

# National Therapeutic Guidelines for Liberia AND ESSENTIAL MEDICINES LIST

Republic of Liberia



Ministry of Health  
and Social Welfare

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# CONTENTS

Abbreviations, Acronyms, and Units	<u>xi</u>
Foreword	<u>xv</u>
Preface and Acknowledgments	<u>xix</u>
Introduction	<u>23</u>
<b>1. Infections</b>	
1.1 Brucellosis	<u>31</u>
1.2 Candidiasis	<u>31</u>
1.3 Chicken Pox	<u>31</u>
1.4 Leprosy	<u>31</u>
1.5 Measles	<u>32</u>
1.6 Meningitis	<u>32</u>
1.7 Plague	<u>34</u>
1.8 Poliomyelitis	<u>34</u>
1.9 Rheumatic Fever	<u>34</u>
1.10 Septicemia	<u>35</u>
1.11 Tetanus	<u>35</u>
1.12 Typhoid Fever (Enteric Fever)	<u>36</u>
<b>2. Parasitic Diseases</b>	
2.1 Ascariasis (Roundworm)	<u>36</u>
2.2 Enterobiasis (Threadworm)	<u>36</u>
2.3 Hookworm	<u>36</u>
2.4 Malaria	<u>37</u>
2.5 Onchocerciasis (River Blindness)	<u>50</u>
2.6 Schistosomiasis (Bilharziasis)	<u>50</u>
2.7 Strongyloidiasis	<u>50</u>
2.8 Taeniasis (Tapeworm Infestation)	<u>50</u>
2.9 Trichuriasis (Whipworm Infestation)	<u>50</u>
<b>3. Diseases of the Digestive System</b>	
3.1 Amebiasis	<u>51</u>
3.2 Bacillary Dysentery (Shigellosis)	<u>51</u>
3.3 Cholera	<u>52</u>
3.4 Constipation	<u>52</u>
3.5 Dental Abscess	<u>52</u>
3.6 Dental Caries	<u>53</u>
3.7 Diarrhea	<u>53</u>
3.8 Gastritis (Heartburn)	<u>53</u>
3.9 Giardiasis	<u>53</u>

3.10 Hemorrhoids (Piles)	54
3.11 Peptic Ulcers	54
<b>4. Diseases of the Respiratory System</b>	
4.1 Asthma	55
4.2 Acute Bronchitis	56
4.3 Coryza (Common Cold)	56
4.4 Laryngitis	56
4.5 Pertussis (Whooping Cough)	57
4.6 Pneumonia (Pyogenic)	57
4.7 Tonsillitis	60
4.8 Tuberculosis (TB)	60
<b>5. Diseases of the Genitourinary System</b>	
5.1 Acute Cystitis	63
5.2 Acute Glomerulonephritis	63
5.3 Nephrotic Syndrome	63
5.4 Nongonococcal Urethritis	63
5.5 Acute Pyelonephritis	64
5.6 Acute Renal Failure	64
<b>6. HIV/AIDS and Sexually Transmitted Infections (STI)</b>	
6.1 Antiretroviral Therapy	65
6.2 Sexually Transmitted Infections	65
<b>7. Complications of Pregnancy, Childbirth, and Puerperium</b>	
7.1 Abortion (Spontaneous or Induced)	69
7.2 Anemia in Pregnancy	69
7.3 Breast Abscess	70
7.4 Dysmenorrhoea	70
7.5 Hyperemesis Gravidarum	70
7.6 Postpartum Hemorrhage	70
7.7 Puerperal Sepsis	71
7.8 Retained Placenta	71
7.9 Severe Preeclampsia	71
7.10 Eclampsia	73
<b>8. Skin Diseases</b>	
8.1 Boils (Furunculosis)	73
8.2 Carbuncles	73

8.3	Eczema (Dermatitis)	73
8.4	Fungal Skin Infections	74
8.5	Herpes Simplex and Herpes Genitalis	74
8.6	Herpes Zoster (Shingles)	74
8.7	Impetigo	74
8.8	Pemphigus	75
8.9	Psoriasis	75
8.10	Scabies	75
8.11	Urticaria or Skin Allergy	75
8.12	Tropical Ulcer	75
<b>9.</b>	<b>Disease of Cardiovascular System</b>	
9.1	Arrhythmias	76
9.2	Bacterial Endocarditis	76
9.3	Congestive Heart Failure	77
9.4	Deep Vein Thrombosis	77
9.5	Hypertension	77
9.6	Ischemic Heart Disease	78
9.7	Pericarditis	78
9.8	Pulmonary Edema	78
9.9	Rheumatic Heart Disease	79
9.10	Thromboembolism	79
<b>10.</b>	<b>Diseases of the Nervous System and Mental Disorders</b>	
10.1	Anxiety Neurosis	80
10.2	Depressive Neurosis	80
10.3	Bipolar Disorders	80
10.4	Epilepsy	80
10.5	Migraine	81
10.6	Parkinsonism (Parkinson's Disease)	82
10.7	Schizophrenia or Psychosis	82
<b>11.</b>	<b>Diseases of the Blood and Blood-Forming Organs</b>	
11.1	Iron Deficiency Anemia	83
11.2	Sickle Cell Disease	83
<b>12.</b>	<b>Endocrine and Metabolic Disorders</b>	
12.1	Adrenal Insufficiency (Addison's Disease)	84
12.2	Diabetes Mellitus, Mature (Non-Insulin Dependent Diabetes Mellitus)	84

12.3	Diabetes Mellitus (Insulin Dependent Diabetes Mellitus)	84
12.4	Diabetic Ketoacidosis	85
12.5	Hypoglycemia	85
12.6	Hypothyroidism	85
12.7	Thyrotoxicosis	86
<b>13.</b>	<b>Nutritional Disorders</b>	
13.1	Guidelines on Feeding the Infant and Young Child	87
13.2	Protein Energy Malnutrition of Early Childhood	88
<b>14.</b>	<b>Diseases of the Eye, Ear, and Throat</b>	
14.1	Conjunctivitis	92
14.2	Ophthalmia Neonatorum	93
14.3	Otitis Externa	93
14.4	Otitis Media	93
14.5	Trachoma	93
14.6	Vitamin A Deficiency (Xerophthalmia)	94
<b>15.</b>	<b>Injuries, Accidents, and Poisoning</b>	
15.1	Bites	95
15.2	Fractures	96
15.3	Foreign Body in the Eye	97
15.4	Foreign Body in the Ear	97
15.5	Foreign Body in the Nose	98
15.6	Injuries	98
15.7	Poisoning	100
<b>16.</b>	<b>Diseases of the Musculoskeletal System and Connective Tissue</b>	
16.1	Pyogenic Arthritis (Septic Arthritis)	105
16.2	Salmonella Arthritis	106
16.3	Cellulitis and Erysipelas	106
16.4	Gout	106
16.5	Osteoarthritis	107
16.6	Osteomyelitis	107
16.7	Pyomyositis	107

<b>17. Family Planning</b>	
17.1 Condom (Male)	<u>108</u>
17.2 Condom (Female)	<u>109</u>
17.3 Combined Oral Contraceptive Pill	<u>110</u>
17.4 Progesterone-Only Pill	<u>112</u>
17.5 Injectable Progestogen-Only Contraceptive	<u>113</u>
17.6 Intrauterine Device	<u>114</u>
17.7 Progestogen-Only Subdermal Implant	<u>116</u>
17.8 Natural FP: Cervical Mucus Method	<u>117</u>
17.9 Natural FP: Lactational Amenorrhea Method	<u>118</u>
17.10 Voluntary Surgical Contraception for Men: Vasectomy	<u>119</u>
17.11 Voluntary Surgical Contraception for Women: Tubal Ligation	<u>120</u>
<b>18. Symptoms, Signs, and Ill-Defined Conditions</b>	
18.1 Anaphylactic Shock	<u>121</u>
18.2 Dehydration	<u>121</u>
18.3 Febrile Convulsions	<u>123</u>
18.4 Hypoglycemia	<u>123</u>
<b>19. Vaccination</b>	
19.1 Vaccination Schedule for Children	<u>124</u>
19.2 Administration and Storage of Vaccines	<u>124</u>
19.3 Tetanus Prevention	<u>125</u>
19.4 Hepatitis B Vaccination	<u>130</u>
19.5 Yellow Fever Vaccination	<u>130</u>
Index	<u>131</u>
<b>Essential Medicines List for Liberia</b>	
Abbreviations, Acronyms, and Units	<u>139</u>
Foreword	<u>141</u>
Preface and Acknowledgments	<u>144</u>
Presentation of Information	<u>147</u>
Medicines Index	<u>168</u>



## Abbreviations, Acronyms, and Units

a.c.	<i>ante cibum</i> (before food)
ACT	artemisinin-based combination therapy
AIDS	acquired immunodeficiency syndrome
AQ	amodiaquine
ART	antiretroviral therapy
AS	artesunate
ATS	anti-tetanus serum [also know as tetanus antitoxin]
BCG	bacillus Calmette-Guérin
b.d.	<i>bis die</i> (twice daily)
BP	blood pressure
BW	body weight
°C	degree Celsius
cap	capsule
cm	centimeter
CMM	cervical mucus method
COC	combined oral contraceptive
dl	deciliter
DOTS	Internationally recognized strategy for tuberculosis control [WHO]
DPT	diphtheria, polio, tetanus
ECG	electrocardiogram
<i>EMLL</i>	<i>Essential Medicines List for Liberia</i>
FDC	fixed-dose combination
FP	family planning
g	gram
Hb	hemoglobin
HepB	hepatitis B
Hib	<i>haemophilus influenzae</i> type B
HIV	human immunodeficiency virus
hr	hour
IM	intramuscular
IPT	intermittent preventive treatment
IUD	intrauterine device

IV	intravenous
kg	kilogram
L	liter
LAM	lactational amenorrhea method
m	meter
mEq	milliequivalent
mg	milligram
min	minute
ml	milliliter
mmHg	millimeters of mercury
mmol	millimole
MOHSW	Ministry of Health and Social Welfare
MSH	Management Sciences for Health
MU	mega units
NF	National Formulary
NGT	nasogastric tube
NTGL	<i>National Treatment Guidelines for Liberia</i>
o.d.	<i>omni die</i> (daily)
o.m.	<i>omni mane</i> (in the morning)
o.n.	<i>omni nocte</i> (at night)
OPV	oral polio vaccine
ORS	oral rehydration salts
p.c.	<i>post cibum</i> (after food)
PCP	pneumocystis pneumonia
PCV	packed cell volume
pess	pessary
PEM	protein energy malnutrition
PID	pelvic inflammatory disease
PMI	President's Malaria Initiative
POP	progesterone-only pill
PPF	procaine penicillin fortified
p.r.n.	<i>pro re nata</i> (when required)
q.d.s	<i>quarter die sumendus</i> (4 times daily)
q.q.h	<i>quarta quaque hora</i> (every 4 hours)

RDT	rapid diagnostic test
RPR	rapid plasma reagin
SC	subcutaneous
sec(s)	second(s)
SLC	sodium lactate compound
SP	sulfadoxine-pyrimethamine
SPS	Strengthening Pharmaceutical Systems [Program]
stat	<i>statim</i> (immediately, as initial dose)
STI	sexually transmitted infections
tab	tablet
TB	tuberculosis
t.d.s.	<i>ter die sumendus</i> (3 times daily)
TIG	tetanus immunoglobulin human
TT	tetanus toxoid
U	unit
USAID	US Agency for International Development
VSC	voluntary surgical contraception
WHO	World Health Organization
wk	week
yr	year



## FOREWORD

The *National Therapeutic Guidelines for Liberia (NTGL)* has evolved out of the *National Standard Treatment Guidelines* 1998. It is designed to provide updated, practical, and useful information for both upper and lower level health facilities on the treatment of common conditions presenting in Liberia. The guidelines are also intended to establish a strong foundation for rational use of medicines.

As Liberia continues to rebuild its public health services, the provision of an adequate supply of good-quality, efficacious, safe, and affordable medicines is a high priority. It is suspected that even the few medicines that may be available are often not properly used by health professionals and patients. Thus, the meager resources available may be wasted and the patient suffers from inadequate, inappropriate, or a complete lack of treatment. These issues are of great concern to the Ministry of Health and Social Welfare (MOHSW) and its partners in the sector. Consequently, intensive efforts are being made to address these problems with the aim of ensuring both the regular availability of, and equitable access to, required essential medicines and their rational use by health professionals, patients, and the public in general.

Rational use of medicines means that patients receive medicines that satisfy their clinical needs, in doses that meet their own individual requirements, for an adequate period, and at the lowest cost to them and the community. The *NTGL* will facilitate rational use of health commodities by providing details of cost-effective treatment and relevant alternatives and guidance on when to refer and admit patients. It

should become a vital tool in the day-to-day work of health professionals. It should prove equally useful, however, to all other health practitioners working in the private health sectors, and the MOHSW strongly encourages these practitioners to make the most appropriate use of the medicines available to them as well. Although the *NTGL* provides details of recommended treatment regimes, as always *clinical judgment and experience* will still be required to adjust these recommendations to meet the particular needs of specific individuals.

The *NTGL* is meant to be used together with the *Essential Medicines List for Liberia (EMLL)*, which provides guidance on the appropriate selection of medicines for each level of health care, and a *National Formulary (NF)*, which provides detailed information on all the medicines used in the *NTGL*. The correct use of the information provided in these three publications will facilitate the appropriate selection and use of essential medicines, thereby minimizing waste and maximizing potential health benefits.

As with earlier therapeutic guidelines, the compilation of the *NTGL* has been possible only through a prolonged process of consultation with key prescribers and subsequent detailed discussions. The *NTGL* also had the benefit of thorough review, revision, and approval at a special national consensus and approval workshops organized by Strengthening Pharmaceutical Systems (SPS) Program through funding from US Agency for International Development (USAID)/President's Malaria Initiative (PMI). The review, revision, and workshops were facilitated by a consultant procured by SPS.

I thank the drafting team for their careful, thorough, and dedicated work and indeed all those who contributed to the preparation of this vital publication. Your efforts are recognized and greatly appreciated.

Therapeutics is a dynamic area. It is therefore important that national guidelines such as the *NTGL* are subjected to regular review and are regularly updated to take into account currently accepted therapeutic practices. Thus your continuing feedback on the usefulness, relevance, and accuracy of *NTGL* is vital in making any decisions on future modifications and improvements. It is my strong hope that familiarization with and daily use of these guidelines by our health professionals will lead to greatly improved diagnosis and prescribing practices. This book will also ensure improvements in the medicines supply system and dispensing practices and thus ensure that our patients receive the best service possible. I therefore would like to recommend the *NTGL* as a policy document to be adapted by MOHSW of Liberia.



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## PREFACE AND ACKNOWLEDGMENTS

This is the second edition of the *NTGL*, the first having come out in 1986. Because this edition has been produced to guide the prescriber with the best way to use the medicines in the *EMLL*, it will provide the population with access to quality of care at all levels of our health care system.

The *NTGL* provides recommendations on how to use the medicines in the *EMLL* to achieve the best outcome in our patients. This edition was prepared after wide consultations with most prescribers and dispensers in Liberia. The vertical programs were also widely consulted and the document has been reconciled with the program guidelines. There was participation and contributions from the National Malaria Control Program, the National AIDS Control Programme, the National Leprosy Tuberculosis Control Program, and Family Planning/Reproductive Health, among others. Physicians from major hospitals made significant contributions to this edition of the *NTGL*.

According to the National Drug Policy, the *NTGL* is a primary medicines use tool for all levels of the health system. It is intended to strengthen and standardize treatment of common conditions in Liberia for both public and private sectors. The document should be used as a basis for prescribing and dispensing in our health care system, whether public or private.

The *NTGL* will be subject to constant review and revision. I encourage all physicians to fully familiarise themselves with its content and constantly evaluate its relevance and appropriateness to their daily work.

The second edition of the *NTGL/EML* has been produced by the MOHSW with financial assistance from SPS–Liberia, funded by USAID.

Other partners in this noble task include the World Health Organization (WHO)–Liberia Office that provided the initial funding for the revision of the document, Rebuilding Basic Health Services for the critical analysis of the document, the Clinton Foundation for its input on the antiretroviral and mental health medications, the European Union that funded the production of the second edition as well as nongovernmental organizations that may have directly or indirectly contributed to the production of the *NTGL*. My profound gratitude to others that I may have omitted.

I register special thanks to the members of the drafting team for their dedication and hard work. The following physicians and pharmacists, representing academic and medical institutions, worked with me from the outset and have continued to offer valuable comments for the process of production of this document: Dr. Eugene Dolopei, Dr. Mohammed Sankor, Dr. John Taban Dada, Dr. John Mulbah, Dr. Abraham Borbor, Dr. Torsoh Jaliba, Pharm. Joseph N. B. Jimmy, Pharm. Duredoh Freeman George, Pharm. Clavenda Bright-Parker, Pharm. Beyan K. Johnson, Pharm. Hasipha C. Tarpeh, Pharm. J. Nathaniel B. Woart, Pharm. J. Juius Janafo, Pharm. Joseph S. Weah, Pharm. David Z. Mulbah, Pharm. Lewis Momoh, Pharm. David Sumo, and Pharm. Thomas G. M. Wolapaye.

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of Nursing, the National Malaria Control Division, the National AIDS Control Programme, the National Leprosy Tuberculosis Control Programme, and county pharmacists from the following County Health Teams: Bomi County, Bong County, Margibi County, and Montserrado County. I also thank all the staff members of the Pharmacy Division, especially the principal deputies, secretaries, and other support staff members, for their dedicated services in the production of this document.

Our profound gratitude goes to the Deputy Minister for Health Services and Chief Medical Officer of Liberia, Dr. Bernice T. Dahn, for her consistent advice given us throughout the preparation of the document.



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## Reference

Review and revision of the *National Therapeutic Guidelines for Liberia* and the *Essential Medicines List for Liberia* are based on the following WHO documents:

World Health Organization. 2008. *WHO Model Formulary*. Ed. M.C. Stuart, M. Zouimtzi, S.R. Hill. Geneva: WHO.

*How to Develop a National Formulary Based on the WHO Model Formulary: A Practical Guide*. 2004. Geneva: WHO.



## INTRODUCTION

The Ministry of Health and Social Welfare (MOHSW), in conjunction with the World Health Organization (WHO), John F. Kennedy Memorial Hospital, Médecines San Frontières–Belgium, and Medical Emergency Relief Cooperative International (MERCY) formulated their own Treatment Guidelines in the 1990s to assist the health worker in choosing the appropriate pharmaceutical treatment after the correct diagnosis has been made. In response to new knowledge on medicines and diseases and changes in the epidemiology of diseases in Liberia, it became necessary to review and revise the existing NTG which was dated back to 1986. This review and revision is being supported with funding from US Agency for International Development (USAID) through the Strengthening Pharmaceutical Systems (SPS) Program.

The Government of Liberia, through its National Drug Policy, remains committed to ensuring that good quality medicines are available and accessible for all people and that these medicines are affordable and rationally used. Achieving these objectives requires a comprehensive strategy that includes not only supply and distribution, but also appropriate and rational prescribing, dispensing, and use of medicines.

### **The Purpose of This Book**

These national therapeutic guidelines have been prepared to assist and guide prescribers (including doctors, medical assistants, and midwives), pharmacists, dispensers, and other health care staff who prescribe at primary care facilities in providing quality care to patients. The guidelines list the preferred treatments

for common health problems experienced by people in the health system and were field-tested before being finalised to ensure that the opinions of the intended users were considered and incorporated.

The guidelines are designed to be used as a guide to treatment choices and as a reference book to help in the overall management of patients, such as when to refer. The guidelines are meant for use at all levels within the health system, both public and private.

### **Treatment Guidelines Used**

We recognize that the treatment guidance detailed in this book may differ from current practice. We emphasize that the choices described here have the weight of scientific evidence to support them, together with the collective opinion of a wide group of recognized national and international experts. The recommendations have been rated on the following basis:

- *Evidence rating A*: requires at least one randomized, controlled trial as part of a body of scientific literature of overall good quality and consistency addressing the specific recommendation
- *Evidence rating B*: requires the availability of well-conducted clinical studies but no randomized clinical trials on the topic of recommendation
- *Evidence rating C*: requires evidence obtained from expert committee reports or opinions and/or clinical experience of respected authorities. This rating indicates an absence of directly applicable clinical studies of good quality.

Use of treatments other than those recommended here may have to be justified to colleagues and health services managers.

The content of these treatment guidelines will undergo a process of continuous review. Comments or suggestions for improvement are welcome. Those comments or suggestions for the addition of diseases should include evidence of prevalence as well as a draft treatment guideline using the format set out in this book. These suggestions should be sent to the Chief Pharmacist, MOHSW.

## How to Use This Book

To use these guidelines effectively, you must become familiar with the contents. Take time to read the book and understand the content and layout. A warning sign  will appear whenever immediate medical action needs to be taken.

## Order of Sections

Diseases are grouped according to the Anatomical Therapeutic Chemical category, and the categories appear in order of importance in a Liberian setting. For each of these disease states, the structuring of the information and guidance has been standardized to include the generic name of the medicine of choice, adult dosage, and where relevant, child dosage.

## Selecting a Treatment

The choice of treatment guidance used here is based on the principles of evidence-based medicine. That is, it is based on the international medical and pharmaceutical literature, which clearly demonstrates the efficacy of the treatment choices.

Care should be taken to avoid symptomatic management of uncertain diagnoses. When treating patients, the final responsibility for the well-being

of the individual patient remains with the prescriber who must take steps to ensure that he or she is competent to manage the most common conditions presenting at his or her practice. He or she should become familiar with particularly those aspects of the treatment guidelines relating to those conditions. It is important to remember that the guidance given in this book is based on the assumption that the prescriber is competent to handle patients at this level and that he or she has diagnostic tests and monitoring equipment available.

### Referral

These guidelines also make provision for referral of patients to other health facilities. Patients should be referred when the prescriber is not able to manage the patient either because of a lack of personal experience or because appropriate facilities are not available. Patients should be referred, in accordance with agreed-upon arrangements, to facilities where the necessary competence, diagnosis, and support mechanisms exist. The patient should be given a transmittal letter or note indicating the problem and what has been done so far, including laboratory tests and treatment. When indicated, emergency treatment must be given before referring the patient. Remember that the act of referral does not remove from the prescriber the responsibility for the well-being of the patient. The need to refer will be indicated in the guidelines by the following symbol .

## Prescription Writing

Medicines should be prescribed only when they are necessary in treatment following a clear diagnosis. Not all patients need a prescription for a medicine; nonpharmaceutical treatment may be suitable and should always be kept in mind. In all cases, the benefit of administering the medicine should be considered in relation to the risk involved. This consideration is particularly important during pregnancy where the risk to both mother and fetus must be considered.

Prescriptions should—

- Be written legibly in ink or other indelible medium
- Be written by the prescriber and not left for another person to complete
- Be dated
- State the full name and address of the patient
- Specify the age and weight of the patient (especially in the case of children)
- Be signed in ink by the prescriber; it is helpful to include contact details (e.g., name and telephone number)

When writing a prescription the following should be noted:

- Names of medicines and preparations should be written in full. Unofficial abbreviations should not be used because the risk is high for misinterpretation.
- Nonproprietary (generic) names are used in this document, and they should always be used in prescribing.
- Avoid the unnecessary use of decimal points—for example, 3 mg, not 3.0 mg.
  - Quantities of 1 gram or more should be written 1 g.

- Quantities less than 1 gram should be written in milligrams—for example, 500 mg, not 0.5 g.
- Quantities less than 1 milligram should be written in micrograms—for example, 100 micrograms, not 0.1 mg.
- Where decimals are unavoidable, a zero should be written in front of the decimal point where there is no other figure—for example, 0.5 ml, not .5 ml.
- *Micrograms, nanograms, and units* should *not* be abbreviated.
- Use the term *milliliter* (ml) *not* cubic centimeter (cc or cm<sup>3</sup>).
- State dose and dose frequency. In the case of “as required,” a minimum dose interval should be specified—for example, “every 4–6 hours (hrs) as required for pain.”
- State the quantity to be supplied, or indicate the number of days of treatment required.
- Write directions, preferably in English, without abbreviation. We recognize that some Latin abbreviations are used, and these abbreviations are detailed in “Abbreviations, Acronyms, and Units.” Do *not* use other abbreviations.
- Avoid—
  - The use of symptomatic treatments for minor self-limiting conditions
  - Where possible, the prescribing of placebos; spend a little time educating and reassuring the patient
  - Multiple prescribing (polypharmacy), especially when the diagnosis is not clear
  - The use of the parenteral route of administration except where there are clear, clinical indications for this route; use the oral route whenever possible

For prescribing purposes, the age groups fall into four broad groups as follows:

- Child: <5 years (yrs)
- Child: 5–8 yrs
- Child: 9–12 yrs
- Adult: >12 yrs

Where possible, all children (younger than 12 yrs) should get dosage according to the body weight. In these guidelines, “Child” refers to a patient younger than 12 yrs unless it is otherwise specified. Where weighing is not possible, children younger than 5 yrs old get a quarter of the adult dose, the 5–8 yr-old group gets half of the adult dose, and 9–12 yr-old category gets three-quarters of the adult dose.

For ease of administration, syrups should be available to children younger than 5 yrs where possible, and the dosage of the base of the medicine by weight should be clearly specified.

Tetracycline should not be given to children younger than 8 yrs. Acetylsalicylic acid should not be given to children younger than 8 yrs and pregnant women. All medicines should be given with caution in pregnant mothers.

For diseases that have more than one medicine to treat, the first medicine listed is the first-line medicine.

Only generic names of medicines are presented in this book, and it should therefore be used together with the *EMLL*.

### For Patients with Penicillin Allergies

The following penicillin derivatives are listed in the *EMLL*. If a patient is allergic to penicillin, do not use these. Instead, please substitute tetracyclines (e.g., doxycycline), quinolones (e.g., ciprofloxacin), macrolides (e.g., clarithromycin), aminoglycosides (e.g., gentamicin) and glycopeptides (e.g., vancomycin). These are all unrelated to penicillins and are safe to use in the penicillin allergic patient.

amoxicillin

ampicillin

benzathine penicillin

benzylpenicillin

cloxacillin

phenoxymethylpenicillin

procaine benzylpenicillin fortified

# 1. INFECTIONS

## 1.1 Brucellosis

Co-trimoxazole tab. Adult: 2 tabs (480 mg) every 12 hrs for 21 days. Child: 1 tab (120 mg) every 12 hrs for 21 days

— OR —

Doxycycline 100 mg/cap, by mouth. Adult and child over 8 yrs: 200 mg on first day then 100 mg daily for 21 days

## 1.2 Candidiasis

### 1.2.1 Oral Thrush

Nystatin tab (500,000 IU/tab). Adult: 1–2 tabs every 6 hrs for 10 days. Child: Nystatin suspension 100,000 IU every 6 hrs for 10 days

### 1.2.2 Vaginal Candidiasis

Nystatin pessary, (100,000 IU/pess).

Insert one into vagina each night for 14 days

## 1.3 Chicken Pox

### 1.3.1 Symptomatic Treatment

Calamine lotion. Apply every 12 hrs for as long as necessary

Chlorpheniramine (4 mg/tab). Adult: 1 tab every 12 hrs for 3 days. Child: Chlorpheniramine (4 mg/tab).

½ tab every 12 hrs for 3 days

### 1.3.2 Severe

Acyclovir 200 mg. Orally every 6 hrs for 10 days.

## 1.4 Leprosy

### 1.4.1 Paucibacillary Type

Dapsone, 100 mg/tab. 100 mg daily for 6 months

— PLUS —

Rifampicin, 300 mg/cap. 600 mg once a month for 6 months

### 1.4.2 Multibacillary Type

Dapsone, 100 mg/tab. 100 mg daily for 12 months

— PLUS —

Clofazimine, 50 mg/cap. 50 mg daily for 12 months

— PLUS —

Rifampicin, 300 mg/cap. 600 mg once a month for 12 months

## 1.5 Measles

### 1.5.1 Symptomatic

- Adult: Tetracycline eye ointment 1%; apply every 12 hrs for 5 days
- Child: Retinol (vitamin A) capsule at the following dosages:
  - More than 1 yr: 200,000 IU at onset, 4 wks, and 6 wks
  - Less than 1 yr: 100,000 IU

### 1.5.2 Measles Complicated with Pneumonia

Child: Co-trimoxazole tab 120 mg twice daily for 5–7 days

## 1.6 Meningitis

Choice of treatment depends on whether the organisms have been identified.

### 1.6.1 Causative Organisms Not Yet Identified

Ceftriaxone. Adult: 2 g IV or IM daily in 1–2 divided doses for up to 14 days. Child: 50–100 mg/kg daily in 2 divided doses for 14 days

— OR —

Chloramphenicol. Adult: 1g IV every 6 hrs for up to 14 days (use IM if IV not possible). Once clinical improvement occurs, change to 500–750 mg orally

every 6 hrs to complete the course. Child: 25 mg/kg per dose

## 1.6.2 Causative Organisms Identified

### 1.6.2.1 Meningitis Due to *Cryptococcus neoformans* (*Cryptococcal meningitis*)

**REFER** to hospital for treatment with amphotericin B infusion. ⚠️

### 1.6.2.2 Meningitis Due to *Streptococcus pneumoniae*

Benzylpenicillin. Adult: 3–4 MU IV or IM every 4 hrs for 10–14 days. Child: 100,000 IU/kg per dose (In penicillin-allergic patients, give erythromycin 250–500 mg every 6 hrs. Child: 10 mg/kg)

— OR —

Ceftriaxone. Adult: 2 g IV or IM daily in 1–2 divided doses. Child: 50–100 mg/kg daily dose as above

### 1.6.2.3 Meningitis Due to *Hemophilus influenzae*

Before sensitivity result

- Ceftriaxone. Adult: 1 g IV or IM every 12 hrs for 7–10 days. Child: 50–100 mg/kg per dose

If patient is sensitive to chloramphenicol or penicillin, change to

- Chloramphenicol. Adult: 1 g IV every 6 hrs. Child: 25 mg/kg per dose

— AND —

- Ampicillin. Adult: 2–3 g IV every 4–6 hrs. Child: 50 mg/kg per dose

### 1.6.2.4 Meningitis Due to *Neisseria meningitidis*

- Chloramphenicol. Adult: 1 g IV every 6 hrs for 14 days. Child: 25mg/kg IV per dose. Use IM if IV not possible.
- Once clinical improvement occurs, change to—  
Adult: 500–750 mg orally every 6 hrs to complete the course. Child: 25mg/kg per dose.

### 1.6.2.5 TB Meningitis

Treat as pulmonary TB (see [section 4.8.1](#)).

## 1.7 Plague

Doxycycline. Adult: 100 mg every 12 hrs for 14 days.

Child >8 yrs: 2 mg/kg per dose

— OR —

Chloramphenicol. Adult: 500 mg orally or IV every 6 hrs for 7–10 days. Child: 25 mg/kg per dose

— OR —

Gentamicin, 80 mg/2 ml ampoule. Adult and child: 1.7 mg/kg

## 1.8 Poliomyelitis

In its acute stage, poliomyelitis is difficult to diagnose. If strongly suspected, manage as follows:

- **Acute stage**—Patient should be on complete bed rest if paralysis is recent. Do not give any injections (they make the paralysis worse). **REFER** the patient to a hospital. After recovery, complete the immunization schedule if the patient is partially immunized or not immunized. ⚠
- **Chronic stage**—Encourage active use of the limb to restore the muscle function.

## 1.9 Rheumatic Fever

Phenoxymethylpenicillin, 250 mg tab. Adult: 250 mg every 6 hrs for 7 days. Child: 125 mg per dose

— PLUS —

Aspirin (300 mg tab). Adult: 600–900 mg every 8 hrs for 5 days. Child: 300–600 mg per dose

— PLUS —

Magnesium trisilicate compound. 2–4 tabs every 8 hrs until the inflammation has subsided

## 1.10 Septicemia

### 1.10.1 Treatment for Septicemia in Adults

Gentamicin (80 mg/2 ml/ampoule). 1.5–2.0 mg/kg IV or IM every 8 hrs

— PLUS EITHER —

Cloxacillin. 2 g IV every 4–6 hrs

— OR —

Chloramphenicol. 750 mg IV every 6 hrs

### 1.10.2 Treatment of Septicemia in Children

Gentamicin. 3.5–4.0 mg/kg IV every 8 hrs. Neonate: every 8–12 hrs

— PLUS EITHER —

Ampicillin. 50 mg/kg IV every 8 hrs. <7 days old: every 12 hrs

— OR —

Cloxacillin. 50 mg/kg IV every 4–6 hrs

— OR —

Benzylpenicillin. 50,000 IU/kg IV every 4–6 hrs

## 1.11 Tetanus

Benzylpenicillin. Adult: 1–2 MU every 6 hrs for 10 days. Child: 50,000–100,000 IU/kg per dose. Neonate: 100,000 IU/kg every 12 hrs

— PLUS —

Metronidazole. Adult: 400 mg every 8 hrs for 5 days. Child: 30 mg/kg daily divided in 3 equal doses

— PLUS —

Chlorpromazine (by NGT). Adult: 12.5 mg 4–6 hrs; alternate with diazepam 2–3 mg. Child: 0.5–1.0 mg/kg by NGT every 4–6 hrs

For tetanus prevention information, see [section 19.3](#).

## 1.12 Typhoid Fever (Enteric Fever)

### 1.12.1 General Treatment

Co-trimoxazole, 480 mg tab. Adult: 960 mg every 12 hrs for 14 days. Child: 24 mg/kg per dose

— OR —

Chloramphenicol. Adult: 1 g IM, IV or oral every 6 hrs for 14 days. Child: 25 mg/kg per dose

— OR —

Ciprofloxacin. Adult: 500–750 mg every 12 hrs for 5–14 days. Child: 10–15 mg/kg per dose

### 1.12.2 Treatment for Chronic Carriers

Treat for 4–6 wks.

Ciprofloxacin. Adult: 500–750 mg every 12 hrs. Child: 10–15 mg/kg per dose

— OR —

Amoxicillin. Adult: 250 mg every 8 hrs. Child: 25 mg/kg per dose (max: 250 mg)

## 2. PARASITIC DISEASES

### 2.1 Ascariasis (Roundworm)

Mebendazole, 500 mg tab. Adult: 500 mg, single dose. Child <2 yrs: 250 mg, single dose

### 2.2 Enterobiasis (Threadworm)

Mebendazole, 500 mg tab. Adult: 500 mg, single dose. Child <2 yrs: 250 mg, single dose

### 2.3 Hookworm

Mebendazole, 500 mg tab. Adult: 500 mg, single dose. Child <2 yrs: 250 mg, single dose

## 2.4 Malaria

Malaria is an acute febrile illness. It is caused by infection with malaria parasites of the genus *Plasmodium* and is normally transmitted from person to person by female mosquitoes of the genus *Anopheles*. There are four species of malaria parasites which infect humans namely: *Plasmodium falciparum*, *Plasmodium vivax*, *Plasmodium ovale*, and *Plasmodium malariae*. Of these, *P. falciparum* is the most virulent malaria parasite in the world and also the most common malaria parasite in Liberia.

The effect of the presence of malaria parasites in the body varies from person to person. There may be no symptoms (asymptomatic infection), mild illness (uncomplicated malaria), or severe illness (complicated malaria). If uncomplicated malaria is not recognized early and treated promptly, it is likely to deteriorate to severe malaria. A patient with severe malaria is in immediate danger of death, and therefore, severe malaria is a medical emergency.

**REFER** after giving the first quinine dose either by rectal or IM route. ⚠

### 2.4.1 Uncomplicated Malaria

#### 2.4.1.1 Clinical Features of Uncomplicated Malaria

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

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

When people are frequently exposed to malaria, they develop partial immunity. In people who have partial

immunity, the above classic stages of a malaria attack may not be observed. In people who have had partial treatment with antimalarial medicines, these three phases may not be pronounced.

Table 2.4.1.1 lists malaria symptoms in children.

**Table 2.4.1.1 Common Symptoms of Uncomplicated Malaria in Children**

Children under 5 Yrs	Older Children
<ul style="list-style-type: none"> <li>▪ Fever (raised temperature detected by thermometer or touch) or a history of fever</li> <li>▪ Loss of appetite</li> <li>▪ Weakness</li> <li>▪ Lethargy</li> <li>▪ Vomiting</li> </ul>	<ul style="list-style-type: none"> <li>▪ Fever (raised temperature detected by thermometer or touch) or a history of fever</li> <li>▪ Loss of appetite</li> <li>▪ Weakness</li> <li>▪ Lethargy</li> <li>▪ Nausea</li> <li>▪ Vomiting</li> <li>▪ Headache</li> <li>▪ Joint and muscle pains</li> </ul>

### 2.4.1.2 Physical Examination

Always take the temperature, weigh the patient, and carry out a general examination. Common signs of uncomplicated malaria are listed in 2.4.1.3.

### 2.4.1.3 Common Signs of Uncomplicated Malaria

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

## 2.4.2 Complicated Malaria

### 2.4.2.1 Identifying Malaria Caused by *P. falciparum* Infection

Malaria caused by *P. falciparum* is an immediate threat to life and is therefore a **MEDICAL EMERGENCY** . Malaria is regarded as severe if there are asexual forms of *P. falciparum* in blood *plus* one or more of the following complications:

- Change of behavior, confusion, or drowsiness
- Altered level of consciousness or coma
- Convulsions
- Hypoglycemia
- Acidosis
- Difficulty in breathing—pulmonary edema or respiratory distress syndrome
- Acute renal failure
- Severe anemia
  - Hemotocrit <20%, Hb <6 g/dl
  - Dizziness, tiredness, pallor
- Shock
- Hemoglobinuria
- Oliguria with very dark urine (coca-cola or coffee color)
- Jaundice
- Bleeding tendency
- Prostration
- Hyperparasitemia ( $\geq 100,000$  parasites/ml, MPs +++ or above)
- Hyperpyrexia  $\geq 40$  °C
- Severe vomiting
- Threatening abortion

#### 2.4.2.2 Danger Signs of Severe Illness

- Convulsions or fits within the last 2 days or at present
- Not able to drink or breastfeed

- Vomiting everything
- Altered mental state (lethargy, drowsiness, unconsciousness, or confusion)
- Prostration or extreme weakness (unable to stand or sit without support)
- Severe respiratory distress or difficulty breathing
- Severe anemia (severe pallor of palms and mucous membranes)
- Severe dehydration (sunken eyes, coated tongue, lethargy, inability to drink)

#### 2.4.2.3 Differential Diagnosis

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

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

#### 2.4.2.4 Parasitological Diagnosis of Malaria

Parasitological diagnosis of malaria requires examination of blood smear for the presence of malaria parasites. Blood is examined by using a microscope or by rapid diagnostic tests.

#### 2.4.2.5 Microscopic Examination of a Blood Smear for Malaria Parasites

The gold standard of malaria diagnosis is the examination of blood smear for malaria parasites. Where laboratory facilities exist, blood examination for malaria parasites must be done for the following groups of patients:

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

**Notes:**

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

### 2.4.3 Management of Malaria

The Liberian national antimalarial policy is as follows:

- *Treatment of uncomplicated malaria:* The recommended first-line medicine is artesunate (AS) + amodiaquine (AQ). Artemether/lumefantrine is the alternative that may be used when artesunate/amodiaquine is not available. The recommended second-line medicine is oral quinine for all patients.
- *Treatment of severe and complicated malaria:* Parenteral quinine is the recommended treatment for the management of severe malaria for all patients. Parenteral artemisinin derivatives (artemether 20 mg/ml) may be used if quinine is contraindicated or not available.
- *Intermittent preventive treatment (IPT) of malaria in pregnancy:* Sulfadoxine-pyrimethamine (SP) is the recommended medicine for IPT.

- *Treatment of uncomplicated malaria in pregnant women:* Artemisinin-based combined therapies (ACTs) are contraindicated during the first trimester; Quinine should be used instead. Artesunate/amodiaquine or other ACT can be used *after* the first trimester.
- *Treatment of uncomplicated malaria in children younger than 4 months of age:* ACTs are *not* recommended for children younger than 4 months of age or who have less than 5 kg body weight. Such children should be treated with quinine.

#### 2.4.3.1 Fixed-Dose ACT

The recommended dosages for AS/AQ are shown in table 2.4.3.1A, for artemether 20 mg + lumefantrine 120 mg in table 2.4.3.1B, and for quinine in table 2.4.3.1C.

Table 2.4.3.1A Recommended Dosages for AS/AQ

Age	Artesunate			Amodiaquine		
	Day 1	Day 2	Day 3	Day 1	Day 2	Day 3
2–11 months	25 mg	25 mg	25 mg	67.5 mg	67.5 mg	67.5 mg
1–5 yrs	50 mg	50 mg	50 mg	135 mg	135 mg	135 mg
6–13 yrs	100 mg	100 mg	100 mg	270 mg	270 mg	270 mg
>13 yrs	100 mg	100 mg	100 mg	270 mg	270 mg	270 mg

Table 2.4.3.1B Recommended Dosages of Artemether 20 mg + Lumefantrine 120 mg

Weight (kg)	Age	Day 1	Day 2	Day 3
5–14	From 4 months to 3 yrs	1 tab twice a day; every 12 hrs	1 tab twice a day; every 12 hrs	1 tab twice a day; every 12 hrs
15–24	From 3 to 7 yrs	2 tab twice a day; every 12 hrs	2 tab twice a day; every 12 hrs	2 tabs twice a day; every 12 hrs
25–35	From 7 to 12 yrs	3 tab twice a day; every 12 hrs	3 tab twice a day; every 12 hrs	3 tabs twice a day; every 12 hrs
>35	2 yrs and older	4 tab twice a day; every 12 hrs	4 tab twice a day; every 12 hrs	4 tabs twice a day; every 12 hrs

**Table 2.3.3.1c Recommended Dosages of Quinine (300 mg/tab)**

Age	Weight	Dose Given Every 8 hrs for 7 Days
3 months to 1 yr	5–10 kg	75 mg (¼ tab)
1–5 yrs	10–18 kg	150 mg (½ tab)
5–7 yrs	18–24 kg	225 mg (¾ tab)
7–10 yrs	24–30 kg	300 mg (1 tab)
10–13 yrs	30–40 kg	375 mg (1¼ tab)
13–15 yrs	40–50 kg	450 mg (1½ tab)
>15 yrs	>50 kg	600 mg (2 tabs)

### 2.4.3.2 Treatment with IV Quinine

This procedure is used for treatment of severe malaria:

- *IV line*: Establish an IV infusion line
- *Fluids*: Correct dehydration by assessing and administering fluid requirements according to body weight
- *Antipyretic*: Reduce body temperature if >38.5 °C using—
  - Paracetamol. Adult: 1 g; adult max: 4 g/day.  
Child: 10 mg/kg every 6 hrs.
  - Tepid sponging or fanning
- *Anticonvulsant*: Treat detectable causes (e.g., hypoglycemia, hyperpyrexia) then if necessary, give an anticonvulsant (e.g., diazepam). Adult: 200 micrograms/kg (max: 10 mg) rectally, IV, or (in adults) IM. Child: 200 micrograms/kg (max: 10 mg) rectally or by IV.

### 2.4.3.3 Treatment with IV Antimalarial

- *At a health unit without admission and IV medicine administration facilities:* Give a pre-referral dose of quinine hydrochloride 10 mg/kg IM diluted to the strength of 100 mg/ml and administered either by rectal or IM route, and **REFER** for further management. ⚠
- *At a health unit with admission and IV medicine administration facilities:* Give quinine hydrochloride 10 mg/kg, IV infusion in 5–10 ml/kg of glucose 5% and run over a 4 hr period.  
**Note:** Do not give a 20 mg/kg loading dose of quinine. Continue with doses of 10 mg/kg every 8 hrs until patient improves and can take oral medication. Then change to oral quinine 10 mg/kg every 8 hrs, and continue treatment for at least 72 hrs.
- *After 72 hrs:* Continue with quinine to complete a full 7 days quinine treatment (from start of IV quinine).

### 2.4.3.4 Treatment with IM Quinine (Dose Dilution)

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

- Dilute to a concentration of 100 mg/ml
- Give the dose IM (10 mg/kg every 8 hrs)

For example, for an ampoule of 600 mg/2 ml; add 4 ml of water for injection to get 600 mg in 6 ml (100 mg/ml).

If the diluted volume for the required dose is more than 3 ml:

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

### 2.4.3.5 Management of Complications of Severe Malaria

- **Hypoglycemia:** Give glucose 50% 0.5–1.0 ml/kg as an IV bolus diluted with an equal volume of water for injections.
  - Give glucose dose by NGT if IV route is not possible.
  - Monitor blood glucose frequently.
  - Ensure patient is eating.
- **Acidosis:** Correct fluid and electrolyte balance. If there is severe acidosis without sodium depletion—
  - Give sodium bicarbonate 8.4% infusion 50 ml IV.
  - Monitor plasma pH.
- **Pulmonary edema:**
  - Regulate the IV infusion.
  - Prop up the patient.
  - Give oxygen.
  - Give furosemide.
- **Acute renal failure** [urine output: <17 ml/hr (adult) or <0.3 ml/kg/hr (child)].
- Check to ensure that the cause of oliguria is not dehydration or shock. *If due to acute renal failure:* Give a challenge dose of furosemide 40 mg IM or slow IV (*child: 1 mg/kg*). *If this fails:* Arrange for peritoneal dialysis or hemodialysis.
- **Severe anemia:**
  - Do blood grouping and cross-matching.
  - Transfuse patient with packed cells 10–15 ml/kg or whole blood 20 ml/kg especially if the anemia is also causing heart failure.
  - Repeat Hb/PCV before discharge and preferably 28 days after discharge.
- **Shock:** If systolic BP <80 mm Hg (adult) or <50 mm Hg (child) or if peripheral pulse absent and capillary refill is slow (>2 seconds):

- Raise the foot of the bed.
- Give sodium chloride 0.9% by fast IV infusion.
- Review fluid balance and urinary outputs.
- Look for evidence of hemorrhage or septicemia and treat accordingly.
- *Hemoglobinuria (intravascular hemolysis):*
  - Investigate and treat the cause.
  - Discontinue any suspect medicine.
  - Steroids may be of value.
- *Bleeding tendency:* Transfuse patient with whole fresh blood to provide lacking clotting factors.
- *Convulsions:* Give diazepam 200 micrograms/kg (max: 10 mg) rectally, IV, or (in adults) IM. If convulsions still persist, give phenobarbitone 200 mg IM (child: 10–15 mg/kg) then 2.5 mg/kg once or twice daily if still necessary.
- *Coma:* Provide intensive nursing care with—
  - IV drip (for rehydration and IV medication)
  - NGT (for feeding and oral medication)
  - Urethral catheter (to monitor urine output)
  - Turning of patient frequently to avoid bedsores
- *Hyperpyrexia:* Give paracetamol 1 g every 6 hrs (child: 10 mg/kg) plus tepid sponging and fanning

#### 2.4.3.6 Criteria for REFERRAL to Regional or Tertiary Hospital

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

#### 2.4.3.7 Malaria Prophylaxis

Recommended for all those from nonmalaria-endemic countries and certain high-risk groups such as pregnant women and patients with sickle cell disease:

- *In pregnancy:* This approach assumes that all pregnant women in malaria endemic areas carry malaria parasites in their blood or placenta, and

their presence is detrimental to the women's well-being and that of their fetuses. Give IPT as follows: SP single dose (3 tabs) in second and third trimesters. Give first dose between wks 16 and 24 and the second dose between wks 28 and 36.

- *Sickle-cell disease patients*: Chloroquine. Adult: 300 mg base weekly. Child: 5 mg (base)/kg weekly
- *Non-immune visitors or tourists*: Mefloquine. Adult: 250 mg once every wk. Child: 5 mg/kg weekly

#### 2.4.3.8 Malaria Prevention and Control

- Give effective treatment and prophylaxis.
  - Eliminate parasites from the human population by early diagnosis and effective treatment.
  - Protect vulnerable groups with chemoprophylaxis.
  - Give IPT to all pregnant women.
- Reduce human-mosquito contact.
  - Use insecticide-treated materials (e.g., bed nets).
  - Destroy adult mosquitoes by residual spraying of dwellings with insecticide or use of knockdown sprays.
  - Screen houses.
  - Carefully select house sites avoiding mosquito-infested areas.
  - Wear clothes that cover the arms and legs.
  - Use repellent mosquito coils and creams or sprays on the skin when sitting outdoors at night.
- Control breeding sites.
  - Eliminate collections of stagnant water where mosquitoes breed (e.g., in empty cans or containers, potholes, old car tires, plastic bags, footprints) by disposal, draining, or covering with soil, sand, or other material.

- Destroy mosquito larvae by dosing stagnant water bodies with insecticides or with biological methods (e.g., larvae-eating fish).
- Provide public health education on the above measures.

## 2.5 Onchocerciasis (River Blindness)

Ivermectin, 3 mg/tab. 150 micrograms/kg once every yr

- Not recommended for children <5 yrs or nursing mothers
- No food or alcohol to be taken within 2 hrs of taking the medicine

## 2.6 Schistosomiasis (Bilharziasis)

Praziquantel, 600 mg tab. 40 mg/kg, single dose

## 2.7 Strongyloidiasis

Mebendazole, 500 mg tab. Adult: 500 mg, single dose. Child <2 yrs: 250 mg, single dose

— OR —

Ivermectin, 3 mg/tab. 150 micrograms/kg, single dose

## 2.8 Taeniasis (Tapeworm Infestation)

Mebendazole, 500 mg/tab. Adult: 500 mg, single dose. Child <2 yrs: 250 mg, single dose

— OR —

Niclosamide, 500 mg/tab. Adult: 2 g, single dose. Child <2 yrs: 500 mg; 2–6 yrs: 1 g; >6 yrs: 2 g, single dose

## 2.9 Trichuriasis (Whipworm Infestation)

Mebendazole, 500 mg tab. Adult: 500 mg, single dose. Child <2 yrs: 250 mg, single dose

## 3. DISEASES OF THE DIGESTIVE SYSTEM

### 3.1 Amebiasis

#### 3.1.1 General Treatment

Metronidazole, 400 mg/tab. Adult: 800 mg every 8 hrs for 8–10 days. Child: 10 mg/kg per dose

— OR —

Tinidazole. 2 g daily for 5 days. Child >3 yrs: 50 mg/kg daily up to 2 g per day

#### 3.1.2 Treatment of Chronic Carriers (Luminal) and Tissue Amebiasis (Liver, Lung, Brain, Ameboma)

Metronidazole, 400 mg/tab. Adult: 800 mg every 8 hrs for 10 days. Child: 10 mg/kg per dose

— OR —

Tinidazole. Adult: 2 g daily for 5 days. Child: 50 mg/kg per dose

### 3.2 Bacillary Dysentery (Shigellosis)

#### 3.2.1 General Treatment

Nalidixic acid, 500 mg tab. 1 g every 6 hrs for 5 days

— OR —

Ciprofloxacin, 500 mg tab. 1 g, single dose

**CAUTION:** Ciprofloxacin and nalidixic acid are contraindicated in pregnancy. Use instead chloramphenicol 500 mg every 8 hrs for 5 days.

#### 3.2.2 Treatment of a Child >3 Months

Co-trimoxazole, 120 mg tab. 24 mg/kg per dose

— OR —

Ciprofloxacin. 30 mg/kg twice daily for 3 days

— OR —

Nalidixic acid. 15 mg/kg per dose

### 3.3 Cholera

**Note:** Up to 90% of patients with cholera only require prompt oral rehydration. Severely dehydrated patients need IV fluids and antimicrobials.

Give oral rehydration salts (ORS)

— OR —

IV fluids, e.g., Ringer's lactate, according to degree of dehydration. Keep maintenance fluid to at least 4–5 liters daily.

— AND —

Doxycycline, 100 mg cap. 300 mg, single dose

— OR —

Ciprofloxacin 500 mg/tab. 1 g/2 tabs at same time.

Child: 20 mg/kg single dose 12.5 mg/kg 4 times a day for 3 days.

— OR —

Erythromycin, 500 mg. Single dose. Child <2 yrs: 125 mg every 6 hrs; 2–8 yrs: 250 mg every 6 hrs.

### 3.4 Constipation

Bisacodyl, 10 mg tab. Adult: 10 mg at night as a single dose. Child: 5 mg at night as a single dose

### 3.5 Dental Abscess

**REFER** for drainage and extraction of the infected tooth. ⚠

Phenoxymethylpenicillin, 250 mg/tab. Adult: 500 mg every 6 hrs. Child: 10–20 mg/kg per dose

— OR —

Amoxicillin. Adult: 250 mg every 8 hrs. Child: 25 mg/kg per dose

— OR —

Procaine penicillin fortified (PPF). Adult: 1 MU IM daily. Child: 50,000 IU/kg per dose

Aspirin, 300 mg/tab. Adult: 600 mg 3 times a day for

5 days. Child >3 months: paracetamol, 125 mg/5 ml.  
10 mg/kg per dose

### 3.6 Dental Caries

**REFER** to a dental specialist for fillings or extraction. ⚠

Aspirin, 300 mg/tab. Adult: 600 mg 3 times a day for 5 days. Child >3 months: paracetamol, 125 mg/5 ml.  
10 mg/kg per dose

### 3.7 Diarrhea

Prevent or correct dehydration (see [section 18.2](#)). Persistent or chronic diarrhea: Treat as in dehydration.

— PLUS —

Codeine phosphate, 30 mg/tab. Adult: 30 mg every 8–12 hrs as required. Child: vitamin A. Ages 6–11 months, 100,000 IU; ages 1–6 yrs, 200,000 IU

### 3.8 Gastritis (Heartburn)

Magnesium trisilicate compound. 2 tabs every 8 hrs as required

If there is no response—

Ranitidine, 150 mg tab. Adult: 150 mg twice daily for a total of 4–6 wks. Child (8–18 yrs): 150 mg twice daily for 6 wks

If vomiting—

Metoclopramide. 10 mg IM; repeat as necessary up to 3 times daily

### 3.9 Giardiasis

Metronidazole, 400 mg/tab. Adult: 2 g after food daily for 3 days. Child: 30 mg/kg (max: 1.2 g) per dose

— OR —

Tinidazole, 500 mg/tab. Adult: 2 g, single dose. Child: 50 mg/kg, single dose

### 3.10 Hemorrhoids (Piles)

Bismuth subgallate suppository rectally every 12 hrs for 5 days

### 3.11 Peptic Ulcers

Magnesium trisilicate compound. 2 tabs every 8 hrs as required

If there is no response—

Give cimetidine 200–400 mg every 8 hrs until symptom-free, then reduce to 400 mg every 12 hrs for a total of 4–6 wks.

**Note:** Aspirin and other NSAIDS are contraindicated in patients with peptic ulcers.

For prevention of peptic ulcer, advise patient to avoid spices, tobacco, alcohol, and carbonated drinks; encourage regular, small, and frequent meals; encourage milk intake.

If *Helicobacter pylori* associated, give—

Omeprazole 20 mg twice daily for 14 days

— PLUS —

Amoxicillin 1 g twice daily for 14 days

— PLUS —

Metronidazole 400 mg twice daily for 14 days

## 4. DISEASES OF THE RESPIRATORY SYSTEM

### 4.1 Asthma

#### 4.1.1 Treatment in Adults and Children >12

##### 4.1.1.1 Uncontrolled Asthma

- Salbutamol. 5 mg by nebulizer or inhaler; 2 puffs (200 micrograms) every 10 min for 60 min
- Prednisolone, 5 mg/tab. 30–60 mg as a single dose, or in 2–3 divided doses

##### 4.1.1.2 Acute Severe Asthma

- Oxygen, 40–60%
- Salbutamol. 5 mg by nebulizer or inhaler; 2 puffs (200 micrograms) every 2–5 min for 20 puffs
- Prednisolone, 5 mg/tab. 30–60 mg, single dose

— OR —

Hydrocortisone. 200 mg IV bolus stat

— OR —

Aminophylline, 250 mg/10 ml ampoule. 250 mg slow IV

#### 4.1.2 Treatment of a Mild to Moderate Acute Asthma Episode in Children <12

Salbutamol, 2 mg/5ml syrup or 2 mg/tab. Child <2 yrs: 100 micrograms/kg; child 2–6 yrs: 1–2 mg; child 6–12 yrs: 2 mg

— OR —

Salbutamol inhaler 100 micrograms (1 puff) every 30 seconds; repeat as necessary up to 10 puffs until symptoms improve

— OR —

Salbutamol nebulizer solution 2.5 mg by nebulizer

**Note:** Use tablets only when inhaler or nebulizer is not available.

**REFER** to a pediatrician if no response after 3 hrs. 

## 4.2 Acute Bronchitis

### 4.2.1 Treatment of Viral and Mild Bronchitis

Aspirin, 300 mg/tab. 2 tabs every 8 hrs

— OR —

Paracetamol, 500 mg tab. Adult: 1 g every 4–6 hrs (max: 4 g daily). Child: 10 mg/kg (max: 500 mg) per dose

### 4.2.2 Chronic Bronchitis (in Exacerbation)

Co-trimoxazole. 960 mg every 12 hrs. Child: 24 mg/kg per dose

— OR —

Amoxicillin. Adult: 500 mg every 8 hrs. Child: 15 mg/kg per dose

## 4.3 Coryza (Common Cold)

Common cold is a viral disease and so does *not* require any antibiotics.

Give adult symptomatic treatment with aspirin (300 mg/tab) 600 mg 3 times a day for 5 days. Give child symptomatic treatment with paracetamol (125 mg/4 ml syrup) 5 mg 3 times daily for 4 days.

## 4.4 Laryngitis

For an adult—

Benzylpenicillin. 1–2 MU every 6 hrs for 5 days

— OR —

Co-trimoxazole, 480 mg/tab. 960 mg every 12 hrs for 5 days

Add aspirin, 300 mg/tab. 600 mg every 8 hrs for 4 days

For a child—

Benzylpenicillin. 0.2 MU/kg in 4 divided doses for 5 days

— OR —

Co-trimoxazole, 120 mg/tab. 1–2 tab every 12 hrs for 5 days

Add paracetamol 10 mg/kg every 8 hrs for 4 days

## 4.5 Pertussis (Whooping Cough)

Fluid intake and maintenance of nutrition are crucial in the management of whooping cough. Cough mixtures, sedatives, mucolytics, and antihistamines are of no value at all and should not be given.

Antibiotics are indicated only if a patient is seen within a period of one wk after contracting the disease and is given for the purpose of preventing the spread of the disease to others or when the whooping cough is complicated with pneumonia or otitis media. The following is then given—

- Erythromycin 12.5 mg/kg every 6 hrs for 10 days, if seen within a period of 1 wk of getting the infection
- OR —
- If there are signs of pneumonia, chloramphenicol 75 mg/kg per day in 4 divided doses for 10 days

## 4.6 Pneumonia (Pyogenic)

### 4.6.1 Treatment of Pneumonia in Infants, 1 Week to 2 Months

Give a first dose of—

- Benzylpenicillin. 50,000 IU/kg IM

— PLUS —

- Chloramphenicol. 40 mg/kg IM

Then **REFER** immediately to a hospital. ⚠

Continue with the above medicines every 6 hrs for at least 5 days.

After referral and admission, give—

- Ampicillin. 25–50 mg/kg IV every 6 hrs
- PLUS —
- Gentamicin. 2.5 mg/kg IV every 8 hrs

**Note:** In neonates <7 days old, give doses every 12 hrs. Continue both medicines for at least 5 days.

In severely ill infants, give—

- Ceftriaxone. 100 mg/kg, IV once daily for 5 days

## 4.6.2 Treatment of Pneumonia in Children, 2 Months to 5 Yrs

### 4.6.2.1 General Treatment

- Vitamin A to all children with pneumonia. 6–11 months: 100,000 IU, single dose; 1–6 yrs: 200,000 IU, single dose
- Paracetamol 10 mg/kg every 8 hrs for 3 days
- Co-trimoxazole 24 mg/kg every 12 hrs for 5 days
- OR —
- PPF 50,000 IU/kg IM daily for at least 3 days

Once clinical improvement occurs, give—

- Amoxicillin 15–25 mg/kg may be used to complete the course of at least 5 days.
- OR —
- Amoxicillin 15–25 mg/kg every 8 hrs for 5 days

### 4.6.2.2 Treatment of Severe Pneumonia

- Benzylpenicillin. 50,000–100,000 IU/kg IV or IM every 6 hrs
- Oxygen by nasal catheter

Once the patient improves, switch to oral amoxicillin, 15 mg/kg every 8 hrs for 5 days to complete a total of at least 5 days of antibiotics.

### 4.6.3 Treatment of Pneumonia in Children >5 Yrs and Adults

#### 4.6.3.1 Management of Moderate Pneumonia

Co-trimoxazole. Adult: 960 mg every 12 hrs for 5 days. Child: 24 mg/kg per dose

— OR —

Amoxicillin. Adult: 500 mg every 8 hrs for 5 days. Child: 15 mg/kg per dose

— OR —

Erythromycin. Adult: 500 mg every 6 hrs for 5 days; 14 days in cases of atypical pneumonia. Child: 10–15 mg/kg per dose

— OR —

PPF 20,000 IU/kg IM once daily for 5 days

#### 4.6.3.2 Management of Severe Pneumonia (Hospitalized Patients)

Benzylpenicillin. Adult: 2 MU IV or IM daily every 4–6 hrs for 5 days. Child: 50,000–100,000 IU/kg per dose

— OR —

Chloramphenicol. Adult: 1g IV every 6 hrs for 7 days. Child: 25 mg/kg per dose (max: 750 mg)

Give nasal oxygen.

**REFER** immediately to next level for continuation of treatment. ⚠

#### 4.6.4 Pneumococcal Pneumonia

Benzylpenicillin. 50,000 IU/kg IM every 6 hrs for 2 days

Then PPF, 800,000 IU IM once daily for 5 days

#### 4.6.5 Pneumocystis Carinii Pneumonia (PCP)

Co-trimoxazole. 80 mg/kg every 6–8 hrs for at least 14 days

— OR —

Pentamidine. 4 mg/kg by IV infusion daily

— PLUS —

Prednisolone. 2 mg/kg daily in 3 divided doses

#### 4.6.6 Pneumonia Due to *Staphylococcus aureus*

Adults and children >5 yrs: Cloxacillin. 1–2 g IV or IM every 6 hrs for 10–14 days

Child >5 yrs: Cloxacillin. 50 mg/kg per dose (max: 2 g)

Children 2 months to 5 yrs: Cloxacillin. 25–50 mg/kg IV or IM every 6 hrs

— PLUS —

Gentamicin. 7.5 mg/kg IV in up to 3 divided doses daily and continue both medicines for at least 21 days

#### 4.7 Tonsillitis

Phenoxymethylpenicillin, 250 mg/tab. Adult: 500 mg every 6 hrs for 5 days. Child: 250 mg every 6 hrs for 5 days

#### 4.8 Tuberculosis (TB)

Refer also to the updated National Tuberculosis and Leprosy Program manual.

TB is a chronic infection caused by *Mycobacteria* organisms. As recommended by WHO, the community-based TB care with DOTS should be adapted. All cases of TB are treated with short-course regimens as shown in [table 4.8.1A](#). Fixed-drug combinations (FDCs) are encouraged because they may improve compliance.

##### 4.8.1 Pulmonary TB

Treatment is divided into the initial (intensive) phase of 2–3 months and the continuation phase of 4–6 months, depending on the medicine combinations used.

TB treatment regimens are expressed in a standard format (e.g., 4RH) where the letters represent abbreviated medicine names and the numbers show the duration in months and “/” shows the division between treatment phases. Medicines used are ethambutol (E), isoniazid (H), rifampicin (R), streptomycin (S), and pyrazinamide (Z). Table 4.8.1A gives the treatment regimes and [table 4.8.1B](#) provides daily dosages by body weight.

**Table 4.8.1A Short-Course TB Treatment Regimes**

Patient Category (Type of TB)	Initial Phase	Continuation Phase
1. New smear positive	2 EHRZ	4RH
2. Severe smear negative		
3. Severe extra-pulmonary		
4. Previously treated smear positive— <ul style="list-style-type: none"> <li>▪ Relapse</li> <li>▪ Failure to respond</li> <li>▪ Return after interruption</li> </ul>	2 SEHRZ	RHE
5. Any form of TB in children	2 HRZ	4 HR
6. Adult non-severe extrapulmonary		

**Table 4.8.1B Daily Medicine Dose (mg) by Body Weight**

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

#### 4.8.2 TB Arthritis

2 HRZ/7 HR (i.e., 2 months intensive phase of daily isoniazid + rifampicin + pyrazinamide followed by 7 months continuation phase of daily isoniazid + rifampicin).

#### 4.8.3 TB Meningitis

Treat as pulmonary TB (see [section 4.8.1](#)).

#### 4.8.4 Miliary TB, TB Pericarditis, and TB Peritonitis

2 SHRZ/6 HR or 2 EHRZ/6 HR (i.e., 2 months intensive phase of daily streptomycin + isoniazid + rifampicin + pyrazinamide followed by 6 months continuation phase of daily isoniazid + rifampicin *or* 2 month intensive phase of daily ethambutol + isoniazid + rifampicin + pyrazinamide followed by 6 months continuation phase of daily isoniazid + rifampicin)

## 5. DISEASES OF THE GENITOURINARY SYSTEM

### 5.1 Acute Cystitis

For uncomplicated infections, ensure high fluid intake and give—

- Sodium bicarbonate solution 5% (dissolve 5 g in 100 ml water), taken orally twice daily
- Co-trimoxazole. Adult: 1.92 g (4 tab of 480 mg), single dose. Child: 48 mg/kg, single dose

— OR —

Ciprofloxacin. Adult: 500 mg, single dose.

Child: 10–15 mg/kg, single dose

### 5.2 Acute Glomerulonephritis

Phenoxymethylpenicillin, 250 mg/tab. Adult: 500 mg every 6 hrs. Child: 10–20 mg/kg per dose

— OR —

Amoxicillin, 250 mg/tab. Adult: 500 mg every 8 hrs. Child: 15 mg/kg per dose

— OR — (if allergic to penicillin or pregnant)

Erythromycin, 250 mg/tab. Adult: 500 mg every 6 hrs. Child: 15 mg/kg per dose

### 5.3 Nephrotic Syndrome

Furosemide, 40 mg/tab. Adult: 40–80 mg each morning to induce diuresis. Child: 1–2 mg/kg each morning

— AND —

Prednisolone. 2 mg/kg daily (max: 60 mg). Child: 1–2 mg/kg each morning. Continue until there is no further proteinuria (around 6 wks).

### 5.4 Nongonococcal Urethritis

Tetracycline, 250 mg cap/tab. 500 mg every 6 hrs for 7 days

— OR —

Erythromycin, 250 mg tab. 500 mg every 6 hrs for 7 days

**Note:** Erythromycin is the medicine of choice in pregnancy.

### 5.5 Acute Pyelonephritis

Co-trimoxazole. Adult: 960 mg every 12 hrs for 10–14 days. Child: 24 mg/kg per dose

— OR —

Amoxicillin. Adult: 500 mg every 8 hrs for 10–14 days. Child: 15 mg/kg per dose

In severe cases or if no response to above in 48 hrs, add—

Gentamicin, 2.5 mg/kg IV or IM every 8 hrs for 7 days (reduce dose in renal impairment)

### 5.6 Acute Renal Failure

Furosemide, 40 mg/2 ml/ampoule. Adult: 6–8 mg/kg in 3 divided doses. Child: 1 mg/kg every 8 hrs

## 6. HIV/AIDS AND SEXUALLY TRANSMITTED INFECTIONS (STI)

### 6.1 Antiretroviral Therapy

**REFER** patient to an antiretroviral treatment center for prevention, care, and treatment. ⚠

Table 6.1 lists the first- and second-line treatment regimes for antiretroviral therapy (ART).

### 6.2 Sexually Transmitted Infections

#### 6.2.1 Urethral Discharge Syndrome (Male)

##### 6.2.1.1 Causes

A number of diseases, usually spread by sexual intercourse, produce similar manifestations in the male and may be difficult to distinguish clinically:

- *Gonorrhoea*: caused by the bacterium *Neisseria gonorrhoea*
- *Trichomoniasis*: caused by the protozoan *Trichomonas vaginalis*
- *Nongonococcal urethritis*: caused by virus-like bacteria *Mycoplasma* and *Chlamydia trachomatis*

##### 6.2.1.2 Treatment (Patients and Partners)

Ciprofloxacin, 500 mg/tab. 500 mg, single dose

— **PLUS** —

Doxycycline, 100 mg/cap. 100 mg every 12 hrs for 7 days

**Note:** If partner is pregnant, give—

Erythromycin, 250 mg/tab. 500 mg every 6 hrs for 7 days

— **PLUS** —

Co-trimoxazole, 480 mg/tab. 2.4 g (5 tabs) every 12 hrs for 3 days

Also give metronidazole, 400 mg/tab 2 g, single dose

Table 6.1 First- and Second-Line ART Regimens in Adults and Adolescents

First-Line Regimens	Second-Line Regimens	Comments
ZDV/3TC+NVP — OR — EFV	ABC/ddl + LPV/r — OR — TDF+3TC — OR — FTC+LPV/r	<ul style="list-style-type: none"> <li>First-line regimen is relatively inexpensive; second-line regimen is more expensive</li> <li>ZDV causes anemia.</li> <li>If patient is anemic, start with TDF.</li> </ul>
Alternative 1 TDF+3TC or FTC — PLUS — NVP/EFV	ZDV/ddl + LPV/r — OR — TDF+3TC or FTC+LPV/r	<ul style="list-style-type: none"> <li>Use of TDF, FTC, and EFV has low toxicity, once-daily administration, and they are effective against hepatitis.</li> <li>When affordable, this combination is the preferred first line.</li> <li>Patients who have peripheral neuropathy and anemia may be considered for this first-line regimen.</li> </ul>
Alternative 2 d4T <sup>a</sup> /3TC+NVP/EFV	ABC/ddl + LPV/r — OR — TDF+3TC or FTC+LPV/r	<ul style="list-style-type: none"> <li>Generic co-formulated d4T/3TC + NVP is inexpensive.</li> <li>d4T, however, is associated with many toxicities.</li> <li>Only d4T 30 mg is recommended, irrespective of weight.</li> </ul>

<sup>a</sup> Stavudine is being phased out because of serious toxicity.

Key:

3TC: Lamivudine

ABC: Abacavir

ZDV: Zidovudine

ddl: Didanosine

d4T: Stavudine

LPV/r: Lopinavir/ritonavir

TDF: Tenofovir

FTC: Emtricitabine

## 6.2.2 Abnormal Vaginal Discharge Syndrome (Vaginitis)

Vaginitis can be caused by a variety and often a mixture of organisms (bacterial vaginosis).

- If there is lower abdominal tenderness, treat as in lower abdominal pain syndrome (see 6.2.3).
- If there is *no* lower abdominal tenderness but there is itching, erythema, or excoriations, give—  
Nystatin pessary, (100,000 IU/pess). Insert one into the vagina each night for 14 days

— OR —

Clotrimazole pessary, 500 mg. Single dose at night for 1 night

— PLUS —

Metronidazole, 400 mg/tab. 2 g, single dose

- If there is *no* lower abdominal tenderness and *no* itching, erythema, or excoriations, give—  
Ciprofloxacin, 500 mg/tab. 500 mg stat

— PLUS —

Doxycycline, 100 mg/cap. 100 mg every 12 hrs for 7 days

— PLUS —

Metronidazole, 400 mg/tab. 2 g, single dose

- In pregnancy, give—  
Erythromycin, 250 mg/tab. 500 mg every 6 hrs for 7 days

— PLUS —

Co-trimoxazole. 2.4 g (5 tabs) every 12 hrs for 3 days

## 6.2.3 Lower Abdominal Pain Syndrome and Pelvic Inflammatory Disease (PID) Syndrome

These terms refer to infection of the uterus, tubes and ovaries by *N. gonorrhoea*, *Chlamydia*, and anaerobes.

Ciprofloxacin, 500 mg/tab. 500 mg every 12 hrs for 3 days

— PLUS —

Doxycycline, 100 mg/cap. 100 mg every 12 hrs for 10 days

— PLUS —

Metronidazole, 400 mg/tab. 400 mg every 12 hrs for 10 days

## 6.2.4 Genital Ulcer Disease Syndrome

### 6.2.4.1 Causes

A number of conditions may produce genital sores in men and women:

- *Syphilis*: caused by *Treponema pallidum* bacteria
- *Genital herpes*: caused by *Herpes simplex* virus
- *Granuloma inguinale*: caused by *Donovania granulomatis*
- *Chancroid*: caused by *Haemophilus ducreyi*

### 6.2.4.2 Treatment

- If blisters or vesicles are present, give—  
Acyclovir, 200 mg/tab. 200 mg every 5 hrs for 5 days  
If RPR test is positive, give benzathine penicillin, 2.4 MU IM, single dose.
- If blisters or vesicles are absent, give—  
Ciprofloxacin, 500 mg/tab. 500 mg every 12 hrs for 3 days  
— PLUS —  
Benzathine penicillin, 2.4 MU IM, single dose
- For pregnant or penicillin-allergic patients, give—  
Erythromycin, 250 mg/tab. 500 mg every 6 hrs for 7 days

## 6.2.5 Inguinal Swelling (Bubo)

Causes are lymphogranuloma venereum, granuloma inguinale, and chancroid.

Doxycycline, 100 mg/cap. 100 mg every 12 hrs for 10 days

— **PLUS** —

Ciprofloxacin, 500 mg/tab. 500 mg every 12 hrs for 3 days

## 7. COMPLICATIONS OF PREGNANCY, CHILDBIRTH, AND PUERPERIUM

### 7.1 Abortion (Spontaneous or Induced)

- If patient is bleeding, give—

Misoprostol, 200 micrograms/tab. 600 micrograms orally stat or 400 micrograms sublingually stat

— **ADD** —

Ampicillin, 250 mg/cap. 500 mg every 6 hrs for 7 days

— **OR** —

Tetracycline, 250 mg/cap. 500 mg every 6 hrs for 7 days

— **PLUS** —

Metronidazole, 200 mg tab. 400 mg every 8 hrs for 7 days

- If products of conception are retained, then evacuate.

### 7.2 Anemia in Pregnancy

Ferrous sulfate, 200 mg/tab. 200 mg 3 times daily

— **PLUS** —

Folic acid 5 mg daily

De-worm the patient with mebendazole 500 mg, single dose, in second and third trimesters.

### 7.3 Breast Abscess

Perform incision and drain.

Erythromycin, 250 mg/tab. 500 mg every 6 hrs for 5 days

### 7.4 Dysmenorrhea

Acetylsalicylic acid, 300 mg tab. 600 mg every 8 hrs as long as needed

— OR —

Paracetamol, 500 mg tab. 1 g every 8 hrs as long as necessary

### 7.5 Hyperemesis Gravidarum

Hyperemesis gravidarum is severe vomiting in pregnancy.

Chlorpromazine, 25 mg tab or 50 mg/2ml. 25 mg every 6 hrs as necessary

— AND —

Metoclopramide, 10 mg/tab. 10 mg every 6 hrs as necessary

### 7.6 Postpartum Hemorrhage

Blood loss is more than 500 ml.

#### 7.6.1 Prevention

Oxytocin injection, 10 IU. IM or IV

— OR —

Misoprostol, 600 micrograms, orally or sublingually

#### 7.6.2 Treatment

Oxytocin, 10–40 IU, IV

— OR —

Misoprostol, 800 microgram, sublingually

— OR —

Ergometrine, 0.2 mg/ml/ampoule. 0.2–0.4 mg IV or IM immediately

## 7.7 Puerperal Sepsis

- Treat with a combination of antibiotics until the patient is fever free for 48 hrs:  
Ampicillin, 2 g IV every 6 hrs  
— PLUS —  
Gentamicin, 5 mg/kg IV every 24 hrs  
— PLUS —  
Metronidazole, 500 mg IV every 8 hrs for at least 3 doses
- If fever persists after 72 hrs of starting antibiotics, re-evaluate and revise the diagnosis.  
— OR —  
**REFER** to higher medical level. ⚠

## 7.8 Retained Placenta

This term refers to a failure of delivery of placenta within 30 min of delivery of the baby.

Set up an IV infusion—

Amoxicillin. 500 mg every 8 hrs

— OR —

Erythromycin. 500 mg every 6 hrs

— PLUS —

Metronidazole. 400 mg every 8 hrs

**REFER** to hospital immediately. ⚠

## 7.9 Severe Preeclampsia

This is a hypertensive condition of pregnancy which may result in maternal convulsions.

Set up an IV drip and give a loading dose of magnesium sulfate as for eclampsia ([section 7.10](#)).

- Loading dose—
  - Give 4 g of 20% magnesium sulfate solution IV over 5 min.
  - Follow promptly with 10 g of 50% magnesium sulfate solution. Administer 5 g in each buttock

deep IM with 1 ml of 2% lignocaine in the same syringe.

- If convulsions recur after 15 min, give 2 g of 50% magnesium sulfate solution IV over 5 min.
- Maintenance dose—
  - Give 5 g of 50% magnesium sulfate solution with 1 ml of 2% lignocaine in the same syringe by deep IM injection into alternate buttocks every 4 hrs. Continue treatment for 24 hrs after delivery or last convulsion, whichever occurs last.
  - If 50% solution is not available, give 1 g of 20% magnesium sulfate solution IV every hr by continuous infusion.

**WARNING:** Monitor for signs of magnesium toxicity: respiratory rate, patellar reflexes, and urinary output. If signs of toxicity occur, give **ANTIDOTE** for magnesium sulfate: calcium gluconate 1–2 g slow IV, and repeat as needed until respiratory rate increases.

If magnesium sulfate is not available, give diazepam as an alternative, as follows:

- Loading dose—
  - Diazepam 10 mg IV slowly over 2 min.
  - If convulsions recur, repeat loading dose
- Maintenance dose—
  - Diazepam 40 mg in 500 ml normal saline or Ringer's lactate.

**WARNING:** Maternal respiratory depression may occur if dose exceeds 30 mg in 1 hr.

  - Assist respiration, if necessary.
  - Do not give more than 100 mg in 24 hrs.
- Rectal administration—
  - Give a loading dose of 20 mg in 10 ml syringe.
  - If convulsions are not controlled in 10 min, administer additional 10 mg. Be prepared to assist ventilation.

## 7.10 Eclampsia

Treat as severe preeclampsia (section 7.9).

In hospital, if BP is >110 mmHg diastolic or >160 mmHg systolic, give—

- Hydralazine. 10 mg IV bolus. Repeat hydralazine dose every 15 min until diastolic BP down to 100 mmHg, but not below 90 mmHg.

— OR —

- If hydralazine is not available, give nifedipine 20 mg sublingually every 12 hrs for 1–2 doses until delivery.

## 8. SKIN DISEASES

### 8.1 Boils (Furunculosis)

If ready, drain and dress. Give—

- Cloxacillin. Adult: By mouth, 500 mg cap. 1–2 capsules every 6 hrs; by IM inj, 250 mg every 6 hrs. Child: By any route, under 2 yrs give quarter adult dose; 2–10 yrs: half adult dose

— OR —

- Erythromycin, 250 mg/tab. Adult: 250 mg every 6 hrs. Child: 7.5mg/kg per dose

### 8.2 Carbuncles

Treat as boils (section 8.1).

### 8.3 Eczema (Dermatitis)

Hydrocortisone cream, 1% every 12 hrs

— OR —

Betamethasone cream, 0.1% every 12 hrs

Chlorpheniramine, 2 mg/tab. 2–4 mg every 8 hrs for 5 days. Child: 2 mg every 8 hrs for 5 days

Erythromycin, 250 mg/tab. 250 mg every 6 hrs for 7 days. Child: 7.5 mg/kg every 6 hrs for 7 days.

## 8.4 Fungal Skin Infections

Benzoic acid 3% + salicylic acid 6% sparingly twice daily. Continue for 14 days after lesions healed.

— OR —

Clotrimazole cream, 1% every 12 hrs. Continue for 14 days after the lesions have healed.

## 8.5 Herpes Simplex and Herpes Genitalis

Clean lesion with—

Chlorhexidine solution 0.05%

— OR —

Hydrogen peroxide solution 6%

— ADD —

If lesions are infected, co-trimoxazole, 480 mg/tab. 960 mg every 12 hrs.

## 8.6 Herpes Zoster (Shingles)

- Clean the lesions with an antiseptic solution—
  - Chlorhexidine solution 0.05%
- OR —
- Hydrogen peroxide solution 6%
- Apply calamine lotion 2–3 times daily.
- Use analgesics as necessary.
- Give acyclovir 800 mg every 5 hrs for 7 days if the disease is diagnosed very early or is disseminated.

## 8.7 Impetigo

- Clean lesion with chlorhexidine solution 0.05%.
- Apply gentian violet aqueous paint 1% every 12 hrs.
- Give co-trimoxazole, 480 mg/tab. Adult: 960 mg every 12 hrs. Child: 24 mg/kg per dose

— OR —

Erythromycin, 250 mg/tab. Adult: 250 mg every 6 hrs. Child: 7.5 mg/kg per dose

## 8.8 Pemphigus

- Clean affected area with chlorhexidine solution 0.05%
  - OR —
  - Hydrogen peroxide solution 6%
- Give co-trimoxazole, 480 mg/tab. Adult: 960 mg every 12 hrs. Child: 24 mg/kg per dose
  - OR —
  - Erythromycin, 250 mg/tab. 250 mg every 6 hrs. Child: 7.5 mg/kg per dose

## 8.9 Psoriasis

Salicylic acid ointment 2% twice daily

— OR —

In more severe cases, coal tar ointment 1% 1–3 times daily. Then expose affected area to sunlight.

## 8.10 Scabies

Benzyl benzoate lotion 25% daily for 3 days

## 8.11 Urticaria or Skin Allergy

Calamine lotion 15% 1–2 times daily

Aspirin, 300 mg/tab. 600 mg every 8 hrs for 5 days

Chlorpheniramine, 2 mg/tab. Adult: 4 mg every

8 hrs. Child: 2 mg per dose

— OR —

Promethazine hydrochloride. Adult 25 mg at night.

Child: 1 mg/kg daily in 1–2 divided doses

## 8.12 Tropical Ulcer

- Clean the wound with chlorhexidine solution 0.05%
  - OR —
  - Hydrogen peroxide solution 6%
- Give PPF. Adult: 800,000 IU IM once daily for 7–10 days. Child: 20,000 IU/kg per dose

## 9. DISEASE OF CARDIOVASCULAR SYSTEM

### 9.1 Arrhythmias

**Note:** Indications and dosages are only cursory. Consult special literature. **REFER** patient to hospital. ⚠

- For slowing of arterial tachycardia (fibrillation and flutter), give digoxin 0.25 mg daily.
- For ventricular tachycardia and fibrillation during ischaemia and after a myocardial infarction, give lidocaine, 500 mg/5 ml/ampoule. Initially 50–100 mg, IV slowly (ECG monitored), then 1–4 mg/min, IV continuous treatment.

— **PLUS** —

Propranolol, 1 mg/ml/ampoule. 10 mg slowly, IV

- For atrial, supra, and ventricular extrasystoles and tachyarrhythmias, give procainamide, 250 mg tab. 250–500 mg in 5–8 divided doses daily.
- For AV block and bradyarrhythmias, give isoprenaline slow release, 30 mg tab. 30 mg every 6–8 hrs daily.

### 9.2 Bacterial Endocarditis

#### 9.2.1 Empirical Therapy

Benzylpenicillin. Adult: 1 MU IV every 4 hrs. Child: 50,000 IU/kg per dose every 6 hrs

— **AND** —

Gentamicin. 1 mg/kg IV every 8 hrs. Child: 2.5 mg/kg per dose every 8 hrs

#### 9.2.2 Prevention

Prophylactic amoxicillin. Adult: 2 g. Child: 50 mg/kg

— **PLUS** —

Gentamicin 1 hr before plus 500 mg every 8 hrs for 48 hrs after dental extraction and tonsillectomy in individuals with cardiac valve defects.

Prompt treatment of skin infections

### 9.3 Congestive Heart Failure

- Furosemide, 20 mg/2 ml ampoule. Adult: 20–40 mg IV or oral (40 mg/tab) increasing as required to 80–160 mg daily or every 12 hrs according to response. Child: 1 mg/kg, IV or IM, repeated as needed according to response (max: 4 mg/kg daily)
- Captopril. Adult 6.25 mg every 8 hrs aiming for a maintenance dose of 50 mg every 8 hrs. Child: 1 mg/kg daily
- Spironolactone for heart failure. Adult: 25–50 mg once a day. Child: initially 1.5–3 mg/kg daily in divided doses
- Digoxin, 0.125 mg/tab. Adult loading dose: 0.5–1 mg orally daily in 2–3 divided doses for 2–3 days. Adult maintenance dose: 250 micrograms orally daily. Child loading dose: 15 micrograms/kg orally 3–4 times daily for 2–4 days. Child maintenance dose: 15 micrograms/kg daily for 5 days

### 9.4 Deep Vein Thrombosis

Treat as thromboembolism ([section 9.10](#)).

### 9.5 Hypertension

#### 9.5.1 Mild Hypertension (Diastolic 90–100 mmHg)

Bendrofluazide, 5 mg/tab. 2.5–5.0 mg each morning

### 9.5.2. Moderate Hypertension (Diastolic 100–110 mmHg)

Bendrofluazide, 5 mg/tab. 2.5–5.0 mg each morning

— PLUS —

Enalapril, 2.5 mg/tab. 2.5–5.0 mg daily

— OR —

Nifedipine, 10 mg/tab. 20–100 mg daily in 1–2 divided doses

— OR —

Atenolol, 50 mg/tab. 1–2 tab daily or propranolol (40 mg/tab) 80 mg every 12 hrs

### 9.5.3 Severe Hypertension (Diastolic >110 mmHg)

Bendrofluazide, 5 mg/tab. 10 mg every 12 hrs

— PLUS —

Hydralazine, 50 mg/tab. 100–200 mg a day

— PLUS —

Propranolol, 40 mg/tab. 40–120 mg every 8–12 hrs or atenolol (50 mg/tab) 50–100 mg every 12 hrs

## 9.6 Ischaemic Heart Disease

Glyceryl trinitrate, 0.5 mg/tab. 0.5 mg sublingually.

If no response, repeat after 5 min.

Propranolol, 40 mg/tab. 10–40 mg daily for as long as is required

## 9.7 Pericarditis

Treatment depends on the causative organism and presenting clinical features. If there is fluid, perform tapping.

## 9.8 Pulmonary Edema

Aminophylline, 250 mg/10 ml ampoule. Adult: IV 500 mg diluted in 20 ml saline. Child: 5–8 mg/kg diluted in 20 ml of saline over 20 min

— PLUS —

Furosemide, 20 mg/2 ml ampoule. 40–80 mg IM or slow IV. Child: 1 mg/kg slow IM or IV

— PLUS —

Morphine. Adult: 5–15 mg IM or 2–4 mg slow IV. Child: 0.1 mg/kg slow IV, single dose

— PLUS —

Digoxin as in cardiac failure

**WARNING:** No digitalization if patient has had digoxin within 14 days but give maintenance dose.

## 9.9 Rheumatic Heart Disease

Benzathine penicillin. 2.4 MU IM once monthly

— OR —

Adult: Phenoxymethylpenicillin (penicillin V), 250 mg/tab. 750 mg every day. Child: Benzathine penicillin. <30 kg: 0.6 MU once monthly. >30 kg: 1.2 MU once monthly. Continue either medicine up to 30 yrs of age.

**WARNING:** If allergic to penicillin, give erythromycin (250 mg/tab) 250 mg once daily.

## 9.10 Thromboembolism

Heparin, 5,000 IU/ml/ampoule. Initially 5,000–10,000 IU then boluses of 25,000–40,000 IU/day in 3–4 doses IV

— PLUS —

Warfarin, 3 mg/tab. Give as follows—

- First day, 15 mg; second day, 7.5 mg each in one dose
- Maintenance dose 2.5–7.5 mg/day as a single dose. Watch for bleeding, and monitor prothrombin time.

### ANTIDOTES:

- Protamine sulfate (50 mg/5 ml ampoule) is a heparin **ANTIDOTE** (to reverse heparin toxicity);

50 mg of protamine sulfate reverses the action of 5,000 IU of heparin.

- Phytomenadione/vitamin K (10 mg/ml/ampoule) is a warfarin **ANTIDOTE**. Give 2–20 mg by slow IV.

## 10. DISEASES OF THE NERVOUS SYSTEM AND MENTAL DISORDERS

### 10.1 Anxiety Neurosis

Psychotherapy (counseling) is of primary importance.

Diazepam. 5 mg 1–2 times daily. Elderly patients: 2.5 mg 1–2 times daily.

### 10.2 Depressive Neurosis

Imipramine, 25 mg/tab. 75–100 mg at bedtime (max: 150 mg daily in divided doses). Continue treatment for at least 6 months.

### 10.3 Bipolar Disorders

Lithium carbonate, 300 mg/cap or tab. Adult: 0.6–1.8 g daily (300–900 mg daily in the elderly). For dose information for a specific preparation, consult manufacturer's literature.

**REFER** to psychiatrist for management. 

### 10.4 Epilepsy

#### 10.4.1 Petit-mal

Ethosuximide, 250 mg/cap. Adult: 500 mg daily in 2 divided doses. Increase if necessary by 250 mg every 4–7 days up to a daily dose of 1.0–1.5 g. Child: Ethosuximide, 250 mg/5 ml syrup. <6 yrs: 250 mg every 12 hrs. >6 yrs: 500 mg every 12 hrs.

## 10.4.2 Grand-mal

### 10.4.2.1 Adult

Phenytoin, 100 mg/cap. 100 mg every 8 hrs. Increase gradually as needed to usual 200–500 mg daily

— OR —

Carbamazepine, 200 mg/tab. 100–200 mg 2–3 times daily. Increase in 100 mg doses every 2 wks to 800–1,200 mg daily in divided doses

— OR —

Phenobarbitone, 30 mg/tab. 30–60 mg every 12 hrs

### 10.4.2.2 Child

Phenytoin initially. 5 mg/kg daily in 2 divided doses (max: 300 mg daily)

— OR —

Carbamazepine. 10–20 mg/kg daily in at least 2 divided doses

— OR —

Phenobarbitone. 8 mg/kg daily

**Note:** Treat for at least 2 yrs. If there are no further epileptic attacks 2 yrs after the last attack, taper off the dose before stopping.

## 10.4.3 Status Epilepticus

Diazepam. Adult: 10 mg/2 ml ampoule. 5–10 mg IV stat. Child: Rectal diazepam tube, 5 mg/2.5 ml/tube. One tube. May be repeated after 30 min.

## 10.5 Migraine

### 10.5.1 Treatment of Acute Attack

Acetylsalicylic acid (aspirin), 300 mg/tab. Adult: 300–900 mg at first sign of attack; repeat every 4–6 hrs if necessary (max: 4 g daily). Child under 16 yrs: Not recommended.

— OR —

Paracetamol, 500 mg/tab. Adult: 0.5–1.0 g at first sign of attack; repeat every 4–6 hrs if necessary (max:

4 g daily). Child: 6–12 yrs: 250–500 mg at first sign of attack; repeat every 4–6 hrs if necessary (max: 4 doses in 24 hrs).

### 10.5.2 Prophylaxis

Propranolol, 40 mg/tab. Adult: Initially 40 mg 2–3 times daily; increase by same amount at weekly intervals if necessary; usual maintenance dose is 80–160 mg daily. Child <12 yrs: 20 mg 2–3 times daily.

## 10.6 Parkinsonism (Parkinson's Disease)

Benzhexol, 2 mg/tab. 2–15 mg daily in 1–3 divided doses

— OR —

Levodopa 250 mg

— PLUS —

Carbidopa 25 mg once a day

## 10.7 Schizophrenia or Psychosis

Chlorpromazine, 25 mg or 100 mg/tab. 25–100 mg every 8 hrs

— OR —

Chlorpromazine injection, 50 mg/ampoule. 10 mg/kg/day in 3 divided doses (max: 400 mg per day).

Haloperidol, 5 mg tab. 5–10 mg every 12 hrs then adjust according to response.

### ANTIDOTE:

Benzhexol, 2 mg/tab. 2 mg every 12 hrs

— OR —

Benzhexol, 1 ml IM every 12 hrs

**REFER** to psychiatrist for management. 

## 11. DISEASES OF THE BLOOD AND BLOOD-FORMING ORGANS

### 11.1 Iron Deficiency Anemia

Ferrous sulfate, 200 mg tab. Adult: 200 mg every 12 hrs for 2 months. Child: 6 mg/kg/day in 2–3 divided doses (with food) for 2 months.

**Note:** All pregnant women should take ferrous sulfate and folic acid tablets routinely.

### 11.2 Sickle Cell Disease

Not in crisis (prophylaxis)—

- Folic acid, 5 mg/tab. 5 mg daily. **Note:** Give double dose in pregnancy.
- Chloroquine, 250 mg/tab. Give ½ –1 tab once weekly.

In crisis—

- Folic acid, 5 mg/tab. 5 mg every 8 hrs for 7 days
- Paracetamol, 125 mg/5 ml syrup. 125–250 mg every 6 hrs

## 12. ENDOCRINE AND METABOLIC DISORDERS

### 12.1 Adrenal Insufficiency (Addison's Disease)

Cortisone, 25 mg/tab. 25 mg every 8 hrs as replacement therapy

— OR —

Prednisolone, 5 mg/tab. 5 mg daily for replacement therapy

### 12.2 Diabetes Mellitus, Mature (Non-Insulin Dependent Diabetes Mellitus)

Metformin. 500 mg, twice daily at breakfast and supper

— OR —

Tolbutamide, 500 mg/tab. 0.5–2.0 g daily in 2 divided doses taken pre-breakfast and pre-supper

— OR —

Glibenclamide, 5 mg/tab. 5 mg once daily, with meals. Elderly: 2.5 mg daily; adjust according to response up to a maximum of 10 mg.

#### WARNING:

- Tolbutamide is contraindicated in breastfeeding mothers.
- Elderly patients should take 2.5 mg instead of 5 mg of glibenclamide because they can go into hypoglycemia quickly.

### 12.3 Diabetes Mellitus (Insulin Dependent Diabetes Mellitus)

Insulin zinc suspension. Adult: Lente insulin 40 IU/ml. Lente insulin is 2/3 of the 24-hr requirement of soluble insulin, and it should be used after establishing the 24-hr requirement of soluble insulin.

Child: 10–50 IU once daily subcutaneously

— OR —

Soluble insulin, 40 IU/ml. Adult: 40–100 IU SC daily in 3 divided doses before meals. Child: 40–80 IU as above.

**Note:** Avoid using propranolol or other  $\beta$ -blockers in diabetics because they mask hypoglycemic symptoms. If required, use alternative antihypertensives.

**REFER** to hospital for management. ⚠️

## 12.4 Diabetic Ketoacidosis

- Soluble insulin. 10–20 IU IM every hr
- Monitor urine and blood sugar hourly.
- Treat any dehydration with normal saline or 5% dextrose when blood sugar has fallen below 250 mg for 5 days.
- Potassium chloride 1 g every 8 hrs for 5 days

**REFER** to hospital immediately. ⚠️

## 12.5 Hypoglycemia

Dextrose 50% inj, 50 ml/ampoule. 20–50 ml, IV

You can also give oral glucose or sugar before coma sets in.

## 12.6 Hypothyroidism

### 12.6.1 Adult

Thyroxine, 0.05 mg/tab. 0.1–0.2 mg (2–4 tab) once daily before breakfast. Gradually increase by 25–50 micrograms every 4 wks to maintenance dose of 100–200 micrograms daily.

— OR —

Lugol's iodine 5% solution. 10 drops once daily or 3 drops every 8 hrs (with meals) as long as necessary

— OR —

Iodized oil inj, 385% IM. 1 ml (480 mg) once every 3 yrs

### 12.6.2 Child

Thyroxine. 1 microgram/kg daily for the first 6 months, then adjust according to response (max: 100 micrograms daily)

— OR —

Iodized oil inj, 385% IM. <1 yr: 0.5 ml (240 mg) once every 3 yrs; >1 yr: 1 ml (480 mg) once every 3 yrs

## 12.7 Thyrotoxicosis

Carbimazole, 5 mg/tab. Adult: 15–20 mg every 8 hrs for 1–2 months. Once patient is euthyroid, progressively reduce carbimazole to daily maintenance dose of 5–15 mg and continue for 18 months. Child: 15 mg/day in 3 divided doses then adjust dose according to response.

Propranolol (40 mg/tab) is added in the acute phase. Give 40–80 mg every 12 hrs for at least 1 month.

## 13. NUTRITIONAL DISORDERS

### 13.1 Guidelines on Feeding the Infant and Young Child

1. All mothers should be counseled and supported to initiate breastfeeding within an hour of delivery and to exclusively breastfeed their infants for the first 6 months of life unless medically contraindicated.
2. Parents should be counseled and supported to introduce adequate, safe, and appropriate supplementary foods at 6 months of age and continue breastfeeding for 2 yrs.
3. Pregnant women and lactating mothers should be appropriately cared for and encouraged to eat adequate nutritious foods.
4. Health service providers should establish HIV status of all pregnant women and lactating mothers.
5. Exclusive breastfeeding should be recommended for infants of HIV infected women for the first 6 months irrespective of the infants' HIV status, unless replacement is acceptable, feasible, affordable, sustainable, and safe.
6. Infants born to mothers with HIV should be tested for HIV infection from 6 weeks of age; appropriate feeding and counseling should be given to the mother.
7. Mothers of low-birth-weight infants should be encouraged to breastfeed if the infant can suckle. If the infant cannot suckle, mothers should be assisted to express breast milk to feed the baby.
8. Malnourished children should be provided with appropriate medical care, nutritional rehabilitation, and follow-up.

## 13.2 Protein Energy Malnutrition of Early Childhood

### 13.2.1 Malnutrition in Childhood

Malnutrition is a significant contributor of morbidity and mortality among children younger than 5 yrs of age in sub-Saharan Africa. Thus, protein energy malnutrition (PEM) is a significant public health problem, mainly of the underdeveloped world. In children <5 yrs, the most prevalent form of malnutrition is PEM. PEM is a broad spectrum of clinical conditions ranging from marasmus (dry malnutrition) on one extreme to kwashiorkor (wet malnutrition) on the other extreme with intermediate forms, such as marasmic–kwashiorkor (mixed malnutrition). The intermediate forms constitute the majority of cases.

### 13.2.2 Consequences of PEM

Consequences of PEM in children include—

- Impaired growth and development
- Impaired mental development
- Impaired body resistance and immune system
- Increased risk of adult chronic diseases
- Increased risk for the cycle of intergenerational malnutrition

PEM contributes greatly to the loss of millions of dollars to the national economy and overall development.

### 13.2.3 General Principles of Initial Treatment of PEM

- Treat or prevent hypoglycemia (blood sugar <3 mmol/l or <55 mg/dl). Give 2 ml/kg of 25% glucose/dextrose solution IV.
  - Begin feeding quickly upon admission.
  - Provide frequent and regular small feedings (every 3 hrs day and night).

- Treat infections promptly.
- If the patient can drink, give a small feeding of an intensive therapeutic diet.
- Treat or prevent hypothermia.
  - Hypothermia is axillary temperature  $<35^{\circ}\text{C}$  and rectal temperature  $<35.5^{\circ}\text{C}$ .
  - Ensure that the patient is well covered with clothes, hats, and blankets.
  - Encourage caretaker or mother to sleep next to the child (to provide body-to-body contact, direct heat, or warmth transfer from adult to child).
  - Keep the ward closed during the night and avoid wind drafts inside.
  - Quickly clean the patient with a warm wet towel and dry immediately. Avoid washing the baby directly in the first few weeks of admission.
- Treat dehydration.
  - Dehydration is a clinical condition brought about by the loss of a significant quantity of fluids and salts from the body.
  - Common causes of dehydration include—
    - Diarrhea
    - Excessive sweating as in high fever
    - Vomiting
    - Respiratory distress
  - Use plans A, B, or C below to manage dehydration based on the degree of dehydration.

### 13.2.3.1 Plan A for Treating Dehydration in Children

Use plan A when there is no clinical dehydration yet.

Prevent clinical dehydration—

1. Advise the mother or caretaker on the three rules of home treatment (i.e., extra fluids, continue feeding, appointment to come back for review).

- Give extra fluids—as much as the child can take.
2. Advise mother to continue breastfeeding, and give oral rehydration solution (ORS) or clean water in addition to milk. If the child is not exclusively breastfed, give one or more of ORS, soup, rice-water, yoghurt drinks, or clean water. In addition to the usual fluid intake, give ORS after each loose stool or episode of vomiting as follows:
    - <2 yrs: Give 50–100 ml
    - >2 yrs: Give 100–200 ml
 Continue giving extra fluids as well as ORS until the diarrhea or other cause of dehydration ceases.
  3. Advise the mother on—
    - Correct breastfeeding and other feeding during sickness and health
    - Increasing fluids during illness
    - When to return to the health worker or health facility for review

### 13.2.3.2 Plan B for Treating Dehydration in Children

Use plan B when there is some clinical dehydration.

Give ORS in the amounts shown in [table 13.2.3.2](#) during the first 4 hrs.

### 13.2.3.3 Plan C for Treating Dehydration in Children

Use plan C when there is severe dehydration.

**REFER** the child to a facility where IV capability and expertise are available. 

**REFER** the child to a nutritional unit. 

**Table 13.2.3.2 ORS Quantities for Dehydration Treatment**

Age (months)	Weight (kg)	ORS (ml)
<4	<6	200–400
4–12	6.0–9.9	400–700
13–24	10.0–11.9	700–900
25–60	12–19	900–1,400

*Notes:*

1. Use the child's age only when the weight is not known.
2. You can also calculate the approximate amount of ORS to give a child in the first 4 hrs as weight (kg) × 75 ml.
3. Show the mother how to give the ORS—
  - a. Give frequent small sips from a cup.
  - b. If the child wants more than is shown in the table, give more as required.
  - c. If the child vomits, wait 10 min, then continue more slowly.
    - i. For infants <6 months who are not breastfed, also give 100–200 ml of clean water during the first 4 hrs.
    - ii. Reassess the patient frequently (every 30–60 min) for the classification of dehydration and the selection of the treatment plan.

## 14. DISEASES OF THE EYE, EAR, AND THROAT

### 14.1 Conjunctivitis

#### 14.1.1 General Treatment

Tetracycline eye ointment 1%

— OR —

Chloramphenicol eye ointment 1%. Apply 2 to 4 times daily for 5 to 7 days.

#### 14.1.2 Allergic Conjunctivitis

Dexamethasone eye ointment 1%, Apply 2 to 4 times daily for 5 to 7 days.

— OR —

Dexamethasone eye drops 0.1%. 1 to 2 drops into infected eye every 1 to 2 hrs while awake.

#### 14.1.3 Associated Allergy and Infection

Neomycin + betamethasone eye drops 1%. 1 to 2 drops into infected eye every 1 to 2 hrs while awake.

— OR —

Chloramphenicol + betamethasone eye drops 1%. 1 to 2 drops into infected eye every 1 to 2 hrs while awake.

— OR —

Gentamicin + betamethasone eye drops 1%, 1 to 2 drops into infected eye every 1 to 2 hrs while awake.

#### 14.1.4 Chlamydia Infections

Tetracycline eye ointment every 6 hrs for at least 21 days

— OR —

Erythromycin, 250 mg/tab. 250 mg every 6 hrs for 14–21 days

## 14.2 Ophthalmia Neonatorum

Benzylpenicillin. 50,000 IU/kg IM every 12 hrs for 5–7 days

**Note:** If antibiotic eye drops are not available, dissolve benzylpenicillin, 1 MU, in 10 ml of sodium chloride infusion 0.9%. Use this solution as eye drops, but make a fresh solution every day.

## 14.3 Otitis Externa

Chloramphenicol eye drops 0.5%. 2 drops into the ear every 8 hrs for 14 days

Flucloxacillin. Adult: 250–500 mg every 6 hrs for 5–7 days. Child: 12.5–25.0 mg/kg per dose

If a fungal infection is suspected, give clotrimazole ear drops twice daily for 2 months.

## 14.4 Otitis Media

Amoxicillin, 250 mg/cap. Adult: 500 mg every 8 hrs for 7 days. Child: Amoxicillin, 125 mg/5 ml syrup. 15 mg/kg per dose

— OR —

Co-trimoxazole, 480 mg/tab. Adult: 960 mg every 12 hrs for 7 days. Child: 120 mg/tab. 2 tabs every 12 hrs for 7 days

## 14.5 Trachoma

Tetracycline eye ointment 1%. Twice daily for 4–6 wks

— PLUS —

Co-trimoxazole, 480 mg/tab. Adult: 960 mg every 12 hrs for 14 days. Child: 24 mg/kg per dose

— OR —

Erythromycin, 250 mg/tab. Adult: 500 mg every 6 hrs for 14 days. Child: 10–15 mg/kg per dose

## 14.6 Vitamin A Deficiency (Xerophthalmia)

Retinol (vitamin A) to be given every 2 wks for a total of 3 doses in the following amounts—

- <6 months: 50,000 IU
- 6–11 months: 100,000 IU
- 1–6 yrs: 200,000 IU
- >6 yrs: 200,000 IU

Vitamin A can also be given prophylactically to children and lactating mothers for the target conditions and diseases listed in table 14.6 at the dose by age given above.

**Table 14.6 When to Give Vitamin A**

Disease or Condition	Dosage
Measles, severe diarrhea, severe PEM	First dose at diagnosis Second dose 2 wks later Third dose 6 wks later
Acute respiratory infection	One dose at diagnosis of pneumonia and TB
Lactating mothers	First dose of 200,000 IU at delivery Second dose 1 month after delivery

## 15. INJURIES, ACCIDENTS, AND POISONING

### 15.1 Bites

#### 15.1.1 Animal Bite—Rabies

##### 15.1.1.1 If Animal Was Identified

Quarantine the animal for 10 days while feeding it. If the animal does not show any signs of rabies infection, it may be released. If the animal was infected, it should die within 10 days. If it shows signs of rabies infection, the animal should be killed and the head put in a polythene bag and sent to the veterinary department for verification of the infection.

Meanwhile, treat the patient—

- Do surgical toilet.
- Do not suture the wound.
- Give systemic antibiotic

— **PLUS** —

anti-tetanus serum (ATS)

If results indicate rabies infection in the dog, then give anti-rabies vaccine.

##### 15.1.1.2 If Animal Was Not Identified

Do surgical toilet.

Give systemic antibiotics, ATS, and anti-rabies vaccine.

**Note:** Anti-rabies vaccine is very expensive and should be used only when there is an absolute need.

#### 15.1.2 Human Bite

- Clean the wound with chlorhexidine solution 0.5 %
- If not fully immunized, give tetanus toxoid (TT) as per immunization schedule ([section 19.2](#)).

- Give antibiotics such as—  
Benzylpenicillin IM. Adult: 1–2 MU every 6 hrs for 5 days. Child: 0.2 MU (200,000 IU)/kg/day in divided doses for 5 days  
— OR —  
Erythromycin, 250 mg/tab. Adult: 250 mg every 6 hrs for 5 days. Child: 12.5 mg/kg every 6 hrs for 5 days  
— OR —  
Metronidazole, 200 mg/tab. 400 mg 3 times a day for 5 days

### 15.1.3 Snake Bite

Antivenom polyvalent, 5 ml/ampoule. 10–100 ml sc or IM

ATS

— OR —

TT as per immunization schedule ([section 19.3](#))

**Note:** Do not give antivenom if there is no sign of poisoning. The signs are bleeding (i.e., hematuria, oozing from the site, hematemesis), paralysis, and failure of collected blood to clot within 5–15 min.

### 15.1.4 Insect Bite

Give an antihistamine such as chlorpheniramine, 2 mg/tab. Adult: 4 mg every 6 hrs. Child: <2 yrs 1 mg every 12 hrs; 2–5 yrs: 1 mg every 4–6 hrs; 6–12 yrs: 2 mg every 4–6 hrs

## 15.2 Fractures

### 15.2.1 Simple Fractures—General Management

- Clear the airway and treat the shock.
- Immobilize the affected part with a splint; give special attention to neck or spinal injuries.
- Give an analgesic to relieve pain. Adults: Aspirin, 600 mg every 8 hrs. Child or pregnant woman:

Paracetamol, 10 mg/kg every 8 hrs

- If there is need for a stronger analgesic, give pethidine, 100 mg/ampoule. Adult: 100 mg IM. Child: 2 months–12 yrs: 0.5–2 mg/kg IM. 12–18 yrs: 50–100 mg/kg every 4–6 hrs IM

**WARNING:** Pethidine should not be given for rib fractures or head injuries. It depresses the respiration.

### 15.2.2 Compound Fractures— General Management

Same as in simple fractures but in addition—

- Stop the bleeding.
- Carry out surgical toilet.
- Manage any anemia accordingly.

Give ATS as in burns ([section 15.6.1](#)).

*Notes:*

- The first aid management of fractures can be done at the district level, and then **REFER** the patient as soon as possible. ⚠
- Check the blood circulation distant to the affected area.

## 15.3 Foreign Body in the Eye

Foreign body in the eye should be removed by an eye specialist or someone knowledgeable in that field.

**REFER** if no specialists are available. ⚠

## 15.4 Foreign Body in the Ear

### 15.4.1 Round Object

- If near the ear opening, hook with a hooked instrument and remove it.
- If deep inside the ear, clean with clean, lukewarm water.

**WARNING:** Do not syringe if the foreign body is a seed, but **REFER** immediately. ⚠

### 15.4.2 Insect

Kill the insect with oil, and syringe the ear with clean lukewarm water.

## 15.5 Foreign Body in the Nose

Try blowing out the foreign body forcefully by blocking the unaffected nostril and blowing through the mouth. If this fails—

- Remove round objects with a hook
- Grasp insects with fine forceps

## 15.6 Injuries

### 15.6.1 Burns

- **REFER.**  The following categories of burns should be managed in the hospital:
  - Burns of the face neck, head, joints, and perineum
  - Burns covering more than 9% of the body
  - Any third degree burns
- Manage. Do the following:
  - Clean the wound with chlorhexidine solution 0.5%
    - OR —
    - Physiological saline
  - Dress the wound with a paraffin gauze dressing plus dry gauze on top. Change the dressing every 2 days.
  - If not fully immunized, give ATS 1,500 IU SC or IM and TT as per immunization schedule ([section 19.2](#)).
  - Give an antibiotic—
    - Benzylpenicillin IM. Adult: 1–2 MU every 6 hrs for 5 days. Child: 0.2 MU (200,000 IU)/kg/day in divided doses for 5 days
    - OR —

Erythromycin, 250 mg/tab. Adult: 250 mg every 6 hrs for 5 days. Child: 12.5 mg/kg every 6 hrs for 5 days

### 15.6.2 Bruises and Minor Cuts

- Clean the wound with chlorhexidine solution 0.5%
- If not fully immunized or if the wound is suspected to be contaminated, give antitetanus serum (ATS) 1,500 IU SC or IM.
- If not fully immunized, give TT as per immunization schedule ([section 19.2](#)).
- If grossly contaminated, give antibiotics such as—  
Benzylpenicillin IM. Adult: 1–2 MU every 6 hrs for 5 days. Child: 0.2 MU (200,000 IU)/kg/day in divided doses for 5 days

— OR —

Erythromycin, 250 mg/tab. Adult: 250 mg every 6 hrs for 5 days. Child: 12.5 mg/kg every 6 hrs for 5 days

### 15.6.3 Wounds

- Ascertain the cause of the wound if possible.
- Clean the wound with chlorhexidine solution 0.5% or physiological saline.
- Explore the wound to ascertain extent of damage.
- If clean and fresh (i.e., <12 hrs), suture under local anesthesia (lignocaine hydrochloride 1%).  
**Note:** Gunshot and dog and human bite wounds should *not* be sutured.
- If wound is suspected to be contaminated, give ATS 1,500 IU or IM.
- If not fully immunized, give TT as per immunization schedule ([section 19.2](#)).
- Give an antibiotic if necessary as in burns ([section 15.6.1](#)).

## 15.6.4 Head Injuries

### 15.6.4.1 If There Are Signs of Cerebral Edema

Give supportive treatment—

- Nurse in a semi-prone position
- Keep a head injury chart to monitor the Glasgow coma scale, pupil size, and neurological signs.
- Withhold or use IV fluids with caution.

Give furosemide, 40 mg/2ml/ampoule. Adult: 40 mg every 8 hrs IV. Child: 1 mg/kg every 8 hrs

### 15.6.4.2 Open Head Injury

**REFER** immediately after giving the initial dose of antibiotics and first aid as for wounds (section 15.6.3). 

**WARNING:** Do not sedate the patient.

### 15.6.4.3 Closed Head Injury

Treat as for cerebral edema (section 15.6.4.1).

## 15.7 Poisoning

### 15.7.1 General Measures

#### 15.7.1.1 Respiration

Respiration is often impaired in unconscious patients. Use these measures—

- Ensure the airway is cleared and maintained by inserting an airway if available.
- Position the patient in semi-prone position to minimize risk of inhalation.
- Assist ventilation if necessary.

#### 15.7.1.2 Blood Pressure

Hypotension is common in severe poisoning with central nervous system depressants. Use these measures—

- A systolic BP <70 mmHg may cause irreversible brain or renal damage.

- Carry the patient head down on the stretcher and nurse in this position in the ambulance.
- Give oxygen to correct hypoxia.
- Set up an IV infusion.

**Note:** Fluid depletion without hypotension is common after prolonged coma and after aspirin poisoning due to vomiting, sweating, and hyperpnoea. Hypertension is less common but may be associated with sympathomimetic poisoning (e.g., amphetamines, cocaine).

### 15.7.1.3 Heart

Cardiac conduction defects and arrhythmias may occur in acute poisoning, especially with tricyclic antidepressants but these often respond to correction of any hypoxia or acidosis.

### 15.7.1.4 Body Temperature

Hypothermia may develop in patients with prolonged unconsciousness, especially after an overdose of barbiturates or phenothiazines (e.g., chlorpromazine, trifluoperazine).

Treat by covering the patient with a blanket.

### 15.7.1.5 Convulsions

Do not treat single brief convulsions.

If convulsions are prolonged or recur frequently, give—

- Diazepam. Adult 10 mg slow IV; repeat if necessary. Child: 400 micrograms (0.4 mg)/kg per dose to a (max: 30 mg).
- Do not give IM; if IV route is not possible, remove the needle of the syringe, and give the dose rectally.

## 15.7.2 Acetylsalicylic Acid Poisoning

- Gastric lavage is worthwhile up to 4 hrs after poisoning because stomach emptying is delayed.

Use activated charcoal, 50 g; repeat as needed every 4 hrs, to delay absorption of any remaining salicylate.

- Monitor and manage fluid and electrolytes to correct acidosis, hyperpyrexia, hypokalemia, and dehydration.
- Watch for hypoglycemia; treat with glucose 50% as IV bolus. Adult: 20 ml. Child: 1 ml/kg
- Anticipate and treat convulsions.

### 15.7.3 Barbiturate Poisoning

Monitor vital signs and—

- Perform gastric lavage.
- Give ipecacuanha syrup to induce vomiting.
- Give activated charcoal (50 g) to absorb poison.

### 15.7.4 Food Poisoning

- Establish the cause and treat accordingly.
- Give oral or IV fluids for rehydration as required.
- For pain, give paracetamol. Adult: 1 g every 4–6 hrs (max: 4 g daily). Child: 10 mg/kg per dose
- If the poisoning is bacterial in origin and diarrhea persists or is severe (i.e., more than 5 stools per day, bloody, and/or with fever), give an antibiotic for 3–7 days, depending on response—  
Co-trimoxazole, 480 mg/tab. Adult: 960 mg every 12 hrs. Child: 24 mg/kg per dose

— OR —

Erythromycin, 250 mg/tab. Adult: 500 mg every 6 hrs. Child: 10 mg/kg per dose

— OR —

Ciprofloxacin, 500 mg/tab. 500 mg every 12 hrs. Child: 10 mg/kg twice daily

### 15.7.5 Iron Poisoning

Deferoxamine, 15 mg/kg/hr by continuous IV  
Sodium chloride 0.9% or dextrose 5% infusion

### 15.7.6 Methyl Alcohol Poisoning

- If taken within 2 hrs, do gastric aspiration and lavage.
- Correct metabolic acidosis with oral sodium bicarbonate solution 5% and leave the solution in the stomach.
- In severe cases—
  - Give sodium bicarbonate 8.4%. 50 ml by slow IV, and monitor plasma pH.
  - Give 30–35 ml of alcohol 40% (e.g., whisky, brandy) in 100 ml of water every 3 hrs until acidosis is corrected.

### 15.7.7 Opium or Morphine Poisoning

Naloxone, 400 microgram/ml ampoule. Adult:

0.8–2.0 mg IV. Child: 10 micrograms/kg IV

If respiratory function does not improve—

- Adult: Repeat dose every 5 min to a maximum of 10 mg total dose.
- Child: Give one subsequent dose of 100 micrograms/kg.

### 15.7.8 Organophosphate Poisoning

- Gastric lavage if the poison was ingested
- Atropine, 1 mg/ml/ampoule. Adult: 2 mg IM or IV (according to the severity of the poisoning). Child: 20 micrograms/kg per dose; repeat dose every 20–30 min until signs of atropinization occur (pupil dilatation, hot dry skin, dry mouth, fast pulse)
- In moderate to severe poisoning only and if not responding to atropine—
  - Pralidoxime mesylate. 30 mg/kg IM
  - Followed by 1–2 more doses at 4–6 hr intervals, depending on the severity of the poisoning and response to treatment

### 15.7.9 Paraffin Poisoning

- The main danger is damage to lung tissue.
- Avoid gastric lavage or use of an emetic because it may lead to inhalation causing pneumonitis.
- Give plenty of oral fluids (preferably milk).
- Give activated charcoal (50 g) and repeat as necessary every 4 hrs or 25 g repeated as necessary every 2 hrs.

### 15.7.10 Pesticide Poisoning (e.g., diazinon)

Atropine, 0.6 mg/ml/ampoule. 0.02 mg/kg, as in organophosphate poisoning (section 15.7.8).  
Perform gastric lavage if poison was ingested.

### 15.7.11 Rat Poisoning (Warfarin Poisoning)

Give activated charcoal (50 g) and repeat as necessary every 4 hrs or 25 g repeated as necessary every 2 hrs, to absorb any remaining poison.

If there is major bleeding, give phytomenadione (vitamin K1), 5 mg IV.

### 15.7.12 Paracetamol Poisoning

If poisoning took place <2 hrs before—

- Empty the stomach to remove any remaining medicine using gastric lavage or an emetic.
- Despite few significant early symptoms, **TRANSFER** patient to hospital immediately. Maximal liver damage occurs 3–4 days after poisoning. ⚠

If poisoning took place >12 hrs before—

- Methionine 2.5 g orally. Repeat 3 times at 4 hr intervals.

— OR —

In hospital setting

- Acetylcysteine, 200 mg/ml inj in 10 ml ampoule. Adult and child: Initially 150 g/kg over 15 min, then 50 mg/kg over 4 hrs, then 100 mg/kg over 16 hrs.

Administration. Dilute requisite dose in glucose IV infusion solution, 5% as follows—

- Adult and child >12 yrs, 200 ml/kg over 15 minutes, then 500 ml over 4 hrs, then 1 liter over 16 hrs
- Child <12 years with body weight over 20 kg. Initially 100 ml/kg over 15 min., then 250 ml over 4 hrs, then 500 ml over 16 hrs
- Child <12 years with body weight under 20 kg. Initially 3 mg/kg over 15 min, the 7 ml/kg over 4 hrs, then 14 ml/kg over 16 hrs

## 16. DISEASES OF THE MUSCULOSKELETAL SYSTEM AND CONNECTIVE TISSUE

### 16.1 Pyogenic Arthritis (Septic Arthritis)

Aspirate the joint repeatedly until no further pus obtained. Give—

- Analgesic (aspirin or paracetamol) for 3 days
- Gentamicin, 40 mg/2 ml/vial. 2.5 mg/kg IV every 8 hrs

When acute phase is over or clinical improvement occurs—

- Change to flucloxacillin, 250 mg/cap. Adult: 500 mg every 6 hrs to complete the course. Child: ≤2 yrs: 125 mg/dose; 2–10 yrs: 250 mg/dose.
- Continue for at least 3 wks after inflammation subsides.

Alternative antibiotic in adults for pathogens other than *S. aureus*: Adult: Ciprofloxacin, 500 mg every 12 hrs for at least 3 wks. Child (for sedation):

Diazepam 2.5–5.0 mg rectally; repeat after 30 min.

## 16.2 Salmonella Arthritis

Chloramphenicol, 250 mg/cap. Adult: 500 mg every 6 hrs for 14 days. Child: 12.5 mg/kg per dose

## 16.3 Cellulitis and Erysipelas

PPF. Adult: 1.5 MU IM daily for 7–10 days. Child: 50,000 IU/kg per dose

— OR —

Benzylpenicillin. Adult: 1–2 MU IV or IM every 6 hrs. Child: 50,000–100,000 IU/kg per dose

Once clinical improvement occurs, change to amoxicillin. Adult: 500 mg every 8 hrs to complete the course. Child: 7.5–15.0 mg/kg per dose

**Note:** If patient is allergic to penicillin, give erythromycin. Adult: 250 mg every 6 hrs for 7 days. Child: 7.5 mg/kg per dose

## 16.4 Gout

### 16.4.1 Acute Gout Attack

Indomethacin, 25 mg/cap. 50 mg every 4–6 hrs for 24–48 hrs then 25–50 mg every 8 hrs for the duration of the attack

— OR —

Colchicine, 500 microgram/tab. 0.5–1.0 mg initially followed by 0.5 mg every 2–3 hrs until relief of pain or vomiting or diarrhea occurs. Maximum total dose is 6 mg.

Avoid aspirin.

Avoid diuretics.

Do not treat with allopurinol or uricosuric medicines.

### 16.4.2 Chronic Gout

Allopurinol, 100 mg/tab. 100 mg every 8 hrs indefinitely

## 16.5 Osteoarthritis

Aspirin, 300 mg/tab. 1.2 g after food every 8 hrs until symptoms are relieved.

— OR —

Indomethacin, 50 mg after food every 8 hrs until symptoms are relieved.

Combine omeprazole with either aspirin or indomethacin when patient experiences serious gastrointestinal discomfort.

## 16.6 Osteomyelitis

Antibiotics as for septic arthritis ([section 16.1](#)), and continue as needed for up to 3 months.

Diazepam, 2.5–5.0 mg rectally; repeat as needed after 30 min

## 16.7 Pyomyositis

Cloxacillin, 500 mg/vial. Adult: 2 g IV or IM every 6 hrs for 5–10 days. Child: 12.5–25.0 mg/kg per dose

As soon as pus localizes, carry out surgical incision and drainage of the abscess and leave the wound open.

Once clinical improvement occurs, give chloramphenicol, 250 mg/cap. Adult: 500 mg every 6 hrs for 5–10 days. Child: 12.5 mg/kg per dose

## 17. FAMILY PLANNING

For further detailed information on family planning (FP) and maternal health, please refer to Family Planning and Maternal Health Unit of the MOHSW.

The key objective of FP is to ensure that all couples plan their families so that all children are born when wanted, expected, and welcome. The health benefits of FP also play a major role in protecting the lives of infants, children, women, and the family as a whole.

**The key steps to be followed in provision of FP services are to—**

1. Provide information about FP to different groups
2. Counsel clients at high risk to accept and use FP services
3. Counsel clients to make an informed choice of FP method
4. Obtain and record client history
5. Perform physical assessment
6. Perform pelvic examination
7. Manage client for chosen FP method

### 17.1 Condom (Male)

Indications:

- Couples where one or both partners are HIV infected, even if they are using another FP method
- Couples needing an immediately effective method
- Couples waiting to rule out suspected pregnancy
- Couples needing protection against exposure to STIs including HIV/AIDS
- Couples for whom a back-up method is needed when woman is starting or has forgotten to take oral contraceptives
- Couples who prefer this FP method

**Advantages:**

- Men play role in planning their family.
- Male condoms protect against STI and HIV infection.

**Disadvantages:**

- Some men may have difficulty maintaining an erection with condom on.
- Male condoms may cause insensitivity of the penis.
- Some men may experience occasional hypersensitivity to latex or lubricants.

**Management:**

- Ensure that client understands correct use, storage, and disposal.
- Supply at least 40 condoms per visit.
- Advise clients to return for more before they run out.

**17.2 Condom (Female)**

A female condom is a soft plastic pre-lubricated sheath with an inner and outer ring which is inserted into the vagina before intercourse.

**Indications:**

- Same as for the male condoms ([section 17.1](#))
- Women whose partners will not use the male condom
- Where there is allergy or hypersensitivity to condom latex

**Advantages:**

- Women play active role in planning their family.
- Female condom can be inserted before intercourse and so does not interrupt sexual spontaneity.
- Use is not dependent on male erection and does not require immediate withdrawal after ejaculation.

- It protects against STI and HIV infections.
- No special storage is required.

Disadvantages:

- It requires special training and practice to use correctly.
- It is a new product with limited public awareness.

Management:

- Ensure client understands correct use, storage, and disposal.
- Supply at least 40 female condoms per visit.
- Advise client to return for more before they run out.

### 17.3 Combined Oral Contraceptive Pill

The combined oral contraceptive (COC) pill contains an estrogen plus a progestogen, the types and quantities of which may vary in different preparations.

Indications:

- Women <35 yrs needing highly effective FP method
- Non-breastfeeding clients or breastfeeding clients after 6 months postpartum
- Clients with dysmenorrhea
- Clients with heavy periods or ovulation pain
- Clients concerned by irregular menstrual cycles

Contraindications:

- Diastolic BP >100 mmHg
- Cardiac disease
- Thromboembolic disease
- Active liver disease
- Within 2 wks of childbirth
- When major surgery planned within 4 wks
- Unexplained abnormal vaginal bleeding
- Known or suspected cervical cancer

- Undiagnosed breast lumps or breast cancer
- Pregnancy (known or suspected)

Risk factors—If patient falls into any 2 of the following categories, recommend progesterone-only or non-hormonal FP method:

- Smoking (especially if >10 cigarettes/day)
- Age >35 yrs
- Diabetes mellitus

Disadvantages and common side-effects:

- Spotting, nausea, and vomiting within first few months
- May cause headaches and weight gain
- Effectiveness dependent on regular daily dosage
- Suppresses lactation
- Medicine interactions reduce effectiveness including:
  - Medicines which increase hepatic enzyme activity (e.g., rifampicin [especially], carbamazepine, griseofulvin, nevirapine, phenytoin, phenobarbitone)
  - Short courses of some broad-spectrum antibiotics (e.g., ampicillin, amoxicillin, doxycycline)
  - An additional FP method must be used during course of treatment and for at least 7 days after completion of treatment with the above medicines.

Complications and warning signs:

- Severe headaches + blurred vision
- Depression
- Acute severe abdominal pain
- Chest pain plus dyspnea
- Swelling or pain in calf muscle

Management:

- Give 3 cycles of COC and explain carefully—
  - How to take the tablets
  - That strict compliance is essential
  - What to do if doses are missed or there are side-effects or warning signs
- If starting COC within 5 days of period—
  - Supply, and show how to use back-up FP method
  - Ask client to return when <7 tablets remain in last cycle

## 17.4 Progesterone-Only Pill

The progesterone-only pill (POP) is also known as the *mini pill*.

Indications:

- Breastfeeding clients after 3 wks postpartum
- Women who cannot take COC but prefer to use pills
- Women >40 yrs

Contraindications:

- Breast or genital malignancy (known or suspected)
- Pregnancy (known or suspected)
- Undiagnosed vaginal bleeding

Disadvantages and common side-effects:

- Spotting, amenorrhea
- Unpredictable irregular periods
- Not as effective as COC
- Medicine interactions: effectiveness reduced by medicines that increase hepatic enzyme activity

Management:

- Give 3 cycles of POP.
- Explain carefully how to take the tablets and what to do if doses are missed or if there are side-effects.

- Supply and show how to use back-up FP methods for first 14 days of first packet (e.g., condoms or abstinence from sex).
- Ask client to return 11 wks after start of using POP. Use the last pill packet to show the client when this will be.

## 17.5 Injectable Progestogen-Only Contraceptive

This method is a slowly absorbed depot IM injection which provides contraceptive protection for 3 months.

Indications:

- Proven fertile women who require long-term contraception
- Breastfeeding postpartum women
- Known or suspected HIV-positive women who need an effective FP method
- Women with sickle-cell disease
- Women who cannot use COC because of estrogen content
- Women who do not want more children but do not (yet) want voluntary surgical contraception
- Women awaiting surgical contraception

Contraindications:

- Same as for POP ([section 17.4](#))
- Women without proven fertility unless have HIV/AIDS

Disadvantages and common side-effects:

- Amenorrhea, often after first injection and after 9–12 months of use
- Can cause heavy prolonged vaginal bleeding during first 1–2 months after injection
- Weight gain
- Loss of libido, delayed return to fertility of up to 10 months after stopping injection

Complications and warning signs:

- Headaches
- Heavy vaginal bleeding
- Severe abdominal pain
- Excessive weight gain

Management:

- Medroxyprogesterone acetate depot inj 150 mg deep IM into deltoid or buttock muscle. Do not rub the area as this increases absorption and shortens depot effect
- If given after day 1–7 of menstrual cycle, advise client to—
  - Abstain from sex or use a back-up FP method (e.g., condoms) for the first 7 days after injection
  - Return for the next dose on a specific date 12 wks after the injection (if client returns >2–4 wks later than the date advised, rule out pregnancy before giving the next dose)
  - Watch for side-effects; advise on likely side-effects
  - Return promptly if there are any warning signs

## 17.6 Intrauterine Device

An intrauterine device (IUD) is an easily reversible long-term, nonhormonal FP method effective for up to 8 yrs, which can be inserted as soon as 6 wks postpartum (e.g., Copper T380A).

Indications:

- Women in stable monogamous relationships wanting long-term contraception
- Breastfeeding mothers
- When hormonal FP methods are contraindicated

Contraindications:

- Pregnancy (known or suspected)

- Pelvic inflammatory disease (PID) or history of it in last 3 months
- Undiagnosed abnormal uterine bleeding
- Women at risk of STIs, including HIV (e.g., women who have, or whose partners have, multiple sexual partners)
- Reduced immunity (e.g., from diabetes mellitus or HIV/AIDS)
- Known or suspected cancer of pelvic organs
- Severe anemia or heavy menstrual bleeding

Disadvantages and common side-effects:

- Mild cramps during first 3–5 days after insertion
- Longer and heavier menstrual blood loss in first 3 months
- Vaginal discharge in first 3 months
- Spotting or bleeding between periods
- Increased cramping pains during menstruation

Complications and warning signs:

- Lower abdominal pain
- Foul-smelling vaginal discharge
- Missed period
- Displaced IUD or missing strings
- Prolonged vaginal bleeding
- PID

Management:

- Insert the IUD closely following recommended procedures and explaining to the client as each step is undertaken.
- Carefully explain possible side-effects and what to do if they should arise.
- Advise client to—
  - Abstain from intercourse for 7 days after insertion
  - Avoid douching
  - Not have more than one sexual partner

- Check each sanitary pad before disposal to ensure the IUD has not been expelled, in which case to use an alternative FP method and return to the clinic
- Check after menstruation is finished to ensure the IUD is still in place; explain how to check
- Report to the clinic promptly if she experiences—
  - Late period or pregnancy
  - Abdominal pain during intercourse
  - Exposure to STI
  - Feeling unwell with chills or fever
  - Shorter, longer, or missing strings
  - Feeling the hard part of IUD in vagina or at cervix
- Use condoms if there is any risk of STIs including HIV

## 17.7 Progestogen-Only Subdermal Implant

This method uses flexible progestogen-releasing plastic rods surgically inserted under the skin of the woman's upper arm and provides contraceptive protection for 5 yrs (e.g., Norplant®).

Indications:

- Women wanting long-term highly effective but not permanent contraception where alternative FP methods are inappropriate or undesirable

Contraindications:

- Same as for POP ([section 17.4](#))

Advantages:

- Highly effective (1–3% failure rate)
- No delay in return to fertility after removal
- Long-acting
- Low level of user responsibility

Disadvantages and common side-effects:

- Irregular bleeding, spotting, or heavy bleeding in first few months; amenorrhea
- Possibility of local infection at insertion site
- Must be surgically inserted and removed by specially trained service provider
- May not be as effective in women > 70 kg

Warning signs (require urgent return to clinic):

- Heavy vaginal bleeding
- Severe chest pain
- Pus, bleeding, or pain at insertion site on arm

Management:

- Insert the implant subdermally, under the skin of the upper arm following recommended procedures.
- Carefully explain warning signs and need to return if they occur.
- Advise client to return:
  - After 2 wks to examine implant site
  - After 3 months for first routine follow-up
  - Annually until implant removed for routine follow-up

## 17.8 Natural FP: Cervical Mucus Method

The cervical mucus method (CMM) is a fertility awareness-based method of FP which relies on the change in the nature of vaginal mucus during the menstrual cycle to detect the fertile time. During this time, the couple avoids pregnancy by changing sexual behaviour as follows:

- Abstaining from sexual intercourse; avoiding vaginal sex completely (also called *periodic abstinence*)
- Using withdrawal; taking the penis out of the vagina before ejaculation (also called *coitus interruptus*)

- Using barriers methods (e.g., condoms)

Guidance on the correct use of the method is available only at centers with specially trained service providers.

Management:

- Ensure client understands how the method works.
- Explain how to distinguish the different types of mucus.
- Show client how to complete the CMM chart.
- Carry out a practice or trial period of at least 3 cycles.
- Confirm that the chart is correctly filled in.
- Advise client to—
  - Always use condoms as well as CMM if there is any risk of exposure to STIs or HIV
  - Return on a specific follow-up date after one menstrual cycle

## 17.9 Natural FP: Lactational Amenorrhea Method

The lactational amenorrhea method (LAM) relies on the suppression of ovulation through breastfeeding exclusively as a means of contraception. Guidance on the correct use of the method is available only at centers with trained service providers.

Management:

- Ensure client understands how the method works.
- Explain to client that she must—
  - Breastfeed her child on demand, on both breasts at least 10 times during day and night
  - Not give the child any solid foods or other liquids apart from breast milk

- Advise the client that LAM will no longer be an effective FP method and that she will then need to use another FP method if—
  - The baby does not feed regularly on demand
  - Menstruation resumes
- Advise the client to—
  - Use condoms as well as LAM if there is any risk of exposure to STIs or HIV.
  - Return after 3 months for a routine follow-up or earlier if she has any problem or wants to change to another FP method.

### 17.10 Voluntary Surgical Contraception for Men: Vasectomy

Voluntary surgical contraception (VSC) for men is a permanent FP method that involves a minor operation carried out under local anesthetic to cut and tie the two sperm-carrying tubes (vas deferens). It is available only at centers with specially trained service providers.

Indications:

- Fully aware, counseled clients who have voluntarily signed the consent form
- Males of couples—
  - Who have definitely reached their desired family size and want no more children
  - Where the woman cannot risk another pregnancy because of age or health problems

Management:

- Ensure client understands how the method works and that it is permanent, not reversible, and highly effective.
- Explain to client that—
  - Vasectomy is not castration and sexual ability and activity are not affected.

- The procedure is not immediately effective and that the client will need to use a condom for at least 15 ejaculations after the operation.
- After the operation, advise client—
  - On wound care
  - To return for routine follow-up after 7 days or earlier if there is fever, excessive swelling, pus, or tenderness at the site of operation

### 17.11 Voluntary Surgical Contraception for Women: Tubal Ligation

VSC for women is a permanent FP method that involves a minor 15-min operation carried out under local anesthetic to cut and tie the two egg-carrying fallopian tubes. It is available only at centers with specially trained service providers.

Indications:

- Same as for vasectomy ([section 17.10](#)) but for females

Management:

- Ensure client understands how the method works and that it is—
  - Permanent and irreversible
  - Highly and immediately effective
- Explain to client that there may be some discomfort or pain over the small wound for a few days.
- Advise client—
  - On wound care
  - To use condoms if there is any risk of exposure to STIs or HIV
  - To return after 7 days for routine follow-up or earlier if there is fever, excessive swelling, pus, or tenderness at the site of operation

## 18. SYMPTOMS, SIGNS, AND ILL-DEFINED CONDITIONS

### 18.1 Anaphylactic Shock

#### 18.1.1 Adult

Adrenaline (epinephrine) inj 1 in 1,000 (1 mg/ml). 0.5–1.0 mg IM; repeat initially (several times if necessary) every 10 min according to BP, pulse rate, and respiratory function until improvement occurs

#### 18.1.2 Child

Adrenaline (epinephrine) inj 0.1 mg/kg or 0.25 mg diluted in 10 ml of saline IV or IM slowly. Give an antihistamine as useful adjunctive treatment (e.g., promethazine hydrochloride 25–50 mg by deep IM or slow IV. Give <25 mg/min as a diluted solution of 2.5 mg/ml in water for injections: max: 100 mg)

Child 1–5 yrs: 5 mg by deep IM. Child 6–10 yrs: 6.25–12.5 mg by deep IM; repeat dose every 8 hrs for 24–48 hrs to prevent relapse.

#### 18.1.3 Severely Affected Patients

Hydrocortisone, 100 mg/vial. Adult: 200 mg IM or slow IV stat. Child <1 yr: 25 mg

Child 1–5 yrs: 50 mg. Child 6–12 yrs: 100 mg.

Repeat adrenaline and hydrocortisone every 2–6 hrs as needed depending on the patient's progress.

### 18.2 Dehydration

#### 18.2.1 No Dehydration and for Prevention

- Continue or increase breastfeeding—
  - If child exclusively breastfed, give ORS or clean water in addition to milk.
  - If child not exclusively breastfed, give one or more cups of ORS, soup, rice-water, yoghurt drinks, and clean water.

- In addition to the usual fluid intake, give ORS after each loose stool or episode of vomiting. <2 yrs: 50–100 ml; 2 yrs and over: 100–200 ml
- Give frequent small sips from a cup.
- If child vomits, wait 10 min, then give more.

### 18.2.2 Some Dehydration

Give ORS in the approximate amounts shown in [table 13.2.3.2](#) (page 91) during the first 4 hrs.

- Give frequent small sips from a cup.
- If the child wants more than is shown in the table, give more as required.
- If the child vomits, wait 10 min, then continue more slowly.
  - For infants <6 months who are not breastfed, also give 100–200 ml of clean water during the first 4 hrs.
  - Reassess the patient frequently (every 30–60 min) for the classification of dehydration and the selection of the treatment plan.

### 18.2.3 Severe Dehydration

Start IV fluids line immediately. If the child can drink, give ORS while the drip is set up.

Give 100 ml/kg of compound sodium lactate infusion (Hartmann’s solution or Ringer’s lactate solution)

— OR —

Half-strength Darrow’s solution in glucose 2.5%

— OR —

Sodium chloride infusion 0.9%; divide the IV fluid as shown in [table 18.2.3A](#).

As soon as the patient can drink—usually after 3–4 hrs in infants or 1–2 hrs in children—give ORS 5ml/kg/hr. Continue to reassess the patient frequently.

For older children and adults, refer to [table 18.2.3B](#).

**Table 18.2.3A How to Divide IV Fluid**

Age	First give 30 ml/kg in	Then give 70 ml/kg in
<2 yrs	1 hr	5 hrs
2–5 yrs	30 min	2.5 hrs

**Table 18.2.3B Older Children and Adults**

Degree of Dehydration	Rehydration Fluid	Route	Volume to give in the first 4 hrs
Mild	ORS	Oral	25 ml/kg
Moderate	ORS	Oral	50 ml/kg
Severe	SLC <sup>a</sup> inf	IV	50 ml/kg

<sup>a</sup>SLC = sodium lactate compound infusion

If sodium lactate compound IV infusion (Ringer's lactate) is not available, use half-strength Darrow's solution in glucose 2.5%

— OR —

Sodium chloride infusion 0.9%

### 18.3 Febrile Convulsions

Paracetamol. 10 mg/kg every 8 hrs as needed

Diazepam. 500 micrograms/kg rectally

- Max: 10 mg
- Repeat as needed after 10 min
- If diazepam rectal dose-form is not available, use diazepam injection solution and give the same dose rectally using the syringe after removing the needle.

### 18.4 Hypoglycemia

Oral glucose or sugar (before coma sets in); 10–20 g in 200 ml water (2–4 teaspoons) is usually taken

initially and repeated after 15 min if necessary

— OR —

If patient is unconscious, glucose 50% 20–50 ml IV, followed by 10% dextrose solution by drip at 5–10 mg/kg/min until patient regains consciousness, then encourage oral sugary drinks.

## 19. VACCINATION

### 19.1 Vaccination Schedule for Children

Table 19.1 displays the vaccination schedule for children. Refer also to the Expanded Programme on Immunization guidelines.

### 19.2 Administration and Storage of Vaccines

- Never use any vaccine—
  - After its expiry date
  - When the vaccine vial monitor has changed to discard point
  - If there has been contamination or loss of the vial labels
- Open only one vial or ampoule of a vaccine at a time and only when there is a child to vaccinate.
- Remember to discard reconstituted vials of BCG, measles, and DPT-HepB + Hib after 6 hrs.
- In a static unit, if there is a balance of doses left in a vial of TT and OPV at the end of a vaccination session, return the opened vial to the refrigerator for subsequent use.
- Do not keep any opened vial for more than 4 wks.
- Store vaccines in health units at +2 °C to +8 °C, but do not keep them for longer than 6 wks.
- In district and central vaccine stores that have freezers, polio and measles vaccine may be stored for prolonged periods at –20 °C.

- Do not freeze DPT-Hep B + Hib and TT vaccines (other vaccines may be kept at freezing temperatures without harm).
- Never freeze the diluents for BCG and measles vaccines.
- Never use the diluents provided for vaccines to mix other injections.
- Do not vaccinate in direct sunlight (always carry out immunization in a building or under shade).
- Carefully follow the recommended procedures to maintain the cold chain for all vaccines (e.g., ensure continuous supply of power or gas, record refrigerator temperature twice daily, and use the sponge method during each immunization session).
- Record every vaccination done in the child register and tally sheet. Use the child register for tracking drop-outs.

## 19.3 Tetanus Prevention

### 19.3.1 Childhood Immunization

Immunize all children against tetanus during routine childhood immunization (see Immunization Schedule, [section 19.1](#)).

### 19.3.2 Prophylaxis against Neonatal Tetanus

Immunize all pregnant women and women of childbearing age (15–45 yrs) against tetanus. Give TT vaccine 0.5 ml IM into the left upper arm or upper outer thigh as indicated in [table 19.3.2](#).

Table 19.1 Vaccination Schedule for Children from Birth to 12 Months

Age	Vaccination to Be Given	Site of Administration
At birth	<ul style="list-style-type: none"> <li>▪ BCG: 0.05 ml intradermally for children &lt;11 months</li> <li>▪ Polio 0: 2 drops orally</li> </ul>	<ul style="list-style-type: none"> <li>▪ BCG: Right upper arm</li> <li>▪ Polio (OPV): Mouth</li> </ul>
6 wks	<ul style="list-style-type: none"> <li>▪ DPT-HepB + Hib 1: 0.5 ml IM</li> <li>Polio 1: 2 drops orally</li> </ul>	<ul style="list-style-type: none"> <li>▪ DPT-HepB + Hib: Outer upper aspect of left thigh</li> <li>▪ Polio (OPV): Mouth</li> </ul>
10 wks	<ul style="list-style-type: none"> <li>▪ DPT-HepB + Hib 2: 0.5 ml IM</li> <li>▪ Polio 2: 2 drops orally</li> </ul>	<ul style="list-style-type: none"> <li>▪ DPT-HepB + Hib: Outer upper aspect of left thigh</li> <li>▪ Polio (OPV): Mouth</li> </ul>
16 wks	<ul style="list-style-type: none"> <li>▪ DPT-HepB + Hib 3: 0.5 ml IM</li> <li>▪ Polio 3: 2 drops orally</li> </ul>	<ul style="list-style-type: none"> <li>▪ DPT-HepB + Hib: Outer upper aspect of left thigh</li> <li>▪ Polio (OPV): Mouth</li> </ul>
9 months	Measles: 0.5 ml SC	Left upper arm
12 months	Measles: 0.5 ml SC	Left upper arm

## Table 19.1 Vaccination Schedule for Children from Birth to 12 Months (continued)

### Notes:

1. Aim to complete this schedule within the first year of life.
2. Give each vaccine at the recommended age, or if this is not possible, at first contact with the child after this age.
3. Give the BCG vaccination as early as possible in life, preferably at birth.
  - a. Do not give BCG vaccine to any child with clinical signs and symptoms of HIV/AIDS
  - b. Use only the diluent provided for BCG vaccine to reconstitute this vaccine.
4. The polio 0 vaccination (i.e., zero dose) is a primer dose of oral polio vaccine (OPV), which should be given ideally at birth but otherwise in the first 2 wks of life.
5. The DPT-HepB + Hib vaccine is a new combination of DPT vaccine + hepatitis B vaccine (HepB) + haemophilus influenzae type B (Hib) vaccine.
6. The minimum dosage interval between each of the three occasions when the DPT-HepB + Hib/polio vaccines are given is 4 wks—ideally they are given at 6 wks, 10 wks, and 14 wks.
7. Child is normally given the measles vaccination at 9 months of age or at first contact after this age, but it should also be given to any unimmunized child of 6–9 months old who has been exposed to measles patients.
  - a. Children of 6–9 months vaccinated in this way must have the vaccination repeated at 9 months of age; doses should be separated by at least 28 days.
  - b. Use only the diluent provided for measles vaccine to reconstitute this vaccine.
8. Admit and treat any child who is severely ill and vaccinate at the time of discharge.

**Table 19.3.2 Recommended TT Vaccination Schedule for Pregnant Women and Women of Childbearing Age**

Vaccine	Recommended Timing
TT1 (1st dose)	At first contact with the girl or woman, during primary or secondary school, at the first prenatal visit, or as early as possible during pregnancy
TT2 (2nd dose)	At least 4 wks after TT1
TT3 (3rd dose)	At least 6 months after TT2 or as early as possible during a subsequent pregnancy
TT4 (4th dose)	At least 1 yr after TT3 or as early as possible during a subsequent pregnancy
TT5 (5th dose)	At least 1 yr after TT4 or as early as possible during a subsequent pregnancy

### 19.3.3 Vaccination against Adult Tetanus

- School children should get 3 doses spaced at initial dose (0-), then 1- and 6-month intervals.
- High-risk groups such as farm workers, military personnel, miners, and road traffic accident victims should also be vaccinated according to the schedule for pregnant women or women of childbearing age as in the table above. First 2 doses should be at least 4 weeks apart; third dose to be given 6–12 months after second dose.
- Ensure hygienic infant deliveries include proper cutting and care of umbilical cords.

#### Notes:

- Refer to section 19.2 for general information on administration, storage, and handling of vaccines.
- Store TT at +2 °C to +8 °C. Do not freeze TT.

### 19.3.4 Prophylaxis in At-Risk Patients

Any patient who has contaminated wounds, bites, or burns is at risk of contracting tetanus.

General measures:

- Ensure adequate surgical toilet and proper care of wounds

Passive immunization:

- Give IM tetanus immunoglobulin human (TIG):  
Child <5 yrs: 75 IU; child 5–10 yrs: 125 IU; child >10 yrs and adult: 250 IU
- **Note:** Double the dose if heavy contamination suspected or if it has been more than 24 hrs since injury was sustained.

Alternative—Use only if TIG is not available:

- ATS (tetanus antitoxin) 1,500 IU deep SC or IM

Active immunization:

- For partially immunized or unimmunized patients—
  - Give a booster dose for patients who are partially immunized
  - Give a full course of vaccination for those who are not immunized at all
- For fully immunized patients who have had five doses of TT administered at the correct intervals but last dose given >30 yrs ago, give one booster dose of TT 0.5 ml deep SC or IM.

**Notes:**

- Fully immunized patients who have had a booster dose within the last 10 yrs do not need treatment with ATS or antitetanus immunoglobulin, human, or TT vaccination
- Giving TIG or TT to a fully immunized person may cause an unpleasant reaction (e.g., redness, itching, swelling, fever), but with a severe injury this discomfort is justified.

## 19.4 Hepatitis B Vaccination

Hepatitis B vaccine for adolescents and adults is recommended. Hepatitis B vaccination is done preferably after testing for hepatitis B infection (HBsAg and anti-HBs). Vaccination is recommended for high-risk groups such as health workers (particularly those in clinical settings and health workers in training), intravenous drugs users, and persons who frequently receive blood transfusions.

Give three doses using either of the following schedules: 0, 1, 6 months or 0, 2, 4 months.

A dose of 0.5 ml is given IM on the deltoid muscle (upper arm). Injections of hepatitis B vaccine should not be given on the buttocks because of low immune response, decreased protective antibody response, and risks of injury to the sciatic nerve.

The storage temperature for the vaccine is 2 °C to 8 °C.

## 19.5 Yellow Fever Vaccination

The yellow fever 17D vaccine is live attenuated, and it is reconstituted before use. Ideally, it should be used within 1 hr after reconstitution.

A dose of 0.5 ml given SC on the upper arm as a single dose.

The storage temperature for the vaccine is 2 °C to 8 °C.

Immunity is almost life long, but for international travel, the international travel certificate is valid for only 10 yrs.

# INDEX

- Abnormal vaginal discharge syndrome, [67](#)
- Abortion, [69](#)
- Acetylsalicylic acid poisoning, [101](#)
- Acute bronchitis, [56](#)
- Acute cystitis, [63](#)
- Acute glomerulonephritis, [63](#)
- Acute pyelonephritis, [64](#)
- Acute renal failure, [64](#)
- Adrenal insufficiency, [84](#)
- Amebiasis, [51](#)
- Anaphylactic shock, [121](#)
- Anemia in pregnancy, [69](#)
- Animal bite, [95](#)
- Anxiety neurosis, [80](#)
- Arrhythmias, [76](#)
- Ascariasis, [36](#)
- Asthma, [55](#)
- Bacillary dysentery, [51](#)
- Bacterial endocarditis, [76](#)
- Barbiturate poisoning, [102](#)
- Bipolar disorders, [80](#)
- Bites, [95](#)
- Boils, [73](#)
- Breast abscess, [70](#)
- Brucellosis, [31](#)
- Bruises and minor cuts, [99](#)
- Burns, [98](#)
- Candidiasis, [31](#)
- Carbuncles, [73](#)
- Cellulitis, [106](#)
- Chicken pox, [31](#)
- Cholera, [52](#)
- Complicated malaria, [39](#)
- Congestive heart failure, [77](#)
- Conjunctivitis, [92](#)
- Constipation, [52](#)
- Coryza, [56](#)
- Deep vein thrombosis, [77](#)
- Dehydration, [121](#)
- Dental abscess, [52](#)
- Dental caries, [53](#)
- Depressive neurosis, [80](#)
- Diabetes mellitus, [84](#)
- Diabetic ketoacidosis, [85](#)
- Diarrhea, [53](#)
- Dysmenorrhea, [70](#)
- Eclampsia, [73](#)
- Eczema, [73](#)
- Enterobiasis, [36](#)
- Epilepsy, [80](#)
- Erysipelas, [106](#)
- Family planning, [108](#)
- Febrile convulsions, [123](#)
- Food poisoning, [102](#)
- Foreign body in the ear, [97](#)
- Foreign body in the eye, [97](#)
- Foreign body in the nose, [98](#)
- Fractures, [96](#)
- Fungal skin infections, [74](#)
- Gastritis, [53](#)
- Genital ulcer disease syndrome, [68](#)
- Giardiasis, [53](#)
- Gout, [106](#)
- Head injuries, [100](#)
- Hemorrhoids, [54](#)
- Herpes genitalis, [74](#)

- Herpes simplex, [74](#)  
 Herpes zoster, [74](#)  
 Hookworm, [36](#)  
 Human bite, [95](#)  
 Hyperemesis gravidarum, [70](#)  
 Hypertension, [77](#)  
 Hypoglycemia, [85](#), [123](#)  
 Hypothyroidism, [85](#)
- Impetigo, [74](#)  
 Inguinal swelling, [68](#)  
 Injuries, [98](#)  
 Insect bite, [96](#)  
 Iron deficiency anemia, [83](#)  
 Iron poisoning, [102](#)  
 Ischaemic heart disease, [78](#)
- Laryngitis, [56](#)  
 Leprosy, [31](#)  
 Lower abdominal pain syndrome and pelvic inflammatory disease, [67](#)
- Malaria, [37](#)  
 Measles, [32](#)  
 Meningitis, [32](#)  
 Methyl alcohol poisoning, [103](#)  
 Migraine, [81](#)  
 Miliary TB, [62](#)
- Nephrotic syndrome, [63](#)  
 Nongonococcal urethritis, [63](#)
- Onchocerciasis, [50](#)  
 Ophthalmia neonatorum, [93](#)  
 Opium or morphine poisoning, [103](#)
- Oral thrush, [31](#)  
 Organophosphate poisoning, [103](#)  
 Osteoarthritis, [107](#)  
 Osteomyelitis, [107](#)  
 Otitis externa, [93](#)  
 Otitis media, [93](#)
- Paracetamol poisoning, [104](#)  
 Paraffin poisoning, [104](#)  
 Parkinsonism, [82](#)  
 Pemphigus, [75](#)  
 Peptic ulcers, [54](#)  
 Pericarditis, [78](#)  
 Pertussis, [57](#)  
 Pesticide poisoning, [104](#)  
 Plague, [34](#)  
 Pneumococcal pneumonia, [59](#)  
 Pneumocystis carinii pneumonia, [59](#)  
 Pneumonia, [57](#)  
 Poisoning, [100](#)  
 Poliomyelitis, [34](#)  
 Postpartum hemorrhage, [70](#)  
 Preeclampsia, [71](#)  
 Protein energy malnutrition, [88](#)  
 Psoriasis, [75](#)  
 Puerperal sepsis, [71](#)  
 Pulmonary edema, [78](#)  
 Pulmonary tb, [62](#)  
 Pyogenic arthritis, [105](#)  
 Pyomyositis, [107](#)
- Rabies, [95](#)  
 Rat poisoning, [104](#)  
 Retained placenta, [71](#)  
 Rheumatic fever, [34](#)

- Rheumatic heart disease,  
79
- Salmonella arthritis, 106
- Scabies, 75
- Schistosomiasis, 50
- Schizophrenia or psychosis,  
82
- Septicemia, 35
- Sickle cell disease, 83
- Snake bite, 96
- Strongyloidiasis, 50
- Taeniasis, 50
- TB arthritis, 62
- TB meningitis, 34, 62
- TB pericarditis, 62
- TB peritonitis, 62
- TB, pulmonary, 60
- Tetanus, 35, 125
- Thromboembolism, 79
- Thyrotoxicosis, 86
- Tonsillitis, 60
- Trachoma, 93
- Trichuriasis, 50
- Tropical ulcer, 75
- Tuberculosis, 60
- Typhoid fever, 36
- Urethral discharge  
syndrome, 65
- Urticaria or skin allergy, 75
- Vaccination, 124
- Vaginal candidiasis, 31
- Vitamin a deficiency, 94
- Wounds, 99

# Essential Medicines List for Liberia

REPUBLIC OF LIBERIA



MINISTRY OF HEALTH  
AND SOCIAL WELFARE

# CONTENTS

Abbreviations, Acronyms, and Units	<u>139</u>
Foreword	<u>141</u>
Preface and Acknowledgments	<u>144</u>
Presentation of Information	<u>147</u>
<b>1. Medicines Used in Anesthesia</b>	
1.1 General Anesthetics and Oxygen	<u>149</u>
1.2 Local Anesthetics	<u>149</u>
1.3 Preoperative Medication	<u>149</u>
<b>2. Analgesics, Antipyretics, Non-Steroidal Anti-Inflammatory Medicines</b>	
2.1 Non-opioids and Non-steroidal Anti-inflammatory Analgesics	<u>149</u>
2.2 Opioid Analgesics	<u>149</u>
2.3 Medicines Used to Treat Gout	<u>150</u>
<b>3. Antiallergics and Medicines Used in Anaphylaxis</b>	<u>150</u>
<b>4. Antidotes and Other Substances Used in Poisoning</b>	
4.1 Nonspecific	<u>150</u>
4.2 Specific	<u>150</u>
<b>5. Anticonvulsants and Antiepileptics</b>	<u>151</u>
<b>6. Anti-Infective Medicines</b>	
6.1 Anthelmintics	<u>151</u>
6.2 Antibacterials	<u>151</u>
6.3 Antifungal Medicines	<u>153</u>
6.4 Antiviral Medicines	<u>154</u>
6.5 Antiprotozoal Medicines	<u>155</u>
<b>7. Antimigraine Medicines</b>	
7.1 For Treatment of Acute Attack	<u>156</u>
7.2 For Prophylaxis	<u>156</u>
<b>8. Antineoplastic and Immunosuppressives</b>	
8.1 Immunosuppressive Medicines	<u>157</u>
8.2 Cytotoxic Medicines	<u>157</u>
8.3 Hormones and Antihormones	<u>157</u>

<b>9. Anti-Parkinsonism Medicines</b>	<u>157</u>
<b>10. Medicines Affecting the Blood</b>	
10.1 Antianemia Medicines	<u>157</u>
10.2 Medicines Affecting Coagulation	<u>157</u>
<b>11. Plasma Substitutes</b>	<u>158</u>
<b>12. Cardiovascular Medicines</b>	
12.1 Anti-angina Medicines	<u>158</u>
12.2 Antiarrhythmic Medicines	<u>158</u>
12.3 Antihypertensive Medicines	<u>158</u>
12.4 Medicines Used in Heart Failure	<u>158</u>
12.5 Medicines Used in Vascular Shock	<u>159</u>
<b>13. Dermatological Medicines (Topical)</b>	
13.1 Antifungal Medicines	<u>159</u>
13.2 Anti-infective Medicines	<u>159</u>
13.3 Anti-inflammatory and Antipruritic Medicines	<u>159</u>
13.4 Medicines Affecting Skin Differentiation and Proliferation	<u>159</u>
13.5 Scabicides and Pediculicides	<u>159</u>
<b>14. Diagnostic Agents</b>	
14.1 Ophthalmic Preparations	<u>159</u>
14.2 Radio-Contrast Media	<u>159</u>
<b>15. Antiseptics and Disinfectants</b>	
15.1 Antiseptics	<u>160</u>
15.2 Disinfectants	<u>160</u>
<b>16. Diuretics</b>	<u>160</u>
<b>17. Gastrointestinal Medicines</b>	
17.1 Antacids and Other Antiulcer Medicines	<u>160</u>
17.2 Antiemetic Medicine	<u>161</u>
17.3 Anti-hemorrhoidal Medicines	<u>161</u>
17.4 Laxatives	<u>161</u>
17.5 Medicines Used in Diarrhea	<u>161</u>
<b>18. Hormones and Other Endocrine Medicines</b>	
18.1 Adrenal Hormones and Synthetic Substitutes	<u>161</u>
18.2 Androgens	<u>161</u>

18.3	Contraceptives	<u>161</u>
18.4	Estrogens and Anti-estrogens	<u>162</u>
18.5	Insulin and Other Antidiabetic Agents	<u>162</u>
18.6	Progestogens	<u>162</u>
18.7	Thyroid Hormones and Antithyroid Medicines	<u>163</u>
<b>19.</b>	<b>Immunologicals</b>	
19.1	Diagnostic Agents	<u>163</u>
19.2	Sera and Immunoglobulins	<u>163</u>
19.3	Vaccines	<u>163</u>
<b>20.</b>	<b>Muscle Relaxants (Peripherally Acting) and Cholinesterase Inhibitors</b>	<u>163</u>
<b>21.</b>	<b>Ophthalmological Preparations</b>	
21.1	Antiinfective Agents	<u>164</u>
21.2	Antiinflammatory Agents	<u>164</u>
21.3	Local Anesthetics	<u>164</u>
21.4	Miotics and Antiglaucoma Medicines	<u>164</u>
21.5	Mydriatics	<u>164</u>
<b>22.</b>	<b>Oxytocics and Antioxytocics</b>	
22.1	Oxytocics	<u>164</u>
22.2	Antioxytocics	<u>164</u>
<b>23.</b>	<b>Peritoneal Dialysis Solution</b>	<u>165</u>
<b>24.</b>	<b>Psychotherapeutic Medicines</b>	
24.1	Medicines Used in Psychotic Disorders	<u>165</u>
24.2	Medicines Used in Mood Disorders	<u>165</u>
24.3	Medicines Used in Generalised Anxiety and Sleep Disorders	<u>165</u>
24.4	Medicines Used for Obsessive Compulsive Disorders or Panic Attacks	<u>165</u>
24.5	Medicines Used for Substance Abuse (Alcohol/Opioid Dependence)	<u>166</u>
<b>25.</b>	<b>Medicines Acting on the Respiratory Tract</b>	
25.1	Antiasthmatic and Medicines for Chronic Obstructive Pulmonary Disease	<u>166</u>

<b>26. Solutions Correcting Water, Electrolyte, and Acid-Base Disturbances</b>	
26.1 Oral	<u>166</u>
26.2 Parenteral	<u>166</u>
26.3 Miscellaneous	<u>167</u>
<b>27. Vitamins and Minerals</b>	<u>167</u>
<b>28. Ear, Nose, and Oropharyngeal Preparations</b>	
28.1 Ear Preparations	<u>167</u>
28.2 Nasal Preparations	<u>167</u>
28.3 Oropharyngeal Preparations	<u>167</u>
Medicines Index	<u>168</u>

## Abbreviations, Acronyms, and Units

btl	bottle
C	clinic
CMS	Central Medical Stores
CMV	cytomegalovirus
<i>EMLL</i>	<i>Essential Medicines List for Liberia</i>
FDC	fixed-dose combination
g	gram
HC	health center
HOS	hospital
IM	intramuscular
inf	infusion
inh	inhalation
inj	injection
INN	international nonproprietary names
IT	intrathecal
IU	international units
IV	intravenous
liq	liquid
mg	milligram
ml	millilitre
MOHSW	Ministry of Health and Social Welfare
MSH	Management Sciences for Health
MU	mega unit (one million units)
<i>NTGL</i>	<i>National Treatment Guidelines for Liberia</i>
oint	ointment
pc	pieces
pess	pessary
PFR	powder for reconstitution
R	restricted use
RH	referral hospital
sach	sachet
SC	subcutaneous
sol	solution

SPS	Strengthening Pharmaceutical Systems [Program]
SR	slow release
sup	suppository
susp	suspension
tab	tablet
U	unit
USAID	US Agency for International Development
WHO	World Health Organization

## FOREWORD

I am pleased to present this revised and updated *Essential Medicines List for Liberia (EMLL)* to all prescribing and dispensing staff and to other health professionals handling medicines in Liberia. This edition was necessitated by the various changes that have taken place in therapeutic practice and disease patterns since the 2007 edition was published.

Essential medicines are those that satisfy the health needs of the majority of the population and should, therefore, be available in adequate amounts in all health units in the country, whether public or private. The *EMLL* lists the medicines that are most appropriate for use in the Liberia public health system. The *EMLL* also provides the most rational basis for procurement and prescribing in the private sector, and we recommend that private sector health care systems adapt its use in their facilities.

To select these essential medicines, the technical committee, consisting of various stakeholders, used a number of criteria including the following:

- **Effectiveness:** The medicine achieves the therapeutic objective in the patient.
- **Safety:** The beneficial effects of the medicine outweigh the harmful effects.
- **Quality:** The medicine presentation complies with the internationally accepted standards of purity, composition, and consistency.
- **Cost-effectiveness:** In comparison to other available, effective medicines or dosage forms, the medicine is cost-effective.
- **Appropriateness:** In terms of dosage schedule, dosage forms, compliance, and shelf life (among other factors), the medicine is appropriate.

In revising the *EMLL*, these criteria have been carefully considered by the committee, assisted by a consultant contracted by Strengthening Pharmaceutical Systems (SPS) Program and other specialists.

Medicine lists rapidly become obsolete and should, therefore, be subjected to constant scrutiny and revised and updated accordingly. This process is highly dependent on the input of clinicians in the field, who should continuously assess the usefulness of the selected medicines for treating the conditions encountered.

The *EMLL*, which provides a good guide for selection of medicines and level of distribution, is intended to be used with the *National Therapeutic Guidelines of Liberia (NTGL)* (found in the front part of this manual), which gives a practical guidance on appropriate therapeutic approaches to the common conditions in Liberia. Both documents are also useful resources for training in all aspects of rational medicine use.

I thank the Chief Pharmacist and members of the *EMLL* draft committee for the time and effort they have put in the production of this useful and vital document.

I most sincerely thank the US Agency for International Development (USAID)–Liberia, through SPS for financial support for the review, revision, and production of this policy document.

I have no doubt in my mind that the routine use of the *EMLL* together with the *NTGL* by all levels of health care workers will greatly assist in ensuring that our people receive optimum treatment of their health problems at all times.

Let me end by reiterating the commitment of the Ministry of Health and Social Welfare (MOHSW) to improving accessibility to essential medicines through active implementation of the National Health Policy, which aims at, among other things, securing adequate funding for procurement and improved management of essential medicines at all levels.



Bernice T. Dahn, MD  
Chief Medical Officer/Deputy Minister  
Ministry of Health and Social Welfare,  
Republic of Liberia

## PREFACE AND ACKNOWLEDGMENTS

This is the third edition of the *EMLL*, the first two being produced in 1998 and 2007, respectively. This edition has been produced to provide the population with access to quality and affordable medicines, which are necessary for the prevention and treatment of common health problems in Liberia.

The *EMLL* provides a list of essential medicines currently considered to be most suitable for use in Liberia. The World Health Organization (WHO) model list (2008) was used as a basis for *EMLL* and modified to suit the requirements of Liberia according to the criteria of efficacy, safety, appropriateness, and quality, and taking into account the available resources and applicable clinical practice at present.

According to the National Drug Policy, the *EMLL* is a primary medicines management tool for all levels of the health system and is intended to strengthen and harmonise the essential medicines selection process at national and county levels for both public and private sectors. The document should be used as a basis for procurement, prescribing, and dispensing in our health care system, whether in public or private facilities.

The *EMLL* will be subject to constant review and revision. I encourage all physicians to fully familiarise themselves with its content and constantly evaluate its relevance and appropriateness to their daily work.

The *EMLL* has been produced by the MOHSW with financial assistance from SPS–Liberia, funded by USAID.

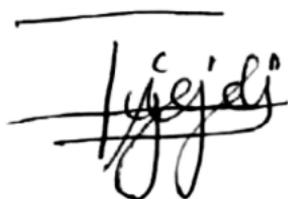
Other partners in this noble task include the WHO–Liberia Office that provided the initial funding for the revision of the document, Rebuilding Basic Health Services for the critical analysis of the document, the Clinton Foundation for its input on the antiretroviral and mental health medications, the European Union for its funding of the production of the second edition, and nongovernmental organizations that may have directly or indirectly contributed to the production of *EMLL*. My profound gratitude goes to others that I may have omitted.

I register special thanks to the members of the drafting team for their dedication and hard work. The following physicians and pharmacists, representing academic and medical institutions, worked with me from the outset and have continued to offer valuable comments for the process of production of this document: Dr. Eugene Dolopei, Dr. Mohammed Sankor, Dr. John Taban Dada, Dr. John Mulbah, Dr. Abraham Borbor, Dr. Torsoh Jaliba, Pharm. Joseph N. B. Jimmy, Pharm. Duredoh Freeman George, Pharm. Clavenda Bright-Parker, Pharm. Beyan K. Johnson, Pharm. Hasipha C. Tarpeh, Pharm. J. Nathaniel B. Woart, Pharm. J. Juius Janafo, Pharm. Joseph S. Weah, Pharm. David Z. Mulbah, Pharm. Lewis Momoh, Pharm. David Sumo, and Pharm. Thomas G. M. Wolapaye.

Participation of the departments and their other divisions and programmes in the MOHSW will never be forgotten. These include the Division of Occupational and Environmental Health, the Division of Nursing, the National Malaria Control Division, the National AIDS Control Programme, the National Leprosy Tuberculosis Control Programme, and county pharmacists from the following County

Health Teams: Bomi County, Bong County, Margibi County, and Montserrado County. I also thank all the staff members of the Pharmacy Division, especially the principal deputies, secretaries, and other support staff members, for their dedicated services in the production of this document.

Our profound gratitude goes to the Deputy Minister for Health Services and Chief Medical Officer of Liberia, Dr. Bernice T. Dahn, for her consistent advice given us throughout the preparation of the document.



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## Reference

Review and revision of the *National Therapeutic Guidelines for Liberia* and the *Essential Medicines List for Liberia* are based on the following WHO documents:

World Health Organization. 2008. *WHO Model Formulary*. Ed. M.C. Stuart, M. Zouimtzi, S.R. Hill. Geneva: WHO.

*How to Develop a National Formulary Based on the WHO Model Formulary: A Practical Guide*. 2004. Geneva: WHO.

## PRESENTATION OF INFORMATION

### Medicine Names

The international nonproprietary names (INN), or generic names, are used throughout the list. Generic names should be used for prescribing and labelling (including dispensing) of medicines, except where no such generic or suitable alternative nonproprietary name exists.

### Order of Sections

Medicines are arranged in alphabetical order by the Anatomical Therapeutic Chemical groups following the same basic arrangement as the “WHO Model List of Essential Medicines” with additional one section included “28. Ear, Nose, and Oropharyngeal Preparations.”

### Presentation in EMLL

The medications under the sections are listed in the following format—

Medicine name (INN)	Dose	Method of administration	Level of use
Atropine	1 mg/ml	inj	HC

Please check the Abbreviations, Acronyms, and Units listing at the front of this section for specific abbreviations.

### Level of Use

For each item, the lowest level of health care facility at which the item may be used is indicated as shown below. This designation is in line with diagnostic and clinical skills expected to be available at the level. In certain cases, the use of an item is further restricted to a facility where a specific type of clinical and/or

diagnostic expertise is available (e.g., certain ophthalmologic or psychiatric preparations).

Abbreviation	Health Care Facility
C	clinic
HC	health centre
HOS	hospital
REF	referral hospital
R	restricted use (i.e., needs high level diagnostic or clinical skills that are available only in specialised institutions such as a cancer unit or national psychiatric unit)

*Notes:*

**Diagnostic facilities:** Health facility levels have different degrees of laboratory diagnostic support facilities available.

**Drug availability:** All the items listed for health centre levels up to hospital levels are expected to be available at all times from the Central Medical Stores (CMS). Restricted and referral level medicines will be available from the CMS only at the request of the relevant institution. It is, therefore, important that accurate estimates for the annual requirements for these items are made by the institutions concerned well in advance and the information forwarded to the CMS so that sufficient quantities of the required items may be procured and held in stock.

## 1. Medicines Used in Anesthesia

### 1.1 General Anesthetics and Oxygen

Halothane		inh	HOS
Ketamine	50 mg/ml	inj	HOS
Nitrous oxide		gas	REF
Oxygen		gas	HC
Thiopental	1 g (PFR)	inj	HOS

### 1.2 Local Anesthetics

Lidocaine (plain)	1%	inj	HC
Lidocaine (plain)	2%	inj	HC
Lidocaine, dental with epinephrine	2%	inj	HOS
Lidocaine, spinal (with glucose)	5% + 7.5%	inj	HOS

### 1.3 Preoperative Medication

Atropine	1 mg/ml	inj	HC
Diazepam	5 mg/ml	inj	HOS
Morphine sulfate	10 mg/ml	inj	HOS

## 2. Analgesics, Antipyretics, Non-Steroidal Anti-Inflammatory Medicines

### 2.1 Non-opioids and Non-steroidal Anti-inflammatory Analgesics

Acetylsalicylic acid	300 mg	tab	C
Diclofenac	50 mg	tab	HC
Diclofenac sodium	25 mg/ml; 3 ml	inj	HC
Ibuprofen	200 mg	tab	C
Paracetamol	100 mg	tab	C
Paracetamol	500 mg	tab	C
Paracetamol syrup	125 mg/5 ml		

### 2.2 Opioid Analgesics

Morphine oral solution		sol	HC
Morphine sulfate or hydrochloride	10 mg/ml	inj	HOS

Pethidine	50 mg/ml	inj	HOS
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### 2.3 Medicines Used to Treat Gout

Allopurinol	100 mg	tab	HC
Colchicine	300 micrograms	tab	HOS
Indomethacin	25 mg	cap	HC

### 3. Antiallergics and Medicines Used in Anaphylaxis

Chlorpheniramine	4 mg	tab	C
Chlorpheniramine	10 mg/ml	inj	HC
Dexamethasone	0.5 mg	tab	C
Dexamethasone	4 mg/ml	inj	HC
Epinephrine	1 mg/ml	inj	C
Hydrocortisone	100 mg	inj	C
Prednisolone	5 mg	tab	HC
Promethazine	25 mg	tab	C

### 4. Antidotes and Other Substances Used in Poisoning

#### 4.1. Nonspecific

Charcoal activated	250 mg	tab	HOS
Pralidoxime	200 mg/ml	inj	HOS

#### 4.2 Specific

Acetylcysteine	200 mg/ml in 10 ml ampoule	inj	HOS
Atropine	1 mg/ml	inj	C
Benztropine meslyate	1 mg/ml	inj	HOS
Calcium folinate (folinic acid)	15 mg	tab	HOS
Calcium folinate (folinic acid)	3 mg/ml	inj	HOS
Calcium gluconate		inj	HC
Deferoxamine	500 mg (PFR)	inj	HOS
Dimecaprol	50 mg/ml	inj	HOS

Methylthioninium chloride (methylene blue)	10 mg/ml	inj	HOS
Naloxone	400 micrograms/ml	inj	HOS
Penicillamine	250 mg	cap	HOS

## 5. Anticonvulsants and Antiepileptics

Carbamazepine	200 mg	tab	HOS
Diazepam	2 mg	sup	HC
Diazepam	5 mg	tab	HOS
Diazepam	5 mg/ml	inj	HOS
Ethosuximide	250 mg	tab	HOS
Magnesium sulfate	50%	inj	HC
Phenobarbitone	100 mg/ml	inj	HOS
Phenobarbitone	60 mg	tab	C
Phenytoin	100 mg	tab	HC
Sodium valproate	100 mg	tab	HOS

## 6. Anti-Infective Medicines

### 6.1 Anthelmintics

#### 6.1.1 Intestinal Infestations

Mebendazole	100 mg	tab	C
Mebendazole	500 mg	tab	C
Niclosamide	500 mg	tab	HOS

#### 6.1.2 Anti-filariasis

Ivermectin	6 mg	tab	C
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#### 6.1.3 Anti-schistosomiasis Medicines

Praziquantel	600 mg	tab	C
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### 6.2 Antibacterials

#### 6.2.1 Beta Lactam Medicines

Amoxicillin	125 mg/5 ml	susp	C
Amoxicillin	250 mg	cap/tab	C
Amoxicillin	1 g, IM/IV (PFR)	inj	HC

Amoxicillin	250 + clavulanic acid 125 mg	tab	REF
Benzathine penicillin	2.4 MU		inj
Benzylpenicillin	1 MU (600 mg)	inj	C
Ceftriaxone	250 mg/1 g vial		inj
Cefuroxime	125 mg/5 ml (PFR)	syrup	HOS
Cefuroxime axitel	250 mg	tab	HOS
Cefuroxime sodium	750 mg IV/IM	inj	HOS
Cloxacillin	250 mg	cap	HC
Cloxacillin	500 mg	cap	HOS
Cloxacillin	250 mg/vial	inj	HOS
Phenoxymethylpenicillin	250 mg	tab	C
Procaine benzylpenicillin fortified	4 MU		inj

### 6.2.2 Other Antibacterials

Chloramphenicol	250 mg	tab	C
Chloramphenicol	1 g vial	inj	HOS
Ciprofloxacin	500 mg	tab	HC
Co-trimoxazole	200 + 40 mg/5 ml	susp	C
Co-trimoxazole	400 + 80 mg	tab	C
Co-trimoxazole	100 + 20 mg	tab	HC
Doxycycline	100 mg	cap	HC
Erythromycin	250 mg	tab	HC
Gentamycin	40 mg/ml	inj	HOS
Metronidazole	125 mg/5 ml	syrup	C
Metronidazole	200 mg	tab	C
Metronidazole	500 mg/100 ml inf	inj	HOS
Nalidixic acid	500 mg	cap/tab	HOS
Nitrofurantoin	100 mg	tab	HC

### 6.2.3 Antileprosy Medicines

Clofazimine	100 mg	cap	HC
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Dapsone	100 mg	tabs	HC
Rifampicin	150 mg	cap/tab	HC

### 6.2.4 Anti-tuberculosis Medicines

Ethambutol	100 mg	tab	HC
Ethambutol	400 mg	tab	HC
Isoniazid	100 mg	tab	HC
Isoniazid	300 mg	tab	HC
Pyrazinamide	500 mg	tab	HC
Pyridoxine	50 mg	tab	HC
Streptomycin	1 g	inj	HC

#### 6.2.4.1 Fixed-Dose Combination (FDC) (Adults)

Rifampicin/isoniazid	150 mg/75 mg	tab	HC
Rifampicin/isoniazid/ ethambutol	150 mg/75 mg/ 275 mg	tab	HC
Rifampicin/isoniazid/ pyrazinamide/ ethambutol	150 mg/75 mg/ 400 mg/275 mg	tab	HC

#### 6.2.4.2 FDC (Children)

Rifampicin/isoniazid	60 mg/30 mg	tab	HC
Rifampicin/isoniazid	60 mg/60 mg	tab	HC
Rifampicin/isoniazid/ pyrazinamide	60 mg/30 mg/ 150 mg	tab	HC

### 6.2.5. Multidrug-Resistant Tuberculosis

Amikacin	500 mg/2 ml	inj	HOS
Cycloserine	250 mg	tabs	HOS
Kanamycin	1 g vial	inj	HOS
p-aminosalicylic acid	4 g packet	powder	HOS
Ofloxacin	200 mg	tabs	HOS
Levofloxacin	250 mg	tab	HOS
Ethionamide	250 mg	tabs	HOS
Pyridoxine	50 mg	tab	HOS

### 6.3 Antifungal Medicines

Amphotericin B	50 mg, IV	inj	HOS
Clotrimazole	400 mg	pess	C

Fluconazole	100 mg	cap/tab	HOS
Fluconazole	200 mg	cap/tab	HC
Flucytosine	10 mg/ml IV	inj	HOS
Griseofulvin	125 mg	tabs	C
Griseofulvin	500 mg	tabs	HC
Miconazole	100 mg	pess	C
Nystatin	100,000 IU	pess	C
Nystatin	100,000 IU/ml	susp	C
Nystatin	500,000 IU oral use	tabs	C

## 6.4 Antiviral Medicines

### 6.4.1 Antiherpes Medicines

Acyclovir	400 mg	tab	HOS
Gancyclovir	500 mg IV (CMV infection)	inj	REF

### 6.4.2 Antiretrovirals

Note: Subject to protocols in the current version of the *Integrated Guidelines for Prevention, Testing, Care and Treatment of HIV/AIDS in Liberia*. Newly released FDCs containing the medicines below should be used if available.

#### 6.4.2.1 Nucleoside Reverse Transcriptase Inhibitors

Abacavir	60 mg	tab	HC
Abacavir	300 mg	tab	HC
Abacavir oral solution	20 mg/ml	sol	HC
Didanosine	125 mg	cap	HC
Didanosine	250 mg	cap	HC
Didanosine	400 mg	cap	HC
Lamivudine	150 mg	tab	C
Lamivudine oral solution	10 mg/ml	sol	HC
Zidovudine	300 mg	tab	C
Zidovudine oral solution	10 mg/ml	sol	C

#### 6.4.2.2 Non-Nucleoside Reverse Transcriptase Inhibitors

Efavirenz	200 mg	tab	HC
Efavirenz	600 mg	tab	HC

Nevirapine	200 mg	tab	C
Nevirapine oral susp	10 mg/ml	susp	C

### 6.4.2.3 Protease Inhibitors

Atazanavir	300 mg	tab	HC
Indinavir	200 mg	tab	HC
Indinavir	400 mg	tab	HC
Lopinavir/ritonavir	100/25 mg	tab	HC
Lopinavir/ritonavir	200/50 mg	tab	HC
Lopinavir/ritonavir oral solution	80/20 mg/ml	sol	HC
Nelfinavir	250 mg	tab	HC
Ritonavir	100 mg	tab	HC
Saquinavir	200 mg (soft gel)	cap	HC
Saquinavir	200 mg (hard gel)	cap	HC

### 6.4.2.4 FDCs

Lamivudine/stavudine	30/6 mg	tab	HC
Lamivudine/stavudine	60/12 mg	tab	HC
Lamivudine/stavudine	150/30 mg	tab	HC
Lamivudine/stavudine/ nevirapine	30/6/50 mg	tab	HC
Lamivudine/stavudine/ nevirapine	60/12/100 mg	tab	HC
Lamivudine/stavudine/ nevirapine	150/30/200 mg	tab	HC
Lamivudine/zidovudine	30/60 mg	tab	HC
Lamivudine/zidovudine	150/300 mg	tab	C
Lamivudine/zidovudine/ nevirapine	30/60/50 mg	tab	HC
Lamivudine/zidovudine/ nevirapine	150/300/200 mg	tab	HC
Tenofovir/lamivudine	300/300 mg	tab	HC

## 6.5 Antiprotozoal Medicines

### 6.5.1 Antiamoebic and Antigiardiasis Medicines

Metronidazole	125 mg/5 ml	syrup	C
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Metronidazole	250 mg	tab	C
Tinidazole	500 mg	tab	HOS

### 6.5.2 Antimalarial Medicines

#### 6.5.2.1 For Curative Treatment

Artemether	20 mg/ml	inj	HC
Artemether	80 mg/ml	inj	HC
Artesunate 50 mg + amodiaquine 135 mg		tab	C
Artesunate 100 mg + amodiaquine 270 mg		tab	C
Primaquine	15 mg	tab	HOS
Quinine dihydrochloride	300 mg/ml	inj	HC
Quinine sulfate	300 mg	tab	C
Sulfadoxine- pyrimethamine	500 + 25 mg	tab	C

#### 6.5.2.2 For Prophylaxis

Doxycycline	100 mg	cap	HOS
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### 6.5.3 Anti-pneumocystosis

Co-trimoxazole	120 mg	tab	HOS
Co-trimoxazole	480 mg	tab	HOS
Pentamidine	300 mg (PFR) IV	inj	HOS

### 6.5.4 Anti-trichomoniasis medicines

Metronidazole	200 mg	tab	C
Tinidazole	500 mg	tab	HOS

## 7. Antimigraine Medicines

### 7.1 For Treatment of Acute Attack

Acetylsalicylic acid	300 mg	tab	C
Ergotamine tartrate	1 mg	tab	C
Paracetamol	500 mg	tab	C

### 7.2 For Prophylaxis

Propranolol	40 mg	tab	HOS
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## 8. Antineoplastic and Immunosuppressives

### 8.1 Immunosuppressive Medicines

Azathioprine	50 mg	tab	HOS
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### 8.2 Cytotoxic Medicines

Cyclophosphamide	25 mg	tab	HOS
Methotrexate	2.5 mg	tab	HOS
Vincristine	1 mg	inj	HOS

### 8.3 Hormones and Antihormones

Dexamethasone	4 mg	tab	HOS
Dexamethasone	1 mg/ml	inj	HOS
Hydrocortisone	100 mg	inj	HOS
Prednisolone	5 mg	tabs	HOS
Tamoxifen	10 mg	tabs	HOS

## 9. Anti-Parkinsonism Medicines

Benzhexol	2 mg	tab	HOS
Levodopa 100 mg + carbidopa 10 mg		tab	HOS

## 10. Medicines Affecting the Blood

### 10.1 Antianemia Medicines

Ferrous fumarate	20 mg/ml	syrup	HC
Ferrous salt 200 mg + folic acid 0.25 mg		tab	C
Ferrous sulfate	200 mg coated (65 mg iron)	tab	C
Folic acid	5 mg	tab	C

### 10.2 Medicines Affecting Coagulation

Heparin	5,000 IU/ml	inj	HOS
Phytomenadione (vitamin K <sub>1</sub> )	1 mg/ml	inj	HC
Protamine sulfate	10 mg/ml	inj	HOS
Warfarin	3 mg	tab	HOS

**11. Plasma Substitutes**

Dextran 70% in sodium chloride 0.9%		inf	HOS
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**12. Cardiovascular Medicines****12.1 Anti-angina Medicines**

Atenolol	100 mg	tab	HOS
Glyceryl trinitrate	500 mg sublingual	tab	HOS
Propranolol	20 mg	tab	HC
Propranolol	40 mg	tab	HC

**12.2 Antiarrhythmic Medicines**

Atenolol	100 mg	tab	HOS
Digoxin	0.25 mg	tab	HOS
Lidocaine (plain)	2%	inj	HOS
Procainamide	1%	inj	HOS
Propranolol	40 mg	tab	HOS

**12.3 Antihypertensive Medicines**

Atenolol	50 mg	tab	HC
Enalapril	10 mg	tab	HOS
Hydralazine	25 mg	inj	C
Hydrochlorothiazide	25 mg	tab	C
Nifedipine	10 mg	tab	HC
Propranolol	40 mg	tab	HC
Propranolol	80 mg	tab	HC

**12.3.1 Antihypertensive Medicines in Pregnancy**

Magnesium sulfate	500 mg/ml	inj	HC
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**12.4 Medicines Used in Heart Failure**

Captopril	12.5 mg	tab	HOS
Digoxin	0.25 mg	tab	HOS
Digoxin	0.25 mg/ml	inj	HOS
Furosemide	10 mg/ml	inj	HOS
Furosemide	40 mg	tab	HOS

## 12.5 Medicines Used in Vascular Shock

Adrenaline (epinephrine)	1 mg/ml	inj	HOS
Hydrocortisone sodium succinate	100 mg	inj	HOS

## 13. Dermatological Medicines (Topical)

### 13.1 Antifungal Medicines

Benzoic acid + salicylic acid		oint	C
Clotrimazole 1%	20 g cream	cream	C

### 13.2 Anti-infective Medicines

Neomycin 5 mg + bacitracin 500 IU		cream	HC
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### 13.3 Anti-inflammatory and Antipruritic Medicines

Calamine	15%	lotion	C
Hydrocortisone	1%	cream	HC

### 13.4 Medicines Affecting Skin Differentiation and Proliferation

Coal tar	1%	oint	HOS
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### 13.5 Scabicides and Pediculicides

Benzyl benzoate	25%	lotion	C
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## 14. Diagnostic Agents

### 14.1 Ophthalmic Preparations

Atropine eye drops	0.1%	drops	HOS
Atropine eye drops	0.5%	drops	HOS
Atropine eye drops	1.0%	drops	HOS
Fluorescein	1% eye drops	drops	HOS
Rose bengal	1% eye drops	drops	HOS

### 14.2 Radio-Contrast Media

Barium sulfate	75%	powder	HOS
Diatrizoate	60%	inj	HOS
Diatrizoate	76%	inj	HOS
Iodized oil	38%	inj	HOS

loglycamate	17%	inj	HOS
loglycamate	35%	inj	HOS
lohexol	18%	inj	HOS
lohexol	24%	inj	HOS
lohexol	30%	inj	HOS
lohexol	35%	inj	HOS
lopanoic acid	500 mg	tab	HOS
lothalamate	54%	inj	HOS
lothalamate	60%	inj	HOS
lothalamate	70%	inj	HOS

## 15. Antiseptics and Disinfectants

### 15.1 Antiseptics

Chlorhexidine + cetrimide	0.5% + 0.5%	sol	C
Chlorhexidine gluconate 5%	1 litre	btl	C
Povidone iodine		liq	HC
Surgical spirit		liq	C

### 15.2 Disinfectants

Sodium hypochlorite	5% solution	sol	C
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## 16. Diuretics

Furosemide	10 mg/ml	inj	HOS
Furosemide	40 mg	tab	HC
Hydrochlorothiazide	25 mg	tab	C
Mannitol	20%	inj	HOS
Spironolactone	25 mg	tab	HOS

## 17. Gastrointestinal Medicines

### 17.1 Antacids and Other Antiulcer Medicines

Aluminium hydroxide + magnesium trisilicate	400 mg	tab	C
Magnesium trisilicate	500 mg	tab	C
Omeprazole	20 mg	tab	C

Ranitidine	25 mg/ml	inj	HOS
Ranitidine	150 mg	tab	HC

### 17.2 Antiemetic Medicine

Metoclopramide	10 mg	tab	HC
Metoclopramide	5 mg/ml	inj	HC
Promethazine	25 mg	tab	HC
Promethazine	25 mg/ml, 2 ml	inj	HC

### 17.3 Anti-hemorrhoidal Medicines

Bismuth subgallate compound		sup	HC
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### 17.4 Laxatives

Bisacodyl	5 mg	tab	C
Bisacodyl	5 mg (pediatric)	sup	C

### 17.5 Medicines Used in Diarrhea

#### 17.5.1 Oral Rehydration Salts

Oral rehydration salt		sach	C
Zinc sulfate	10 mg	tabs	C

## 18. Hormones and Other Endocrine Medicines

### 18.1 Adrenal Hormones and Synthetic Substitutes

Dexamethasone	0.5 mg	tab	HC
Dexamethasone	4 mg/ml	inj	HC
Hydrocortisone	100 mg	inj	HC
Prednisolone	5 mg	tab	HOS

### 18.2 Androgens

Methyltestosterone	5 mg	tab	REF
Testosterone enanthate	250 mg/ml	inj	REF

### 18.3 Contraceptives

#### 18.3.1 Oral Hormonal Contraceptives

Ethinylestradiol levonorgestrel 150 micrograms	30 micrograms + 150 micrograms	tab	C
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Ethinylestradiol	30 micrograms + levonorgestrel 300 micrograms	tab	C
Ethinylestradiol	50 micrograms + levonorgestrel 250 micrograms	tab	C
Ethinylestradiol	30 micrograms + norethisterone 1 mg	tab	C
Levonorgestrel	300 micrograms	tab	C
Norethisterone	1 mg	tab	C
Norgestrel	75 micrograms	tab	C
<b>18.3.2 Injectable Hormonal Contraceptives</b>			
Medroxyprogesterone acetate	150 mg	inj	HC
<b>18.3.3 Intrauterine Devices</b>			
Copper containing device		pc	HC
<b>18.3.4 Barrier Methods</b>			
Condoms (male and female)		pc	C
Diaphragms		pc	HOS
<b>18.4 Estrogens and Anti-estrogens</b>			
Ethinylestradiol	0.5 mg	tab	HOS
Tamoxifen	10 mg	tab	REF
<b>18.5 Insulin and Other Antidiabetic Agents</b>			
Glibenclamide	5 mg	tab	HOS
Insulin isophane NPH	100 IU/ml, 10 ml	inj	HOS
Insulin zinc suspension	100 IU/ml	inj	HOS
Metformin	500 mg	tab	HOS
Soluble insulin	100 IU/ml, 10 ml	inj	HOS
<b>18.6 Progestogens</b>			
Norethisterone	5 mg	tab	HOS
Levonorgestrel	36 mg	tab	HOS

**18.7 Thyroid Hormones and Antithyroid Medicines**

Carbimazole	5 mg	tab	HOS
Iodine 5% + Potassium iodide 10% (Lugol's iodine)		oral sol	HC
Levothyroxine	100 µg	tab	HOS

**19. Immunologicals****19.1 Diagnostic Agents**

Tuberculin PPD	100 IU/ml	inj	HC
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**19.2 Sera and Immunoglobulins**

Antivenom polyvalent		inj	HOS
Antitetanus serum, human	1,500 U	inj	HOS

**19.3 Vaccines****19.3.1 For Universal Immunization**

BCG vaccine dried		inj	C
DPT vaccine		inj	C
DPT-HepB+Hib		inj	HOS
Measles vaccine		inj	C
Polio vaccine		oral sol	C
Tetanus toxoid vaccine		inj	C

**19.3.2 For Specific Groups of Individuals**

Rabies vaccine		inj	HOS
Yellow fever vaccine		inj	HOS

**20. Muscle Relaxants (Peripherally Acting) and Cholinesterase Inhibitors**

Neostigmine	0.5 mg/ml	inj	HOS
Suxamethonium	50 mg/ml	inj	HOS

## 21. Ophthalmological Preparations

### 21.1 Antiinfective Agents

Acyclovir eye ointment		ointment	HC
Chloramphenicol	0.5% eye drops	drop	C
Gentamicin eye drops	0.3%	drop	C
Tetracycline	1% eye	ointment	C

### 21.2 Antiinflammatory Agents

Dexamethasone eye ointment		ointment	HOS
Dexamethasone sodium eye drop	1 mg	drop	HOS

### 21.3 Local Anesthetics

Tetracaine eye drops	0.5%	drop	HOS
Tetracaine eye ointment	1%	ointment	HOS

### 21.4 Miotics and Antiglaucoma Medicines

Acetazolamide	250 mg	tab	HOS
Pilocarpine hydrochloride	2% eye drops	drop	HOS
Timolol maleate	0.25% eye drops	drop	HOS

### 21.5 Mydriatics

Atropine sulfate	1% eye drops	drop	HOS
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## 22. Oxytocics and Antioxytocics

### 22.1 Oxytocics

Ergometrine	0.5 mg/ml	inj	HOS
Ergometrine maleate	0.5mg	tab	HC
Misoprostol	200 micrograms	tab	HC
Oxytocin	10 IU/ml	inj	HC

### 22.2 Antioxytocics

Salbutamol	2 mg	tab	HC
Salbutamol	0.5 mg/ml	inj	HOS

### 23. Peritoneal Dialysis Solution

Electrolyte solutions for dialysis		sol	REF
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### 24. Psychotherapeutic Medicines

#### 24.1 Medicines Used in Psychotic Disorders

Benzhexol	5 mg	tab	HOS
Benzhexol	10 mg/5 ml	inj	HOS
Chlorpromazine	100 mg	tab	HOS
Chlorpromazine	50 mg/2ml	inj	HOS
Fluphenazine	25 mg/1ml	inj	R
Haloperidol	5 mg/ml	inj	REF
Risperidone	2 mg	tab	R

#### 24.2 Medicines Used in Mood Disorders

##### 24.2.1 Medicines Used in Depressive Disorders

Amitriptyline	25 mg	tab	HOS
Fluoxetine	20 mg	tab	R

##### 24.2.2 Medicines Used in Bipolar Disorders

Carbamazepine	100 mg	tab	HOS
Carbamazepine	200 mg	tab	HOS
Lithium carbonate	150/300 mg	tab	HOS
Valproic acid	200 mg/500 mg	tab	REF

#### 24.3 Medicines Used in Generalised Anxiety and Sleep Disorders

Diazepam	5 mg	tab	HOS
Clomipramine	10 mg	tab	R
Clomipramine	25 mg	tab	R

#### 24.4 Medicines Used for Obsessive Compulsive Disorders or Panic Attacks

Clomipramine	10 mg	tab	R
Clomipramine	25 mg	tab	R

## 24.5 Medicines Used for Substance Abuse (Alcohol/Opioid Dependence)

Buprenorphine	2 mg/8 mg	tab	R
Methadone	5 mg/ml, 10 mg/ml	oral sol	HOS

## 25. Medicines Acting on the Respiratory Tract

### 25.1 Antiasthmatic and Medicines for Chronic Obstructive Pulmonary Disease

Aminophylline 25 mg/ml	10 ml	inj	C
Beclomethasone aerosol		inh	HC
Epinephrine	1 mg/ml	inj	HOS
Hydrocortisone	100 mg/ml	inj	HC
Prednisolone	5 mg	tab	HOS
Salbutamol	0.5 mg/ml	inj	HOS
Salbutamol	4 mg	tab	HC
Salbutamol aerosol inhaler		inh	HOS

## 26. Solutions Correcting Water, Electrolyte, and Acid-Base Disturbances

### 26.1 Oral

Oral rehydration salt		sach	C
Potassium chloride	600 mg (slow release)	tab	HC

### 26.2 Parenteral

Dextrose 5% in normal saline		inf	HC
Dextrose 50% concentrate		inf	HC
Dextrose 5%		inf	HC
Normal saline 0.9% sodium chloride		inf	HC
Ringer's lactate	500 ml	inf	HC

(Half strength) Ringer's lactate	500 ml	inf	HC
Sodium bicarbonate 8.4%	10 ml	inj	HOS

### 26.3 Miscellaneous

Water for injection	10 ml	inj	C
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## 27. Vitamins and Minerals

Ascorbic acid	250 mg	tab	C
Calcium gluconate 100 mg/ml	10 ml	inj	HOS
Calcium lactate	300 mg	tab	HC
Ergocalciferol	1.25 mg	tab	HOS
Multivitamin		tab	C
Pyridoxine (vitamin B <sub>6</sub> )	25 mg	tab	C
Retinol (vitamin A)	50,000 IU	cap	C
Retinol (vitamin A)	200,000 IU	cap	C
Vitamin B-compound		tab	C
Vitamin B-compound	2 ml	inj	C

## 28. Ear, Nose, and Oropharyngeal Preparations

### 28.1 Ear Preparations

Betamethasone 0.1%		ear/eye drops	HOS
Clotrimazole 1%		sol	HOS
Gentamicin 0.3%		ear drops	HOS

### 28.2 Nasal Preparations

Ephedrine 1%		nasal drops	HOS
Lignocaine + adrenaline 2% + 1:100,000		nasal drops	HOS

### 28.3 Oropharyngeal Preparations

Miconazole 2%		oral gel	HOS
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## MEDICINES INDEX

- Abacavir, [154](#)  
 Acetazolamide, [164](#)  
 Acetylcysteine, [150](#)  
 Acetylsalicylic acid, [149](#),  
     [156](#)  
 Acyclovir, [154](#), [164](#)  
 Adrenaline, [159](#)  
 Allopurinol, [150](#)  
 Aluminium hydroxide +  
     magnesium trisilicate,  
     [160](#)  
 Amikacin, [153](#)  
 Aminophylline, [166](#)  
 Amitriptyline, [165](#)  
 Amodiaquine, [156](#)  
 Amoxicillin, [151](#), [152](#)  
 Amphotericin B, [153](#)  
 Antitetanus serum, [163](#)  
 Antivenom polyvalent,  
     [163](#)  
 Artemether, [156](#)  
 Artesunate, [156](#)  
 Ascorbic acid, [167](#)  
 Atazanavir, [155](#)  
 Atenolol, [158](#)  
 Atropine, [149](#), [150](#), [159](#),  
     [164](#)  
 Azathioprine, [157](#)  
  
 Bacitracin, [159](#)  
 Barium sulfate, [159](#)  
 Beclomethasone aerosol,  
     [166](#)  
 Benzathine penicillin, [152](#)  
 Benzhexol, [157](#), [165](#)  
 Benzoic acid, [159](#)  
 Benztropine meslyate, [150](#)  
 Benzyl benzoate, [159](#)  
 Benzylpenicillin, [152](#)  
  
 Betamethasone, [167](#)  
 Bisacodyl, [161](#)  
 Bismuth subgallate  
     compound, [161](#)  
 Buprenorphine, [166](#)  
  
 Calamine, [159](#)  
 Calcium folinate, [150](#)  
 Calcium gluconate, [150](#),  
     [167](#)  
 Calcium lactate, [167](#)  
 Captopril, [158](#)  
 Carbamazepine, [151](#), [165](#)  
 Carbimazole, [163](#)  
 Ceftriaxone, [152](#)  
 Cefuroxime, [152](#)  
 Cetrimide, [160](#)  
 Charcoal, [150](#)  
 Chloramphenicol, [152](#), [164](#)  
 Chlorhexidine, [160](#)  
 Chlorpheniramine, [150](#)  
 Chlorpromazine, [165](#)  
 Ciprofloxacin, [152](#)  
 Clofazimine, [152](#)  
 Clomipramine, [165](#)  
 Clotrimazole, [153](#), [159](#),  
     [167](#)  
 Cloxacillin, [152](#)  
 Coal tar, [159](#)  
 Colchicine, [150](#)  
 Condoms, [162](#)  
 Copper containing device,  
     [162](#)  
 Co-trimoxazole, [152](#), [156](#)  
 Cyclophosphamide, [157](#)  
 Cycloserine, [153](#)  
  
 Dapsone, [153](#)  
 Deferoxamine, [150](#)

- Dexamethasone, [150](#), [157](#),  
[161](#), [164](#)  
 Dextran, [158](#)  
 Dextrose, [166](#)  
 Diaphragms, [162](#)  
 Diatrizoate, [159](#)  
 Diazepam, [149](#), [151](#), [165](#)  
 Diclofenac, [149](#)  
 Diclofenac sodium, [149](#)  
 Didanosine, [154](#)  
 Digoxin, [158](#)  
 Dimecaprol, [150](#)  
 Doxycycline, [152](#), [156](#)
- Efavirenz, [154](#)  
 Electrolyte solutions for  
 dialysis, [165](#)  
 Enalapril, [158](#)  
 Ephedrine, [167](#)  
 Epinephrine, [150](#), [166](#)  
 Ergocalciferol, [167](#)  
 Ergometrine, [164](#)  
 Ergometrine maleate, [164](#)  
 Ergotamine tartrate, [156](#)  
 Erythromycin, [152](#)  
 Ethambutol, [153](#)  
 Ethinylestradiol, [161](#), [162](#)  
 Ethionamide, [153](#)  
 Ethosuximide, [151](#)
- Ferrous fumarate, [157](#)  
 Ferrous salt, [157](#)  
 Ferrous sulfate, [157](#)  
 Fluconazole, [154](#)  
 Flucytosine, [154](#)  
 Fluorescein, [159](#)  
 Fluoxetine, [165](#)  
 Fluphenazine, [165](#)  
 Folic acid, [157](#)  
 Furosemide, [158](#), [160](#)
- Gancyclovir, [154](#)  
 Gentamicin, [164](#), [167](#)  
 Gentamycin, [152](#)  
 Glibenclamide, [162](#)  
 Glycerol trinitrate, [158](#)  
 Griseofulvin, [154](#)
- Haloperidol, [165](#)  
 Halothane, [149](#)  
 Heparin, [157](#)  
 Hydralazine, [158](#)  
 Hydrochlorothiazide, [158](#),  
[160](#)  
 Hydrocortisone, [150](#), [157](#),  
[159](#), [161](#), [166](#)  
 Hydrocortisone sodium  
 succinate, [159](#)
- Ibuprofen, [149](#)  
 Indinavir, [155](#)  
 Indomethacin, [150](#)  
 Insulin isophane, [162](#)  
 Insulin, [soluble](#), [162](#)  
 Insulin zinc suspension,  
[162](#)  
 Iodine, [163](#)  
 Iodized oil, [159](#)  
 Ioglycamate, [160](#)  
 Iohexol, [160](#)  
 Iopanoic acid, [160](#)  
 Iothalamate, [160](#)  
 Isoniazid, [153](#)  
 Ivermectin, [151](#)
- Kanamycin, [153](#)  
 Ketamine, [149](#)
- Lamivudine, [154](#), [155](#)  
 Levodopa, [157](#)  
 Levofloxacin, [153](#)  
 Levonorgestrel, [162](#)

- Levothyroxine, [163](#)  
 Lidocaine, [149](#), [158](#)  
 Lignocaine, [167](#)  
 Lithium carbonate, [165](#)  
 Lopinavir, [155](#)
- Magnesium sulfate, [151](#),  
[158](#)  
 Magnesium trisilicate,  
[160](#)  
 Mannitol, [160](#)  
 Mebendazole, [151](#)  
 Medroxyprogesterone  
 acetate, [162](#)  
 Metformin, [162](#)  
 Methadone, [166](#)  
 Methotrexate, [157](#)  
 Methyltestosterone, [161](#)  
 Methylthioninium  
 chloride, [151](#)  
 Metoclopramide, [161](#)  
 Metronidazole, [152](#), [155](#),  
[156](#)  
 Miconazole, [154](#), [167](#)  
 Misoprostol, [164](#)  
 Morphine, [149](#)  
 Morphine sulfate, [149](#)  
 Multivitamin, [167](#)
- Nalidixic acid, [152](#)  
 Naloxone, [151](#)  
 Nelfinavir, [155](#)  
 Neomycin, [159](#)  
 Neostigmine, [163](#)  
 Nevirapine, [155](#)  
 Niclosamide, [151](#)  
 Nifedipine, [158](#)  
 Nitrofurantoin, [152](#)  
 Nitrous oxide, [149](#)  
 Norethisterone, [162](#)  
 Norgestrel, [162](#)
- Normal saline, [166](#)  
 Nystatin, [154](#)
- Ofloxacin, [153](#)  
 Omeprazole, [160](#)  
 Oral rehydration salt, [161](#),  
[166](#)  
 Oxygen, [149](#)  
 Oxytocin, [164](#)
- p-aminosalicylic acid, [153](#)  
 Paracetamol, [149](#), [156](#)  
 Paracetamol syrup, [149](#)  
 Penicillamine, [151](#)  
 Pentamidine, [156](#)  
 Pethidine, [150](#)  
 Phenobarbitone, [151](#)  
 Phenoxymethylpenicillin,  
[152](#)  
 Phenytoin, [151](#)  
 Phytomenadione, [157](#)  
 Pilocarpine hydrochloride,  
[164](#)  
 Potassium chloride, [166](#)  
 Povidone iodine, [160](#)  
 Pralidoxime, [150](#)  
 Praziquantel, [151](#)  
 Prednisolone, [150](#), [157](#),  
[161](#), [166](#)  
 Primaquine, [156](#)  
 Procainamide, [158](#)  
 Procaine benzylpenicillin,  
[152](#)  
 Promethazine, [150](#), [161](#)  
 Propranolol, [156](#), [158](#)  
 Protamine sulfate, [157](#)  
 Pyrazinamide, [153](#)  
 Pyridoxine, [153](#), [167](#)
- Quinine dihydrochloride,  
[156](#)

- Quinine sulfate, [156](#)  
 Ranitidine, [161](#)  
 Retinol, [167](#)  
 Rifampicin, [153](#)  
 Ringer's lactate, [166](#)  
 Risperidone, [165](#)  
 Ritonavir, [155](#)  
 Rose bengal, [159](#)  
  
 Salbutamol, [164](#), [166](#)  
 Salicylic acid, [159](#)  
 Saquinavir, [155](#)  
 Sodium bicarbonate, [167](#)  
 Sodium hypochlorite, [160](#)  
 Sodium valproate, [151](#)  
 Spironolactone, [160](#)  
 Stavudine, [155](#)  
 Streptomycin, [153](#)  
 Sulfadoxine-  
   pyrimethamine, [156](#)  
 Surgical spirit, [160](#)  
 Suxamethonium, [163](#)  
  
 Tamoxifen, [157](#), [162](#)  
 Tenofovir, [155](#)  
 Testosterone enanthate,  
   [161](#)  
 Tetracaine eye drops, [164](#)  
 Tetracaine eye ointment,  
   [164](#)  
 Tetracycline, [164](#)  
 Thiopental, [149](#)  
 Timolol maleate, [164](#)  
 Tinidazole, [156](#)  
 Tuberculin, [163](#)  
  
 Valproic acid, [165](#)  
 Vincristine, [157](#)  
 Vitamin B, [167](#)  
  
 Warfarin, [157](#)  
 Water for injection, [167](#)  
  
 Zidovudine, [154](#)  
 Zinc sulfate, [161](#)