World Health Organization Model List of Essential Medicines for Children

8th List
(2021)

World Health Organization

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WHO Model List of Essential Medicines for Children – 8th List (2021)

Explanatory notes

This Model List is intended for use for children up to and including 12 years of age.

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

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

The **square box symbol (□)** is 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. 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 format and numbering of the 22nd WHO Model List of Essential Medicines is used for the 8th WHO Model Essential List for Children. Some sections have been deleted because they contain medicines that are not relevant for children.

The a symbol indicates that there is an age or weight restriction on use of the medicine; details for each medicine are in Table 1.1 of Annex 1.

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

For recommendations and advice concerning all aspects of the quality assurance of medicines see the WHO Medicines 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 of Annex 1.

Definitions of many of these terms and pharmaceutical quality requirements applicable to the different categories are published in the current edition of *The International Pharmacopoeia* https://www.who.int/teams/health-product-and-policy-standards/standards-and-specifications/norms-and-standards-for-pharmaceuticals/pharmacopoeia.

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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).
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 (2023)	**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 (2023)	**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.
1.3 Preoperative medication and sedation for short-term procedures	
atropine	**Injection:** 1 mg (sulfate) in 1mL ampoule.
☐ midazolam Therapeutic alternatives to be reviewed (2023)	**Injection:** 1 mg/mL. **Oral liquid:** 2 mg/mL. **Tablet:** 7.5 mg; 15 mg.
morphine	**Injection:** 10 mg (sulfate or hydrochloride) in 1mL ampoule.
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)	
ibuprofen [a]	**Oral liquid:** 200 mg/5 mL. **Tablet:** 200 mg; 400 mg; 600 mg. [a] Not in children less than 3 months.
paracetamol*	**Oral liquid:** 120 mg/5 mL; 125 mg/5 mL. **Suppository:** 100 mg. **Tablet:** 100 mg to 500 mg. *Not recommended for anti-inflammatory use due to lack of proven benefit to that effect.
2.2 Opioid analgesics	
☐ morphine Therapeutic alternatives: - hydrormorphone - 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.*
2.3 Medicines for other symptoms common in palliative care	
amitriptyline	**Tablet:** 10 mg; 25 mg.
cyclizine	**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.
diazepam	**Injection:** 5 mg/mL. **Oral liquid:** 2 mg/5 mL. **Rectal solution:** 2.5 mg; 5 mg; 10 mg. **Tablet:** 5 mg; 10 mg.

docusate sodium	**Capsule:** 100 mg. **Oral liquid:** 50 mg/5 mL.
fluoxetine [a]	**Solid oral dosage form:** 20 mg (as hydrochloride). [a] > 8 years.
hyoscine hydrobromide	**Injection:** 400 micrograms/mL; 600 micrograms/mL. **Transdermal patches:** 1 mg/72 hours.
lactulose	**Oral liquid:** 3.1 to 3.7 g/5 mL.
midazolam	**Injection:** 1 mg/mL; 5 mg/mL. **Oral liquid:** 2mg/mL. **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.
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. **There may be a role for sedating antihistamines for limited indications.*
☐ prednisolone Therapeutic alternatives: - prednisone	**Oral liquid:** 5 mg/mL. **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%; 20%.
atropine	**Injection:** 1 mg (sulfate) in 1 mL ampoule.
calcium gluconate	**Injection:** 100 mg/mL in 10 mL ampoule.
naloxone	**Injection:** 400 micrograms (hydrochloride) in 1 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.*
5. ANTICONVULSANTS/ANTIEPILEPTICS	
carbamazepine	**Oral liquid:** 100 mg/5 mL. **Tablet (chewable):** 100 mg; 200 mg. **Tablet (scored):** 100 mg; 200 mg.
diazepam	**Gel or rectal solution:** 5 mg/mL in 0.5 mL; 2 mL; 4 mL tubes.
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.
☐ lorazepam Therapeutic alternatives: - diazepam (injection) - midazolam (injection)	**Injection:** 2 mg/mL in 1 mL ampoule; 4 mg/mL in 1 mL ampoule.
midazolam	**Solution for oromucosal administration:** 5 mg/mL; 10 mg/mL **Ampoule*:** 1 mg/mL; 10 mg/mL *For buccal administration when solution for oromucosal administration is not available
phenobarbital	**Injection:** 200 mg/mL (sodium). **Oral liquid:** 15 mg/5 mL. **Tablet:** 15 mg to 100 mg.
phenytoin	**Injection:** 50 mg/mL (sodium) in 5 mL vial. **Oral liquid:** 25 mg to 30 mg/5 mL.* **Solid oral dosage form:** 25 mg; 50 mg; 100 mg (sodium).