

First DRAFT:
WHO Model List of Essential Medicines for Children
Explanatory notes

1. The aim of the list is to identify medicines, dosage forms and strengths that are essential for children aged 12 years and under. This age delineation may be debated at the meeting in July.
2. The selection criteria for essential medicines for children are proposed to be the same as those for the existing List but this may be debated at the meeting.
3. This first draft list is based on the existing structure and medicines on the WHO Model List of Essential Medicines. Sections that are clearly not clinically relevant to children under 12 (e.g. anti Parkinsonian medicines) have been left listed but are marked with strikethrough and the medicines in the section have been deleted. Where there may be debate, the medicines have been left listed as they are, but highlighted in pink with strikethrough. Additional sections may need to be added. The meeting will be asked to consider the best format for the List, including for example, identifying medicines for neonates and older children separately in some way.
4. Medicines highlighted in green have an approved indication for children in at least 1 major market and an approved dosage form/strength and have already been identified as essential for children. In some cases they have already been reviewed in detail by a previous Expert Committee meeting on Selection and Use of Essential Medicines. The meeting in July will be asked to review and confirm these medicines as essential for children.
5. Medicines highlighted in yellow may be essential, may have an approved indication or appropriate dosage form but there are some uncertainties about them. Generally the uncertainties are annotated in red text. The meeting will review these and prioritize where necessary for further evidence based reviews.
6. Medicines highlighted in pink are either not indicated in children clinically or have no approved indication in children. The meeting will need to review these for further research and development and/or evidence reviews.
7. It is expected that the meeting in July will produce a revised draft List. It may be necessary to hold an additional consultation meeting in 2008.

Comments on this draft should be submitted to emlsecretariat@who.int, no later than 31 May 2007. All comments will be published on the meeting website. Full proposals for additional medicines should be made according to the format specified on the meeting website, no later than 15 May 2007.

WHO Model List

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.

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. Medicines are listed in alphabetical order, within sections.

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

Entries of the type *oral liquid* are intended to permit any solution, suspension or other form of liquid. Granules for reconstitution as an oral liquid may substitute for oral liquids, and typically carry 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 solutions for children do not contain alcohol.

Entries of the type *tablet* are intended to allow various forms of immediate-release tablet such as uncoated, film-coated, crushable, chewable, dispersible etc. Enteric coating, on the other hand, modifies drug release, and enteric-coated products are a modified release dosage form. Crushable, chewable and dispersible tablets may be easier to administer to paediatric populations and to the elderly.

CODES:

Indicated, on list, marketed, no queries

Indicated, on list, marketed but queries

Not indicated or not marketed

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1. ANAESTHETICS	
1.1 General anaesthetics and oxygen	
<input type="checkbox"/> halothane	<p>Inhalation.</p> <p>(Note Martindale states: "It is recommended in the UK that halothane should not be used for dental procedures outside hospital in patients under 18 years old.")</p>
ketamine	<p>Injection: 50 mg (as hydrochloride)/ml in 10-ml vial.</p> <p>(Note: the SA presentation is either 10 mg/ml (20 ml vial), 50 mg/ml (10 ml vial) or 100 mg/ml (20 ml vial). Martindale listing: Ketamine is given as the hydrochloride but doses are expressed in terms of the equivalent amount of base; ketamine hydrochloride 1.15 mg is approximately equivalent to 1 mg of ketamine base. For induction in adults and children the dose given by intravenous injection may range from the equivalent of 1 to 4.5 mg/kg of ketamine; a dose of 2 mg/kg given intravenously over 60 seconds usually produces surgical anaesthesia within 30 seconds of the end of the injection and lasting for 5 to 10 minutes. The initial intramuscular dose may range from 6.5 to 13 mg/kg; an intramuscular dose of 10 mg/kg usually produces surgical anaesthesia within 3 to 4 minutes lasting for 12 to 25 minutes. For diagnostic or other procedures not involving intense pain an initial intramuscular dose of 4 mg/kg has been used. Additional doses may be given for maintenance.</p> <p>For induction by intravenous infusion a total dose of 0.5 to 2 mg/kg is usually given at an appropriate infusion rate. Maintenance is achieved with 10 to 45 micrograms/kg per minute, the infusion rate being adjusted according to response." Should IM be used in children, except as analgesia (e.g. in emergency situations)?</p>
nitrous oxide	Inhalation.
oxygen	Inhalation (medicinal gas).
<input type="checkbox"/> thiopental	<p>Powder for injection: 0.5 g; 1.0 g (sodium salt) in ampoule.</p> <p>(Note: 3-7 mg/kg IV can be used for induction in children. Is a square box needed here?)</p>
1.2 Local anaesthetics	
<input type="checkbox"/> bupivacaine	<p>Injection: 0.25%; 0.5% (hydrochloride) in vial.</p> <p>Injection for spinal anaesthesia: 0.5% (hydrochloride) in 4-ml ampoule to be mixed with 7.5% glucose solution.</p> <p>(Note: need to determine whether spinal anaesthesia is appropriate in children with these agents – 2 mg/kg is used for local infiltration, 2.5 mg/kg for regional anaesthesia in children).</p>

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<p>lidocaine</p>	<p>Injection: 1%; 2% (hydrochloride) in vial.</p> <p>Injection for spinal anaesthesia: 5% (hydrochloride) in 2-ml ampoule to be mixed with 7.5% glucose solution.</p> <p>Topical forms: 2-4% (hydrochloride).</p> <p><i>(Note: special precaution needed in children, and lower doses – see below as well – 3 mg/kg with a vasoconstrictor and 7 mg/kg with a vasoconstrictor in children).</i></p>
<p>lidocaine + epinephrine (adrenaline)</p>	<p>Dental cartridge: 2% (hydrochloride) + epinephrine 1:80 000.</p> <p>Injection: 1%; 2% (hydrochloride) + epinephrine 1:200 000 in vial.</p>
<p><i>Complementary List</i></p>	
<p>ephedrine (not relevant)</p>	<p><i>Injection: 30 mg (hydrochloride)/ml in 1-ml ampoule</i></p> <p><i>(For use in spinal anaesthesia during delivery, to prevent hypotension).</i></p>
<p>1.3 Preoperative medication and sedation for short-term procedures</p>	
<p>atropine</p>	<p>Injection: 1 mg (sulfate) in 1-ml ampoule.</p>
<p>diazepam (form/strength?)</p>	<p>Injection: 5 mg/ml in 2-ml ampoule.</p> <p>Tablet: 5 mg.</p>
<p>morphine</p>	<p>Injection: 10 mg (sulfate or hydrochloride) in 1-ml ampoule.</p> <p><i>(Note: need to insert particular dosing guides for IM and SC administration in neonates).</i></p>

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2. ANALGESICS, ANTIPYRETICS, NON-STEROIDAL ANTI-INFLAMMATORY MEDICINES (NSAIMs), MEDICINES USED TO TREAT GOUT AND DISEASE MODIFYING AGENTS IN RHEUMATOID DISORDERS (DMARDs)	
2.1 Non-opioids and non-steroidal anti-inflammatory medicines (NSAIMs)	
acetylsalicylic acid	<p>Tablet: 100-500 mg.</p> <p>Suppository: 50-150 mg.</p> <p>(Note: strengths and dosage forms need attention, but it may well be necessary to list ASA for juvenile chronic arthritis, e.g. at 80-100 mg/kg/day in 5-6 divided doses)</p>
ibuprofen	<p>Tablet: 200 mg; 400 mg.</p> <p>(Note: May have to consider a paediatric liquid preparation as well Also see some new evidence: Eric Clark, Amy C. Plint, Rhonda Correll, Isabelle Gaboury and Brett Passi. A Randomized, Controlled Trial of Acetaminophen, Ibuprofen, and Codeine for Acute Pain Relief in Children With Musculoskeletal Trauma. PEDIATRICS Vol. 119 No. 3 March 2007, pp. 460-467 (doi:10.1542/peds.2006-1347) - http://pediatrics.aappublications.org/cgi/content/abstract/119/3/460)</p>
paracetamol*	<p>Tablet: 100-500 mg.</p> <p>Suppository: 100 mg.</p> <p>Oral liquid: 125 mg/5 ml.</p> <p>* Not recommended for anti-inflammatory use due to lack of proven benefit to that effect.</p>
2.2 Opioid analgesics	
codeine	<p>Tablet: 30 mg (phosphate).</p> <p>(Note: should consider including Codeine Phosphate Syrup (BP, USP), containing 25mg/5ml, even though commercial preparations may be limited. Indicative doses may be 0.5mg/kg po (or 15mg/m²) every 4-6 hours)</p>
morphine	<p>Injection: 10 mg (morphine hydrochloride or morphine sulfate) in 1-ml ampoule.</p> <p>Tablet: 10 mg (morphine sulfate).</p> <p>Tablet (prolonged release): 10 mg; 30 mg; 60 mg (morphine sulfate).</p> <p>Oral liquid: 10 mg (morphine hydrochloride or morphine sulfate)/5 ml.</p>
2.3 Medicines used to treat gout (Note: necessary?)	
2.4 Disease modifying agents used in rheumatoid disorders (DMARDs) (relevant?)	
chloroquine	<p>Tablet: 100 mg; 150 mg (as phosphate or sulfate).</p> <p>(Note: necessary?)</p>

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Complementary List (Note: necessary?)	
azathioprine	Tablet: 50 mg.
methotrexate	Tablet: 2.5 mg (as sodium salt).
penicillamine	Capsule or tablet: 250 mg.
sulfasalazine	Tablet: 500 mg.

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3. ANTIALLERGICS AND MEDICINES USED IN ANAPHYLAXIS	
<input type="checkbox"/> chlorphenamine (form/strength?)	<p>Injection: 10 mg (hydrogen maleate) in 1-ml ampoule.</p> <p>Tablet: 4 mg (hydrogen maleate).</p> <p>(See previous note re promethazine. May consider adding a 2 mg/5 ml chlorphenamine preparation and specific doses for children – e.g. 6-12 mo 1mg twice daily; 1-5 yrs 1-2 mg 3 times a day; 6-12 yrs 2-4 mg 3-4 times a day).</p>
dexamethasone	<p>Injection: 4 mg dexamethasone phosphate (as disodium salt) in 1-ml ampoule.</p>
epinephrine (adrenaline)	<p>Injection: 1 mg (as hydrochloride or hydrogen tartrate) in 1-ml ampoule.</p>
hydrocortisone	<p>Powder for injection: 100 mg (as sodium succinate) in vial.</p>
<input type="checkbox"/> prednisolone*	<p>Tablet: 5 mg; 25 mg</p> <p>* There is no evidence for complete clinical similarity between prednisolone and dexamethasone at high doses.</p> <p>(Note: although 5mg/ml oral solutions are available, they are expensive and not palatable. Needs careful discussion).</p>

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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.
atropine	Injection: 1 mg (sulfate) in 1-ml ampoule.
calcium gluconate	Injection: 100 mg/ml in 10-ml ampoule.
deferoxamine	Powder for injection: 500 mg (mesilate) in vial.
dimercaprol	Injection in oil: 50 mg/ml in 2-ml ampoule.
DL-methionine (form/strength?)	Tablet: 250 mg.
methylthioninium chloride (methylene blue) (form/strength?)	Injection: 10 mg/ml in 10-ml ampoule
naloxone (form/strength?)	Injection: 400 micrograms (hydrochloride) in 1-ml ampoule. (Note: may need to specifically list naloxone for neonatal use – 0.02 mg/ml injection, to be given as 0.1 mg/kg every 2-3 minutes; in children with opioid toxicity, 0.01 mg/kg to be followed by a 0.1 mg/kg after 2 minutes if no response)
penicillamine (marketed indication?)	Capsule or tablet: 250 mg.
potassium ferric hexacyano-ferrate(II) - 2H ₂ O (Prussian blue)	Powder for oral administration.
sodium calcium edetate	Injection: 200 mg/ml in 5-ml ampoule.
sodium nitrite	Injection: 30 mg/ml in 10-ml ampoule.
sodium thiosulfate (form/strength?)	Injection: 250 mg/ml in 50-ml ampoule.

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5. ANTICONVULSANTS/ANTIEPILEPTICS	
carbamazepine	<p>Tablet (chewable): 100 mg; 200 mg.</p> <p>Tablet (scored): 100 mg; 200 mg</p> <p>Oral liquid: 100 mg/5 ml.</p>
<input type="checkbox"/> diazepam	<p>Injection: 5 mg/ml in 2-ml ampoule (intravenous or rectal).</p> <p>(Note: specific mention should be made of rectal administration of the IV solution if the IV route is not available (e.g. 5 mg pr for children under 3 years, 10 mg pr for children over 5 years)).</p>
magnesium sulfate* (Not relevant for this indication)	<p>Injection: 500 mg/ml in 2-ml ampoule; 500 mg/ml in 10-ml ampoule.</p> <p>* For use in eclampsia and severe pre-eclampsia and not for other convulsant disorders.</p>
phenobarbital	<p>Injection: 200 mg/ml (phenobarbital sodium).</p> <p>Tablet: 15-100 mg (phenobarbital).</p> <p>Oral liquid: 15 mg/5 ml (phenobarbital) or 5 ml (phenobarbital sodium).</p>
phenytoin	<p>Injection: 50 mg/ml in 5-ml vial (sodium salt).</p> <p>Capsule: 25 mg; 50 mg; 100 mg (sodium salt).</p> <p>Tablet: 25 mg; 50 mg; 100 mg (sodium salt).</p> <p>Tablet (chewable): 50 mg.</p> <p>Oral liquid: 25 - 30 mg/5 ml.*</p> <p>* 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.</p>
valproic acid (sodium valproate)	<p>Tablet (crushable): 100 mg.</p> <p>Tablet (enteric-coated): 200 mg; 500 mg (sodium salt).</p> <p>Oral liquid: 200 mg/5 ml.</p>
<i>Complementary List</i>	
ethosuximide	<p>Capsule: 250 mg.</p> <p>Oral liquid: 250 mg/5 ml.</p>

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6. ANTI-INFECTIVE MEDICINES	
6.1 Anthelmintics	
6.1.1 Intestinal anthelmintics	
albendazole	Tablet (chewable): 400 mg.
levamisole (form/strength?)	Tablet: 50 mg; 150 mg (as hydrochloride).
☐ mebendazole	Tablet (chewable): 100 mg; 500 mg.
niclosamide*	Tablet (chewable): 500 mg. * Niclosamide is listed for use when praziquantel treatment fails.
praziquantel (no indication?)	Tablet: 150 mg; 600 mg.
pyrantel	Tablet (chewable): 250 mg (as embonate). Oral liquid: 50 mg (as embonate)/ml.
6.1.2 Antifilarials (Note: this section needs careful review for children)	
ivermectin	Tablet (scored): 3 mg; 6 mg.
<i>Complementary List</i>	
diethylcarbamazine	Tablet: 50 mg; 100 mg (dihydrogen citrate).
suramin sodium	Powder for injection: 1 g in vial.
6.1.3 Antischistosomes and antitrematode medicine	
praziquantel	Tablet: 600 mg. (Note: the advice that children over 2 years be given the same dose as adults needs checking – what about those under 2 years?)
triclabendazole (no indication?)	Tablet: 250 mg. (Note: needs checking)
<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	Capsule or tablet: 250 mg; 500 mg (anhydrous). Powder for oral liquid: 125 mg (anhydrous)/5 ml. (Note: may perhaps consider also listing a 12 mg/1.25 ml paediatric drop formulation, though this may be expensive and available from few sources)

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amoxicillin + clavulanic acid (form/strength?)	Tablet: 500 mg + 125 mg. (Note" consider adding paediatric suspensions, e.g. 125 mg amoxicillin + 31.25 mg clavulanic acid/5 ml AND/OR 250 mg amoxicillin + 62.5 mg clavulanic acid/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. (Note: is the 1.2 million IU formulation necessary for children – those < 30kg would get 600 000 IU IM as prophylaxis for rheumatic fever, those > 30kg would get 1.2 million IU monthly, for example)
benzylpenicillin	Powder for injection: 600 mg (= 1 million IU); 3 g (= 5 million IU) (sodium or potassium salt) in vial.
cefazolin*	Powder for injection: 1 g (as sodium salt) in vial. * For surgical prophylaxis.
cefixime ² (not relevant)	Capsule: 400 mg. * Only listed for single dose treatment of uncomplicated ano-genital gonorrhoea.
<input type="checkbox"/> cloxacillin	Powder for injection: 500 mg (as sodium salt) in vial. Capsule: 500 mg; 1 g (as sodium salt). 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.
Complementary List	
ceftazidime	Powder for injection: 250 mg (as pentahydrate) in vial.
<input type="checkbox"/> ceftriaxone	Powder for injection: 250 mg, 1 g (as sodium salt) in vial. (Note: Should be considered for inclusion in the Core List, as per IMCI guidelines)
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.
6.2.2 Other antibacterials	
azithromycin*	Capsule: 250 mg or 500 mg. Oral liquid: 200 mg/5 ml. * Only listed for single-dose treatment of genital <i>C. trachomatis</i> and of trachoma.

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chloramphenicol	<p>Capsule: 250 mg.</p> <p>Oily suspension for injection: 0.5 g (as sodium succinate)/ml in 2-ml ampoule.</p> <p>Oral liquid: 150 mg (as palmitate)/5 ml.</p> <p>Powder for injection: 1 g (sodium succinate) in vial.</p> <p>(Note: Martindales states: "Where there is no alternative to the use of chloramphenicol, premature and full-term neonates may be given daily doses of 25 mg/kg, in 4 divided doses, and full-term infants over the age of 2 weeks may be given up to 50 mg/kg daily, in 4 divided doses. Monitoring of plasma concentrations is essential to avoid toxicity.")</p> <p>Consider including a 1% topical formulation for neonatal conjunctivitis)</p>
□ ciprofloxacin*	<p>Tablet: 250 mg (as hydrochloride).</p> <p>* Final selection depends on indication for use.</p> <p>(Note: a decision needs to be taken about paediatric use of the fluoroquinolones).</p>
doxycycline*	<p>Capsule or tablet: 100 mg (hydrochloride).</p> <p>* Final selection depends on indication for use.</p> <p>(Note: Need to discuss how to deal with use under 8 years, which indications are included – e.g. malaria prophylaxis).</p>
□ erythromycin	<p>Capsule or tablet: 250 mg (as stearate or ethyl succinate).</p> <p>Powder for injection: 500 mg (as lactobionate) in vial.</p> <p>Powder for oral liquid: 125 mg (as stearate or ethyl succinate).</p>
□ gentamicin*	<p>Injection: 10 mg; 40 mg (as sulfate)/ml in 2-ml vial.</p> <p>* Final selection depends on indication for use.</p>
□ metronidazole	<p>Injection: 500 mg in 100-ml vial.</p> <p>Tablet: 200-500 mg.</p> <p>Suppository: 500 mg; 1 g.</p> <p>Oral liquid: 200 mg (as benzoate)/5 ml.</p>
nitrofurantoin (indication?)	<p>Tablet: 100 mg.</p> <p>(Note: may need a 25mg/5ml suspension)</p>
spectinomycin	<p>Powder for injection: 2 g (as hydrochloride) in vial.</p> <p>(Note: necessary?)</p>
sulfamethoxazole + trimethoprim	<p>Injection: 80 mg + 16 mg/ml in 5-ml and 10-ml ampoules.</p> <p>Tablet: 100 mg + 20 mg; 400 mg + 80 mg.</p> <p>Oral liquid: 200 mg + 40 mg/5 ml.</p>
trimethoprim (form/strength?)	<p>Tablet: 100 mg; 200 mg.</p> <p>(Note: necessary?).</p>

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Complementary List <i>(Note: need checking for relevance to paediatrics)</i>	
clindamycin	<i>Injection: 150 mg (as phosphate)/ml. Capsule: 150 mg.</i>
sulfadiazine	<i>Injection: 250 mg (sodium salt) in 4-ml ampoule. Tablet: 500 mg.</i>
vancomycin	<i>Powder for injection: 250 mg (as hydrochloride) in vial.</i>
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 (form/strength?)	Capsule: 50 mg; 100 mg.
dapsone (form/strength?)	Tablet: 25 mg; 50 mg; 100 mg.
rifampicin (form/strength?)	Capsule or tablet: 150 mg; 300 mg. <i>(Note: is a paediatric formulation available?)</i>
6.2.4 Antituberculosis medicines <i>(Note: access to paediatric formulations is a major problem in TB management. Paediatric-friendly FDCs are also rare)</i>	
ethambutol	Tablet: 100-400 mg (hydrochloride).
isoniazid	Tablet: 100-300 mg. Tablet (scored): 50 mg. <i>(Note: Isoniazid Elixir BPC containing 50 mg/5 ml may be available).</i>
isoniazid + ethambutol	Tablet: 150 mg + 400 mg.
pyrazinamide	Tablet: 400 mg. Tablet (dispersible): 150 mg. Tablet (scored): 150 mg.
rifampicin (form/strength?)	Capsule or tablet: 150 mg; 300 mg.
rifampicin + isoniazid (indication and dose?)	Tablet: 60 mg + 30 mg; 150 mg + 75 mg; 300 mg + 150 mg. 60 mg + 60 mg (For intermittent use three times weekly). 150 mg + 150 mg (For intermittent use three times weekly).
rifampicin + isoniazid + ethambutol (indication and dose?)	Tablet: 150 mg + 75 mg + 275 mg.

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rifampicin + isoniazid + pyrazinamide	<p>Tablet:</p> <p>60 mg + 30 mg + 150 mg; 150 mg + 75 mg + 400 mg.</p> <p>150 mg + 150 mg + 500 mg (For intermittent use three times weekly).</p>
rifampicin + isoniazid + pyrazinamide + ethambutol	<p>Tablet: 150 mg + 75 mg + 400 mg + 275 mg.</p>
streptomycin	<p>Powder for injection: 1 g (as sulfate) in vial.</p> <p>(Note: should this not be square boxed? Other aminoglycosides, such as amikacin or kanamycin are now more frequently used as first-line – see listing below as complementary items).</p>
<i>Complementary List</i>	
<p><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></p>	
amikacin	<p>Powder for injection: 1000 mg in vial.</p>
p-aminosalicylic acid (indication?)	<p>Granules: 4 g in sachet.</p> <p>Tablet: 500 mg.</p>
capreomycin	<p>Powder for injection: 1000 mg in vial.</p>
cycloserine (form/strength?)	<p>Capsule or tablet: 250 mg.</p>
ethionamide (form/strength?)	<p>Tablet: 125 mg; 250 mg.</p>
kanamycin	<p>Powder for injection: 1000 mg in vial.</p>
ofloxacin*	<p>Tablet: 200 mg; 400 mg.</p> <p>* Levofloxacin may be an alternative based on availability and programme considerations.</p>
6.3 Antifungal medicines	
clotrimazole	<p>Vaginal cream: 1%; 10%.</p> <p>Vaginal tablet: 100 mg; 500 mg.</p> <p>(Note: necessary?)</p>
□ fluconazole	<p>Injection: 2 mg/ml in vial.</p> <p>Capsule: 50 mg.</p> <p>Oral liquid: 50 mg/5 ml.</p>
griseofulvin (form/strength?)	<p>Capsule or tablet: 125 mg; 250 mg.</p>
nystatin (form/strength?)	<p>Lozenge: 100 000 IU.</p> <p>Pessary: 100 000 IU.</p> <p>Tablet: 100 000 IU; 500 000 IU.</p> <p>(Note: consider adding the oral solution 100 000IU/ml).</p>

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<i>Complementary List</i>	
<i>amphotericin B</i>	<i>Powder for injection: 50 mg in vial.</i>
<i>flucytosine</i>	<i>Capsule: 250 mg.</i> <i>Infusion: 2.5 g in 250 ml.</i>
<i>potassium iodide</i>	<i>Saturated solution.</i>
6.4 Antiviral medicines	
6.4.1 Antiherpes medicines	
☐ <i>aciclovir</i> (form/strength, indication?)	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). The Committee emphasizes the importance of using these products in accordance with global and national guidelines. The Committee 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 with assured pharmaceutical quality.	
6.4.2.1 Nucleoside/Nucleotide reverse transcriptase inhibitors	
<i>abacavir (ABC)</i>	Tablet: 300 mg (as sulfate). Oral liquid: 100 mg (as sulfate)/5 ml.
<i>didanosine (ddI)</i>	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. Buffered powder for oral liquid: 100 mg; 167 mg; 250 mg packets.
<i>emtricitabine (FTC)*</i>	Capsule: 200 mg. Oral liquid: 10 mg/ml. * 3TC is an acceptable alternative to FTC, based on knowledge of the pharmacology, the resistance patterns and clinical trials of antiretrovirals.
<i>lamivudine (3TC)</i>	Tablet: 150 mg. Oral liquid: 50 mg/5 ml.
<i>stavudine (d4T)</i>	Capsule: 15 mg; 20 mg; 30 mg; 40 mg.* * The Committee expects this dosage form to be reviewed for possible deletion at the next meeting. Powder for oral liquid: 5 mg/5 ml.
<i>tenofovir</i> (not approved in children)	Capsule: 300 mg (tenofovir disoproxil fumarate - equivalent to 245 mg tenofovir disoproxil).

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zidovudine (ZDV or AZT)	<p>Solution for IV infusion injection: 10 mg/ml in 20-ml vial.</p> <p>Capsule: 100 mg; 250 mg.</p> <p>Tablet: 300 mg.</p> <p>Oral liquid: 50 mg/5 ml.</p>
6.4.2.2 Non-nucleoside reverse transcriptase inhibitors	
efavirenz (EFV or EFZ)	<p>Capsule: 50 mg; 100 mg; 200 mg.</p> <p>Tablet: 600 mg.</p> <p>Oral liquid: 150 mg/5 ml.</p>
nevirapine (NVP)	<p>Tablet: 200 mg.</p> <p>Oral liquid: 50 mg/5 ml.</p>
6.4.2.3 Protease inhibitors	
<p>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.</p> <p>This section will be reviewed by the Committee as a priority at its next meeting. It is expected that application for a heat stable tablet formulation containing 200/50 mg lopinavir + ritonavir will be submitted for the next meeting.</p>	
indinavir (IDV) (not approved in children)	<p>Capsule: 200 mg; 333 mg; 400 mg (as sulfate).</p>
lopinavir + ritonavir (LPV/r)	<p>Capsule: 133.3 mg + 33.3 mg.</p> <p>Oral liquid: 400 mg + 100 mg/5 ml.</p>
nelfinavir (NFV)	<p>Oral powder: 50 mg/g.</p> <p>Tablet: 250 mg (as mesilate).</p>
ritonavir	<p>Oral solid dosage form: 100 mg.</p> <p>Oral liquid: 400 mg/5 ml.</p>
saquinavir (SQV) (indication?)	<p>Capsule: 200 mg.</p>
FIXED-DOSE COMBINATIONS	
efavirenz + emtricitabine* + tenofovir (indication in children?)	<p>Tablet: 600 mg + 200 mg + 300 mg.</p> <p>* 3TC is an acceptable alternative to FTC, based on knowledge of the pharmacology, the resistance patterns and clinical trials of antiretrovirals.</p>
emtricitabine* + tenofovir (indication in children?)	<p>Tablet: 200 mg + 300 mg.</p> <p>* 3TC is an acceptable alternative to FTC, based on knowledge of the pharmacology, the resistance patterns and clinical trials of antiretrovirals.</p>
stavudine + lamivudine + nevirapine	<p>Tablet: 30 mg + 150 mg + 200 mg.</p>
zidovudine + lamivudine	<p>Tablet: 300 mg + 150 mg.</p>

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zidovudine + lamivudine + nevirapine	Tablet: 300 mg + 150 mg + 200 mg.
6.4.3 Other antivirals	
ribavirin (indication in children?)	Injection for intravenous administration: 1000 mg and 800 mg in 10-ml phosphate buffer solution. Oral solid dosage forms: 200 mg; 400 mg; 600 mg.
6.5 Antiprotozoal medicines	
6.5.1 Antiamoebic and anti giardiasis medicines	
diloxanide	Tablet: 500 mg (furoate).
<input type="checkbox"/> metronidazole	Injection: 500 mg in 100-ml vial. Oral liquid: 200 mg (as benzoate)/5 ml. Tablet: 200-500 mg.
6.5.2 Antileishmaniasis medicines (Note: necessary?).	
<input type="checkbox"/> meglumine antimoniate	Injection , 30%, equivalent to approximately 8.1% antimony in 5-ml ampoule.
paromomycin	Solution for intramuscular injection: 750 mg/2 ml (as sulfate).
<i>Complementary List</i>	
amphotericin B	<i>Powder for injection: 50 mg in vial.</i>
pentamidine	<i>Powder for injection: 200 mg; 300 mg (isetionate) in vial.</i>
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. The Committee recognizes that not all of these FDCs exist and encourages their development and rigorous testing. The Committee also encourages development and testing of rectal dosage formulations.	
amodiaquine*	Tablet: 153 mg or 200 mg (as hydrochloride). * To be used (a) in combination with artesunate 50 mg OR (b) may be used alone for the treatment of <i>P.vivax</i> , <i>P.ovale</i> and <i>P.malariae</i> infections.
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. * Not recommended in the first trimester of pregnancy or in children below 5 kg.

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artesunate*	<p>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.</p> <p>Tablet: 50 mg.</p> <p>* To be used in combination with either amodiaquine, mefloquine or sulfadoxine + pyrimethamine.</p>
chloroquine	<p>Tablet: 100 mg; 150 mg (as phosphate or sulfate).</p> <p>Oral liquid: 50 mg (as phosphate or sulfate)/5 ml.</p>
doxycycline*	<p>Capsule: 100 mg (as hydrochloride).</p> <p>Tablet (dispersible): 100 mg (as monohydrate).</p> <p>* For use only in combination with quinine.</p>
mefloquine*	<p>Tablet: 250 mg (as hydrochloride).</p> <p>* To be used in combination with artesunate 50 mg.</p>
primaquine*	<p>Tablet: 7.5 mg; 15 mg (as diphosphate)</p> <p>* Only for use to achieve radical cure of <i>P.vivax</i> and <i>P.ovale</i> infections, given for 14 days.</p>
quinine*	<p>Injection: 300 mg quinine hydrochloride/ml in 2-ml ampoule.</p> <p>Tablet: 300 mg (quinine sulfate) or 300 mg (quinine bisulfate).</p> <p>* For use only in the management of severe malaria, and should be used in combination with doxycycline.</p>
sulfadoxine + pyrimethamine*	<p>Tablet: 500 mg + 25 mg.</p> <p>* Only in combination with artesunate 50 mg.</p>
6.5.3.2 For prophylaxis	
chloroquine*	<p>Tablet: 150 mg (as phosphate or sulfate).</p> <p>Oral liquid: 50 mg (as phosphate or sulfate)/5 ml.</p> <p>* For use only in central American regions, for use for <i>P.vivax</i>.</p>
doxycycline	<p>Capsule or tablet: 100 mg (hydrochloride).</p> <p>(see previous note about possible contraindication and the suggested age break – e.g. 8 years).</p>
mefloquine	<p>Tablet: 250 mg (as hydrochloride).</p>
proguanil*	<p>Tablet: 100 mg (hydrochloride).</p> <p>* For use only in combination with chloroquine.</p>
6.5.4 Anti-pneumocystosis and antitoxoplasmosis medicines	
pyrimethamine (form/strength?)	<p>Tablet: 25 mg.</p>
sulfamethoxazole + trimethoprim	<p>Injection: 80 mg + 16 mg/ml in 5-ml ampoule; 80 mg + 16 mg/ml in 10-ml ampoule.</p>

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<i>Complementary List</i>	
pentamidine	Tablet: 200 mg; 300 mg.
6.5.5 Antitrypanosomal medicines	
6.5.5.1 African trypanosomiasis (Note: needs careful checking)	
Medicines for the treatment of 1 st stage African trypanosomiasis	
pentamidine*	Powder for injection: 200 mg (pentamidine 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 exclusively for the treatment of the initial phase of <i>Trypanosoma brucei rhodesiense</i> infection.
Medicines for the treatment of 2 nd stage African trypanosomiasis	
eflornithine	Injection: 200 mg (hydrochloride)/ml in 100-ml bottle.
melarsoprol	Injection: 3.6% solution, 5-ml ampoules (180 mg of active compound).
6.5.5.2 American trypanosomiasis (Note: needs careful checking)	
benznidazole	Tablet: 100 mg.
nifurtimox	Tablet: 30 mg; 120 mg; 250 mg.

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7. ANTIMIGRAINE MEDICINES	
7.1 For treatment of acute attack (Note: necessary, based on epidemiological grounds?)	
acetylsalicylic acid	Tablet: 300-500 mg.
paracetamol	Tablet: 300-500 mg. Syrup: 125 mg/5 ml
7.2 For prophylaxis	
□ propranolol	Tablet: 20 mg; 40 mg (hydrochloride).

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8. ANTINEOPLASTIC, IMMUNOSUPPRESSIVES AND MEDICINES USED IN PALLIATIVE CARE (Note: this entire section needs a specific review)	
8.1 Immunosuppressive medicines	
<i>Complementary List</i>	
azathioprine	<i>Powder for injection: 100 mg (as sodium salt) in vial.</i> <i>Tablet: 50 mg.</i>
ciclosporin	<i>Concentrate for injection: 50 mg/ml in 1-ml ampoule for organ transplantation.</i> <i>Capsule: 25 mg.</i>
8.2 Cytotoxic medicines	
This section is expected to be reviewed at the next meeting.	
<i>Complementary List</i>	
asparaginase	<i>Powder for injection: 10 000 IU in vial.</i>
bleomycin	<i>Powder for injection: 15 mg (as sulfate) in vial.</i>
calcium folinate	<i>Injection: 3 mg/ml in 10-ml ampoule.</i> <i>Tablet: 15 mg.</i>
chlorambucil	<i>Tablet: 2 mg.</i>
cisplatin	<i>Powder for injection: 10 mg; 50 mg in vial.</i>
cyclophosphamide	<i>Powder for injection: 500 mg in vial.</i> <i>Tablet: 25 mg.</i>
cytarabine	<i>Powder for injection: 100 mg in vial.</i>
dacarbazine	<i>Powder for injection: 100 mg in vial.</i>
dactinomycin	<i>Powder for injection: 500 micrograms in vial.</i>
daunorubicin	<i>Powder for injection: 50 mg (as hydrochloride).</i>
doxorubicin	<i>Powder for injection: 10 mg; 50 mg (hydrochloride) in vial.</i>
etoposide	<i>Injection: 20 mg/ml in 5-ml ampoule.</i> <i>Capsule: 100 mg.</i>
fluorouracil	<i>Injection: 50 mg/ml in 5-ml ampoule.</i>
mercaptopurine	<i>Tablet: 50 mg.</i>
methotrexate	<i>Powder for injection: 50 mg (as sodium salt) in vial.</i> <i>Tablet: 2.5 mg (as sodium salt).</i>
procarbazine	<i>Capsule: 50 mg (as hydrochloride).</i>
vinblastine	<i>Powder for injection: 10 mg (sulfate) in vial.</i>
vincristine	<i>Powder for injection: 1 mg; 5 mg (sulfate) in vial.</i>

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8.3 Hormones and antihormones	
<i>Complementary List</i>	
dexamethasone	Injection: 4 mg dexamethasone phosphate (as disodium salt) in 1-ml ampoule.
hydrocortisone	Powder for injection: 100 mg (as sodium succinate) in vial.
<input type="checkbox"/> prednisolone*	Tablet: 5 mg; 25 mg. <i>* There is no evidence for complete clinical similarity between prednisolone and dexamethasone at high doses.</i> <i>(Note: see previous note about the paediatric liquid formulation).</i>
tamoxifen	Tablet: 10 mg; 20 mg (as citrate).
8.4 Medicines used in palliative care	
<p>The WHO Expert Committee recognizes the importance of listing specific medicines in the Palliative Care Section. Some medicines currently used in palliative care are included in the relevant sections of the Model List, according to their therapeutic use, e.g. analgesics. The Guidelines for Palliative Care that were referenced in the previous list are in need of update. The Committee expects applications for medicines needed for palliative care to be submitted for the next meeting.</p>	

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~~9. ANTIPARKINSONISM MEDICINES~~ (Note: necessary, based on epidemiological grounds?).

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10. MEDICINES AFFECTING THE BLOOD	
10.1 Antianaemia medicines	
ferrous salt	<p>Tablet: equivalent to 60 mg iron.</p> <p>Oral liquid: equivalent to 25 mg iron (as sulfate)/ml.</p> <p>(Note: need to check listed formulation, as that is a “drop” – a 15 mg/5 ml elemental iron content syrup may also be available).</p>
ferrous salt + folic acid	<p>Tablet equivalent to 60 mg iron + 400 micrograms folic acid (Nutritional supplement for use during pregnancy).</p>
folic acid	<p>Tablet: 1 mg; 5 mg.</p>
hydroxocobalamin	<p>Injection: 1 mg in 1-ml ampoule.</p>
10.2 Medicines affecting coagulation (Note: necessary, based on epidemiological grounds?)	
heparin sodium	<p>Injection: 1000 IU/ml; 5000 IU/ml; 20,000 IU/ml in 1-ml ampoule.</p>
phytomenadione	<p>Injection: 10 mg/ml in 5-ml ampoule.</p> <p>Tablet: 10 mg.</p>
protamine sulfate	<p>Injection: 10 mg/ml in 5-ml ampoule.</p>
<input type="checkbox"/> warfarin	<p>Tablet: 1 mg; 2 mg; 5 mg (sodium salt).</p>

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11. BLOOD PRODUCTS AND PLASMA SUBSTITUTES	
11.1 Plasma substitutes	
<input type="checkbox"/> dextran 70*	Injectable solution: 6%. * Polygeline, injectable solution, 3.5% is considered as equivalent.
11.2 Plasma fractions for specific use	
All plasma fractions should comply with the WHO 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).	
<i>Complementary List</i>	
<input type="checkbox"/> human normal immunoglobulin	Intravenous administration: 5%, 10% protein solution. Intramuscular administration: 16% protein solution.
<input type="checkbox"/> factor VIII concentrate	Dried.
<input type="checkbox"/> factor IX complex (coagulation factors, II, VII, IX, X) concentrate	Dried.

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12. CARDIOVASCULAR MEDICINES	
12.1 Antianginal medicines (Not relevant)	
12.2 Antiarrhythmic medicines (relevance?)	
<input type="checkbox"/> atenolol	Tablet: 50 mg; 100 mg.
digoxin	Injection: 250 micrograms/ml in 2-ml ampoule. Tablet: 62.5 micrograms; 250 micrograms. Oral liquid: 50 micrograms/ml.
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 (form/strength?)	Injection: 2.5 mg (hydrochloride)/ml in 2-ml ampoule. Tablet: 40 mg; 80 mg (hydrochloride).
<i>Complementary List (Note: needs careful review)</i>	
<input type="checkbox"/> procainamide	Injection: 100 mg (hydrochloride)/ml in 10-ml ampoule.
<input type="checkbox"/> quinidine	Tablet: 200 mg (sulfate).
12.3 Antihypertensive medicines	
<input type="checkbox"/> amlodipine	Tablet: 5 mg.
<input type="checkbox"/> atenolol (form/strength?)	Tablet: 50 mg; 100 mg.
<input type="checkbox"/> enalapril	Tablet: 2.5 mg.
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.
<input type="checkbox"/> hydrochlorothiazide	Tablet (scored): 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.
<i>Complementary List</i>	
<input type="checkbox"/> sodium nitroprusside	Powder for infusion: 50 mg in ampoule.

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12.4 Medicines used in heart failure	
digoxin	Injection: 250 micrograms/ml in 2-ml ampoule. Tablet: 62.5 micrograms; 250 micrograms. Oral liquid: 50 micrograms/ml.
enalapril	Tablet: 2.5 mg.
furosemide	Injection: 10 mg/ml in 2-ml ampoule. Tablet: 40 mg. <i>(Note: needs to be included in the antihypertensive section as well. A 10 mg/ml oral solution is available, but requires refrigeration).</i>
hydrochlorothiazide (form/strength?)	Tablet (scored): 25 mg.
<i>Complementary List</i>	
dopamine	Injection: 40 mg (hydrochloride) in 5-ml vial.
12.5 Antithrombotic medicines <i>(Note: needs careful review)</i>	
acetylsalicylic acid	Tablet: 100 mg.
<i>Complementary List</i>	
streptokinase	Powder for injection: 1.5 million IU in vial.
12.6 Lipid-lowering agents <i>(Note: needs careful review, as some children with familial dyslipidaemias may need treatment – may not justify listing in the EML-c at this stage)</i>	

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13. DERMATOLOGICAL MEDICINES (topical)	
13.1 Antifungal medicines	
benzoic acid + salicylic acid	Ointment or cream: 6% + 3%.
<input type="checkbox"/> miconazole	Ointment or cream: 2% (nitrate).
sodium thiosulfate	Solution: 15%.
<i>Complementary List</i>	
selenium sulfide	Detergent-based suspension: 2%.
13.2 Anti-infective medicines	
<input type="checkbox"/> methylrosanilinium chloride (gentian violet)	Aqueous solution: 0.5%. <i>(Note: may consider for deletion)</i> Tincture: 0.5%.
neomycin sulfate + <input type="checkbox"/> bacitracin	Ointment: 5 mg neomycin sulfate + 250 IU bacitracin zinc/g.
<i>(Note: may consider inclusion of polyvidone iodine topical formulations here, e.g. 10% ointment)</i>	
potassium permanganate	Aqueous solution: 1:10 000.
silver sulfadiazine	Cream: 1%, in 500-g container.
13.3 Anti-inflammatory and antipruritic medicines	
<input type="checkbox"/> betamethasone	Ointment or cream: 0.1% (as valerate).
<input type="checkbox"/> calamine lotion	Lotion.
<input type="checkbox"/> hydrocortisone	Ointment or cream: 1% (acetate).
13.4 Astringent medicines	
aluminium diacetate	Solution: 5%.
13.5 Medicines affecting skin differentiation and proliferation	
benzoyl peroxide	Lotion or cream: 5%.
coal tar	Solution: 5%.
dithranol	Ointment: 0.1%-2%.
fluorouracil	Ointment: 5%.
<input type="checkbox"/> podophyllum resin	Solution: 10-25%.
salicylic acid (form/strength?)	Solution: 5%.
urea (indication?)	Ointment or cream: 10%.
13.6 Scabicides and pediculicides	
<input type="checkbox"/> benzyl benzoate	Lotion: 25%.
permethrin	Cream: 5%. Lotion: 1%.

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14. DIAGNOSTIC AGENTS	
14.1 Ophthalmic medicines	
fluorescein	Eye drops: 1% (sodium salt).
<input type="checkbox"/> tropicamide	Eye drops: 0.5%.
14.2 Radiocontrast media (<i>Note: needs careful review</i>)	
<input type="checkbox"/> amidotrizoate (form/strength?)	Injection: 140-420 mg iodine (as sodium or meglumine salt)/ml in 20-ml ampoule.
barium sulfate	Aqueous suspension.
<input type="checkbox"/> iohexol	Injection: 140-350 mg iodine/ml in 5-ml; 10-ml; 20-ml ampoule.
<i>Complementary List</i>	
<input type="checkbox"/> meglumine iotroxate	Solution: 5-8 g iodine in 100-250 ml.

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15. DISINFECTANTS AND ANTISEPTICS	
15.1 Antiseptics	
<input type="checkbox"/> chlorhexidine	Solution: 5% (digluconate) for dilution.
<input type="checkbox"/> ethanol	Solution: 70% (denatured).
<input type="checkbox"/> polyvidone iodine	Solution: 10%. <i>(Note: see previous note on polyvidone iodine ointment).</i>
15.2 Disinfectants (Relevant?)	
<input type="checkbox"/> chlorine base compound	Powder: (0.1% available chlorine) for solution.
<input type="checkbox"/> chloroxylenol	Solution: 4.8%.
glutaral	Solution: 2%.

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16. DIURETICS	
amiloride	Tablet: 5 mg (hydrochloride).
<input type="checkbox"/> furosemide	Injection: 10 mg/ml in 2-ml ampoule. Tablet: 40 mg. (Note: see previous note re oral solution).
<input type="checkbox"/> hydrochlorothiazide	Tablet (scored): 25 mg.
mannitol	Injectable solution: 10%; 20%.
spironolactone	Tablet: 25 mg.

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17. GASTROINTESTINAL MEDICINES	
17.1 Antacids and other antiulcer medicines	
aluminium hydroxide	Tablet: 500 mg. Oral liquid: 320 mg/5 ml.
ranitidine	Injection: 25 mg/ml in 2-ml ampoule. Tablet: 150 mg (as hydrochloride). Oral liquid: 75 mg/5 ml.
magnesium hydroxide	Oral liquid: equivalent to 550 mg magnesium oxide/10 ml.
17.2 Antiemetic medicines	
metoclopramide	Injection: 5 mg (hydrochloride)/ml in 2-ml ampoule. Tablet: 10 mg (hydrochloride). <i>(Note: consider adding 5 mg/5 ml syrup formulation).</i>

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promethazine

Injection: 25 mg (hydrochloride)/ml in 2-ml ampoule.

Tablet: 10 mg; 25 mg (hydrochloride).

Oral liquid: 5 mg (hydrochloride)/5 ml.

(Note: see previous note about toxicity in children under 2 years).

(Note: Martindale has this warning section

“ Sudden infant death syndrome.

Although some early reports raised the possibility of an association between the use of phenothiazine antihistamines and the sudden infant death syndrome (SIDS) this has not been confirmed. Following an initial report that 4 of 7 infants with SIDS had been given alimemazine before death and that a series of severe apnoeic crises had been observed in the twin of a SIDS victim given **promethazine**,¹ the same workers studied 52 SIDS victims, 36 near-miss infants (those who had experienced severe unexplained episodes of cyanosis or pallor during sleep), and 175 control subjects to investigate the role of nasopharyngitis and phenothiazines in this syndrome.² They found that there was no difference in the incidence of nasopharyngitis between the 3 groups, but the proportion of infants given phenothiazines was higher in both the SIDS group (23%) and the near-miss group (22%) than in the control group (2%). In a subsequent study,³ they found that the incidence of central and obstructive sleep apnoeas was increased in 4 healthy infants given **promethazine** for 3 days, although the duration of the attacks was unaltered and generally short, with a range of 3 to 10 seconds. A report on behalf of the European Commission,⁴ stated that no link between sudden deaths in infants and drug use had been confirmed by national drug monitoring centres. It was likely that the risk of apnoea was associated with all sedative drugs, especially in overdose.⁴ Previously, phenothiazine-induced hyperthermia had been proposed as a contributory factor in SIDS.⁵

Concern has been expressed⁶ that **promethazine** was frequently prescribed for children aged under 2 years despite recommendations to the contrary. Licensed product information in the USA states that **promethazine** should not be given to children under 2 years of age because of the potential for fatal respiratory depression; it should also be given with caution to children over 2 years of age. In 2004, the FDA⁷ reviewed all reports of serious adverse events in children given **promethazine** that it had received between 1969 and 2003; 22 of 125 reports were of respiratory depression in patients aged 1.5 months to 2 years, 7 of which were fatal. Doses received in these 22 cases ranged from 0.45 to 6.4 mg/kg. The current view in the UK is that phenothiazine antihistamines such as **promethazine** and alimemazine should not be given to children under 2 years of age, primarily because the safety of such use has not been established.

1. Kahn A, Blum D. Possible role of phenothiazines in sudden infant death. *Lancet* 1979; ii: 364-5. (PubMed id:89428)

2. Kahn A, Blum D. Phenothiazines and sudden infant death syndrome. *Pediatrics* 1982; 70: 75-8. (PubMed id:7088637)

3. Kahn A, et al. Phenothiazine-induced sleep apnoeas in normal infants. *Pediatrics* 1985; 75: 844-7. (PubMed id:3991270)

4. Cockfield. Phenergan, Theralene, Algotropyl--drugs responsible for the death of new-born babies. *Off J EC* 1986; 29: C130/25-6.

5. Stanton AN. Sudden infant death syndrome and phenothiazines. *Pediatrics* 1983; 71: 986-7. (PubMed id:6856418)

6. Pollard AJ, Rylance G. Inappropriate prescribing of **promethazine** in infants. *Arch Dis Child* 1994; 70: 357. (PubMed id:8185380)

7. Starke PR, et al. Boxed warning added to **promethazine** labeling for pediatric use. *N Engl J Med* 2005; 352: 2653. (PubMed id:15972879)

This requires careful consideration and perhaps a specific warning in the List regarding use in children under 2 years. Although listed here, it is possible that promethazine is included on national EMLs, but given for

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17.3 Anti-inflammatory medicines (Note: necessary, based on epidemiological grounds?).																					
17.4 Laxatives																					
□ senna	<p>Tablet: 7.5 mg (sennosides) (or traditional dosage forms).</p> <p>(Note: consider deleting senna and replacing with phosphate-containing enema and/or lactulose. Other agents that may be considered are ispaghula husk and liquid paraffin).</p>																				
17.5 Medicines used in diarrhoea																					
17.5.1 Oral rehydration																					
oral rehydration salts*	<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="padding-right: 20px;">glucose:</td> <td style="text-align: right;">75 mEq</td> </tr> <tr> <td>sodium:</td> <td style="text-align: right;">75 mEq or mmol/l</td> </tr> <tr> <td>chloride:</td> <td style="text-align: right;">65 mEq or mmol/l</td> </tr> <tr> <td>potassium:</td> <td style="text-align: right;">20 mEq or mmol/l</td> </tr> <tr> <td>citrate:</td> <td style="text-align: right;">10 mmol/l</td> </tr> <tr> <td>osmolarity:</td> <td style="text-align: right;">245 mOsm/l</td> </tr> <tr> <td>glucose:</td> <td style="text-align: right;">13.5 g/l</td> </tr> <tr> <td>sodium chloride:</td> <td style="text-align: right;">2.6 g/l</td> </tr> <tr> <td>potassium chloride:</td> <td style="text-align: right;">1.5 g/l</td> </tr> <tr> <td>trisodium citrate dihydrate+:</td> <td style="text-align: right;">2.9 g/l</td> </tr> </table> <p>+ 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.</p> <p>* In cases of cholera a higher concentration of sodium may be required.</p>	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
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17.5.2 Medicines for diarrhoea in children																					
zinc sulfate*	<p>Tablet: in 10 mg per unit dosage forms.</p> <p>Oral liquid: in 10 mg per unit dosage forms.</p> <p>* In acute diarrhoea zinc sulfate should be used as an adjunct to oral rehydration salts.</p>																				
17.5.3 Antidiarrhoeal (symptomatic) medicines in adults																					
codeine*	<p>Tablet: 30 mg (phosphate).</p> <p>* The role of this item has been questioned and its continued inclusion on the list will be reviewed at the next meeting of the Expert Committee.</p>																				

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18. HORMONES, OTHER ENDOCRINE MEDICINES AND CONTRACEPTIVES	
18.1 Adrenal hormones and synthetic substitutes	
18.2 Androgens	
18.3 Contraceptives	
18.3.1 Oral hormonal contraceptives	
18.3.2 Injectable hormonal contraceptives	
18.3.3 Intrauterine devices	
18.3.4 Barrier methods	
18.3.5 Implantable contraceptives	
18.4 Estrogens	
18.5 Insulins and other antidiabetic agents	
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	
18.7 Progestogens	
18.8 Thyroid hormones and antithyroid medicines	
levothyroxine (dose?)	Tablet: 50 micrograms; 100 micrograms (sodium salt).
potassium iodide	Tablet: 60 mg. <i>(Note: consider the addition of Lugol's Solution (about 130 mg total iodine/ml) or Potassium iodide solution USP (1 g/ml).</i>
□ propylthiouracil	Tablet: 50 mg. <i>(Note: consider replacing with carbimazole 5mg tablets –not registered for paediatric use, although paediatric doses have been suggested - <1yr 0.75 mg/kg/day; 1-4 yrs 7.5 mg/day; 4-12 years, 15 mg per day in 3 divided doses).</i>

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19. IMMUNOLOGICALS	
19.1 Diagnostic agents	
All tuberculins should comply with the WHO Requirements for Tuberculins (Revised 1985). WHO Expert Committee on Biological Standardization. Thirty-sixth report. (WHO Technical Report Series, No. 745, 1987, Annex 1).	
tuberculin, purified protein derivative (PPD)	Injection.
19.2 Sera and immunoglobulins	
All plasma fractions should comply with the WHO Requirements for the Collection, Processing and Quality Control of Blood, Blood Components and Plasma Derivatives (Revised 1992). WHO Expert Committee on Biological Standardization. Forty-third report. (WHO Technical Report Series, No. 840, 1994, Annex 2).	
anti D immunoglobulin (human)	Injection: 250 micrograms in single dose 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.
<input type="checkbox"/> rabies immunoglobulin	Injection: 150 IU/ml in vial.
19.3 Vaccines <i>(Note: need to check against EPI guidelines, as may be subject to change) (Note: needs careful review of exactly which are relevant to which groups of children, infants and neonates)</i>	
<p>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.</p> <p>All vaccines should comply with the WHO Requirements for Biological Substances.</p>	
BCG vaccine	
cholera vaccine	
diphtheria vaccine	
hepatitis A vaccine	
hepatitis B vaccine	
<i>Haemophilus influenzae</i> type b vaccine	
influenza vaccine	
Japanese encephalitis vaccine	
measles vaccine	
meningococcal meningitis vaccine	

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mumps vaccine	
pertussis vaccine	
pneumococcal vaccine	
poliomyelitis vaccine	
rabies vaccine	
rotavirus vaccine	
rubella vaccine	
tetanus vaccine	
typhoid vaccine	
varicella vaccine	
yellow fever vaccine	

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20. MUSCLE RELAXANTS (PERIPHERALLY-ACTING) AND CHOLINESTERASE INHIBITORS	
□ alcuronium	Injection: 5 mg (chloride)/ml in 2-ml ampoule
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.
<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.

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21. OPHTHALMOLOGICAL PREPARATIONS	
21.1 Anti-infective agents	
aciclovir	Ointment: 3% W/W.
<input type="checkbox"/> gentamicin*	Solution (eye drops): 0.3% (sulfate). * Final selection depends on indication for use.
<input type="checkbox"/> tetracycline	Eye ointment: 1% (hydrochloride).
21.2 Anti-inflammatory agents	
<input type="checkbox"/> prednisolone	Solution (eye drops): 0.5% (sodium phosphate).
21.3 Local anaesthetics	
<input type="checkbox"/> tetracaine	Solution (eye drops): 0.5% (hydrochloride).
21.4 Miotics and antiglaucoma medicines (Note: necessary, based on epidemiological grounds?)	
21.5 Mydriatics	
atropine	Solution (eye drops): 0.1%; 0.5%, 1% (sulfate).
<i>Complementary List</i>	
epinephrine (adrenaline)	Solution (eye drops): 2% (as hydrochloride).

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22. OXYTOCICS AND ANTI-OXYTOCICS
22.1 Oxytocics
22.2 Antioxytocics (tocolytics)

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23. PERITONEAL DIALYSIS SOLUTION	
<i>Complementary List</i>	
<i>intraperitoneal dialysis solution (of appropriate composition)</i>	<i>Parenteral solution.</i>

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24. PSYCHOTHERAPEUTIC MEDICINES	
(Note: could also consider listing treatments for pervasive developmental disorders, tic disorders, attention deficit hyperactivity disorder). Also need a review to consider the place of risperidone in paediatric practice (e.g. for schizophrenia, severe aggression and self-injurious behaviour, bipolar mood disorder).	
24.1 Medicines used in psychotic disorders	
<input type="checkbox"/> chlorpromazine	<p>Injection: 25 mg (hydrochloride)/ml in 2-ml ampoule.</p> <p>Tablet: 100 mg (hydrochloride).</p> <p>Oral liquid: 25 mg (hydrochloride)/5 ml.</p>
<input type="checkbox"/> fluphenazine	<p>Injection: 25 mg (decanoate or enantate) in 1-ml ampoule.</p> <p>(Note: needs careful checking, but may be useful in older children).</p>
<input type="checkbox"/> haloperidol (form/strength?)	<p>Injection: 5 mg in 1-ml ampoule.</p> <p>Tablet: 2 mg; 5 mg.</p>
24.2 Medicines used in mood disorders	
24.2.1 Medicines used in depressive disorders	
<input type="checkbox"/> amitriptyline	<p>Tablet: 25 mg (hydrochloride).</p> <p>(Note: this section requires careful review; a case could be made for replacing amitriptyline with fluoxetine as the first-line choice. A comment though would be needed in relation to other SSRIs and safety in children and adolescents).</p>
fluoxetine	Capsule or tablet: 20 mg (present as hydrochloride).
24.2.2 Medicines used in bipolar disorders	
carbamazepine	Tablet (scored): 100 mg; 200 mg.
lithium carbonate	Capsule or tablet: 300 mg.
valproic acid	Tablet (enteric-coated): 200 mg; 500 mg (sodium salt).
24.3 Medicines used in generalized anxiety and sleep disorders (Note: necessary, based on epidemiological grounds?)	
24.4 Medicines used for obsessive compulsive disorders and panic attacks	
clomipramine	<p>Capsule: 10 mg; 25 mg (hydrochloride).</p> <p>(Note: consider using fluoxetine as first-line instead).</p>
24.5 Medicines used in substance dependence programmes	

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25. MEDICINES ACTING ON THE RESPIRATORY TRACT																
25.1 Antiasthmatic and medicines for chronic obstructive pulmonary disease																
□ beclometasone	<p>Inhalation (aerosol): 50 micrograms per dose (dipropionate); 250 micrograms (dipropionate) per dose.</p> <p>(Note: given the access to generic budesonide and fluticasone, a change to the model agent listed could be considered, based on safety grounds).</p>															
epinephrine (adrenaline)	<p>Injection: 1 mg (as hydrochloride or hydrogen tartrate) in 1-ml ampoule.</p>															
ipratropium bromide	<p>Inhalation (aerosol): 20 micrograms/metered dose.</p>															
□ salbutamol	<p>Injection: 50 micrograms (as sulfate)/ml in 5-ml ampoule.</p> <p>Tablet: 2 mg; 4 mg (as sulfate).</p> <p>Oral liquid: 2 mg/5 ml.</p> <p>Inhalation (aerosol): 100 micrograms (as sulfate) per dose.</p> <p>Respirator solution for use in nebulizers: 5 mg (as sulfate)/ml.</p> <p>(Note: consider deleting the oral solid and liquid dosage forms, but including a statement about the various face masks and spacers that should be used at different ages:</p> <p>The suggested choices that can be made at various ages are listed as follows in the 2006 GINA guidelines:</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="3" style="text-align: center;">Figure 3-3: Choosing an Inhaler Device for Children with Asthma*</th> </tr> <tr> <th style="text-align: center;">Age Group</th> <th style="text-align: center;">Preferred Device</th> <th style="text-align: center;">Alternate Device</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">Younger than 4 years</td> <td style="text-align: center;">Pressurized metered-dose inhaler plus dedicated spacer with face mask</td> <td style="text-align: center;">Nebulizer with face mask</td> </tr> <tr> <td style="text-align: center;">4 – 6 years</td> <td style="text-align: center;">Pressurized metered-dose Inhaler plus dedicated spacer with mouthpiece</td> <td style="text-align: center;">Nebulizer with mouthpiece</td> </tr> <tr> <td style="text-align: center;">Older than 6 years</td> <td style="text-align: center;">Dry powder inhaler, or breath-actuated pressurized metered-dose inhaler, or pressurized metered-dose inhaler with spacer and mouthpiece</td> <td style="text-align: center;">Nebulizer with mouthpiece</td> </tr> </tbody> </table> <p style="font-size: small;">*Based on efficacy of drug delivery, cost effectiveness, safety, ease of use, and convenience.</p> <p>Could replace terminology of “inhalation (aerosol)” with the more specific “pressurized metered-dose inhaler”)</p>	Figure 3-3: Choosing an Inhaler Device for Children with Asthma*			Age Group	Preferred Device	Alternate Device	Younger than 4 years	Pressurized metered-dose inhaler plus dedicated spacer with face mask	Nebulizer with face mask	4 – 6 years	Pressurized metered-dose Inhaler plus dedicated spacer with mouthpiece	Nebulizer with mouthpiece	Older than 6 years	Dry powder inhaler, or breath-actuated pressurized metered-dose inhaler, or pressurized metered-dose inhaler with spacer and mouthpiece	Nebulizer with mouthpiece
Figure 3-3: Choosing an Inhaler Device for Children with Asthma*																
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Younger than 4 years	Pressurized metered-dose inhaler plus dedicated spacer with face mask	Nebulizer with face mask														
4 – 6 years	Pressurized metered-dose Inhaler plus dedicated spacer with mouthpiece	Nebulizer with mouthpiece														
Older than 6 years	Dry powder inhaler, or breath-actuated pressurized metered-dose inhaler, or pressurized metered-dose inhaler with spacer and mouthpiece	Nebulizer with mouthpiece														
25.2 Other medicines acting on the respiratory tract																
caffeine citrate	<p>Injection: 20 mg/ml (equivalent to 10 mg caffeine base/ml).</p> <p>Oral liquid: 20 mg/ml (equivalent to 10 mg caffeine base/ml).</p>															

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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 (Note: consider adding half strength Darrow's solution with 5% dextrose)	
glucose	Injectable solution: 5%; 10% isotonic; 50% hypertonic.
glucose with sodium chloride	Injectable solution: 4% glucose, 0.18% sodium chloride (equivalent to Na ⁺ 30 mmol/l, Cl ⁻ 30 mmol/l).
potassium chloride	Solution: 11.2% in 20-ml ampoule (equivalent to K ⁺ 1.5 mmol/ml, Cl ⁻ 1.5 mmol/ml).
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, HCO ₃ ⁻ 167 mmol/l). Solution: 8.4% in 10-ml ampoule (equivalent to Na ⁺ 1000 mmol/l, HCO ₃ ⁻ 1000 mmol/l).
<input type="checkbox"/> sodium lactate, compound solution	Injectable solution.
26.3 Miscellaneous	
water for injection	2-ml; 5-ml; 10-ml ampoules.

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27. VITAMINS AND MINERALS	
(Note: need to review this section in the light of the WHO guidelines on nutritional supplementation in HIV; e.g. is a good quality multivitamin needed?)	
ascorbic acid (form/strength?)	Tablet: 50 mg.
ergocalciferol	Capsule or tablet: 1.25 mg (50 000 IU). Oral liquid: 250 micrograms/ml (10 000 IU/ml).
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 (form/strength?)	Tablet: 25 mg (hydrochloride).
retinol	Water-miscible injection: 100 000 IU (as palmitate) in 2-ml ampoule. Capsule: 50 000 IU; 100 000 IU; 200 000 IU (as palmitate). Tablet (sugar-coated): 10 000 IU (as palmitate). Oral oily solution: 100 000 IU (as palmitate)/ml in multidose dispenser.
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.