the low doses now given to reduce blood pressure.

Beta-blockers can interfere with awareness of, and recovery from, hypoglycaemia in insulin dependent diabetics. However, this is less likely with the more selective beta1 blockers (e.g. atenolol). Beta blockers can also exacerbate dyslipidaemia in diabetics.

- Recommendations: ■Low dose thiazide diuretic ■**and/or** Beta-blocker (e.g. **atenolol**)
- If this fails or if unwanted effects occur, an ACE inhibitor, calcium channel blocker or alpha blocker can be tried.
- In hypertensive patients with diabetic nephropathy ACE inhibitors have been found to be more effective in slowing the decline in renal function and are the agent of first choice.

Hypertension in black people

Black people respond poorly to beta blockers and ACE inhibitors **when used as single agents**. However, these drugs are effective when combined with a diuretic.

Resistant hypertension

- Poor compliance should always be considered in all treatment-resistant patients. Minimise the pill burden.
- Drug interactions should be considered (such as concurrent use of non-steroidal anti-inflammatories, aminophylline, cold cures etc)
- If control remains poor, refer to a specialist.

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
- start nifedipine 10mg sublingually, repeat after two hours if diastolic >110 mmHg.

CARDIAC FAILURE

Usually presents with shortness of breath on exertion or at rest, swelling of ankles, ascites and easy fatigability.

General guidelines:

- Precipitating factors should be sought and treated e.g:
 - ◆ hypertension
 - ◆ infections eg. sub-acute bacterial endocarditis, chest infection
 - ◆ arrhythmias
 - ◆ hypokalaemia
 - ◆ anaemia
 - ◆ drugs, 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.

Drug Management:

Drug	Codes	Adult dose	Frequency
frusemide po ¹	BV	40-80mg	1-2 times a day long term
and captopril* po	BV	6.25-25mg	2-3 times a day long term
Or enalapril po	BV	5-20mg	once daily long term
or Lisinopril	BV	5000 units	3 times a day as long term
po	BV	600mg-1.2g	1-2 times a day long term
+/- potassium chloride	BE	0.25-0.5mg	3 times a day first 24hrs
po ² +/- digoxin po	then	0.125-0.25mg	once a day long term
		Paed = 0.01mg/kg	
	B E	25-50mg	Once daily

¹give intravenous treatment for severely oedematous patients

²if using ACE inhibitors discontinue or use **cautiously**

*ACE inhibitors (captopril) are of benefit in all stages of heart failure

For oedematous and bed-ridden patients:

Drug	Codes	Adult dose	Frequency
Duration			
		required	

+/- Spirinolactone po
add heparin sc

Acute pulmonary oedema:

Prop up in bed.

40% **oxygen** by mask (2 – 4L/min)

and:

Drug	Codes	Adult dose	Frequency
Duration			
	BE	5-10mg	slowly over 1-2 mins; repeat every 15mins if required.
	BE	12.5mg when required for vomiting	
morphine iv	BV	40-80mg	repeat as required

plus prochlorperazine
iv

Plus frusemide iv

- Subsequent treatment includes ACE inhibitors as for heart failure.

Resistant cardiac failure

Exclude advanced renal failure as a cause of resistant heart

failure.

Increase dose of frusemide up to 240mg daily (in divided doses).

Addition of another diuretic eg. hydrochlorthiazide

may be advantageous. If still unsatisfactory consider **referral** for further management under specialist care.

	Drug Duration	Codes	Adult dose	Frequency	
And term or	Spirolactone	B	E 25mg	once a day	long term
	Propranolol	B	V 20mg	3 times a day	long
	atenolol	B	V 25-50 mg	once daily	long term

Cor Pulmonale

Treat as above but ACE inhibitors are not recommended.

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:

	Drug Duration	Codes	Adult dose	Frequency	
and	aspirin po¹ term	C	V 75-150mg	Once a day	long term
	glyceryl trinitrate sub-lingual² than 3 tablets	A	E 500mcg	not more every 15 mins	

¹aspirin is contraindicated in bleeding peptic ulcers

²glyceryl trinitrate deteriorates on storage - tablets should be kept in original container and discarded 3 months after opening.

Frequent attacks of angina:

	Drug Duration	Codes	Adult dose	Frequency	
and long term	aspirin po term	C	V 75-150mg	once a day	long
	isosorbide dinitrate po	A	E 10-40mg	3 times a day	

If no response, add:

	Drug Duration	Codes	Adult dose	Frequency	
+/-	atenolol po term	B	V 50-100mg	once a day	long
	nifedipine slow release	B	V 10-20mg	2 times a day	

long term **po**

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- 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:

Drug	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

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 Myocardial Infarction:

Drug	Codes	Adult dose	Frequency
Duration aspirin po dose, then 75-150mg once a day	C V	300mg	once only as a single
and morphine iv	B E	2-5mg every 10–15min	as required
and isosorbide dinitrate po as required	A E	10-40mg	3 times a day
and streptokinase iv 0.9%	A N	1.5MU in 100ml sodium chloride or dextrose 5% run over one hour, once only	
Useful for MI with ST segment elevation			
and atenolol po term	B V	50-100mg	once a day long
and captopril po	B E	12.5-25mg	2 times a day long

- *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:

- **Sinus bradycardia**

Drug	Codes	Adult dose	Frequency
term atropine iv	B V	0.6-1.2mg	as required

- **Heart block**

If symptomatic requires temporary pacemaker insertion.

■ Atrial fibrillation

In acute atrial fibrillation D.C. cardioversion. Digoxin may be used with caution.

■ Supraventricular tachycardia

Try vagal manoeuvres e.g. carotid sinus massage. Consider D.C. cardioversion if patient distressed.

Drug	Codes	Adult dose
Frequency Duration		
<u>verapamil iv</u>	A N	5-10mg <u>as required</u>

Ventricular tachycardia

Consider D.C. cardioversion if patient distressed.

Drug	Codes	Adult dose	Frequency
Duration			
lignocaine iv (no adrenaline)	A E	75-100mg stat, then 4mg/min for 30 mins, then 1-2mg/min for 12-24 hours	

Caution: for all arrhythmias correct low serum potassium and hypoxia

Major Complications of myocardial infarction

- Post infarction angina - treat as for angina pectoris
- Left ventricular pump failure
- Arrhythmias after myocardial infarction

Rehabilitation

The period of bed rest, rehabilitation, and management varies in individual cases. Risk factors should be avoided, such as smoking, high cholesterol diet, stress, and thrombogenic agents such as oestrogens. Patients with hypercholesterolaemia should be referred for specialist management.

ARRHYTHMIA

Ectopic beats

Give reassurance about the condition, but if troublesome:

Drug	Codes	Adult dose	Frequency
Duration			
atenolol po required	B V	50-100mg	once a day as

Atrial fibrillation and atrial flutter

Drug	Codes	Adult dose	Frequency
Duration digoxin po 24hrs	B V	0.25-0.5mg	3 times a day first
	then	0.125-0.25mg once a day	long term

If poor control of ventricular response, cautiously add:

Drug	Codes	Adult dose	Frequency
Duration add atenolol po review	B V	25-50mg	once a day
or verapamil po review	A V	40-120mg	3 times a day

For chronic atrial fibrillation:

Drug	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/valsava manoeuvre or prompt squatting. Consider synchronized D.C. cardioversion (50-200 joules) if patient distressed.

Drug	Codes	Adult dose	Frequency
Duration verapamil iv	A V	5-10mg	bolus, can be repeated after 10 min

For long term therapy:

Drug	Codes	Adult dose	Frequency
Duration verapamil po long term	A V	40-120mg	3 times a day

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.

Drug	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.

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ULCERS AND RELATED CONDITIONS

Gastroesophageal disease(GERD) (Reflux Oesophagitis)

General measures: Life style and dietary modifications such as weight reduction, elevation of head of bed, avoidance of tight clothes/belts, stooping, large meals (particularly before bedtime).

■ Mild symptoms:

Drug	Codes	Adult dose	Frequency	Duration
magnesium trisilicate required po	C N	20ml or 2 tablets	at least 4 times a day	as

■ Moderate symptoms:

Drug	Codes	Adult dose	Frequency	Duration
add metoclopramide po	A V	10mg	3 times	Review

■ Severe symptoms: If no response to above, give:

Drug	Codes	Adult dose	Frequency	Duration
ranitidine po	B E	150	Twice a day	6-8 weeks
Or Omeprazole	A E	20mg	Twice a day	two weeks

Note: Maintenance therapy with acid secretion blockers may be required.

Peptic Ulcer - General Measures

Treatment of peptic ulcer disease begins with eradication of *Helicobacter pylori* as well as acid suppression therapy. Precipitating causes such as NSAIDs, cigarettes and alcohol should be withdrawn. "Ulcer diets" are unnecessary. Avoid foods that exacerbate pain in individual patients.

- Stop smoking and avoid alcohol.
- Drugs to be avoided: all non-steroidal anti-inflammatory agents, aspirin/aspirin compounds, and steroids.
- Antacids will alleviate symptoms in most cases
- Patients with persistent symptoms or recurrent ulcers should be referred to a specialist.

Drug Duration	Codes	Adult dose	Frequency
magnesium trisilicate as required po	C	N 20ml or 2 tablets	at least 4 times a day

For *H. pylori* eradication:

	Drug Duration	Codes	Adult dose	Frequency
	amoxicillin po*	B V	500mg	3 times a day 2 weeks
and	Metronidazole po	B E	400mg	3 times a day 2 weeks
And	Ranitidine po	B E	150mg	Twice a day 2 weeks
Or	Omeprazole po*	A E	20mg	Twice a day 1 week
*	doxycycline po as an alternative to amoxicillin	C V	100mg	2 times a day 2 weeks

Note: If using Omeprazole, the antibiotic course can be reduced to 1 week.

Oesophageal Ulcer

Treat as for severe reflux oesophagitis

Gastric Ulcer

- Referral to a specialist is recommended for endoscopic biopsy to exclude malignancy in ALL cases whenever possible.

- General measures are important.
- Treat for H pylori as above

If inadequate response or any evidence of malignancy, refer to specialist.

Duodenal Ulcer

- General measures are important.
- Treat for H. pylori
- If symptoms persist, endoscopy or barium meal is necessary.

Complicated duodenal ulcer:

This usually involves bleeding and/or perforation. This requires emergency referral to the Specialists.

- Need maintenance antisecretory therapy
- For recurrent ulcers on endoscopy, repeat course at same dose. Also consider referral to a specialist
- For persistent (non-healing) ulcers on endoscopy, repeat course at following doses:

Drug	Codes	Adult dose	Frequency
Ranitidine po	B E	150mg	Once nocte
Duration			
indefinitely			
Or Omeprazole po	A E	20mg	Once daily

Non-Ulcer Dyspepsia

Pain or discomfort in the upper abdomen but with normal endoscopy or barium meal. Could be due to gall stones and these can be diagnosed by ultrasound. If pain is not relieved by bowel movement or associated with a change in stool frequency or form, irritable bowel syndrome may be a possibility.

- Explanation and reassurance are important.
- May need to treat as "ulcer" dyspepsia.
- Try milk-free diet for possible lactose intolerance.
- Try an antidepressant

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/ viral)

- Rehydrate - oral fluids in mild cases, IV fluids in more severe cases.

- If anti-emetics are necessary (adults only):

	Drug Duration	Codes	Adult dose	Frequency
	prochlorperazine im	B E	12.5mg	one dose
	Review			
Or	Metoclopramide iv	B V	10mg	
Then	prochlorperazine po	B E	5mg po	3 times Review
or	Metoclopramide po/iv	B E	10mg po	3 times Review

NB: Antibiotics are not required except in the special circumstances given below. Anti-diarrhoeals should be avoided.

Bacillary Dysentery (bloody diarrhoea)

Always send stool for microscopy and culture to guide your antibiotic choice.

- Rehydration as for gastro-enteritis above.

	Drug Duration	Codes	Adult dose	Frequency
	Nalidixic acid po	B V	1gm	4 times a day 5
	days			
or	Ciprofloxacin	B V	500mg	Twice a day

Cholera

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

In suspected cases, notify Provincial Medical Director immediately.

- 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.

Moderate Dehydration

- Give oral rehydration:

Drug Duration	Codes	Adult dose	Frequency
oral rehydration then	- -	75-100ml/ kg	in the first 4 hours, reassess:
oral rehydration to	- -	10-20ml/kg	or corresponding losses
- If not improved, treat as **severe**.

Severe Dehydration

- Give IV fluids immediately:

Drug Duration	Codes	Adult dose	Frequency
Ringers Lactate iv review after	C V	100ml/kg	over 6hrs 4 hrs

Rate for paedts 30ml/kg in first hour then reassess.
[see also section in paediatric chapter] Good response: 10ml/ kg/ hr for 5 hrs
Poor response: repeat 30ml/kg in one hour, then 10ml/kg for 4hrs
- Monitor frequently; give ORS in addition to IV fluids as soon as able to drink.
- Reassess after 4 hours: if improved treat as moderate dehydration; if still severe, continue IV fluids.

Further Management

- Avoid further contamination /reinfection
- Start antibiotics (see below) after the patient is rehydrated and vomiting has stopped, usually after 4-6 hours. Although the disease is self-limiting, an effective antibiotic will reduce the volume of diarrhoea and shorten the period during which *Vibrio cholera* is excreted. Antibiotic prophylaxis may be given to all close contacts in the same dosage as for treatment:

Drug Duration	Codes	Adult dose	Frequency
cotrimoxazole po 3 days [in <12yrs]	C V	24mg/kg	twice a day
or erythromycin po 3 days [in pregnancy]	C V	500mg	4 times a day
Or Ciprofloxacin	B V	500mg	Twice a day 3 days

Note: Erythromycin may be used in cases of resistance to the above antibiotics, upon the advice of the Provincial Medical Director.

- Start feeding 3-4 hours after oral rehydration begun. Preferably, give antibiotics with food to minimise vomiting.

Acute Intestinal Disease - Amoebic Dysentery

Drug Duration	Codes	Adult dose	Frequency
metronidazole po 5 days	C V	800mg	3 times a day

(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.

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

Pyogenic Abscess:

Drug dose	Codes	Adult	Frequency 3 times a day 4 times a day	Duration 4 – 6 weeks 4 - 6 weeks
metronidazole IV	C V	500mg	once a day	
plus Ampicillin iv	B V	1 gm	twice a day	
Or Ceftriaxone iv	A V	1 gram		
Or Ciprofloxacin po	B V	500mg		

Amoebic Abscess:

Drug	Codes	Adult dose	Frequency
Duration			
Metronidazole po	C V	400mg	3 times a day
days			7-10

CHRONIC DIARRHOEA

Investigations to establish cause are essential. See also chapters on HIV Related Disease and Paediatrics. Also refer to the HAQOCI guidelines.

General Measures

- Rehydration is important - orally if appropriate; IV fluids when there is severe dehydration or concomitant vomiting.
- Give potassium and vitamin supplements as indicated on clinical grounds and after serum potassium measurements.
- For persistent diarrhoea after infection has been excluded: Drug

Duration	Codes	Adult dose	Frequency
codeine	B V	30-60mg	3 times a day
Review			

In refractory cases use:

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

Giardiasis

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

Irritable Bowel Syndrome

- May present with pain, chronic diarrhoea or constipation. It is important to investigate for and exclude organic pathology.
- Reassurance and explanation are essential. A high fibre diet is the mainstay of treatment and treatment of constipation with sufficient water intake and physical activity.
- For relief of pain:

Drug Duration	Codes	Adult dose	Frequency
hyoscine butylbromide po	B	N 20mg	4 times a day review

If constipation is prominent:

Drug Duration	Codes	Adult dose	Frequency
magnesium trisilicate review po	C	N 20ml or 2 tablets	3 times a day

- Explore psychosocial factors in resistant cases.
- Consider referral to clinical psychologist.

Malabsorption Syndromes

Correction of electrolyte and nutritional deficiencies is important.

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.

Chronic Pancreatitis

- Exclude gallstones and alcohol as causes
- Pain control must be tailored to each patient and often requires opiates.
- Treat diabetes as necessary.
- Cessation of alcohol intake is imperative.
- Referral to a specialist is recommended.

Lactose intolerance

- Milk and all milk products must be withdrawn.

OTHER GASTROINTESTINAL PROBLEMS

Peritonitis

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

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

Constipation

- Encourage high fibre diet and adequate fluid
 - Give laxatives as required but avoid chronic
 - Rectal stimulant: Drug Codes Adult dose
- | | | |
|---|------------|-----------------|
| glycerine suppository rectal | C N | one suppository |
| or liquid paraffin po
[faecal softener] | B N | 10-30ml |

Constipation

- Encourage high fibre diet and adequate fluid intake.
 - Give laxatives as required but avoid chronic use.
 - Rectal stimulant: Drug Codes Adult dose Frequency
- | Duration | | | |
|-------------------------------------|------------|-----------------|---------------|
| glycerine suppository rectal | C N | one suppository | as required - |

or bisacodyl po [only if no abdominal tenderness]	C N	5 - 10mg	
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 -

Haemorrhoids (and other pain conditions)

- Encourage high fibre diet and adequate fluid
- Avoid constipation.
- Careful anal hygiene plus saline baths. Drug

bismuth subgallate with 1% hydrocortisone ointment rectally

Codes **B N** Adult dose one application

hygiene plus saline baths. Drug
Frequency Duration

Codes

Haemorrhoids (and other painful peri-anal conditions)

- Encourage high fibre diet and adequate fluid intake.
- Avoid constipation.
- Careful anal

Adult dose

twice a day as required

LIVER DISEASE

Acute Liver Failure/ Hepatic Encephalopathy

- Identify and eliminate precipitating causes (viral hepatitis, drugs, toxins, septicaemia, alcohol, upper GI bleeding).
- Stop all unnecessary drugs including diuretics and sedatives.
- Give high calorie diet (2000 kcal/day), and low protein diet.
- Manage with:

	Drug Duration	Codes	Adult dose	Frequency
	doxycycline po	C V	100mg	twice a day until recovery
or	neomycin po recovery	A N	1g	every 6 hrs until
	Give sufficient laxatives to induce diarrhoea:			
	Drug Duration	Codes	Adult dose	Frequency
	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

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

Screen for infection (urine, chest, blood), and treat vigorously.

If bleeding tendency present, give:

	Drug Duration	Codes	Adult dose	Frequency
	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/L and patient actively bleeding.*

- If ethanol aetiology is suspected, give:

	Drug Duration	Codes	Adult dose	Frequency
	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
- Sedate [avoid opiates]:

Drug	Codes	Adult dose	Frequency
Duration			
diazepam iv	C V	5-15mg	as necessary

- 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:

Drug	Codes	Adult dose	Frequency
Duration			
Propranolol po indefinitely	B E	40mg	2-3 times a day

Ascites of Chronic Liver Failure

Perform diagnostic paracentesis if possible.

- 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.
- Resistant patients:

	Drug	Codes	Adult dose	Frequency	Duration
	spironolactone po	A N	100-400mg	once a day	
			review		
or	amiloride po	A N	10-20mg	once a day	
			review		

Note: Do not give potassium supplements with these diuretics.

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

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

Stop if encephalopathy or uraemia develop.

Massive intractable ascites

Refer. Perform large volume paracentesis.

RENAL TRACT CONDITIONS

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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:

Drug Duration	Codes	Adult dose	Frequency
norfloxacin* po	C E	400mg	2 times a day 3 days

**Do not use norfloxacin in pregnant women or children. For UTI in pregnancy refer to the Obstetrics & Gynaecology chapter.*

m 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

Drug Duration	Codes	Adult dose	Frequency
norfloxacin po weeks	C E	400mg	2 times a day 2

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

Drug Duration	Codes	Adult dose	Frequency
ampicillin iv	B E	500mg	6 hourly review
gentamicin* iv review	B V	4-7mg/kg	once a day

or

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

Acute Renal Failure

Try and classify by cause. The majority of cases of acute renal failure are due to ischaemic or toxic injury to the kidney and are reversible if treatment is instituted promptly

i.e. within hours not days.

Pre-Renal Cases

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. Management is summarised in Figure 13.1.

Established Acute Renal Failure

Consider sepsis, malaria, acute glomerulonephritis, acute tubular necrosis, myeloma, nephrotoxic drugs such as gentamicin and NSAID's, and other causes such as acute-on-chronic renal failure. Ultrasound kidneys for size and get urine microscopy.

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. Ultrasound 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:** If you suspect renal failure, **refer**.
- **Second line:** If the patient fails to respond to adequate rehydration and fluid challenge with sodium chloride 0.9% [**not** dextrose 5%] within 48 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]. Monitor fluid balance carefully. Check electrolytes regularly and maintain nutrition. Watch for infections.
- **Third line:** Consult dialysis team sooner rather than later so that they can help monitor the patient. Selection criteria for the chronic dialysis programme are applied and each individual patient should be discussed with the dialysis team.

Late referrals contribute to the mortality of acute renal failure and end-stage renal failure.

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:

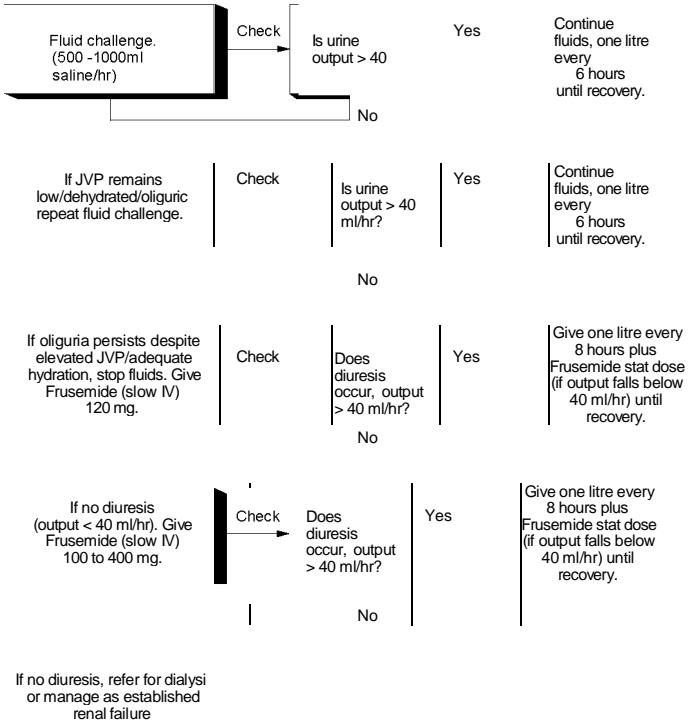
Drug	Codes	Adult dose	Frequency
Duration			
salbutamol nebulised	B V	10mg	2 times a day Review
+/- insulin with dextrose	B V	50mls of 50% dextrose +	
10 units of		short acting insulin	

General measures in the management of acute renal failure

- **Catheter:** Insert a catheter but remove it once sustained diuresis has occurred, or if oliguria persists and the patient is started on dialysis or conservative treatment.
- **Urine:** Ward urinalysis test - high specific gravity >1.020 suggests dehydration; check for haematuria, proteinuria; microscopy (for cells, casts), culture and sensitivity are essential.
- **Diet:** High calorie and normal or high protein diet with low sodium and low potassium.
- **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.

IMPORTANT: avoid nephrotoxic drugs; watch for and treat infections; check weight daily and BP 4 hourly; strict fluid input/output charting.

Fig 14.1: Management Approach in Adult Pre-renal Cases



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).

Note: Large doses of frusemide may cause hearing loss if given too quickly.

ACUTE NEPHRITIC SYNDROME

Usually presents with oliguria, hypertension, smoky coloured urine and generalised oedema. There may be a recent history of tonsillitis, arthralgia, skin rashes/ infection.

- Try to induce 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:

Drug	Codes	Adult dose	Frequency
Duration			
penicillin V po	C E	500mg	6hrly 10 days
- Do not give steroids.
- Treat hypertension conventionally. Children need early intervention for elevated blood pressure. Treat if diastolic BP > 90 mm Hg.
- 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 for dialysis.

NEPHROTIC SYNDROME

Diagnosed where there is generalised oedema, hypoalbuminaemia and proteinuria (>3gm/day). Dipstick should show at least protein ++. Ideally do 24hr urine collection for both creatinine clearance and proteinuria. Check urine microscopy and U&Es. Weigh patient at each review. Exclude SLE, HIV and Hepatitis B or C.

- Try and induce diuresis:

Drug	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).

Drug	Codes	Adult dose	Frequency	Duration
prednisolone po	B V	1mg/kg	once a day [mornings]	2 months

- Aim to tail off dose to zero during the 3rd month. Stopping early may result in a relapse. Refer if there is failure to reduce oedema within two weeks on high dose steroids.

- Anticoagulate if immobile:

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

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

PRESCRIBING IN RENAL IMPAIRMENT / RENAL FAILURE

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

Table 14.2 Drugs in Renal Impairment

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

Table continued overpage.../

Table 14.2 Drugs in Renal Impairment [contd.]

Antibiotics	
penicillins /cephalosporins	Reduce doses by 50% in advanced failure Use with extreme caution if no alternative. Use loading dose of 1mg/kg gentamicin, then use maintenance dose of 1 mg/kg as well, once daily in moderate renal failure and once on alternate days for advanced renal failure.
aminoglycosides (gentamicin)	
<hr/>	
nitrofurantoin	
nalidixic acid	
trimethoprim	Avoid
sulphonamides	
cotrimoxazole	
_tetracycline	
doxycycline	May be used safely
Cardiovascular	
atenolol	Reduce dose by 50% [propranolol = safe] Reduce dose by 50%, but if creatinine is >300)j.mol/L avoid Use smaller loading/maintenance doses (125micrograms daily). Consider alternate day dosing. Measure digoxin levels.
captopril /enalapril	
digoxin	
Diuretics	
amiloride / 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
chlorpropamide	Avoid
glibenclamide	Use with caution.
Other	
allopurinol	Reduce dose (maximum 200mg daily) Use
phenobarbitone	25% of normal dose or avoid if possible Use
benzodiazepines	25% of normal dose or avoid

Drugs and Dialysis

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

Chronic Dialysis

Chronic peritoneal dialysis and haemodialysis may be available but discuss with specialist before transferring patient. Psychosocial issues may exclude the patient from the chronic dialysis programme.

Current chronic dialysis centres are in Bulawayo and Harare only.

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INFECTIONS

Septic arthritis, and Acute osteomyelitis

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

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

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.

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

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:

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

Chronic pain:

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

GOUT (URATE CRYSTAL SYNOVITIS)

Acute gout

Always consider the possibility of septic arthritis. 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:

Drug Duration	Codes	Adult dose	Frequency
indomethacin po	BE	50mg	4 times a day first 24 hrs then reduce by 25mg daily to 25mg 3 times a day review
or colchicine	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.

Drug Duration	Codes	Adult dose	Frequency
allopurinol po	BE	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 or patients on diuretics, or with impaired renal function, allopurinol should be started at 100 mg daily and cautiously increased if necessary.
- Do not start allopurinol during or immediately after an acute attack.

or The period of introduction of allopurinol should be covered by concurrent colchicine or a regular dose of NSAID until normal serum uric acid levels have been achieved:

Drug	Codes	Adult dose	Frequency
Duration			
colchicine po	A N	0.5mg 2 times a day	7 days
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:

Drug	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 is forbidden.
- Avoid dehydration.

Avoid the following foods:

- organ meats, red meat especially goat meat.

Foods allowed:

- 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 current or past peptic ulceration. Refer patients with serious rheumatic disease and peptic ulceration for specialist help. Note that indomethacin is available in suppository form.
- 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. (See above). 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

Note: Refer chronic cases of polyarthritis for definitive diagnosis and exclusion of the following conditions. 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 NSAID, disease modifying anti-rheumatic drugs (e.g. chloroquine, methotrexate and sulphasalazine), and low dose steroids in the presence of severe inflammation or vasculitis is necessary. Disease modifying drugs are the mainstay of treatment to minimise erosions and deformities

- Manage with:

Drug Duration	Codes	Adult dose	Frequency
aspirin po		C V	4 times a day Review
	(Paed 12.5mg - 25mg/kg)		
or indomethacin po		BE	3 times a day Review
+/- an additional night time dose of	75mg		at night
or ibuprofen po		A E	3 times a day Review
200-400mg (Paed 7-14mg/kg)			
or Diclofenac po	B	E 25	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

- m** Disease modifying anti-rheumatic drugs should be started early:

Drug Duration	Codes	Adult dose	Frequency
chloroquine po	C V	150mg base	once a day
continual/			

review

Or **Methotrexate po** **A** **E** 5- 25mg Once a review
week

Eye check is advised after 9 months of chloroquine treatment. Uninterrupted treatment should not exceed 2 years. Treatment should be stopped if patient complains of visual disturbance on chloroquine. Methotrexate should be monitored with FBC and LFTs at 3 monthly intervals.

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

Drug Duration	Codes	Adult dose	Frequency
prednisolone po limited	B V	2.5 - 10mg	once a day period

Note: Best results are achieved with combination of drugs.

Systemic Lupus Erythematosus (SLE)

Refer to a higher level for diagnosis and initial treatment. Avoid the sun and advise the use of a broad brimmed hat. See cautions for aspirin and indomethacin as above.

- Manage with aspirin or indomethacin as for Rheumatoid arthritis as above.
- If severe skin or joint lesions, **add**:

Drug Duration	Codes	Adult dose	Frequency
chloroquine po	C V	150mg base	once a day continual/ review

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

Drug Duration	Codes	Adult dose	Frequency
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:

	Drug	Codes	Adult dose	Frequency	
		Duration			
	aspirin po	CV	300-600mg	4 hourly	review
Or	indomethacin	BE	25-50mg	3 times a day	
Or		review			
Or		AE	200-400mg	3 times a day	review
po		BE	25 -50mg	3 times a day	
	ibuprofen po	Review			
	Diclofenac po				

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

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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

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 properly informed and managed soon become experts in their own care.

Insulin dosages

- In **type I** diabetes, when initiating treatment the starting dose of insulin is **0.6units/kg/day**. In most patients this should be given 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. Alternatively a "basal/bolus" regime can be used where intermediate acting insulin is taken at bedtime (basal) and 6-8u of soluble taken 3 times a day before meals (bolus). This regime allows more flexibility with meals as the soluble insulin dose can be varied depending on 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.
- In **insulin treated type II** diabetes, the total daily dose of insulin is **0.3units/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 glycaemic control in type 2 diabetes.

- Do not change dietary and drug 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 as a minimum every 3 months.

Types of Insulin

Duration of action	Peak activity [hrs]	Duration [hrs]	Type of insulin	Brand names
Short acting	2 - 5	5-8	soluble	Actrapid HM ® Humulin-R ®
Intermediate	4 - 12	12- 24	isophane	Protaphane HM ® Humulin-N ®
	6 - 14	16 - 22	insulin zinc suspension	Monotard HM ® Humulin-L ®
Long acting	8 - 24	24 - 28	crystalline insulin zinc suspension	Ultratard HM ®
Biphasic	2-12	± 24hrs	soluble/ isophane	Actraphane ® Humulin 30/70 ®

Note: All of the above are human insulin and are available in U100 strength [100units/ml].

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 lactic acidosis)*

Obese type 2 diabetic:

Drug	Codes	Adult dose	Frequency
Duration			
metformin po	B V	500mg	3 times a
gradual			
_____ [max 3g/ day] day _____ increase			

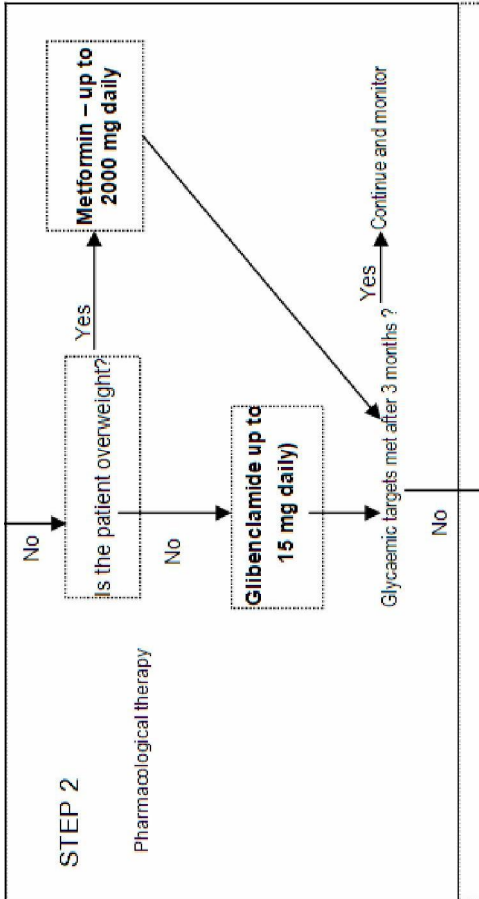
- if poorly controlled with strict adherence to diet, **add**:

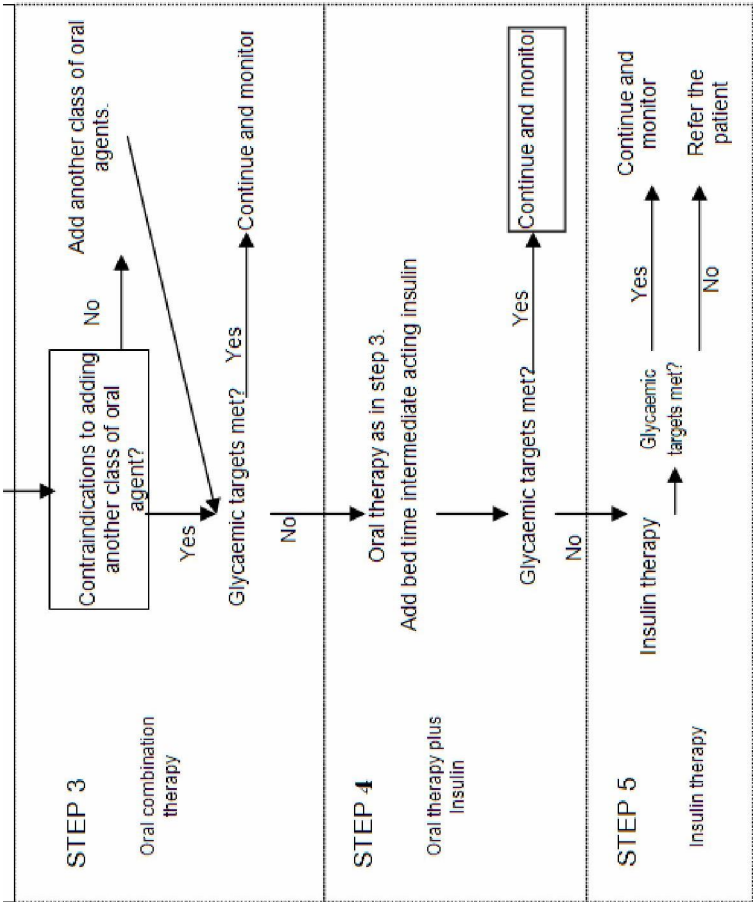
Drug	Codes	Adult dose	Frequency
Duration			
Add glibenclamide po	B V	5mg	once a day -
increase to a max of 10mg twice a day			

- if poorly controlled despite diet : **change** to insulin or **add** a daily dose of intermediate acting insulin.

Continues on next page!

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Normal weight type 2 diabetes:

Drug Duration	Codes	Adult dose	Frequency
glibenclamide po	B V	2.5mg	once to - twice a day increase to a max of 10mg twice a day

- if poorly controlled with strict adherence to diet, add:

Drug Duration	Codes	Adult dose	Frequency
Add metformin po	B V	500mg	3 times a day review

- if poorly controlled despite diet, **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. An insulin dependent diabetic may have snacks between meals.
- An adequate intake of fibre is important.
- Alcohol is allowed in moderation only.
- 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.

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, take care to avoid burns.

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 drugs, preferably including an ACEI, target BP 140/80

Aspirin and diabetes

- Add aspirin 75mg/day to all diabetics with hypertension and any with documented vascular disease.

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.

Diabetic Clinics

- Are useful to focus care even at District Hospital level. Six monthly review should include acuities 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 (insulin dependent and non-insulin dependent) may need to be given an increased dose of soluble insulin or soluble insulin according to the sliding scale (see insulin therapy in adults). In type 1 diabetes NEVER stop insulin, even if the patient is unable to eat.

Hypoglycaemia and Hypoglycaemic Coma

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

- For **hypoglycaemic** coma give:

Drug	Codes	Adult dose	Frequency
Duration			
dextrose 50% iv	C	V 20ml	immed. then,
dextrose 5% infusion	C	V infusion	until taking oral feeds

- 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 are best cared for by specialists: **refer wherever possible.**

In the case of diabetic patients on **oral agents**,

- omit the morning dose* on morning of preparation,
- 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 soluble insulin according to a sliding scale (see below).

In the case of **type 1**:

- give 2/3 of the usual morning dose,
- set up infusion of 5% dextrose to run through the period of the operation,
- post-operatively administer soluble insulin according to a sliding scale.

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:

Drug	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:

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

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

Drug	Codes	Adult dose
------	-------	------------

or **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:

Drug Codes Adult dose Frequency

Duration

potassium chloride po **B V** 600 – 1200mg twice a day 7 days

Insulin Therapy (Adults)

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

Drug Codes Adult dose Frequency

Duration

soluble insulin im **B V** 10units 10units immediately, then hourly until blood sugar down to 16mmol/L

When the blood sugar is 16mmol/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), see below. Give insulin according to a sliding scale (see overpage).

Sliding scale:

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.

An **alternative** to the sliding scale is to use an empirical dose especially when stabilising failed “type II” cases:

Drug Codes Adult dose Frequency

Duration

soluble insulin sc **B V** 6-12units 3 times a day. then

As soon as the patient's condition is stable, start appropriate maintenance therapy.

On this regimen, most cases show definite clinical improvement within 6-10 hours. Clinical and (if available) biochemical reassessments should be made at frequent

intervals during treatment. Modifications of the fluid and electrolyte therapy should be made as necessary.

CAUTION: sodium bicarbonate injection should be used ONLY in cases of extreme acidosis and if complete biochemical data are available (arterial pH less than 7 or bicarbonate less than 9 mmol).

DIABETES IN CHILDREN

A significant number of new cases of insulin dependent diabetes occur in children who usually present with classical features of diabetic ketoacidosis with polyuria, polydypsia etc. While the broad principles of management are similar to those in adult type I diabetes, the different ages and weights of children and children's special needs must be taken into consideration.

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:

Drug	Codes	Rate
sodium chloride 0.9% iv infusion	C V	20ml/kg fast, then

½ the remaining volume in 8hrs, then

Total volume = 200ml/kg
in 24 hours

½ the remaining volume in 16hrs.

and potassium chloride 20mg/kg infusion	B V	add 20mmol/L after the initial fast infusion.
--	------------	---

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

Drug	Codes	Rate
------	-------	------

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

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)

Drug	Codes	Dose	Rate
soluble insulin iv sugar (initial – continuous infusion) (e.g. make up infusion of insulin in normal saline)	B V	0.1units/ kg/ hr	until blood falls below 10mmol/L. then until condition stabilises, then
soluble insulin sc doses (maintenance)	B V	0.75 – 1unit/kg/day in 3 divided	before meals for one day. then

soluble + isophane sc
the total

B V apply the rule of thirds, (2/3 of

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 ($\pm 0.75 - 1 \text{ unit} \times 30\text{kg} / \text{day}$) 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):

Drug	Codes	Adult dose	Frequency
propranolol po	B	E	40 - 240mg 3 times a day

Graves' Disease

- Treat initially with anti-thyroid drugs:

Drug	Codes	Adult dose	Frequency
Duration			
carbimazole po	B E	20 -60mg	daily until
euthyroid, then		[0.5 mg/kg]	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 drug 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 drugs
- Aqueous iodine oral solution may be administered for 10-14 days before thyroidectomy:

Drug	Codes	Adult dose	Frequency	Duration
Aq. iodine solution	A N	0.1 - 0.3ml		3 times a
(Lugol's iodine)	10-14 days	diluted in	day	before
130mg iodine/ml		water		surgery

Hypothyroidism

Except in iodine deficient areas, this is treated by thyroid hormone replacement whatever the cause:

Drug	Codes	Adult dose	Frequency
thyroxine po	B V	50 -100mcg	once a day
Duration weeks,		initially	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.

Replacement with Prednisolone 5 mg daily is enough for most patients but as the mineralocorticoid component is lacking, this can be supplied by the addition of fludrocortisone 0.1mg daily if necessary.

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.

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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 (e.g. 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:

Drug	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 + 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.
- 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.

If symptoms present less than one week:

Drug	Codes	Adult dose	Frequency
		Duration	
benzylpenicillin iv	CV	3g (5MU)	6-hourly
Chloramphenicol iv	BV	500mg	6-hourly

results out

6

Spinal fluid microscopy, (protein and glucose; Gram stain and India ink stain and Ziehl-Neelsen stain and cultures if possible) plus blood glucose.

Treat according to lumbar puncture results:

Cerebrospinal fluid	Likely diagnosis	Treatment
WBC < 10; protein <44mg/dl; glucose > ½ blood glucose	Normal. Could be meningism (neck stiffness in the absence of meningitis, e.g. malaria, upper lobe pneumonia).	Depends on diagnosis
WBC < 50 (<10 polymorphs), protein <100 mg/dl, glucose > ½ blood glucose	Could be HIV infection only, without other causes of meningitis present.	Symptomatic
WBC > 50, > 90% lymphocytes, protein normal or high, glucose > ½ blood glucose	Viral meningitis. Differential : Partially treated bacterial, cryptococcal, syphilis, encephalitis.	Symptomatic. Observe in hospital.
WBC >50, > 90% lymphocytes, protein normal or high, glucose < ½ blood glucose , India ink stain negative	cryptococcal meningitis likely. Differential: includes bacterial, TB meningitis.	Repeat lumbar puncture. Serum CRAG (cryptococcal antigen) if available. If negative: Start anti-TB drugs and prednisolone 40 mg daily for two weeks.
WBC > 50, > 10 polymorphs, protein normal or high, glucose normal or low	Bacterial meningitis. Differential includes TB, cryptococcal meningitis.	Continue antibacterial drugs. Add anti-TB drugs if no better in 48 hours.
As above plus Gram stain shows Gram negative cocci or <i>N meningitidis</i> grown on culture	Meningococcal meningitis.	Treat as for bacterial meningitis. NOTIFY. Chemoprophylaxis to close contacts.
India ink stain or CRAG shows cryptococcal infection	Cryptococcal meningitis.	Fluconazole 400mg daily orally 14 days, 200mg daily indefinitely thereafter*

*Amphotericin B (0.7 mg/kg IV daily for 14 days) is preferred as initial therapy, but is at present not affordable in the public sector. Essential precautions must be taken when administering this medication.

Treatment for bacterial meningitis:

Drug	Codes	Adult dose	Frequency
		Duration	
benzylpenicillin iv	CV	3g (5MU)	6 hourly
and chloramphenicol	BV	500mg	6 hourly
iv or Ceftriaxone iv	S V	1g	12 hourly

Note: for paediatric doses see chapter on Paediatric conditions

Chemoprophylaxis for close contacts (meningococcal meningitis only):

- Give as soon as diagnosis made in index case.

Drug Duration	Codes	Adult dose	Frequency
ciprofloxacin po dose	B V	500mg	once only single
or rifampicin po	B V	600mg Paed = 10mg/kg	2 times a day 2 days

Note: Do not use ciprofloxacin in pregnant women.

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, 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**:

Drug Duration	Codes	Adult dose	Frequency
* sulphadiazine po	S E	2g	4 times a day 6 weeks
and pyrimethamine po	S E	50mg	once a day 6 weeks
*or clindamycin po	B E	600mg	3 times a day 6 weeks
*or Co-trimoxazole alternative to sulphadiazine	C V	Four tablets	3 times a day 6 weeks

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).

Drug	Codes	Adult dose	Frequency	Duration
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/symptomatic:

- In secondary head or facial pain treat the underlying cause (e.g. 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.

Drug	Codes	Adult dose	Frequency	Duration
aspirin po week	C V	600mg	4 hourly prn	no longer than one 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 (codeine compounds) and benzodiazepines as they particularly can cause rebound headache and habituation.

If headache persists for more than six weeks, add

Drug	Codes	Adult dose	Frequency	Duration
amitriptyline po	B E	25mg	at night	3 months

Migraine

- Unilateral; (occasionally bilateral); throbbing attacks; last hours to days; with nausea ± vomiting; photophobia, sometimes preceded by visual aura; often have to lie down.

Drug	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:

Drug	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).

m Look for and avoid precipitating factors: Not enough sleep, alcohol, cheese, chocolate, menarche, menstrual cycle, oral contraceptive pill may all influence migraine frequency.

- If two or more disabling migraines a month (leave work, off school);

Drug	Codes	Adult dose	Frequency
propranolol po 3	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	BE	25mg at night
			minimum 3 months

Note: propranolol contraindicated in asthma - use amitriptyline.

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 500mg 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, drug 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:

Drug	Codes	Adult dose	Frequency
Duration			
phenobarbitone po	C V	60-90mg*	once a day, 2
weeks			

Paed = 5mg/ kg at night until review

* 90 mg if weight > 70kg

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, drug interactions, intercurrent illness.

- Increase:

Drug Duration	Codes	Adult dose	Frequency
phenobarbitone po	C V	150mg	every night 4 weeks then review

- If seizures persist (one or more in four weeks):

Drug Duration	Codes	Adult dose	Frequency
add carbamazepine po	B V	200mg	once a day for 3 days, twice a day for 3 days, then three times
Paed = 6mg/kg reduce phenobarbitone by 30mg each week			

- If seizures persist, increase:

Drug Duration	Codes	Adult dose	Frequency
carbamazepine po	B V	400mg	twice a day 4 weeks,
_____ Paed = 10mg/kg _____ then review			

- If seizures continue to persist:

- 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 include whether further investigation (EEG, CT scan) is indicated, and the use of phenytoin, sodium valproate, ethosuximide, diazepam or clonazepam.

Status epilepticus

A seizure continuing more than 30 minutes, or recurrent seizures without regaining consciousness in-between, more than 30 minutes. Many cases do not occur in known epileptic patients - always consider possible underlying causes such as stroke or brain abscess.

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:**

Drug	Codes	Adult dose	Rate
diazepam slow iv (or pr) (not im)	C V	10mg given over 2-3 minutes.	May be repeated once after 5mins.

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:**

Drug	Codes	Adult dose	Frequency
Duration phenobarbitone iv/im	B E	10-15mg/kg	30-50mg per minute infusion(iv over 10 mins)
or paraldehyde im (deep)*	A N	10ml (5ml each buttock)	may be repeated once

**a plastic syringe may be used if the dose is given immediately after the drug has been drawn up.*

m Commence oral drugs as soon as fully conscious: by nasogastric tube if unrousable for more than 6hrs. ■ If seizures persist, **transfer** to provincial or central level for:

Drug	Codes	Adult dose	Frequency
Duration phenytoin sodium iv	A E	15mg/kg then 100mg	over 5 minutes, 6 hourly

- If seizures still persist after 30 minutes, and ICU facilities and anaesthetist available, give:

	Drug	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:

	Drug	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*

- m** Further management at district (B) level:

	Drug	Codes	Paed dose	Frequency
	Duration			
	diazepam iv slow	C V	1mg/year of	May be repeated once

or **paraldehyde im (deep)*** **A N** $\frac{\text{0.1ml/kg}}{\text{age}}$ May be repeated once **a plastic syringe may be used if the dose is given immediately after the drug has been drawn up.*

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 conscious level. In delirium there are also hallucinations + illusions. 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 drug abuse (e.g. alcohol withdrawal).

Management should focus on identification and treatment of the underlying cause, usually by searching for an infection and treating empirically (see section on antibiotics) or for malaria.

If sedation is required give:

Drug	Codes	Adult dose	Frequency
Duration chlorpromazine im required	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:

- 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 Day One.
- occupational therapy and speech therapy if available / 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 nifedipine).
- stop smoking
- treat arrhythmias, e.g. atrial fibrillation
- treat cardiac failure

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:

Drug	Codes	Adult dose	Frequency
Duration aspirin po term	C V	150mg	once daily long term

For patients with atrial fibrillation who have access to facilities for regular blood monitoring (weekly INR for 1 month, then monthly):

Drug Duration	Codes	Adult dose	Frequency
warfarin po then	B V	10mg	2 times a day
			2 days,
			adjust Usual
			maintenance dose
		2.5 - 5mg	once a day INR range 1.5 and 2

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 require **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 / 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: alcohol, diabetes, HIV infection, chronic renal disease and drugs including isoniazid, anticonvulsants, and allopurinol.
- For **pain** give:

Drug	Codes	Adult dose	Frequency	Duration
amitriptyline po	BE	25-75mg*	at night	review

**the lower dose is usually sufficient*

- If ineffective or intolerable side effects, add:

Drug	Codes	Frequency	Duration
carbamazepine po	B E	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:

Drug	Codes	Adult dose	Frequency
Codeine phosphate required po	B E	30-60mg	6 hourly as
If codeine required ineffective Morphine sulphate	B V	10-100mg	4hourly As

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 tremor, Parkinsonism or cerebellar).

Essential tremor

Fine and postural (stops when the hand is held), there is no increase in muscle tone. Treat with:

Drug	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. Initial treatment of tremor usually consists of:

Drug	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, confusion.

Patients usually require treatment with levodopa at some time:

Drug	Codes	Adult dose	Frequency
Duration levodopa 250mg + review, carbidopa 25mg po (levocarb 275)	A N	¼ tablet*	3 times a day 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.

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GENERAL GUIDELINES

Treatment of the mentally ill person does not always require drugs. Other forms of treatment, i.e. 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 drug compliance.
- Emphasise the importance of adhering to the prescriber's instructions.
- Patients on psychotropic medication should be reviewed frequently.
- Do a thorough physical examination in all psychiatric cases to identify possible organic causes and to exclude co-existing physical illness that may influence the person's response to psychotropic drugs.

CAUTION is required when prescribing psychotropic medicines to children, to the elderly and during pregnancy and lactation.

PSYCHOSES

Psychotic persons usually have hallucinations, delusions, loss of contact with reality. They may be violent; some may be withdrawn and mute.

Non-organic psychosis

This refers to conditions where there is no physical disease affecting the brain, e.g. schizophrenia and mania.

- Keep the person in a safe place: prevent harm to self or others.
- Give anti-psychotic drugs:

Drug	Codes	Adult dose	Frequency
Duration			
chlorpromazine po	C V	200-300mg	3 times a day
below			see
or chlorpromazine im	C V	100mg	repeat 1- 2hrs if necessary

Note: Use of chlorpromazine should be avoided in patients with epilepsy. Use of intramuscular chlorpromazine is likely to cause postural hypotension.

Alternative therapy:

Drug	Codes	Adult dose	Frequency
Duration			
trifluoperazine po	A E	5 - 10mg	3 times a day
below			see

Trifluoperazine is less sedating than chlorpromazine

Organic Psychosis

- May be due to HIV and other infections, head trauma, vitamin deficiencies, tumours, etc.
- Identify the cause and treat whenever possible. Use lower doses of chlorpromazine.

Maintenance therapy:

	Drug	Codes	Adult dose	Frequency	Duration
	chlorpromazine po	C	V 15 - 200mg	3 times a day	continual
or	trifluoperazine po	A	E 1.5 - 6mg	3 times a day	continual
or	haloperidol po	A	N 1.5 - 6mg	3 times a day	continual

- If the patient does not comply with oral medication or would prefer not to have to take the tablets repeatedly, use:

Drug	Codes	Adult dose	Frequency
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

**Inform patient and relatives of possible dystonic reactions and the need to report immediately to the nearest health centre with treatment cards if this occurs.*

*Fluphenazine decanoate should **not** be started at clinic level. However, once a patient has been started on depot injections they may be continued at clinics, but ensure referral every six months for specialist review.*

Duration of therapy:

First or single psychotic episode

Most persons have to be maintained on a reduced dose of medication for 3-12 months after disappearance of psychotic symptoms. Then the drug 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 persons require long term maintenance medication to prevent future relapses. Search for the cause of relapses [e.g. continuing stress or non-compliance] and remedy if possible.

Side effects and adverse reactions of anti-psychotic drugs

Early side effects

- Sedation, hypotension, dizziness, dry mouth, blurred vision: usually occur in early stages of treatment and may be self-limiting.
- Acute dystonia [common features are body stiffness, tongue protrusion, grimacing, writhing, twisting of neck or body, torticollis, and oculogyric crisis].
- Treat with:

Drug	Codes	Adult dose	Frequency
Duration			
benzhexol po	BE	5mg	1-2 times a 1 week
or diazepam po	BE	5mg	1-2 times a 1 week
■ If severe give:	Codes	day	Duration
Drug		Adult dose	Frequency
biperiden im/ iv	AN	2 – 4mg	once only

and then continue with benzhexol as above. Reduce the dose of the anti-psychotic therapy.

Medium term side effects

Drug-induced Parkinsonism, stiffness of arms and legs, muscle cramps, internal restlessness [akathisia] require addition of:

Drug	Codes	Adult dose	Frequency
Duration			

benzhexol po	B E	5mg	1-2 times a day	review
---------------------	------------	-----	-----------------	--------

Note: Avoid long-term use of benzhexol without specialist consultation. Some patients become addicted to benzhexol.

Hypothermia: keep the patient warm; refer to hospital as medical emergency if body temperature cannot be raised.

Long term side effects

Tardive dyskinesia: reduce drug very gradually and refer for specialist opinion. Do not give benzhexol.

MOOD (AFFECTIVE) DISORDERS**Mania**

Treatment as for non-organic psychosis. For poorly controlled patients and long term maintenance therapy, refer to specialist level.

Depression

- **Mild**

Counsel; identify and remove possible cause.

■ Severe Depression

In addition to the counselling & identifying and removing the cause, assess and take precautions for possible suicidal behaviour;

Drug	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.*

Do not issue large quantities of antidepressant drugs; 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.

Anxiety Disorders

■ Mild

Counsel; identify cause and treat.

■ Severe

In addition to counselling, give:

Drug	Codes	Adult dose	Frequency
diazepam po	BE	5mg [up to 10-15mg]	once a day max 2 weeks

Caution: Do not prescribe for more than two weeks. If severe anxiety persists refer to specialist.

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:

Drug	Codes	Adult dose	Frequency
diazepam iv	Duration		
diazepam po	CV	10mg	once only then
	BE	20-40mg	once a day
	discontinue [reduce by 5mg every other day]		
and multivitamins			within 7 – 14days
or	CN	2 tablets	once a day review
po	AN	50mg once a day	review
thiamine po			

COMMON EYE CONDITIONS

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PREVENTION OF BLINDNESS

75% 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
- early referral of serious eye diseases and injuries
- tetracycline eye ointment in the new-born child's eyes
- not 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** the following conditions:

- unexplained vision loss; or visual disturbance - **urgent**
- glaucoma: high pressure in the eye - **urgent**
- severe perforating injuries with loss of vision - **urgent**
- corneal ulcer - **urgent**
- burns - **urgent**
- orbital cellulitis : **urgent**
- cataract: cloudiness in an otherwise clear lens;
- retinoblastoma: (white pupil) cataract / tumour in children -**urgent**
- severe eye pain
- conjunctivitis persisting after one week of treatment
- trachoma if eyelashes touching cornea
- congenital or developmental squint
- 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.

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:

	Drug	Codes	Adult dose	Frequency	Duration
	pilocarpine eye drops (2 or 4%)	BV	2 drops	hourly	review
And	acetazolamide po	A N	500mg 250mg	stat, then 8 hourly	-

- Refer to eye specialist within 24 hours.

Xerophthalmia/ Vitamin A deficiency

- Preventive measures include promotion of breast-feeding, measles immunisation, foods rich in Vitamin A [carrot, mango, pumpkin, paw-paw] or supplementation.
- To all children with signs and symptoms of xerophthalmia and/or measles, give:

Drug	Codes	Adult dose	Frequency	Duration
vitamin A po	C V	200,000 iu	single dose	Day 1,
Day		[<1yr = 100,000iu]		2 and after 1- 4 weeks

Nutritional rehabilitation is indicated.

Refer.

Table 19.1 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 19.2: 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	Both
Recurrences?	Unusual	Unusual	Usually	^Chronic

Note: SBold lettering indicates distinguishing feature.

Treatment of conjunctivitis:

■ Acute bacterial conjunctivitis:

Drug	Codes	Adult dose	Frequency	Duration
tetracycline 1% eye ointment	CV	apply	3 times a day	one week

■ Viral conjunctivitis:

No drug 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.

■ Trachoma:

- If left untreated, the cornea becomes permanently and irreversibly damaged. Apply:

Drug	Codes	Adult dose	Frequency	Duration
tetracycline 1% eye ointment	CV	apply	4 times a day	for 6 weeks

If intumed eye lashes (trichiasis, entropion) present, 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, and clean hands.

Conjunctivitis of the Newborn

See also the section in Sexually Transmitted Diseases and the STD Module.

- Prevention:

Drug	Codes	Paed dose	Frequency
Duration			
tetracycline 1% eye ointment	C V	one single application to both eyes within 24 hours of delivery.	
- Treatment:

Drug	Codes	Paed dose	Frequency
Duration			
kanamycin im	C V	25mg/kg	once single dose
and erythromycin po	C V	16mg/kg	3 times a day 14 days
- Treat the parents of the child.

TRAUMATIC EYE CONDITIONS

Penetrating Injury

Treatment: Put on eye shield and ensure NO pressure. Refer urgently to an eye hospital.

	Drug	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	amoxycillin po	B 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:

Drug	Codes	Adult dose	Frequency
Duration			
tetracycline 1% eye ointment	C V	apply under an eye pad for 24hrs, then 3 times a day for 7 days	

If worse after 24 hours – **refer to eye hospital.**

Corneal Abrasion

- Apply an eye pad with tetracycline eye ointment for 24 hours, then review.

- If worse, refer to eye hospital

- If improving, continue with:

Drug	Codes	Adult dose	Frequency	Duration
tetracycline 1% eye ointment	C V	apply	3 times a day	4 days

Chemical Burns

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.

Then:

Drug	Codes	Adult dose	Frequency	Duration
tetracycline 1% eye ointment	C V	apply under an eye pad for 24hrs, then review		

If cornea is involved (ulcer or opacity): **refer**

If cornea is not involved use, and after 24 hours is improving:

Drug	Codes	Adult dose	Frequency	Duration
tetracycline 1% eye ointment	C V	apply	3 times a day	2 weeks

Iritis/ Uveitis

Refer to eye specialist.

Corneal Ulcers

- Treatment:

Drug	Codes	Adult dose	Frequency	Duration
tetracycline 1% eye ointment	C V	apply	3 times a day	5-7 days

Eye pad is advised **only** in clean ulcers, with no discharge or conjunctival oedema.

If no improvement after 4-7 days refer to an eye specialist.

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.

Drug Duration	Codes	Adult dose	Frequency
pilocarpine 4% eye drops	B V Continual	1 drop in each eye	6 hourly

- If intra-ocular pressure is more than 40mmHg:

Drug Duration	Codes	Adult dose	Frequency
acetazolamide po*	A N	250mg	3 times a day until <
and potassium chloride po	B V	600mg	once a day

40mmHg

**NOTE: This drug should NOT be used for more than 3 continuous months.*

COMMON ORAL CONDITIONS

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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 candidiasis/angular cheilitis
- 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 lesion will need referral to a dentist for biopsy if one is worried about malignancy e.g. with Kaposi's sarcoma and lymphoma or infections such as histoplasmosis.
Refer to HAQOCI guidelines.

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 VCT.

Treat with topical therapy such as:

Drug	Codes	Adult dose	Frequency
Nystatin suspension 7- 14days	B E	200 000 units a day	Five times
Nystatin lozenges days	B E	sucked	5 times a 7- 14 day
Or Miconazole oral gel 2% 14days-	C V	topically	4 times a 7 - day

- If there is odynophagia, treat as oesophageal candidiasis 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 VCT and consider giving Cotrimoxazole prophylaxis.

Treat oesophageal candidiasis with systemic drugs such as:

Drug	Codes	Adult dose	Frequency
Fluconazole po 14days	C V	200mg	Twice a day 7 -
Or Ketoconazole days	A N	200mg	Twice a day 7 - 14

- 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:

Drug	Codes	Adult dose	Frequency
Acyclovir po	C E	400mg	3 times a day 5 days

Kaposi's 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 VCT. Assess for Cotrimoxazole prophylaxis and refer to your nearest O I 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

Drug	Codes	Adult dose	Frequency
Duration			
Metronidazole po	C V	200mg	3 times a day 5 days
plus Amoxycillin po	C V	500mg	3 times a day 5 days

Dental Caries

The teeth will have multiple decay. 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 VCT.

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:

Drug	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
or				

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.

Drug	Codes	Adult dose	Frequency	Duration
Ketoconazole	A N	200mg	Twice a day	Months

EAR NOSE AND THROAT DISORDERS

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Ear disorders are common especially in children and HIV infected patients. See Paediatrics Chapter.

Otitis externa

Otoscopy shows an inflamed and granulating ear canal. Malignant otitis externa(MOE) is said to have occurred when there is bone involvement. *P.aeruginosa* and *S. aureus* are usually involved.

- Aural toilet – Just clean the ear canal to remove debris and also apply acidifying solutions such as half strength hydrogen peroxide.

Drug	Code	Adult	Frequency	
Duration	s	dose	cy	
Gentian violet	C	V	Once	Review after 2 days
Or Half strength hydrogen peroxide	C	E	once	Review in 2 days

- Control pain with simple analgesia
- Avoid getting the ear wet
- Do not put objects in the ear.
- MOE needs surgical intervention

Follow up after 7-14 days.

Drug	Code	Adult	Frequency	
Duration	s	dose	cy	
Ciprofloxacin po 6 weeks	B	E	250mg	Twice a day

Acute Otitis media

Patient presents with throbbing earache, hearing loss with or without discharge. Antibacterial therapy will shorten the episode but pain control is also important.

Drug	Code	Adult	Frequen
Duration	s	dose	cy
Amoxicillin	C V	500mg	3 times a 10
days		tds	day
		40mg /kg in	
		paeds	

Chronic suppurative otitis media

Pus is draining from the ear and there is a long history of ear disease.

- This needs referral to an ENT specialist.

Hearing loss

If there are signs of infection such as meningitis, consider cryptococcal or TB meningitis and treat accordingly.

Exclude drug toxicity.

Acute sinusitis

Sudden onset nasal congestion, fever, headache or facial pain. May last up to 1 month.

- Give simple analgesia

Drug	Code	Adult	Frequen
Duration	s	dose	cy
Amoxicillin po	C V	500mg	3 times a
3 weeks		day	
or Clindamycin po	B V	600mg	3 times a
3 weeks		day	
Or Ciprofloxacin po	B V	500mg	Twice a 3
weeks		day	

Refer if not resolving after the above.

Chronic sinusitis

Look for facial pain or headache, nasal congestion and post nasal drip. May last up to 3 months.

Drug	Code	Adult	Frequen
Duration	s	dose	cy
Amoxicillin	CV	500mg	Twice a day
			B V 500mg
Or		Twice a day	3 weeks

Rhinitis

Atrophic and allergic rhinitis- These are quite common and the identification and control/removal of potential allergens is helpful. Potential allergens include cat and dog dander, fleas, cockroaches, pollen and house dust mite. These can be identified by allergology techniques (see also Chapter 25).

Drug	Code	Adult	Frequen
Duration	s	dose	cy
Beclomethasone nasal spray	AN	topically	Review

Tonsillitis

In most cases this is a viral infection and does not need antibiotics. The presence of both fever and tonsillar exudate may warrant antibiotics.

Drug	Code	Adult	Frequen
Duration	s	dose	cy
Aspirin gargles	C V		Review
or Paracetamol po	C V	500mg	4 times a day
Or Amoxicillin po	C V	500mg	3 times a day
			7 days

Laryngitis**Acute laryngitis**

There is a sore throat, painful dry cough and hoarseness of the voice. Manage with voice rest. plus:

Drug	Code	Adult	Frequency
Amoxicillin po	C	E	500mg 3 times
7 days			a day

Chronic laryngitis

If the symptoms including hoarseness persist for more than one month, direct laryngoscopy is required. Refer to an ENT specialist.

SKIN CONDITIONS

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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.

m 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, or:

Drug Duration	Codes	Adult dose	Frequency
potassium permanganate as needed 1:4000 [0.025%]	B	N soak	once a day

■ If severe, or systemic symptoms present **add**:

Drug Duration	Codes	Adult dose	Frequency
erythromycin po 7-10days	C	V 250-500mg	4 times a day

[Paed = 125-150mg]

or **cloxacillin po** 7-10days

B **V** 250-500mg 4 times a day

[Paed = 125-150mg]

Folliculitis

Superficial infection causing small pustules, each localised around a hair. Deep follicular inflammation often occurs in hairy areas.

m Bathe and remove crusts using soap and water, or:

Drug Frequency Duration	Codes	Adult dose
potassium permanganate as needed 1:4000 [0.025%]	B	N soak once a day

■ Topical treatment is sufficient in mild cases.

■ If severe treat as for impetigo, above.

Furunculosis

Painful boils, most frequently caused by Staphylococcus aureus.

m Usually resolves itself, 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:

Drug	Codes	Adult dose	Frequency
cloxacillin po		Duration	
	B V	250-500mg 4 times a day	5-7 days
		[Paed = 125-250mg]	

Erysipelas

A superficial cellulitis with lymphatic vessel involvement, due to streptococcal infection.

- m** Begins at a small break in the skin or umbilical stump (infants). Area affected has a growing area of redness and swelling, accompanied by high fever and pains.

- Treat with:

Drug	Codes	Adult dose	Frequency
Penicillin V po		Duration	
	C E	250-500mg 4 times a day	5-7 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.

- m** Acute cellulitis [indistinct borders] should be differentiated from erysipelas [raised, sharply demarcated margins from uninvolved skin]. Give antibiotics:

Drug	Codes	Adult dose	Frequency
cloxacillin po		Duration	
	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:

Drug	Codes	Adult dose	Frequency
Penicillin V po		Duration	
	C E	250-500mg 4 times a day	

5-7 days
[Paed = 125-250mg]

- If ineffective:

Drug	Codes	Adult dose	Frequency
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:

Drug	Codes	Adult dose	Frequency
Miconazole topical	C V	topical	twice a day
Duration			until resolved
or Clotrimazole cream	C E	topical	Twice a day
			Until resolved

- 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.

- m** Seek underlying cause if any e.g. overuse of oils on skin, stress, anticonvulsant drugs, 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:

Drug	Codes	Adult dose	Frequency
benzoyl peroxide 5%gel	A N	apply	every night
Duration			Review

In severe cases of nodular acne, treat with oral antibiotic:

Drug	Codes	Adult dose	Frequency
doxycycline po	C V	100mg	once a day
Duration			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.

m Responds to any of the topical antifungal agents.

First line: Drug Frequency	Codes	Adult dose	Duration
benzoic acid compound times a ointment	C E	Topical	2-3 4 weeks
Second line: Drug Frequency	Codes	Adult dose	Duration
Miconazole cream more	C V	topically	2-3 times a day for 7 days after resolved
or Clotrimazole cream for 7 more	C E	Topically	2-3 times a day days after resolved

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:

Drug Duration	Codes	Adult dose	Frequency
potassium permanganate 1:4000 [0.025%]	B N	Soak	twice a day as needed

- THEN apply:

Drug Duration	Codes	Adult dose	Frequency
Miconazole cream 2%	C V	topical	2-3 times a day for 7 more days after resolved
Or Clotrimazole cream 1% for 7 more	C E	topical	2-3 times a day days after resolved

In severe infections use griseofulvin:

Drug Duration	Codes	Adult dose	Frequency
griseofulvin po	B N	500mg [Paed = 10mg/kg]	once a day 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:

First line:

Drug	Codes	Adult dose	Frequency
Miconazole Cream 2%	C V	topically	Twice a day 2 weeks
or Selenium sulphide 2.5%	B N	topically	once a day 7 days
			(leave of skin for 10mins)

Second line: If above not effective

Caution: Exclude use of Nevirapine based ART before using Ketoconazole.

Drug	Codes	Adult dose	Frequency
Ketoconazole po	B N	200-400mg daily	5 days

Scalp Ringworm (Tinea Capitis)

In this case the fungus has grown down into the hair follicle.

- m** Topical antifungal therapy may work but if ineffective; treat with:

Drug	Codes	Adult dose	Frequency
griseofulvin po	B N	500mg	once a day 14 days
		[Paed = 10mg/kg]	

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 zig-zag channel), the resting place of the female mite.

- m** 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:

Drug	Codes	Adult dose	Frequency
Gamma benzene	C V	apply from	once and

onc
e
only
hex
achl
orid
e
1%
loti
on

neck down wash off
a
f
t
e
r

2
4
h
r
s
*

CAUTIONS: *In prepubertal children the gamma benzene hexachloride is washed off after 12 hours. Hot baths and scrubbing should be avoided to prevent systemic absorption.

m Alternative in pregnancy, lactating mothers or children < 6 months:

Drug	Codes Duration	Adult dose	Frequency
Benzyl benzoate 25% night emulsion * [irritant]	B	N apply from neck down	once at night for 3 nights, wash off next morning repeat if necessary
*Dilute with one part water (1:1) for children.			
*Dilute with three parts water (1:3) for infants.			
or sulphur ointment 5-10% [in infants]	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:

Drug	Codes Duration	Adult dose	Frequency
calamine lotion	C	N apply as needed	as required
and Chlorpheniramine po	C	E 4mg 3 times a day	3 days
[Paed = 0.1mg/kg]			

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).

m 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:

Drug	Codes	Adult dose	Frequency
	Duration		
Calamine lotion	C N	apply	as needed as required
and chlorpheniramine po	C E	4mg	3 times a day 3
days			
	[Paed = 0.1mg/kg]		

Herpes Zoster

See the chapter on HIV Related Diseases.

OTHER DERMATOLOGICAL CONDITIONS

Eczema

Allergic Contact Dermatitis

Results from an acquired allergy after skin contact with particular chemicals (dyes, perfumes, rubber, chromium, nickel) or drugs (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 adults 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:

Drug	Codes	Adult dose	Frequency
Duration			
emulsifying ointment	B	N	as a soap substitute
or aqueous cream	B	N	as a soap substitute

- Treat itching with an oral antihistamine. **Never** use topical antihistamines:

Drug	Codes	Adult dose	Frequency
Duration			
Chlorpheniramine po	C	E	4mg 3 times a day 3 days [Paed = 0.1mg/kg]
or promethazine po*	B	N	25-50mg at night as needed

* *Not to be used in children under the age of 2 yrs.*

- m** Treat any infection. Choice of skin preparations depends on whether lesions are wet (use cream) or dry/ (use ointment)

- If eczema is “weepy”, dry first using saline baths or bathe in:

Drug	Codes	Adult dose	Frequency
Duration			
potassium permanganate	B	N	soak once a day as needed 1:4000 [0.025%]

- Where large areas are involved give a course of antibiotics for 5-10 days (as for impetigo).
- After the lesions have dried, if necessary, apply a bland preparation such as aqueous cream or zinc oxide preparation for soothing effect.

CAUTIONS: Never use corticosteroid preparations on the face or in children unless supervised by a specialist. More potent steroids, e.g. betamethasone must only be prescribed by specialist. Do not use corticosteroids on ‘weepy’ skin.

▪

- If the skin starts scaling, **add** a keratolytic preparation such as:

Drug	Codes	Adult dose	Frequency
Duration			
salicylic acid 2% oint.	B	N	apply twice a day as needed
or coal tar ointment 5%	B	N	apply twice a day as needed
			[with salicylic acid 2%]

Urticaria

Allergic urticaria may be caused by: drugs (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.

m Exclude drug reaction (e.g. penicillin), or infection (bacterial, viral or fungal).

■ Give antihistamine by mouth [never use topical antihistamines]:

Drug	Codes	Adult dose	Frequency
Duration			
chlorpheniramine po	C E	4mg	3 times a day
required			as

[Paed = 0.1mg/kg]

or **promethazine po*** **C E** 25mg once at night as required

* *Not to be used in children under the age of 2 yrs.*

m If no improvement after 1 month or chronic problem, refer.

Psoriasis

A condition of the skin characterised by thickening and scaling; usually symmetrical.

m Exclude precipitating factors e.g. alcohol, deficiencies of B12 or folate, stress, infections.

■ Avoid using steroids.

■ To reduce scaling use a keratolytic:

Drug	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**:

Drug	Codes	Adult dose	Frequency	Duration
coal tar ointment 5% in	B N	apply	twice a day	as needed
salicylic acid 2%				

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:

Drug
Duration

Codes

Adult dose

Frequency

278

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":

Drug	Codes	Adult dose	Frequency
para-amino-benzoic acid cream / lotion	B	E	apply daily in the morning

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 on Sexually Transmitted Diseases

BURNS

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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 life saving.

Smoke Inhalation Burns

- If occurred in an enclosed area - may need 100 % oxygen.

Assessment

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.

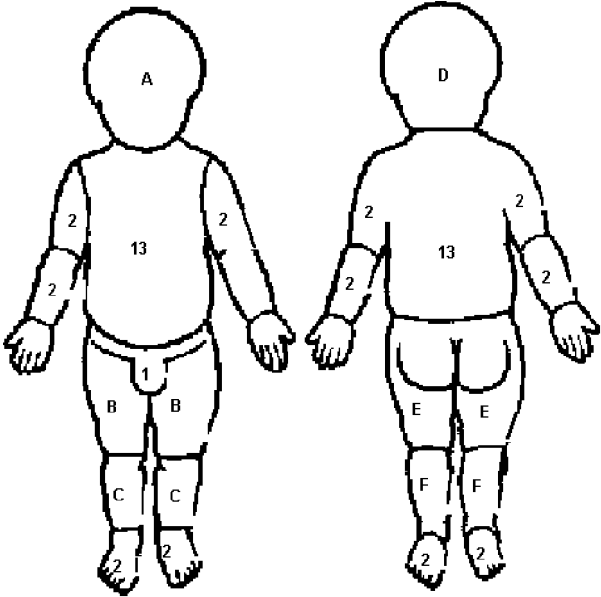
Evaluation of Burnt Surface Area

Resuscitation is initially based on surface area burned.

- In **children** use the Lund & Browder chart (Figure 23.1).
- In **adults** use the rule of nine's (Fig 23.2).

Figure 23.1 Estimating the Body Surface Area for Burns in Children (modified Lund & Browder)

In children the head, thigh and legs account for different percentages according to the age of the child. Use the table below.



	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%

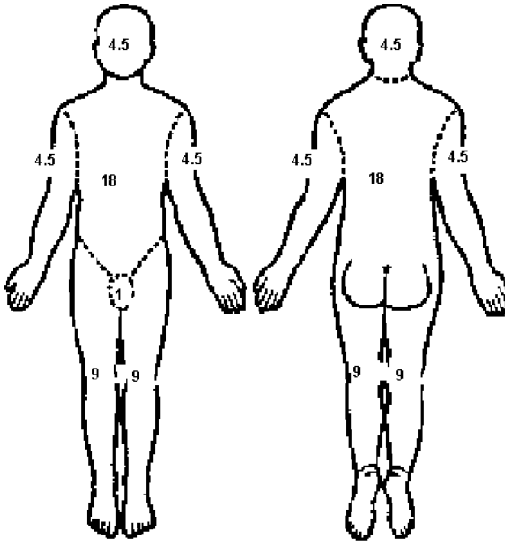
Note:

The Wallace Rule of Nines (fig. 23.2) 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 23.2 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:

Drug	Codes	Adult dose	Frequency
Duration			
paracetamol po	C E		as required
	500mg-1gm Paed =	4-6hrly 4	
+/- codeine phosphate po	BE Adults:		as required
	15-60mg	hourly	
■ Give an anti-tetanus booster:		Frequency	Duration
Drug	Codes	one dose on	
Adult dose			
tetanus toxoid im	CV 0.5ml*		ly

**check manufacturers 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 ONLY and should relate to the swab culture. Meanwhile if temperature greater than 39°C, give:

Drug	Codes	Adult dose	Frequency
Duration benzylpenicillin iv CV	0.05MU per	every 6hrs	reassess
or erythromycin po	C V Paed = 12.5mg/kg	500mg every 6hrs	reassess after culture

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:

Drug	Codes	Rate
ringers lactate iv	BV	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:

Drug	Codes	Adult dose	Frequency
Duration Morphine iv slow review	B E	2.5 - 5mg	every 4hrs
		increasing as required	
or petidine im (or iv in small diluted doses)	BV	1mg/kg	every 4hrs review

Analgesia in children:

Drug	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 empty 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 %

Drug	Codes	Rate
ringers lactate iv 8hrs.	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:

Drug	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 %

Drug	Codes	Rate
ringers lactate iv	B	V Give 1/3 the total amount every 8hrs
and Darrows half strength section with dextrose 2.5%	C	V Normal daily requirement (see 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:

	Drug	Codes	Dose	Frequency	Duration
	silver sulphadiazine 1% face) topical cream	B V		Apply daily (not to the	
or	povidone-iodine 5% topical cream	B E		Apply daily	

- Give antitetanus booster:

Drug	Codes	Adult dose	Frequency	Duration
tetanus toxoid im	C V	0.5ml	one dose only	

- Give antacids routinely every 6 hours:

Drug	Codes	Adult dose	Frequency	Duration
magnesium trisilicate po	C N	20ml	6 hourly	review
or Cimetidine po	B E	400mg	once a day at night	review

- **Antibiotics** are required only if/when wounds contaminated. Gram positive organisms (notably B-haemolytic *streptococcus*) predominate early on (first 5 days):

Drug Duration	Codes	Adult dose	Frequency
benzylpenicillin iv	C V	2.5MU	6 hourly
*then penicillin V po	C E	500mg	6 hourly

change to oral *
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:

Drug Duration	Codes	Adult dose	Frequency
benzylpenicillin iv	C V	2.5MU	6 hrly
and gentamicin iv	B V	80mg	8 hrly

review based on c/s

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:

Drug Duration	Codes	Adult dose	Frequency
(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 <u>early</u> using sterile preparation. Apply burn cream* <u>twice</u> daily.

** burn cream is the term used to denote either silver sulphadiazine or povidone iodine cream*

PAIN MANAGEMENT & CARE OF THE TERMINALLY ILL

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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.
- Anxiety, depression and fear should also be assessed and managed accordingly. Anxiolytic and anti-depressant medication is seldom needed - the opportunity for discussion is more effective. If overlooked, these underlying conditions may aggravate pain, making control more difficult.
- In acute pain, careful and frequent assessment is needed to determine the period for which drugs should be given. As the pain lessens, analgesics should be reduced and even discontinued.
- In chronic pain, long term analgesia is required. Frequent assessment is needed to establish the correct dose and minimise side effects of the drugs. 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

Unless there is a definite contra-indication (peptic ulceration, coagulation defects, low platelet count, prior to surgery or breast feeding), the drug of first choice for analgesic and antipyretic action is paracetamol. If anti-inflammatory action is required aspirin is the drug of choice*:

Drug	Codes	Adult dose	Frequency
paracetamol po Duration	C V	500mg-1g	every 4-6hrs as required
or aspirin po	CV ($\leq 4g/day$)	300-900mg	every 4-6hrs as required
or ibuprofen po	B E ($\leq 4g/day$)	200-400mg (\leq)	every 4-6hrs as required

Moderate Pain

Treat as for mild pain. If inadequate control:

Drug Duration	Codes	Adult dose	Frequency
add codeine phosphate po as required	B E	15-60mg	every 4 hrs

Severe Pain

- Morphine is the drug 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.
- An anti-inflammatory may be needed as an adjuvant.
- In most cases patients will have been given drugs for mild and moderate pain with no success. However, certain patients have such severe pain that morphine is required straight away.
- Morphine is **always** given 4 hourly.

Drug Duration	Codes	Adult dose	Frequency
morphine im*	B E	10mg	every 4 hrs review
or morphine po	B V	5-10mg	every 4 hrs review, then increase by 10mg until 30mg/dose, then increase by 15mg until 90mg/dose, then increase by 30mg until 180mg/dose, then <u>increase by 60mg until pain is controlled.</u>

**when calculating parenteral dose, use one third of estimated or existing oral dose.*

- Increments should be made quite rapidly i.e. after 2-3 doses 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, addiction and respiratory depression are **very unlikely** if the dose of morphine is adjusted to the needs of the individual patient.
- It is unusual for patients to require more than 200 mg per dose, and for acute pain smaller doses are usually adequate.
- If pain control is not achieved the patient may require an **additional**, higher dose to prevent this 'break through' pain.
- Long term usage of morphine should be restricted to cancer patients.

Side-effects of morphine

These are mostly transient and treatable and should **not** contraindicate the continued use of morphine. They include:

■ Constipation:

This is common and all patients should receive regular laxatives. Encourage high roughage diet and high fluid intake.

■ Nausea and vomiting:

This is usually transient. An, antiemetic should be given for the first three days or longer as needed.

Drug	Codes	Adult dose	Frequency	Duration
metoclopramide po	B V	10-20mg	3 times a day	as required
or prochlorperazine po	B N	5-10mg	3 times a day	as required
or haloperidol po	A N	1.5-4.5mg	at night	as required

**If vomiting is severe, antiemetics may need to be given parenterally or rectally.*

■ Drowsiness, dizziness, confusion:

Occurs especially in the elderly, but improves in 3-5 days. Do **not** discontinue morphine.

■ Allergy:

Morphine allergy is **very rare**. An alternative is pethidine, but it is short-acting and less potent than morphine. Pethidine is better suited to acute pain than chronic.

Drug	Codes	Adult dose	Frequency
pethidine im	B V	50-100mg	3 hourly
	as		required*

**Not suitable for long term use.*

Special Types of Pain

In certain situations other drugs may be useful in controlling pain. These drugs may be used alone or with an analgesic

Nerve Compression

Drug	Codes	Adult dose	Frequency
prednisolone po	B V	5-10mg	3 times a day
Duration below			see

Reduce dose of steroids progressively to minimal maintenance level once clinical improvement occurs.

Short courses of high dose prednisolone (60-100mg/day) may be required.

Raised Intracranial Pressure

Manage with a diuretic, codeine or morphine analgesia and:

	Drug Duration	Codes	Adult dose	Frequency
	dexamethasone po	B N	4mg	3 times a review
or	prednisolone po	B V	20-30mg	3 times a day review

Joint / Bone Pain

See also chapter on Bone & Joint Conditions

	Drug Duration	Codes	Adult dose	Frequency
	aspirin po	C V	600-900mg	every 4-6hrs review
or	ibuprofen po	BE	400mg	every 4hrs review
or	indomethacin* po	B E	25 - 50mg	every 4-6hrs review

** if a rectal form of indomethacin or other anti-inflammatory is available it should be considered for use*

Metastatic Bone Pain

Use morphine. Note: regular long term addition of a non-steroidal anti-inflammatory drug **is** effective and often allows lower doses of morphine to be used.

Neuropathic Pain

Trigeminal Neuralgia, Post Herpetic Neuralgia & Peripheral Neuralgia

- Use with or without analgesics:

	Drug Duration	Codes	Adult dose	Frequency
	Carbamazepine po increasing	B E	100mg	1-2 times a day
			slowly	
	to max of 400mg	3 times a day,	review	
+/-	amitriptyline po	BE	25mg to 150mg*	at night at night, max increasing 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

Drug	Codes	Paed dose	Frequency
paracetamol po	CV	10-15mg/kg	every 4hrs
	Duration		review

Moderate Pain

Drug	Codes	Paed dose	Frequency
paracetamol po	C V	10-15mg/kg	every 4hrs
and codeine* phosphate po	B V	0.5-1mg/kg	every 4hrs
review			review

**Prevent constipation by increased fluid intake and high fibre diet where feasible*

Severe Pain

Drug	Codes	Paed dose	Frequency
paracetamol po	CV	10-15mg/kg	every 4hrs
and morphine po	review BV	<1yr =	every 4hrs
or morphine iv		0.2mg/kg	
or morphine iv bolus		>1yr =	
		0.25mg/kg	
	BE	0.05-0.06	per hour continuous
		iv	infusion
		mg/kg	every 2 hrs
	BE	0.1mg	

Nausea and vomiting

Drug	Codes	Paed dose	Frequency
metoclopramide po	BV	1-2mg/kg	3 times a day
or promethazine po*	B N	0.25-	3 times a day
		0.5mg/kg	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:

- a truthful explanation of the illness showing understanding and concern
- 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 from a relative / carer, propping the patient up, oxygen, and the use of morphine and mild sedatives all help.

During the last hours of a person's life, carers should focus on minimising pain, reducing shortness of breath, and reducing the risk of seizures and choking. If symptoms and distress are not easily controlled it may be appropriate to use sedation

DRUGS AND THE ELDERLY

Due to physiological changes and altered pharmacodynamic response of target organs the elderly are more susceptible to adverse drug reactions.

Elderly patients may require multiple drug therapies. Therefore medication should be reviewed frequently (every 3 months).

- Provide simple, once or twice daily regimens wherever possible.
- Give clear instructions on how drugs are to be taken.
- Where possible ask relatives to supervise drug taking.
- Suppositories or liquid formulations should be prescribed where swallowing is difficult.

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

Do **not** use chlorpropamide as impaired renal function may increase risk of toxicity. Use:

Drug Duration	Codes	Adult dose	Frequency
glibenclamide po	B V	2.5mg up to 15mg	once a day

But remember - The elderly are also at increased risk of hypoglycaemia with glibenclamide.

If control is not achieved add metformin/**refer** for further management (See section on diabetes.)

Hypnotic / Sedatives

Benzodiazepines (e.g. diazepam) significantly impair cognitive function and should not be used. Hypnosis or sedation should be achieved with:

Drug Duration	Codes	Adult dose	Frequency
amitriptyline* po intermittently	B E	12.5mg	at night

**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:

Drug Duration	Codes	Adult dose	Frequency
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 drugs before an adequate physical examination has excluded impaction high up. In such cases a high fibre diet, regular enemas and a stimulant such as senna will relieve the problem.

Non-steroidal Anti-inflammatory drugs

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.

Drug	Codes	Adult dose	Frequency
Duration			
Aspirin po required	C V	300-600mg	≤ 3 times a day as
or ibuprofen po required	A N	200mg	≤ 3 times a day as

**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

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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 (< 42% in men and <36% in women). Use of red blood cell indices and careful examination of a peripheral blood smear will usually indicate the likely cause of anaemia. If in doubt contact a central hospital laboratory for assistance (bone marrow smear and peripheral blood films can be sent for comment).

Avoid blood transfusion in haematinic deficiency. For other causes, transfuse only when patient is symptomatic and the cause of anaemia is not immediately treatable. 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.*

Drug Duration	Codes	Adult dose	Frequency	Review
ferrous sulphate po	C E	200mg [60mg iron]	3 times a day	
Paed = 12mg iron, <1yr = 6mg iron				

Expected response rise is haemoglobin 1g/dl/week. Continue treatment for 3 months after haemoglobin normal to replenish body iron stores.

Megaloblastic Anaemia

This is due to deficiency of vitamin B₁₂ and/or folic acid. It is important to establish the cause for appropriate treatment. Until or unless blood levels are available, it is mandatory to give both vitamin B₁₂ (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 multiple myeloma. In the presence of these conditions vitamin B₁₂

/folate deficiency must be excluded. Macrocytosis is physiological in the neonate.

Vitamin B₁₂ Deficiency

Life long replacement is mandatory in pernicious anaemia, post-gastrectomy or ileal resection.

Drug	Codes	Adult dose	Frequency
Duration hydroxocobalamin weeks, (vitamin B₁₂) im	B V	1mg	2 times a week
			3 then once every 3 months for life

Folic Acid Deficiency

In malabsorption up to 15mg daily may be required.

Drug	Codes	Adult dose	Frequency
Duration folic acid po	C E	5mg	once a day
			Review

Sickle Cell Anaemia

■ Management:

Drug	Codes	Adult dose	Frequency	Duration
folic acid po	C E	5mg	once a day	for life
and benzathine penicillin im	C V			2.4MU
once a month		for life		
or penicillin V po	C E	250mg	once a day	for life

For **malaria prophylaxis** in endemic areas:

Drug	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 and antibiotics are required.

Morphine is necessary to control **severe pain**. Weaker opiates (codeine) or non-steroidal anti-inflammatory drugs (e.g. aspirin) may be used for less severe pain. See chapter on Pain.

Antibiotic therapy:

Drug	Codes	Adult dose	Frequency
Duration			

amoxicillin po
5 days

C V 500mg 3 times a day

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, haemolytic or sequestration crisis, red cell transfusion may be required to treat anaemic heart failure. Note that over transfusion worsens the sickling crisis and may cause iron overload.

- Sickle cell trait requires no treatment, and does not cause anaemia.

G6PD deficiency

Glucose-6-phosphate dehydrogenase (G6PD) deficiency is common in Zimbabwe.

Intravascular haemolysis and haemoglobinuria may occur with oxidant drugs (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.

The risk of malaria outweighs the risk of haemolysis, so chloroquine and quinine should be used if indicated for malaria treatment

Avoid blood transfusion unless clinically indicated. Other

Anaemias

- **HIV anaemia** is a common finding with HIV/AIDS patients. Transfusion is only indicated in treating severe anaemia and cardiac failure.
- **Other cytopaenias:** refer to next section on Blood Products.
- **Aplastic anaemia** presents as pancytopenia. 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 B₆, 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 haemophilic 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. Involve the physiotherapist as soon as the bleed is resolving.

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 1,2 and 3 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 4 above, 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: **For paediatrics** give 10ml/kg of cryoprecipitate or of fresh frozen plasma.

- As adjunct to factor replacement in mucosal or gastro-intestinal bleeding and surgery, give fibrinolytic inhibitor [tranexamic acid]. Do not use for haematuria.
- In an emergency, fresh frozen plasma can be used to treat bleeding in haemophiliacs (give 3 bags initially) if none of the above are available
- 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:**

	Drug Duration	Codes	Adult dose	Frequency	
	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

	Drug Codes	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:

Drug Duration	Codes	Adult dose	Frequency
------------------	-------	------------	-----------

cryoprecipitate	A	E	6 bags per	every 24-48	if
bleeding			dose	hrs	continues

Tranexamic acid (specialist drug) 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:

Drug	Codes	Adult dose	Frequency	
Duration				
fresh frozen plasma	B	V	4 bags	every 12- if
bleeding				24hrs continues

If platelet count $<50 \times 10^9/L$ and patient is bleeding:

Drug	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):

Drug	Codes	Adult dose	Frequency	
Duration				
cryoprecipitate	A	E	6 bags per	review Review
			dose	

- The use of heparin is NOT recommended in bleeding patients with DIC, except under specialist supervision.

Liver Disease

Drug	Codes	Adult dose	Frequency
Duration			
vitamin K iv *	B 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:

Drug	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:

Drug	Codes	Paed dose	Frequency	
Duration				
vitamin K im	C V	1mg	once a day	3 days

Idiopathic Thrombocytopenic Purpura (ITP)

Drug	Codes	Adult dose	Frequency	
Duration				
prednisolone po	B V	1mg/kg	once a day	2 weeks, then according to response – see notes below

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.

Consider splenectomy for those in whom steroids fail to achieve adequate control or who relapse after treatment.

ANTICOAGULATION

Oral Anticoagulation

Drug	Codes	Adult dose	Frequency	Duration
warfarin po	B V	10mg	once a day	2 days, (loading dose) then check the INR on Day 3 and adjust

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 daily/ 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: drug interactions are common and can be dangerous. Below are a few examples:

Warfarin Inhibition

Barbiturates
Oral contraceptives
Griseofulvin
Rifampicin
Carbamazepine
Vitamin K

Warfarin Potentiation

Alcohol
Chloramphenicol
Cimetidine
Erythromycin
Cotrimoxazole
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:

Drug	Codes	Adult dose	Frequency
Duration			
vitamin K slow iv	B 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:

Drug	Codes	Adult dose	Frequency
Duration			
fresh frozen plasma	B V	4 units	
and vitamin K iv	B V	0.5 - 1mg	once a day
Review			

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 (protein C & S deficiency etc.)
- Paroxysmal nocturnal haemoglobinuria
- Previous history of DVT
- Other pro-thrombotic states such as artificial cardiac valves and atrial fibrillation need life long anticoagulation.

Methods of prophylaxis available

Physical methods include stockings. Early mobility must be encouraged in all surgical patients.

Drug management (targeting an INR of 2 to 2.5):

Drug	Codes	Adult dose	Frequency	Duration
warfarin po	BV	10mg	once a day	2
		days then review based on INR level		
or heparin sc (unfractionated)	BV	5000 units	8 hourly	Review
■ Treatment of DVT	Codes	Adult dose	Frequency	Duration
Drug				
heparin sc (unfractionated)	BV	17500 units	Twice a day	see below*

*Duration is 4-6 months except in pregnancy, or if there is another reason for prolonged treatment;

- Pulmonary embolism: 4-6 months.
- Atrial fibrillation: life long treatment.
- Heart valve prostheses: life long 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:

Drug	Codes	Adult dose	Frequency
Duration			
heparin sc	B V	17500 units	twice a day
or warfarin po	B V	keep INR in	
			to 37 weeks,
after 12 weeks up to 37 weeks		range 2-3	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 thrombocytopenia, and with prolonged use osteoporosis.

Life Threatening Pulmonary Embolism/ Arterial Embolism

See also section in Cardiovascular conditions.

Drug	Codes	Adult dose	Frequency
Duration			
hydrocortisone iv [for allergic reactions]	B V	100mg	once only
and streptokinase iv	AN	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. Even the process of cross-matching blood is expensive: for straightforward volume expansion use **crystalloids**.

*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. cardiac failure, give small doses (e.g. 20mg). Intra-venous frusemide is rarely required.*

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;
- 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).

Surgery

Pre-and peri-operative - Anaesthesia is safe if haemoglobin >8g/dl in stable individuals (except for the condition being managed surgically). Where facilities are available major surgical cases can proceed with group and save. Requests for cross matching should be done only when blood loss necessitating replacement is expected. Efforts should be made to encourage autologous transfusion where appropriate.

- Pre-anaesthetic bleeding and transfusion during or at end of operation.
- Intra-operative cell salvage and re-transfusion.
- Autologous blood donation for elective surgical procedure.

Post Operative - Give packed cells if further treatment of patient (e.g. further surgery, chemotherapy or radiotherapy) would be compromised by a low haemoglobin.

For specific indications and operative interventions, see table below.

Table 26.1 Surgery: Specific Indications and Operative Interventions

Type of Surgery	Operation	Blood Requirements
General Surgery	Splenectomy Gastrostomy, ileostomy Laparotomy for peritonitis Bowel resection Abdominal stab and gun-shot wounds	Group and save serum Cross-match 3 units Cross-match 2 units Cross-match 3 units Cross-match 3 units
Vascular Surgery	Amputation of limb	Group and save serum
Cardio-Thoracic Surgery	Open pleural/lung biopsy	Group and save serum
Neurosurgery	Head injury-extradural haematoma	Cross-match 2 units
Orthopaedics	Nailing fractured neck of femur Internal fixation of femur Internal fixation of tibia or ankle	Group and save serum Cross-match 2 units Nil
Urology	Nephrectomy Open prostatectomy	Cross-match 2 units Cross-match 2 units

Obstetrics and Gynaecology

The general principles are the same as for the surgery. For specific indications and operative interventions, see Table 26.2 below, where examples of blood requirements (packed cells) are given.

Table 26.2 Obstetrics and Gynaecology: Specific Indications and Operative Interventions

Procedure	Hb<8 gms/dl	Hb 8 - 10 gms/dl	Hb>10 gms/dl
Dilation and curettage	E	A A	A A
Uterine evacuation	E	A A	A A
Cervical biopsy Tubal ligation	E		
Laparoscopy	E	B	B
Manual removal of placenta	G	C	B C
Vaginal repair	G	C	
Caesarean section for: Placenta praevia, abruption Eclampsia Other indications	F F E	H C B	C C B
Laparotomy for: Ruptured ectopic Mass, unruptured ectopic Ruptured uterus Genital tract malignancy	E G H H	C C H H	C C C C
Hysterectomy (abdominal or vaginal)	G	C	C

Key for table:

- Proceed without cross-match or grouping
- Group and save serum
- Cross-match 2 units.
- Cross-match 4 units.
- Cross-match and transfuse to 8 gms/dl pre or peri-operatively
- Cross-match and transfuse to 10 gms/dl pre or peri-operatively
- Transfuse to 8 gms/dl and keep 2 more units.
- Transfuse to 10 gms/dl and keep 2 more units.

Note: These modes of management are regarded as safe in usual circumstances. In situations where less blood is available, it may be more appropriate to take some risks by proceeding, than taking the greater risk of transferring a deteriorating patient. Individual clinical judgement is required. If necessary, telephone the referral centre for advice.

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
- Disseminated intravascular coagulation (DIC) with active generalised bleeding and platelets $<20 \times 10^9/L$
- DIC prior to LSCS (or other operation) with platelets $<50 \times 10^9/L$
- Cranial operations and eye operations need platelets above $100 \times 10^9/L$.

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.

** 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 thrombocytopenic 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

The sole use is for exchange transfusions.

Blood should be less than 5 days old.

EXCHANGE TRANSFUSION IN NEONATES

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.

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

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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	100ml/kg/24hrs
	11 to 20kg	1000ml + 50ml/kg/24hrs
	21 kg or more	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:

Drug	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)

Drug	Codes	Paed dose	Frequency	Duration
half strength Darrow's 100ml/kg/24hrs	C	V 0-10kg =		
solution with dextrose 2.5% iv		5-10yrs=	75ml/kg/24hrs	

Infants: (Up to 30 days old)

Drug	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)

Drug	Codes	Adult dose	Frequency
sodium chloride 0.9% iv	C	V	In severe dehydration the first litre may

Or **Ringer lactate iv** **C V** 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).

Intravenous Infusion Rehydration (Children)

Drug	Codes	Adult dose	Frequency
Duration half strength Darrow's and with dextrose 2.5% iv	C V		Severely dehydrated infants

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:

Drug	Codes	Adult dose	Frequency
Duration			

Sodium chloride 0.9%	C	V	replace losses iv And
Potassium chloride iv	B	V	1g (13mmol) added to each litre

Surgical Losses (not 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:

Drug	Codes	Adult dose	Frequency
Duration			

Ringer lactate iv surgery	C	V	10 ml/kg for the first hour of
----------------------------------	----------	----------	--------------------------------

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 38°C 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 27.1 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 drugs.

It should **not** be used in head injured patients (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 drugs.

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: resuscitation in severe hypovolaemia, as a plasma substitute.

Fresh frozen plasma (FFP) should not be used as a general colloid, but only when specifically indicated. See section on Blood and Blood Products.

Dextran 70

Used to reduce viscosity and prevent venous thrombosis.

Modified gelatin

Used to expand and maintain blood volume in hypovolaemic shock.

See table 27.2 on next page.

Table 27.2 Composition of Available IV Solutions

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-m mol/L	154	111	65	51	0	0	77	21	77
HC03 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
Calorie s 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

Severe anaphylaxis is a medical emergency (life and death situation) in which seconds count. Prompt treatment is required for acute airway obstruction, bronchospasm and hypotension.

Common causes of anaphylaxis are drugs, (notably: antibiotics, non-steroidal anti-inflammatory drugs, antiarrhythmics, heparin, parenteral iron, desensitising preparations and vaccines), blood transfusions, bee and other insect stings, and certain foods.

Note: If the allergen can be identified, it is essential 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 (e.g. drug, blood)
- Lie the patient flat and elevate the legs.
- Ensure a clear airway; give 100% oxygen, if available.
- Monitor pulse, blood pressure, bronchospasm and general response/condition every 3-5 minutes.
- Give:

Drug Duration	Codes	Adult dose	Frequency
adrenaline 1 in 1000 im	C V	0.5 – 1ml	Repeat as necessary every 10mins until improvement occurs.
children 1-5yrs		[= 10mg/kg] 0.1-0.2ml	
children 6-12yrs		0.2-0.4ml	

- In **severe** allergic reaction give:

Drug Duration	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 <u>slow</u> [1-5yr =0.1 ml/kg]	repeat every minute	until satisfactory clinical response

Start IV volume expansion with normal saline (or Ringer lactate) adjusting rate according to blood pressure:

Drug	Codes	Adult dose	Frequency
normal saline iv	CV	First litre run in over 15-20mins, then review.	

Drug	Codes	Adult dose	Frequency
Add:	Duration		
promethazine slow iv	BV	25-50mg	8 hourly up to 48hrs
	Paed:	1-5yr = 5mg	
		<u>6-12yr = 12.5mg</u>	

and hydrocortisone iv		200mg required	12 hourly as
	B		
	V		
	Paed:	< 1yr = 25mg	
		1-5yrs = 50mg	
		<u>6-12yrs = 100mg</u>	

Monitor pulse, blood pressure, bronchospasm and general response/condition every two minutes.

If **no improvement**, the following may be necessary:

Drug	Codes	Adult dose	Frequency
aminophylline slow iv	BV	6mg/kg over 20 minutes	unless the patient has taken aminophylline in the past 8 hours
then aminophylline in dextrose 5% slow infusion	BV	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):

Drug	Codes	Adult dose	Frequency
sodium bicarbonate iv	B V	50mmolas required (15-30min intervals)	

POISONING

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Poisons include drugs, 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, Medical School
P O Box A178 Avondale, Harare.
Telephone Harare 790233 direct or 791631 ext 172.
datis@healthnet.org.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 drugs and poisons out of reach of children; do NOT store in areas or containers used for food storage.
- Do NOT transfer drugs 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

- 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.

Induce vomiting with:

Drug	Codes	Adult dose	Frequency	Duration
ipecacuanha syrup po (Ipecac Syrup USP: 0.7ml ipecac liq. extract in 10ml syrup)	B N	30ml syrup, if vomiting does not occur then half a within 20 minutes, repeat glass of water.		the dose.
		6-18months = 10ml		
		older children = 15ml		

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:

Drug	Codes	Paed dose	Frequency
Duration			
D314	C V	100 ml for each washing, and repeat until aspirated fluid is clear.	
half strength darrows with dextrose 2.5%			

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, then give:

Drug	Codes	Adult dose	Frequency
Duration			
activated charcoal	B E	400ml	administration may be repeated after 4-6 hours
50g added to 400 ml water *		slurry	
		children 0.25 - 0.5 g/kg	

**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.

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 drugs 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 drug 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:

Drug	Codes	Adult dose	Frequency
Duration diazepam slow iv required	C V	0.05 - 0.1mg/kg	as required as

- Control arrhythmias appropriately

Drug	Codes	Adult dose	Frequency
Duration lignocaine 2% iv preservative free	A E	500mg over 2-4mins, then 1-2mg/min by infusion	

- For metabolic acidosis, if arterial pH < 7.2:

Drug	Codes	Adult dose	Frequency
Duration sodium bicarbonate iv infusion in dextrose 5%	B V	continuous	

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

- Induce emesis with ipecacuanha syrup unless respiration is depressed. Delay absorption of the remaining 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 drug.

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, give milk orally every hour up to a total of 100ml/kg in the first 24 hours.
- In severe poisoning, hydration with intravenous fluids must be initiated in the **first hour**:

Drug Duration	Codes	Adult dose	Frequency
dextrose 5% with sodium infusion bicarbonate 75mmol/L	B V	continuous	

Alkaline diuresis is an option under specialist guidance. •

In the presence of fluid retention, give:

Drug Duration	Codes	Adult dose	Frequency
furosemide 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:

Drug Duration	Codes	Adult dose	Frequency
furosemide iv	B V	0.25-1mg/kg	once review
and hydrocortisone iv/ im	B V	4mg/kg	4 hourly

- Control convulsions or hyperactivity with:

Drug	Codes	Adult dose	Frequency
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diazepam <u>slow iv</u> required [max =30mg]	C	V	0.05- 0.1mg/kg	as required	as
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- 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

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:

Drug Duration	Codes	Adult dose	Frequency
diazepam <u>slow iv</u> required [max =30mg]	C	V	0.05- 0.1mg/kg
			as required
			as

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:

Drug Duration	Codes	Adult dose	Frequency
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:

Drug	Codes	Adult dose	Frequency
Duration			
acetylcysteine iv infusion in dextrose 5%	AE	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 if performed soon after ingestion
- Maintain adequate airway. Give artificial respiration if necessary.
- If patient is in coma, give:

Drug	Codes	Adult dose	Frequency
Duration			
naloxone iv required	B V	0.01mg/kg	as required as

- Maintain normal body temperature.
- Correct acidosis as it arises. For metabolic acidosis, if arterial pH < 7.2:

Drug	Codes	Adult dose	Frequency
Duration			
sodium bicarbonate iv infusion in dextrose 5%	B V	continuous	

- Correct hypoglycaemia if present by:

Drug	Codes	Adult dose	Frequency
Duration			
dextrose 50% iv and dextrose 5% iv _____	C V C V	20ml bolus dose, then infusion_____	

- Avoid administration of excessive fluids and depressant drugs and give:

Drug	Codes	Adult dose	Frequency
Duration			
thiamine po	AN	200mg	once a day review

- In acute alcoholic mania (following ethanol withdrawal after chronic ingestion) give:

Drug	Codes	Adult dose	Frequency
Duration			
diazepam <u>slow iv</u>	C V	10mg then 5mg then 5-10mg	one dose immediately every 5-10mins until controlled, 8 hourly as required

- In ethanol withdrawal in patients with a history of seizures give:

Drug	Codes	Adult dose	Frequency

Duration

diazepam slow iv
[max = 30mg]

C V 0.05- as required -
0.1mg/kg

- For encephalopathy:

Drug	Codes	Adult dose	Frequency	Duration
thiamine iv/im	AN	250mg	once	-
then thiamine po	AN	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 and purgative 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 (see notes at the beginning of this chapter).
- CAUTION: Do not give milk, fats or oils as they will increase absorption of the insecticide if ingested.
- Control of convulsions, hyperactivity, or tremors:

Drug	Codes	Adult dose	Frequency	Duration
diazepam slow iv [max = 30mg]	C V	0.05- 0.1mg/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, propoxur, 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 emptied by airway protected gastric lavage.(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:

Drug	Codes	Adult dose	Frequency
Duration			

atropine iv /im	B V	2mg [Paed=0.02 -0.05mg/kg	every 15 mins [Paed every 10-15mins], until signs of atropinisation
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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.

Drug	Codes	Adult dose	Frequency
Duration			

add* pralidoxime iv	A N	8-10mg/kg/hr	continuous infusion
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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]:

- Give ipecacuanha syrup if patient not already vomiting.
- Perform gastric lavage.
- Give Fuller’s Earth (aluminium silicate) if available.
- 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**:

Drug	Codes	Adult dose	Frequency	
Duration				
hydrocortisone iv	B V	200mg	4 times a day	early in therapy

Paraffin, Petrol and 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 Drugs and Chemicals

see table on next page

Table 29 - Antidotes for Poisoning by other specific drugs and chemicals

Drug/ poison	Antidote	Dosage	Notes
atropine	paraldehyde po/ im/ pr physostigimine iv	0.05-0.2ml/kg 1-2mg in 1-2ml 0.9% sodium chloride over 2min	To control convulsions (do not use diazepam) May be repeated every 5mins to a total dose of 6mg for adults (2mg for children) every 30mins.
arsenic compounds	dimercaprol im then penicillamine po	3mg/kg im every 4hrs for 2 days Up to 25mg/kg 4 times a day (max 1g/day) for 7 days	Should be given within 4hrs of poisoning Start after 2 days of dimercaprol therapy.
copper salts	calcium disodium edetate iv or penicillamine po	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 Up to 25mg/kg 4 times a day (max 1g/day) for 7 days	

cyanides	sodium nitrite 3% iv and sodium thiosulphate	10ml iv over 3min 25ml of 50% injection (or 50ml of 25%) over 10min Repeat BOTH injections at half the initial dose if symptoms reappear.	Stop if systolic BP drops below 80mm Hg Give after sodium nitrite using same needle and vein. SPEED IS ESSENTIAL
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Table 29 - Antidotes for Poisoning by other specific drugs and chemicals (cont.)

Drug/ 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	
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Table 29 - Antidotes for Poisoning by other specific drugs and chemicals (cont.)

Drug/ 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, prochlorperazine)	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 arrhythmias. Do not use lignocaine.
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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:**
 - x cut the wound
 - x use a tourniquet
 - x give electric shock to the site
 - x rub or massage the wound site.

In hospital

- Remove the pressure bandage
- Give analgesia and:

Drug	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:

Drug	Codes	Adult dose	Frequency
Duration			
*snake antivenom, then polyvalent iv	B E	Test dose of 0.5ml. If no reaction, 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.

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:

Drug Duration	Codes	Adult dose	Frequency
scorpion anti-venom instructions	B N	Check the manufacturers	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 *Aminita 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

DRUGS USED IN ANAESTHESIA

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GENERAL NOTES:

Only persons trained to administer them should use the drugs in this section and 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 **visited** 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 **recovery period** is an anaesthetic responsibility.
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

A thiobarbiturate (intravenous use only) which produces anaesthesia, but **no** analgesia, within one arm-brain circulation time.

Drug	Codes	Dose	Onset	Duration
thiopentone sodium	B V	3-5mg/kg	10-15secs	
5-10mins				
slow iv			repeat if necessary after 20-30secs	

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.

Drug	Codes	Dose	Onset	Duration
etomidate iv	B N	0.2 -0.4mg	30-60sec	
3-10min		per kg		

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.

Propofol

Produces anaesthesia but **no** analgesia in one arm-brain circulation time. Recovery is rapid with minimal post-op nausea and vomiting.

Drug	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
- Avoin in children less than one year and epileptic patients
- In Caesarean Section
- Discard unused solutions
- Contraindicated in people allergic to eggs and soyabean oil

Ketamine

Produces dissociative anaesthesia gradually.

Drug	Codes	Dose	Onset	Duration
ketamine iv	B V	1-2mg/kg iv	30-90sec	10-20min

4-8mg/kg
im

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.
- 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.

Drug	Codes	Dose
nitrous oxide induction	B V	Titrate to effect for analgesia, 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.

Halothane

Volatile liquid - always administer via a calibrated vaporiser.

Drug	Codes	Dose	Onset	Duration
halothane	B V	Titrate to effect dependent	Dose dependent	Dose

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.

Soda Lime

An adjunct to inhalational anaesthesia. Use in **circle** carbon dioxide absorber system with low fresh gas flow anaesthesia.

Drug	Codes
soda lime	B V

LOCAL ANAESTHESIA & CONDUCTION

ANAESTHESIA

This includes local infiltration, peripheral nerve block, spinal anaesthesia and epidural analgesia.

- Factors influencing the safe dosage of local anaesthetics include
 - patient's age, weight, physical status, vascularity of the area to which the drug 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 drug (e.g. ephedrine) is available to treat possible hypotension.
- Preservative-containing solutions should **not** be used for spinal anaesthesia.

Bupivacaine Hydrochloride

Drug	Codes	Dose	Onset	Duration
bupivacaine max = hydrochloride		A E	10-15 min	3-6 hours

Lignocaine Hydrochloride

Drug	Codes	Dose	Onset	Duration
lignocaine HCl 2% plain =	C V	max	2-10 min	1-2 hours
lignocaine HCl 2% + max = adrenaline 1:100 000	B E		2-10 min	1-2 hours

MUSCLE RELAXANTS/ CHOLINESTERASE

INHIBITORS

- **Only** personnel who are skilled in managing the patients' airway through intubation and ventilation must administer these drugs.
- Ventilation must be mechanically assisted until the drug 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.

Drug	Codes	Dose	Onset	Duration
suxamethonium chloride iv	B V	0.5-1 5mg	≤ 30secs	up to 5min
		per kg		
		Ave. for intubation: 1mg/kg		

Indications

- Laryngoscopy and intubation
- Muscle relaxation of short duration

Contra-indications:

- moderate/severe burns
- crush injuries
- spinal cord transection
- division of a major nerve e.g sciatic, brachial plexus
- tetanus
- history of malignant hyperthermia
- scolene apnoea

Cautions

Repeat doses will cause bradycardia; this can be prevented by atropine (10-20 micrograms/kg intravenously).

Alcuronium Chloride (non-depolarising)

Drug	Codes	Dose	Onset	Duration
alcuronium chloride iv	B V	0.2-0.25	30-40mins	1-2mins
		mg per kg		

Indications

- Muscle relaxation of medium duration.

Cautions

- Moderate histamine release may occur.
- Hypotension may occur.
- Avoid in renal failure.

Pancuronium Bromide (non-depolarising)

Does not cause significant histamine release.

Drug	Codes	Dose	Onset	Duration
pancuronium bromide	A N	0.1mg/kg	1-3mins	40-60mins
iv				

top up using 10% of paralyzing dose

Indications:

- Muscle relaxation of medium to long duration.

Cautions:

- Care is required in hepatic impairment.
- Reduce dose in renal failure.
- Causes moderate tachycardia and rise in blood pressure.

Neostigmine bromide (Cholinesterase inhibitor)

Provides reversal of non-depolarising neuromuscular blockade.

Drug	Codes	Dose
neostigmine bromide atropine	B	V 2.5-5 mg after/with 1-1.8mg 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.

PERI-OPERATIVE DRUGS

Atropine Sulphate (antimuscarinic)

Drug	Codes
atropine sulphate	B V

Indications:

- Drying secretions: 0.3-0.6mg **im** 30-60mins before induction, or **iv** immediately before induction [Paed = 20mcg/kg]
- Reversal of excessive bradycardia: 0.3-1mg **iv** [Paed =10-30mcg/kg]
- Used with neostigmine for reversal of non-depolarising neuromuscular block: 1-1.8mg **iv** [Paed=20mcg/kg]

Hyoscine butylbromide (antimuscarinic)

Drug	Codes
hyoscine butylbromide	B N

Indications:

- Drying secretions: 0.2-0.6mg oral (or **im**) 30-60mins before induction

Diazepam (sedative)

Drug	Codes
diazepam iv/ po	C V

Indications:

- Anxiolysis and sedation with amnesia: 5-10mg orally 1-2hrs before surgery, or 0.2mg/kg slow iv (adults and over 8yrs)

Midazolam		Codes		Dose	Onset	Duration
Drug						
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 – 80minutes
or midazolam	B	V		1-15mg/hr	30-60 seconds	

- Premedication
- Adjunct to general anaesthesia
- Conscious sedation and sedation in ICU

Caution:

- causes respiratory depression when used in conjunction with opioids 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 (sedative)

Antihistamine with sedative, antiemetic and anti-cholinergic properties. Useful for the pre-operative preparation of the asthmatic patient.

Drug	Codes
promethazine	B V

Indications:

- Premedication one hour before surgery: 25-50mg im
1-5yr = 15-20mg po >5yrs =
6.25-12.5mg im
- Severe anaphylaxis during anaesthesia: 50mg (Paed 0.4mg/kg) slow iv.

Trimeprazine tartrate (sedative)

Drug	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.

Sodium Citrate (antacid)

Drug	Codes	Dose
sodium citrate 0.3molar induction solution	B N	30ml immediately before

Indications

- neutralization of gastric contents to prevent acid aspiration syndrome where this is a risk, e.g. obstetrics.

Metoclopramide (antiemetic)

Dopamine antagonist; accelerates gastric emptying.

Drug	Codes	Adult dose	Frequency
metoclopramide po 1hr	B V	Premedication: 10 mg po/im/iv 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 (antiemetic)

Drug	Codes
prochlorperazine	B N

Indications:

- Prophylaxis (Adult 12.5mg po/im) and treatment of post-operative nausea and vomiting (12.5mg po/im 6hourly) (Paed: 0.2mg/kg im).

Cautions

- Extrapyramidal symptoms may occur, particularly in children.

Analgesics

See chapter on Pain Management for guidelines on morphine, pethidine and codeine phosphate.

DRUGS USED IN SHOCK

see also chapter on Anaphylaxis

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 aetiological diagnosis for appropriate treatment. CVP monitoring is required.

Adrenaline 1 in 10 000

Add 9ml normal saline / water to 1ml of 1 in 1000 adrenaline

■ Severe anaphylaxis in anaesthesia

Drug	Codes	Adult dosage
adrenaline 1 in 10 000	C V	1ml <u>slow</u> repeat
iv		[1-5yr every minute until satisfactory clinical response =0.1 ml/kg]

■ Cardiac arrest during anaesthesia:

Drug	Codes	Adult dosage
adrenaline 1 in 10 000	C V	5ml for fine / low amplitude
ventricular iv		fibrillation persisting after defibrillation [or 10ml of 1 in 1000]; 10ml for asystole [or 20ml of 1 in 1000]

Ephedrine sulphate

This is the drug of choice in obstetrics

■ Hypotension due to spinal or epidural anaesthesia

Drug	Codes	Adult dosage
ephedrine sulphate iv	B E	increments of 5 mg iv

If many increments are needed a larger dose may be given intramuscular or by intravenous infusion.

Hydrocortisone

■ Peri-operative cover for patients on corticosteroid therapy:

Drug	Codes	Adult dosage
Hydrocortisone	B V	100mg with premedication, then

100mg	6 hourly	24hrs, then decrease
-------	----------	----------------------

■ **Severe anaphylaxis during anaesthesia:**

Drug	Codes	Adult dosage	
hydrocortisone iv required	B V	200mg	12 hourly as
		[Paed = 3-4mg/kg]	

Lignocaine hydrochloride [preservative-free]

■ **Cardiac arrest during anaesthesia, with ventricular fibrillation persisting after defibrillation:**

Drug	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:**

Drug	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

ANTINEOPLASTIC AGENTS

A wide variety of antineoplastic agents is generally available. These agents should be used under the supervision of a specialist in oncology, be it for the treatment of malignant or other conditions. Chemotherapy drugs fall into the following classes;

alkylating drugs, cytotoxic antibiotics, antimetabolites, vinca alkaloids, other drugs.

Chemotherapy can be used in a number of ways. The criteria for use differ for each tumour type, stage morphologic and biologic characteristics. Drug combinations are more commonly used than single agents.

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 drug should be used at maximum dose
4. Each drug should be used at maximum dose.
5. Agents with similar dose – limiting toxicities can be combined safely only by reducing doses, resulting in decreased effects.

6. Drug combination should be administered in shortest interval between therapy cycles to allow for the recovery of normal tissue.

GUIDELINES OF HANDLING CHEMOTHERAPY DRUGS

- The drugs should be reconstituted by trained personnel.
- Reconstitution should be done in designated areas, preferably under lamina flow.
- Protective clothing should be worn at all times whilst reconstituting the drugs. This includes eye protection.
- Gloves should always be worn when administering the drugs.
- Pregnant health care workers should not handle chemotherapy drugs.
- Waste disposal should be meticulously handled. All contaminated disposables should be incinerated.

ADJUVANT CHEMOTHERAPY

Adjuvant Chemotherapy is use of chemotherapy drugs in patients who remain at high risk of recurrence after the primary tumour and all evidence of cancer has been surgically removed or treated definitely with radiation. These patients with not be having any evidence of clinical disease.

Cancer effectively treated by adjuvant chemotherapy includes, Wilms tumour, breast cancer, osteosarcoma and colorectal cancer.

Principles of Adjuvant Chemotherapy

1. Effective chemotherapy must be available
2. Known tumor should be removed by surgery
3. Chemotherapy should be started as soon as possible postoperatively
4. Chemotherapy should be given in maximally tolerated doses
5. Chemotherapy should continue for a limited time period
6. Chemotherapy should be intermittent, when possible, to minimise immunosuppression

NEOADJUVANT CHEMOTHERAPY

Chemotherapy is administered before surgery or radiotherapy. Cancers effectively treated by neoadjuvant chemotherapy include, soft tissue sarcomas, osteosarcoma, anal cancer, bladder cancer, larynx cancer, oesophageal cancer and locally advanced breast cancer.

CHEMORADIATION

Chemotherapy is increasingly being administered concurrently with radiotherapy in some tumours. The result of chemoradiation in these tumours is superior to the use of

either agent alone or the use of combining chemotherapy and radiotherapy in any other way. The improved outcome outweighs the slightly increase incidence of side effects. Cancers effectively treated by chemoradiation include, cervical cancer, oesophageal cancer, nasopharyngeal cancer and other head and neck cancers

PALLIATIVE CHEMOTHERAPY

Chemotherapy can be used in advanced disease for palliation where there is no alternative therapy or where local therapies have failed. Palliative chemotherapy is a very expensive form of palliation. Complete responses are achievable in carefully selected patients. 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.

CANCER CURABLE OR OCCASIONALLY CURABLE WITH CHEMOTHERAPY ALONE

Cancers that are 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)

Cancers occasionally curable with chemotherapy

Ovarian cancer Small cell
lung cancer

SELECTION OF CHEMOTHERAPY AGENTS

Patients should be assessed adequately prior to prescription and administration of these drugs or referral to a tertiary hospital. Consider the following:

PHYSIOLOGIC AGE OF THE PATIENT

Whilst age alone is not a valid criterion for excluding patients from 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 a Karnofsky performance status of 30 percent or less are not usually candidates for chemotherapy unless the tumour is previously untreated and especially very likely to respond.

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

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

Failure to respond to first line therapy lessens the probability to respond to second line therapy. It is most likely due to the development of multi drug 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 drugs 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

1. Biopsy – proven, residual or metastatic disease
2. Indicator lesion

3. Satisfactory performance score and nutrition
4. Patient capable of informed consent
5. Minimal bone marrow, renal, and hepatic function (occasionally pulmonary or cardiac function important)
6. Available monitoring and support functions

Common side effects of chemotherapy *Nausea and*

vomiting; This is one of the most common side effect. The different drugs have different emetogenic potential. Treatment of these side effects is therefore tailored to suit the emetogenic potential of the drugs used. This has to be done prophylactically. Nausea and vomiting can be acute, delayed or anticipatory.

Bone marrow suppression; Most drugs will cause bone marrow suppression, especially neutropenia. This is worst 7 to 10 days after administration of the drug. 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 drugs. It is however reversible.

Extravasation reactions; This is a serious side effect resulting from the drug 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 speciality.

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 drugs is a possibility for both male and female patients. Germ cell banking should be considered as appropriate.

DOSE MODIFICATION

Drug 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 DRUG REACTIONS

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 drug 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 thiacetazone, itching due to chloroquine, etc. Reactions to vaccines specially imported unregistered drugs, 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 +263-4-736981/5, Fax +263-4-736980, E-mail:

mcaz@africaonline.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:			
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 Drug(s)

Drug:	Generic Name:
	Brand Name:
Condition/indication drug was given for:	
Daily dose/route:	
Date begun:	
all other drugs used by patients:	
Laboratory test results	

Reported by

Family Name:	
Forename(s):	
Status:	
Address:	
Signature:	

Send this form to:

The Director-General Medicines Control Authority in Zimbabwe
106 Baines Avenue, P O Box 10559, Harare Fax:
+263-4-736980, Tel: +263-4-736981/5
E-mail:mcaz@africaonline.co.zw

Adverse Drug Reaction Report

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Reported by

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Signature:	

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Daily dose/route:	
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		Days	Months
Description:			
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Drug:	Generic Name:
	Brand Name:
Condition/indication drug was given for:	
Daily dose/route:	
Date begun:	
all other drugs used by patients:	
Laboratory test results	

Reported by

Family Name:	
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Address:	
Signature:	

Send this form to:

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E-mail:mcaz@africaonline.co.zw

Adverse Drug Reaction Report

DRUG 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.: Harare 790233 or 791631 (ext. 172), or 794411 (ext. 2005)

General notes

When two drugs 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 drugs concerned, and may cause unexpected toxicity. As newer and more potent drugs are available to us, the number of serious drug interactions occurring is likely to increase.

Remember that interactions may involve non-prescription drugs and social drugs (such as alcohol, mbanje), plants and traditional remedies.

Drug interactions can be the result of interference with another drug's absorption, displacing the drug from a plasma protein binding site, having a similar, additive effect, increasing or decreasing the other drug'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: >f> increased / enhanced effect 4> decreased effect

Drug affected	Effect	Drugs causing effect
ACE inhibitors "f	enhanced hypotensive effect	anaesthetics diuretics
ACE inhibitors 4*	decreased hypotensive effect	non-steroidal anti-inflammatory drugs
alpha blockers (prazosin) "f	enhanced hypotensive effect	anaesthetics antidepressants beta blockers calcium channel blockers diuretics
amiloride / spironolactone "f	raised potassium levels	captopril
aminoglycosides "f	ototoxic & nephrotoxic effects increased	high dose frusemide
anticoagulants "f	increased risk of bleeding	aspirin
anticoagulants 4*	increased metabolism	carbamazepine
anticoagulants /warfarin "f	increased anticoagulant effect	alcohol imidazole antifungals
antidepressants (tricyclics) "f	enhanced sedative effect	alcohol other antidepressants anti-epileptics
anti-epileptics 4*	lowered threshold	antidepressants (tricyclics)
anti-epileptics 4*	inhibited metabolism	isoniazid
benzodiazepines "f	increased action	cimetidine
beta blockers (atenolol/ propranolol) -f	enhanced hypotensive effect	anaesthetics
calcium channel blockers 4*	reduced effect	phenobarbitone rifampicin phenytoin
calcium channel blockers "f	enhanced effect	anaesthetics
calcium channel blockers 4*	increased metabolism	rifampicin
carbamazepine "f	increased action of carbamazepine	erythromycin isoniazid cimetidine
carbamazepine 4*	reduced anti-epileptic effect	chloroquine
CNS depressants "f	increased action	alcohol sedative drugs phenobarbitone
corticosteroids 4*	increased metabolism	phenobarbitone
digoxin "f	enhanced toxicity	thiazides frusemide quinine

Potentially hazardous interactions (contd.)

doxycycline 4*	increased metabolism	carbamazepine
imidazole antifungals 4*	increased metabolism reduced plasma conc.	rifampicin phenytoin
indinavir (antiviral) "f	inhibited metabolism	imidazole antifungals
indinavir (antiviral) 4*	enhanced metabolism	rifampicin
ketoconazole 4*	reduced absorption	antacids anti-muscarinic drugs cimetidine
lithium "f	increased toxicity	diuretics
metronidazole 4*	reduced plasma conc.	phenytoin
metronidazole ♦	antabuse reaction	alcohol
neuromuscular blockers "f	enhanced effects	aminoglycosides
non-steroidal anti-inflammatory drugs -f	increased risk of renal damage	ACE inhibitors
oral contraceptives 4*	reduced contraceptive effect	rifampicin 'broad spectrum' antibiotics phenobarbitone carbamazepine phenytoin
oral hypoglycaemic /insulin "f	increased hypoglycaemic effect	alcohol
phenytoin "f	enhanced effect	imidazole antifungals
phenytoin "f	action increased	chloramphenicol cimetidine cotrimoxazole isoniazid metronidazole
sulphonylureas "f (glibenclamide / metformin)	increased action	chloramphenicol cotrimoxazole fluconazole miconazole
theophylline "f	increased theophylline levels	cimetidine erythromycin oral contraceptives calcium channel blockers

Incompatibilities between Drugs and IV Fluids

This section only intended as a general guide. Many other incompatibilities exist. Always check for compatibility before adding any drug to an IV fluid (look at the package insert of the drug, or ask your local pharmacy department for advice).

Drugs should **not** be added to blood, amino acid solutions, or fat emulsions.

Certain drugs, 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).

Drug	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'

CATEGORISATION OF DRUGS ON THE 5TH ESSENTIAL LIST FOR ZIMBABWE

Drugs used in Anaesthesia

Analgesics and Antipyretics (incl. narcotics & anti-migraine)

Anti-inflammatory Drugs & drugs for Rheumatism and Gout

Antihistamines (anti-allergic drugs)

Antidotes & Substances used in Poisoning Management

Anti-infective Drugs (antibiotics & other anti-microbials)

Drugs affecting the blood & Blood Products/ Substitutes

Cardiovascular Drugs

Central Nervous System Drugs

Dermatological Agents

Gastrointestinal Drugs

Hormones

Immunological agents (incl. vaccines & sera)

Ophthalmological Drugs

Respiratory System Drugs

Drugs Used in Labour & Delivery

Intravenous (& other) Solutions

Vitamins & Minerals

Drug name	Form	Level	VEN
1. Drugs used in Anaesthesia			
alcuronium chloride	Inj	B	V
bupivacaine hydrochloride	Inj	A	E
etomidate	Inj	B	N
halothane	Gas	B	V
ketamine	Inj	B	V
lignocaine + adrenaline	Inj	B	E
lignocaine hydrochloride	Inj	C	V
lignocaine no preserv 2%	Inj	B	N
neostigmine bromide	Inj	B	V
nitrous oxide	Gas	B	V
Oxygen	Gas	C	V
pancuronium bromide	Inj	A	N
Propofol	Inj	A	V
soda lime	-	B	V
suxamethonium chloride	Inj	B	V
thiopentone sodium	Inj	B	V
trimeprazine tartrate	Po	B	N
2. Analgesics, Antipyretics, Narcotics, Anti-migraine			
Aspirin	Po	C	V
codeine	Po	B	V
ergotamine	Po	A	N
morphine	Inj	B	E
morphine	Po	B	V
paracetamol	Po	C	V
paracetamol	Syr	C	V
pethidine	Inj	B	V
3. Anti-inflammatory, Rheumatism, Gout			
allopurinol	Po	B	E
colchicine	Po	A	N
ibuprofen	Po	A	E
indomethacin	Po	B	E
diclofenac		B	E
4. Antihistamines			
chlorpheniramine	Po	C	E
promethazine	Po	B	N
5. Antidotes, Poisoning			
acetylcysteine	Inj	A	E

<u>Drug name</u>	<u>Form</u>	<u>Level</u>	<u>V</u>
Atropine	Inj	B	V
Charcoal activated	Po	B	E
ipecacuanha syrup USP	Po	B	N
naloxone neonatal 20mcg/ml	Inj	B	V
Pralidoxime scorpion	Inj	A	N
antivenom snake antivenom	Inj	B	N
polyvalent	Inj	B	E
<u>6. Anti-infectives, Antibiotics,</u>			
	antivirals		
acyclovir	Po	B	E
albendazole	Po	C	E
amoxicillin	Po	C	V
amoxicillin	susp	C	E
ampicillin	Inj	B	E
benzathine penicillin	Inj	C	V
benzyl benzoate	Top	B	N
benzylpenicillin	Inj	C	V
chloramphenicol	Inj	B	V
chloramphenicol	Po	B	V
chloramphenicol	susp	B	E
chloroquine	Po	C	V
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
dapsone	susp	C	V
doxycycline	po	B	V
erythromycin	po	C	V
erythromycin	po	C	V
ethambutol	susp	C	V
fluconazole	po	B	V
gentamicin	po	B	V
gentian violet	inj	B	V
griseofulvin	top	C	V
	po	B	N

Drug name	Form	Level	VEN
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
6. Anti-infectives (contd.)			
miconazole oral gel	po	C	V
Nalidixic acid	po	B	V
neomycin	po	A	N
nitrofurantoin	po	B	N
norfloxacin	po	C	V
Ny statin	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	paed	B	E
streptomycin	inj	B	V
Selenium sulphide 2%			
sulphadoxine + pyrimethamine	po	B	E
7. Drugs 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

Drug name	Form	Level	VEN
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 Drugs

amiloride	po	A	N
atenolol	po	B	V
Captopril	po	B	E
digoxin	po	B	V
digoxin	inj	B	E
ephedrine	inj	A	N
enalapril	po	B	V

8. Cardiovascular Drugs (contd.)

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	V
magnesium sulphate	inj	B	V
methyldopa	po	B	E
nifedipine sr	po	B	V
potassium chloride	po	B	V
potassium chloride	inj	B	V
prazosin	po	B	E
propranolol	po	B	E
spironolactone	po	A	N
Verapamil	inj	A	N
verapamil	po	A	N

9. Central Nervous System Drugs

Amitriptylline	po	B	E
Benzhexol	po	B	E
Biperiden	inj	A	N
Carbamazepine	po	B	E
carbidopa-levodopa	po	A	N
Chlorpromazine	po	C	V
Chlorpromazine	inj	C	V

Drug name	Form	Level	VEN
Diazepam	po	B	E
Diazepam	inj	C	V
fluphenazine deconate	inj	B	V
Haloperidol	po	A	N
Haloperidol	inj	A	N
Imipramine	po	A	E
Midazolam	inj	A	E
paraldehyde (deep)	inj	A	N
Phenobarbitone	inj	B	E
Phenobarbitone	po	C	V
phenytoin sodium	po	B	V
phenytoin sodium	inj	A	E
sodium valproate	po	A	N
Trifluoperazine	po	A	E
10. Dermatological Agents			
aqueous cream	top	B	N
benzoyl peroxide 5% gel	top	A	N
calamine lotion	top	C	N
coal tar 5% ointment	top	B	N
compound benzoic acid ointment	top	C	E
10. Dermatological Agents (contd.)			
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 Drugs			
Bisacodyl	po	C	N
bismuth subgallate with 1%	pr	B	N
hydrocortisone			
Cimetidine	po	B	N
glycerine suppositories	pr	C	N
hyoscine butylbromide	po	B	N
liquid paraffin	po	B	N
magnesium trisilicate	po	C	N
Metoclopramide	po	B	V

Drug name	Form	Level	VEN
Prochlorperazine	inj	B	N
Prochlorperazine	po	B	N
Promethazine	inj	B	V
Omeprazole	po	A	E
Ranitidine	po	B	E
12. Hormones			
Carbimazole	po	B	E
combined oral contraceptive pill	po	C	V
Dexamethasone	inj	B	E
Dexamethasone	po	B	N
dinoprost (PG F2 alpha)	inj	A	E
dinoprostone (PG E2)	po	A	E
dinoprostone (PG E2)	vag	A	E
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
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 immunoglobulin	inj	B	E
tetanus toxoid	inj	C	V
tuberculin, purified	-	B	N
14. Ophthalmic Drugs			
Acetazolamide	po	A	N
pilocarpine eye drops	eye	B	V

Drug name	Form	Level	VEN
tetracycline eye ointment 1%	eye	C	V
15. Respiratory System Drugs			
Adrenaline	Inj	C	V
Aminophylline	Inj	B	V
beclomethasone inhaler	Inh	B	E
beclomethasone nasal spray	Spray	A	N
Salbutamol	po	B	V
salbutamol inhaler	inh	B	E
salbutamol nebulised	neb	B	V
theophylline	po	C	E
16. Drugs 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
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	N
Thiamine	inj	A	N
vitamin A	po	C	V
vitamin D	po	B	V
Vitamins, multi	po	C	E
Vitamins, multi	paed	B	E

SPECIALIST ESSENTIAL DRUG LIST IN ZIMBABWE

Drug	Dosage form	Strength	VEN
1			
Drugs Used in Anaesthesia			
1.1 General Anaesthetics/Medical Gases			
Isoflurane	Gas		E
Sevoflurane	Gas		E
1.2 Local Anaesthetics			
Amethocaine	Gel	4%	N
Ropivacaine	Injection	2mg/ml	N
1.3 Muscle Relaxants			
Atracurium	Injection	10mg/ml	N
Vecuronium	injection	10mg/vial	N
1.4 Peri-operative drugs (a) 2			
2.1 Narcotic Analgesics			
fentanyl	Injection	50mcg/ml	N
Alfentanil	injection	500mcg/ml	N
2.2 Nonsteroidal Anti-inflammatory Drugs (NSAID)			
Diclofenac	Injection	25mg/ml	N
diclofenac sodium	tablet SR	75mg	N
Indomethacin	Suppository	100mg	N
2.3 Disease Modifying Antirheumatic Drugs			
Methotrexate	Tablet	2.5mg	N
sulphasalazine	Tablet	500mg	N
tablet			
3 Antihistamines			

4 ANTIDOTES AND SUBSTANCES FOR TREATMENT OF POISONING

Edrophonium	injection	10mg/ml	V
Flumazenil	injection	0.1mg/ml	V

5**Antiinfective drugs****5.1 Antibacterial Drugs**

Ceftazidime	injection	500mg	
ceftriaxone	injection	1g	V
ciprofloxacin	injection	10mg/ml	V

5.2 Antitubercular Drugs

Cycloserine	tablet	250mg	E
Ethionamide	tablet	250mg	E

5.3 Antipneumocystis and antitoxoplasmosis drugs

Pyrimethamine	lhadiazine	tablet	25mg	E
Sulphadiazine		tablet	500mg	E

5.4 Systemic Antifungal Drugs

amphotericin B	injection	50mg	E
Fluconazole	injection		N

5.5 Systemic Antiviral Drugs

acyclovir	Injection	250mg	E
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6 Antimigraine Drugs

Dihydroergotamine mesylate	Injection	1mg/ml	N
Sumatriptan	Tablet	50 mg	N

7 ANTINEOPLASTIC AND IMMUNOSUPPRESSIVE DRUGS 7.1
Antineoplastic and Immunosuppressives

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
7.2 Complementary Drugs			
aminoglutethimide	Tablet	250mg	
Filgrastim	Injection	30million units	
folinic acid	tablet	15mg	
folinic acid	Injection	3mg/ml	
medroxyprogesterone acetate	tablet	100mg	
medroxyprogesterone acetate	Injection	50mg/ml	
Mesna	Injection	100mg/ml	
Tamoxifen	Tablet	10mg	

8 DRUGS AFFECTING THE BLOOD

8.1 Anticoagulants and fibrinolytics

Streptokinase	Injection	250 000 IU
E		

8.2 Antifibrinolytic and Antihaemostatic Drugs

tranexamic acid	tablet	500mg
N		

9 BLOOD PRODUCTS/BLOOD SUBSTITUTES

9.1 Plasma Substitutes (a)

dextran "70"	infusion	6% in
	N	
dextran "70"	glucose 5% or in sodium chloride	N 0.9%

9.2 Anti-anaemic drug

epoetin alfa and beta	Injection	4000units/ N ml
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10 CARDIOVASCULAR DRUGS

10.1 Antianginal Drugs

glyceryl trinitrate	injection	1 mg/ml	V
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10.2 Antiarrhythmic Drugs

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 Drugs

sodium nitroprusside	infusion	10mg/ml	N
Minoxidil			
Amlodipine	tablet	10 mg	N
Labetolol			

10.4 Diuretics

	tablet	5mg	E
	infusion	1mg/ml	N

10.5 Drugs used in Shock or Anaphylaxis (c)

Dobutamine	injection	12.5mg/ml
V		

Dopamine	injection	40mg/ml	
Noradrenaline	injection	V 2mg/ml	
10.6 Sclerosing Agents		V	
ethanolamine oleate	injection		

11

CENTRAL NERVOUS SYSTEM DRUGS 11.1

Anticonvulsants

Sodium valproate	tablet	200mg	N
Sodium valproate	suspension	40mg/ml	N
Clobazam	tablets	10mg	N
Clonazepam	tablet	500ugm	N
Lamotrigine	tablet	5, 25mg	N

11.2 Psychotherapeutic Drugs

Fluoxetine	tablet	20mg	N
Olanzapine	tablet	5, 10mg	N
Methylphenidate	tablet	10mg	N

11.3 Antiparkinsonian Drugs

L-dopa	tablet	100/25	N
Orphenadrine	tablet	50mg	N

11.4 Drugs used in Spasms and Spastic Conditions

Baclofen	tablet	10mg	N
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11.5 Myasthenia Gravis

edrophonium chloride	injection	10mg/ml	V
Pyridostigmine	tablets	60mg	V

11.6 Other

Oxybutynin	tablets	2.5mg	N
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12

DERMATOLOGICAL AGENTS

12.1 Anti-inflammatory Agents

Betamethasone	cream	0.10%	N
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12.2 Antibacterial Agents (Topical)

13

DIAGNOSTIC AGENTS

Tetracosactrin Methylene blue	injection	250ug/ml	
Radiopaque 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

14

GASTROINTESTINAL DRUGS**14.1 Antiemetics**

	tablets	4mg	E
Ondansetron			

14.2 Gastric/Peptic Ulcer Drugs**14.3 Anti-inflammatory Drugs**

Prednisolone	Enema 20mg/100	N ml	
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14.4 Antidiarrhoeal Drugs

15

HORMONES**15.1 Corticosteroids**

Fludrocortisone	tablet	100	N
		micrograms	
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	
oestrogens, conjugated	vaginal cream		N
16			N

OPHTHALMOLOGICAL DRUGS

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/Antiallergi

cs			
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
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16.6 Systemic Treatment of Glaucoma

Acetazolamide	Injection	500mg/ml	N
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16.7 Miscellaneous

methylcellulose (artificial tears)			N
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17

EAR, NOSE AND THROAT PREPARATIONS

17.1 Ear drops

Clotrimazole	ear drops	1%	N
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Gentamicin	ear drops	0.30%	N
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18

AGENTS CORRECTING WATER AND ELECTROLYTE DISTURBANCES

18.1 Parenteral

magnesium sulphate	Injection	0.6mg/ml	V
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18.2 Parenteral Nutrition

parenteral iron	Injection		N
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Aminoacid	Solution		N
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Aminoacid with electrolytes	Solution		N
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Dextrose 20%	Solution		N
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Lipid-solution	Infusion	10% 500ml	N
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Lipid-solution	Infusion	20% 500ml	N
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Trace elements	Injection (additive)		N
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Vitamins (fat soluble)	Injection (additive)		N
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Vitamins, water soluble	Injection (additive)		N
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Dialysis Solutions

18.3

Intraperitoneal dialysis	Solution with 1.5% dextrose		V
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Intraperitoneal dialysis	Solution with 4.5% dextrose		V
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Haemodialysis cone.	Solution		E
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19

ANTIRETROVIRAL DRUGS

19.1 Nucleoside Reverse Transcriptase Inhibitors

Zidovudine		tab300mg	N
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Zidovudine	solution	50mg/5ml	
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Zidovudine	injection	10mg/ml	E
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Lamivudine		tab150mg	
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Lamivudine	solution	50mg/5ml	N
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Didanosine		tab200mg	
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Didanosine	Powder	100mg	N
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Stavudine		tab	N
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Stavudine	powder	30/40mg	
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Stavudine		5mg/ml	E
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Abacavir		tab	
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Abacavir		300mg	N
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Abacavir	solution	100mg/5ml	
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Stavudine/Lamivudine/Nevirapine	tab	30/150/200mg	
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Stavudine/Lamivudine/Nevirapine	tab V	40/150/200mg	
Stavudine/Lamivudine	tab	30/150mg	V
Stavudine/Lamivudine	tab	40/150mg	V
Zidovudine/lamivudine	tab	300/150mg	V

19.2

Non-nucleoside reverse Transcriptase Inhibitors

Nevirapine			
Nevirapine	tab	200mg	V
Efavirenz	suspension	50mg/ml	V
Efavirenz	tab	200mg	E
Nelfinavir	suspension	150mg/5ml	E
	tab	250mg	N

19.3 Protease Inhibitors

Nelfinavir Indinavir			
Saquinavir	suspensio	50mg/ml	N
Ritonavir Ritonavir	tab	400mg	N
Lopinavir/ritonavir	capsule	200mg	N
	capsule	100mg	N
Lopinavir/ritonavir	solution	400mg/ml	N
	capsule	133.3mg/33.3m	E
	solution	g 400mg/1	E
		00mg/	
		5ml	

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INDEX BY MEDICINE NAME

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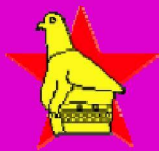
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NOTES

NOTES

This concludes
the new EDLIZ 2006



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For the side cover

Edition

