



**Mercy  
Ships®**

Bringing Hope and Healing...

# Formulary 2009-2011



**An Essential Medicines Dosing Guide  
Based on the WHO Model Formulary**

## IMMUNOLOGICALS

### 12.01 ANTISERA & IMMUNOGLOBULINS

#### WHO MODEL FORMULARY 2008 NOTES:

Antibodies of human origin are usually termed **immunoglobulins**. Material prepared from animals is called **antiserum**. Because of serum sickness and other allergic-type reactions that may follow injections of antisera, this therapy has been replaced wherever possible by the use of immunoglobulins. All immunoglobulins and antisera should comply with WHO requirements for blood and plasma products. **Contraindications/Precautions:** Anaphylaxis, although rare, can occur and epinephrine (adrenaline) must always be immediately available during immunization. Immunoglobulins may interfere with the immune response to live virus vaccines which should normally be given *either at least 3 weeks before or at least 3 months after* the administration of the immunoglobulin. **Adverse reactions:** *Intramuscular injection.* Local reactions including pain and tenderness may occur at the injection site. Hypersensitivity reactions may occur including, rarely, anaphylaxis. *Intravenous injection.* Systemic reactions including fever, chills, facial flushing, headache and nausea may occur, particularly following high rates of infusion. Hypersensitivity reactions may occur including, rarely, anaphylaxis.

**Rabies immunoglobulin** is a preparation containing immunoglobulins derived from the plasma of adults immunized with rabies vaccine. It is used as part of the management of potential rabies following exposure of an unimmunized individual to an animal in or from a high-risk country. It should be administered as soon as possible after exposure without waiting for confirmation that the animal is rabid. The site of the bite should be washed with soapy water and the rabies immunoglobulin should be infiltrated in and around the site of the bite. In addition rabies vaccine (see section 12.02) should be administered at a different site.

**Antitetanus immunoglobulin** of human origin is a preparation containing immunoglobulins derived from the plasma of adults immunized with tetanus toxoid. It is used for the management of tetanus-prone wounds in addition to wound toilet and if appropriate antibacterial prophylaxis and adsorbed tetanus vaccine (see section 12.02).

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[Mercy Ships note: Please refer to the WHO Formulary 2008 for the full notes including anti-D immunoglobulin & antivenom sera, both not on Mercy Ships list.]



## 12.02 VACCINES

### WHO MODEL FORMULARY 2008 NOTES:

All **vaccines** should comply with WHO recommendations for the production, control, and evaluation of vaccines and other biological substances; these recommendations provide guidance for national regulatory authorities and for vaccine manufacturers and are available from the WHO web site: [www.who.int/biologicals/publications/trs/areas/en/index.html](http://www.who.int/biologicals/publications/trs/areas/en/index.html). WHO publishes regularly-updated advice on vaccines against diseases of international relevance; the advice deals primarily with large-scale immunization programmes. The advice is available from the WHO web site: [www.who.int/immunization/documents/positionpapers\\_intro/en/index.html](http://www.who.int/immunization/documents/positionpapers_intro/en/index.html). The Strategic Advisory Group of Experts on Immunization (SAGE) regularly reports on a range of issues, including vaccine research and immunization against all vaccine-preventable diseases. The current SAGE reports and recommendations are also available from the WHO web site: [www.who.int/immunization/sage\\_conclusions/en/index.html](http://www.who.int/immunization/sage_conclusions/en/index.html). The Global Advisory Committee on Vaccine Safety (GACVS) reports on vaccine safety issues. The current GACVS reports are available via the WHO web site: [www.who.int/vaccine\\_safety/en/](http://www.who.int/vaccine_safety/en/). The WHO web site also has links to further information about the use of vaccines; go to: [www.who.int/immunization/en](http://www.who.int/immunization/en). Vaccines may consist of a live attenuated or inactivated form of a virus or bacteria, or an extract of or detoxified exotoxin produced by a micro-organism. Some inactivated vaccines are adsorbed onto an adjuvant to enhance the antibody response.

**ADVERSE EFFECTS.** Vaccines are generally both effective and safe. Adverse reactions are usually mild and commonly include injection site reactions (pain, erythema and inflammation), fever and malaise, generally occurring within 1–2 days of immunization. However, systemic symptoms that may arise with measles or measles, mumps and rubella vaccine (MMR) vaccine occur 5–12 days after vaccination. Serious reactions are rare, but may include hypersensitivity reactions including anaphylaxis (see section 3 for management). If a serious adverse event occurs (severe allergy or anaphylaxis) following a dose of any vaccine, subsequent doses should **not** be given. In addition, certain components of the vaccine (e.g. aluminium adjuvant, antibiotics, excipients or preservatives) occasionally cause reactions. Some vaccines are prepared using hens' eggs, so caution is required when egg sensitivity is known. Vaccines are contraindicated in individuals with known severe hypersensitivity to any component; consult the manufacturer's literature for the specific composition of individual vaccines.

**HIV INFECTION.** The likelihood of successful immunization is reduced in some HIV-infected individuals, but the risk of serious adverse effects remains low, except for BCG. See under individual vaccines for specific precautions and contraindications in HIV infection.

**LIVE VACCINES.** When two live virus vaccines are required (and are not available as a combined preparation) they should be given either simultaneously at different sites or with an interval of at least 4 weeks. Live vaccines should not be routinely administered to **pregnant** women because of the possible harm to the fetus but where there is significant risk of exposure, the need for immunization may outweigh any possible risk to the fetus.

**POST-IMMUNIZATION FEVER.** If fever develops after childhood immunization, the infant can be given a dose of paracetamol, followed if necessary by a second dose 4–6 hours later. If fever persists after the second dose, medical advice should be sought. For post-immunization pyrexia in an infant 2–3 months of age, the dose of paracetamol is 60 mg. When there is a personal or family history of febrile convulsions, there is an increased risk of these occurring during fever from any cause, including immunization. When immunization of these children is recommended, advise on prevention of fever before vaccine administration.

**Diphtheria** is a bacterial infection caused by *Corynebacterium diphtheriae* and is transmitted from person to person through close physical and respiratory contact. **Diphtheria vaccine** is given as part of primary immunization schedule in **fixed combinations with tetanus, or tetanus and pertussis vaccines**. Combinations with other antigens such as *Haemophilus influenzae* type b, poliomyelitis, and hepatitis B vaccines are available in some countries. Immunization against diphtheria should be considered for healthcare workers who are at risk of occupational exposure to *Corynebacterium diphtheriae*. A **two-component diphtheria vaccine with tetanus** exists in two forms. The form containing a low dose of diphtheria toxoid is associated with less frequent local reactions in adults and older children than the standard dose diphtheria preparation, and should be used for adults and children 7 years of age and older. When tetanus prophylaxis is needed following tetanus injuries, use combined diphtheria and tetanus preparations rather than tetanus alone to promote immunity against diphtheria.

***Haemophilus influenzae* type b (Hib)** causes serious infection such as bacterial pneumonia and meningitis, especially in young children. The bacteria are transmitted from person to person by droplets from nasopharyngeal secretions. WHO recommends the inclusion of **Hib vaccine** in all routine infant immunization programmes. The risk of infection decreases in older children and therefore Hib vaccine is not generally offered to children over 2 years of age. However, older children and adults at an increased risk of Hib infection should be vaccinated, including individuals with HIV or immunoglobulin deficiency, stem cell transplant recipients, patients with malignant neoplasms receiving chemotherapy, and those with asplenia (for example, due to sickle-cell disease or splenectomy).

**Hepatitis A** is caused by hepatitis A virus. It is transmitted via the faecal-oral route from person to person through close physical contact and ingestion of contaminated food and water. Those at increased risk of infection include parenteral drug abusers, individuals who change sexual partners frequently,

individuals exposed to untreated sewage, those living in closed communities, travellers to endemic countries, laboratory staff working with the virus, patients with haemophilia treated with plasma-derived clotting factors, and individuals who work with primates. Patients with chronic liver disease including chronic hepatitis B or chronic hepatitis C are at risk of severe liver disease if infected with hepatitis A. In highly endemic countries, exposure is almost universal before 10 years of age and large-scale immunization programmes should not be undertaken. In areas of intermediate endemicity with periodic outbreaks, control of hepatitis A may be achieved through widespread vaccination programmes, but is most successful in small, self-contained communities. In countries with low endemicity, vaccination for high-risk populations may be recommended. Several vaccines are available, which provide long-lasting protection, but none are licensed for use in children under one year of age; the dose of the vaccine and vaccination schedule varies between manufacturers. A single dose of vaccine provides a protective antibody response within a month; the manufacturers recommend a second dose 6–18 months later to ensure long term protection.

**Hepatitis B** is caused by hepatitis B virus. It is transmitted in blood and blood products, by sexual contact and by contact with infectious body fluids. Persons at increased risk of infection because of their life-style, occupation or other factors, include parenteral drug abusers, individuals who change sexual partners frequently, staff and inmates of custodial institutions, healthcare workers who are at risk of injury from blood-stained sharp instruments, dialysis patients and haemophiliacs. Also at risk are babies born to mothers who are HbsAg-positive (hepatitis B virus surface antigen positive), those having medical or dental procedures in countries with high prevalence, and travellers to endemic countries. WHO recommends **hepatitis B vaccine** given as part of the national infant immunization programme. Catch-up immunization should be considered for older age groups, or high-risk individuals who have not been previously immunized in countries with intermediate or low hepatitis B endemicity.

**Measles** is an acute viral infection transmitted by close respiratory contact. Immunization against measles is recommended for all infants and young children, and also for adolescents and adults who are susceptible or at high risk of exposure. Immunization should be considered for individuals with early signs of HIV-induced immunosuppression in endemic areas or during outbreaks. Large scale vaccination to control ongoing outbreaks is of limited value, but for high-risk individuals immunization within 2 days of exposure vaccine may improve the clinical course of measles. The **measles vaccine** is a live, attenuated vaccine, available either as a single antigen vaccine or combined with either rubella (**MR**), or **mumps and rubella (MMR) vaccines**; the combined vaccines are usually given as part of the primary immunization schedule. No evidence has been found for the alleged associations between measles or MMR immunization and serious developmental disorders including autism, or chronic bowel disease.

*Neisseria meningitidis* causes meningococcal disease including meningitis and septicaemia and primarily affects young children. The bacteria are transmitted from person to person via respiratory secretions. Immunization against meningococcal disease is recommended as part of the routine childhood immunization programme, for outbreak situations, for individuals at high-risk including those in military camps and boarding schools, travellers to epidemic areas, and for those with a predisposition to meningococcal disease (such as asplenia and inherited immune deficiencies). **Meningococcal vaccines** are available as combinations of capsular polysaccharide antigens (serogroups A and C, or A, C, W135 and Y) or as a polysaccharide of serogroup C conjugated to a protein carrier; other variants of the vaccine are available in some countries. **Group C conjugate vaccine** is recommended for national childhood immunization programmes. A single dose of either A and C, or A, C, W135 and Y polysaccharide vaccine is recommended to control outbreaks and for at-risk individuals including travellers to epidemic areas. Groups A and C, and A, C, W135 and Y vaccines elicit a suboptimal response in infants under 2 years old and are not recommended for routine immunization but they may be given in emergency outbreak situations.

**Pertussis** (whooping cough) is a bacterial respiratory infection caused by *Bordetella pertussis* and is transmitted through droplets. **Pertussis vaccine** is usually administered in fixed-dose combinations with diphtheria, tetanus and other vaccines as part of the primary immunization programme. WHO recommends 3 doses, each to be given at 6, 10 and 14 weeks of age. Booster doses are recommended 1–6 years after the primary series in countries where the incidence of pertussis has been reduced by immunization. Single component pertussis vaccines are available in some countries.

*Streptococcus pneumoniae* causes serious infection such as pneumonia and meningitis, especially in young children under 2 years of age, the elderly, and individuals with immunodeficiency. The bacteria are transmitted via respiratory secretions. WHO recommends that **pneumococcal conjugate vaccine** should be included in national routine childhood immunization programmes. The 7-valent conjugate vaccine (PCV-7) provides effective protection in young children; the primary schedule usually consists of 3 doses, each administered at intervals of at least 4 weeks; other 3-dose schedules have been shown to be effective and are in use in some countries. A booster dose given after 12 months of age may improve the immune response. Immunization should be initiated before 6 months of age and may start as early as 6 weeks of age. The vaccine can be given to HIV-infected individuals. A single dose of PCV-7 can be given to children aged 12–24 months of age who have not been previously vaccinated and children 2–5 years of age at high risk of pneumococcal disease. A 23-valent (unconjugated) polysaccharide vaccine is also available for adults and children over 2 years of age at risk of pneumococcal infection (note suboptimal response in infants).

**Poliomyelitis** is an acute viral infection spread by the faecal-oral or oral-oral route which can cause paralysis of varying degrees. There are two types of vaccines. **Oral poliomyelitis vaccine (OPV)** contains three types of live attenuated poliomyelitis viruses; monovalent live oral vaccines are also available. **Injectable inactivated poliomyelitis vaccine (IPV)** contains three types of inactivated strains. For primary immunization using oral poliomyelitis vaccine, a 3-dose schedule is used. The vaccine may need to be repeated in patients with diarrhoea or vomiting. HIV-infected individuals can receive the live oral vaccine, but it must **not** be used for those with primary immunodeficiency, those who are immunosuppressed or their close contacts. The need for **strict personal hygiene** must be stressed as the vaccine virus is excreted in the faeces; the contacts of a recently vaccinated baby should be advised of the need to wash their hands after changing the baby's nappies. Reinforcing doses can be given after primary immunization.

**Rabies** is a virus transmitted to humans by rabid animals via a bite or scratch. It is invariably fatal once signs of disease occur. WHO recommends *preexposure* immunization of individuals at increased risk of contracting rabies either due to occupational exposure such as laboratory workers, veterinary surgeons, animal handlers and health workers or people living or travelling to enzootic areas—in such areas children aged 5–15 years are at particular risk of exposure. Cell-derived vaccines are used for both pre-exposure and post exposure protection. Vaccines of nerve cell tissue origin should **not be used** because they are less potent and are frequently associated with adverse events. **Rabies vaccine** is used as part of the *post-exposure treatment* to prevent rabies in patients who have been bitten by rabid animals or animals suspected of being rabid. The bite wound or scratch should be thoroughly cleansed. Treatment is dependent upon the individual's immune status and upon the level of risk of rabies in the country concerned (consult national immunization schedule). In certain circumstances, such as patients with incomplete prophylaxis or unimmunized individuals, *passive immunization* with rabies immunoglobulin can be given (see Rabies Immunoglobulin, section 19.2). Post-exposure treatment with rabies vaccine **and** rabies immunoglobulin is necessary for individuals who are immunocompromised, HIV-positive, taking malaria chemoprophylaxis or under anaesthesia; antibody response should be monitored.

Neonatal **tetanus** due to infection of the baby's umbilical stump during unclean delivery is the cause of many deaths of newborn infants. Control of neonatal tetanus may be achieved by ensuring adequate hygiene during delivery and by ensuring protective immunity of mothers in late pregnancy. **Tetanus vaccine** is highly effective and the efficacy of two doses during pregnancy in preventing neonatal tetanus ranges from 80-100% (2 doses of 0.5ml during pregnancy at interval of 4 weeks, second dose at least 2 weeks before delivery, and 1 dose during each of subsequent 3 pregnancies, max 5 doses). Women of child-bearing age may be immunized by a course of 5 doses of tetanus vaccine: 3

primary doses of 0.5ml at 0, 1 and 6 months intervals; then 2 reinforcing doses of 0.5ml at 1 and 2 years after the primary doses.

**Wounds** are considered to be tetanus-prone if they are sustained *either* more than 6 hours before surgical treatment of the wound *or* at any interval after injury and show one or more of the following: a puncture-type wound, a significant degree of devitalized tissue, clinical evidence of sepsis, contamination with soil/manure likely to contain tetanus organisms. All wounds should receive thorough surgical toilet. Antibacterial prophylaxis may also be required for tetanus-prone wounds.

For *clean wounds*, fully immunized individuals (total 5 doses of tetanus vaccine at appropriate intervals) and those whose primary immunization is complete (with boosters up to date) do not require tetanus vaccine; individuals whose primary immunization is incomplete or whose boosters are not up to date require a reinforcing dose of tetanus vaccine (followed by further doses as required to complete the schedule); non-immunized individuals (or whose immunization status is not known) should be given a dose of the vaccine immediately (followed by completion of the full course of the vaccine if records confirm the need).

For *tetanus-prone wounds*, management is as for clean wounds with the addition of a dose of antitetanus immunoglobulin (section 12.01) given at a different site; in fully immunized individuals and those whose primary immunization is complete (see above) the immunoglobulin is needed only if the risk of infection is especially high (for example, contamination with manure). Antibacterial prophylaxis (with benzylpenicillin, or amoxicillin with clavulanic acid, or metronidazole) may also be required for tetanus-prone wounds.

**Typhoid vaccine** is used for active immunization against typhoid fever and is advised for those travelling to endemic areas. The efficacy of the vaccine is not complete and the importance of maintaining scrupulous attention to food and water hygiene as well as personal hygiene must also be emphasized. Typhoid vaccine is available as a capsular polysaccharide injection. In children under 2 years the injection may show sub-optimal response. Immunization is also recommended for laboratory workers handling specimens from suspected cases. A live oral typhoid vaccine containing an attenuated strain of *Salmonella typhi* (Ty21a) may also be available.

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GENERIC (TRADE) NAME	CAT.	INDICATION/DOSE
<b>Diphtheria, Tetanus and Pertussis Adsorbed Vaccine 10 doses/5ml (DTPer/Vac/Ads)</b> °Fridge Item	D-crew clinic  EML	Primary immunisation: <i>By IM inj</i> , Infant 0.5ml at 6, 10 and 14 weeks; reinforcement at school entry: 0.5ml. (see WHO schedule, section 12.03).
<b>Diphtheria and Tetanus Vaccine Single Dose (Adult) (Td/Vac/Ads(Adult))</b> °Fridge Item	D-crew clinic	Primary immunisation of Adults/Child > 10 yo not previously immunized: <i>By IM inj</i> 0.5ml, 3 doses to be given at intervals of 4 weeks. Booster dose: Child < 10 yo, 0.5ml at least 3 years after completion of primary course of DPT or DT immunisation.
<b>Haemophilus influenzae type b Single Dose Vaccine (HIB)</b> °Fridge Item	D-crew clinic  EML	Primary immunisation of children < 13 month old: <i>By deep SC/IM inj</i> 0.5ml 3 doses at 4 week intervals. Primary immunisation of children 13 month-4 yo or high risk/asplenia: single dose 0.5ml.
<b>Hepatitis A Vaccine Injection Single Dose (Adult &amp; Paediatric) (Havrix Monodose)</b> °Fridge Item	D-crew clinic  EML	By IM inj, Adults: 1ml single dose, booster dose 1ml 6-18 months after first dose. Child 1-15 yo: 0.5ml single dose, booster dose 0.5ml 6-18 months after first dose.
<b>Hepatitis B Vaccine Injection Single Dose (Adult) (Engerix B)</b> °Fridge Item	EML	Primary immunisation of adults: By IM inj in the deltoid region, 3 doses of 1ml, give first dose, second dose 1 month after the first dose, third dose 5 months after second dose.
<b>Hepatitis B Vaccine Injection Single Dose (Paediatric) (Euvax)</b> °Fridge Item  <b>Different products may contain different concentrations of antigen. Consult manufacturer's literature</b>	EML	Primary immunisation of children 6 weeks-15 yo: By IM inj at anterolateral thigh site (not buttock), 3 doses of 0.5ml given at intervals of 4 weeks. Alternatively, 0.5ml dose given at birth, followed by two 0.5ml doses each given at 6 and 14 weeks of age. Use SC route in patients with bleeding disorders/thrombocytopenia

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GENERIC (TRADE) NAME	CAT.	INDICATION/DOSE
<b>Pneumococcal Vaccine Single Dose</b> °Fridge Item	D- crew clinic          EML	Infant primary immunisation: By IM inj in the anterolateral thigh area 0.5ml, 3 doses given at intervals of 4 weeks, usually started at the same time as routine immunisation against diphtheria, tetanus and pertussis; or 2 doses given at 8 weeks interval; booster doses recommended at school entry. Child 1-5 yo single dose 0.5ml (in the deltoid region).
<b>Poliomyelitis Vaccine, Live Oral (OPV) or Inactivated Single Dose Injection (IPV)</b> °Fridge Item	D- crew clinic          EML	Child primary immunisation: IPV By SC inj 0.5ml, OPV By mouth 3 drops (may be given with a lump of sugar); 3 doses given at intervals of 4 weeks, usually started at the same time as routine immunisation against diphtheria, tetanus and pertussis; booster doses recommended at school entry and school leaving. Adult primary immunisation: IPV By SC inj 0.5ml, OPV By mouth 3 drops (may be given with a lump of sugar); 3 doses given at intervals of 4 weeks; 1 booster dose 10 years after completion of the primary course.
<b>Rabies Vaccine Single Dose Injection</b> °Fridge Item	IDA          EML	Post-exposure prophylaxis ONLY. By deep SC/IM injection into the deltoid region, Adult/Child, in previously un-immunised individuals: 5 doses of 1ml on days 0, 3, 7, 14 and 28; if high risk, give rabies immunoglobulin on day 0 as well. In previously immunised individuals: 2 doses of 1 ml separated by 3-7 days. See also WHO notes above.
<b>Typhoid Vaccine (Typhim VI)</b> °Fridge Item	D - crew clinic       EML	By deep SC/IM inj, Adult/Child over 2 yo, 0.5ml for 3 years' protection. (Cautions on oral typhoid vaccine, see next page.)

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### 12.03 GENERAL IMMUNISATION SCHEDULE (BNF MAR 2009)

*Note: This is the UK schedule, please follow patient's home country schedule where possible. Not all vaccines listed in this schedule are Mercy Ship formulary items and certain may not be available or in current stock. For WHO recommendations see the following links:*

[http://www.who.int/immunization/policy/immunization\\_tables/en/index.html](http://www.who.int/immunization/policy/immunization_tables/en/index.html)

[http://www.who.int/immunization/policy/Immunization\\_routine\\_table1.pdf](http://www.who.int/immunization/policy/Immunization_routine_table1.pdf)

[http://www.who.int/immunization/policy/Immunization\\_routine\\_table2.pdf](http://www.who.int/immunization/policy/Immunization_routine_table2.pdf)

AGE	VACCINE	NO. OF DOSES	FIRST DOSE	INTERVAL
<b>Infants</b>	DTP, Hib, Polio	3	2 months old	4 weeks
	Pneumococcal	2	2 months old	8 weeks
	Meningococcal C	2	3 months old	4 weeks
	Consider BCG, Hep B	1	Neonates at risk only	
<b>12 months old</b>	Hib, Meningococcal C	Single booster		
<b>13 months old</b>	MMR	1	First dose 12-15 mths old	
	Pneumococcal, Hib	Single booster		
<b>Between 3 yo and 4 months, and 5 yo</b>	MMR, DTP, Hib, Polio	Single booster	Dose preferably 3 years after first vaccine regime	
<b>12-13 yo females only</b>	Consider Human Papilloma virus vaccine	3	Second dose 1-2 months, third dose 6 months after first dose	
<b>Before leaving school or before employment or further education</b>	Diphtheria & Tetanus (adult), Polio	Single booster		
<b>Adult</b>	Consider Polio if not given previously	3		4 weeks
	Consider Rubella for sero-negative women	Single dose.		
	Consider Tetanus if not given previously	3		4 weeks
	Consider Diphtheria if not given previously	3		4 weeks
<b>High risk (See Comment)</b>	Consider BCG, Hep A & B, Influenza, Pneumococcal, Tetanus vaccines.	See individual product details.		