

WHO Model List of Essential Medicines

18th list
(April 2013)

Status of this document

This is a reprint of the text on the WHO Medicines web site

<http://www.who.int/medicines/publications/essentialmedicines/en/index.html>

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18th edition

Essential Medicines

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Explanatory Notes

The **core list** presents a list of minimum medicine needs for a basic health-care system, listing the most efficacious, safe and cost-effective medicines for priority conditions. Priority conditions are selected on the basis of current and estimated future public health relevance, and potential for safe and cost-effective treatment.

The **complementary list** presents essential medicines for priority diseases, for which specialized diagnostic or monitoring facilities, and/or specialist medical care, and/or specialist training are needed. In case of doubt medicines may also be listed as complementary on the basis of consistent higher costs or less attractive cost-effectiveness in a variety of settings.

The **square box symbol** (□) is primarily intended to indicate similar clinical performance within a pharmacological class. The listed medicine should be the example of the class for which there is the best evidence for effectiveness and safety. In some cases, this may be the first medicine that is licensed for marketing; in other instances, subsequently licensed compounds may be safer or more effective. Where there is no difference in terms of efficacy and safety data, the listed medicine should be the one that is generally available at the lowest price, based on international drug price information sources. Not all square boxes are applicable to medicine selection for children — see the second EMLc for details.

Therapeutic equivalence is only indicated on the basis of reviews of efficacy and safety and when consistent with WHO clinical guidelines. National lists should not use a similar symbol and should be specific in their final selection, which would depend on local availability and price.

The **[a]** symbol indicates that there is an age or weight restriction on use of the medicine; details for each medicine can be found in Table 1.

Where the **[c]** symbol is placed next to the complementary list it signifies that the medicine(s) require(s) specialist diagnostic or monitoring facilities, and/or specialist medical care, and/or specialist training for their use in children.

Where the **[c]** symbol is placed next to an individual medicine or strength of medicine it signifies that there is a specific indication for restricting its use to children.

The presence of an entry on the Essential Medicines List carries no assurance as to pharmaceutical quality. It is the responsibility of the relevant national or regional drug regulatory authority to ensure that each product is of appropriate pharmaceutical quality (including stability) and that when relevant, different products are interchangeable.

For recommendations and advice concerning all aspects of the quality assurance of medicines see the WHO Medicines web site http://www.who.int/medicines/areas/quality_assurance/en/index.html.

Medicines and dosage forms are listed in alphabetical order within each section and there is no implication of preference for one form over another. Standard treatment guidelines should be consulted for information on appropriate dosage forms.

The main terms used for dosage forms in the Essential Medicines List can be found in Annex 1.

Definitions of many of these terms and pharmaceutical quality requirements applicable to the different categories are published in the current edition of *The International Pharmacopoeia*
<http://www.who.int/medicines/publications/pharmacopoeia/en/index.html>.

1. ANAESTHETICS	
1.1 General anaesthetics and oxygen	
1.1.1 Inhalational medicines	
halothane	Inhalation.
isoflurane	Inhalation.
nitrous oxide	Inhalation.
oxygen	Inhalation (medicinal gas).
1.1.2 Injectable medicines	
ketamine	Injection: 50 mg (as hydrochloride)/ml in 10-ml vial.
propofol*	Injection: 10 mg/ml; 20 mg/ml. * Thiopental may be used as an alternative depending on local availability and cost.
1.2 Local anaesthetics	
☐ bupivacaine	Injection: 0.25%; 0.5% (hydrochloride) in vial. Injection for spinal anaesthesia: 0.5% (hydrochloride) in 4-ml ampoule to be mixed with 7.5% glucose solution.
☐ lidocaine	Injection: 1%; 2% (hydrochloride) in vial. Injection for spinal anaesthesia: 5% (hydrochloride) in 2-ml ampoule to be mixed with 7.5% glucose solution. Topical forms: 2% to 4% (hydrochloride).
lidocaine + epinephrine (adrenaline)	Dental cartridge: 2% (hydrochloride) + epinephrine 1:80 000. Injection: 1%; 2% (hydrochloride or sulfate) + epinephrine 1:200 000 in vial.
<i>Complementary List</i>	
<i>ephedrine</i>	Injection: 30 mg (hydrochloride)/ml in 1-ml ampoule. (For use in spinal anaesthesia during delivery, to prevent hypotension).
1.3 Preoperative medication and sedation for short-term procedures	
atropine	Injection: 1 mg (sulfate) in 1-ml ampoule.
☐ midazolam	Injection: 1 mg/ml. Oral liquid: 2 mg/ml [c] . Tablet: 7.5 mg; 15 mg.
morphine	Injection: 10 mg (sulfate or hydrochloride) in 1-ml ampoule.

2. MEDICINES FOR PAIN AND PALLIATIVE CARE	
2.1 Non-opioids and non-steroidal anti-inflammatory medicines (NSAIDs)	
acetylsalicylic acid	Suppository: 50 mg to 150 mg. Tablet: 100 mg to 500 mg.
ibuprofen [a]	Oral liquid: 200 mg/5 ml. Tablet: 200 mg; 400 mg; 600 mg. [a] Not in children less than 3 months.
paracetamol*	Oral liquid: 125 mg/5 ml. Suppository: 100 mg. Tablet: 100 mg to 500 mg. * Not recommended for anti-inflammatory use due to lack of proven benefit to that effect.
2.2 Opioid analgesics	
codeine	Tablet: 30 mg (phosphate).
morphine*	Granules (slow-release; to mix with water): 20 mg to 200 mg (morphine sulfate). Injection: 10 mg (morphine hydrochloride or morphine sulfate) in 1-ml ampoule. Oral liquid: 10 mg (morphine hydrochloride or morphine sulfate)/5 ml. Tablet (immediate release): 10 mg (morphine sulfate). Tablet (slow release): 10 mg to 200 mg (morphine hydrochloride or morphine sulfate). *Alternatives limited to hydromorphone and oxycodone.
2.3 Medicines for other common symptoms in palliative care	
amitriptyline	Tablet: 10 mg; 25 mg; 75 mg.
cyclizine [c]	Injection: 50 mg/ml. Tablet: 50 mg.
dexamethasone	Injection: 4 mg/ml in 1-ml ampoule (as disodium phosphate salt). Oral liquid: 2 mg/5 ml. Tablet: 2 mg [c] ; 4 mg.
diazepam	Injection: 5 mg/ml. Oral liquid: 2 mg/5 ml. Rectal solution: 2.5 mg; 5 mg; 10 mg. Tablet: 5 mg; 10 mg.

docusate sodium	Capsule: 100 mg. Oral liquid: 50 mg/5 ml.
fluoxetine [a]	Solid oral dosage form: 20 mg (as hydrochloride). [a] >8 years.
haloperidol	Injection: 5 mg in 1-ml ampoule. Oral liquid: 2 mg/ml. Solid oral dosage form: 0.5 mg; 2mg; 5 mg.
hyoscine butylbromide	Injection: 20 mg/ml.
hyoscine hydrobromide [c]	Injection: 400 micrograms/ml; 600 micrograms/ml. Transdermal patches: 1 mg/72 hours.
lactulose [c]	Oral liquid: 3.1-3.7 g/5 ml.
loperamide	Solid oral dosage form: 2 mg.
metoclopramide	Injection: 5 mg (hydrochloride)/ml in 2-ml ampoule. Oral liquid: 5 mg/5 ml. Solid oral dosage form: 10 mg (hydrochloride)
midazolam	Injection: 1 mg/ml; 5 mg/ml. Oral liquid: 2 mg/ml [c] . Solid oral dosage form: 7.5 mg; 15 mg.
ondansetron [c] [a]	Injection: 2-mg base/ml in 2-ml ampoule (as hydrochloride). Oral liquid: 4 mg base/5 ml. Solid oral dosage form: Eq 4 mg base; Eq 8 mg base. [a] >1 month.
senna	Oral liquid: 7.5 mg/5 ml.
3. ANTIALLERGICS AND MEDICINES USED IN ANAPHYLAXIS	
dexamethasone	Injection: 4 mg/ml in 1-ml ampoule (as disodium phosphate salt).
epinephrine (adrenaline)	Injection: 1 mg (as hydrochloride or hydrogen tartrate) in 1-ml ampoule.
hydrocortisone	Powder for injection: 100 mg (as sodium succinate) in vial.
☐ loratadine *	Oral liquid: 1 mg/ml. Tablet: 10 mg. <i>* There maybe a role for sedating antihistamines for limited indications (EMLc).</i>
☐ prednisolone	Oral liquid: 5 mg/ml [c] . Tablet: 5 mg; 25 mg.

4. ANTIDOTES AND OTHER SUBSTANCES USED IN POISONINGS	
4.1 Non-specific	
charcoal, activated	Powder.
4.2 Specific	
acetylcysteine	Injection: 200 mg/ml in 10-ml ampoule. Oral liquid: 10% [c]; 20% [c].
atropine	Injection: 1 mg (sulfate) in 1-ml ampoule.
calcium gluconate	Injection: 100 mg/ml in 10-ml ampoule.
methylthioninium chloride (methylene blue)	Injection: 10 mg/ml in 10-ml ampoule.
naloxone	Injection: 400 micrograms (hydrochloride) in 1-ml ampoule.
penicillamine	Solid oral dosage form: 250 mg.
potassium ferric hexacyano-ferrate(II) -2H ₂ O (Prussian blue)	Powder for oral administration.
sodium nitrite	Injection: 30 mg/ml in 10-ml ampoule.
sodium thiosulfate	Injection: 250 mg/ml in 50-ml ampoule.
Complementary List	
<i>deferoxamine</i>	Powder for injection: 500 mg (mesilate) in vial.
<i>dimercaprol</i>	Injection in oil: 50 mg/ml in 2-ml ampoule.
<i>fomepizole</i>	Injection: 5 mg/ml (sulfate) in 20-ml ampoule or 1 g/ml (base) in 1.5-ml ampoule.
<i>sodium calcium edetate</i>	Injection: 200 mg/ml in 5-ml ampoule.
<i>succimer</i>	Solid oral dosage form: 100 mg.
5. ANTICONVULSANTS / ANTIEPILEPTICS	
carbamazepine	Oral liquid: 100 mg/5 ml. Tablet (chewable): 100 mg; 200 mg. Tablet (scored): 100 mg; 200 mg.
diazepam	Gel or rectal solution: 5 mg/ml in 0.5 ml; 2-ml; 4-ml tubes.
□ lorazepam	Parenteral formulation: 2 mg/ml in 1-ml ampoule; 4 mg/ml in 1-ml ampoule.
magnesium sulfate*	Injection: 500 mg/ml in 2-ml ampoule; 500 mg/ml in 10-ml ampoule. * For use in eclampsia and severe pre-eclampsia and not for other convulsant disorders.

phenobarbital	Injection: 200 mg/ml (sodium). Oral liquid: 15 mg/5 ml. Tablet: 15 mg to 100 mg.
phenytoin	Injection: 50 mg/ml in 5-ml vial (sodium salt). Oral liquid: 25 mg to 30 mg/5 ml.* Solid oral dosage form: 25 mg; 50 mg; 100 mg (sodium salt). Tablet (chewable): 50 mg. * The presence of both 25 mg/5 ml and 30 mg/5 ml strengths on the same market would cause confusion in prescribing and dispensing and should be avoided.
valproic acid (sodium valproate)	Oral liquid: 200 mg/5 ml. Tablet (crushable): 100 mg. Tablet (enteric-coated): 200 mg; 500 mg (sodium valproate).
<i>Complementary List</i>	
ethosuximide	Capsule: 250 mg. Oral liquid: 250 mg/5 ml.
6. ANTI-INFECTIVE MEDICINES	
6.1 Anthelmintics	
6.1.1 Intestinal anthelmintics	
albendazole	Tablet (chewable): 400 mg.
levamisole	Tablet: 50 mg; 150 mg (as hydrochloride).
mebendazole	Tablet (chewable): 100 mg; 500 mg.
niclosamide	Tablet (chewable): 500 mg.
praziquantel	Tablet: 150 mg; 600 mg.
pyrantel	Oral liquid: 50 mg (as embonate or pamoate)/ml. Tablet (chewable): 250 mg (as embonate or pamoate).
6.1.2 Antifilarials	
albendazole	Tablet (chewable): 400 mg.
diethylcarbamazine	Tablet: 50 mg; 100 mg (dihydrogen citrate).
ivermectin	Tablet (scored): 3 mg.
6.1.3 Antischistosomes and other antitremitode medicines	
praziquantel	Tablet: 600 mg.
triclabendazole	Tablet: 250 mg.

<i>Complementary List</i>	
oxamniquine*	Capsule: 250 mg. Oral liquid: 250 mg/5 ml. * Oxamniquine is listed for use when praziquantel treatment fails.
6.2 Antibacterials	
6.2.1 Beta Lactam medicines	
amoxicillin	Powder for oral liquid: 125 mg (as trihydrate)/5 ml; 250 mg (as trihydrate)/5 ml [c]. Solid oral dosage form: 250 mg; 500 mg (as trihydrate).
amoxicillin + clavulanic acid	Oral liquid: 125 mg amoxicillin + 31.25 mg clavulanic acid/5 ml AND 250 mg amoxicillin + 62.5 mg clavulanic acid/5 ml [c]. Tablet: 500 mg (as trihydrate) + 125 mg (as potassium salt).
ampicillin	Powder for injection: 500 mg; 1 g (as sodium salt) in vial.
benzathine benzylpenicillin	Powder for injection: 900 mg benzylpenicillin (= 1.2 million IU) in 5-ml vial [c] ; 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.
cefalexin [c]	Powder for reconstitution with water: 125 mg/5 ml; 250 mg/5 ml (anhydrous). Solid oral dosage form: 250 mg (as monohydrate).
☐ cefazolin* [a]	Powder for injection: 1 g (as sodium salt) in vial. * For surgical prophylaxis. [a] >1 month.
cefixime*	Capsule: 400 mg (as trihydrate). * Only listed for single-dose treatment of uncomplicated anogenital gonorrhoea.
ceftriaxone* [a]	Powder for injection: 250 mg; 1 g (as sodium salt) in vial. * Do not administer with calcium and avoid in infants with hyperbilirubinemia. [a] >41 weeks corrected gestational age.
☐ cloxacillin	Capsule: 500 mg; 1 g (as sodium salt). Powder for injection: 500 mg (as sodium salt) in vial. Powder for oral liquid: 125 mg (as sodium salt)/5 ml.
phenoxymethylpenicillin	Powder for oral liquid: 250 mg (as potassium salt)/5 ml. Tablet: 250 mg (as potassium salt).

procaine benzylpenicillin*	Powder for injection: 1 g (=1 million IU); 3 g (=3 million IU) in vial. * Procaine benzylpenicillin is not recommended as first-line treatment for neonatal sepsis except in settings with high neonatal mortality, when given by trained health workers in cases where hospital care is not achievable.
Complementary List	
cefotaxime* [c]	Powder for injection: 250 mg per vial (as sodium salt). * 3rd generation cephalosporin of choice for use in hospitalized neonates.
ceftazidime	Powder for injection: 250 mg or 1 g (as pentahydrate) in vial.
imipenem* + cilastatin*	Powder for injection: 250 mg (as monohydrate) + 250 mg (as sodium salt); 500 mg (as monohydrate) + 500 mg (as sodium salt) in vial. * Only listed for the treatment of life-threatening hospital-based infection due to suspected or proven multidrug-resistant infection. Meropenem is indicated for the treatment of meningitis and is licensed for use in children over the age of 3 months.
6.2.2 Other antibacterials	
azithromycin*	Capsule: 250 mg; 500 mg (anhydrous). Oral liquid: 200 mg/5 ml. * Only listed for single-dose treatment of genital <i>Chlamydia trachomatis</i> and of trachoma.
chloramphenicol	Capsule: 250 mg. Oily suspension for injection*: 0.5 g (as sodium succinate)/ml in 2-ml ampoule. * Only for the presumptive treatment of epidemic meningitis in children older than 2 years. Oral liquid: 150 mg (as palmitate)/5 ml. Powder for injection: 1 g (sodium succinate) in vial.
□ ciprofloxacin*	Oral liquid: 250 mg/5 ml (anhydrous) [c]. Solution for IV infusion: 2 mg/ml (as hyclate) [c]. Tablet: 250 mg (as hydrochloride). * Square box applies to adults only.
clarithromycin*	Solid oral dosage form: 500 mg. * For use in combination regimens for eradication of <i>H. Pylori</i> in adults.

doxycycline ^a	Oral liquid: 25 mg/5 ml [c]; 50 mg/5 ml (anhydrous) [c]. Solid oral dosage form: 50 mg [c]; 100 mg (as hyclate). ^a Use in children <8 years only for life-threatening infections when no alternative exists.
☐ erythromycin	Powder for injection: 500 mg (as lactobionate) in vial. Powder for oral liquid: 125 mg/5 ml (as stearate or estolate or ethyl succinate). Solid oral dosage form: 250 mg (as stearate or estolate or ethyl succinate).
☐ gentamicin	Injection: 10 mg; 40 mg (as sulfate)/ml in 2-ml vial.
☐ metronidazole	Injection: 500 mg in 100-ml vial. Oral liquid: 200 mg (as benzoate)/5 ml. Suppository: 500 mg; 1 g. Tablet: 200 mg to 500 mg.
nitrofurantoin	Oral liquid: 25 mg/5 ml [c]. Tablet: 100 mg.
spectinomycin	Powder for injection: 2 g (as hydrochloride) in vial.
sulfamethoxazole + trimethoprim	Injection: 80 mg + 16 mg/ml in 5-ml ampoule; 80 mg + 16 mg/ml in 10-ml ampoule. Oral liquid: 200 mg + 40 mg/5 ml. Tablet: 100 mg + 20 mg; 400 mg + 80 mg; 800 mg + 160 mg.
trimethoprim ^a	Oral liquid: 50 mg/5 ml [c]. Tablet: 100 mg; 200 mg. ^a >6 months.
Complementary List	
clindamycin	Capsule: 150 mg (as hydrochloride). Injection: 150 mg (as phosphate)/ml. Oral liquid: 75 mg/5 ml (as palmitate) [c].
vancomycin	Powder for injection: 250 mg (as hydrochloride) in vial.
6.2.3 Antileprosy medicines	
Medicines used in the treatment of leprosy should never be used except in combination. Combination therapy is essential to prevent the emergence of drug resistance. Colour coded blister packs (MDT blister packs) containing standard two medicine (paucibacillary leprosy) or three medicine (multibacillary leprosy) combinations for adult and childhood leprosy should be used. MDT blister packs can be supplied free of charge through WHO.	

clofazimine	Capsule: 50 mg; 100 mg.
dapsone	Tablet: 25 mg; 50 mg; 100 mg.
rifampicin	Solid oral dosage form: 150 mg; 300 mg.
6.2.4 Antituberculosis medicines WHO recommends and endorses the use of fixed-dose combinations and the development of appropriate new fixed-dose combinations, including modified dosage forms, non-refrigerated products and paediatric dosage forms of assured pharmaceutical quality.	
ethambutol	Oral liquid: 25 mg/ml [c] . Tablet: 100 mg to 400 mg (hydrochloride).
ethambutol + isoniazid	Tablet: 400 mg + 150 mg.
ethambutol + isoniazid + pyrazinamide + rifampicin	Tablet: 275 mg + 75 mg + 400 mg + 150 mg.
ethambutol + isoniazid + rifampicin	Tablet: 275 mg + 75 mg + 150 mg.
isoniazid	Oral liquid: 50 mg/5 ml [c] . Tablet: 100 mg to 300 mg. Tablet (scored): 50 mg.
isoniazid + pyrazinamide + rifampicin	Tablet: 75 mg + 400 mg + 150 mg. 150 mg + 500 mg + 150 mg (For intermittent use three times weekly).
isoniazid + rifampicin	Tablet: 75 mg + 150 mg; 150 mg + 300 mg. 60 mg + 60 mg (For intermittent use three times weekly). 150 mg + 150 mg (For intermittent use three times weekly).
pyrazinamide	Oral liquid: 30 mg/ml [c] . Tablet: 400 mg. Tablet (dispersible): 150 mg. Tablet (scored): 150 mg.
rifabutin*	Capsule: 150 mg. * For use only in patients with HIV receiving protease inhibitors.
rifampicin	Oral liquid: 20 mg/ml [c] . Solid oral dosage form: 150 mg; 300 mg.
streptomycin	Powder for injection: 1 g (as sulfate) in vial.
<i>Complementary List</i>	
<i>Reserve second-line drugs for the treatment of multidrug-resistant tuberculosis (MDR-TB) should be used in specialized centres adhering to WHO standards for TB control.</i>	
amikacin	Powder for injection: 100 mg; 500 mg; 1 g (as sulfate) in vial.

capreomycin	Powder for injection: 1 g (as sulfate) in vial.
cycloserine	Solid oral dosage form: 250 mg.
ethionamide*	Tablet: 125 mg; 250 mg. *Prothionamide may be an alternative.
kanamycin	Powder for injection: 1 g (as sulfate) in vial.
levofloxacin*	Tablet: 250 mg; 500 mg; 750 mg. * Ofloxacin and moxifloxacin may be alternatives based on availability and programme considerations.
p-aminosalicylic acid	Granules: 4 g in sachet. Tablet: 500 mg.
streptomycin [c]	Powder for injection: 1 g (as sulfate) in vial.
6.3 Antifungal medicines	
amphotericin B	Powder for injection: 50 mg in vial (as sodium deoxycholate or liposomal complex).
clotrimazole	Vaginal cream: 1%; 10%. Vaginal tablet: 100 mg; 500 mg.
□ fluconazole	Capsule: 50 mg. Injection: 2 mg/ml in vial. Oral liquid: 50 mg/5 ml.
flucytosine	Capsule: 250 mg. Infusion: 2.5 g in 250 ml.
griseofulvin	Oral liquid: 125 mg/5 ml [c] . Solid oral dosage form: 125 mg; 250 mg.
nystatin	Lozenge: 100 000 IU. Oral liquid: 50 mg/5 ml [c] ; 100 000 IU/ml [c] . Pessary: 100 000 IU. Tablet: 100 000 IU; 500 000 IU.
Complementary List	
potassium iodide	Saturated solution.
6.4 Antiviral medicines	
6.4.1 Antiherpes medicines	
□ aciclovir	Oral liquid: 200 mg/5 ml [c] . Powder for injection: 250 mg (as sodium salt) in vial. Tablet: 200 mg.

6.4.2 Antiretrovirals	
Based on current evidence and experience of use, medicines in the following three classes of antiretrovirals are included as essential medicines for treatment and prevention of HIV (prevention of mother-to-child transmission and post-exposure prophylaxis). WHO emphasizes the importance of using these products in accordance with global and national guidelines. WHO recommends and endorses the use of fixed-dose combinations and the development of appropriate new fixed-dose combinations, including modified dosage forms, non-refrigerated products and paediatric dosage forms of assured pharmaceutical quality. Scored tablets can be used in children and therefore can be considered for inclusion in the listing of tablets, provided adequate quality products are available.	
6.4.2.1 Nucleoside / Nucleotide reverse transcriptase inhibitors	
abacavir (ABC)	Oral liquid: 100 mg (as sulfate)/5 ml. Tablet: 300 mg (as sulfate).
didanosine (ddI)	Buffered powder for oral liquid: 100 mg; 167 mg; 250 mg packets. Capsule (unbuffered enteric-coated): 125 mg; 200 mg; 250 mg; 400 mg. Tablet (buffered chewable, dispersible): 25 mg; 50 mg; 100 mg; 150 mg; 200 mg.
emtricitabine (FTC)* 	Capsule: 200 mg. Oral liquid: 10 mg/ml. * FTC is an acceptable alternative to 3TC, based on knowledge of the pharmacology, the resistance patterns and clinical trials of antiretrovirals.  >3 months.
lamivudine (3TC)	Oral liquid: 50 mg/5 ml. Tablet: 150 mg.
stavudine (d4T)	Capsule: 15 mg; 20 mg; 30 mg. Powder for oral liquid: 5 mg/5 ml.
tenofovir disoproxil fumarate (TDF)	Tablet: 300 mg (tenofovir disoproxil fumarate – equivalent to 245 mg tenofovir disoproxil).
zidovudine (ZDV or AZT)	Capsule: 100 mg; 250 mg. Oral liquid: 50 mg/5 ml. Solution for IV infusion injection: 10 mg/ml in 20-ml vial. Tablet: 300 mg.

6.4.2.2 Non-nucleoside reverse transcriptase inhibitors	
efavirenz (EFV or EFZ) a	Capsule: 50 mg; 100 mg; 200 mg. Oral liquid: 150 mg/5 ml. Tablet: 600 mg. a >3 years or >10 kg weight.
nevirapine (NVP)	Oral liquid: 50 mg/5 ml. Tablet: 200 mg.
6.4.2.3 Protease inhibitors	
Selection of protease inhibitor(s) from the Model List will need to be determined by each country after consideration of international and national treatment guidelines and experience. Ritonavir is recommended for use in combination as a pharmacological booster, and not as an antiretroviral in its own right. All other protease inhibitors should be used in boosted forms (e.g. with ritonavir).	
atazanavir a	Solid oral dosage form: 100 mg; 150 mg; 300 mg (as sulfate). a >25 kg.
indinavir (IDV)	Solid oral dosage form: 400 mg (as sulfate).
lopinavir + ritonavir (LPV/r)	Capsule: 133.3 mg + 33.3 mg. Oral liquid: 400 mg + 100 mg/5 ml. Tablet (heat stable): 100 mg + 25 mg; 200 mg + 50 mg.
ritonavir	Oral liquid: 400 mg/5 ml. Solid oral dosage form: 100 mg. Tablet (heat stable): 25 mg; 100 mg.
saquinavir (SQV) a	Solid oral dosage form: 200 mg; 500 mg (as mesilate). a >25 kg.
FIXED-DOSE COMBINATIONS	
efavirenz + emtricitabine* + tenofovir	Tablet: 600 mg + 200 mg + 300 mg (disoproxil fumarate equivalent to 245 mg tenofovir disoproxil). * FTC is an acceptable alternative to 3TC, based on knowledge of the pharmacology, the resistance patterns and clinical trials of antiretrovirals.
emtricitabine* + tenofovir	Tablet: 200 mg + 300 mg (disoproxil fumarate equivalent to 245 mg tenofovir disoproxil). * FTC is an acceptable alternative to 3TC, based on knowledge of the pharmacology, the resistance patterns and clinical trials of antiretrovirals.

lamivudine + nevirapine + stavudine	Tablet: 150 mg + 200 mg + 30 mg. Tablet (dispersible): 30 mg + 50 mg + 6 mg [c] ; 60 mg + 100 mg + 12 mg [c] .
lamivudine + nevirapine + zidovudine	Tablet: 30 mg + 50 mg + 60 mg [c] ; 150 mg + 200 mg + 300 mg.
lamivudine + zidovudine	Tablet: 30 mg + 60 mg [c] ; 150 mg + 300 mg.
6.4.3 Other antivirals	
oseltamivir*	Capsule: 30 mg; 45 mg; 75 mg (as phosphate). Oral powder: 12 mg/ml. * Potentially severe or complicated illness due to confirmed or suspected influenza virus infection in accordance with WHO Treatment Guidelines.
ribavirin*	Injection for intravenous administration: 800 mg and 1 g in 10-ml phosphate buffer solution. Solid oral dosage form: 200 mg; 400 mg; 600 mg. * For the treatment of viral haemorrhagic fevers and in combination with pegylated interferons for the treatment of hepatitis C.
Complementary List	
pegylated interferon alpha (2a or 2b)*	Vial or prefilled syringe: 180 micrograms (peginterferon alfa-2a); 80 micrograms; 100 micrograms (peginterferon alfa-2b). * To be used in combination with ribavirin.
6.5 Antiprotozoal medicines	
6.5.1 Antiamoebic and anti giardiasis medicines	
diloxanide [a]	Tablet: 500 mg (furoate). [a] > 25 kg.
☐ metronidazole	Injection: 500 mg in 100-ml vial. Oral liquid: 200 mg (as benzoate)/5 ml. Tablet: 200 mg to 500 mg.
6.5.2 Antileishmaniasis medicines	
amphotericin B	Powder for injection: 50 mg in vial (as sodium deoxycholate or liposomal complex).
miltefosine	Solid oral dosage form: 10 mg; 50 mg.
paromomycin	Solution for intramuscular injection: 750 mg of paromomycin base (as the sulfate).
sodium stibogluconate or meglumine antimoniate	Injection: 100 mg/ml, 1 vial = 30 ml or 30%, equivalent to approximately 8.1% antimony (pentavalent) in 5-ml ampoule.

6.5.3 Antimalarial medicines	
6.5.3.1 For curative treatment	
Medicines for the treatment of <i>P. falciparum</i> malaria cases should be used in combination. The list currently recommends combinations according to treatment guidelines. WHO recognizes that not all of the FDCs in the WHO Treatment Guidelines exist, and encourages their development and rigorous testing. WHO also encourages development and testing of rectal dosage formulations.	
amodiaquine*	Tablet: 153 mg or 200 mg (as hydrochloride). * To be used in combination with artesunate 50 mg.
artemether*	Oily injection: 80 mg/ml in 1-ml ampoule. * For use in the management of severe malaria.
artemether + lumefantrine*	Tablet: 20 mg + 120 mg. Tablet (dispersible): 20 mg + 120 mg [c] . * Not recommended in the first trimester of pregnancy or in children below 5 kg.
artesunate*	Injection: ampoules, containing 60 mg anhydrous artesunic acid with a separate ampoule of 5% sodium bicarbonate solution. For use in the management of severe malaria. Rectal dosage form: 50 mg [c] ; 200 mg capsules (for pre-referral treatment of severe malaria only; patients should be taken to an appropriate health facility for follow-up care) [c] . Tablet: 50 mg. * To be used in combination with either amodiaquine, mefloquine or sulfadoxine + pyrimethamine.
artesunate + amodiaquine*	Tablet: 25 mg + 67.5 mg; 50 mg + 135 mg; 100 mg + 270 mg. * Other combinations that deliver the target doses required such as 153 mg or 200 mg (as hydrochloride) with 50 mg artesunate can be alternatives.
artesunate + mefloquine	Tablet: 25 mg + 55 mg; 100 mg + 220 mg.
chloroquine*	Oral liquid: 50 mg (as phosphate or sulfate)/5 ml. Tablet: 100 mg; 150 mg (as phosphate or sulfate). * For use only for the treatment of <i>P. vivax</i> infection.
doxycycline*	Capsule: 100 mg (as hydrochloride or hyclate). Tablet (dispersible): 100 mg (as monohydrate). * For use only in combination with quinine.
mefloquine*	Tablet: 250 mg (as hydrochloride). * To be used in combination with artesunate 50 mg.

primaquine*	Tablet: 7.5 mg; 15 mg (as diphosphate). * Only for use to achieve radical cure of <i>P.vivax</i> and <i>P.ovale</i> infections, given for 14 days.
quinine*	Injection: 300 mg quinine hydrochloride/ml in 2-ml ampoule. Tablet: 300 mg (quinine sulfate) or 300 mg (quinine bisulfate). * For use only in the management of severe malaria, and should be used in combination with doxycycline.
sulfadoxine + pyrimethamine*	Tablet: 500 mg + 25 mg. * Only in combination with artesunate 50 mg.
6.5.3.2 For prophylaxis	
chloroquine*	Oral liquid: 50 mg (as phosphate or sulfate)/5 ml. Tablet: 150 mg (as phosphate or sulfate). * For use only in central American regions, for use for <i>P.vivax</i> .
doxycycline [a]	Solid oral dosage form: 100 mg (as hydrochloride or hyclate). [a] >8 years.
mefloquine [a]	Tablet: 250 mg (as hydrochloride). [a] >5 kg or >3 months.
proguanil*	Tablet: 100 mg (as hydrochloride). * For use only in combination with chloroquine.
6.5.4 Antipneumocystosis and antitoxoplasmosis medicines	
pyrimethamine	Tablet: 25 mg.
sulfadiazine	Tablet: 500 mg.
sulfamethoxazole + trimethoprim	Injection: 80 mg + 16 mg/ml in 5-ml ampoule; 80 mg + 16 mg/ml in 10-ml ampoule. Oral liquid: 200 mg + 40 mg/5 ml [c] . Tablet: 100 mg + 20 mg; 400 mg + 80 mg [c] .
Complementary List	
pentamidine	Tablet: 200 mg; 300 mg (as isethionate).
6.5.5 Antitrypanosomal medicines	
6.5.5.1 African trypanosomiasis	
Medicines for the treatment of 1st stage African trypanosomiasis	
pentamidine*	Powder for injection: 200 mg (as isetionate) in vial. * To be used for the treatment of <i>Trypanosoma brucei gambiense</i> infection.

suramin sodium*	Powder for injection: 1 g in vial. * To be used for the treatment of the initial phase of <i>Trypanosoma brucei rhodesiense</i> infection.
Medicines for the treatment of 2nd stage African trypanosomiasis	
eflornithine*	Injection: 200 mg (hydrochloride)/ml in 100-ml bottle. * To be used for the treatment of <i>Trypanosoma brucei gambiense</i> infection.
melarsoprol	Injection: 3.6% solution, 5-ml ampoule (180 mg of active compound).
nifurtimox*	Tablet: 120 mg. * Only to be used in combination with eflornithine, for the treatment of <i>Trypanosoma brucei gambiense</i> infection.
Complementary List [c]	
melarsoprol	Injection: 3.6% solution in 5-ml ampoule (180 mg of active compound).
6.5.5.2 American trypanosomiasis	
benznidazole	Tablet: 12.5 mg [c]; 100 mg. Tablet (scored): 50 mg.
nifurtimox	Tablet: 30 mg; 120 mg; 250 mg.
7. ANTIMIGRAINE MEDICINES	
7.1 For treatment of acute attack	
acetylsalicylic acid	Tablet: 300 mg to 500 mg.
ibuprofen [c]	Tablet: 200 mg; 400 mg.
paracetamol	Oral liquid: 125 mg/5 ml [c]. Tablet: 300 mg to 500 mg.
7.2 For prophylaxis	
□ propranolol	Tablet: 20 mg; 40 mg (hydrochloride).
8. ANTINEOPLASTIC AND IMMUNOSUPPRESSIVES	
This section will be reviewed and updated shortly. In view of this, no changes were made to this section during the 19th Expert Committee.	
8.1 Immunosuppressive medicines	
Complementary List	
azathioprine	Powder for injection: 100 mg (as sodium salt) in vial. Tablet (scored): 50 mg.
ciclosporin	Capsule: 25 mg. Concentrate for injection: 50 mg/ml in 1-ml ampoule for organ transplantation.

8.2 Cytotoxic and adjuvant medicines	
<i>Complementary List</i>	
allopurinol [c]	Tablet: 100 mg; 300 mg.
asparaginase	Powder for injection: 10 000 IU in vial.
bleomycin	Powder for injection: 15 mg (as sulfate) in vial.
calcium folinate	Injection: 3 mg/ml in 10-ml ampoule. Tablet: 15 mg.
□ carboplatin	Injection: 50 mg/5 ml; 150 mg/15 ml; 450 mg/45 ml; 600 mg/60 ml.
chlorambucil	Tablet: 2 mg.
cyclophosphamide	Powder for injection: 500 mg in vial. Tablet: 25 mg.
cytarabine	Powder for injection: 100 mg in vial.
dacarbazine	Powder for injection: 100 mg in vial.
dactinomycin	Powder for injection: 500 micrograms in vial.
daunorubicin	Powder for injection: 50 mg (hydrochloride) in vial.
docetaxel	Injection: 20 mg/ml; 40 mg/ml.
doxorubicin	Powder for injection: 10 mg; 50 mg (hydrochloride) in vial.
etoposide	Capsule: 100 mg. Injection: 20 mg/ml in 5-ml ampoule.
fluorouracil	Injection: 50 mg/ml in 5-ml ampoule.
hydroxycarbamide	Solid oral dosage form: 200 mg; 250 mg; 300 mg; 400 mg; 500 mg; 1 g.
ifosfamide	Powder for injection: 1 g vial; 2 g vial.
mercaptopurine	Tablet: 50 mg.
mesna	Injection: 100 mg/ml in 4-ml and 10-ml ampoules. Tablet: 400 mg; 600 mg.
methotrexate	Powder for injection: 50 mg (as sodium salt) in vial. Tablet: 2.5 mg (as sodium salt).
paclitaxel	Powder for injection: 6 mg/ml.
procarbazine	Capsule: 50 mg (as hydrochloride).
thioguanine [c]	Solid oral dosage form: 40 mg.
vinblastine	Powder for injection: 10 mg (sulfate) in vial.
vincristine	Powder for injection: 1 mg; 5 mg (sulfate) in vial.

8.3 Hormones and antihormones	
Complementary List	
<i>dexamethasone</i>	Injection: 4 mg/ml in 1-ml ampoule (as disodium phosphate salt). Oral liquid: 2 mg/5 ml [c] .
<i>hydrocortisone</i>	Powder for injection: 100 mg (as sodium succinate) in vial.
<i>methylprednisolone</i> [c]	Injection: 40 mg/ml (as sodium succinate) in 1-ml single dose vial and 5-ml multidose vials; 80 mg/ml (as sodium succinate) in 1-ml single dose vial.
□ <i>prednisolone</i>	Oral liquid: 5 mg/ml [c] . Tablet: 5 mg; 25 mg.
<i>tamoxifen</i>	Tablet: 10 mg; 20 mg (as citrate).
9. ANTIPARKINSONISM MEDICINES	
□ biperiden	Injection: 5 mg (lactate) in 1-ml ampoule. Tablet: 2 mg (hydrochloride).
levodopa + □ carbidopa	Tablet: 100 mg + 10 mg; 100 mg + 25 mg; 250 mg + 25 mg.
10. MEDICINES AFFECTING THE BLOOD	
10.1 Antianaemia medicines	
ferrous salt	Oral liquid: equivalent to 25 mg iron (as sulfate)/ml. Tablet: equivalent to 60 mg iron.
ferrous salt + folic acid	Tablet equivalent to 60 mg iron + 400 micrograms folic acid (nutritional supplement for use during pregnancy).
folic acid	Tablet: 1 mg; 5 mg.
hydroxocobalamin	Injection: 1 mg (as acetate, hydrochloride or as sulfate) in 1-ml ampoule.
10.2 Medicines affecting coagulation	
heparin sodium	Injection: 1000 IU/ml; 5000 IU/ml; 20 000 IU/ml in 1-ml ampoule.
phytomenadione	Injection: 1 mg/ml [c] ; 10 mg/ml in 5-ml ampoule. Tablet: 10 mg.
protamine sulfate	Injection: 10 mg/ml in 5-ml ampoule.
tranexamic acid	Injection: 100 mg/ml in 10-ml ampoule.
□ warfarin	Tablet: 1 mg; 2 mg; 5 mg (sodium salt).
Complementary List [c]	
<i>heparin sodium</i>	Injection: 1000 IU/ml; 5000 IU/ml in 1-ml ampoule.

<i>protamine sulfate</i>	Injection: 10 mg/ml in 5-ml ampoule.
☐ <i>warfarin</i>	Tablet: 0.5 mg; 1 mg; 2 mg; 5 mg (sodium salt).
10.3 Other medicines for haemoglobinopathies	
<i>Complementary List</i>	
<i>deferoxamine*</i>	Powder for injection: 500 mg (mesilate) in vial. * <i>Deferasirox oral form may be an alternative, depending on cost and availability.</i>
<i>hydroxycarbamide</i>	Solid oral dosage form: 200 mg; 500 mg; 1 g.
11. BLOOD PRODUCTS AND PLASMA SUBSTITUTES (under construction, the section will be updated in the EM list that will be published together with the full report of the Expert Committee meeting)	
12. CARDIOVASCULAR MEDICINES	
12.1 Antianginal medicines	
☐ bisoprolol*	Tablet: 1.25 mg; 5 mg. * ☐ includes metoprolol and carvedilol as alternatives.
glyceryl trinitrate	Tablet (sublingual): 500 micrograms.
☐ isosorbide dinitrate	Tablet (sublingual): 5 mg.
verapamil	Tablet: 40 mg; 80 mg (hydrochloride).
12.2 Antiarrhythmic medicines	
☐ bisoprolol*	Tablet: 1.25 mg; 5 mg. * ☐ includes metoprolol and carvedilol as alternatives.
digoxin	Injection: 250 micrograms/ml in 2-ml ampoule. Oral liquid: 50 micrograms/ml. Tablet: 62.5 micrograms; 250 micrograms.
epinephrine (adrenaline)	Injection: 100 micrograms/ml (as acid tartrate or hydrochloride) in 10-ml ampoule.
lidocaine	Injection: 20 mg (hydrochloride)/ml in 5-ml ampoule.
verapamil	Injection: 2.5 mg (hydrochloride)/ml in 2-ml ampoule. Tablet: 40 mg; 80 mg (hydrochloride).
<i>Complementary List</i>	
<i>amiodarone</i>	Injection: 50 mg/ml in 3-ml ampoule (hydrochloride). Tablet (HCl): 100 mg; 200 mg; 400 mg (hydrochloride).
12.3 Antihypertensive medicines	
☐ amlodipine	Tablet: 5 mg (as maleate, mesylate or besylate).
☐ bisoprolol*	Tablet: 1.25 mg; 5 mg. * ☐ includes metoprolol and carvedilol as alternatives.

☐ enalapril	Tablet: 2.5 mg; 5 mg (as hydrogen maleate).
hydralazine*	Powder for injection: 20 mg (hydrochloride) in ampoule. Tablet: 25 mg; 50 mg (hydrochloride). * Hydralazine is listed for use in the acute management of severe pregnancy-induced hypertension only. Its use in the treatment of essential hypertension is not recommended in view of the availability of more evidence of efficacy and safety of other medicines.
☐ hydrochlorothiazide	Oral liquid: 50 mg/5 ml. Solid oral dosage form: 12.5 mg; 25 mg.
methyldopa*	Tablet: 250 mg. * Methyldopa is listed for use in the management of pregnancy-induced hypertension only. Its use in the treatment of essential hypertension is not recommended in view of the availability of more evidence of efficacy and safety of other medicines.
Complementary List	
<i>sodium nitroprusside</i>	Powder for infusion: 50 mg in ampoule.
12.4 Medicines used in heart failure	
☐ bisoprolol*	Tablet: 1.25 mg; 5 mg. * ☐ includes metoprolol and carvedilol as alternatives.
digoxin	Injection: 250 micrograms/ml in 2-ml ampoule. Oral liquid: 50 micrograms/ml. Tablet: 62.5 micrograms; 250 micrograms.
☐ enalapril	Tablet: 2.5 mg; 5 mg (as hydrogen maleate).
☐ furosemide	Injection: 10 mg/ml in 2-ml ampoule. Oral liquid: 20 mg/5 ml [c] . Tablet: 40 mg.
☐ hydrochlorothiazide	Oral liquid: 50 mg/5 ml. Solid oral dosage form: 25 mg.
spironolactone	Tablet: 25 mg.
Complementary List	
<i>dopamine</i>	Injection: 40 mg/ml (hydrochloride) in 5-ml vial.
12.5 Antithrombotic medicines	
acetylsalicylic acid	Tablet: 100 mg.
Complementary List	

streptokinase	<i>Powder for injection: 1.5 million IU in vial.</i>
12.6 Lipid-lowering agents	
☐ simvastatin*	Tablet: 5 mg; 10 mg; 20 mg; 40 mg. * For use in high-risk patients.
13. DERMATOLOGICAL MEDICINES (topical)	
13.1 Antifungal medicines	
☐ miconazole	Cream or ointment: 2% (nitrate).
selenium sulfide	Detergent-based suspension: 2%.
sodium thiosulfate	Solution: 15%.
terbinafine	Cream: 1% or Ointment: 1% terbinafine hydrochloride.
13.2 Anti-infective medicines	
mupirocin	Cream (as mupirocin calcium): 2%. Ointment: 2%.
potassium permanganate	Aqueous solution: 1:10 000.
silver sulfadiazine ^a	Cream: 1%. ^a > 2 months.
13.3 Anti-inflammatory and antipruritic medicines	
☐ betamethasone ^a	Cream or ointment: 0.1% (as valerate). ^a Hydrocortisone preferred in neonates.
☐ calamine	Lotion.
☐ hydrocortisone	Cream or ointment: 1% (acetate).
13.4 Medicines affecting skin differentiation and proliferation	
benzoyl peroxide	Cream or lotion: 5%.
coal tar	Solution: 5%.
fluorouracil	Ointment: 5%.
☐ podophyllum resin	Solution: 10% to 25%.
salicylic acid	Solution: 5%.
urea	Cream or ointment: 5%; 10%.
13.5 Scabicides and pediculicides	
☐ benzyl benzoate ^a	Lotion: 25%. ^a > 2 years.
permethrin	Cream: 5%. Lotion: 1%.
14. DIAGNOSTIC AGENTS	

14.1 Ophthalmic medicines	
fluorescein	Eye drops: 1% (sodium salt).
☐ tropicamide	Eye drops: 0.5%.
14.2 Radiocontrast media	
☐ amidotrizoate	Injection: 140 mg to 420 mg iodine (as sodium or meglumine salt)/ml in 20-ml ampoule.
barium sulfate	Aqueous suspension.
☐ iohexol	Injection: 140 mg to 350 mg iodine/ml in 5-ml; 10-ml; 20-ml ampoules.
<i>Complementary List</i>	
barium sulfate [c]	Aqueous suspension.
☐ meglumine iotroxate	Solution: 5 g to 8 g iodine in 100 ml to 250 ml.
15. DISINFECTANTS AND ANTISEPTICS	
15.1 Antiseptics	
☐ chlorhexidine	Solution: 5% (digluconate).
☐ ethanol	Solution: 70% (denatured).
☐ polyvidone iodine	Solution: 10% (equivalent to 1% available iodine).
15.2 Disinfectants	
☐ chlorine base compound	Powder: (0.1% available chlorine) for solution.
☐ chloroxylenol	Solution: 4.8%.
glutaral	Solution: 2%.
16. DIURETICS	
amiloride	Tablet: 5 mg (hydrochloride).
☐ furosemide	Injection: 10 mg/ml in 2-ml ampoule. Oral liquid: 20 mg/5 ml [c] . Tablet: 10 mg [c] ; 20 mg [c] ; 40 mg.
☐ hydrochlorothiazide	Solid oral dosage form: 25 mg.
mannitol	Injectable solution: 10%; 20%.
spironolactone	Tablet: 25 mg.
<i>Complementary List [c]</i>	
☐ hydrochlorothiazide	Tablet (scored): 25 mg.
mannitol	Injectable solution: 10%; 20%.
spironolactone	Oral liquid: 5 mg/5 ml; 10 mg/5 ml; 25 mg/5 ml. Tablet: 25 mg.
17. GASTROINTESTINAL MEDICINES	

<i>Complementary List [c]</i>	
☐ pancreatic enzymes	<i>Age-appropriate formulations and doses including lipase, protease and amylase.</i>
17.1 Antiulcer medicines	
☐ omeprazole	Powder for oral liquid: 20 mg; 40 mg sachets. Solid oral dosage form: 10 mg; 20 mg; 40 mg.
☐ ranitidine	Injection: 25 mg/ml (as hydrochloride) in 2-ml ampoule. Oral liquid: 75 mg/5 ml (as hydrochloride). Tablet: 150 mg (as hydrochloride).
17.2 Antiemetic medicines	
dexamethasone	Injection: 4 mg/ml in 1-ml ampoule (as disodium phosphate salt). Oral liquid: 0.5 mg/5 ml; 2 mg/5 ml. Solid oral dosage form: 0.5 mg; 0.75 mg; 1.5 mg; 4 mg.
metoclopramide ^a	Injection: 5 mg (hydrochloride)/ml in 2-ml ampoule. Oral liquid: 5 mg/5 ml [c]. Tablet: 10 mg (hydrochloride). ^a Not in neonates.
ondansetron ^a	Injection: 2 mg base/ml in 2-ml ampoule (as hydrochloride). Oral liquid: 4 mg base/5 ml. Solid oral dosage form: Eq 4 mg base; Eq 8 mg base; Eq 24 mg base. ^a >1 month.
17.3 Anti-inflammatory medicines	
☐ sulfasalazine	Retention enema. Suppository: 500 mg. Tablet: 500 mg.
<i>Complementary List</i>	
☐ hydrocortisone	Retention enema. Suppository: 25 mg (acetate). (the ☐ only applies to hydrocortisone retention enema).
17.4 Laxatives	
☐ senna	Tablet: 7.5 mg (sennosides) (or traditional dosage forms).

17.5 Medicines used in diarrhoea																					
17.5.1 Oral rehydration																					
oral rehydration salts	Powder for dilution in 200 ml; 500 ml; 1 L. <table> <tr><td>glucose:</td><td>75 mEq</td></tr> <tr><td>sodium:</td><td>75 mEq or mmol/L</td></tr> <tr><td>chloride:</td><td>65 mEq or mmol/L</td></tr> <tr><td>potassium:</td><td>20 mEq or mmol/L</td></tr> <tr><td>citrate:</td><td>10 mmol/L</td></tr> <tr><td>osmolarity:</td><td>245 mOsm/L</td></tr> <tr><td>glucose:</td><td>13.5 g/L</td></tr> <tr><td>sodium chloride:</td><td>2.6 g/L</td></tr> <tr><td>potassium chloride:</td><td>1.5 g/L</td></tr> <tr><td>trisodium citrate dihydrate+:</td><td>2.9 g/L</td></tr> </table> + trisodium citrate dihydrate may be replaced by sodium hydrogen carbonate (sodium bicarbonate) 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.	glucose:	75 mEq	sodium:	75 mEq or mmol/L	chloride:	65 mEq or mmol/L	potassium:	20 mEq or mmol/L	citrate:	10 mmol/L	osmolarity:	245 mOsm/L	glucose:	13.5 g/L	sodium chloride:	2.6 g/L	potassium chloride:	1.5 g/L	trisodium citrate dihydrate+:	2.9 g/L
glucose:	75 mEq																				
sodium:	75 mEq or mmol/L																				
chloride:	65 mEq or mmol/L																				
potassium:	20 mEq or mmol/L																				
citrate:	10 mmol/L																				
osmolarity:	245 mOsm/L																				
glucose:	13.5 g/L																				
sodium chloride:	2.6 g/L																				
potassium chloride:	1.5 g/L																				
trisodium citrate dihydrate+:	2.9 g/L																				
17.5.2 Medicines for diarrhoea in children																					
zinc sulfate*	Solid oral dosage form: 20 mg. * In acute diarrhoea zinc sulfate should be used as an adjunct to oral rehydration salts.																				
18. HORMONES, OTHER ENDOCRINE MEDICINES AND CONTRACEPTIVES																					
18.1 Adrenal hormones and synthetic substitutes																					
fludrocortisone	Tablet: 100 micrograms (acetate).																				
hydrocortisone	Tablet: 5 mg; 10 mg; 20 mg.																				
18.2 Androgens																					
<i>Complementary List</i>																					
<i>testosterone</i>	Injection: 200 mg (<i>enanthate</i>) in 1-ml ampoule.																				
18.3 Contraceptives																					
18.3.1 Oral hormonal contraceptives																					
☐ ethinylestradiol + ☐ levonorgestrel	Tablet: 30 micrograms + 150 micrograms.																				
☐ ethinylestradiol + ☐ norethisterone	Tablet: 35 micrograms + 1 mg.																				
levonorgestrel	Tablet: 30 micrograms; 750 micrograms (pack of two); 1.5 mg.																				
18.3.2 Injectable hormonal contraceptives																					
estradiol cypionate + medroxyprogesterone acetate	Injection: 5 mg + 25 mg.																				
medroxyprogesterone acetate	Depot injection: 150 mg/ml in 1-ml vial.																				
norethisterone enantate	Oily solution: 200 mg/ml in 1-ml ampoule.																				

18.3.3 Intrauterine devices	
copper-containing device	
18.3.4 Barrier methods	
condoms	
diaphragms	
18.3.5 Implantable contraceptives	
levonorgestrel-releasing implant	Two-rod levonorgestrel-releasing implant, each rod containing 75 mg of levonorgestrel (150 mg total).
18.4 Estrogens	
18.5 Insulins and other medicines used for diabetes	
☐ gliclazide*	Oral solid dosage form (controlled release tablets): 30 mg; 60 mg; 80 mg. * Glibenclamide not suitable above 60 years.
glucagon	Injection: 1 mg/ml.
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).
<i>Complementary List [c]</i>	
<i>metformin</i>	<i>Tablet: 500 mg (hydrochloride).</i>
18.6 Ovulation inducers	
<i>Complementary List</i>	
<i>clomifene</i>	<i>Tablet: 50 mg (citrate).</i>
18.7 Progestogens	
☐ medroxyprogesterone acetate	Tablet: 5 mg.
18.8 Thyroid hormones and antithyroid medicines	
levothyroxine	Tablet: 25 micrograms [c]; 50 micrograms; 100 micrograms (sodium salt).
potassium iodide	Tablet: 60 mg.
☐ propylthiouracil	Tablet: 50 mg.
<i>Complementary List [c]</i>	
<i>Lugol's solution</i>	<i>Oral liquid: about 130 mg total iodine/ml.</i>
<i>potassium iodide</i>	<i>Tablet: 60 mg.</i>
<i>propylthiouracil</i>	<i>Tablet: 50 mg.</i>

19. IMMUNOLOGICALS	
19.1 Diagnostic agents	
All tuberculins should comply with the WHO Requirements for Tuberculins.	
tuberculin, purified protein derivative (PPD)	Injection.
19.2 Sera and immunoglobulins	
All plasma fractions should comply with the WHO Requirements.	
anti-D immunoglobulin (human)	Injection: 250 micrograms in single-dose vial.
antirabies immunoglobulin (human)	Injection: 150 IU/ml in vial.
antitetanus immunoglobulin (human)	Injection: 500 IU in vial.
antivenom immunoglobulin*	Injection. * Exact type to be defined locally.
diphtheria antitoxin	Injection: 10 000 IU; 20 000 IU in vial.
19.3 Vaccines	
Selection of vaccines from the Model List will need to be determined by each country after consideration of international recommendations, epidemiology and national priorities. The list below details the vaccines for which there is either a recommendation from the Strategic Advisory Group of Experts on Immunization (SAGE) (http://www.who.int/immunization/sage_conclusions/en/index.html) and/or a WHO position paper (http://www.who.int/immunization/documents/positionpapers/en/index.html). This site will be updated as new position papers are published and contains the most recent information and recommendations. All vaccines should comply with the WHO Requirements for Biological Substances. WHO noted the need for vaccines used in children to be polyvalent.	
BCG vaccine	
cholera vaccine	
diphtheria vaccine	
<i>Haemophilus influenzae</i> type b vaccine	
hepatitis A vaccine	
hepatitis B vaccine	
influenza vaccine	
Japanese encephalitis vaccine	
measles vaccine	
meningococcal meningitis vaccine	
mumps vaccine	
pertussis vaccine	
pneumococcal vaccine	

poliomyelitis vaccine	
rabies vaccine	
rotavirus vaccine	
rubella vaccine	
tetanus vaccine	
typhoid vaccine	
varicella vaccine	
yellow fever vaccine	
20. MUSCLE RELAXANTS (PERIPHERALLY-ACTING) AND CHOLINESTERASE INHIBITORS	
☐ atracurium	Injection: 10 mg/ml (besylate).
neostigmine	Injection: 500 micrograms in 1-ml ampoule; 2.5 mg (metilsulfate) in 1-ml ampoule. Tablet: 15 mg (bromide).
suxamethonium	Injection: 50 mg (chloride)/ml in 2-ml ampoule. Powder for injection (chloride), in vial.
☐ vecuronium [c]	Powder for injection: 10 mg (bromide) in vial.
<i>Complementary List</i>	
pyridostigmine	Injection: 1 mg in 1-ml ampoule. Tablet: 60 mg (bromide).
☐ vecuronium	Powder for injection: 10 mg (bromide) in vial.
21. OPHTHALMOLOGICAL PREPARATIONS	
21.1 Anti-infective agents	
aciclovir	Ointment: 3% W/W.
azithromycin	Solution (eye drops): 1.5%.
☐ gentamicin	Solution (eye drops): 0.3% (sulfate).
☐ ofloxacin	Solution (eye drops): 0.3%.
☐ tetracycline	Eye ointment: 1% (hydrochloride).
21.2 Anti-inflammatory agents	
☐ prednisolone	Solution (eye drops): 0.5% (sodium phosphate).
21.3 Local anaesthetics	
☐ tetracaine [a]	Solution (eye drops): 0.5% (hydrochloride). [a] Not in preterm neonates.

21.4 Miotics and antiglaucoma medicines	
acetazolamide	Tablet: 250 mg.
latanoprost	Solution (eye drops): latanoprost 50 micrograms/ml.
☐ pilocarpine	Solution (eye drops): 2%; 4% (hydrochloride or nitrate).
☐ timolol	Solution (eye drops): 0.25%; 0.5% (as hydrogen maleate).
21.5 Mydriatics	
atropine* a	Solution (eye drops): 0.1%; 0.5%; 1% (sulfate). * [c] Or homatropine (hydrobromide) or cyclopentolate (hydrochloride). a >3 months.
<i>Complementary List</i>	
epinephrine (adrenaline)	Solution (eye drops): 2% (as hydrochloride).
21.6 Anti-vascular endothelial growth factor (VEGF)	
<i>Complementary List</i>	
bevacizumab	Injection: 25 mg/ml.
22. OXYTOCICS AND ANTIOXYTOCICS	
22.1 Oxytocics	
☐ ergometrine	Injection: 200 micrograms (hydrogen maleate) in 1-ml ampoule.
misoprostol	Tablet: 200 micrograms.* * For management of incomplete abortion and miscarriage, and for prevention of postpartum haemorrhage where oxytocin is not available or cannot be safely used. Vaginal tablet: 25 micrograms.* * Only for use for induction of labour where appropriate facilities are available.
oxytocin	Injection: 10 IU in 1-ml.
<i>Complementary List</i>	
mifepristone* – misoprostol* <i>Where permitted under national law and where culturally acceptable.</i>	Tablet 200 mg – tablet 200 micrograms. * Requires close medical supervision.
22.2 Antioxytocics (tocolytics)	
nifedipine	Immediate-release capsule: 10 mg.

23. PERITONEAL DIALYSIS SOLUTION	
<i>Complementary List</i>	
<i>intraperitoneal dialysis solution (of appropriate composition)</i>	<i>Parenteral solution.</i>
24. MEDICINES FOR MENTAL AND BEHAVIOURAL DISORDERS	
24.1 Medicines used in psychotic disorders	
☐ chlorpromazine	Injection: 25 mg (hydrochloride)/ml in 2-ml ampoule. Oral liquid: 25 mg (hydrochloride)/5 ml. Tablet: 100 mg (hydrochloride).
☐ fluphenazine	Injection: 25 mg (decanoate or enantate) in 1-ml ampoule.
☐ haloperidol	Injection: 5 mg in 1-ml ampoule. Tablet: 2 mg; 5 mg.
risperidone	Solid oral dosage form: 0.25 mg to 6 mg.
<i>Complementary List</i>	
<i>chlorpromazine [c]</i>	Injection: 25 mg (hydrochloride)/ml in 2-ml ampoule. Oral liquid: 25 mg (hydrochloride)/5 ml. Tablet: 10 mg; 25 mg; 50 mg; 100 mg (hydrochloride).
<i>haloperidol [c]</i>	Injection: 5 mg in 1-ml ampoule. Oral liquid: 2 mg/ml. Solid oral dosage form: 0.5 mg; 2 mg; 5 mg.
<i>clozapine</i>	Solid oral dosage form: 25 mg to 200 mg.
24.2 Medicines used in mood disorders	
24.2.1 Medicines used in depressive disorders	
☐ amitriptyline	Tablet: 25 mg; 75 mg (hydrochloride).
fluoxetine	Solid oral dosage form: 20 mg (as hydrochloride).
<i>Complementary List [c]</i>	
<i>fluoxetine [a]</i>	Solid oral dosage form: 20 mg (as hydrochloride). [a] >8 years.
24.2.2 Medicines used in bipolar disorders	
carbamazepine	Tablet (scored): 100 mg; 200 mg.
lithium carbonate	Solid oral dosage form: 300 mg.
valproic acid (sodium valproate)	Tablet (enteric-coated): 200 mg; 500 mg (sodium valproate).
24.3 Medicines for anxiety disorders	
☐ diazepam	Tablet (scored): 2 mg; 5 mg.

24.4 Medicines used for obsessive compulsive disorders	
clomipramine	Capsule: 10 mg; 25 mg (hydrochloride).
24.5 Medicines for disorders due to psychoactive substance use	
nicotine replacement therapy (NRT)	Chewing gum: 2 mg; 4 mg (as polacrilex). Transdermal patch: 5 mg to 30 mg/16 hrs; 7 mg to 21 mg/24 hrs.
<i>Complementary List</i>	
☐ methadone*	Concentrate for oral liquid: 5 mg/ml; 10 mg/ml (hydrochloride). Oral liquid: 5 mg/5 ml; 10 mg/5 ml (hydrochloride). * The square box is added to include buprenorphine. The medicines should only be used within an established support programme.
25. MEDICINES ACTING ON THE RESPIRATORY TRACT	
25.1 Antiasthmatic and medicines for chronic obstructive pulmonary disease	
☐ beclometasone	Inhalation (aerosol): 50 micrograms (dipropionate) per dose; 100 micrograms (dipropionate) per dose (as CFC free forms).
☐ budesonide [c]	Inhalation (aerosol): 100 micrograms per dose; 200 micrograms per dose.
epinephrine (adrenaline)	Injection: 1 mg (as hydrochloride or hydrogen tartrate) in 1-ml ampoule.
ipratropium bromide	Inhalation (aerosol): 20 micrograms/metered dose.
☐ salbutamol	Inhalation (aerosol): 100 micrograms (as sulfate) per dose. Injection: 50 micrograms (as sulfate)/ml in 5-ml ampoule. Metered dose inhaler (aerosol): 100 micrograms (as sulfate) per dose. Respirator solution for use in nebulizers: 5 mg (as sulfate)/ml.
26. SOLUTIONS CORRECTING WATER, ELECTROLYTE AND ACID-BASE DISTURBANCES	
26.1 Oral	
oral rehydration salts	See section 17.5.1.
potassium chloride	Powder for solution.
26.2 Parenteral	
glucose	Injectable solution: 5% (isotonic); 10% (hypertonic); 50% (hypertonic).

glucose with sodium chloride	Injectable solution: 4% glucose, 0.18% sodium chloride (equivalent to Na⁺ 30 mmol/L, Cl⁻ 30 mmol/L). Injectable solution: 5% glucose, 0.9% sodium chloride (equivalent to 150 mmol/L Na⁺ and 150 mmol/L Cl⁻); 5% glucose, 0.45% sodium chloride (equivalent to 75 mmol/L Na⁺ and 75 mmol/L Cl⁻) [c].
potassium chloride	Solution: 11.2% in 20-ml ampoule (equivalent to K⁺ 1.5 mmol/ml, Cl⁻ 1.5 mmol/ml). Solution for dilution: 7.5% (equivalent to K 1 mmol/ml and Cl 1 mmol/ml) [c]; 15% (equivalent to K 2 mmol/ml and Cl 2 mmol/ml) [c].
sodium chloride	Injectable solution: 0.9% isotonic (equivalent to Na ⁺ 154 mmol/L, Cl ⁻ 154 mmol/L).
sodium hydrogen carbonate	Injectable solution: 1.4% isotonic (equivalent to Na⁺ 167 mmol/L, HCO₃⁻ 167 mmol/L). Solution: 8.4% in 10-ml ampoule (equivalent to Na⁺ 1000 mmol/L, HCO₃⁻ 1000 mmol/L).
☐ sodium lactate, compound solution	Injectable solution.
26.3 Miscellaneous	
water for injection	2-ml; 5-ml; 10-ml ampoules.
27. VITAMINS AND MINERALS	
ascorbic acid	Tablet: 50 mg.
calcium	Tablet: 500 mg (elemental).
cholecalciferol* [c]	Oral liquid: 400 IU/ml. Solid oral dosage form: 400 IU; 1000 IU. * Ergocalciferol can be used as an alternative.
☐ ergocalciferol	Oral liquid: 250 micrograms/ml (10 000 IU/ml). Solid oral dosage form: 1.25 mg (50 000 IU).
iodine	Capsule: 200 mg. Iodized oil: 1 ml (480 mg iodine); 0.5 ml (240 mg iodine) in ampoule (oral or injectable); 0.57 ml (308 mg iodine) in dispenser bottle.
☐ nicotinamide	Tablet: 50 mg.
pyridoxine	Tablet: 25 mg (hydrochloride).

retinol	Capsule: 50 000 IU; 100 000 IU; 200 000 IU (as palmitate). Oral oily solution: 100 000 IU (as palmitate)/ml in multidose dispenser. Tablet (sugar-coated): 10 000 IU (as palmitate). Water-miscible injection: 100 000 IU (as palmitate) in 2-ml ampoule.
riboflavin	Tablet: 5 mg.
sodium fluoride	In any appropriate topical formulation.
thiamine	Tablet: 50 mg (hydrochloride).
<i>Complementary List</i>	
calcium gluconate	Injection: 100 mg/ml in 10-ml ampoule.
28. EAR, NOSE AND THROAT MEDICINES IN CHILDREN [c]	
acetic acid	Topical: 2%, in alcohol.
☐ budesonide	Nasal spray: 100 micrograms per dose.
☐ ciprofloxacin	Topical: 0.3% drops (as hydrochloride).
☐ xylometazoline ^[a]	Nasal spray: 0.05%. ^[a] Not in children less than 3 months.
29. SPECIFIC MEDICINES FOR NEONATAL CARE	
29.1 Medicines administered to the neonate [c]	
caffeine citrate	Injection: 20 mg/ml (equivalent to 10 mg caffeine base/ml). Oral liquid: 20 mg/ml (equivalent to 10 mg caffeine base/ml).
chlorhexidine	Solution or gel: 7.1% (digluconate) delivering 4% chlorhexidine (for umbilical cord care).
<i>Complementary List</i>	
☐ ibuprofen	Solution for injection: 5 mg/ml.
☐ prostaglandin E	Solution for injection: Prostaglandin E 1: 0.5 mg/ml in alcohol. Prostaglandin E 2: 1 mg/ml.
surfactant	Suspension for intratracheal instillation: 25 mg/ml or 80 mg/ml.
29.2 Medicines administered to the mother	
dexamethasone	Injection: 4 mg/ml dexamethasone phosphate (as disodium salt).
30. MEDICINES FOR DISEASES OF JOINTS	
30.1 Medicines used to treat gout	
allopurinol	Tablet: 100 mg.

30.2 Disease modifying agents used in rheumatoid disorders (DMARDs)	
chloroquine	Tablet: 100 mg; 150 mg (as phosphate or sulfate).
<i>Complementary List</i>	
azathioprine	Tablet: 50 mg.
hydroxychloroquine [c]	Solid oral dosage form: 200 mg (as sulfate).
methotrexate	Tablet: 2.5 mg (as sodium salt).
penicillamine	Solid oral dosage form: 250 mg.
sulfasalazine	Tablet: 500 mg.
30.3 Juvenile joint diseases [c]	
<i>Complementary List</i>	
acetylsalicylic acid* (acute or chronic use)	Suppository: 50 mg to 150 mg. Tablet: 100 mg to 500 mg. * For use for rheumatic fever, juvenile arthritis, Kawasaki disease.

Table 1: Medicines with age or weight restrictions

atazanavir	>25 kg
atropine	>3 months
benzyl benzoate	>2 years
betamethasone topical preparations	Hydrocortisone preferred in neonates
cefazolin	>1 month
ceftriaxone	>41 weeks corrected gestational age
diloxanide	>25 kg
doxycycline	>8 years (except for serious infections e.g. cholera)
efavirenz	>3 years or >10 kg
emtricitabine	>3 months
fluoxetine	>8 years
ibuprofen	>3 months (except IV form for patent <i>ductus arteriosus</i>)
mefloquine	>5 kg or >3 months
metoclopramide	Not in neonates
ondansetron	>1 month
saquinavir	>25 kg
silver sulfadiazine	>2 months
tetracaine	Not in preterm neonates
trimethoprim	>6 months
xylometazoline	>3 months

Annex 1: Explanation of dosage forms

A. Principal dosage forms used in EML - Oral administration

Term	Definition
Solid oral dosage form	Refers to tablets or capsules or other solid dosage forms such as 'melts' that are immediate-release preparations. It implies that there is no difference in clinical efficacy or safety between the available dosage forms, and countries should therefore choose the form(s) to be listed depending on quality and availability. The term 'solid oral dosage form' is <i>never</i> intended to allow any type of modified-release tablet.
Tablets	Refers to: • uncoated or coated (film-coated or sugar-coated) tablets that are intended to be swallowed whole; • unscored and scored*; • tablets that are intended to be chewed before being swallowed; • tablets that are intended to be dispersed or dissolved in water or another suitable liquid before being swallowed; • tablets that are intended to be crushed before being swallowed. The term 'tablet' without qualification is <i>never</i> intended to allow any type of modified-release tablet.
Tablets (qualified)	Refers to a specific type of tablet: chewable - tablets that are intended to be chewed before being swallowed; dispersible - tablets that are intended to be dispersed in water or another suitable liquid before being swallowed; soluble - tablets that are intended to be dissolved in water or another suitable liquid before being swallowed; crushable - tablets that are intended to be crushed before being swallowed; scored - tablets bearing a break mark or marks where sub-division is intended in order to provide doses of less than one tablet; sublingual - tablets that are intended to be placed beneath the tongue. The term 'tablet' is <i>always</i> qualified with an additional term (in parentheses) in entries where one of the following types of tablet is intended: gastro-resistant (such tablets may sometimes be described as enteric-coated or as delayed-release), prolonged-release or another modified-release form.

* Scored tablets may be divided for ease of swallowing, provided dose is a whole number of tablets.

Term	Definition
Capsules	Refers to hard or soft capsules. The term 'capsule' without qualification is <i>never</i> intended to allow any type of modified-release capsule.
Capsules (qualified)	The term 'capsule' with qualification refers to gastro-resistant (such capsules may sometimes be described as enteric-coated or as delayed-release), prolonged-release or another modified-release form.
Granules	Preparations that are issued to patient as granules to be swallowed without further preparation, to be chewed, or to be taken in or with water or another suitable liquid. The term 'granules' without further qualification is <i>never</i> intended to allow any type of modified-release granules.
Oral powder	Preparations that are issued to patient as powder (usually as single-dose) to be taken in or with water or another suitable liquid.
Oral liquid	Liquid preparations intended to be <i>swallowed</i> i.e. oral solutions, suspensions, emulsions and oral drops, including those constituted from powders or granules, but <i>not</i> those preparations intended for <i>oromucosal administration</i> e.g. gargles and mouthwashes. Oral liquids presented as powders or granules may offer benefits in the form of better stability and lower transport costs. If more than one type of oral liquid is available on the same market (e.g. solution, suspension, granules for reconstitution), they may be interchanged and in such cases should be bioequivalent. It is preferable that oral liquids do not contain sugar and that solutions for children do not contain alcohol.

B. Principal dosage forms used in EMLc - Parenteral administration

Term	Definition
Injection	Refers to solutions, suspensions and emulsions including those constituted from powders or concentrated solutions.
Injection (qualified)	Route of administration is indicated in parentheses where relevant.
Injection (oily)	The term injection is qualified by (oily) in relevant entries.
Intravenous infusion	Refers to solutions and emulsions including those constituted from powders or concentrated solutions.

C. Other dosage forms

Mode of administration	Term to be used
To the eye	Eye drops, eye ointments.
Topical	For liquids: lotions, paints. For semi-solids: cream, ointment.
Rectal	Suppositories, gel or solution.
Vaginal	Pessaries or vaginal tablets.
Inhalation	Powder for inhalation, pressurized inhalation, nebulizer.

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