

# Essential Drugs

## WHO Model List (revised December 1999)

### Section 1: Anaesthetics

#### 1.1 GENERAL ANAESTHETICS AND OXYGEN

ether, anaesthetic (1c) (2)	inhalation
halothane (2)	inhalation
ketamine (2)	injection, 50 mg (as hydrochloride)/ml in 10-ml vial
nitrous oxide (2)	inhalation
oxygen	inhalation (medicinal gas)
<sup>o</sup> thiopental (2)	powder for injection, 0.5 g, 1.0 g (sodium salt) in ampoule

#### 1.2 LOCAL ANAESTHETICS

<sup>o</sup> bupivacaine (2, 9)	injection, 0.25%, 0.5% (hydrochloride) in vial
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injection for spinal anaesthesia, 0.5% (hydrochloride) in 4-ml ampoule to be mixed with 7.5% glucose solution

<sup>o</sup>lidocaine injection, 1%, 2% (hydrochloride) in vial

injection, 1%, 2% (hydrochloride) + epinephrine 1:200 000 in vial

injection for spinal anaesthesia, 5% (hydrochloride) in 2-ml ampoule to be mixed with 7.5% glucose solution

topical forms, 2–4% (hydrochloride)

dental cartridge, 2% (hydrochloride) + epinephrine 1:80 000

#### Complementary drug

ephedrine (C) injection, 30 mg (For use in spinal anaesthesia during delivery to prevent hypotension) (hydrochloride)/ml in 1-ml ampoule

<sup>o</sup> Example of a therapeutic group. Various drugs can serve as alternatives.

### Explanatory Notes

When the strength of a drug is specified in terms of a selected salt or ester, this is mentioned in brackets; when it refers to the active moiety, the name of the salt or ester in brackets is preceded by the word "as".

Many drugs included in the list are preceded by a box (°) to indicate that they represent an example of a therapeutic group and that various drugs could serve as alternatives. It is imperative that this is understood when drugs are selected at national level, since choice is then influenced by the comparative cost and availability of equivalent products. Examples of acceptable substitutions include:

- <sup>o</sup> Hydrochlorothiazide: any other thiazide-type diuretic currently in broad clinical use.
- <sup>o</sup> Hydralazine: any other peripheral vasodilator having an antihypertensive effect.
- <sup>o</sup> Senna: any stimulant laxative (either synthetic or of plant origin).
- <sup>o</sup> Sulfadiazine: any other short-acting, systemically active sulfonamide unlikely to cause crystalluria.

Numbers in parentheses following drug names indicate: (1) Drugs subject to international control under: (a) the Single Convention on Narcotic Drugs (1961); (b) the Convention on Psychotropic Substances (1971); or (c) the

United Nations Convention against Illicit Traffic in Narcotic Drugs and Psychotropic Substances (1988).

(2) Specific expertise, diagnostic precision, individualization of dosage or special equipment required for proper use.

(3) Greater potency or efficacy.

(4) In renal insufficiency, contraindicated or dosage adjustments necessary.

(5) To improve compliance.

(6) Special pharmacokinetic properties.

(7) Adverse effects diminish benefit/risk ratio.

(8) Limited indications or narrow spectrum of activity.

(9) For epidural anaesthesia.

(10) Sustained-release preparations are available. A proposal to include such a product in a national list of essential drugs should be supported by adequate documentation.

(11) Monitoring of therapeutic concentrations in plasma can improve safety and efficacy.

Letters in parentheses following the drug names indicate the reasons for the inclusion of *complementary drugs*:

(A) When drugs in the main list cannot be made available.

(B) When drugs in the main list are known to be ineffective or inappropriate for a given individual.

(C) For use in rare disorders or in exceptional circumstances.

(D) Reserve antimicrobials to be used only when there is significant resistance to other drugs on the list.

Drugs are listed in alphabetical order.

### 1.3 PREOPERATIVE MEDICATION & SEDATION FOR SHORT-TERM PROCEDURES

atropine	injection, 1 mg (sulfate) in 1-ml ampoule
chloral hydrate	syrup, 200 mg/5 ml
<sup>a</sup> diazepam (1b)	injection, 5 mg/ml in 2-ml ampoule tablet, 5 mg
<sup>a</sup> morphine (1a)	injection, 10 mg (sulfate or hydrochloride) in 1-ml ampoule
<sup>a</sup> promethazine	elixir or syrup, 5 mg (hydrochloride)/5 ml

## Section 2: Analgesics, Antipyretics, Nonsteroidal Anti-Inflammatory Drugs (NSAIDs), Drugs Used to Treat Gout and Disease-Modifying Agents used in Rheumatic Disorders (DMARDs)

### 2.1 NON-OPIOID ANALGESICS & NSAIDs

acetylsalicylic acid	tablet, 100–500 mg suppository, 50–150 mg
<sup>a</sup> ibuprofen	tablet, 200 mg, 400 mg
paracetamol	tablet, 100–500 mg suppository, 100 mg syrup, 125 mg/5 ml

### 2.2 OPIOID ANALGESICS

<sup>a</sup> codeine (1a)	tablet, 30 mg (phosphate)
<sup>a</sup> morphine (1a)	injection, 10 mg (sulfate or hydrochloride) in 1-ml ampoule oral solution, 10 mg (hydrochloride or sulfate)/5 ml tablet, 10 mg (sulfate)

#### Complementary drug

<sup>a</sup> pethidine (A) (1a, 4)	injection, 50 mg (hydrochloride) in 1-ml ampoule tablet, 50 mg, 100 mg (hydrochloride)
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### 2.3 DRUGS USED TO TREAT GOUT

allopurinol (4)	tablet, 100 mg
colchicine (7)	tablet, 500 µg

### 2.4 DISEASE-MODIFYING AGENTS USED IN RHEUMATIC DISORDERS

azathioprine (2)	tablet, 50 mg
chloroquine (2)	tablet, 100 mg, 150 mg (as phosphate or sulfate)
cyclophosphamide (2)	tablet, 25 mg
methotrexate (2)	tablet, 2.5 mg (as sodium salt)
penicillamine (2)	capsule or tablet, 250 mg
sulfasalazine (2)	tablet, 500 mg

## Section 3: Antiallergics and Drugs Used in Anaphylaxis

<sup>a</sup> chlorphenamine	tablet, 4 mg (hydrogen maleate) injection, 10 mg (hydrogen maleate) in 1-ml ampoule
<sup>a</sup> dexamethasone	tablet, 500 µg, 4 mg injection, 4 mg dexamethasone phosphate (as disodium salt) in 1-ml ampoule
epinephrine	injection, 1 mg (as hydrochloride or hydrogen tartrate) in 1-ml ampoule
hydrocortisone	powder for injection, 100 mg (as sodium succinate) in vial
<sup>a</sup> prednisolone	tablet, 5 mg

## Section 4: Antidotes and Other Substances Used in Poisonings

### 4.1 NON-SPECIFIC

<sup>a</sup> charcoal, activated	powder
ipecacuanha	syrup, containing 0.14% ipecacuanha alkaloids calculated as emetine

### 4.2 SPECIFIC

acetylcysteine	injection, 200 mg/ml in 10-ml vial
atropine	injection, 1 mg (sulfate) in 1-ml ampoule
calcium gluconate (2, 8)	injection, 100 mg/ml in 10-ml ampoule
deferoxamine	powder for injection, 500 mg (mesilate) in vial

<sup>a</sup> Example of a therapeutic group. Various drugs can serve as alternatives.

dimercaprol (2)	injection in oil, 50 mg/ml in 2-ml ampoule
<sup>o</sup> DL-methionine	tablet, 250 mg
methylthioninium chloride (methylene blue)	injection, 10 mg/ml in 10-ml ampoule
naloxone	injection, 400 µg (hydrochloride) in 1-ml ampoule
penicillamine (2)	capsule or tablet, 250 mg
potassium ferric hexacyano- ferrate(II) · 2H <sub>2</sub> O (Prussian blue)	powder for oral administration
sodium calcium edetate (2)	injection, 200 mg/ml in 5-ml ampoule
sodium nitrite	injection, 30 mg/ml in 10-ml ampoule
sodium thiosulfate	injection, 250 mg/ml in 50-ml ampoule

## Section 5: Anticonvulsants/ Antiepileptics

carbamazepine (10, 11)	scored tablet, 100 mg, 200 mg
<sup>o</sup> diazepam (1b)	injection, 5 mg/ml in 2-ml ampoule (intravenous or rectal)
ethosuximide	capsule, 250 mg syrup, 250 mg/5 ml
magnesium sulfate	injection, 500 mg/ml in 2-ml ampoule and 10-ml ampoule
phenobarbital (1b, 11)	tablet, 15–100 mg elixir, 15 mg/5 ml
phenytoin (7, 11)	capsule or tablet, 25 mg, 50 mg, 100 mg (sodium salt) injection, 50 mg (sodium salt)/ml in 5-ml vial
valproic acid (7, 11)	enteric coated tablet, 200 mg, 500 mg (sodium salt)
<i>Complementary drug</i>	
<sup>o</sup> clonazepam (B) (1b)	scored tablet, 500 µg

## Section 6: Anti-infective Drugs

### 6.1 ANTHELMINTHICS

#### 6.1.1 INTESTINAL ANTHELMINTHICS

albendazole	chewable tablet, 400 mg
levamisole	tablet, 50 mg, 150 mg (as hydrochloride)
<sup>o</sup> mebendazole	chewable tablet, 100 mg, 500 mg
niclosamide	chewable tablet, 500 mg
praziquantel	tablet, 150 mg, 600 mg
pyrantel	chewable tablet, 250 mg (as embonate) oral suspension, 50 mg (as embonate)/ml

#### 6.1.2 ANTIFILARIALS

diethylcarbamazine	tablet, 50 mg, 100 mg (dihydrogen citrate)
ivermectin	scored tablet, 3 mg, 6 mg

#### *Complementary drug*

suramin sodium (B) (2, 7)	powder for injection, 1 g in vial
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#### 6.1.3 ANTISCHISTOSOMALS AND OTHER ANTITREMATODE DRUGS

praziquantel	tablet, 600 mg
triclabendazole	tablet, 250 mg
<i>Complementary drug</i>	
oxamniquine (C) (8)	capsule, 250 mg syrup, 250 mg/5 ml

### 6.2 ANTIBACTERIALS

#### 6.2.1 BETA LACTAM DRUGS

<sup>o</sup> amoxicillin	capsule or tablet, 250 mg, 500 mg (anhydrous) powder for oral suspension, 125 mg (anhydrous)/5 ml
ampicillin	powder for injection, 500 mg, 1 g (as sodium salt) in vial
benzathine benzylpenicillin	powder for injection, 1.44 g benzylpenicillin (= 2.4 million IU) in 5-ml vial
benzylpenicillin	powder for injection, 600 mg (= 1 million IU), 3 g (= 5 million IU) (sodium or potassium salt) in vial

<sup>o</sup> Example of a therapeutic group. Various drugs can serve as alternatives.

<sup>o</sup> cloxacillin	capsule, 500 mg, 1 g (as sodium salt) powder for oral solution, 125 mg (as sodium salt)/5 ml powder for injection, 500 mg (as sodium salt) in vial	<sup>o</sup> metronidazole	tablet, 200–500 mg injection, 500 mg in 100-ml vial suppository, 500 mg, 1 g oral suspension, 200 mg (as benzoate)/5 ml
phenoxymethylpenicillin	tablet, 250 mg (as potassium salt) powder for oral suspension, 250 mg (as potassium salt)/5 ml	nalidixic acid (8)	tablet, 250 mg, 500 mg
procaine benzylpenicillin	powder for injection, 1 g (= 1 million IU), 3 g (= 3 million IU) in vial	nitrofurantoin (4, 8)	tablet, 100 mg
<i>Restricted indications</i>		spectinomycin (8)	powder for injection, 2 g (as hydrochloride) in vial
<sup>o</sup> amoxicillin + <sup>o</sup> clavulanic acid (D)	tablet, 500 mg + 125 mg	<sup>o</sup> sulfadiazine (4)	tablet, 500 mg injection, 250 mg (sodium salt) in 4-ml ampoule
ceftazidime (D)	powder for injection, 250 mg (as pentahydrate) in vial	<sup>o</sup> sulfamethoxazole + trimethoprim (4)	tablet, 100 mg + 20 mg, 400 mg + 80 mg oral suspension, 200 mg + 40 mg/5 ml
<sup>o</sup> ceftriaxone (D)	powder for injection, 250 mg (as sodium salt) in vial	trimethoprim (8)	injection, 80 mg + 16 mg/ml in 5-ml and 10-ml ampoule tablet, 100 mg, 200 mg injection, 20 mg/ml in 5-ml ampoule
imipenem + cilastatin (D)	powder for injection, 250 mg (as monohydrate) + 250 mg, (as sodium salt) 500 mg (as monohydrate) + 500 mg in vial (as sodium salt)	<i>Complementary drugs</i>	
<b>6.2.2 OTHER ANTIBACTERIALS</b>		chloramphenicol (C)	oily suspension for injection, 0.5 g (as sodium succinate)/ml in 2-ml ampoule
<sup>o</sup> chloramphenicol (7)	capsule, 250 mg oral suspension, 150 mg (as palmitate)/5 ml powder for injection, 1 g (sodium succinate) in vial	clindamycin (B) (8)	capsule, 150 mg injection, 150 mg (as phosphate)/ml
<sup>o</sup> ciprofloxacin	tablet, 250 mg (as hydrochloride)	<i>Restricted indications</i>	
<sup>o</sup> doxycycline (5, 6)	capsule or tablet, 100 mg (hydrochloride)	vancomycin (D)	powder for injection 250 mg (as hydrochloride) in vial
<sup>o</sup> erythromycin	capsule or tablet, 250 mg (as stearate or ethyl succinate) powder for oral suspension, 125 mg (as stearate or ethyl succinate) powder for injection, 500 mg (as lactobionate) in vial	<b>6.2.3 ANTILEPROSY DRUGS</b>	
<sup>o</sup> gentamicin (2, 4, 7, 11)	injection, 10 mg, 40 mg (as sulfate)/ml in 2-ml vial	clofazimine	capsule, 50 mg, 100 mg
		dapsone	tablet, 25 mg, 50 mg, 100 mg
		rifampicin	capsule or tablet, 150 mg, 300 mg
		<b>6.2.4 ANTITUBERCULOSIS DRUGS</b>	
		ethambutol (4)	tablet, 100–400 mg (hydrochloride)
		isoniazid	tablet, 100–300 mg
		isoniazid + ethambutol (5)	tablet, 150 mg + 400 mg

<sup>o</sup> Example of a therapeutic group. *Various drugs can serve as alternatives.*

pyrazinamide	tablet, 400 mg
rifampicin	capsule or tablet, 150 mg, 300 mg
rifampicin + isoniazid (5)	tablet, 60 mg + 30 mg, 150 mg + 75 mg, 300 mg + 150 mg
	tablet, 60 mg + 60 mg, 150 mg + 150 mg (for intermittent use 3 times weekly)
rifampicin + isoniazid + pyrazinamide (5)	tablet, 60 mg + 30 mg + 150 mg, 150 mg + 75 mg + 400 mg
	tablet, 150 mg + 150 mg + 500 mg (for intermittent use 3 times weekly)
rifampicin + isoniazid + pyrazinamide + ethambutol	tablet, 150 mg + 75 mg + 400 mg + 275 mg
streptomycin (4)	powder for injection, 1 g (as sulfate) in vial
<i>Complementary drug</i>	
thioacetazone + isoniazid (A) (5, 7)	tablet, 50 mg + 100 mg, 150 mg + 300 mg

Additional reserve antituberculosis drugs for the treatment of drug-resistant tuberculosis should be used in specialized centres only with WHO-recommended TB control strategy, DOTS, and treatment programmes.

### 6.3 ANTIFUNGAL DRUGS

amphotericin B (4)	powder for injection, 50 mg in vial
<sup>o</sup> fluconazole	capsule, 50 mg injection, 2 mg/ml in vial oral suspension, 50 mg/5-ml
griseofulvin (7)	capsule or tablet, 125 mg, 250 mg
nystatin	tablet, 100 000, 500 000 IU lozenge, 100 000 IU pessary, 100 000 IU
<i>Complementary drugs</i>	
flucytosine (B) (4, 8)	capsule, 250 mg infusion, 2.5 g in 250 ml
potassium iodide (A)	saturated solution

### 6.4 ANTIVIRAL DRUGS

#### 6.4.1 ANTIHERPES DRUGS

aciclovir (8)	tablet, 200 mg powder for injection, 250 mg (as sodium salt) in vial
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### 6.4.2 ANTIRETROVIRAL DRUGS

*Adequate resources and specialist oversight are a prerequisite for the introduction of this class of drugs.*

nevirapine (8)	tablet, 200 mg oral solution, 50 mg/5 ml
zidovudine (8)	capsule, 100 mg, 250 mg injection, 10 mg/ml in 20-ml vial oral solution, 50 mg/5 ml

Drugs for treatment of HIV/AIDS include nucleoside reverse transcriptase inhibitors (NRTIs), non-nucleoside reverse transcriptase inhibitors (NNRTIs) and protease inhibitors (PIs). Zidovudine and nevirapine have been shown to reduce or prevent mother-to-child transmission of HIV infection. **This is the only indication for which they are included here.** Single drug use with zidovudine, except in pregnancy, is now regarded as obsolete because of the development of resistance. Triple therapy is beyond the budgets of most national drug programmes and therefore HIV/AIDS treatment policies must be decided at country or institutional level.

### 6.5 ANTIPROTOZOAL DRUGS

#### 6.5.1 ANTIAMOEBIAC AND ANTIGIARDIASIS DRUGS

<sup>o</sup> diloxanide	tablet, 500 mg (furoate)
<sup>o</sup> metronidazole	tablet, 200–500 mg injection, 500 mg in 100-ml vial oral suspension, 200 mg (as benzoate)/5 ml

#### 6.5.2 ANTILEISHMANIASIS DRUGS

<sup>o</sup> meglumine antimoniate	injection, 30%, equivalent to approx. 8.5% antimony, in 5-ml ampoule
pentamidine (5)	powder for injection, 200 mg, 300 mg (isetionate) in vial

#### *Complementary drug*

amphotericin B (B) (4)	powder for injection, 50 mg in vial
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### 6.5.3 ANTIMALARIAL DRUGS

#### (a) FOR CURATIVE TREATMENT

<sup>o</sup> chloroquine	tablet, 100 mg, 150 mg (as phosphate or sulfate) syrup, 50 mg (as phosphate or sulfate)/5 ml injection, 40 mg (as hydrochloride, phosphate or sulfate)/ml in 5-ml ampoule
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<sup>o</sup> Example of a therapeutic group. *Various drugs can serve as alternatives.*

primaquine	tablet, 7.5 mg, 15 mg (as diphosphate)
°quinine	tablet, 300 mg (as bisulfate or sulfate) injection, 300 mg (as dihydrochloride)/ml in 2-ml ampoule

*Complementary drugs*

°doxycycline (B) (for use only in combination with quinine)	capsule or tablet, 100 mg (hydrochloride)
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mefloquine (B)	tablet, 250 mg (as hydrochloride)
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°sulfadoxine + pyrimethamine (B)	tablet, 500 mg + 25 mg
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*Restricted indications*

artemether (D)	injection, 80 mg/ml in 1-ml ampoule
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artesunate (D)	tablet, 50 mg
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## (b) FOR PROPHYLAXIS

chloroquine	tablet, 150 mg (as phosphate or sulfate) syrup, 50 mg (as phosphate or sulfate)/5 ml
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doxycycline	capsule or tablet, 100 mg (hydrochloride)
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mefloquine	tablet, 250 mg (as hydrochloride)
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proguanil (for use only in combination with chloroquine)	tablet, 100 mg (hydrochloride)
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## 6.5.4 ANTIPNEUMOCYSTOSIS AND ANTITOXOPLASMOSIS DRUGS

pentamidine (2)	tablet, 200 mg, 300 mg
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pyrimethamine	tablet, 25 mg
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sulfamethoxazole + trimethoprim	injection, 80 mg + 16 mg/ml in 5-ml and 10-ml ampoule
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## 6.5.5 ANTITRYPANOSOMAL DRUGS

## (a) AFRICAN TRYPANOSOMIASIS

melarsoprol (2)	injection, 3.6% solution
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pentamidine (2)	powder for injection, 200 mg, 300 mg (isetionate) in vial
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suramin sodium	powder for injection, 1 g in vial
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*Complementary drug*

eflornithine (C)	injection, 200 mg (hydrochloride)/ml in 100-ml bottles
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## (b) AMERICAN TRYPANOSOMIASIS

benznidazole (7)	tablet, 100 mg
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nifurtimox (2, 8)	tablet, 30 mg, 120 mg, 250 mg
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## 6.6 INSECT REPELLENTS

diethyltoluamide	topical solution, 50%, 75%
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## Section 7: Antimigraine Drugs

## 7.1 FOR TREATMENT OF ACUTE ATTACK

acetylsalicylic acid	tablet, 300–500 mg
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ergotamine (1c) (7)	tablet, 1 mg (tartrate)
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paracetamol	tablet, 300–500 mg
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## 7.2 FOR PROPHYLAXIS

°propranolol	tablet, 20 mg, 40 mg (hydrochloride)
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## Section 8: Antineoplastic and Immunosuppressive Drugs and Drugs Used in Palliative Care

## 8.1 IMMUNOSUPPRESSIVE DRUGS

*Adequate resources and specialist oversight are a prerequisite for the introduction of this class of drugs.*

°azathioprine (2)	tablet, 50 mg
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powder for injection, 100 mg  
(as sodium salt) in vial

°cyclosporin (2)	capsule, 25 mg
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(for organ transplantation)

concentrate for injection,  
50 mg/ml in 1-ml ampoule

## 8.2 CYTOTOXIC DRUGS

*Adequate resources and specialist oversight are a prerequisite for the introduction of this class of drugs.*

asparaginase (2)	powder for injection, 10 000 IU in vial
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bleomycin (2)	powder for injection, 15 mg (as sulfate) in vial
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calcium folinate (2)	tablet, 15 mg injection, 3 mg/ml in 10-ml ampoule
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chlorambucil (2)	tablet, 2 mg
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chlormethine (2)	powder for injection, 10 mg (hydrochloride) in vial
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° Example of a therapeutic group. Various drugs can serve as alternatives.

cisplatin (2)	powder for injection, 10 mg, 50 mg in vial
cyclophosphamide (2)	tablet, 25 mg powder for injection, 500 mg in vial
cytarabine (2)	powder for injection, 100 mg in vial
dacarbazine (2)	powder for injection, 100 mg in vial
daunorubicin (2)	powder for injection, 50 mg (as hydrochloride) in vial
dactinomycin (2)	powder for injection 500 µg in vial
<sup>a</sup> doxorubicin (2)	powder for injection, 10 mg, 50 mg (hydrochloride) in vial
etoposide (2)	capsule, 100 mg injection, 20 mg/ml in 5-ml ampoule
fluorouracil (2)	injection, 50 mg/ml in 5-ml ampoule
levamisole (2)	tablet, 50 mg (as hydrochloride)
mercaptopurine (2)	tablet, 50 mg
methotrexate (2)	tablet, 2.5 mg (as sodium salt) powder for injection, 50 mg (as sodium salt) in vial
procarbazine	capsule, 50 mg (as hydrochloride)
vinblastine (2)	powder for injection, 10 mg (sulfate) in vial
vincristine (2)	powder for injection, 1 mg, 5 mg (sulfate) in vial

### 8.3 HORMONES AND ANTIHORMONES

<sup>a</sup> prednisolone	tablet, 5 mg powder for injection, 20 mg, 25 mg (as sodium phosphate or sodium succinate) in vial
tamoxifen	tablet, 10 mg, 20 mg (as citrate)

### 8.4 DRUGS USED IN PALLIATIVE CARE

The WHO Expert Committee on Essential Drugs recommended that all the drugs mentioned in the WHO publication *Cancer Pain Relief: with a Guide to Opioid Availability, 2nd edition*, be considered essential. The drugs are included in the relevant sections of the model list according to their therapeutic use, e.g. analgesics.

## Section 9: Antiparkinsonism Drugs

<sup>a</sup> biperiden	tablet, 2 mg (hydrochloride) injection, 5 mg (lactate) in 1-ml ampoule
levodopa + <sup>a</sup> carbidopa (5, 6)	tablet, 100 mg + 10 mg, 250 mg + 25 mg

## Section 10: Drugs affecting the Blood

### 10.1 ANTIANAEMIA DRUGS

ferrous salt	tablet, equivalent to 60 mg iron oral solution, equivalent to 25 mg iron (as sulfate)/ml
ferrous salt + folic acid ( <i>nutritional supplement for use during pregnancy</i> )	tablet, equivalent to 60 mg iron + 400 µg folic acid
folic acid (2)	tablet, 1 mg, 5 mg injection, 1 mg (as sodium salt) in 1-ml ampoule
hydroxocobalamin (2)	injection, 1 mg in 1-ml ampoule

### Complementary drug

<sup>a</sup> iron dextran (B) (5)	injection, equivalent to 50 mg iron/ ml in 2-ml ampoule
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### 10.2 DRUGS AFFECTING COAGULATION

desmopressin (8)	injection, 4 µg (acetate)/ml in 1-ml ampoule nasal spray, 10 µg (acetate)/ metered dose
heparin sodium	injection, 1000 IU/ml, 5000 IU/ml, 20 000 IU/ml in 1-ml ampoule
phytomenadione	injection, 10 mg/ml in 5-ml ampoule tablet, 10 mg
protamine sulfate	injection, 10 mg/ml in 5-ml ampoule
<sup>a</sup> warfarin (2, 6)	tablet, 1 mg, 2 mg and 5 mg (sodium salt)

<sup>a</sup> Example of a therapeutic group. Various drugs can serve as alternatives.

## Section 11: Blood Products and Plasma Substitutes

### 11.1 PLASMA SUBSTITUTES

<sup>a</sup> dextran 70	injectable solution, 6%
<sup>a</sup> polygeline	injectable solution, 3.5%

### 11.2 PLASMA FRACTIONS FOR SPECIFIC USE<sup>1</sup>

#### Complementary drugs

<sup>a</sup> factor VIII concentrate (C) (2, 8)	dried
<sup>a</sup> factor IX complex (coagulation factors II, VII, IX, X) concentrate (C) (2, 8)	dried

## Section 12: Cardiovascular Drugs

### 12.1 ANTIANGINAL DRUGS

<sup>a</sup> atenolol	tablet, 50 mg, 100 mg
glyceryl trinitrate	tablet (sublingual), 500 µg
<sup>a</sup> isosorbide dinitrate	tablet (sublingual), 5 mg
<sup>a</sup> verapamil (10)	tablet, 40 mg, 80 mg (hydrochloride)

### 12.2 ANTIARRHYTHMIC DRUGS

<sup>a</sup> atenolol	tablet, 50 mg, 100 mg
digoxin (4, 11)	tablet, 62.5 µg, 250 µg oral solution, 50 µg/ml injection, 250 µg/ml in 2-ml ampoule
lidocaine	injection, 20 mg (hydrochloride)/ml in 5-ml ampoule
verapamil (8, 10)	tablet, 40 mg, 80 mg (hydrochloride) injection, 2.5 mg (hydrochloride)/ml in 2-ml ampoule

#### Complementary drugs

epinephrine (C)	injection, 1 mg (as hydrochloride)/ml
isoprenaline (C)	injection, 20 µg (hydrochloride)/ml

<sup>a</sup> procainamide (B)	tablet, 250 mg, 500 mg (hydrochloride) injection, 100 mg (hydrochloride)/ml in 10-ml ampoule
<sup>a</sup> quinidine (A) (7)	tablet, 200 mg (sulfate)

### 12.3 ANTIHYPERTENSIVE DRUGS

<sup>a</sup> atenolol	tablet, 50 mg, 100 mg
<sup>a</sup> captopril	scored tablet, 25 mg
<sup>a</sup> hydralazine	tablet, 25 mg, 50 mg (hydrochloride) powder for injection, 20 mg (hydrochloride) in ampoule

<sup>a</sup> hydrochlorothiazide	scored tablet, 25 mg
methyldopa (7)	tablet, 250 mg
<sup>a</sup> nifedipine (10)	sustained-release formulations tablet, 10 mg
<sup>a</sup> reserpine	tablet, 100 µg, 250 µg injection, 1 mg in 1-ml ampoule

#### Complementary drugs

prazosin	tablet, 500 µg, 1 mg (mesilate)
<sup>a</sup> sodium nitroprusside (C) (2, 8)	powder for infusion, 50 mg in ampoule

### 12.4 DRUGS USED IN HEART FAILURE

<sup>a</sup> captopril	scored tablet, 25 mg
digoxin (4, 11)	tablet, 62.5 µg, 250 µg oral solution, 50 µg/ml injection, 250 µg/ml in 2-ml ampoule
dopamine	injection, 40 mg (hydrochloride)/ml in 5-ml vial
<sup>a</sup> hydrochlorothiazide	tablet, 25 mg, 50 mg

### 12.5 ANTITHROMBOTIC DRUGS

acetylsalicylic acid	tablet, 100 mg
<i>Complementary drug</i>	
streptokinase (C)	powder for injection, 100 000 IU, 750 000 IU in vial

<sup>a</sup> Example of a therapeutic group. Various drugs can serve as alternatives.

<sup>1</sup> All plasma fractions should comply with the Requirements for the Collection, Processing and Quality Control of Blood, Blood Components and Plasma Derivatives (Revised 1992). WHO Technical Report Series, No. 840, 1994, Annex 2.

**12.6 LIPID-LOWERING AGENTS**

The WHO Expert Committee on Essential Drugs recognizes the value of lipid-lowering drugs in treating patients with hyperlipidaemia. Beta-hydroxy-beta-methylglutaryl-coenzyme A (HMG CoA) reductase inhibitors, often referred to as "statins", are potent and effective lipid-lowering drugs with a good tolerability profile. Several of these drugs have been shown to reduce the incidence of fatal and non-fatal myocardial infarction, stroke and mortality (all causes), as well as the need for coronary bypass surgery. All remain very costly but may be cost-effective for secondary prevention of cardiovascular disease as well as for primary prevention in some very high-risk patients. Since no single drug has been shown to be significantly more effective or less expensive than others in the group, none is included in the model list; the choice of drug for use in patients at highest risk should be decided at national level.

## Section 13: Dermatological Drugs (topical)

**13.1 ANTIFUNGAL DRUGS**

benzoic acid + salicylic acid	ointment or cream, 6% + 3%
<sup>a</sup> miconazole	ointment or cream, 2% (nitrate)
sodium thiosulfate	solution, 15%
<i>Complementary drug</i>	
selenium sulfide (C)	detergent-based suspension, 2%

**13.2 ANTI-INFECTIVE DRUGS**

<sup>a</sup> methylrosanilinium chloride (gentian violet)	aqueous solution, 0.5% tincture, 0.5%
neomycin + <sup>a</sup> bacitracin (7)	ointment, 5 mg neomycin sulfate + 500 IU bacitracin zinc/g
potassium permanganate	aqueous solution, 1:10 000
silver sulfadiazine	cream, 1%, in 500-g container

**13.3 ANTI-INFLAMMATORY AND ANTIPRURITIC DRUGS**

<sup>a</sup> betamethasone (3)	ointment or cream, 0.1% (as valerate)
<sup>a</sup> calamine lotion	lotion
<sup>a</sup> hydrocortisone	ointment or cream, 1% (acetate)

**13.4 ASTRINGENT DRUGS**

aluminium diacetate	solution, 13% for dilution
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**13.5 DRUGS AFFECTING SKIN DIFFERENTIATION AND PROLIFERATION**

benzoyl peroxide	lotion or cream, 5%
coal tar	solution, 5%
dithranol	ointment, 0.1–2%
fluorouracil	ointment, 5%
<sup>a</sup> podophyllum resin (7)	solution, 10–25%
salicylic acid	solution 5%
urea	ointment or cream, 10%

**13.6 SCABICIDES AND PEDICULICIDES**

<sup>a</sup> benzyl benzoate	lotion, 25%
permethrin	cream, 5% lotion, 1%

**13.7 ULTRAVIOLET-BLOCKING AGENTS***Complementary drugs*

topical sun protection agent with activity against UVA and UVB (C) cream, lotion or gel

**Section 14: Diagnostic Agents****14.1 OPHTHALMIC DRUGS**

fluorescein	eye drops, 1% (sodium salt)
<sup>a</sup> tropicamide	eye drops, 0.5%

**14.2 RADIOCONTRAST MEDIA**

<sup>a</sup> amidotrizoate	injection, 140–420 mg iodine (as sodium or meglumine salt)/ml in 20-ml ampoule
barium sulfate	aqueous suspension
<sup>a</sup> iohexol	injection, 140–350 mg iodine/ml in 5-ml, 10-ml and 20-ml ampoule
<sup>a</sup> iopanoic acid	tablet, 500 mg
<sup>a</sup> propylidone (For administration only into the bronchial tree).	oily suspension, 500–600 mg/ml in 20-ml ampoule

*Complementary drug*

<sup>a</sup> meglumine iotroxate (C)	solution, 5 – 8 g iodine in 100–250 ml
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<sup>a</sup> Example of a therapeutic group. Various drugs can serve as alternatives.

## Section 15: Disinfectants and Antiseptics

### 15.1 ANTISEPTICS

°chlorhexidine	solution, 5% (digluconate) for dilution
°ethanol	solution, 70% (denatured)
°polyvidone iodine	solution, 10%

### 15.2 DISINFECTANTS

°chlorine base compound	powder (0.1% available chlorine) for solution
°chloroxylenol	solution, 4.8%
glutaral	solution, 2%

## Section 16: Diuretics

°amiloride (4, 7, 8)	tablet, 5 mg (hydrochloride)
°furosemide	tablet, 40 mg injection, 10 mg/ml in 2-ml ampoule
°hydrochlorothiazide	tablet, 25 mg, 50 mg
spironolactone (8)	tablet, 25 mg
<i>Complementary drug</i>	
°mannitol (C)	injectable solution, 10%, 20%

## Section 17: Gastrointestinal Drugs

### 17.1 ANTACIDS AND OTHER ANTIULCER DRUGS

aluminium hydroxide	tablet, 500 mg oral suspension, 320 mg/5 ml
°cimetidine	tablet, 200 mg injection, 200 mg in 2-ml ampoule
magnesium hydroxide	oral suspension, equivalent to 550 mg magnesium oxide/10 ml

### 17.2 ANTIEMETIC DRUGS

metoclopramide	tablet, 10 mg (hydrochloride) injection, 5 mg (hydrochloride)/ml in 2-ml ampoule
°promethazine	tablet, 10 mg, 25 mg (hydrochloride) elixir or syrup, 5 mg (hydrochloride)/5 ml injection, 25 mg (hydrochloride)/ml in 2-ml ampoule

### 17.3 ANTIHAEMORRHOIDAL DRUGS

°local anaesthetic, astringent and anti-inflammatory drug	ointment or suppository
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### 17.4 ANTI-INFLAMMATORY DRUGS

hydrocortisone	suppository, 25 mg (acetate) ° retention enema
°sulfasalazine (2)	tablet, 500 mg suppository, 500 mg retention enema

### 17.5 ANTISPASMODIC DRUGS

°atropine	tablet, 0.6 mg (sulfate) injection, 1 mg (sulfate) in 1-ml ampoule
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### 17.6 LAXATIVES

°senna	tablet, 7.5 mg (sennosides) (or traditional dosage forms)
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### 17.7 DRUGS USED IN DIARRHOEA

#### 17.7.1 ORAL REHYDRATION

oral rehydration salts (for glucose– electrolyte solution)	powder, 27.9 g/l
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Components	g/l
sodium chloride	3.5
trisodium citrate dihydrate <sup>2</sup>	2.9
potassium chloride	1.5
glucose	20.0

<sup>1</sup> Example of a therapeutic group. *Various drugs can serve as alternatives.*

<sup>2</sup> Trisodium citrate dihydrate may be replaced by sodium bicarbonate (sodium hydrogen carbonate) 2.5 g/l. However, as the stability of this latter formulation is very poor under tropical conditions, it is only recommended when manufactured for immediate use.

## 17.7.2 ANTIDIARRHOEAL (SYMPTOMATIC) DRUGS

<sup>a</sup>codeine (1a) tablet, 30 mg (phosphate)

## Section 18: Hormones, other Endocrine Drugs and Contraceptives

## 18.1 ADRENAL HORMONES AND SYNTHETIC SUBSTITUTES

<sup>a</sup>dexamethasone tablet, 500 µg, 4 mg  
injection, 4 mg dexamethasone phosphate (as disodium salt) in 1-ml ampoule

hydrocortisone powder for injection, 100 mg (as sodium succinate) in vial

<sup>a</sup>prednisolone tablet, 1 mg, 5 mg

*Complementary drug*

fludrocortisone (C) tablet, 100 µg (acetate)

## 18.2 ANDROGENS

*Complementary drug*

testosterone (C) (2) injection, 200 mg (enantate) in 1-ml ampoule

## 18.3 CONTRACEPTIVES

## 18.3.1 HORMONAL CONTRACEPTIVES

<sup>a</sup>ethinylestradiol + <sup>a</sup>levonorgestrel tablet, 30 µg + 150 µg,

<sup>a</sup>ethinylestradiol + <sup>a</sup>levonorgestrel tablet, 50 µg + 250 µg (pack of four)

<sup>a</sup>ethinylestradiol + <sup>a</sup>norethisterone tablet, 35 µg + 1.0 mg

levonorgestrel tablet, 0.75 mg (pack of two)

*Complementary drugs*

<sup>a</sup>levonorgestrel (B) tablet, 30 µg

medroxyprogesterone acetate (B) (7, 8) depot injection, 150 mg in 1-ml vial

norethisterone enantate (B) (7, 8) oily solution, 200 mg/ml in 1-ml ampoule

## 18.3.2 INTRAUTERINE DEVICES

copper-containing device

## 18.3.3 BARRIER METHODS

condoms with or without spermicide (nonoxinol)

diaphragms with spermicide (nonoxinol)

## 18.4 ESTROGENS

<sup>a</sup>ethinylestradiol tablet, 10 µg, 50 µg

## 18.5 INSULINS AND OTHER ANTIDIABETIC AGENTS

<sup>a</sup>glibenclamide tablet, 2.5 mg, 5 mg

insulin injection (soluble) injection, 40 IU/ml in 10-ml vial, 100 IU/ml in 10-ml vial

intermediate-acting insulin injection, 40 IU/ml in 10-ml vial, 100 IU/ml in 10-ml vial (as compound insulin zinc suspension or isophane insulin)

metformin tablet, 500 mg (hydrochloride)

## 18.6 OVULATION INDUCERS

<sup>a</sup>clomifene (2, 8) tablet, 50 mg (citrate)

## 18.7 PROGESTOGENS

norethisterone tablet, 5 mg

*Complementary drug*

medroxyprogesterone acetate (B) tablet, 5 mg

## 18.8 THYROID HORMONES AND ANTITHYROID DRUGS

levothyroxine tablet, 50 µg, 100 µg (sodium salt)

potassium iodide tablet, 60 mg

<sup>a</sup>propylthiouracil tablet, 50 mg

## Section 19: Immunologicals

## 19.1 DIAGNOSTIC AGENTS

tuberculin,<sup>3</sup> injection  
purified protein derivative (PPD)

<sup>a</sup> Example of a therapeutic group. *Various drugs can serve as alternatives.*

<sup>3</sup> All tuberculins should comply with the Requirements for Tuberculins (Revised 1985). WHO Technical Report Series, No. 745, 1987, Annex 1.

**19.2 SERA AND IMMUNOGLOBULINS <sup>4</sup>**

anti-D immunoglobulin (human)	injection, 250 µg in single-dose vial
<sup>a</sup> antitetanus immunoglobulin (human)	injection, 500 IU in vial
antivenom serum	injection
diphtheria antitoxin	injection, 10 000 IU, 20 000 IU in vial
immunoglobulin, human normal (2)	injection (intramuscular)
immunoglobulin, human normal (2, 8)	injection (intravenous)
<sup>a</sup> rabies immunoglobulin	injection, 150 IU/ml

**19.3 VACCINES <sup>5</sup>****19.3.1 FOR UNIVERSAL IMMUNIZATION**

BCG
diphtheria
pertussis
tetanus
hepatitis B
measles
poliomyelitis

**19.3.2 FOR SPECIFIC GROUPS OF INDIVIDUALS**

influenza
meningitis
mumps
rabies
rubella
typhoid
yellow fever

**Section 20:  
Muscle Relaxants (peripherally acting) and Cholinesterase Inhibitors**

<sup>a</sup> alcuronium chloride (2)	injection, 5 mg/ml in 2-ml ampoule
<sup>a</sup> neostigmine	tablet, 15 mg (bromide) injection, 500 µg, 2.5 mg (metilsulfate) in 1-ml ampoule
pyridostigmine bromide (2, 8)	tablet, 60 mg injection, 1 mg in 1-ml ampoule
suxamethonium chloride (2)	injection, 50 mg/ml in 2-ml ampoule powder for injection
<i>Complementary drug</i>	
vecuronium bromide (C)	powder for injection, 10 mg in vial

**Section 21:  
Ophthalmological Preparations****21.1 ANTI-INFECTIVE AGENTS**

<sup>a</sup> gentamicin	solution (eye drops), 0.3% (as sulfate)
<sup>a</sup> idoxuridine	solution (eye drops), 0.1% eye ointment, 0.2%
silver nitrate	solution (eye drops), 1%
<sup>a</sup> tetracycline	eye ointment, 1% (hydrochloride)

**21.2 ANTI-INFLAMMATORY AGENTS**

<sup>a</sup> prednisolone	solution (eye drops), 0.5% (sodium phosphate)
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**21.3 LOCAL ANAESTHETICS**

<sup>a</sup> tetracaine	solution (eye drops), 0.5% (hydrochloride)
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**21.4 MIOTICS AND ANTIGLAUCOMA DRUGS**

acetazolamide	tablet, 250 mg
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<sup>a</sup> Example of a therapeutic group. *Various drugs can serve as alternatives.*

<sup>4</sup> All plasma fractions should comply with the Requirements for the Collection, Processing and Quality Control of Blood, Blood components and Plasma Derivatives (Revised 1992). WHO Technical Report Series, No. 840, 1994, Annex 2.

<sup>5</sup> All vaccines should comply with current WHO recommendations for biological substances.

<sup>a</sup>pilocarpine solution (eye drops), 2%, 4%  
(hydrochloride or nitrate)

<sup>a</sup>timolol solution (eye drops), 0.25%, 0.5%  
(as maleate)

### 21.5 MYDRIATICS

atropine solution (eye drops),  
0.1%, 0.5%, 1% (sulfate)

#### Complementary drug

epinephrine (A) solution (eye drops), 2%  
(as hydrochloride)

## Section 22: Oxytocics and Antioxytocics

### 22.1 OXYTOCICS

<sup>a</sup>ergometrine (1c) tablet, 200 µg (hydrogen maleate)  
injection, 200 µg (hydrogen maleate)  
in 1-ml ampoule

oxytocin injection, 10 IU in 1-ml ampoule

### 22.2 ANTIOXYTOCICS

<sup>a</sup>salbutamol (2) tablet, 4 mg (as sulfate)  
injection, 50 µg (as sulfate)/ml  
in 5-ml ampoule

## Section 23: Peritoneal Dialysis Solution

intraperitoneal dialysis solution parenteral solution  
(of appropriate composition)

## Section 24: Psychotherapeutic Drugs

### 24.1 DRUGS USED IN PSYCHOTIC DISORDERS

<sup>a</sup>chlorpromazine tablet, 100 mg (hydrochloride)  
syrup, 25 mg  
(hydrochloride)/5 ml  
injection, 25 mg  
(hydrochloride)/ml in 2-ml ampoule

<sup>a</sup>fluphenazine (5) injection, 25 mg  
(decanoate or enantate)  
in 1-ml ampoule

<sup>a</sup>haloperidol tablet, 2 mg, 5 mg  
injection, 5 mg in  
1-ml ampoule

## 24.2 DRUGS USED IN MOOD DISORDERS

### 24.2.1 DRUGS USED IN DEPRESSIVE DISORDERS

<sup>a</sup>amitriptyline tablet, 25 mg (hydrochloride)

### 24.2.2 DRUGS USED IN BIPOLAR DISORDERS

carbamazepine (10, 11) scored tablet, 100 mg, 200 mg

lithium carbonate (2, 4) capsule or tablet, 300 mg

valproic acid (7, 11) enteric coated tablet,  
200 mg, 500 mg (sodium salt)

### 24.3 DRUGS USED IN GENERALIZED ANXIETY AND SLEEP DISORDERS

<sup>a</sup>diazepam (1b) scored tablet, 2 mg, 5 mg

### 24.4 DRUGS USED IN OBSESSIVE COMPULSIVE DISORDERS AND PANIC ATTACKS

clomipramine capsules, 10 mg, 25 mg  
(hydrochloride)

## Section 25: Drugs Acting on the Respiratory Tract

### 25.1 ANTI-ASTHMATIC DRUGS

<sup>a</sup>aminophylline (2) injection, 25 mg/ml  
in 10-ml ampoule

<sup>a</sup>beclometasone inhalation (aerosol), 50 µg, 250 µg,  
(dipropionate) per dose

<sup>a</sup>epinephrine injection, 1 mg (as hydrochloride  
or hydrogen tartrate) in 1-ml ampoule

ipratropium bromide inhalation (aerosol), 20 µg/dose

<sup>a</sup>salbutamol tablet, 2 mg, 4 mg (as sulfate)  
inhalation (aerosol), 100 µg  
(as sulfate) per dose  
syrup, 2 mg (as sulfate)/5 ml  
injection, 50 µg (as sulfate)/ml  
in 5-ml ampoule  
respirator solution for use in nebulizers,  
5 mg (as sulfate)/ml

theophylline (10, 11) tablet, 100 mg, 200 mg, 300 mg  
*Complementary drug*

<sup>a</sup>cromoglicic acid (B) inhalation (aerosol),  
20 mg (sodium salt) per dose

<sup>a</sup> Example of a therapeutic group. Various drugs can serve as alternatives.

**25.2 ANTITUSSIVES**

<sup>a</sup>dextromethorphan oral solution,  
3.5 mg (bromide)/5 ml

**Section 26:****Solutions correcting Water, Electrolyte and Acid–base Disturbances****26.1 ORAL**

oral rehydration salts (for glucose–  
electrolyte solution) for composition  
see section 17.7.1

potassium chloride powder for solution

**26.2 PARENTERAL**

glucose injectable solution,  
5% isotonic, 10% isotonic,  
50% hypertonic

glucose with sodium chloride injectable solution, 4%  
glucose, 0.18% sodium chloride  
(equivalent to Na<sup>+</sup> 30 mmol/l  
Cl<sup>-</sup> 30 mmol/l)

potassium chloride (2) 11.2% solution in  
20-ml ampoule, (equivalent to  
K<sup>+</sup> 1.5 mmol/ml, Cl<sup>-</sup> 1.5 mmol/ml)

sodium chloride injectable solution, 0.9%  
isotonic (equivalent to Na<sup>+</sup> 154  
mmol/l, Cl<sup>-</sup> 154 mmol/l)

sodium hydrogen carbonate injectable solution, 1.4%  
isotonic (equivalent to Na<sup>+</sup> 167  
mmol/l, HCO<sub>3</sub><sup>-</sup> 167 mmol/l)

8.4% solution in 10-ml ampoule  
(equivalent to Na<sup>+</sup> 1000 mmol/l,  
HCO<sub>3</sub><sup>-</sup> 1000 mmol/l)

<sup>a</sup> compound solution of sodium lactate injectable solution

**26.3 MISCELLANEOUS**

water for injection 2-ml, 5-ml, 10-ml ampoules

**Section 27: Vitamins and Minerals**

ascorbic acid tablet, 50 mg

<sup>a</sup>ergocalciferol capsule or tablet, 1.25 mg  
(50 000 IU)

oral solution,  
250 µg/ml (10 000 IU/ml)

iodine (8) iodized oil, 1 ml (480 mg iodine),  
0.5 ml (240 mg iodine) in  
ampoule (oral or injectable)

solution, 0.57 ml, (308 mg iodine)  
in dispenser bottle

capsule, 200 mg

<sup>a</sup>nicotinamide tablet, 50 mg

pyridoxine tablet, 25 mg (hydrochloride)

<sup>a</sup>retinol sugar-coated tablet, 10 000 IU  
(as palmitate) (5.5 mg)

capsule, 200 000 IU (as  
palmitate) (110 mg)

oral oily solution,  
100 000 IU/ml in multidose  
dispenser (as palmitate)

water-miscible injection,  
100 000 IU (as palmitate)  
(55 mg) in 2-ml ampoule

riboflavin tablet, 5 mg

<sup>a</sup>sodium fluoride in any appropriate formulation

thiamine tablet, 50 mg (hydrochloride)

**Complementary drug**

calcium gluconate (C) (2, 8) injection, 100 mg/ml  
in 10-ml ampoule

<sup>a</sup> Example of a therapeutic group. *Various drugs can serve as alternatives.*

**The following changes in the WHO Model List were approved by the WHO Expert Committee on the Use of Essential Drugs which met in December 1999. The report of the meeting will be published in the WHO Technical Report Series.**

**Deletions:** , albumin (human); antiscorpion sera.

**Additions:** acetylcysteine; rifampicin + isoniazid + pyrazinamide + ethambutol; nevirapine; artesunate; chlorambucil; daunorubicin; ethanol; iohexol.

**Replacements:** fluconazole to replace ketoconazole; prazosin to replace doxazosin.