

GOVERNMENT OF PAKISTAN
Drug Regulatory Authority of Pakistan
Ministry of National Health Services, Regulations & Coordination

Islamabad, the 2nd October, 2023

NOTIFICATION

No.F.8-43/2021-DD(PS).- For the purpose of clause (xi) of sub-paragraph (1) of paragraph 2 of the Drug Pricing Policy, 2018 the Ministry of National Health Services, Regulations & Coordination is hereby pleased to notify the Model List of Essential Medicines 23rd List (2023) published by the World Health Organization:

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.

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

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.

Where the [c/ symbol is placed next to an individual medicine or strength of medicine on 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.

The **square box symbol (□)** is intended to indicate therapeutic alternatives to the listed medicine that may be considered for selection in national essential medicines lists. Alternatives may be individual medicines, or multiple medicines within a pharmacological class or chemical subgroup, defined at the 4th level of the Anatomical Therapeutic Chemical (ATC) classification, which have similar clinical effectiveness and safety. The listed medicine should be the example of the class or subgroup 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 box listings are applicable to medicine selection for children. A square box is not used to indicate alternative generic brands of the same small molecule medicines, nor alternative biosimilars of biological medicines. However, the selection and use of quality-assured generics and biosimilars of essential medicines at country level is recommended.

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 1.1.



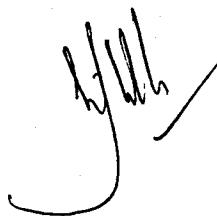
The presence **of an entry on the Essential** Medicines List carries no assurance as to pharmaceutical quality. **It** is the responsibility of the relevant national or regional drug regulatory authority to ensure that each product is of appropriate pharmaceutical quality (including stability) and that,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

For recommendations and advice concerning all aspects of the quality assurance of medicines see the WHO website <https://www.who.int/teams/health-product-and-policy-standards/standards-and-specifications/norms-and-standards-for-pharmaceuticals/guidelines/quality-assurance>

Medicines and dosage forms are listed in alphabetical order within each section and the order of listing does not imply 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 Table 1.2.

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*.
<https://www.who.int/teams/health-product-and-policy-standards/standards-and-specifications/norms-and-standards-for-pharmaceuticals/pharmacopoeia>.

A handwritten signature in black ink, appearing to be 'J. H. H.', is located to the right of the text block containing the URL for the International Pharmacopoeia.

WHO Model List of Essential Medicines – 23rd List (2023)

1. ANAESTHETICS, PREOPERATIVE MEDICINES AND MEDICAL GASES	
1.1 General anaesthetics and oxygen	
1.1.1 Inhalational medicines	
halothane	Inhalation.
isoflurane	Inhalation.
nitrous oxide	Inhalation.
oxygen	Inhalation (medical gas).
sevoflurane	Inhalation.
1.1.2 Injectable medicines	
ketamine	Injection: 50 mg/mL (as hydrochloride) in 10 mL vial.
☐ propofol Therapeutic alternatives: - thiopental	Injection: 10 mg/mL; 20 mg/mL.
1.2 Local anaesthetics	
☐ bupivacaine Therapeutic alternatives to be reviewed	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 Therapeutic alternatives to be reviewed	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/mL (hydrochloride) 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 Therapeutic alternatives to be reviewed	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.

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1.4 Medical gases	
oxygen*	Inhalation For use in the management of hypoxaemia. *No more than 30% oxygen should be used to initiate resuscitation of neonates less than or equal to 32 weeks of gestation.
2. MEDICINES FOR PAIN AND PALLIATIVE CARE	
2.1 Non-opioids and non-steroidal anti-inflammatory medicines (NSAIMs)	
acetylsalicylic acid	Suppository: 50 mg to 150 mg. Tablet: 100 mg to 500 mg.
ibuprofen ^a	Oral liquid: 100 mg/5 mL [c], 200 mg/5 mL. Tablet: 200 mg; 400 mg; 600 mg. ^a Not in children less than 3 months.
paracetamol (acetaminophen)*	Oral liquid: 120 mg/5 mL or 125 mg/5 mL**, 250 mg/5 mL [c]. **The presence of both 120 mg/5 mL and 125 mg/5 mL strengths on the same market would cause confusion in prescribing and dispensing and should be avoided. Suppository: 100 mg, 250 mg [c]. Tablet: 250 mg, 325 mg, 500 mg. Tablet (dispersible): 100 mg, 250 mg [c]. *Not recommended for anti-inflammatory use due to lack of proven benefit to that effect.
2.2 Opioid analgesics	
codeine	Tablet: 30 mg (phosphate).
fentanyl*	Transdermal patch: 12 micrograms/hr; 25 micrograms/hr; 50 micrograms/hr; 75 micrograms/hr; 100 micrograms/hr. *For the management of cancer pain
☐ morphine Therapeutic alternatives: - hydromorphone - oxycodone	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/5 mL (morphine hydrochloride or morphine sulfate). Tablet (slow release): 10 mg to 200mg (morphine hydrochloride or morphine sulfate). Tablet (immediate release): 10 mg (morphine sulfate).
Complementary list	
methadone*	Tablet: 5 mg; 10 mg (hydrochloride) Oral liquid: 5 mg/5 mL; 10 mg/5 mL (hydrochloride) Concentrate for oral liquid: 5 mg/mL; 10 mg/mL (hydrochloride) *For the management of cancer pain.

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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 (as disodium phosphate salt) in 1 mL ampoule. Oral liquid: 2 mg/5 mL. Tablet: 2 mg [c]; 4 mg.
diazepam	Injection: 5 mg/mL. Oral liquid: 2 mg/5 mL. Rectal gel: 5 mg/mL in 0.5 mL, 2 mL, 4 mL rectal delivery system. Rectal solution: 2 mg/mL in 1.25 mL, 2.5 mL rectal tube; 4 mg/mL in 2.5 mL rectal tube. Tablet: 5 mg; 10 mg.
docusate sodium	Capsule: 100 mg. Oral liquid: 50 mg/5 mL.
fluoxetine	Solid oral dosage form: 20 mg (as hydrochloride).
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 to 3.7 g/5 mL.
loperamide	Solid oral dosage form: 2 mg.
metoclopramide	Injection: 5 mg/mL (hydrochloride) in 2 mL ampoule. Oral liquid: 5 mg/5 mL. Solid oral form: 10 mg (hydrochloride).
midazolam	Injection: 1 mg/mL; 5 mg/mL. Oral liquid: 2mg/mL [c]. Solid oral dosage form: 7.5 mg; 15 mg.
☐ ondansetron [a] Therapeutic alternatives: - dolasetron - granisetron - palonosetron - tropisetron	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.

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3. ANTIALLERGICS AND MEDICINES USED IN ANAPHYLAXIS	
dexamethasone	Injection: 4 mg/mL (as disodium phosphate salt) in 1 mL ampoule.
epinephrine (adrenaline)	Injection: 1 mg/mL (as hydrochloride or hydrogen tartrate) in 1 mL ampoule.
hydrocortisone	Powder for injection: 100 mg (as sodium succinate) in vial.
☐ loratadine* Therapeutic alternatives: - cetirizine - fexofenadine	Oral liquid: 1 mg/mL. Tablet: 10 mg. <i>*There may be a role for sedating antihistamines for limited indications (EMLC).</i>
☐ prednisolone Therapeutic alternatives: - prednisone	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.
methylthionium 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	
deferoxamine	Powder for injection: 500 mg (mesilate) in vial.
dimercaprol	Injection in oil: 50 mg/mL in 2 mL ampoule.
fomepizole	Injection: 5 mg/mL (sulfate) in 20 mL ampoule or 1 g/mL (base) in 1.5 mL ampoule.
sodium calcium edetate	Injection: 200 mg/mL in 5 mL ampoule.
succimer	Solid oral dosage form: 100 mg.

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5. MEDICINES FOR DISEASES OF THE NERVOUS SYSTEM	
5.1 Antiseizure medicines	
carbamazepine	Oral liquid: 100 mg/5 mL. Tablet (chewable): 100 mg; 200 mg. Tablet (scored): 100 mg; 200 mg; 400 mg.
diazepam	Rectal gel: 5 mg/mL in 0.5 mL, 2 mL, 4 mL rectal delivery system. Rectal solution: 2 mg/mL in 1.25 mL, 2.5 mL rectal tube; 4 mg/mL in 2.5 mL rectal tube.
lamotrigine*	Tablet: 25 mg; 50 mg; 100 mg; 200 mg. Tablet (chewable, dispersible): 2 mg; 5 mg; 25 mg; 50 mg; 100 mg; 200 mg. *For use as adjunctive therapy for treatment-resistant partial or generalized seizures.
levetiracetam	Oral solution: 100 mg/mL. Tablet: 250 mg; 500 mg; 750 mg; 1000 mg.
☐ lorazepam Therapeutic alternatives: - diazepam (injection) - midazolam (injection)	Injection: 2 mg/mL in 1 mL ampoule; 4 mg/mL in 1 mL ampoule.
magnesium sulfate*	Injection: 0.5 g/mL in 2 mL ampoule (equivalent to 1 g in 2 mL; 50% weight/volume); 0.5 g/mL in 10 mL ampoule (equivalent to 5 g in 10 mL; 50% weight/volume). *For use in eclampsia and severe pre-eclampsia and not for other convulsant disorders.
midazolam	Solution for oromucosal administration: 5 mg/mL in 0.5 mL, 1 mL, 1.5 mL, 2 mL pre-filled syringe; 10 mg/mL in 0.25 mL, 0.5 mL, 0.75 mL, 1 mL pre-filled syringe. Injection*: 1 mg/mL in 5 mL vial; 5 mg/mL in 1 mL or 3 mL vial. *For buccal administration when solution for oromucosal administration is not available.
phenobarbital	Injection: 30 mg/mL or 60 mg/mL [c], 200 mg/mL (sodium). Oral liquid: 15 mg/5 mL. Tablet: 15 mg to 100 mg.
phenytoin	Injection: 50 mg/mL (phenytoin sodium). Oral liquid: 30 mg/5 mL (phenytoin). Solid oral dosage form: 25 mg; 50 mg; 100 mg (phenytoin sodium). Tablet (chewable): 50 mg (phenytoin).
valproic acid (sodium valproate)* <i>*Avoid use in pregnancy and in women and girls of child-bearing potential, unless alternative treatments are ineffective or not tolerated because of the high risk of birth defects and developmental disorders in children exposed to valproate in the womb.</i>	Oral liquid: 200 mg/5 mL. Tablet (crushable): 100 mg. Tablet (enteric-coated): 200 mg; 500 mg.

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Complementary List	
<i>ethosuximide</i>	<i>Capsule: 250 mg. Oral liquid: 250 mg/5 mL.</i>
<i>levetiracetam</i>	<i>Concentrate solution for infusion: 500 mg/5mL in 5 mL vial. Solution for infusion: 5 mg/mL; 10 mg/mL; 15 mg/mL in 100 mL bag.</i>
<i>valproic acid (sodium valproate)*</i> <i>*Avoid use in pregnancy and in women and girls of child-bearing potential, unless alternative treatments are ineffective or not tolerated because of the high risk of birth defects and developmental disorders in children exposed to valproate in the womb.</i>	<i>Injection: 100 mg/mL in 3 mL, 4 mL, 10 mL ampoule.</i>
5.2 Medicines for multiple sclerosis	
Complementary List	
<i>cladribine</i>	<i>Tablet: 10 mg.</i>
<i>glatiramer acetate</i>	<i>Injection (subcutaneous): 20 mg/mL; 40 mg/mL in pre-filled syringe.</i>
<i>rituximab*</i> <i>*including quality-assured biosimilars</i>	<i>Injection (intravenous): 500 mg/50 mL in 50 mL vial.</i>
5.3 Medicines for parkinsonism	
☐ <i>biperiden</i> Therapeutic alternatives: – <i>trihexyphenidyl</i>	<i>Injection: 5 mg (lactate) in 1 mL ampoule. Tablet: 2 mg (hydrochloride).</i>
<i>levodopa</i> + ☐ <i>carbidopa</i> Therapeutic alternatives: – <i>benserazide (for carbidopa)</i>	<i>Tablet: 100 mg + 10 mg; 100 mg + 25 mg; 250 mg + 25 mg.</i>

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6. ANTI-INFECTIVE MEDICINES	
6.1 Anthelmintics	
6.1.1 Intestinal anthelmintics	
albendazole	Tablet (chewable, scored): 400 mg.
ivermectin	Tablet: 3 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, 500 mg Tablet (scored): 600 mg.
pyrantel	Tablet (chewable): 250 mg (as embonate or pamoate).
6.1.2 Antifilarials	
albendazole	Tablet (chewable, scored): 400 mg.
diethylcarbamazine	Tablet: 50 mg; 100 mg (dihydrogen citrate).
ivermectin	Tablet: 3 mg.
6.1.3 Antischistosomes and other antitremitode medicines	
praziquantel	Tablet: 150 mg, 500 mg. Tablet (scored): 600 mg.
triclabendazole	Tablet (scored): 250 mg.
Complementary List	
oxamniquine*	Capsule: 250 mg. Oral liquid: 250 mg/5 mL. *For use when praziquantel treatment fails.
6.1.4 Cysticidal medicines	
Complementary List	
albendazole	Tablet (chewable): 200 mg [c]. Tablet (chewable, scored): 400 mg.
mebendazole	Tablet (chewable): 100 mg [c], 500 mg.
praziquantel	Tablet: 150 mg, 500 mg. Tablet (scored): 600 mg.

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6.2 Antibacterials

To assist in the development of tools for antibiotic stewardship at local, national and global levels and to reduce antimicrobial resistance, the Access, Watch, Reserve (AWaRe) classification of antibiotics was developed – where antibiotics are classified into different groups to emphasize the importance of their appropriate use.

ACCESS GROUP ANTIBIOTICS

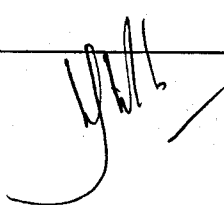
This group includes antibiotics that have activity against a wide range of commonly encountered susceptible pathogens while also showing lower resistance potential than antibiotics in the other groups. Selected Access group antibiotics are recommended as essential first or second choice empiric treatment options for infectious syndromes reviewed by the EML Expert Committee and are listed as individual medicines on the Model Lists to improve access and promote appropriate use. They are essential antibiotics that should be widely available, affordable and quality assured.

WATCH GROUP ANTIBIOTICS

This group includes antibiotic classes that have higher resistance potential and includes most of the highest priority agents among the Critically Important Antimicrobials for Human Medicine and/or antibiotics that are at relatively high risk of selection of bacterial resistance. These medicines should be prioritized as key targets of stewardship programs and monitoring. Selected Watch group antibiotics are recommended as essential first or second choice empiric treatment options for a limited number of specific infectious syndromes and are listed as individual medicines on the Model Lists.

RESERVE GROUP ANTIBIOTICS

This group includes antibiotics and antibiotic classes that should be reserved for treatment of confirmed or suspected infections due to multi-drug-resistant organisms. Reserve group antibiotics should be treated as “last resort” options. Selected Reserve group antibiotics are listed as individual medicines on the Model Lists when they have a favourable risk-benefit profile and proven activity against “Critical Priority” or “High Priority” pathogens identified by the WHO Priority Pathogens List, notably carbapenem resistant *Enterobacteriaceae*. These antibiotics should be accessible, but their use should be tailored to highly specific patients and settings, when all alternatives have failed or are not suitable. These medicines could be protected and prioritized as key targets of national and international stewardship programs involving monitoring and utilization reporting, to preserve their effectiveness.



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6.2.1 Access group antibiotics

amikacin	Injection: 50 mg/mL (as sulfate) [c]; 250 mg/mL (as sulfate) in 2 mL vial.	
	FIRST CHOICE – High-risk febrile neutropenia – Pyelonephritis or prostatitis (severe)	SECOND CHOICE – Sepsis in neonates and children [c]
amoxicillin	Powder for injection: 250 mg; 500 mg; 1 g (as sodium) in vial. Powder for oral liquid: 125 mg/5 mL; 250 mg/5 mL (as trihydrate) [c]. Solid oral dosage form: 250 mg; 500 mg; 1g (as trihydrate). Tablet (dispersible, scored): 250 mg; 500 mg (as trihydrate) [c].	
	FIRST CHOICE – Community acquired pneumonia (mild to moderate) – Community acquired pneumonia (severe) [c] – Complicated severe acute malnutrition [c] – Exacerbations of COPD – Otitis media – Pharyngitis – Progressive apical dental abscess – Sepsis in neonates and children [c] – Sinusitis – Uncomplicated severe acute malnutrition [c]	SECOND CHOICE – Acute bacterial meningitis
amoxicillin + clavulanic acid	Powder for injection: 500 mg (as sodium) + 100 mg (as potassium salt); 1000 mg (as sodium) + 200 mg (as potassium salt) in vial. Powder for oral liquid: 125 mg (as trihydrate) + 31.25 mg (as potassium salt)/5 mL; 250 mg (as trihydrate) + 62.5 mg (as potassium salt)/5mL [c]. Tablet: 500 mg (as trihydrate) + 125 mg (as potassium salt); 875 mg (as trihydrate) + 125 mg (as potassium salt). Tablet (dispersible): 200 mg (as trihydrate) + 28.5 mg (as potassium salt) [c]; 250 mg (as trihydrate) + 62.5 mg (as potassium salt) [c].	
	FIRST CHOICE – Community acquired pneumonia (severe) [c] – Complicated intraabdominal infections (mild to moderate) – Exacerbations of COPD – Hospital acquired pneumonia – Low-risk febrile neutropenia – Lower urinary tract infections – Sinusitis – Skin and soft tissue infections	SECOND CHOICE – Bone and joint infections – Community-acquired pneumonia (mild to moderate) – Community acquired pneumonia (severe) – Otitis media – Surgical prophylaxis

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ampicillin	Powder for injection: 500 mg; 1 g (as sodium) in vial.	
	FIRST CHOICE – Community acquired pneumonia (severe) [c] – Complicated intraabdominal infections [c] – Complicated severe acute malnutrition [c] – Sepsis in neonates and children [c]	SECOND CHOICE – Acute bacterial meningitis
benzathine benzylpenicillin	Powder for injection: 1.2 million IU (≈ 900 mg) in vial [c]; 2.4 million IU (≈ 1.8 g) in vial.	
	FIRST CHOICE – Syphilis	SECOND CHOICE
benzylpenicillin	Powder for injection: 600 mg (= 1 million IU); 3 g (= 5 million IU) (sodium or potassium salt) in vial.	
	FIRST CHOICE – Community acquired pneumonia (severe) [c] – Complicated severe acute malnutrition [c] – Sepsis in neonates and children [c] – Syphilis	SECOND CHOICE – Acute bacterial meningitis
cefalexin	Powder for oral liquid: 125 mg/5 mL; 250 mg/5 mL (anhydrous). Solid oral dosage form: 250 mg; 500 mg (as monohydrate). Tablet (dispersible): 125 mg [c]; 250 mg [c].	
	FIRST CHOICE – Skin and soft tissue infections	SECOND CHOICE – Exacerbations of COPD – Pharyngitis
cefazolin ^a	Powder for injection: 1 g (as sodium salt) in vial. ^a > 1 month.	
	FIRST CHOICE – Surgical prophylaxis	SECOND CHOICE – Bone and joint infections
chloramphenicol	Oily suspension for injection*: 0.5 g/mL (as sodium succinate) in 2 mL ampoule. *Only for the presumptive treatment of epidemic meningitis in children older than 2 years and in adults. Powder for injection: 1 g (as sodium succinate) in vial.	
	FIRST CHOICE	SECOND CHOICE – Acute bacterial meningitis

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clindamycin	Capsule: 150 mg (as hydrochloride). Injection: 150 mg/mL (as phosphate); 600 mg/4 mL (as phosphate); 900 mg/6 mL (as phosphate). Powder for oral liquid: 75 mg/5 mL (as palmitate hydrochloride) [c].	
	FIRST CHOICE – <i>Necrotizing fasciitis</i>	SECOND CHOICE – <i>Bone and joint infections</i>
☐ cloxacillin* Therapeutic alternatives: – 4th level ATC chemical subgroup (J01CF Beta-lactamase resistant penicillins)	Capsule: 250 mg [c], 500 mg; 1 g (as sodium). Powder for injection: 250 mg [c], 500 mg (as sodium) in vial. Powder for oral liquid: 125 mg/5 mL, 250 mg/5 mL (as sodium) [c]. *cloxacillin, dicloxacillin and flucloxacillin are preferred for oral administration due to better bioavailability.	
	FIRST CHOICE – <i>Bone and joint infections</i> – <i>Skin and soft tissue infections</i>	SECOND CHOICE – <i>Sepsis in neonates and children [c]</i>
doxycycline ^a	Oral liquid: 50 mg/5 mL (calcium) [c]. Powder for oral liquid: 25 mg/5 mL (monohydrate) [c]. Powder for injection: 100 mg in vial. Solid oral dosage form: 50 mg [c]; 100 mg (as hyclate). Tablet (dispersible): 100 mg (as monohydrate) [c]. ^a Use in children <8 years only for life-threatening infections when no alternative exists.	
	FIRST CHOICE – <i>Cholera</i> – <i>Sexually transmitted infection due to Chlamydia trachomatis</i>	SECOND CHOICE – <i>Cholera [c]</i> – <i>Community acquired pneumonia (mild to moderate)</i> – <i>Exacerbations of COPD</i>
gentamicin	Injection: 10 mg/mL (as sulfate); 40 mg/mL (as sulfate) in 2 mL vial.	
	FIRST CHOICE – <i>Acute bacterial meningitis in neonates [c]</i> – <i>Community acquired pneumonia (severe) [c]</i> – <i>Complicated intraabdominal infections [c]</i> – <i>Complicated severe acute malnutrition [c]</i> – <i>Sepsis in neonates and children [c]</i>	SECOND CHOICE – <i>Gonorrhoea</i> – <i>Surgical prophylaxis</i>

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metronidazole	Injection: 500 mg in 100 mL vial. Oral liquid: 200 mg/5 mL (as benzoate). Suppository: 500 mg; 1 g. Tablet: 200 mg; 250 mg; 400 mg; 500 mg.	
	FIRST CHOICE – <i>C. difficile</i> infection – Complicated intraabdominal infections (mild to moderate) – Complicated intrabdominal infections (severe) – Necrotizing fasciitis – Surgical prophylaxis – Trichomoniasis	SECOND CHOICE – Complicated intraabdominal infections (mild to moderate)
nitrofurantoin	Oral liquid: 25 mg/5 mL [c]. Solid oral dosage form: 50 mg [c]; 100 mg.	
	FIRST CHOICE – Lower urinary tract infections	SECOND CHOICE
phenoxymethylpenicillin	Powder for oral liquid: 250 mg/5 mL (as potassium). Solid oral dosage form: 250 mg; 500 mg (as potassium).	
	FIRST CHOICE – Community acquired pneumonia (mild to moderate) – Pharyngitis – Progressive apical dental abscess	SECOND CHOICE
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.	
	FIRST CHOICE – Syphilis (congenital) [c]	SECOND CHOICE – Syphilis
spectinomycin	Powder for injection: 2 g (as hydrochloride) in vial.	
	FIRST CHOICE	SECOND CHOICE – Gonorrhoea
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. Tablet (dispersible): 100 mg + 20 mg [c].	
	FIRST CHOICE – Lower urinary tract infections	SECOND CHOICE – Acute invasive diarrhoea / bacterial dysentery

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trimethoprim	Tablet: 100 mg; 200 mg. Oral liquid: 50 mg/5 mL [c].	
	FIRST CHOICE – Lower urinary tract infections	SECOND CHOICE
6.2.2 Watch group antibiotics		
azithromycin	Solid oral dosage form: 250 mg; 500 mg (anhydrous). Powder for oral liquid: 200 mg/5 mL (anhydrous) [c].	
	FIRST CHOICE – Cholera – Enteric fever – Gonorrhoea – Sexually transmitted infection due to <i>Chlamydia trachomatis</i> – Trachoma – Yaws	SECOND CHOICE – Acute invasive bacterial diarrhoea / dysentery – Gonorrhoea
cefixime	Powder for oral liquid: 100 mg/5 mL [c]. Solid oral dosage form: 200 mg; 400 mg (as trihydrate).	
	FIRST CHOICE	SECOND CHOICE – Acute invasive bacterial diarrhoea / dysentery – Gonorrhoea
cefotaxime*	Powder for injection: 250 mg; 500 mg; 1 g; 2 g (as sodium) in vial. *3rd generation cephalosporin of choice for use in hospitalized neonates.	
	FIRST CHOICE – Acute bacterial meningitis – Community acquired pneumonia (severe) – Complicated intraabdominal infections (mild to moderate) – Complicated intraabdominal infections (severe) – Hospital acquired pneumonia – Pyelonephritis or prostatitis (severe)	SECOND CHOICE – Bone and joint infections – Pyelonephritis or prostatitis (mild to moderate) – Sepsis in neonates and children [c]

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ceftriaxone* ^a	Powder for injection: 250 mg; 500 mg; 1 g; 2 g (as sodium) in vial. *Do not administer with calcium and avoid in infants with hyperbilirubinaemia. ^a > 41 weeks corrected gestational age. <table border="1"> <thead> <tr> <th>FIRST CHOICE</th><th>SECOND CHOICE</th></tr> </thead> <tbody> <tr> <td> – Acute bacterial meningitis – Community acquired pneumonia (severe) – Complicated intraabdominal infections (mild to moderate) – Complicated intrabdominal infections (severe) – Endophthalmitis – Enteric fever – Gonorrhoea – Hospital acquired pneumonia – Necrotizing fasciitis – Pyelonephritis or prostatitis (severe) </td><td> – Acute invasive bacterial diarrhoea / dysentery – Bone and joint infections – Pyelonephritis or prostatitis (mild to moderate) – Sepsis in neonates and children [c] </td></tr> </tbody> </table>	FIRST CHOICE	SECOND CHOICE	– Acute bacterial meningitis – Community acquired pneumonia (severe) – Complicated intraabdominal infections (mild to moderate) – Complicated intrabdominal infections (severe) – Endophthalmitis – Enteric fever – Gonorrhoea – Hospital acquired pneumonia – Necrotizing fasciitis – Pyelonephritis or prostatitis (severe)	– Acute invasive bacterial diarrhoea / dysentery – Bone and joint infections – Pyelonephritis or prostatitis (mild to moderate) – Sepsis in neonates and children [c]
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cefuroxime	Powder for injection: 250 mg; 750 mg; 1.5 g (as sodium) in vial. <table border="1"> <thead> <tr> <th>FIRST CHOICE</th><th>SECOND CHOICE</th></tr> </thead> <tbody> <tr> <td></td><td> – Surgical prophylaxis </td></tr> </tbody> </table>	FIRST CHOICE	SECOND CHOICE		– Surgical prophylaxis
FIRST CHOICE	SECOND CHOICE				
	– Surgical prophylaxis				
ciprofloxacin	Oral liquid: 250 mg/5 mL (anhydrous) [c]. Solution for IV infusion: 2 mg/mL (as hyclate) [c]. Solid oral dosage form: 100 mg [c]; 250 mg; 500 mg (as hydrochloride). <table border="1"> <thead> <tr> <th>FIRST CHOICE</th><th>SECOND CHOICE</th></tr> </thead> <tbody> <tr> <td> – Acute invasive bacterial diarrhoea / dysentery – Enteric fever – Low-risk febrile neutropenia – Pyelonephritis or prostatitis (mild to moderate) </td><td> – Cholera – Complicated intraabdominal infections (mild to moderate) </td></tr> </tbody> </table>	FIRST CHOICE	SECOND CHOICE	– Acute invasive bacterial diarrhoea / dysentery – Enteric fever – Low-risk febrile neutropenia – Pyelonephritis or prostatitis (mild to moderate)	– Cholera – Complicated intraabdominal infections (mild to moderate)
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– Acute invasive bacterial diarrhoea / dysentery – Enteric fever – Low-risk febrile neutropenia – Pyelonephritis or prostatitis (mild to moderate)	– Cholera – Complicated intraabdominal infections (mild to moderate)				
☐ clarithromycin† Therapeutic alternatives: – erythromycin* *as second choice treatment for pharyngitis in children (EMLc only)	Powder for oral liquid: 125 mg/5 mL; 250 mg/5 mL. Powder for injection: 500 mg in vial. Solid oral dosage form: 250 mg [c]; 500 mg. †clarithromycin is also listed for use in combination regimens for eradication of <i>H. pylori</i> in adults. <table border="1"> <thead> <tr> <th>FIRST CHOICE</th><th>SECOND CHOICE</th></tr> </thead> <tbody> <tr> <td>Community acquired pneumonia (severe)</td><td>– Pharyngitis</td></tr> </tbody> </table>	FIRST CHOICE	SECOND CHOICE	Community acquired pneumonia (severe)	– Pharyngitis
FIRST CHOICE	SECOND CHOICE				
Community acquired pneumonia (severe)	– Pharyngitis				

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piperacillin + tazobactam	Powder for injection: 2 g (as sodium) + 250 mg (as sodium); 4 g (as sodium) + 500 mg (as sodium) in vial.	
	FIRST CHOICE – Complicated intraabdominal infections (severe) – High-risk febrile neutropenia – Hospital acquired pneumonia – Necrotizing fasciitis	SECOND CHOICE
vancomycin*	Capsule: 125 mg; 250 mg (as hydrochloride). *vancomycin powder for injection may also be used for oral administration	
	FIRST CHOICE	SECOND CHOICE – <i>C. difficile</i> infection
Complementary List		
ceftazidime	Powder for injection: 250 mg; 1 g (as pentahydrate) in vial.	
	FIRST CHOICE – Endophthalmitis	SECOND CHOICE
☐ meropenem* ☐ Therapeutic alternatives*: - imipenem + cilastatin *complicated intraabdominal infections and high-risk febrile neutropenia only. Meropenem is the preferred choice for acute bacterial meningitis in neonates.	Powder for injection: 500 mg (as trihydrate); 1 g (as trihydrate) in vial. ☐ > 3 months.	
	FIRST CHOICE	SECOND CHOICE – Acute bacterial meningitis in neonates [c] – Complicated intraabdominal infections (severe) – High-risk febrile neutropenia
vancomycin	Powder for injection: 250 mg; 500 mg; 1 g (as hydrochloride) in vial.	
	FIRST CHOICE – Endophthalmitis – Necrotizing fasciitis	SECOND CHOICE – High-risk febrile neutropenia
6.2.3 Reserve group antibiotics		
Complementary List		
cefiderocol	Powder for injection: 1 g (as sulfate toxylate) in vial.	
ceftazidime + avibactam	Powder for injection: 2 g + 0.5 g in vial.	
ceftolozane + tazobactam	Powder for injection: 1 g + 0.5 g in vial.	
colistin	Powder for injection: 1 million IU (as colistimethate sodium) (equivalent to 34 mg colistin base activity) in vial.	
fosfomycin	Powder for injection: 2 g; 4 g (as sodium) in vial.	
☐ linezolid Therapeutic alternatives: - tedizolid phosphate	Injection for intravenous administration: 2 mg/mL in 300 mL bag. Powder for oral liquid: 100 mg/5 mL. Tablet: 600 mg. Tablet (dispersible): 150 mg [c].	

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<i>meropenem + vaborbactam</i>	Powder for injection: 1 g (as trihydrate) + 1 g in vial.
<i>plazomicin</i>	Injection: 500 mg/10 mL.
<i>polymyxin B</i>	Powder for injection: 500 000 IU (equivalent to 50 mg polymyxin B base) in vial.
6.2.4 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	Solid oral dosage form: 50 mg; 100 mg.
dapsone	Tablet: 25 mg; 50 mg; 100 mg.
rifampicin	Oral liquid: 20 mg/mL [c]. Solid oral dosage form: 150 mg; 300 mg.
6.2.5 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	Tablet: 100 mg; 400 mg (hydrochloride). Tablet (dispersible): 100 mg [c]
ethambutol + isoniazid + pyrazinamide + rifampicin	Tablet: 275 mg + 75 mg + 400 mg + 150 mg.
ethambutol + isoniazid + rifampicin	Tablet: 275 mg + 75 mg + 150 mg.
ethionamide	Tablet: 250 mg. Tablet (dispersible): 125 mg [c].
isoniazid	Tablet: 100 mg; 300 mg. Tablet (dispersible): 100 mg [c].
isoniazid + pyrazinamide + rifampicin	Tablet (dispersible): 50 mg + 150 mg + 75 mg [c].
isoniazid + rifampicin	Tablet: 75 mg + 150 mg; 150 mg + 300 mg. Tablet (dispersible): 50 mg + 75 mg [c].
isoniazid + rifapentine	Tablet (scored): 300 mg + 300 mg.
moxifloxacin	Tablet: 400 mg.
pyrazinamide	Tablet: 400 mg; 500 mg Tablet (dispersible): 150 mg.
rifabutin	Solid oral dosage form: 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.
rifapentine	Tablet: 150 mg; 300 mg.

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Complementary List	
Medicines for the treatment of multidrug-resistant tuberculosis (MDR-TB) should be used in specialized centres adhering to WHO standards for TB control.	
amikacin	Injection: 250 mg/mL (as sulfate) in 2 mL vial.
amoxicillin + clavulanic acid*	Powder for oral liquid: 250 mg (as trihydrate) + 62.5 mg (as potassium salt)/5mL [c]. Tablet: 500 mg (as trihydrate) + 125 mg (as potassium salt). *For use only in combination with meropenem or imipenem+cilastatin.
bedaquiline	Tablet: 20 mg [c]; 100 mg.
clofazimine	Solid oral dosage form: 50 mg; 100 mg.
☐ cycloserine Therapeutic alternatives: - terizidone	Solid oral dosage form: 125 mg [c]; 250 mg.
delamanid	Tablet (dispersible): 25 mg [c]. Tablet: 50 mg.
☐ ethionamide Therapeutic alternatives: - protonamide	Tablet: 250 mg. Tablet (dispersible): 125 mg [c].
levofloxacin	Tablet: 250mg; 500 mg; 750 mg. Tablet (dispersible): 100 mg [c].
linezolid	Tablet: 600 mg. Tablet (dispersible): 150 mg [c].
☐ meropenem Therapeutic alternatives: - imipenem + cilastatin	Powder for injection: 500 mg (as trihydrate); 1 g (as trihydrate) in vial.
moxifloxacin	Tablet: 400 mg. Tablet (dispersible): 100 mg [c].
p-aminosalicylate sodium	Powder for oral solution: 5.52 g in sachet (equivalent to 4 g p-aminosalicylic acid).
pretomanid	Tablet: 200 mg.
streptomycin [c]	Powder for injection: 1 g (as sulfate) in vial.

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6.3 Antifungal medicines	
amphotericin B*	Powder for injection: 50 mg (liposomal complex) in vial. Powder for injection: 50 mg (as sodium deoxycholate) in vial *Liposomal amphotericin B has a better safety profile than the sodium deoxycholate formulation and should be prioritized for selection and use depending on local availability and cost.
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. Powder for oral liquid: 50 mg/5 mL [c].
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.
itraconazole*	Capsule: 100 mg. Oral liquid: 10 mg/mL. *For treatment of chronic pulmonary aspergillosis, histoplasmosis, sporotrichosis, paracoccidioidomycosis, mycoses caused by <i>T. marneffe</i>i and chromoblastomycosis; and prophylaxis of histoplasmosis and infections caused by <i>T. marneffe</i>i in AIDS patients.
nystatin	Lozenge: 100 000 IU. Oral liquid: 100 000 IU/mL [c]. Pessary: 100 000 IU. Solid oral dosage form: 500 000 IU.
voriconazole*	Tablet: 50 mg; 200 mg Powder for injection: 200 mg in vial Powder for oral liquid: 40 mg/mL *For treatment of chronic pulmonary aspergillosis and acute invasive aspergillosis.
Complementary List	
☐ micafungin Therapeutic alternatives: - anidulafungin - caspofungin	Powder for injection: 50 mg (as sodium); 100 mg (as sodium) in vial.
potassium iodide	Saturated solution.

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6.4 Antiviral medicines	
6.4.1 Antiherpes medicines	
☐ aciclovir Therapeutic alternatives: - valaciclovir (oral)	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 classes of antiretrovirals are included as essential medicines for treatment and prevention of HIV (prevention of mother-to-child transmission, pre-exposure prophylaxis (where indicated) 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 that adequate quality products are available.	
6.4.2.1 Nucleoside/Nucleotide reverse transcriptase inhibitors	
abacavir	Tablet: 300 mg (as sulfate).
lamivudine	Oral liquid: 50 mg/5 mL [c]. Tablet: 150 mg.
tenofovir disoproxil fumarate†	Tablet: 300 mg (tenofovir disoproxil fumarate – equivalent to 245 mg tenofovir disoproxil). †also indicated for pre-exposure prophylaxis.
zidovudine	Capsule: 250 mg. Oral liquid: 50 mg/5 mL. Solution for IV infusion: 10 mg/mL in 20 mL vial. Tablet: 300 mg.
6.4.2.2 Non-nucleoside reverse transcriptase inhibitors	
efavirenz	Tablet: 600 mg.
nevirapine ^a	Oral liquid: 50 mg/5 mL. Tablet: 50 mg (dispersible); 200 mg. ^a > 6 weeks
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 + ritonavir	Tablet (heat stable): 300 mg (as sulfate) + 100 mg.
darunavir ^a	Tablet: 75 mg; 400 mg; 600 mg; 800 mg ^a > 3 years
lopinavir + ritonavir	Solid oral dosage form: 40 mg + 10 mg [c]. Tablet (heat stable): 100 mg + 25 mg; 200 mg + 50 mg.
ritonavir	Tablet (heat stable): 25 mg; 100 mg.

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6.4.2.4 Integrase inhibitors	
dolutegravir ^a	Tablet (dispersible, scored): 10 mg [c]. ^a ≥ 4 weeks and ≥ 3 kg Tablet: 50 mg ^a ≥ 25 kg
raltegravir*	Granules for oral suspension: 100 mg in sachet. Tablet (chewable): 25 mg. Tablet: 400 mg. *For use in pregnant women and in second-line regimens in accordance with WHO treatment guidelines.
6.4.2.5 Fixed-dose combinations of antiretroviral medicines	
abacavir + lamivudine	Tablet (dispersible, scored): 120 mg (as sulfate) + 60 mg.
dolutegravir + lamivudine + tenofovir	Tablet: 50 mg + 300 mg + 300 mg (tenofovir disoproxil fumarate – equivalent to 245 mg tenofovir disoproxil)
efavirenz + ^a emtricitabine + tenofovir Therapeutic alternatives: - lamivudine (for emtricitabine)	Tablet: 600 mg + 200 mg + 300 mg (tenofovir disoproxil fumarate – equivalent to 245 mg tenofovir disoproxil).
efavirenz + lamivudine + tenofovir	Tablet: 400 mg + 300 mg + 300 mg (tenofovir disoproxil fumarate – equivalent to 245 mg tenofovir disoproxil)
^a emtricitabine + tenofovir† Therapeutic alternatives: - lamivudine (for emtricitabine)	Tablet: 200 mg + 300 mg (tenofovir disoproxil fumarate – equivalent to 245 mg tenofovir disoproxil). † combination also indicated for pre-exposure prophylaxis
lamivudine + zidovudine	Tablet: 30 mg + 60 mg [c]; 150 mg + 300 mg.
6.4.2.6 Medicines for prevention of HIV-related opportunistic infections	
isoniazid + pyridoxine + sulfamethoxazole + trimethoprim	Tablet (scored): 300 mg + 25 mg + 800 mg + 160 mg
6.4.3 Other antivirals	
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
valganciclovir*	Tablet: 450 mg. *For the treatment of cytomegalovirus retinitis (CMVr).

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<i>Complementary list</i>	
oseltamivir*	Capsule: 30 mg; 45 mg; 75 mg (as phosphate). *Severe illness due to confirmed or suspected influenza virus infection in critically ill hospitalized patients
valganciclovir*[c]	Powder for oral solution: 50 mg/mL Tablet: 450 mg. *For the treatment of cytomegalovirus retinitis (CMVr).
6.4.4 Antihepatitis medicines	
6.4.4.1 Medicines for hepatitis B	
6.4.4.1.1 Nucleoside/Nucleotide reverse transcriptase inhibitors	
entecavir	Oral liquid: 0.05 mg/mL Tablet: 0.5 mg; 1 mg
tenofovir disoproxil fumarate	Tablet: 300 mg (tenofovir disoproxil fumarate – equivalent to 245 mg tenofovir disoproxil).
6.4.4.2 Medicines for hepatitis C	
Pangenotypic direct-acting antivirals should be considered as therapeutic alternatives for the purposes of selection and procurement at national level.	
6.4.4.2.1 ☐ Pangenotypic direct-acting antiviral combinations	
daclatasvir*	Tablet: 30 mg; 60 mg (as hydrochloride). *Pangenotypic when used in combination with sofosbuvir
daclatasvir + sofosbuvir	Tablet: 60 mg + 400 mg.
glecaprevir + pibrentasvir	Tablet: 100 mg + 40 mg. Granules: 50 mg + 20 mg in sachet [c].
ravidasvir*	Tablet: 200 mg. *Pangenotypic when used in combination with sofosbuvir
sofosbuvir*	Tablet: 200 mg; 400 mg. *Pangenotypic when used in combination with daclatasvir or ravidasvir
sofosbuvir + velpatasvir	Tablet: 200 mg + 50 mg [c]; 400 mg + 100 mg.
6.4.4.2.2 Non-pangenotypic direct-acting antiviral combinations	
ledipasvir + sofosbuvir	Tablet: 90 mg + 400 mg.
6.4.4.2.3 Other antivirals for hepatitis C	
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 hepatitis C, in combination with direct acting anti-viral medicines

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6.5 Antiprotozoal medicines	
6.5.1 Antiamoebic and anti giardiasis medicines	
diloxanide ^a	Tablet: 500 mg (furoate). ^a > 25 kg.
☐ metronidazole Therapeutic alternatives: - tinidazole	Injection: 500 mg in 100 mL vial. Oral liquid: 200 mg/5 mL (as benzoate). Tablet: 200 mg; 250 mg; 400 mg; 500 mg.
6.5.2 Antileishmaniasis medicines	
amphotericin B*	Powder for injection: 50 mg (liposomal complex) in vial. Powder for injection: 50 mg (as sodium deoxycholate) in vial. *Liposomal amphotericin B has a better safety profile than the sodium deoxycholate formulation and should be prioritized for selection and use depending on local availability and cost.
meglumine antimoniate	Injection: 1.5 g/5 mL in 5 mL ampoule.
miltefosine	Solid oral dosage form: 10 mg; 50 mg.
paromomycin	Solution for intramuscular injection: 750 mg of paromomycin base (as sulfate).
sodium stibogluconate	Injection: 100 mg/mL in 30 mL vial.
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 fixed dose combinations (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.

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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]; 100 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.
artesunate + pyronaridine tetraphosphate ^a	Granules: 20 mg + 60 mg [c]. Tablet: 60 mg + 180 mg. ^a > 5 kg
chloroquine*	Oral liquid: 50 mg/5 mL (as phosphate or sulfate). Tablet: 100 mg; 150 mg (as phosphate or sulfate). *For use only for the treatment of <i>Plasmodium vivax</i> infection.
dihydroartemisinin + piperazine phosphate ^a	Tablet: 20 mg + 160 mg; 40 mg + 320 mg. ^a > 5 kg
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>Plasmodium vivax</i> and <i>Plasmodium ovale</i> infections, given for 14 days.
quinine*	Injection: 300 mg/mL (hydrochloride) in 2 mL ampoule. Tablet: 300 mg (sulfate) or 300 mg (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.

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6.5.3.2 For chemoprevention	
amodiaquine – sulfadoxine + pyrimethamine [c]	Co-packaged dispersible tablets: amodiaquine 76.5 mg (as hydrochloride) [3] and sulfadoxine + pyrimethamine 250 mg + 12.5 mg [1]; amodiaquine 153 mg (as hydrochloride) [3] and sulfadoxine + pyrimethamine 500 mg + 25 mg [1].
chloroquine*	Oral liquid: 50 mg/5 mL (as phosphate or sulfate). Tablet: 150 mg (as phosphate or sulfate). *For use only in central American regions, for <i>Plasmodium vivax</i> infections.
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.
sulfadoxine + pyrimethamine	Tablet: 250 mg + 12.5 mg [c]; 500 mg + 25 mg.
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]; 800 mg + 160 mg. Tablet (dispersible): 100 mg + 20 mg [c].
Complementary List	
pentamidine	Tablet: 200 mg; 300 mg (as isethionate).
6.5.5 Antitrypanosomal medicines	
6.5.5.1 African trypanosomiasis	
fexinidazole*	Tablet: 600 mg *For the treatment of 1 st and 2 nd stage of human African trypanosomiasis due to <i>Trypanosoma brucei gambiense</i> infection.
Medicines for the treatment of 1st stage African trypanosomiasis	
pentamidine*	Powder for injection: 300 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.

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Medicines for the treatment of 2 nd stage African trypanosomiasis	
eflornithine*	Injection: 200 mg/mL (hydrochloride) in 50 mL bottle. *To be used for the treatment of <i>Trypanosoma brucei gambiense</i> infection.
melarsoprol	Injection: 180 mg/5 mL in 5 mL ampoule (3.6% solution).
nifurtimox *	Tablet (scored): 30 mg; 120 mg. *Only to be used in combination with eflornithine, for the treatment of <i>Trypanosoma brucei gambiense</i> infection.
Complementary List	
melarsoprol [c]	Injection: 180 mg/5 mL in 5 mL ampoule (3.6% solution).
6.5.5.2 American trypanosomiasis	
benznidazole	Tablet: 12.5 mg [c] Tablet (scored): 50 mg; 100 mg.
nifurtimox	Tablet (scored): 30 mg; 120 mg.
6.6 Medicines for ectoparasitic infections	
ivermectin	Tablet: 3 mg
6.7 Medicines for Ebola virus disease	
ansuvimab	Powder for injection: 400 mg
atoltivimab + maftivimab + odesivimab	Injection: 241.7 mg + 241.7 mg + 241.7 mg in 14.5 mL vial
6.8 Medicines for COVID-19	
WHO recommends that effective and safe therapeutics for prevention and treatment of COVID-19 should be considered as essential medicines in the context of the public health emergency. WHO recommendations are revised and updated regularly in WHO living guidelines for therapeutics for the treatment and prevention of COVID-19. Selection of essential therapeutics for COVID-19 at the national level should be informed by recommendations in these guidelines, and consideration of the latest evidence, epidemiology and national priorities. The latest WHO Therapeutics and COVID-19: living guideline is available online at: https://app.magicapp.org/#/guideline/nBkO1E The latest WHO Drugs to prevent COVID-19: living guideline is available online at: https://app.magicapp.org/#/guideline/L6RxYL	

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7. ANTIMIGRAINE MEDICINES	
7.1 For treatment of acute attack	
acetylsalicylic acid	Tablet: 300 mg to 500 mg.
ibuprofen [c]	Oral liquid: 100 mg/5 mL [c]. Tablet: 200 mg; 400 mg.
paracetamol (acetaminophen)	Oral liquid: 120 mg/5 mL or 125 mg/5 mL*; 250 mg/5 mL [c]. *The presence of both 120 mg/5 mL and 125 mg/5mL strengths on the same market would cause confusion in prescribing and dispensing and should be avoided. Suppository: 250 mg [c]. Tablet: 250 mg; 325 mg; 500 mg. Tablet (dispersible): 100 mg, 250 mg [c].
sumatriptan	Tablet: 50 mg
7.2 For prophylaxis	
☐ propranolol	Tablet: 20 mg; 40 mg (hydrochloride).
Therapeutic alternatives to be reviewed	
8. IMMUNOMODULATORS AND ANTINEOPLASTICS	
8.1 Immunomodulators for non-malignant disease	
Complementary List	
☐ adalimumab* Therapeutic alternatives*: - certolizumab pegol - etanercept - golimumab - infliximab *including quality-assured biosimilars	Injection: 10 mg/0.2 mL [c]; 20 mg/0.4 mL [c]; 40 mg/0.8 mL; 40 mg/0.4 mL.
azathioprine	Oral liquid: 10 mg/mL [c]. Powder for injection: 50 mg [c]; 100 mg (as sodium salt) in vial. Tablet: 25 mg [c]. Tablet (scored): 50 mg.
ciclosporin	Capsule: 25 mg. Concentrate for injection: 50 mg/mL in 1 mL ampoule. Oral liquid: 100 mg/mL [c].
tacrolimus	Capsule (immediate-release): 0.5 mg; 0.75 mg; 1 mg; 2 mg; 5 mg. Granules for oral suspension: 0.2 mg; 1 mg. Injection: 5 mg/mL in 1 mL vial.

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8.2 Antineoplastics and supportive medicines	
Medicines listed below should be used according to protocols for treatment of the diseases.	
8.2.1 Cytotoxic medicines	
Complementary List	
arsenic trioxide	Concentrate for solution for infusion: 1 mg/mL; 2 mg/mL. – Acute promyelocytic leukaemia
asparaginase* *including quality-assured biosimilars	Powder for injection: 10 000 IU in vial. – Acute lymphoblastic leukaemia.
bendamustine	Injection: 45 mg/0.5 mL; 180 mg/2 mL. – Chronic lymphocytic leukaemia – Follicular lymphoma
bleomycin	Powder for injection: 15 000 IU (as sulfate) in vial. – Hodgkin lymphoma – Kaposi sarcoma – Ovarian germ cell tumour – Testicular germ cell tumour
calcium folinate (leucovorin calcium)	Injection: 3 mg/mL in 10 mL ampoule; 7.5 mg/mL in 2 mL ampoule; 10 mg/mL in 5 mL ampoule. Tablet: 5 mg; 15 mg; 25 mg. – Burkitt lymphoma – Early stage colon cancer – Early stage rectal cancer – Gestational trophoblastic neoplasia – Metastatic colorectal cancer – Osteosarcoma
capecitabine	Tablet: 150 mg; 500 mg. – Early stage colon cancer – Early stage rectal cancer – Metastatic breast cancer – Metastatic colorectal cancer
carboplatin	Injection: 50 mg/5 mL; 150 mg/15 mL; 450 mg/45 mL; 600 mg/60 mL. – Cervical cancer – Early stage breast cancer – Epithelial ovarian cancer – Head and neck cancer (as a radio-sensitizer) – Low-grade glioma – Nasopharyngeal cancer – Nephroblastoma (Wilms tumour) – Non-small cell lung cancer – Osteosarcoma – Ovarian germ cell tumour – Retinoblastoma – Testicular germ cell tumour
chlorambucil	Tablet: 2 mg. – Chronic lymphocytic leukaemia

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cisplatin	Injection: 10 mg/10 mL; 20 mg/20 mL; 50 mg/50 mL; 100 mg/100 mL. – Cervical cancer – Head and neck cancer (as a radio-sensitizer) – Low-grade glioma – Nasopharyngeal cancer (as a radio-sensitizer) – Non-small cell lung cancer – Osteosarcoma – Ovarian germ cell tumour – Testicular germ cell tumour
cyclophosphamide	Powder for injection: 500 mg; 1 g; 2 g in vial. Solid oral dosage form: 25 mg; 50 mg. – Acute lymphoblastic leukaemia – Anaplastic large cell lymphoma – Burkitt lymphoma – Chronic lymphocytic leukaemia – Diffuse large B-cell lymphoma – Early stage breast cancer – Ewing sarcoma – Follicular lymphoma – Gestational trophoblastic neoplasia – Hodgkin lymphoma – Low-grade glioma – Metastatic breast cancer – Multiple myeloma – Nephroblastoma (Wilms tumour) – Rhabdomyosarcoma
cytarabine	Injection: 100 mg/mL in vial Powder for injection: 100 mg in vial. – Acute lymphoblastic leukaemia – Acute myeloid leukaemia – Acute promyelocytic leukaemia – Anaplastic large cell lymphoma – Burkitt lymphoma – Langerhans cell histiocytosis
dacarbazine	Powder for injection: 100 mg; 200 mg in vial. – Hodgkin lymphoma
dactinomycin	Powder for injection: 500 micrograms in vial. – Ewing sarcoma – Gestational trophoblastic neoplasia – Nephroblastoma (Wilms tumour) – Rhabdomyosarcoma
daunorubicin	Injection: 2 mg/mL; 5 mg/mL (as hydrochloride) in vial. Powder for injection: 20 mg; 50 mg (as hydrochloride) in vial. – Acute lymphoblastic leukaemia – Acute myeloid leukaemia – Acute promyelocytic leukaemia

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docetaxel	Injection: 20 mg/mL; 40 mg/mL. – Early stage breast cancer – Metastatic breast cancer – Metastatic prostate cancer
doxorubicin	Injection: 2 mg/mL (hydrochloride) in vial. Powder for injection: 10 mg; 50 mg (hydrochloride) in vial. – Acute lymphoblastic leukaemia – Anaplastic large cell lymphoma – Burkitt lymphoma – Diffuse large B-cell lymphoma – Early stage breast cancer – Ewing sarcoma – Follicular lymphoma – Hodgkin lymphoma – Kaposi sarcoma – Metastatic breast cancer – Multiple myeloma – Nephroblastoma (Wilms tumour) – Osteosarcoma
doxorubicin (as pegylated liposomal)	Injection: 2 mg/mL (hydrochloride) in 10 mL, 25 mL vial – Kaposi sarcoma
etoposide	Capsule: 50 mg, 100 mg. Injection: 20 mg/mL in 5 mL ampoule. Powder for injection: 100 mg (as phosphate) in vial – Acute lymphoblastic leukaemia – Acute myeloid leukaemia – Anaplastic large cell lymphoma – Burkitt lymphoma – Ewing sarcoma – Gestational trophoblastic neoplasia – Hodgkin lymphoma – Nephroblastoma (Wilms tumour) – Non-small cell lung cancer – Osteosarcoma – Ovarian germ cell tumour – Retinoblastoma – Testicular germ cell tumour
fludarabine	Powder for injection: 50 mg (phosphate) in vial. Tablet: 10 mg – Chronic lymphocytic leukaemia.
fluorouracil	Injection: 50 mg/mL in vial. – Early stage breast cancer – Early stage colon cancer – Early stage rectal cancer – Metastatic colorectal cancer – Nasopharyngeal cancer
gemcitabine	Powder for injection: 200 mg; 1 g in vial. – Epithelial ovarian cancer – Non-small cell lung cancer

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hydroxycarbamide (hydroxyurea)	Solid oral dosage form: 100 mg [c]; 200 mg; 300 mg; 400 mg; 500 mg; 1 g. – Chronic myeloid leukaemia
ifosfamide	Powder for injection: 500 mg; 1 g; 2 g in vial. – Anaplastic large cell lymphoma – Burkitt lymphoma – Ewing sarcoma – Nephroblastoma (Wilms tumour) – Ovarian germ cell tumour – Osteosarcoma – Rhabdomyosarcoma – Testicular germ cell tumour
irinotecan	Injection: 40 mg/2 mL in 2 mL vial; 100 mg/5 mL in 5 mL vial; 500 mg/25 mL in 25 mL vial. – Metastatic colorectal cancer – Nephroblastoma (Wilms tumour) – Rhabdomyosarcoma
melphalan	Tablet: 2 mg Powder for injection: 50 mg in vial – Multiple myeloma
mercaptopurine	Tablet: 50 mg. Oral liquid: 20 mg/mL [c]. – Acute lymphoblastic leukaemia – Acute promyelocytic leukaemia. – Langerhans cell histiocytosis
methotrexate	Concentrated injection: 1000 mg/10 mL. Injection: 50mg/2 mL. Powder for injection: 50 mg (as sodium) in vial. Tablet: 2.5 mg (as sodium). – Acute lymphoblastic leukaemia – Acute promyelocytic leukaemia – Anaplastic large cell lymphoma – Burkitt lymphoma – Early stage breast cancer – Gestational trophoblastic neoplasia – Langerhans cell histiocytosis – Osteosarcoma
oxaliplatin	Injection: 50 mg/10 mL in 10 mL vial; 100 mg/20 mL in 20 mL vial; 200 mg/40 mL in 40 mL vial. Powder for injection: 50 mg; 100 mg in vial. – Early stage colon cancer – Metastatic colorectal cancer

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paclitaxel	Injection: 6 mg/mL in vial. – Cervical cancer – Epithelial ovarian cancer – Early stage breast cancer – Metastatic breast cancer – Kaposi sarcoma – Nasopharyngeal cancer – Non-small cell lung cancer – Ovarian germ cell tumour
pegaspargase* *including quality-assured biosimilars	Injection: 3750 units/5 mL in vial. Powder for injection: 3750 units in vial. – Acute lymphoblastic leukaemia
procarbazine [c]	Capsule: 50 mg (as hydrochloride). – Hodgkin lymphoma
realgar-Indigo naturalis formulation	Tablet: 270 mg (containing tetra-arsenic tetra-sulfide 30 mg). – Acute promyelocytic leukaemia
tioguanine [c]	Solid oral dosage form: 40 mg. – Acute lymphoblastic leukaemia
vinblastine	Injection: 10 mg/10 mL (sulfate) in vial. Powder for injection: 10 mg (sulfate) in vial. – Anaplastic large cell lymphoma – Hodgkin lymphoma – Kaposi sarcoma – Langerhans cell histiocytosis – Low-grade glioma – Ovarian germ cell tumour – Testicular germ cell tumour
vincristine	Injection: 1 mg/mL (sulfate); 2 mg/2 mL (sulfate) in vial. Powder for injection: 1 mg; 5 mg (sulfate) in vial. – Acute lymphoblastic leukaemia – Burkitt lymphoma – Diffuse large B-cell lymphoma – Ewing sarcoma – Follicular lymphoma – Gestational trophoblastic neoplasia – Hodgkin lymphoma – Kaposi sarcoma – Langerhans cell histiocytosis – Low-grade glioma – Nephroblastoma (Wilms tumour) – Retinoblastoma – Rhabdomyosarcoma
vinorelbine	Capsule: 20 mg; 30 mg; 80 mg. Injection: 10 mg/mL in 1 mL, 5 mL vial. – Non-small cell lung cancer – Metastatic breast cancer – Rhabdomyosarcoma

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3.2.2 Targeted therapies	
Complementary List	
all-trans retinoid acid (ATRA)	Capsule: 10 mg. – Acute promyelocytic leukaemia.
bortezomib	Powder for injection: 3.5 mg in vial. – Multiple myeloma
dasatinib	Tablet: 20 mg; 50 mg; 70 mg; 80 mg; 100 mg; 140 mg. – Imatinib-resistant chronic myeloid leukaemia
☐ erlotinib Therapeutic alternatives: – afatinib – gefitinib	Tablet: 100 mg, 150 mg. – EGFR mutation-positive advanced non-small cell lung cancer
everolimus	Tablet: 2.5 mg; 5 mg; 7.5 mg; 10 mg. Tablet (dispersible): 2 mg; 3 mg; 5 mg. – Subependymal giant cell astrocytoma
ibrutinib	Capsule: 140 mg. – Relapsed/refractory chronic lymphocytic leukaemia
imatinib	Solid oral dosage form: 100 mg; 400 mg. – Chronic myeloid leukaemia – Gastrointestinal stromal tumour – Philadelphia chromosome positive acute lymphoblastic leukaemia
nilotinib	Capsule: 150 mg; 200 mg. – Imatinib-resistant chronic myeloid leukaemia
rituximab* *including quality-assured biosimilars	Injection (intravenous): 100 mg/10 mL in 10 mL vial; 500 mg/50 mL in 50 mL vial. – Burkitt lymphoma – Diffuse large B-cell lymphoma – Chronic lymphocytic leukaemia – Follicular lymphoma
trastuzumab* *including quality-assured biosimilars	Powder for injection: 60 mg; 150 mg; 440 mg in vial. – Early stage HER2-positive breast cancer – Metastatic HER2-positive breast cancer

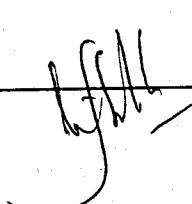
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8.2.3 Immunomodulators	
Complementary List	
<i>filgrastim*</i> <i>*including quality-assured biosimilars</i>	Injection: 120 micrograms/0.2 mL; 300 micrograms/0.5 mL; 480 micrograms/0.8 mL in pre-filled syringe. Injection: 300 micrograms/mL in 1 mL vial; 480 micrograms/1.6 mL in 1.6 mL vial. – Primary prophylaxis in patients at high risk for developing febrile neutropenia associated with myelotoxic chemotherapy. – Secondary prophylaxis for patients who have experienced neutropenia following prior myelotoxic chemotherapy – To facilitate administration of dose dense chemotherapy regimens
<i>lenalidomide</i>	Capsule: 25 mg. – Multiple myeloma
☐ <i>nivolumab*</i> <i>Therapeutic alternatives*:</i> - pembrolizumab <i>*including quality-assured biosimilars</i>	Concentrate solution for infusion: 10 mg/mL. – Metastatic melanoma
<i>pegfilgrastim*</i> <i>*including quality-assured biosimilars</i>	Injection: 6 mg/0.6 mL in pre-filled syringe. – Primary prophylaxis in patients at high risk for developing febrile neutropenia associated with myelotoxic chemotherapy – Secondary prophylaxis for patients who have experienced neutropenia following prior myelotoxic chemotherapy – To facilitate administration of dose dense chemotherapy regimens
<i>thalidomide</i>	Capsule: 50 mg. – Multiple myeloma
8.2.4 Hormones and antihormones	
Complementary List	
☐ <i>abiraterone</i> <i>Therapeutic alternatives:</i> - enzalutamide	Tablet: 250 mg; 500 mg. – Metastatic castration-resistant prostate cancer
☐ <i>anastrozole</i> <i>Therapeutic alternatives:</i> - 4th level ATC chemical subgroup (L02BG Aromatase inhibitors)	Tablet: 1 mg. – Early stage breast cancer – Metastatic breast cancer
☐ <i>bicalutamide</i> <i>Therapeutic alternatives:</i> - flutamide - nilutamide	Tablet: 50 mg. – Metastatic prostate cancer

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dexamethasone	Injection: 4 mg/mL (as disodium phosphate salt) in 1 mL ampoule. Oral liquid: 2 mg/5 mL [c]. Tablet: 2 mg [c]; 4 mg. – Acute lymphoblastic leukaemia – Anaplastic large cell lymphoma – Burkitt lymphoma – Multiple myeloma
hydrocortisone	Powder for injection: 100 mg (as sodium succinate) in vial. – Acute lymphoblastic leukaemia – Burkitt lymphoma
☐ leuprorelin Therapeutic alternatives: - goserelin - triptorelin	Injection: 7.5 mg; 22.5 mg in pre-filled syringe. – Early stage breast cancer – Metastatic prostate cancer.
methylprednisolone [c]	Injection: 40 mg/mL (as sodium succinate) in 1 mL single-dose vial and 5 mL multi-dose vials; 80 mg/mL (as sodium succinate) in 1 mL single-dose vial. – Acute lymphoblastic leukemia – Burkitt lymphoma
☐ prednisolone Therapeutic alternatives: - prednisone	Oral liquid: 5 mg/mL [c]. Tablet: 5 mg; 25 mg. – Acute lymphoblastic leukaemia – Anaplastic large cell lymphoma – Burkitt lymphoma – Chronic lymphocytic leukaemia – Diffuse large B-cell lymphoma – Follicular lymphoma – Hodgkin lymphoma – Langerhans cell histiocytosis – Metastatic castration-resistant prostate cancer – Multiple myeloma
tamoxifen	Tablet: 10 mg; 20 mg (as citrate). – Early stage breast cancer – Metastatic breast cancer.
8.2.5 Supportive medicines	
Complementary List	
allopurinol [c]	Tablet: 100 mg; 300 mg. – Tumour lysis syndrome
mesna	Injection: 100 mg/mL in 4 mL and 10 mL ampoules. Tablet: 400 mg; 600 mg. – Burkitt lymphoma – Ewing sarcoma – Nephroblastoma (Wilms tumour) – Ovarian germ cell tumour – Osteosarcoma – Rhabdomyosarcoma – Testicular germ cell tumour

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rasburicase	Powder and solvent for solution for infusion: 1.5 mg; 7.5 mg in vial. – Tumour lysis syndrome
zoledronic acid	Concentrate solution for infusion: 4 mg/5 mL in 5 mL vial. Solution for infusion: 4 mg/100 mL in 100 mL bottle. – Malignancy-related bone disease
9. THERAPEUTIC FOODS	
ready-to-use therapeutic food [c]	Biscuit or paste*. *of nutritional composition as determined by the UN joint statement on the community-based management of severe acute malnutrition and Codex alimentarius guidelines.
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 elemental iron + 400 micrograms folic acid.* *nutritional supplement for use during pregnancy Tablet: equivalent to 60 mg elemental iron + 2.8 mg folic acid.** **for weekly iron and folic acid supplementation
folic acid	Tablet: 400 micrograms*; 1 mg; 5 mg. *periconceptual use for prevention of first occurrence of neural tube defects
hydroxocobalamin	Injection: 1 mg/mL (as acetate, as hydrochloride or as sulfate) in 1 mL ampoule.
Complementary List	
☐ erythropoiesis-stimulating agents* Therapeutic alternatives: - epoetin alfa, beta and theta - darbepoetin alfa - methoxy polyethylene glycol-epoetin beta *including quality-assured biosimilars	Injection: pre-filled syringe 1000 IU/0.5 mL; 2000 IU/0.5 mL; 3000 IU/0.3 mL; 4000 IU/0.4 mL; 5000 IU/0.5 mL; 6000 IU/0.6 mL; 8000 IU/0.8 mL; 10 000 IU/1 mL; 20 000 IU/0.5 mL; 40 000 IU/1 mL.
10.2 Medicines affecting coagulation	
☐ dabigatran Therapeutic alternatives: - apixaban - edoxaban - rivaroxaban	Capsule: 110 mg; 150 mg. 

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o enoxaparin*	Injection: ampoule or pre-filled syringe
Therapeutic alternatives*: - dalteparin - nadroparin	20 mg/0.2 mL; 40 mg/0.4 mL; 60 mg/0.6 mL; 80 mg/0.8 mL; 100 mg/1 mL; 120 mg/0.8 mL; 150 mg/1 mL.
*including quality-assured biosimilars	
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 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 Therapeutic alternatives to be reviewed	Tablet: 1 mg; 2 mg; 5 mg (sodium).
Complementary List	
desmopressin[c]	Injection: 4 micrograms/mL (as acetate) in 1 mL ampoule. Nasal spray: 10 micrograms (as acetate) per dose.
heparin sodium [c]	Injection: 1000 IU/mL; 5000 IU/mL in 1 mL ampoule.
protamine sulfate [c]	Injection: 10 mg/mL in 5 mL ampoule.
☐ warfarin [c] Therapeutic alternatives to be reviewed	Tablet: 0.5 mg; 1 mg; 2 mg; 5 mg (sodium).
10.3 Other medicines for haemoglobinopathies	
☐ deferasirox Therapeutic alternatives: - deferiprone	Tablet (dispersible): 100 mg; 125 mg; 250 mg; 400 mg; 500 mg. Tablet (film-coated): 90 mg; 180 mg; 360 mg.
Complementary List	
deferoxamine	Powder for injection: 500 mg (mesilate) in vial.
hydroxycarbamide (hydroxyurea)	Solid oral dosage form: 100 mg [c]; 200 mg; 500 mg; 1 g.
11. BLOOD PRODUCTS OF HUMAN ORIGIN AND PLASMA SUBSTITUTES	
11.1 Blood and blood components	
In accordance with the World Health Assembly resolution WHA63.12, WHO recognizes that achieving self-sufficiency, unless special circumstances preclude it, in the supply of safe blood components based on voluntary, non-remunerated blood donation, and the security of that supply are important national goals to prevent blood shortages and meet the transfusion requirements of the patient population. All preparations should comply with the WHO requirements.	
☐ cryoprecipitate, pathogen-reduced Therapeutic alternatives: - cryoprecipitate (not pathogen-reduced)	Injection: frozen liquid in bag or lyophilized powder in vial containing: - > 50 IU Factor VIII - > 100 IU vWF - > 140 mg clottable fibrinogen per unit
fresh-frozen plasma	
platelets	
red blood cells	

WHO Model List of Essential Medicines – 23rd List (2023)

whole blood	
11.2 Plasma-derived medicines	
All human plasma-derived medicines should comply with the WHO requirements.	
11.2.1 Human immunoglobulins	
anti-D immunoglobulin	Injection: 250 micrograms in single-dose vial.
anti-rabies immunoglobulin	Injection: 150 IU/mL in vial.
anti-tetanus immunoglobulin	Injection: 500 IU in vial.
Complementary List	
normal immunoglobulin	Intramuscular administration: 16% protein solution. Subcutaneous administration: 15%; 16% protein solution. – Primary immune deficiency. Intravenous administration: 5%; 10% protein solution. – Primary immune deficiency – Kawasaki disease – Langerhans cell histiocytosis
11.2.2 Blood coagulation factors	
Complementary List	
coagulation factor VIII	Powder for injection: 250 IU; 500 IU; 1000 IU in vial.
☐ coagulation factor IX Therapeutic alternatives: - coagulation factor IX complex	Powder for injection: 500 IU; 1000 IU in vial.
11.3 Plasma substitutes	
☐ dextran 70 Therapeutic alternatives: - polygeline injectable solution 3.5%	Injectable solution: 6%.
12. CARDIOVASCULAR MEDICINES	
12.1 Antianginal medicines	
☐ bisoprolol Therapeutic alternatives: - carvedilol - metoprolol	Tablet: 1.25 mg; 5 mg.
glyceryl trinitrate	Tablet (sublingual): 500 micrograms.
isosorbide dinitrate	Tablet (sublingual): 5 mg.
verapamil	Tablet: 40 mg; 80 mg (hydrochloride).

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12.2 Antiarrhythmic medicines	
☐ bisoprolol Therapeutic alternatives: - carvedilol - metoprolol	Tablet: 1.25 mg; 5 mg.
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/mL (hydrochloride) in 5 mL ampoule.
verapamil	Injection: 2.5 mg/mL (hydrochloride) in 2 mL ampoule. Tablet: 40 mg; 80 mg (hydrochloride).
Complementary List	
amiodarone	Injection: 50 mg/mL (hydrochloride) in 3 mL ampoule. Tablet: 100 mg; 200 mg; 400 mg (hydrochloride).
12.3 Antihypertensive medicines	
☐ amlodipine Therapeutic alternatives: - 4 th level ATC chemical subgroup (C08CA Dihydropyridine derivatives)	Tablet: 5 mg (as maleate, mesylate or besylate).
☐ bisoprolol Therapeutic alternatives: - atenolol* - carvedilol - metoprolol	Tablet: 1.25 mg; 5 mg. *atenolol should not be used as a first-line agent in uncomplicated hypertension in patients > 60 years
☐ enalapril Therapeutic alternatives: - 4 th level ATC chemical subgroup (C09AA ACE inhibitors, plain)	Oral liquid: 1 mg/mL (as hydrogen maleate) [c]. Tablet: 2.5 mg; 5 mg; 10 mg (as hydrogen maleate).
hydralazine*	Powder for injection: 20 mg (hydrochloride) in ampoule. Tablet: 25 mg; 50 mg (hydrochloride). *Hydralazine is listed for use only in the acute management of severe pregnancy-induced hypertension. Its use in the treatment of essential hypertension is not recommended in view of the evidence of greater efficacy and safety of other medicines.
☐ hydrochlorothiazide Therapeutic alternatives: - chlorothiazide - chlorthalidone - indapamide	Oral liquid: 50 mg/5 mL. Solid oral dosage form: 12.5 mg; 25 mg.

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☐ lisinopril + ☐ amlodipine Therapeutic alternatives: - 4 th level ATC chemical subgroup (C09AA ACE inhibitors, plain) (for lisinopril) - 4 th level ATC chemical subgroup (C08CA Dihydropyridine derivatives) (for amlodipine)	Tablet: 10 mg + 5 mg; 20 mg + 5 mg; 20 mg + 10 mg.
☐ lisinopril + ☐ hydrochlorothiazide Therapeutic alternatives: - 4 th level ATC chemical subgroup (C09AA ACE inhibitors, plain) (for lisinopril) - chlorthalidone, chlorothiazide, indapamide (for hydrochlorothiazide)	Tablet: 10 mg + 12.5 mg; 20 mg + 12.5 mg; 20 mg + 25 mg.
☐ losartan Therapeutic alternatives: - 4 th level ATC chemical subgroup (C09CA Angiotensin II receptor blockers (ARBs), plain)	Tablet: 25 mg; 50 mg; 100 mg.
methyldopa*	Tablet: 250 mg. *Methyldopa is listed for use only in the management of pregnancy-induced hypertension. Its use in the treatment of essential hypertension is not recommended in view of the evidence of greater efficacy and safety of other medicines.
☐ telmisartan + ☐ amlodipine Therapeutic alternatives: - 4 th level ATC chemical subgroup (C09CA Angiotensin II receptor blockers (ARBs), plain) (for telmisartan) - 4 th level ATC chemical subgroup (C08CA Dihydropyridine derivatives) (for amlodipine)	Tablet: 40 mg + 5 mg; 80 mg + 5 mg; 80 mg + 10 mg.
☐ telmisartan + ☐ hydrochlorothiazide Therapeutic alternatives: - 4 th level ATC chemical subgroup (C09CA Angiotensin II receptor blockers (ARBs), plain) (for telmisartan) - chlorthalidone, chlorothiazide, indapamide (for hydrochlorothiazide)	Tablet: 40 mg + 12.5 mg; 80 mg + 12.5 mg; 80 mg + 25 mg.
Complementary List	
sodium nitroprusside	Powder for infusion: 50 mg in ampoule.

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12.4 Medicines used in heart failure

☐ bisoprolol Therapeutic alternatives: - carvedilol - metoprolol	Tablet: 1.25 mg; 5 mg.
digoxin	Injection: 250 micrograms/mL in 2 mL ampoule. Oral liquid: 50 micrograms/mL. Tablet: 62.5 micrograms; 250 micrograms.
☐ enalapril Therapeutic alternatives: - 4 th level ATC chemical subgroup (C09AA ACE inhibitors, plain)	Tablet: 2.5 mg; 5 mg; 10 mg (as hydrogen maleate).
☐ furosemide Therapeutic alternatives: - bumetanide - torasemide	Injection: 10 mg/mL in 2 mL, 5 mL ampoule. Oral liquid: 20 mg/5 mL; 50 mg/5 mL [c]. Tablet: 20 mg; 40 mg.
☐ hydrochlorothiazide Therapeutic alternatives: - chlorothiazide - chlorthalidone - indapamide	Oral liquid: 50 mg/5 mL. Solid oral dosage form: 25 mg.
☐ losartan Therapeutic alternatives: - 4 th level ATC chemical subgroup (C09CA Angiotensin II receptor blockers (ARBs), plain)	Tablet: 25 mg; 50 mg; 100 mg.
spironolactone	Tablet: 25 mg.

Complementary List

digoxin [c]	Injection: 100 micrograms/mL in 1 mL ampoule; 250 micrograms/mL in 2 mL ampoule. Oral liquid: 50 micrograms/mL. Tablet: 62.5 micrograms; 125 micrograms; 250 mg micrograms.
dopamine	Injection: 40 mg/mL (hydrochloride) in 5 mL vial.

12.5 Antithrombotic medicines

12.5.1 Anti-platelet medicines

acetylsalicylic acid	Tablet: 100 mg.
clopidogrel	Tablet: 75 mg; 300 mg

12.5.2 Thrombolytic medicines

Complementary List

alteplase	Powder for injection: 10 mg; 20 mg; 50 mg in vial
streptokinase	Powder for injection: 1.5 million IU in vial.

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12.6 Lipid-lowering agents

☐ simvastatin*

Therapeutic alternatives:

- atorvastatin
- fluvastatin
- lovastatin
- pravastatin

Tablet: 5 mg; 10 mg; 20 mg; 40 mg.

*For use in high-risk patients.

12.7 Fixed-dose combinations for prevention of atherosclerotic cardiovascular disease

acetylsalicylic acid + ☐ atorvastatin + ☐ ramipril

Therapeutic alternatives:

- fluvastatin, lovastatin, pravastatin, simvastatin (for atorvastatin)
- 4th level ATC chemical subgroup (C09AA ACE inhibitors, plain) (for ramipril)

Tablet: 100 mg + 20 mg + 2.5 mg; 100 mg + 20 mg + 5 mg; 100 mg + 20 mg + 10 mg; 100 mg + 40 mg + 2.5 mg; 100 mg + 40 mg + 5 mg; 100 mg + 40 mg + 10 mg.

acetylsalicylic acid + ☐ simvastatin + ☐ ramipril + ☐ atenolol + ☐ hydrochlorothiazide

Therapeutic alternatives:

- atorvastatin, fluvastatin, lovastatin, pravastatin (for simvastatin)
- 4th level ATC chemical subgroup (C09AA ACE inhibitors, plain) (for ramipril)
- bisoprolol, carvedilol, metoprolol (for atenolol)
- chlorthalidone, chlorothiazide, indapamide (for hydrochlorothiazide)

Tablet: 100 mg + 20 mg + 5 mg + 50 mg + 12.5 mg.

☐ atorvastatin + ☐ perindopril + ☐ amlodipine

Therapeutic alternatives:

- fluvastatin, lovastatin, pravastatin, simvastatin (for atorvastatin)
- 4th level ATC chemical subgroup (C09AA ACE inhibitors, plain) (for perindopril)
- 4th level ATC chemical subgroup (C08CA Dihydropyridine derivatives) (for amlodipine)

Tablet: 20 mg + 5 mg + 5 mg; 20 mg + 10 mg + 10 mg; 40 mg + 5 mg + 5 mg; 40 mg + 10 mg + 10 mg.

13. DERMATOLOGICAL MEDICINES

13.1 Antifungal medicines

☐ miconazole

Therapeutic alternatives:

- 4th level ATC chemical subgroup (D01AC Imidazole and triazole derivatives) excluding combinations

Cream or ointment: 2% (nitrate).

selenium sulfide

Detergent-based suspension: 2%.

sodium thiosulfate

Solution: 15%.

terbinafine

Cream or ointment: 1% (hydrochloride).

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WHO Model List of Essential Medicines – 23rd List (2023)

13.2 Anti-infective medicines	
mupirocin	Cream: 2% (as calcium). 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 Therapeutic alternatives: - 4 th level ATC chemical subgroup (D07AC Corticosteroids, potent (group III))	Cream or ointment: 0.1% (as valerate). ^a Hydrocortisone preferred in neonates.
calamine	Lotion.
☐ hydrocortisone Therapeutic alternatives: - 4 th level ATC chemical subgroup (D07AA Corticosteroids, weak (group I))	Cream or ointment: 1% (acetate).
13.4 Medicines affecting skin differentiation and proliferation	
benzoyl peroxide	Cream or lotion: 5%.
☐ calcipotriol Therapeutic alternatives: - calcitriol - tacalcitol	Cream or ointment: 50 micrograms/mL (0.005%). Lotion: 50 micrograms/mL (0.005%).
coal tar	Solution: 5%.
fluorouracil	Ointment: 5%.
☐ podophyllum resin Therapeutic alternatives: - podophyllotoxin	Solution: 10% to 25%.
salicylic acid	Solution: 5%.
urea	Cream or ointment: 5%; 10%.
Complementary List	
methotrexate	Tablet: 2.5 mg; 10 mg (as sodium).
13.5 Scabicides and pediculicides	
☐ benzyl benzoate ^a Therapeutic alternatives: - precipitated sulfur topical ointment	Lotion: 25%. ^a > 2 years.
permethrin	Cream: 5%. Lotion: 1%.

WHO Model List of Essential Medicines – 23rd List (2023)

14. DIAGNOSTIC AGENTS

14.1 Ophthalmic medicines

fluorescein	Eye drops: 1% (sodium salt).
☐ tropicamide Therapeutic alternatives: - atropine - cyclopentolate	Eye drops: 0.5%.

14.2 Radiocontrast media

☐ amidotrizoate Therapeutic alternatives to be reviewed	Injection: 140 mg to 420 mg iodine/mL (as sodium or meglumine salt) in 20 mL ampoule.
barium sulfate	Aqueous suspension.
☐ iohexol Therapeutic alternatives to be reviewed	Injection: 140 mg to 350 mg iodine/mL in 5 mL, 10 mL, 20 mL ampoules.
<i>Complementary List</i>	
<i>barium sulfate [c]</i>	<i>Aqueous suspension.</i>
☐ meglumine iotroxate Therapeutic alternatives to be reviewed	Solution: 5 g to 8 g iodine in 100 mL to 250 mL.

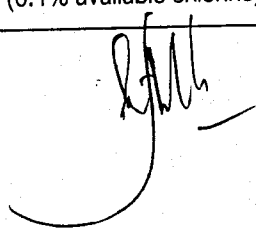
15. ANTISEPTICS AND DISINFECTANTS

15.1 Antiseptics

☐ chlorhexidine Therapeutic alternatives to be reviewed	Solution: 5% (digluconate).
☐ ethanol Therapeutic alternatives: - propanol	Solution: 70% (denatured).
☐ povidone iodine Therapeutic alternatives: - iodine	Solution: 10% (equivalent to 1% available iodine).

15.2 Disinfectants

alcohol based hand rub	Solution: containing ethanol 80% volume/volume. Solution: containing isopropyl alcohol 75% volume/volume.
chlorine base compound	Liquid: (0.1% available chlorine) for solution. Powder: (0.1% available chlorine) for solution. Solid: (0.1% available chlorine) for solution.



WHO Model List of Essential Medicines – 23rd List (2023)

o chloroxylenol	
Therapeutic alternatives: - 4 th level ATC chemical subgroup (D08AE Phenol and derivatives)	Solution: 4.8%.
glutaral	Solution: 2%.
16. DIURETICS	
amiloride	Tablet: 5 mg (hydrochloride).
☐ furosemide	Injection: 10 mg/mL in 2 mL, 5 mL ampoule.
Therapeutic alternatives: - bumetanide - torasemide	Oral liquid: 20 mg/5 mL; 50 mg/5 mL [c]. Tablet: 20 mg; 40 mg.
☐ hydrochlorothiazide	
Therapeutic alternatives: - chlorothiazide - chlortalidone - indapamide	Solid oral dosage form: 25 mg.
mannitol	Injectable solution: 10%; 20%.
spironolactone	Tablet: 25 mg.
<i>Complementary List</i>	
☐ hydrochlorothiazide[c]	
Therapeutic alternatives: - chlorothiazide - chlortalidone	Tablet (scored): 25 mg.
mannitol [c]	Injectable solution: 10%; 20%.
spironolactone[c]	Oral liquid: 5 mg/5 mL; 10 mg/5 mL; 25 mg/5 mL. Tablet: 25 mg.
17. GASTROINTESTINAL MEDICINES	
<i>Complementary List</i>	
pancreatic enzymes[c]	Age-appropriate formulations and doses including lipase, protease and amylase.
17.1 Antiulcer medicines	
☐ omeprazole	
Therapeutic alternatives: - 4 th level ATC chemical subgroup (A02BC Proton pump inhibitors) excluding combinations	Powder for injection: 40 mg in vial Powder for oral liquid: 20 mg; 40 mg sachets. Solid oral dosage form: 10 mg; 20 mg; 40 mg.
☐ ranitidine	
Therapeutic alternatives: - 4 th level ATC chemical subgroup (A02BA H ₂ -receptor antagonists) excluding combinations	Injection: 25 mg/mL (as hydrochloride) in 2 mL ampoule. Oral liquid: 75 mg/5 mL (as hydrochloride). Tablet: 150 mg (as hydrochloride).

WHO Model List of Essential Medicines – 23rd List (2023)

17.2 Antiemetic medicines

dexamethasone	Injection: 4 mg/mL (as disodium phosphate salt) in 1 mL ampoule. 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.
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metoclopramide ^a	Injection: 5 mg/mL (hydrochloride) in 2 mL ampoule. Oral liquid: 5 mg/5 mL [c]. Tablet: 10 mg (hydrochloride). ^a Not in neonates.
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☐ ondansetron ^a

Therapeutic alternatives:

- dolasetron
- granisetron
- palonosetron
- tropisetron

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.

Complementary list

aprepitant

Capsule: 80 mg; 125 mg; 165 mg

Powder for oral suspension: 125 mg in sachet

17.3 Anti-inflammatory medicines

☐ sulfasalazine

Therapeutic alternatives:

- mesalazine

Retention enema.

Suppository: 500 mg.

Tablet: 500 mg.

Complementary List

hydrocortisone

Retention enema: 100 mg/60 mL.

Suppository: 25 mg (acetate).

prednisolone

Retention enema: 20 mg/100 mL (as sodium phosphate).

17.4 Laxatives

☐ senna

Therapeutic alternatives:

- bisacodyl

Tablet: 7.5 mg (sennosides) (or traditional dosage forms).

17.5 Medicines used in diarrhoea

oral rehydration salts – zinc sulfate [c]

Co-package containing:

ORS powder for dilution (see Section 17.5.1) – zinc sulfate solid oral dosage form 20 mg (see Section 17.5.2)

WHO Model List of Essential Medicines – 23rd List (2023)

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 recommended only 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

zinc sulfate*	Solid oral dosage form: 20 mg. *In acute diarrhoea zinc sulfate should be used as an adjunct to oral rehydration salts.
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18. MEDICINES FOR ENDOCRINE DISORDERS

18.1 Adrenal hormones and synthetic substitutes

fludrocortisone	Tablet: 100 micrograms (acetate).
hydrocortisone	Tablet: 5 mg; 10 mg; 20 mg.

18.2 Androgens

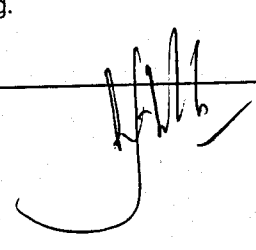
Complementary List

testosterone	Injection: 200 mg (enanthate) in 1 mL ampoule.
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18.3 Estrogens

18.4 Progestogens

☐ medroxyprogesterone acetate Therapeutic alternatives: - norethisterone	Tablet: 5 mg.
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WHO Model List of Essential Medicines – 23rd List (2023)

18.5 Medicines for diabetes

18.5.1 Insulins

insulin injection (soluble)* <i>*including quality-assured biosimilars</i>	Injection: 40 IU/mL in 10 mL vial; 100 IU/mL in 10 mL vial; 100 IU/mL in 3 mL cartridge or pre-filled pen.
intermediate-acting insulin* <i>*including quality-assured biosimilars</i>	Injection: 40 IU/mL in 10 mL vial; 100 IU/mL in 10 mL vial; 100 IU/mL in 3 mL cartridge or pre-filled pen (as compound insulin zinc suspension or isophane insulin).
☐ long-acting insulin analogues* Therapeutic alternatives: - insulin degludec - insulin detemir - insulin glargine <i>*including quality-assured biosimilars</i>	Injection: 100 IU/mL in 3 mL cartridge or pre-filled pen.

18.5.2 Oral hypoglycaemic agents

☐ empagliflozin Therapeutic alternatives: - canagliflozin - dapagliflozin	Tablet: 10 mg; 25 mg.
☐ gliclazide* Therapeutic alternatives: - 4 th level ATC chemical subgroup (A10BB Sulfonylureas)	Solid oral dosage form: (controlled-release tablets) 30 mg; 60 mg; 80 mg. <i>*glibenclamide not suitable above 60 years.</i>
metformin	Tablet: 500 mg (hydrochloride).

Complementary List

metformin [c]	Tablet: 500 mg (hydrochloride).
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18.6 Medicines for hypoglycaemia

glucagon	Injection: 1 mg/mL.
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Complementary List

diazoxide [c]	Oral liquid: 50 mg/mL. Tablet: 50 mg.
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18.7 Thyroid hormones and antithyroid medicines

levothyroxine	Tablet: 25 micrograms [c]; 50 micrograms; 100 micrograms (sodium salt).
potassium iodide	Tablet: 60 mg.
☐ methimazole Therapeutic alternatives: - carbimazole (depending on local availability)	Tablet: 5mg, 10mg, 20mg.
propylthiouracil*	Tablet: 50 mg. <i>*For use when alternative first-line treatment is not appropriate or available; and in patients during the first trimester of pregnancy.</i>

WHO Model List of Essential Medicines – 23rd List (2023)

18.5 Medicines for diabetes

18.5.1 Insulins

insulin injection (soluble)* <i>*including quality-assured biosimilars</i>	Injection: 40 IU/mL in 10 mL vial; 100 IU/mL in 10 mL vial; 100 IU/mL in 3 mL cartridge or pre-filled pen.
intermediate-acting insulin* <i>*including quality-assured biosimilars</i>	Injection: 40 IU/mL in 10 mL vial; 100 IU/mL in 10 mL vial; 100 IU/mL in 3 mL cartridge or pre-filled pen (as compound insulin zinc suspension or isophane insulin).
☐ long-acting insulin analogues* Therapeutic alternatives: - insulin degludec - insulin detemir - insulin glargine <i>*including quality-assured biosimilars</i>	Injection: 100 IU/mL in 3 mL cartridge or pre-filled pen.

18.5.2 Oral hypoglycaemic agents

☐ empagliflozin Therapeutic alternatives: - canagliflozin - dapagliflozin	Tablet: 10 mg; 25 mg.
☐ gliclazide* Therapeutic alternatives: - 4 th level ATC chemical subgroup (A10BB Sulfonylureas)	Solid oral dosage form: (controlled-release tablets) 30 mg; 60 mg; 80 mg. <i>*glibenclamide not suitable above 60 years.</i>
metformin	Tablet: 500 mg (hydrochloride).

Complementary List

metformin [c]

Tablet: 500 mg (hydrochloride).

18.6 Medicines for hypoglycaemia

glucagon	Injection: 1 mg/mL.
Complementary List	
diazoxide [c]	Oral liquid: 50 mg/mL. Tablet: 50 mg.

18.7 Thyroid hormones and antithyroid medicines

levothyroxine	Tablet: 25 micrograms [c]; 50 micrograms; 100 micrograms (sodium salt).
potassium iodide	Tablet: 60 mg.
☐ methimazole Therapeutic alternatives: - carbimazole (depending on local availability)	Tablet: 5mg, 10mg, 20mg.
propylthiouracil*	Tablet: 50 mg. <i>*For use when alternative first-line treatment is not appropriate or available; and in patients during the first trimester of pregnancy.</i>

WHO Model List of Essential Medicines – 23rd List (2023)

Complementary List	
Lugol's solution [c]	Oral liquid: about 130 mg total iodine/mL.
☐ methimazole [c] Therapeutic alternatives: - carbimazole (depending on local availability)	Tablet: 5mg, 10mg, 20mg.
potassium iodide [c]	Tablet: 60 mg.
propylthiouracil* [c]	Tablet: 50 mg. *For use when alternative first-line treatment is not appropriate or available
18.8 Medicines for disorders of the pituitary hormone system	
☐ cabergoline Therapeutic alternatives: - bromocriptine	Tablet: 0.5 mg; 1 mg.
Complementary List	
octreotide	Injection (immediate-release): 0.05 mg/mL; 0.1 mg/mL; 0.5 mg/mL (as acetate) in 1 mL vial. Injection (modified-release): 20 mg (as acetate) in vial plus diluent.
19. IMMUNOLOGICALS	
19.1 Diagnostic agents	
All tuberculin should comply with the WHO requirements for tuberculins.	
tuberculin, purified protein derivative (PPD)	Injection.
19.2 Sera, immunoglobulins and monoclonal antibodies	
All plasma fractions should comply with the WHO requirements.	
anti-rabies virus monoclonal antibodies* *including quality-assured biosimilars	Injection: 40 IU/mL in 1.25 mL, 2.5 mL vial; 100 IU/mL in 2.5 mL vial (human). Injection: 300 IU/mL in 10 mL vial; 600 IU/mL in 1 mL, 2.5 mL and 5 mL vial (murine).
antivenom immunoglobulin*	Injection. *Exact type to be defined locally.
diphtheria antitoxin	Injection: 10 000 IU; 20 000 IU in vial.
equine rabies immunoglobulin	Injection: 150 IU/mL; 200 IU/mL; 300 IU/mL; 400 IU/mL in vial.

WHO Model List of Essential Medicines – 23rd List (2023)

19.3 Vaccines

WHO immunization policy recommendations are published in vaccine position papers based on recommendations made by the Strategic Advisory Group of Experts on Immunization (SAGE).

WHO vaccine position papers are updated three to four times per year. The list below details the vaccines for which there is a recommendation from SAGE and a corresponding WHO position paper as at March 2023. The most recent versions of the WHO position papers, reflecting the current evidence related to a specific vaccine and the related recommendations, can be accessed at any time on the WHO website at:

<https://www.who.int/teams/immunization-vaccines-and-biologicals/policies/position-papers>

Vaccine recommendations may be universal or conditional (e.g., in certain regions, in some high-risk populations or as part of immunization programmes with certain characteristics). Details are available in the relevant position papers, and in the Summary Tables of WHO Routine Immunization Recommendations available on the WHO website at:

<https://www.who.int/teams/immunization-vaccines-and-biologicals/policies/who-recommendations-for-routine-immunization-summary-tables>

Selection of vaccines from the Model List will need to be determined by each country after consideration of international recommendations, epidemiology and national priorities.

All vaccines should comply with the WHO requirements for biological substances.

WHO noted the need for vaccines used in children to be polyvalent.

Recommendations for all

BCG vaccine

diphtheria vaccine

Haemophilus influenzae type b vaccine

hepatitis B vaccine

human papilloma virus (HPV) vaccine

measles vaccine

pertussis vaccine

pneumococcal vaccine

poliomyelitis vaccine

rotavirus vaccine

rubella vaccine

tetanus vaccine

Recommendations for certain regions

Japanese encephalitis vaccine

tick-borne encephalitis vaccine

yellow fever vaccine

Recommendations for some high-risk populations

cholera vaccine

dengue vaccine

hepatitis A vaccine

meningococcal meningitis vaccine

WHO Model List of Essential Medicines – 23rd List (2023)

rabies vaccine	
typhoid vaccine	
Recommendations for immunization programmes with certain characteristics	
influenza vaccine (seasonal)	
mumps vaccine	
varicella vaccine	
20. MUSCLE RELAXANTS (PERIPHERALLY-ACTING) AND CHOLINESTERASE INHIBITORS	
☐ atracurium Therapeutic alternatives to be reviewed	Injection: 10 mg/mL (besylate).
neostigmine	Injection: 500 micrograms/mL (methylsulfate) in 1 mL ampoule; 2.5 mg/mL (methylsulfate) in 1 mL ampoule. Tablet: 15 mg (bromide).
suxamethonium	Injection: 50 mg/mL (chloride) in 2 mL ampoule. Powder for injection: (chloride), in vial.
☐ vecuronium [c] Therapeutic alternatives: -atracurium	Powder for injection: 10 mg (bromide) in vial.
Complementary List	
pyridostigmine	Injection: 1 mg in 1 mL ampoule. Tablet: 60 mg (bromide).
☐ vecuronium Therapeutic alternatives to be reviewed	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%. – Trachoma
erythromycin	Ointment: 0.5% [c] – Infections due to <i>Chlamydia trachomatis</i> or <i>Neisseria gonorrhoea</i> .
☐ gentamicin Therapeutic alternatives: - amikacin - kanamycin - netilmicin - tobramycin	Solution (eye drops): 0.3% (sulfate). – Bacterial blepharitis – Bacterial conjunctivitis
natamycin	Suspension (eye drops): 5% – Fungal keratitis

WHO Model List of Essential Medicines – 23rd List (2023)

☐ ofloxacin Therapeutic alternatives: - 4 th level ATC chemical subgroup (S01AE Fluoroquinolones)	Solution (eye drops): 0.3%. – Bacterial conjunctivitis – Bacterial keratitis
☐ tetracycline Therapeutic alternatives: - chlortetracycline - oxytetracycline	Eye ointment: 1% (hydrochloride). – Bacterial blepharitis – Bacterial conjunctivitis – Bacterial keratitis – Trachoma
21.2 Anti-inflammatory agents	
☐ prednisolone Therapeutic alternatives to be reviewed	Solution (eye drops): 0.5% (sodium phosphate).
21.3 Local anaesthetics	
☐ tetracaine ☒ Therapeutic alternatives: - 4 th level ATC chemical subgroup (S01HA Local anaesthetics) excluding cocaine and combinations	Solution (eye drops): 0.5% (hydrochloride). ☒ Not in preterm neonates.
21.4 Miotics and antiglaucoma medicines	
acetazolamide	Tablet: 250 mg.
latanoprost	Solution (eye drops): 50 micrograms/mL.
☐ pilocarpine Therapeutic alternatives: - carbachol	Solution (eye drops): 2%; 4% (hydrochloride or nitrate).
☐ timolol Therapeutic alternatives: - 4 th level ATC chemical subgroup (S01ED Beta blocking agents) excluding combinations	Solution (eye drops): 0.25%; 0.5% (as hydrogen maleate).
21.5 Mydriatics	
☐ atropine ☒ Therapeutic alternatives*: - cyclopentolate hydrochloride - homatropine hydrobromide *EMLc only	Solution (eye drops): 0.1%; 0.5%; 1% (sulfate). ☒ > 3 months.
Complementary List	
epinephrine (adrenaline)	Solution (eye drops): 2% (as hydrochloride).
21.6 Anti-vascular endothelial growth factor (VEGF) preparations	
Complementary List	
bevacizumab* *including quality-assured biosimilars	Injection: 25 mg/mL.

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22. MEDICINES FOR REPRODUCTIVE HEALTH AND PERINATAL CARE	
22.1 Contraceptives	
22.1.1 Oral hormonal contraceptives	
☐ ethinylestradiol + ☐ levonorgestrel Therapeutic alternatives to be reviewed	Tablet: 30 micrograms + 150 micrograms.
☐ ethinylestradiol + ☐ norethisterone Therapeutic alternatives to be reviewed	Tablet: 35 micrograms + 1 mg.
levonorgestrel	Tablet: 30 micrograms; 750 micrograms (pack of two); 1.5 mg.
ulipristal	Tablet: 30 mg (as acetate).
22.1.2 Injectable hormonal contraceptives	
estradiol cypionate + medroxyprogesterone acetate	Injection: 5 mg + 25 mg.
medroxyprogesterone acetate	Injection (intramuscular): 150 mg/mL in 1 mL vial. Injection (subcutaneous): 104 mg/0.65 mL in pre-filled syringe or single-dose injection delivery system.
norethisterone enantate	Oily solution: 200 mg/mL in 1 mL ampoule.
22.1.3 Intrauterine devices	
copper-containing device	
levonorgestrel-releasing intrauterine system	Intrauterine system: with reservoir containing 52 mg of levonorelrel
22.1.4 Barrier methods	
condoms	
diaphragms	
22.1.5 Implantable contraceptives	
etonogestrel-releasing implant	Single-rod etonogestrel-releasing implant: containing 68 mg of etonogestrel.
levonorgestrel-releasing implant	Two-rod levonorgestrel-releasing implant: each rod containing 75 mg of levonorgestrel (150 mg total).
22.1.6 Intravaginal contraceptives	
ethinylestradiol + etonogestrel	Vaginal ring: containing 2.7 mg + 11.7 mg
progesterone vaginal ring*	Progesterone-releasing vaginal ring: containing 2.074 g of micronized progesterone. *For use in women actively breastfeeding at least 4 times per day

WHO Model List of Essential Medicines – 23rd List (2023)

22.2 Ovulation inducers	
<i>Complementary List</i>	
clomifene	Tablet: 50 mg (citrate).
☐ letrozole Therapeutic alternatives: - anastrozole	Solid oral dosage form: 2.5 mg.
22.3 Uterotonics	
carbetocin	Injection (heat stable): 100 micrograms/mL.
☐ ergometrine Therapeutic alternatives: - methylergometrine	Injection: 200 micrograms (hydrogen maleate) in 1 mL ampoule.
mifepristone – misoprostol Where permitted under national law and where culturally acceptable.	Tablet 200 mg – tablet 200 micrograms. Co-package containing: mifepristone 200 mg tablet [1] and misoprostol 200 micrograms tablet [4] – Management of intrauterine fetal demise; – Management of induced abortion
misoprostol	Tablet: 200 micrograms. – Management of incomplete abortion and miscarriage; – Prevention and treatment 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.
22.4 Antioxytocics (tocolytics)	
nifedipine	Immediate-release capsule: 10 mg.

WHO Model List of Essential Medicines – 23rd List (2023)

22.5 Other medicines administered to the mother																															
dexamethasone	Injection: 4 mg/mL (as disodium phosphate salt) in 1 mL ampoule.																														
multiple micronutrient supplement*	Tablet containing: <table> <tr> <td>Vitamin A (retinol acetate)</td><td>800 micrograms retinol activity equivalent</td></tr> <tr> <td>Vitamin C (ascorbic acid)</td><td>70 mg</td></tr> <tr> <td>Vitamin D (cholecalciferol)</td><td>5 micrograms (200 IU)</td></tr> <tr> <td>Vitamin E (alpha tocopherol succinate)</td><td>10 mg alpha tocopherol equivalent</td></tr> <tr> <td>Vitamin B1 (thiamine mononitrate)</td><td>1.4 mg</td></tr> <tr> <td>Vitamin B2 (riboflavin)</td><td>1.4 mg</td></tr> <tr> <td>Vitamin B3 (niacinamide)</td><td>18 mg niacin equivalent</td></tr> <tr> <td>Vitamin B6 (pyridoxine hydrochloride)</td><td>1.9 mg</td></tr> <tr> <td>Folic acid (folic acid)</td><td>680 micrograms dietary folate equivalent (400 micrograms)</td></tr> <tr> <td>Vitamin B12 (cyanocobalamin)</td><td>2.6 micrograms</td></tr> <tr> <td>Iron (ferrous fumarate)</td><td>30 mg</td></tr> <tr> <td>Iodine (potassium iodide)</td><td>150 micrograms</td></tr> <tr> <td>Zinc (zinc oxide)</td><td>15 mg</td></tr> <tr> <td>Selenium (sodium selenite)</td><td>65 micrograms</td></tr> <tr> <td>Copper (cupric oxide)</td><td>2 mg</td></tr> </table> *For use in specific contexts. Refer to current WHO recommendations.	Vitamin A (retinol acetate)	800 micrograms retinol activity equivalent	Vitamin C (ascorbic acid)	70 mg	Vitamin D (cholecalciferol)	5 micrograms (200 IU)	Vitamin E (alpha tocopherol succinate)	10 mg alpha tocopherol equivalent	Vitamin B1 (thiamine mononitrate)	1.4 mg	Vitamin B2 (riboflavin)	1.4 mg	Vitamin B3 (niacinamide)	18 mg niacin equivalent	Vitamin B6 (pyridoxine hydrochloride)	1.9 mg	Folic acid (folic acid)	680 micrograms dietary folate equivalent (400 micrograms)	Vitamin B12 (cyanocobalamin)	2.6 micrograms	Iron (ferrous fumarate)	30 mg	Iodine (potassium iodide)	150 micrograms	Zinc (zinc oxide)	15 mg	Selenium (sodium selenite)	65 micrograms	Copper (cupric oxide)	2 mg
Vitamin A (retinol acetate)	800 micrograms retinol activity equivalent																														
Vitamin C (ascorbic acid)	70 mg																														
Vitamin D (cholecalciferol)	5 micrograms (200 IU)																														
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Vitamin B2 (riboflavin)	1.4 mg																														
Vitamin B3 (niacinamide)	18 mg niacin equivalent																														
Vitamin B6 (pyridoxine hydrochloride)	1.9 mg																														
Folic acid (folic acid)	680 micrograms dietary folate equivalent (400 micrograms)																														
Vitamin B12 (cyanocobalamin)	2.6 micrograms																														
Iron (ferrous fumarate)	30 mg																														
Iodine (potassium iodide)	150 micrograms																														
Zinc (zinc oxide)	15 mg																														
Selenium (sodium selenite)	65 micrograms																														
Copper (cupric oxide)	2 mg																														
tranexamic acid	Injection: 100 mg/mL in 10 mL ampoule.																														
22.6 Medicines administered to the neonate [c]																															
caffeine citrate [c]	Injection: 20 mg/mL (equivalent to 10 mg caffeine base/mL). Oral liquid: 20 mg/mL (equivalent to 10 mg caffeine base/mL).																														
chlorhexidine [c]	Solution or gel: 7.1% (digluconate) delivering 4% chlorhexidine (for umbilical cord care).																														
Complementary List																															
☐ ibuprofen [c] Therapeutic alternatives: - indometacin	Solution for injection: 5 mg/mL.																														
☐ prostaglandin E1 [c] Therapeutic alternatives: - prostaglandin E2	Solution for injection: 0.5 mg/mL in alcohol.																														
surfactant [c]	Suspension for intratracheal instillation: 25 mg/mL or 80 mg/mL.																														
23. PERITONEAL DIALYSIS SOLUTION																															
Complementary List																															
intrapertoneal dialysis solution	Parenteral solution: of appropriate composition.																														

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24. MEDICINES FOR MENTAL AND BEHAVIOURAL DISORDERS	
24.1 Medicines for psychotic disorders	
☐ fluphenazine Therapeutic alternatives: - haloperidol decanolate - zuclopenthixol decanolate	Injection: 25 mg (decanoate or enantate) in 1 mL ampoule.
☐ haloperidol Therapeutic alternatives: - chlorpromazine	Tablet: 2 mg; 5 mg.
haloperidol	Injection: 5 mg/mL in 1 mL ampoule.
olanzapine	Powder for injection: 10 mg in vial.
☐ paliperidone Therapeutic alternatives: - risperidone injection	Injection (prolonged-release): 25 mg; 50 mg; 75 mg; 100 mg; 150 mg (as palmitate) in pre-filled syringe.
☐ risperidone Therapeutic alternatives: - aripiprazole - olanzapine - paliperidone - quetiapine	Solid oral dosage form: 0.25 mg to 6.0 mg.
<i>Complementary List</i>	
clozapine	Solid oral dosage form: 25 to 200 mg.
24.2 Medicines for mood disorders	
24.2.1 Medicines for depressive disorders	
amitriptyline	Tablet: 25 mg; 75mg (hydrochloride).
☐ fluoxetine Therapeutic alternatives: - citalopram - escitalopram - fluvoxamine - paroxetine - sertraline	Solid oral dosage form: 20 mg (as hydrochloride).
24.2.2 Medicines for bipolar disorders	
carbamazepine	Tablet (scored): 100 mg; 200 mg; 400 mg.
lithium carbonate	Solid oral dosage form: 300 mg.
☐ quetiapine Therapeutic alternatives: - aripiprazole - olanzapine - paliperidone	Tablet (immediate-release): 25 mg; 100 mg; 150 mg; 200 mg; 300 mg. Tablet (modified-release): 50 mg; 150 mg; 200 mg; 300 mg; 400 mg.

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valproic acid (sodium valproate)* <i>*avoid use in pregnancy and in women and girls of child-bearing potential, unless alternative treatments are ineffective or not tolerated because of the high risk of birth defects and developmental disorders in children exposed to valproate in the womb.</i>	Tablet (enteric-coated): 200 mg; 500 mg.
24.3 Medicines for anxiety disorders	
☐ diazepam* Therapeutic alternatives: - lorazepam	Tablet (scored): 2 mg; 5 mg. *For short-term emergency management of acute and severe anxiety symptoms only
☐ fluoxetine Therapeutic alternatives: - citalopram - escitalopram - fluvoxamine - paroxetine - sertraline	Solid oral dosage form: 20 mg (as hydrochloride).
24.4 Medicines for obsessive compulsive disorders	
clomipramine	Capsule: 10 mg; 25 mg (hydrochloride).
☐ fluoxetine Therapeutic alternatives: - citalopram - escitalopram - fluvoxamine - paroxetine - sertraline	Solid oral dosage form: 20 mg (as hydrochloride).
24.5 Medicines for disorders due to psychoactive substance use	
24.5.1 Medicines for alcohol use disorders	
acamprosate calcium	Tablet: 333 mg
naltrexone	Injection suspension (extended-release): 380 mg in vial Tablet: 50 mg
24.5.2 Medicines for nicotine use disorders	
bupropion	Tablet (sustained-release): 150 mg (hydrochloride).
nicotine replacement therapy (NRT)	Chewing gum: 2 mg; 4 mg (as polacrilex). Lozenge: 2 mg; 4 mg. Oral spray: 1 mg per actuation. Transdermal patch: 5 mg to 30 mg/16 hrs; 7 mg to 21 mg/24 hrs.
varenicline	Tablet: 0.5 mg, 1 mg

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24.5.3 Medicines for opioid use disorders	
Complementary List	
☐ methadone* Therapeutic alternatives: - buprenorphine	Concentrate for oral liquid: 5 mg/mL; 10 mg/mL (hydrochloride). Oral liquid: 5 mg/5 mL; 10 mg/5 mL (hydrochloride). <i>*The medicines should only be used within an established support programme.</i>
25. MEDICINES ACTING ON THE RESPIRATORY TRACT	
25.1 Antiasthmatic medicines and medicines for chronic obstructive pulmonary disease	
☐ budesonide Therapeutic alternatives: - beclometasone - ciclesonide - flunisolide - fluticasone - mometasone	Inhalation (aerosol): 100 micrograms per dose; 200 micrograms per dose.
☐ budesonide + ☐ formoterol Therapeutic alternatives: - beclometasone + formoterol - budesonide + salmeterol - fluticasone + formoterol - fluticasone furoate + vilanterol - mometasone + formoterol	Dry powder inhaler: 100 micrograms + 6 micrograms per dose; 200 micrograms + 6 micrograms per dose.
epinephrine (adrenaline)	Injection: 1 mg/mL (as hydrochloride or hydrogen tartrate) in 1 mL ampoule.
ipratropium bromide	Inhalation (aerosol): 20 micrograms/metered dose.
☐ salbutamol Therapeutic alternatives: - terbutaline	Inhalation (aerosol): 100 micrograms (as sulfate) per dose. Injection: 50 micrograms/mL (as sulfate) in 5 mL ampoule. Metered dose inhaler (aerosol): 100 micrograms (as sulfate) per dose. Respirator solution for use in nebulizers: 5 mg/mL (as sulfate).
☐ tiotropium Therapeutic alternatives: - aclidinium - glycopyrronium - umeclidinium	Powder for inhalation, capsule: 18 micrograms. Inhalation solution: 1.25 micrograms; 2.5 micrograms per actuation.
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).

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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 Na ⁺ 150 mmol/L and Cl ⁻ 150 mmol/L); 5% glucose, 0.45% sodium chloride (equivalent to Na ⁺ 75 mmol/L and Cl ⁻ 75 mmol/L) [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, HCO ₃ ⁻ 167 mmol/L). Solution: 8.4% in 10 mL ampoule (equivalent to Na ⁺ 1000 mmol/L, HCO ₃ ⁻ 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).
☐ colecalciferol [c] Therapeutic alternatives: - ergocalciferol	Oral liquid: 400 IU/mL. Solid oral dosage form: 400 IU; 1000 IU.
☐ ergocalciferol Therapeutic alternatives: - colecalciferol	Oral liquid: 250 micrograms/mL (10 000 IU/mL). Solid oral dosage form: 1.25 mg (50 000 IU).
iodine	Capsule: 190 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.
multiple micronutrient powder [c]	Sachets containing: - iron (elemental) 12.5 mg (as coated ferrous fumarate) - zinc (elemental) 5 mg - vitamin A 300 micrograms - with or without other micronutrients at recommended daily values
nicotinamide	Tablet: 50 mg.
pyridoxine	Tablet: 25 mg (hydrochloride).

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retinol	Capsule: 50 000 IU; 100 000 IU; 200 000 IU (as palmitate). Oral oily solution: 100 000 IU/mL (as palmitate) 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.
thiamine	Tablet: 50 mg (hydrochloride).
Complementary List	
calcium gluconate	Injection: 100 mg/mL in 10 mL ampoule.
28. EAR, NOSE AND THROAT MEDICINES	
acetic acid [c]	Topical: 2%, in alcohol.
☐ budesonide [c] Therapeutic alternatives to be reviewed	Nasal spray: 100 micrograms per dose.
☐ ciprofloxacin [c] Therapeutic alternatives: - ofloxacin	Solution (ear drops): 0.3% (as hydrochloride).
☐ xylometazoline ^a [c] Therapeutic alternatives to be reviewed	Nasal spray: 0.05%. ^a Not in children less than 3 months.
29. MEDICINES FOR DISEASES OF JOINTS	
29.1 Medicines used to treat gout	
allopurinol	Tablet: 100 mg.
29.2 Disease-modifying anti-rheumatic drugs (DMARDs)	
chloroquine	Tablet: 100 mg; 150 mg (as phosphate or sulfate).
Complementary List	
azathioprine	Tablet: 50 mg.
hydroxychloroquine	Solid oral dosage form: 200 mg (as sulfate).
methotrexate	Tablet: 2.5 mg (as sodium).
penicillamine	Solid oral dosage form: 250 mg.
sulfasalazine	Tablet: 500 mg.
29.3 Medicines for juvenile joint diseases	
Complementary List	
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.

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o adalimumab* <i>Therapeutic alternatives*:</i> - certolizumab pegol - etanercept - golimumab - infliximab *including quality-assured biosimilars	Injection: 10 mg/0.2 mL [c]; 20 mg/0.4 mL [c]; 40 mg/0.8 mL; 40 mg/0.4 mL.
methotrexate	Tablet: 2.5 mg (as sodium).
□ triamcinolone hexacetonide <i>Therapeutic alternatives:</i> - triamcinoione acetoneide	Injection: 20 mg/mL in vial.
30. DENTAL MEDICINES AND PREPARATIONS	
fluoride	Gel: containing 2500 to 12 500 ppm fluoride (any type). Mouthrinse: containing 230 to 900 ppm fluoride (any type). Toothpaste, cream or gel: containing 1000 to 1500 ppm fluoride (any type). Varnish: containing 22 500 ppm fluoride (any type).
glass ionomer cement	Single-use capsules: 0.4 g powder + 0.09 mL liquid. Multi-use bottle: powder + liquid. Powder (fluoro-alumino-silicate glass) contains: 25-50% silicate, 20-40% aluminium oxide, 1-20% fluoride, 15-40% metal oxide, 0-15% phosphate, remainder are polyacrylic acid powder and metals in minimal quantities. Liquid (aqueous) contains: 7-25% polybasic carboxylic acid, 45-60% polyacrylic acid.
resin-based composite (low-viscosity)*	Single-use applicator or multi-use bottle *of any type for use as dental sealant
resin-based composite (high-viscosity)*	Single-use capsule or multi-use syringe *of any type for use as dental filling material
silver diamine fluoride	Solution: 38% w/v.

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Table 1.1: Medicines with age or weight restrictions

artesunate + pyronaridine tetraphosphate	> 5 kg
atropine	> 3 months
benzyl benzoate	>2 years
betamethasone topical preparations	hydrocortisone preferred in neonates
cefazolin	> 1 month
ceftriaxone	> 41 weeks corrected gestational age
darunavir	> 3 years
dihydroartemisinin + piperaquine phosphate	> 5 kg
diloxanide	>25 kg
dolutegravir	≥ 4 weeks and ≥ 3 kg (10 mg dispersible tablet) ≥ 25 kg (50 mg tablet)
doxycycline	> 8 years (except for serious infections e.g. cholera)
ibuprofen	> 3 months (except IV form for patent ductus arteriosus)
mefloquine	> 5 kg or > 3 months
metoclopramide	Not in neonates
nevirapine	> 6 weeks
ondansetron	> 1 month
silver sulfadiazine	> 2 months
tetracaine	Not in preterm neonates
xylometazoline	> 3 months

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Table 1.2: 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 that dose is a whole number of tablets.
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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 EML – 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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mannitol.....	44	pancreatic enzymes.....	44
measles vaccine.....	49	paracetamol (acetaminophen).....	2, 26
mebendazole.....	7	paromomycin.....	22
medroxyprogesterone acetate.....	46, 52	pegaspargase.....	31
mefloquine.....	23, 24	pegfilgrastim.....	33
meglumine antimoniate.....	22	penicillamine.....	4, 59
meglumine iotroxate.....	43	pentamidine.....	24
melarsoprol.....	25	permethrin.....	42
melphalan.....	30	pertussis vaccine.....	49
meningococcal meningitis vaccine.....	49	phenobarbital.....	5
mercaptopurine.....	30	phenoxymethylpenicillin.....	12
meropenem.....	15, 17	phenytoin.....	5
meropenem + vaborbactam.....	16	phytomenadione.....	36
mesna.....	34	pilocarpine.....	51
metformin.....	47	piperacillin + tazobactam.....	15
methadone.....	2, 57	platelets.....	36
methimazole.....	47, 48	plazomicin.....	16
methotrexate.....	30, 42, 59	pneumococcal vaccine.....	49
methyl dopa.....	39	podophyllum resin.....	42
methylprednisolone.....	34	poliomyelitis vaccine.....	49
methylthioninium chloride (methylene blue).....	4	polymyxin B.....	16
metoclopramide.....	3, 45	potassium chloride.....	57, 58
metronidazole.....	12, 22	potassium ferric hexacyano-ferrate(II) -2H ₂ O.....	4
micafungin.....	18	potassium iodide.....	18, 47, 48
miconazole.....	41	potassium permanganate.....	42
midazolam.....	1, 3, 5	povidone iodine.....	43
mifepristone – misoprostol.....	53	praziquantel.....	7
miltefosine.....	22	prednisolone.....	4, 34, 45, 51
misoprostol.....	53	pretomanid.....	17
morphine.....	1, 2	primaquine.....	23
moxifloxacin.....	16, 17	procaine benzylpenicillin.....	12
multiple micronutrient powder.....	58	procarbazine.....	31
multiple micronutrient supplement.....	54	progesterone vaginal ring.....	52
mumps vaccine.....	50	proguanil.....	24

WHO Model List of Essential Medicines – 23rd List (2023)

propofol	1	succimer	4
propranolol	26	sulfadiazine	24
propylthiouracil	47, 48	sulfadoxine + pyrimethamine	23, 24
prostaglandin E1	54	sulfamethoxazole + trimethoprim	12, 24
protamine sulfate	36	sulfasalazine	45, 59
pyrantel	7	sumatriptan	26
pyrazinamide	16	suramin sodium	24
pyridostigmine	50	surfactant	54
pyridoxine	58	suxamethonium	50
pyrimethamine	24	tacrolimus	26
quetiapine	55	tamoxifen	34
quinine	23	telmisartan + amlodipine	39
rabies vaccine	50	telmisartan + hydrochlorothiazide	39
raltegravir	20	tenofovir disoproxil fumarate	19, 21
ranitidine	44	terbinafine	41
rasburicase	35	testosterone	46
ravidasvir	21	tetanus vaccine	49
ready-to-use therapeutic food	35	tetracaine	51
realgar-Indigo naturalis formulation	31	tetracycline	51
red blood cells	36	thalidomide	33
resin-based composite (high-viscosity)	60	thiamine	59
resin-based composite (low-viscosity)	60	tick-borne encephalitis vaccine	49
retinol	59	timolol	51
ribavirin	20, 21	tioguanine	31
riboflavin	59	tiotropium	57
rifabutin	16	tranexamic acid	36, 54
rifampicin	16	trastuzumab	32
rifapentine	16	triamcinolone hexacetonide	60
risperidone	55	triclabendazole	7
ritonavir	19	trimethoprim	13
rituximab	6, 32	tropicamide	43
rotavirus vaccine	49	tuberculin, purified protein derivative (PPD)	48
rubella vaccine	49	typhoid vaccine	50
salbutamol	57	ulipristal	52
salicylic acid	42	urea	42
selenium sulfide	41	valganciclovir	20, 21
senna	3, 45	valproic acid (sodium valproate)	5, 6, 56
sevoflurane	1	vancomycin	15
silver diamine fluoride	60	varenicline	56
silver sulfadiazine	42	varicella vaccine	50
simvastatin	41	vecuronium	50
sodium calcium edetate	4	verapamil	37, 38
sodium chloride	58	vinblastine	31
sodium hydrogen carbonate	58	vincristine	31
sodium lactate	58	vinorelbine	31
sodium nitrite	4	voriconazole	18
sodium nitroprusside	39	warfarin	36
sodium stibogluconate	22	water for injection	58
sodium thiosulfate	4, 41	whole blood	37
sofosbuvir	21	xylometazoline	59
sofosbuvir + velpatasvir	21	yellow fever vaccine	49
spectinomycin	12	zidovudine	19
spironolactone	40, 44	zinc sulfate	46
streptokinase	40	zoledronic acid	35
streptomycin	17		

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(SIBGHATULLAH)
Section Officer (Admn-II)