
Adverse Event

Global Advisory Committee on Vaccine Safety, 12 December 2005

GACVS considered the possible association between hepatitis B vaccination and chronic fatigue syndrome and concluded that, based on the evidence available, there are no grounds to support the association.

[WER 2006, vol. 81, 2, pp 15-19](#)
page 18

Hepatitis B vaccines (WHO position paper)

(Following hepatitis B vaccination,) reports of severe anaphylactic reactions are very rare.

[WER 2004, vol. 79, 28, pp 255-263](#)
page 261

Available data do not indicate a causal association between hepatitis B vaccine and Guillain-Barré syndrome, or demyelinating disorders including multiple sclerosis, nor is there any epidemiological data to support a causal association between hepatitis B vaccination and chronic fatigue syndrome, arthritis, autoimmune disorders, asthma, sudden infant death syndrome, or diabetes.

Introduction of hepatitis B vaccine into childhood immunization services. Management guidelines, including information for health workers and parents

All serious adverse events (suspected by health workers or the public to be associated with hepatitis B immunization) should be reported to the district health authorities and then to national immunization staff in the health ministry of the country in question.

[WHO/V&B/01.31](#)
page 26

BCG

Immunization in practice: a practical resource guide for Health workers 2004 update_____Module 2: The vaccines

Typical immunization schedule for children (see Appendix 2_19.)

[WHO/IVB/04.06](#)
page 24

WHO-UNICEF effective vaccine store management initiative: Modules 1 - 4

WHO recommended vaccine storage conditions (Appendix 17_3).

[WHO/IVB/04.16-20](#)
page 1

Immunization in practice: a practical resource guide for Health workers 2004 update_____Module 6: Holding an immunization session

See Appendix 6_19 for chart entitled, "Administering vaccines to infants" BCG, DTP, DTP-HepB, HepB, measles, yellow fever, OPV"

[WHO/IVB/04.06](#)
page 19

Vaccine introduction guidelines. Adding a vaccine to a national immunization programme: decision and implementation

WHO recommends the following schedule for infants (Appendix 39_5).

[WHO/IVB/05.18](#)
page 32

Temperature sensitivity of vaccines

[WHO/IVB/06.10](#)

page 2

The recommended conditions for storing vaccines used in immunization programmes are shown in Appendix 81_1. This diagram also indicates the maximum times and temperatures in each case. At the higher levels of the cold chain, i.e., at national (primary), and regional or province level, OPV must be kept frozen between -15oC and -25oC. Freeze-dried vaccines (i.e., BCG, measles, MMR and yellow fever) may also be kept frozen at -15oC to -25oC if cold chain space permits, but this is neither essential nor recommended. At other levels of the cold chain (intermediate vaccine stores and health facilities), these vaccines should be stored between +2oC and +8oC. All other vaccines should be stored at between +2oC and +8oC at all levels of the cold chain. Liquid formulations of vaccines containing diphtheria, pertussis, tetanus, hepatitis B, Haemophilus influenzae type b, IPV and their combinations should not be frozen.

Cold Chain Equipment

Immunization in practice: a practical resource guide for Health workers 2004 update_____Module 3: The cold chain

[WHO/IVB/04.06](#)

page 13

The freeze indicator is used to warn of freezing and is packed with vaccines that are sensitive to freezing temperatures: DTP, TT, DT, Td (freezing point of -6.5C), hepatitis B (-0.5C), liquid Hib and their combinations (DTP-HepB, and DTP-HepB+Hib vaccines) and JE.

Every refrigerator storing vaccines should have a freeze indicator (Freeze Watch). It is strongly recommended that one freeze indicator be placed in each cold box during vaccine transport and distribution. This is critical in places subject to low temperatures.

Contraindications

Hepatitis B vaccines (WHO position paper)

[WER 2004, vol. 79, 28, pp 255-263](#)

page 261

Hepatitis B vaccine is contraindicated for individuals with a history of allergic reactions to any of the vaccines components.

Neither pregnancy nor lactation is a contraindication for use of this vaccine.

Introduction of hepatitis B vaccine into childhood immunization services. Management guidelines, including information for health workers and parents

[WHO/V&B/01.31](#)

page 12

A child with a history of a severe allergic reaction (e.g. generalized urticaria, difficulty in breathing, swelling of the mouth and throat, hypertension, shock) to a previous dose of hepatitis B vaccine should not receive another dose.

The following are NOT contraindications:

- minor illness, such as respiratory tract infection or diarrhoea with temperature below 38.5C;
- allergy or asthma;
- family history of convulsions;
- treatment with antibiotics;
- infection with HIV;
- breastfeeding;
- history of seizures (convulsions, fits);
- chronic illnesses such as chronic diseases of the heart, lung, kidney or liver;
- stable neurological conditions such as cerebral palsy and Down syndrome;
- prematurity or low birth weight;
- history of jaundice at birth.

DPT

Thermostability of vaccines

[WHO/GPV/98.07](#)

page 12

If it is suspected that adsorbed DTP, DT, TT or hepatitis B vaccines have been frozen they should be examined for physical changes. Where these are found the vaccines should be discarded.

Getting started with vaccine vial monitors

[WHO/V&B/02.35](#)

page 9

A policy permitting the use of vaccine outside the cold chain can be implemented either generally for all routine immunization activities or on a limited basis in certain areas or under special circumstances, such as:

- national immunization days;
- hard-to-reach geographical areas;
- immunizations provided in the home;
- cool seasons;
- storage and transportation of freeze-sensitive vaccines (DTP, TT, DT, Td, hepatitis B and Hib vaccines) where the risk of freezing is greater than the risk of heat exposure.

Immunization in practice: a practical resource guide for Health workers 2004 update _____ Module 2: The vaccines

[WHO/IVB/04.06](#)

page 24

Typical immunization schedule for children (see Appendix 2_19.)

WHO-UNICEF effective vaccine store management initiative: Modules 1 - 4

[WHO/IVB/04.16-20](#)
page 1

WHO recommended vaccine storage conditions (Appendix 17_3).

Immunization in practice: a practical resource guide for Health workers 2004 update _____ Module 6: Holding an immunization session

[WHO/IVB/04.06](#)
page 4

Check the freeze indicator in the refrigerator. If it warns of freezing or you suspect that a freeze-sensitive vaccine (DTP, DT, TT, Td, HepB, DTP-HepB, liquid Hib and DTP-HepB+Hib vaccines) has been frozen, you should perform the shake test.

Immunization in practice: a practical resource guide for Health workers 2004 update _____ Module 6: Holding an immunization session

[WHO/IVB/04.06](#)
page 19

See Appendix 6_19 for chart entitled, "Administering vaccines to infants" BCG, DTP, DTP-HepB, HepB, measles, yellow fever, OPV"

Immunization in practice: a practical resource guide for Health workers 2004 update _____ Module 3: The cold chain

[WHO/IVB/04.06](#)
page 13

The freeze indicator is used to warn of freezing and is packed with vaccines that are sensitive to freezing temperatures: DTP, TT, DT, Td (freezing point of -6.5C), hepatitis B (-0.5C), liquid Hib and their combinations (DTP-HepB, and DTP-HepB+Hib vaccines) and JE.

Every refrigerator storing vaccines should have a freeze indicator (Freeze Watch). It is strongly recommended that one freeze indicator be placed in each cold box during vaccine transport and distribution. This is critical in places subject to low temperatures.

Immunization in practice: a practical resource guide for Health workers 2004 update _____ Module 3: The cold chain

[WHO/IVB/04.06](#)
page 26

The shake test can help give an idea whether adsorbed vaccines (DTP, DT, Td, TT or hepatitis B) have been subjected to freezing temperatures likely to have damaged them. The test should be conducted for all boxes where freeze indicators are found to be activated or temperature recordings show negative temperatures.

Identify and separate all vaccines that may have been frozen and ensure that none are distributed or used.

Vaccine introduction guidelines. Adding a vaccine to a national immunization programme: decision and implementation

[WHO/IVB/05.18](#)
page 32

WHO recommends the following schedule for infants (Appendix 39_5).

The use of opened multi-dose vials of vaccine in subsequent immunization sessions (WHO Policy Statement)

[WHO/V&B/00.09](#)

page 0

See "Multi-Dose Open Vial" section of the "General" chapter in this catalogue for policies relevant for DTP, DT, TT, DTP-hepB, DTP-hepB-Hib, hepatitis B, liquid formulations of Hib and OPV.

Temperature sensitivity of vaccines

[WHO/IVB/06.10](#)

page 2

The recommended conditions for storing vaccines used in immunization programmes are shown in Appendix 81_1. This diagram also indicates the maximum times and temperatures in each case. At the higher levels of the cold chain, i.e., at national (primary), and regional or province level, OPV must be kept frozen between -15oC and -25oC. Freeze-dried vaccines (i.e., BCG, measles, MMR and yellow fever) may also be kept frozen at -15oC to -25oC if cold chain space permits, but this is neither essential nor recommended. At other levels of the cold chain (intermediate vaccine stores and health facilities), these vaccines should be stored between +2oC and +8oC. All other vaccines should be stored at between +2oC and +8oC at all levels of the cold chain. Liquid formulations of vaccines containing diphtheria, pertussis, tetanus, hepatitis B, Haemophilus influenzae type b, IPV and their combinations should not be frozen.

Temperature sensitivity of vaccines

[WHO/IVB/06.10](#)

page 6

WHO recommends that a policy permitting the use of vaccine outside the cold chain can be implemented either generally for all routine immunization activities or on a limited basis in certain areas or under special circumstances, such as:

- national immunization days;
- hard-to-reach geographical areas;
- immunizations provided in the home;
- cool seasons;
- storage and transportation of freeze-sensitive vaccines (DTP, TT, DT, Td, hepatitis B and Hib vaccines) where the risk of freezing is greater than the risk of heat exposure.

Immunization in practice: a practical resource guide for Health workers 2004 update _____ Module 2: The vaccines

[WHO/IVB/04.06](#)

page 25

Wait at least four weeks between doses of OPV, DTP, Hib, and HepB vaccines.

Diphtheria

Thermostability of vaccines

[WHO/GPV/98.07](#)

page 12

If it is suspected that adsorbed DTP, DT, TT or hepatitis B vaccines have been frozen they should be examined for physical changes. Where these are found the vaccines should be discarded.

Getting started with vaccine vial monitors

[WHO/V&B/02.35](#)

page 9

A policy permitting the use of vaccine outside the cold chain can be implemented either generally for all routine immunization activities or on a limited basis in certain areas or under special circumstances, such as:

- national immunization days;
- hard-to-reach geographical areas;
- immunizations provided in the home;
- cool seasons;
- storage and transportation of freeze-sensitive vaccines (DTP, TT, DT, Td, hepatitis B and Hib vaccines) where the risk of freezing is greater than the risk of heat exposure.

Immunization in practice: a practical resource guide for Health workers 2004 update_____Module 6: Holding an immunization session

[WHO/IVB/04.06](#)

page 4

Check the freeze indicator in the refrigerator. If it warns of freezing or you suspect that a freeze-sensitive vaccine (DTP, DT, TT, Td, HepB, DTP-HepB, liquid Hib and DTP-HepB+Hib vaccines) has been frozen, you should perform the shake test.

Immunization in practice: a practical resource guide for Health workers 2004 update_____Module 3: The cold chain

[WHO/IVB/04.06](#)

page 13

The freeze indicator is used to warn of freezing and is packed with vaccines that are sensitive to freezing temperatures: DTP, TT, DT, Td (freezing point of -6.5C), hepatitis B (-0.5C), liquid Hib and their combinations (DTP-HepB, and DTP-HepB+Hib vaccines) and JE.

Every refrigerator storing vaccines should have a freeze indicator (Freeze Watch). It is strongly recommended that one freeze indicator be placed in each cold box during vaccine transport and distribution. This is critical in places subject to low temperatures.

Immunization in practice: a practical resource guide for Health workers 2004 update_____Module 3: The cold chain

[WHO/IVB/04.06](#)

page 26

The shake test can help give an idea whether adsorbed vaccines (DTP, DT, Td, TT or hepatitis B) have been subjected to freezing temperatures likely to have damaged them. The test should be conducted for all boxes where freeze indicators are found to be activated or temperature recordings show negative temperatures.

Identify and separate all vaccines that may have been frozen and ensure that none are distributed or used.

The use of opened multi-dose vials of vaccine in subsequent immunization sessions (WHO Policy Statement)

[WHO/V&B/00.09](#)

page 0

See "Multi-Dose Open Vial" section of the "General" chapter in this catalogue for policies relevant for DTP, DT, TT, DTP-hepB, DTP-hepB-Hib, hepatitis B, liquid formulations of Hib and OPV.

Temperature sensitivity of vaccines

[WHO/IVB/06.10](#)

page 2

The recommended conditions for storing vaccines used in immunization programmes are shown in Appendix 81_1. This diagram also indicates the maximum times and temperatures in each case. At the higher levels of the cold chain, i.e., at national (primary), and regional or province level, OPV must be kept frozen between -15oC and -25oC. Freeze-dried vaccines (i.e., BCG, measles, MMR and yellow fever) may also be kept frozen at -15oC to -25oC if cold chain space permits, but this is neither essential nor recommended. At other levels of the cold chain (intermediate vaccine stores and health facilities), these vaccines should be stored between +2oC and +8oC. All other vaccines should be stored at between +2oC and +8oC at all levels of the cold chain. Liquid formulations of vaccines containing diphtheria, pertussis, tetanus, hepatitis B, Haemophilus influenzae type b, IPV and their combinations should not be frozen.

Temperature sensitivity of vaccines

[WHO/IVB/06.10](#)

page 6

WHO recommends that a policy permitting the use of vaccine outside the cold chain can be implemented either generally for all routine immunization activities or on a limited basis in certain areas or under special circumstances, such as:

- national immunization days;
- hard-to-reach geographical areas;
- immunizations provided in the home;
- cool seasons;
- storage and transportation of freeze-sensitive vaccines (DTP, TT, DT, Td, hepatitis B and Hib vaccines) where the risk of freezing is greater than the risk of heat exposure.

GACVS

Global Advisory Committee on Vaccine Safety, 12 December 2005

[WER 2006, vol. 81, 2, pp 15-19](#)

page 18

GACVS considered the possible association between hepatitis B vaccination and chronic fatigue syndrome and concluded that, based on the evidence available, there are no grounds to support the association.

General

Introducing hepatitis B vaccine into national immunization services

[WHO/V&B/01.28](#)

page 1

WHO recommends that HepB vaccine be included in routine immunization services in all countries. HepB immunization of all infants as an integral part of the national immunization schedule should be the highest priority in all countries.

Introducing hepatitis B vaccine into national immunization services

[WHO/V&B/01.28](#)

page 1

Prevention of perinatal HBV transmission should be considered depending on the epidemiology of HBV transmission in a particular country.

In order to prevent HBV transmission from mother to infant, the first dose of HepB vaccine needs to be given as soon as possible after birth (preferably within 24 hours). In countries where a high proportion of chronic infections is acquired perinatally (e.g. South-East Asia), a birth dose should be given to infants. It is usually most feasible to give HepB vaccine at birth when infants are born in hospitals. Efforts should also be made in these countries to give HepB vaccine as soon as possible after delivery to infants delivered at home. In countries where a lower proportion of chronic infections is acquired perinatally (e.g. Africa), the highest priority is to achieve high DTP3 and HepB3 vaccine coverage among infants. In these countries, use of a birth dose may also be considered after disease burden, cost-effectiveness, and feasibility are evaluated.

Introducing hepatitis B vaccine into national immunization services

[WHO/V&B/01.28](#)

page 2

Catch up vaccination of older persons should be considered depending on the epidemiology of HBV transmission in a particular country. (Note: The Vaccine Fund does not provide vaccine for catch-up immunization).

In countries with a high endemicity of chronic HBV infection (hepatitis B surface antigen [HBsAg] prevalence >8%), catch-up immunization is not usually recommended because most chronic infections are acquired among children <5 years of age, and thus, routine infant vaccination will rapidly reduce HBV transmission. In countries with lower endemicity of chronic HBV infection, a higher proportion of chronic infections may be acquired among older children, adolescents and adults; catch-up immunization for these groups may be considered.

Introducing hepatitis B vaccine into national immunization services

[WHO/V&B/01.28](#)

page 2

Monovalent HepB vaccines must be used to give the birth dose of HepB vaccine.

Combination vaccines that include HepB vaccine must not be used to give the birth dose of HepB vaccine because DTP and Hib vaccines are not recommended to be given at birth.

Combination vaccines can be given whenever all of the antigens in the vaccine are indicated.

Introducing hepatitis B vaccine into national immunization services

[WHO/V&B/01.28](#)

page 2

HepB vaccine schedules are very flexible; thus, there are multiple options for adding the vaccine to existing national immunization schedules without requiring additional visits for immunization. (See Appendix 20_5.)

Programmatically, it is usually easiest if the 3 doses of HepB vaccine are given at the same time as the 3 doses of DTP (Option I). This schedule will prevent infections acquired during early childhood, which account for most of the HBV-related disease burden in high endemic countries, and also will prevent infections acquired later in life. However, this schedule will not prevent perinatal HBV infections because it does not include a dose of HepB vaccine at birth. Two schedule options can be used to prevent perinatal HBV infections: a 3-dose schedule of monovalent HepB vaccine, with the 1st dose given at birth and the 2nd and 3rd doses given at the same time as the 1st and 3rd doses of DTP vaccine (Option II); or a 4-dose schedule in which a birth dose of monovalent HepB vaccine is followed by 3 doses of a combination vaccine, e.g. DTP HepB (Option III).

The 3-dose schedule (Option II) is less expensive, but may be more complicated to administer, because infants receive different vaccines at the 2nd immunization visit than at the 1st and 3rd visits. The 4-dose schedule (Option III) may be easier to administer programmatically, but is more costly, and vaccine supply issues may make it unfeasible.

Introducing hepatitis B vaccine into national immunization services

[WHO/V&B/01.28](#)

page 2

HepB vaccine is given by intramuscular injection in the anterolateral aspect of the thigh (infants) or deltoid muscle (older children).

If HepB vaccine is given on the same day as another injectable vaccine, it is preferable to give the two vaccines in different limbs.

Introducing hepatitis B vaccine into national immunization services

[WHO/V&B/01.28](#)

page 2

HepB vaccine can safely be given at the same time as other vaccines (e.g. DTP, Hib, measles, OPV, BCG, and yellow fever).

Introducing hepatitis B vaccine into national immunization services

[WHO/V&B/01.28](#)

page 3

For administering HepB vaccine:

- _ 0.5 ml auto-disable (AD) syringes are recommended.
- _ In immunization services where sterilizable syringes are still used, a 0.5ml sterilized syringe should be used.
- _ If neither AD or sterilizable syringes are available, standard disposable syringes (1.0ml or 2.0ml) must be used ONCE ONLY, and safely disposed of after use.

Introducing hepatitis B vaccine into national immunization services

[WHO/V&B/01.28](#)

page 3

The storage temperature for HepB vaccine is the same as for DTP vaccine, from 2C to 8C. HepB vaccine should never be frozen.

Introducing hepatitis B vaccine into national immunization services

[WHO/V&B/01.28](#)

page 3

Since hepatitis B vaccines are more expensive than the traditional EPI vaccines, it is important to monitor HepB vaccine wastage and to develop and implement strategies to reduce wastage.

Strategies to reduce wastage include:

- _ careful planning of vaccine ordering and distribution;
- _ implementation of WHO's multidose vial policy;
- _ appropriate use of single-dose and multi-dose vials;
- _ careful maintenance of the cold chain;
- _ attention to vaccine security; and
- _ reducing missed opportunities for immunization.

Introducing hepatitis B vaccine into national immunization services

[WHO/V&B/01.28](#)

page 3

HepB vaccine procured through The Vaccine Fund will be supplied with AD syringes and safety boxes. Managers at each level are responsible for ensuring that adequate supplies are available at all times so that each injection is given with a sterile injection device. Attention should also be given to proper use and disposal of safety boxes to collect these materials.

Introducing hepatitis B vaccine into national immunization services

[WHO/V&B/01.28](#)

page 3

Important elements of integrating HepB vaccine into national immunization programmes are:

- _ Revising training and informational materials, immunization cards and forms used to monitor and evaluate immunization services.
- _ Training for health care staff is essential because these staff are responsible for handling and administering HepB vaccine and they are a major source of information for parents and others in the general public.
- _ Advocacy and communication efforts are important in order to generate support and commitment for the new vaccine. The primary target audiences are decision-makers/opinion leaders, health care staff, and the general public including parents.

Introducing hepatitis B vaccine into national immunization services

[WHO/V&B/01.28](#)

page 4

Adequate seroprevalence data needed to assess HepB disease burden are generally available in all countries, or from adjacent countries with similar HBV endemicity. Thus, additional seroprevalence studies are usually not needed.

Introducing hepatitis B vaccine into national immunization services

[WHO/V&B/01.28](#)

page 4

In phasing HepB vaccine into the existing infant immunization services, a strategy in which HepB vaccine is given to infants who have not yet completed the DTP vaccine series at the time HepB vaccine is introduced is generally the most feasible to implement.

Introducing hepatitis B vaccine into national immunization services

[WHO/V&B/01.28](#)

page 4

Issues to consider in choosing a monovalent or combination HepB vaccine for national immunization schedules include:

flexibility in adding the vaccine to the national immunization schedule; impact on cold chain capacity; the number of injections per visit; vaccine security; impact on local vaccine production; and cost.

Use of combination vaccines (e.g. DTP-HepB vaccine) may offer certain programmatic advantages. These include: a decreased number of injections required per visit (and thus decrease the number of needles and syringes required); and a decrease in the amount of space required for cold chain storage and transport.

Thermostability of vaccines

[WHO/GPV/98.07](#)

page 12

If it is suspected that adsorbed DTP, DT, TT or hepatitis B vaccines have been frozen they should be examined for physical changes. Where these are found the vaccines should be discarded.

Thermostability of vaccines

[WHO/GPV/98.07](#)

page 14

HB vaccine should always be protected from being frozen, especially at the end of the cold chain when it is transported in cold boxes and may come into close contact with cold packs. HB vaccine thought to have been frozen should not be used.

Thermostability of vaccines

[WHO/GPV/98.07](#)

page 16

Although HB vaccine is extremely heat stable, there are not yet enough data to recommend using it entirely outside the cold chain. There is, however, scope for developing a management instruction that would allow removal of the vaccine from the cold chain in emergencies, or in outreach activities of short duration, provided that a high temperature indicator was attached to each vial.

Global Advisory Committee on Vaccine Safety, 12 December 2005

[WER 2006, vol. 81, 2, pp 15-19](#)

page 18

GACVS considered the possible association between hepatitis B vaccination and chronic fatigue syndrome and concluded that, based on the evidence available, there are no grounds to support the association.

Getting started with vaccine vial monitors

[WHO/V&B/02.35](#)

page 9

A policy permitting the use of vaccine outside the cold chain can be implemented either generally for all routine immunization activities or on a limited basis in certain areas or under special circumstances, such as:

- national immunization days;
- hard-to-reach geographical areas;
- immunizations provided in the home;
- cool seasons;
- storage and transportation of freeze-sensitive vaccines (DTP, TT, DT, Td, hepatitis B and Hib vaccines) where the risk of freezing is greater than the risk of heat exposure.

Immunization in practice: a practical resource guide for Health workers 2004 update_____Module 1: Target diseases

[WHO/IVB/04.06](#)
page 25

It is recommended that all infants receive three doses of hepatitis B vaccine during the first year of life. More recently, some countries have been using a combination vaccine that includes vaccines for diphtheria, tetanus, pertussis, hepatitis B (hepB), and sometimes Haemophilus influenzae type b (Hib). Programmatically, it is usually easiest if the three doses of hepatitis B vaccine are given at the same time as the three doses of DTP. In countries where hepatitis B is highly endemic, where feasible, a birth dose of hepB is included in the schedule to prevent perinatal hepatitis B infection. Some countries also recommend immunizing adolescents, health workers and other risk groups.

Immunization in practice: a practical resource guide for Health workers 2004 update_____Module 2: The vaccines

[WHO/IVB/04.06](#)
page 16

Only monovalent HepB vaccine should be used as a birth dose, the dose given within the first week of life. Combination vaccines should not be used at birth, but may be used in subsequent doses.

Do not use DTP-HepB+Hib as a birth dose. You may use the vaccine for subsequent doses.

Immunization in practice: a practical resource guide for Health workers 2004 update_____Module 2: The vaccines

[WHO/IVB/04.06](#)
page 16

Administration summary: HepB vaccine and Administration summary: DTP-HepB combination vaccine (see Appendix 2_12.)

Immunization in practice: a practical resource guide for Health workers 2004 update_____Module 2: The vaccines

[WHO/IVB/04.06](#)
page 24

Typical immunization schedule for children (see Appendix 2_19.)

WHO-UNICEF effective vaccine store management initiative: Modules 1 - 4

[WHO/IVB/04.16-20](#)
page 1

WHO recommended vaccine storage conditions (Appendix 17_3).

Immunization in practice: a practical resource guide for Health workers 2004 update_____Module 6: Holding an immunization session

[WHO/IVB/04.06](#)
page 4

Check the freeze indicator in the refrigerator. If it warns of freezing or you suspect that a freeze-sensitive vaccine (DTP, DT, TT, Td, HepB, DTP-HepB, liquid Hib and DTP-HepB+Hib vaccines) has been frozen, you should perform the shake test.

Immunization in practice: a practical resource guide for Health workers 2004 update_____Module 6: Holding an immunization session

[WHO/IVB/04.06](#)

page 19

See Appendix 6_19 for chart entitled, "Administering vaccines to infants" BCG, DTP, DTP-HepB, HepB, measles, yellow fever, OPV"

Hepatitis B vaccines (WHO position paper)

[WER 2004, vol. 79, 28, pp 255-263](#)

page 255

Routine vaccination of all infants against HBV infection should become an integral part of national immunization schedules worldwide. High coverage with the primary vaccine series among infants has the greatest overall impact on the prevalence of chronic HBV infection in children and should be the highest HBV-related priority.

Hepatitis B vaccines (WHO position paper)

[WER 2004, vol. 79, 28, pp 255-263](#)

page 255

(I)n countries where a high proportion of HBV infections are acquired perinatally, the first dose of hepatitis B vaccine should be given as soon as possible (<24 hours) after birth.

In countries where a lower proportion of HBV infections are acquired perinatally, the relative contribution of perinatal HBV infection to the overall disease burden, and the feasibility and cost-effectiveness of providing vaccination at birth, should be carefully considered before a decision is made on the optimal vaccination schedule.

Hepatitis B vaccines (WHO position paper)

[WER 2004, vol. 79, 28, pp 255-263](#)

page 255

(Hepatitis B vaccine catch-up) strategies targeted at older age groups or groups with risk factors for acquiring HBV infection should be considered as a supplement to routine infant vaccination in countries of intermediate or low hepatitis B endemicity. In such settings, a substantial proportion of the disease burden may be attributable to infections acquired by older children, adolescents and adults.

In countries of high endemicity, large-scale routine vaccination of infants rapidly reduces the transmission of HBV. In these circumstances, catch-up vaccination of older children and adults has relatively little impact on chronic disease because most of them have already been infected.

Hepatitis B vaccines (WHO position paper)

[WER 2004, vol. 79, 28, pp 255-263](#)

page 257

In highly endemic areas, HBV is most commonly spread from mother to child at birth, or from person to person in early childhood. In countries with low HBV endemicity, sexual transmission and the use of contaminated needles, especially among injecting drug users, are the major routes of infection. However, perinatal transmission may account for 15% of HBV-related deaths, even in low-endemic areas.

Hepatitis B vaccines (WHO position paper)

Two types of hepatitis B vaccines are available: plasmaderived vaccines and recombinant vaccines. The two vaccines show no differences in terms of reactogenicity, efficacy or duration of protection. Their thermostability is also similar: both should be shipped and stored at 2-8 C; freezing must be avoided as it dissociates antigen from the alum adjuvant.

[WER 2004, vol. 79, 28, pp 255-263](#)
page 258

Hepatitis B vaccines (WHO position paper)

When immunizing against HBV at birth, only monovalent hepatitis B vaccine should be used: the other antigens found in combination vaccines are currently not approved for use at birth (DTwP, DTaP, Hib, hepatitis A and IPV.)

[WER 2004, vol. 79, 28, pp 255-263](#)
page 258

Hepatitis B vaccines (WHO position paper)

The minimum recommended interval between (hepatitis B vaccine) doses is four weeks. Longer dose intervals may increase the final anti-HBs titres but not the seroconversion rates. More than 3 doses of the vaccine are not required, regardless of duration (> 4 weeks) of the interval between them.

[WER 2004, vol. 79, 28, pp 255-263](#)
page 259

Hepatitis B vaccines (WHO position paper)

Recommended schedules for (hepatitis B) vaccination can be divided into those that include a birth-dose and those that do not. Schedules with a birth-dose call for the first vaccination at birth, followed by a second and third dose at the time of the first and third diphtheria/tetanus/pertussis (DTP) vaccination, respectively (see Appendix 55_9, column II.) Alternatively, a four-dose schedule may be used where the dose at birth is followed by three additional doses; these doses may be given either as monovalent vaccine or as a combination (e.g. with DTP and/or Hib) following the schedules commonly used for those vaccines (see Appendix 55_9, column III.) These schedules will prevent most perinatally acquired infection.

[WER 2004, vol. 79, 28, pp 255-263](#)
page 259

Hepatitis B vaccines (WHO position paper)

Some countries have chosen not to implement universal (hepatitis B) immunization and instead use comprehensive HBsAg screening of pregnant women with immunization of newborn infants born to HBsAg-positive women. This strategy is usually not feasible in developing countries with high prevalence of disease and may not be the most reliable and convenient option even in countries where HBsAg screening in pregnancy is well established.

[WER 2004, vol. 79, 28, pp 255-263](#)
page 259

Hepatitis B vaccines (WHO position paper)

When administered without the birth-dose, hepatitis B vaccine is usually given at the same time as DTP, either as a monovalent presentation or in combination with DTP and/or Hib vaccine (see Appendix 55_9, column I) .

[WER 2004, vol. 79, 28, pp 255-263](#)
page 259

Hepatitis B vaccines (WHO position paper)

[WER 2004, vol. 79, 28, pp 255-263](#)
page 260

Countries that opt for schedules with a birth-dose (of hepatitis B vaccine) should vaccinate preterm infants at birth and subsequently enter the respective national hepatitis B vaccination schedule. However, if the birth weight is <2000 g, the vaccine dose at birth should not be counted towards the primary series, and three additional doses should be given.

Hepatitis B vaccines (WHO position paper)

[WER 2004, vol. 79, 28, pp 255-263](#)
page 260

Immunocompromised children and adults can also benefit from vaccination (with hepatitis B vaccine.) However, the immune response may be reduced and additional injections of the vaccine may be required. Where possible, the anti-HBs antibody titres should be followed up after immunization of immunocompromised individuals.

Hepatitis B vaccines (WHO position paper)

[WER 2004, vol. 79, 28, pp 255-263](#)
page 260

The recommended dose (of hepatitis B vaccine) varies by product and with the age of the recipient. In most cases, infants and adolescents receive 50% of the adult dose.

The vaccine is administered by intramuscular injection in the anterolateral aspect of the thigh (infants and children aged <2 years) or in the deltoid muscle (older children and adults). Administration in the buttock is not recommended because this route of administration has been associated with decreased protective antibody levels as well as injury to the sciatic nerve. Intradermal administration is not recommended because the immune response is less reliable, particularly in children.

The hepatitis B vaccine does not interfere with the immune response to any other vaccine, and vice versa. Specifically, the birth-dose of hepatitis B can be given safely together with bacillus Calmette-Gurin (BCG) vaccine; BCG does not interfere negatively with the response to hepatitis B vaccine. However, unless formulated as fixed combinations, hepatitis B vaccine and other vaccines administered during the same visit should be given at different injection sites.

Hepatitis B vaccines (WHO position paper)

[WER 2004, vol. 79, 28, pp 255-263](#)
page 260

Testing to determine antibody responses is not necessary after routine vaccination (with hepatitis B vaccine.) However, when feasible, knowledge of response to vaccination is important in the following groups:

(i) persons at risk of occupationally acquired infection; (ii) infants born to HBsAg-positive mothers; (iii) immunocompromised persons; and (iv) sexual partners of HBsAg-positive persons.

Testing for anti-HBs should be performed by a method that allows determination of whether the anti-HBs concentration is protective (>10 mIU per ml). Adults should be tested 1-2 months after completion of the vaccination series. In settings where resources are available, infants born to HBsAg-positive mothers should be tested at 8-15 months of age, after completion of the vaccination series. Persons found to be antibody-negative after the primary series should be referred for appropriate follow-up.

Hepatitis B vaccines (WHO position paper)

[WER 2004, vol. 79, 28, pp 255-263](#)
page 261

(Following hepatitis B vaccination,) reports of severe anaphylactic reactions are very rare.

Available data do not indicate a causal association between hepatitis B vaccine and Guillain-Barr syndrome, or demyelinating disorders including multiple sclerosis, nor is there any epidemiological data to support a causal association between hepatitis B vaccination and chronic fatigue syndrome, arthritis, autoimmune disorders, asthma, sudden infant death syndrome, or diabetes.

Hepatitis B vaccines (WHO position paper)

[WER 2004, vol. 79, 28, pp 255-263](#)
page 261

All children and adolescents aged less than 18 years and not previously vaccinated should receive the (hepatitis B) vaccine. Hepatitis B vaccination is also indicated for certain groups at high risk of contracting HBV infection, including persons with high-risk sexual behaviour, partners and household contacts of HBsAg-positive persons, injecting drug users, persons who frequently require blood or blood products, recipients of solid organ transplantation, those at occupational risk of HBV infection, including health care workers, as well as for international travellers to HBV-endemic countries.

Hepatitis B vaccines (WHO position paper)

[WER 2004, vol. 79, 28, pp 255-263](#)
page 261

Hepatitis B vaccine is contraindicated for individuals with a history of allergic reactions to any of the vaccines components.

Neither pregnancy nor lactation is a contraindication for use of this vaccine.

Hepatitis B vaccines (WHO position paper)

[WER 2004, vol. 79, 28, pp 255-263](#)
page 261

Temporary immunity may be obtained using hepatitis B immune globulin (HBIG) for post-exposure prophylaxis. HBIG prophylaxis may be indicated (i) for newborn infants whose mothers are HBsAg-positive, (ii) following percutaneous or mucous membrane exposure to HBsAg-positive blood or body fluids, (iii) following sexual exposure to an HBsAg-positive person, and (iv) to protect patients from recurrent HBV infection following liver transplantation. As a rule, HBIG should be used as an adjunct to hepatitis B vaccine. However, in full-term newborns, the protection against perinatally acquired infection achieved by immediate (<24 hours) hepatitis B vaccination is not significantly improved by the addition of HBIG.

Hepatitis B vaccines (WHO position paper)

[WER 2004, vol. 79, 28, pp 255-263](#)
page 262

In countries of high disease endemicity (HBsAg prevalence >8%), HBV is mainly spread from mother to infant at birth or from child to child during early childhood (<5 years). In this epidemiological setting, schedules providing the first vaccine dose at birth are recommended.

Hepatitis B vaccines (WHO position paper)

Routine infant hepatitis B vaccination should also be given high priority in countries of intermediate or low HBV endemicity (HBsAg prevalence of >2- <8% or <2%, respectively) because, even in these settings, an important proportion of chronic infections are acquired through HBV transmission during early childhood.

[WER 2004, vol. 79, 28, pp 255-263](#)
page 262

Hepatitis B vaccines (WHO position paper)

Although HBsAg screening of all pregnant women and vaccination at birth only of infants born to HBsAg-positive mothers may be an option in areas with low HBV transmission, this strategy may be only partially effective, since women at highest risk of infection often fail to attend prenatal clinics.

[WER 2004, vol. 79, 28, pp 255-263](#)
page 262

Hepatitis B vaccines (WHO position paper)

Generally, it is easier to deliver hepatitis B vaccine at birth to infants who are born in health facilities. However, availability of monovalent hepatitis B vaccine in pre-filled singledose injection devices facilitates the administration of the vaccine by health care workers and birth attendants to infants born at home.

[WER 2004, vol. 79, 28, pp 255-263](#)
page 263

Hepatitis B vaccines (WHO position paper)

Catch-up vaccination (with hepatitis B vaccine of older age groups, including adolescents and adults) should be considered only if the continuity of the infant vaccination programme can be ensured.

[WER 2004, vol. 79, 28, pp 255-263](#)
page 263

WHO recommended standards for surveillance of selected vaccine-preventable diseases

Hepatitis B is targeted by WHO for reduced incidence/prevalence.

[WHO/V&B/03.01](#)
page 1

WHO recommended standards for surveillance of selected vaccine-preventable diseases

Recommended types of surveillance for acute viral hepatitis:
_ Routine monthly reporting of aggregated data on suspected cases, and, if available, the number of confirmed cases of each type of hepatitis should be reported from the peripheral level to the intermediate and central levels.
_ Designated reporting sites at all levels should report at a specified frequency (e.g. weekly or monthly) even if there are zero cases (often referred to as zero reporting).

[WHO/V&B/03.01](#)
page 2

WHO recommended standards for surveillance of selected vaccine-preventable diseases

Serological testing for documenting (hepatitis B) seroconversion in children is usually unnecessary.

[WHO/V&B/03.01](#)
page 3

Immunization in practice: a practical resource guide for Health workers 2004 update_____Module 3: The cold chain

[WHO/IVB/04.06](#)
page 13

The freeze indicator is used to warn of freezing and is packed with vaccines that are sensitive to freezing temperatures: DTP, TT, DT, Td (freezing point of -6.5C), hepatitis B (-0.5C), liquid Hib and their combinations (DTP-HepB, and DTP-HepB+Hib vaccines) and JE.

Every refrigerator storing vaccines should have a freeze indicator (Freeze Watch). It is strongly recommended that one freeze indicator be placed in each cold box during vaccine transport and distribution. This is critical in places subject to low temperatures.

Immunization in practice: a practical resource guide for Health workers 2004 update_____Module 3: The cold chain

[WHO/IVB/04.06](#)
page 26

The shake test can help give an idea whether adsorbed vaccines (DTP, DT, Td, TT or hepatitis B) have been subjected to freezing temperatures likely to have damaged them. The test should be conducted for all boxes where freeze indicators are found to be activated or temperature recordings show negative temperatures.

Identify and separate all vaccines that may have been frozen and ensure that none are distributed or used.

Introducing hepatitis B vaccine into national immunization services

[WHO/V&B/01.28](#)
page 3

Adding HepB vaccine to the national immunization schedule will require cold chain assessments at all administrative levels:

_ to assure adequate storage capacity is available, and

_ to assure policies and procedures are in place to prevent freezing of HepB vaccine.

Vaccine introduction guidelines. Adding a vaccine to a national immunization programme: decision and implementation

[WHO/IVB/05.18](#)
page 32

WHO recommends the following schedule for infants (Appendix 39_5).

Vaccine introduction guidelines. Adding a vaccine to a national immunization programme: decision and implementation

[WHO/IVB/05.18](#)
page 45

WHO recommends (hepatitis B vaccine) introduction in all countries.

Introduction of hepatitis B vaccine into childhood immunization services. Management guidelines, including information for health workers and parents

[WHO/V&B/01.31](#)
page 6

In order to prevent perinatal HBV transmission the first dose of hepatitis B vaccine should be given as soon as possible after birth, preferably within 24 hours.

Introduction of hepatitis B vaccine into childhood immunization services. Management guidelines, including information for health workers and parents

[WHO/V&B/01.31](#)

page 7

In all countries: Achieving a high level of completion of the hepatitis B vaccine series among all infants should be the highest priority. This has the greatest overall impact on the prevalence of chronic HBV infection in children, regardless of whether it is feasible to administer a birth dose.

In countries where a high proportion of chronic HBV infections is acquired perinatally (e.g. in south-east Asia): A birth dose should be given to infants who are delivered in hospitals when hepatitis B vaccine is introduced. Efforts should also be made in these countries to give hepatitis B vaccine as soon as possible after birth to infants delivered at home.

In countries where a lower proportion of chronic HBV infections is acquired perinatally (e.g. in Africa): The administration of a birth dose may be considered after evaluating:

- the relative contribution of perinatal HBV infections to the overall disease burden;
- the feasibility and cost-effectiveness of providing a birth dose.

Introduction of hepatitis B vaccine into childhood immunization services. Management guidelines, including information for health workers and parents

[WHO/V&B/01.31](#)

page 9

Monovalent hepatitis B vaccine **MUST BE USED** for the birth dose.

Combination vaccines that include hepatitis B vaccine **MUST NOT BE USED** to give the birth dose of hepatitis B vaccine because DTP and Hib vaccines should not be administered at birth.

Either monovalent hepatitis B vaccine or combination vaccines may be used for later doses in the hepatitis B vaccine schedule. Combination vaccines can be given whenever all the antigens in the vaccines are indicated.

Introduction of hepatitis B vaccine into childhood immunization services. Management guidelines, including information for health workers and parents

[WHO/V&B/01.31](#)

page 10

If hepatitis B vaccine is administered on the same day as another injectable vaccine, it is preferable to give the two vaccines in different limbs. If more than one injection has to be given in the same limb, the thigh is the preferred site of injection because of the greater muscle mass, and the injection sites should be 2.5 cm to 5 cm apart so that any local reactions are unlikely to overlap.

Introduction of hepatitis B vaccine into childhood immunization services. Management guidelines, including information for health workers and parents

[WHO/V&B/01.31](#)

page 11

Hepatitis B vaccine SHOULD NOT be given in the buttock as this route of administration has been associated with decreased protective antibody levels, probably because of inadvertent subcutaneous injection or injection into deep fat tissue. In addition there may be a risk of injury to the sciatic nerve.

Hepatitis B vaccine SHOULD NOT be administered intradermally because this route of administration does not produce an adequate antibody response in children.

Hepatitis B vaccine SHOULD NOT be mixed in the same syringe with other vaccines unless specifically recommended by the manufacturer. (Note: pentavalent DTP-HepB+Hib vaccine is supplied in two separate vials, one containing DTP-HepB vaccine (liquid), the other containing Hib vaccine (lyophilized). The manufacturer recommends mixing the contents of the two vials and giving DTP-HepB+Hib vaccine in the same syringe.)

Introduction of hepatitis B vaccine into childhood immunization services. Management guidelines, including information for health workers and parents

[WHO/V&B/01.31](#)

page 12

All infants aged under 1 year should receive a full series of hepatitis B vaccine. The need for catch-up immunization of older age groups and for targeted risk groups varies between countries.

Introduction of hepatitis B vaccine into childhood immunization services. Management guidelines, including information for health workers and parents

[WHO/V&B/01.31](#)

page 12

A child with a history of a severe allergic reaction (e.g. generalized urticaria, difficulty in breathing, swelling of the mouth and throat, hypertension, shock) to a previous dose of hepatitis B vaccine should not receive another dose.

The following are NOT contraindications:

- minor illness, such as respiratory tract infection or diarrhoea with temperature below 38.5C;
- allergy or asthma;
- family history of convulsions;
- treatment with antibiotics;
- infection with HIV;
- breastfeeding;
- history of seizures (convulsions, fits);
- chronic illnesses such as chronic diseases of the heart, lung, kidney or liver;
- stable neurological conditions such as cerebral palsy and Down syndrome;
- prematurity or low birth weight;
- history of jaundice at birth.

Introduction of hepatitis B vaccine into childhood immunization services. Management guidelines, including information for health workers and parents

[WHO/V&B/01.31](#)
page 13

Programmatically, it is usually easiest if the three doses of hepatitis B vaccine are given at the same time as the three doses of DTP (See Appendix 36_9 for options for adding hepatitis B vaccine to childhood immunization schedules.)

Introduction of hepatitis B vaccine into childhood immunization services. Management guidelines, including information for health workers and parents

[WHO/V&B/01.31](#)
page 22

According to the WHO multidose vial policy (WHO/V&B/00.09), opened multidose vials of hepatitis B vaccine may be reused in subsequent immunization sessions for up to four weeks in fixed health facilities if all the following conditions are met.

The expiry date has not passed.

The vial has been stored under appropriate cold chain conditions (i.e. refrigerated between 2 C and 8 C).

The vaccine vial septum (where the needle is put in to withdraw doses) has not been submerged in water (to prevent this from happening, well-sealed ice packs should be used in vaccine carriers and water should not be allowed to accumulate where the vials are stored).

An aseptic technique has been used to withdraw all doses.

The vaccine vial monitor (VVM), if attached, has not reached the discard point.

Introduction of hepatitis B vaccine into childhood immunization services. Management guidelines, including information for health workers and parents

[WHO/V&B/01.31](#)
page 23

(O)utreach sessions, opened multidose vials of hepatitis B vaccine may be reused in subsequent immunization sessions for up to four weeks if:

all the conditions for reuse of multidose vials in fixed health facilities are met;

a VVM is attached to the vial.

Introduction of hepatitis B vaccine into childhood immunization services. Management guidelines, including information for health workers and parents

[WHO/V&B/01.31](#)
page 25

If a three-dose hepatitis B vaccine schedule is used (Appendix 36_9, Options I and II), HepB3 completion should be defined as completion of the third hepatitis B vaccine dose.

If a four-dose hepatitis B vaccine schedule is used, with a birth dose of monovalent vaccine and three doses of a combination vaccine (Appendix 36_9, Option III), HepB3 completion should be defined as completion of the third dose of the combination vaccine.

Introduction of hepatitis B vaccine into childhood immunization services. Management guidelines, including information for health workers and parents

[WHO/V&B/01.31](#)

page 26

All serious adverse events (suspected by health workers or the public to be associated with hepatitis B immunization) should be reported to the district health authorities and then to national immunization staff in the health ministry of the country in question.

Hepatitis B vaccines (WHO position paper)

[WER 2004, vol. 79, 28, pp 255-263](#)

page 258

Two types of hepatitis B vaccines are available: plasmaderived vaccines and recombinant vaccines. The two vaccines show no differences in terms of reactogenicity, efficacy or duration of protection. The two types of hepatitis B vaccine can be used interchangeably

The use of opened multi-dose vials of vaccine in subsequent immunization sessions (WHO Policy Statement)

[WHO/V&B/00.09](#)

page 0

See "Multi-Dose Open Vial" section of the "General" chapter in this catalogue for policies relevant for DTP, DT, TT, DTP-hepB, DTP-hepB-Hib, hepatitis B, liquid formulations of Hib and OPV.

Temperature sensitivity of vaccines

[WHO/IVB/06.10](#)

page 2

The recommended conditions for storing vaccines used in immunization programmes are shown in Appendix 81_1. This diagram also indicates the maximum times and temperatures in each case. At the higher levels of the cold chain, i.e., at national (primary), and regional or province level, OPV must be kept frozen between -15oC and -25oC. Freeze-dried vaccines (i.e., BCG, measles, MMR and yellow fever) may also be kept frozen at -15oC to -25oC if cold chain space permits, but this is neither essential nor recommended. At other levels of the cold chain (intermediate vaccine stores and health facilities), these vaccines should be stored between +2oC and +8oC. All other vaccines should be stored at between +2oC and +8oC at all levels of the cold chain. Liquid formulations of vaccines containing diphtheria, pertussis, tetanus, hepatitis B, Haemophilus influenzae type b, IPV and their combinations should not be frozen.

Temperature sensitivity of vaccines

[WHO/IVB/06.10](#)

page 6

WHO recommends that a policy permitting the use of vaccine outside the cold chain can be implemented either generally for all routine immunization activities or on a limited basis in certain areas or under special circumstances, such as:

- national immunization days;

- hard-to-reach geographical areas;

- immunizations provided in the home;

- cool seasons;

- storage and transportation of freeze-sensitive vaccines (DTP, TT, DT, Td, hepatitis B and Hib vaccines) where the risk of freezing is greater than the risk of heat exposure.

Temperature sensitivity of vaccines

[WHO/IVB/06.10](#)

page 16

The freezing temperature of HepB vaccine is -0.5 C and freezing destroys potency, a result of destruction of the aluminum lattice. HepB vaccine should be protected from being frozen; vaccine thought to have been frozen should not be used

Vaccine introduction guidelines. Adding a vaccine to a national immunization programme: decision and implementation

[WHO/IVB/05.18](#)

page 45

HepB vaccine is sensitive to low temperatures and can be damaged by freezing. On the other hand, it is quite heat stable and use with a vaccine vial monitor (VVM) allows greater flexibility in transportation and storage.

Immunization in practice: a practical resource guide for Health workers 2004 update_____Module 2: The vaccines

[WHO/IVB/04.06](#)

page 25

Wait at least four weeks between doses of OPV, DTP, Hib, and HepB vaccines.

Vaccine introduction guidelines. Adding a vaccine to a national immunization programme: decision and implementation

[WHO/IVB/05.18](#)

page 45

(Considerations for hepatitis B vaccine schedule:)

A determination of the role of perinatal transmission (useful for birth dose considerations) can be made based on the overall seroprevalance of HBsAg, age-specific prevalence of HBsAg, and the prevalence of the HBeAg in pregnant women.

Combination products may not be used at birth; therefore, programmes including the birth dose will need to include monovalent HepB vaccine in the supply.

WHO recommended standards for surveillance of selected vaccine-preventable diseases

[WHO/V&B/03.01](#)

page 2

(A)cute viral hepatitis:

_ All outbreaks should be investigated immediately and confirmed serologically.

Immunization in practice: a practical resource guide for Health workers 2004 update_____Module 2: The vaccines

[WHO/IVB/04.06](#)

page 16

HepB and DTP-HepB vaccines

_ HepB vaccine should never be frozen.

_ If the vaccine fails the shake test you must discard it.

Immunization in practice: a practical resource guide for Health workers 2004 update_____Module 2: The vaccines

[WHO/IVB/04.06](#)

page 16

Options for adding hepatitis B vaccine to childhood immunization schedules (Appendix 2_35.)

Introducing hepatitis B vaccine into national immunization services

[WHO/V&B/01.28](#)
page 3

For administering HepB vaccine:

- _ A 25 mm, 22 or 23 gauge needle is recommended.
- _ The standard paediatric dose is 0.5 ml.

Weekly Epidemiological Record, No. 40, 2 October 2009

[WER No.40, 2009, 84](#)
page 418

All infants should receive their first dose of hepatitis B vaccine as soon as possible after birth, preferably within 24 hours

Weekly Epidemiological Record, No. 40, 2 October 2009

[WER No.40, 2009, 84](#)
page 418

Delivery of hepatitis B vaccine within 24 hours of birth should be a performance indicator for all immunization programmes, and reporting and monitoring systems should be strengthened to improve the quality of data on the birth dose

Weekly Epidemiological Record, No. 40, 2 October 2009

[WER No.40, 2009, 84](#)
page 418

National strategies to prevent perinatal transmission should include providing hepatitis B vaccine at birth and ensuring high coverage of the birth dose through a combination of strengthened maternal and infant care at birth with skilled health workers present to administer the vaccine and innovative outreach to provide vaccine for children born at home.

Weekly Epidemiological Record, No. 40, 2 October 2009

[WER No.40, 2009, 84](#)
page 418

The birth dose should be followed by 2 or 3 doses to complete the primary series. In most cases, 1 of the following 2 options is considered appropriate: (i) a 3-dose schedule of hepatitis B vaccine, with the first dose (monovalent) being given at birth and the second and third (monovalent or combined vaccine) given at the same time as the first and third doses of DTP vaccine; or (ii) 4 doses, where a monovalent birth dose is followed by 3 monovalent or combined vaccine doses, usually given with other routine infant vaccines

Weekly Epidemiological Record, No. 40, 2 October 2009

[WER No.40, 2009, 84](#)
page 418

There is no evidence to support the need for a booster dose of hepatitis B vaccine in routine immunization programmes

Weekly Epidemiological Record, No. 40, 2 October 2009

[WER No.40, 2009, 84](#)
page 418

Catch-up vaccination should be considered for cohorts of children with low coverage as a way to increase the number of protected children. Priority should be given to younger age groups since the risk for chronic infection is highest in those cohorts

Weekly Epidemiological Record, No. 40, 2 October 2009

[WER No.40, 2009, 84](#)
page 419

The need for catch-up vaccination in older age groups, including adolescents and adults, is determined by the baseline epidemiology of HBV infection in the country and, in particular, the relative importance of reducing acute HBV-related disease

Weekly Epidemiological Record, No. 40, 2 October 2009

[WER No.40, 2009, 84](#)
page 419

Possible additional target groups for catch-up vaccination include people with risk factors for acquiring HBV infection, such as those who frequently require blood or blood products, dialysis patients, recipients of solid organ transplantations, people interned in prisons, injecting drug users, household and sexual contacts of people with chronic HBV infection, people with multiple sexual partners, as well as health-care workers and others who may be exposed to blood and blood products through their work. Also, travellers who have not completed their hepatitis B vaccination series should be offered the vaccine before leaving for endemic areas.

Weekly Epidemiological Record, No. 40, 2 October 2009

[WER No.40, 2009, 84](#)
page 419

As is the case for all vaccines, continued monitoring of vaccine safety is essential

Weekly Epidemiological Record, No. 40, 2 October 2009

[WER No.40, 2009, 84](#)
page 419

WHO strongly recommends that all regions and associated countries develop goals for hepatitis B control appropriate to their epidemiological situation

HIV/AIDS and immunosuppression

Hepatitis B vaccines (WHO position paper)

[WER 2004, vol. 79, 28, pp 255-263](#)
page 260

Immunocompromised children and adults can also benefit from vaccination (with hepatitis B vaccine.) However, the immune response may be reduced and additional injections of the vaccine may be required. Where possible, the anti-HBs antibody titres should be followed up after immunization of immunocompromised individuals.

Hepatitis B vaccines (WHO position paper)

[WER 2004, vol. 79, 28, pp 255-263](#)
page 260

Testing to determine antibody responses is not necessary after routine vaccination (with hepatitis B vaccine.) However, when feasible, knowledge of response to vaccination is important in the following groups:

(i) persons at risk of occupationally acquired infection; (ii) infants born to HBsAg-positive mothers; (iii) immunocompromised persons; and (iv) sexual partners of HBsAg-positive persons.

Testing for anti-HBs should be performed by a method that allows determination of whether the anti-HBs concentration is protective (>10 mIU per ml). Adults should be tested 1-2 months after completion of the vaccination series. In settings where resources are available, infants born to HBsAg-positive mothers should be tested at 8-15 months of age, after completion of the vaccination series. Persons found to be antibody-negative after the primary series should be referred for appropriate follow-up.

Introduction of hepatitis B vaccine into childhood immunization services. Management guidelines, including information for health workers and parents

[WHO/V&B/01.31](#)
page 12

A child with a history of a severe allergic reaction (e.g. generalized urticaria, difficulty in breathing, swelling of the mouth and throat, hypertension, shock) to a previous dose of hepatitis B vaccine should not receive another dose.

The following are NOT contraindications:

- minor illness, such as respiratory tract infection or diarrhoea with temperature below 38.5C;
- allergy or asthma;
- family history of convulsions;
- treatment with antibiotics;
- infection with HIV;
- breastfeeding;
- history of seizures (convulsions, fits);
- chronic illnesses such as chronic diseases of the heart, lung, kidney or liver;
- stable neurological conditions such as cerebral palsy and Down syndrome;
- prematurity or low birth weight;
- history of jaundice at birth.

Hepatitis A

WHO recommended standards for surveillance of selected vaccine-preventable diseases

[WHO/V&B/03.01](#)
page 2

Recommended types of surveillance for acute viral hepatitis:

_ Routine monthly reporting of aggregated data on suspected cases, and, if available, the number of confirmed cases of each type of hepatitis should be reported from the peripheral level to the intermediate and central levels.

_ Designated reporting sites at all levels should report at a specified frequency (e.g. weekly or monthly) even if there are zero cases (often referred to as zero reporting).

WHO recommended standards for surveillance of selected vaccine-preventable diseases

[WHO/V&B/03.01](#)
page 2

(A)cute viral hepatitis:

_ All outbreaks should be investigated immediately and confirmed serologically.

Hib

Getting started with vaccine vial monitors

[WHO/V&B/02.35](#)
page 9

A policy permitting the use of vaccine outside the cold chain can be implemented either generally for all routine immunization activities or on a limited basis in certain areas or under special circumstances, such as:

- national immunization days;
- hard-to-reach geographical areas;
- immunizations provided in the home;
- cool seasons;
- storage and transportation of freeze-sensitive vaccines (DTP, TT, DT, Td, hepatitis B and Hib vaccines) where the risk of freezing is greater than the risk of heat exposure.

Immunization in practice: a practical resource guide for Health workers 2004 update_____Module 2: The vaccines

[WHO/IVB/04.06](#)
page 24

Typical immunization schedule for children (see Appendix 2_19.)

WHO-UNICEF effective vaccine store management initiative: Modules 1 - 4

[WHO/IVB/04.16-20](#)
page 1

WHO recommended vaccine storage conditions (Appendix 17_3).

Immunization in practice: a practical resource guide for Health workers 2004 update_____Module 6: Holding an immunization session

[WHO/IVB/04.06](#)
page 4

Check the freeze indicator in the refrigerator. If it warns of freezing or you suspect that a freeze-sensitive vaccine (DTP, DT, TT, Td, HepB, DTP-HepB, liquid Hib and DTP-HepB+Hib vaccines) has been frozen, you should perform the shake test.

Immunization in practice: a practical resource guide for Health workers 2004 update_____Module 3: The cold chain

[WHO/IVB/04.06](#)
page 13

The freeze indicator is used to warn of freezing and is packed with vaccines that are sensitive to freezing temperatures: DTP, TT, DT, Td (freezing point of -6.5C), hepatitis B (-0.5C), liquid Hib and their combinations (DTP-HepB, and DTP-HepB+Hib vaccines) and JE.

Every refrigerator storing vaccines should have a freeze indicator (Freeze Watch). It is strongly recommended that one freeze indicator be placed in each cold box during vaccine transport and distribution. This is critical in places subject to low temperatures.

Vaccine introduction guidelines. Adding a vaccine to a national immunization programme: decision and implementation

[WHO/IVB/05.18](#)
page 32

WHO recommends the following schedule for infants (Appendix 39_5).

The use of opened multi-dose vials of vaccine in subsequent immunization sessions (WHO Policy Statement)

[WHO/V&B/00.09](#)
page 0

See "Multi-Dose Open Vial" section of the "General" chapter in this catalogue for policies relevant for DTP, DT, TT, DTP-hepB, DTP-hepB-Hib, hepatitis B, liquid formulations of Hib and OPV.

Temperature sensitivity of vaccines

[WHO/IVB/06.10](#)
page 2

The recommended conditions for storing vaccines used in immunization programmes are shown in Appendix 81_1. This diagram also indicates the maximum times and temperatures in each case. At the higher levels of the cold chain, i.e., at national (primary), and regional or province level, OPV must be kept frozen between -15oC and -25oC. Freeze-dried vaccines (i.e., BCG, measles, MMR and yellow fever) may also be kept frozen at -15oC to -25oC if cold chain space permits, but this is neither essential nor recommended. At other levels of the cold chain (intermediate vaccine stores and health facilities), these vaccines should be stored between +2oC and +8oC. All other vaccines should be stored at between +2oC and +8oC at all levels of the cold chain. Liquid formulations of vaccines containing diphtheria, pertussis, tetanus, hepatitis B, Haemophilus influenzae type b, IPV and their combinations should not be frozen.

Temperature sensitivity of vaccines

[WHO/IVB/06.10](#)
page 6

WHO recommends that a policy permitting the use of vaccine outside the cold chain can be implemented either generally for all routine immunization activities or on a limited basis in certain areas or under special circumstances, such as:

- national immunization days;
- hard-to-reach geographical areas;
- immunizations provided in the home;
- cool seasons;
- storage and transportation of freeze-sensitive vaccines (DTP, TT, DT, Td, hepatitis B and Hib vaccines) where the risk of freezing is greater than the risk of heat exposure.

Immunization in practice: a practical resource guide for Health workers 2004 update_____Module 2: The vaccines

[WHO/IVB/04.06](#)
page 25

Wait at least four weeks between doses of OPV, DTP, Hib, and HepB vaccines.

Immunization Coverage

WHO recommended standards for surveillance of selected vaccine-preventable diseases

[WHO/V&B/03.01](#)
page 3

Serological testing for documenting (hepatitis B) seroconversion in children is usually unnecessary.

Introduction of hepatitis B vaccine into childhood immunization services. Management guidelines, including information for health workers and parents

[WHO/V&B/01.31](#)
page 25

If a three-dose hepatitis B vaccine schedule is used (Appendix 36_9, Options I and II), HepB3 completion should be defined as completion of the third hepatitis B vaccine dose.

If a four-dose hepatitis B vaccine schedule is used, with a birth dose of monovalent vaccine and three doses of a combination vaccine (Appendix 36_9, Option III), HepB3 completion should be defined as completion of the third dose of the combination vaccine.

JE

Immunization in practice: a practical resource guide for Health workers 2004 update _____ Module 3: The cold chain

[WHO/IVB/04.06](#)
page 13

The freeze indicator is used to warn of freezing and is packed with vaccines that are sensitive to freezing temperatures: DTP, TT, DT, Td (freezing point of -6.5C), hepatitis B (-0.5C), liquid Hib and their combinations (DTP-HepB, and DTP-HepB+Hib vaccines) and JE.

Every refrigerator storing vaccines should have a freeze indicator (Freeze Watch). It is strongly recommended that one freeze indicator be placed in each cold box during vaccine transport and distribution. This is critical in places subject to low temperatures.

MMR

WHO-UNICEF effective vaccine store management initiative: Modules 1 - 4

[WHO/IVB/04.16-20](#)
page 1

WHO recommended vaccine storage conditions (Appendix 17_3).

Temperature sensitivity of vaccines

[WHO/IVB/06.10](#)

page 2

The recommended conditions for storing vaccines used in immunization programmes are shown in Appendix 81_1. This diagram also indicates the maximum times and temperatures in each case. At the higher levels of the cold chain, i.e., at national (primary), and regional or province level, OPV must be kept frozen between -15oC and -25oC. Freeze-dried vaccines (i.e., BCG, measles, MMR and yellow fever) may also be kept frozen at -15oC to -25oC if cold chain space permits, but this is neither essential nor recommended. At other levels of the cold chain (intermediate vaccine stores and health facilities), these vaccines should be stored between +2oC and +8oC. All other vaccines should be stored at between +2oC and +8oC at all levels of the cold chain. Liquid formulations of vaccines containing diphtheria, pertussis, tetanus, hepatitis B, Haemophilus influenzae type b, IPV and their combinations should not be frozen.

Measles

Immunization in practice: a practical resource guide for Health workers 2004 update_____Module 2: The vaccines

[WHO/IVB/04.06](#)

page 24

Typical immunization schedule for children (see Appendix 2_19.)

WHO-UNICEF effective vaccine store management initiative: Modules 1 - 4

[WHO/IVB/04.16-20](#)

page 1

WHO recommended vaccine storage conditions (Appendix 17_3).

Immunization in practice: a practical resource guide for Health workers 2004 update_____Module 6: Holding an immunization session

[WHO/IVB/04.06](#)

page 19

See Appendix 6_19 for chart entitled, "Administering vaccines to infants" BCG, DTP, DTP-HepB, HepB, measles, yellow fever, OPV"

Vaccine introduction guidelines. Adding a vaccine to a national immunization programme: decision and implementation

[WHO/IVB/05.18](#)

page 32

WHO recommends the following schedule for infants (Appendix 39_5).

Temperature sensitivity of vaccines

[WHO/IVB/06.10](#)

page 2

The recommended conditions for storing vaccines used in immunization programmes are shown in Appendix 81_1. This diagram also indicates the maximum times and temperatures in each case. At the higher levels of the cold chain, i.e., at national (primary), and regional or province level, OPV must be kept frozen between -15oC and -25oC. Freeze-dried vaccines (i.e., BCG, measles, MMR and yellow fever) may also be kept frozen at -15oC to -25oC if cold chain space permits, but this is neither essential nor recommended. At other levels of the cold chain (intermediate vaccine stores and health facilities), these vaccines should be stored between +2oC and +8oC. All other vaccines should be stored at between +2oC and +8oC at all levels of the cold chain. Liquid formulations of vaccines containing diphtheria, pertussis, tetanus, hepatitis B, Haemophilus influenzae type b, IPV and their combinations should not be frozen.

Meningococcal

Temperature sensitivity of vaccines

[WHO/IVB/06.10](#)

page 2

The recommended conditions for storing vaccines used in immunization programmes are shown in Appendix 81_1. This diagram also indicates the maximum times and temperatures in each case. At the higher levels of the cold chain, i.e., at national (primary), and regional or province level, OPV must be kept frozen between -15oC and -25oC. Freeze-dried vaccines (i.e., BCG, measles, MMR and yellow fever) may also be kept frozen at -15oC to -25oC if cold chain space permits, but this is neither essential nor recommended. At other levels of the cold chain (intermediate vaccine stores and health facilities), these vaccines should be stored between +2oC and +8oC. All other vaccines should be stored at between +2oC and +8oC at all levels of the cold chain. Liquid formulations of vaccines containing diphtheria, pertussis, tetanus, hepatitis B, Haemophilus influenzae type b, IPV and their combinations should not be frozen.

Mumps

Temperature sensitivity of vaccines

[WHO/IVB/06.10](#)

page 2

The recommended conditions for storing vaccines used in immunization programmes are shown in Appendix 81_1. This diagram also indicates the maximum times and temperatures in each case. At the higher levels of the cold chain, i.e., at national (primary), and regional or province level, OPV must be kept frozen between -15oC and -25oC. Freeze-dried vaccines (i.e., BCG, measles, MMR and yellow fever) may also be kept frozen at -15oC to -25oC if cold chain space permits, but this is neither essential nor recommended. At other levels of the cold chain (intermediate vaccine stores and health facilities), these vaccines should be stored between +2oC and +8oC. All other vaccines should be stored at between +2oC and +8oC at all levels of the cold chain. Liquid formulations of vaccines containing diphtheria, pertussis, tetanus, hepatitis B, Haemophilus influenzae type b, IPV and their combinations should not be frozen.

New Vaccines

Introducing hepatitis B vaccine into national immunization services

[WHO/V&B/01.28](#)
page 1

WHO recommends that HepB vaccine be included in routine immunization services in all countries. HepB immunization of all infants as an integral part of the national immunization schedule should be the highest priority in all countries.

Introducing hepatitis B vaccine into national immunization services

[WHO/V&B/01.28](#)
page 3

Important elements of integrating HepB vaccine into national immunization programmes are:

- _ Revising training and informational materials, immunization cards and forms used to monitor and evaluate immunization services.
- _ Training for health care staff is essential because these staff are responsible for handling and administering HepB vaccine and they are a major source of information for parents and others in the general public.
- _ Advocacy and communication efforts are important in order to generate support and commitment for the new vaccine. The primary target audiences are decision-makers/opinion leaders, health care staff, and the general public including parents.

Introducing hepatitis B vaccine into national immunization services

[WHO/V&B/01.28](#)
page 4

Adequate seroprevalence data needed to assess HepB disease burden are generally available in all countries, or from adjacent countries with similar HBV endemicity. Thus, additional seroprevalence studies are usually not needed.

Introducing hepatitis B vaccine into national immunization services

[WHO/V&B/01.28](#)
page 4

In phasing HepB vaccine into the existing infant immunization services, a strategy in which HepB vaccine is given to infants who have not yet completed the DTP vaccine series at the time HepB vaccine is introduced is generally the most feasible to implement.

Hepatitis B vaccines (WHO position paper)

[WER 2004, vol. 79, 28, pp 255-263](#)
page 255

Routine vaccination of all infants against HBV infection should become an integral part of national immunization schedules worldwide. High coverage with the primary vaccine series among infants has the greatest overall impact on the prevalence of chronic HBV infection in children and should be the highest HBV-related priority.

Introducing hepatitis B vaccine into national immunization services

[WHO/V&B/01.28](#)
page 3

Adding HepB vaccine to the national immunization schedule will require cold chain assessments at all administrative levels:

- _ to assure adequate storage capacity is available, and
- _ to assure policies and procedures are in place to prevent freezing of HepB vaccine.

Vaccine introduction guidelines. Adding a vaccine to a national immunization programme: decision and implementation

[WHO/IVB/05.18](#)
page 45

WHO recommends (hepatitis B vaccine) introduction in all countries.

Open Vials

Introduction of hepatitis B vaccine into childhood immunization services. Management guidelines, including information for health workers and parents

[WHO/V&B/01.31](#)
page 22

According to the WHO multidose vial policy (WHO/V&B/00.09), opened multidose vials of hepatitis B vaccine may be reused in subsequent immunization sessions for up to four weeks in fixed health facilities if all the following conditions are met.

The expiry date has not passed.

The vial has been stored under appropriate cold chain conditions (i.e. refrigerated between 2 C and 8 C).

The vaccine vial septum (where the needle is put in to withdraw doses) has not been submerged in water (to prevent this from happening, well-sealed ice packs should be used in vaccine carriers and water should not be allowed to accumulate where the vials are stored).

An aseptic technique has been used to withdraw all doses.

The vaccine vial monitor (VVM), if attached, has not reached the discard point.

Introduction of hepatitis B vaccine into childhood immunization services. Management guidelines, including information for health workers and parents

[WHO/V&B/01.31](#)
page 23

(O)utreach sessions, opened multidose vials of hepatitis B vaccine may be reused in subsequent immunization sessions for up to four weeks if:

all the conditions for reuse of multidose vials in fixed health facilities are met;

a VVM is attached to the vial.

The use of opened multi-dose vials of vaccine in subsequent immunization sessions (WHO Policy Statement)

[WHO/V&B/00.09](#)
page 0

See "Multi-Dose Open Vial" section of the "General" chapter in this catalogue for policies relevant for DTP, DT, TT, DTP-hepB, DTP-hepB-Hib, hepatitis B, liquid formulations of Hib and OPV.

Outbreak Control

WHO recommended standards for surveillance of selected vaccine-preventable diseases

[WHO/V&B/03.01](#)
page 2

(A)cute viral hepatitis:

_ All outbreaks should be investigated immediately and confirmed serologically.

Pentavalent

Introducing hepatitis B vaccine into national immunization services

[WHO/V&B/01.28](#)
page 2

Monovalent HepB vaccines must be used to give the birth dose of HepB vaccine.

Combination vaccines that include HepB vaccine must not be used to give the birth dose of HepB vaccine because DTP and Hib vaccines are not recommended to be given at birth.

Combination vaccines can be given whenever all of the antigens in the vaccine are indicated.

Immunization in practice: a practical resource guide for Health workers 2004 update _____ Module 2: The vaccines

[WHO/IVB/04.06](#)
page 16

Only monovalent HepB vaccine should be used as a birth dose, the dose given within the first week of life. Combination vaccines should not be used at birth, but may be used in subsequent doses.

Do not use DTP-HepB+Hib as a birth dose. You may use the vaccine for subsequent doses.

Immunization in practice: a practical resource guide for Health workers 2004 update _____ Module 2: The vaccines

[WHO/IVB/04.06](#)
page 16

Administration summary: HepB vaccine and Administration summary: DTP-HepB combination vaccine (see Appendix 2_12.)

Immunization in practice: a practical resource guide for Health workers 2004 update _____ Module 6: Holding an immunization session

[WHO/IVB/04.06](#)
page 4

Check the freeze indicator in the refrigerator. If it warns of freezing or you suspect that a freeze-sensitive vaccine (DTP, DT, TT, Td, HepB, DTP-HepB, liquid Hib and DTP-HepB+Hib vaccines) has been frozen, you should perform the shake test.

Hepatitis B vaccines (WHO position paper)

[WER 2004, vol. 79, 28, pp 255-263](#)
page 258

When immunizing against HBV at birth, only monovalent hepatitis B vaccine should be used: the other antigens found in combination vaccines are currently not approved for use at birth (DTwP, DTaP, Hib, hepatitis A and IPV.)

Immunization in practice: a practical resource guide for Health workers 2004 update_____Module 3: The cold chain

[WHO/IVB/04.06](#)

page 13

The freeze indicator is used to warn of freezing and is packed with vaccines that are sensitive to freezing temperatures: DTP, TT, DT, Td (freezing point of -6.5C), hepatitis B (-0.5C), liquid Hib and their combinations (DTP-HepB, and DTP-HepB+Hib vaccines) and JE.

Every refrigerator storing vaccines should have a freeze indicator (Freeze Watch). It is strongly recommended that one freeze indicator be placed in each cold box during vaccine transport and distribution. This is critical in places subject to low temperatures.

Introduction of hepatitis B vaccine into childhood immunization services. Management guidelines, including information for health workers and parents

[WHO/V&B/01.31](#)

page 9

Monovalent hepatitis B vaccine **MUST BE USED** for the birth dose.

Combination vaccines that include hepatitis B vaccine **MUST NOT BE USED** to give the birth dose of hepatitis B vaccine because DTP and Hib vaccines should not be administered at birth.

Either monovalent hepatitis B vaccine or combination vaccines may be used for later doses in the hepatitis B vaccine schedule. Combination vaccines can be given whenever all the antigens in the vaccines are indicated.

Introduction of hepatitis B vaccine into childhood immunization services. Management guidelines, including information for health workers and parents

[WHO/V&B/01.31](#)

page 11

Hepatitis B vaccine **SHOULD NOT** be given in the buttock as this route of administration has been associated with decreased protective antibody levels, probably because of inadvertent subcutaneous injection or injection into deep fat tissue. In addition there may be a risk of injury to the sciatic nerve.

Hepatitis B vaccine **SHOULD NOT** be administered intradermally because this route of administration does not produce an adequate antibody response in children.

Hepatitis B vaccine **SHOULD NOT** be mixed in the same syringe with other vaccines unless specifically recommended by the manufacturer. (Note: pentavalent DTP-HepB+Hib vaccine is supplied in two separate vials, one containing DTP-HepB vaccine (liquid), the other containing Hib vaccine (lyophilized). The manufacturer recommends mixing the contents of the two vials and giving DTP-HepB+Hib vaccine in the same syringe.)

The use of opened multi-dose vials of vaccine in subsequent immunization sessions (WHO Policy Statement)

[WHO/V&B/00.09](#)

page 0

See "Multi-Dose Open Vial" section of the "General" chapter in this catalogue for policies relevant for DTP, DT, TT, DTP-hepB, DTP-hepB-Hib, hepatitis B, liquid formulations of Hib and OPV.

Temperature sensitivity of vaccines

[WHO/IVB/06.10](#)

page 2

The recommended conditions for storing vaccines used in immunization programmes are shown in Appendix 81_1. This diagram also indicates the maximum times and temperatures in each case. At the higher levels of the cold chain, i.e., at national (primary), and regional or province level, OPV must be kept frozen between -15°C and -25°C. Freeze-dried vaccines (i.e., BCG, measles, MMR and yellow fever) may also be kept frozen at -15°C to -25°C if cold chain space permits, but this is neither essential nor recommended. At other levels of the cold chain (intermediate vaccine stores and health facilities), these vaccines should be stored between +2°C and +8°C. All other vaccines should be stored at between +2°C and +8°C at all levels of the cold chain. Liquid formulations of vaccines containing diphtheria, pertussis, tetanus, hepatitis B, Haemophilus influenzae type b, IPV and their combinations should not be frozen.

Vaccine introduction guidelines. Adding a vaccine to a national immunization programme: decision and implementation

[WHO/IVB/05.18](#)

page 45

(Considerations for hepatitis B vaccine schedule:)

A determination of the role of perinatal transmission (useful for birth dose considerations) can be made based on the overall seroprevalence of HBsAg, age-specific prevalence of HBsAg, and the prevalence of the HBeAg in pregnant women.

Combination products may not be used at birth; therefore, programmes including the birth dose will need to include monovalent HepB vaccine in the supply.

Policy

Introducing hepatitis B vaccine into national immunization services

[WHO/V&B/01.28](#)

page 1

WHO recommends that HepB vaccine be included in routine immunization services in all countries. HepB immunization of all infants as an integral part of the national immunization schedule should be the highest priority in all countries.

Introducing hepatitis B vaccine into national immunization services

[WHO/V&B/01.28](#)

page 1

Prevention of perinatal HBV transmission should be considered depending on the epidemiology of HBV transmission in a particular country.

In order to prevent HBV transmission from mother to infant, the first dose of HepB vaccine needs to be given as soon as possible after birth (preferably within 24 hours). In countries where a high proportion of chronic infections is acquired perinatally (e.g. South-East Asia), a birth dose should be given to infants. It is usually most feasible to give HepB vaccine at birth when infants are born in hospitals. Efforts should also be made in these countries to give HepB vaccine as soon as possible after delivery to infants delivered at home. In countries where a lower proportion of chronic infections is acquired perinatally (e.g. Africa), the highest priority is to achieve high DTP3 and HepB3 vaccine coverage among infants. In these countries, use of a birth dose may also be considered after disease burden, cost-effectiveness, and feasibility are evaluated.

Introducing hepatitis B vaccine into national immunization services

[WHO/V&B/01.28](#)

page 2

Catch up vaccination of older persons should be considered depending on the epidemiology of HBV transmission in a particular country. (Note: The Vaccine Fund does not provide vaccine for catch-up immunization).

In countries with a high endemicity of chronic HBV infection (hepatitis B surface antigen [HBsAg] prevalence >8%), catch-up immunization is not usually recommended because most chronic infections are acquired among children <5 years of age, and thus, routine infant vaccination will rapidly reduce HBV transmission. In countries with lower endemicity of chronic HBV infection, a higher proportion of chronic infections may be acquired among older children, adolescents and adults; catch-up immunization for these groups may be considered.

Introducing hepatitis B vaccine into national immunization services

[WHO/V&B/01.28](#)

page 2

Monovalent HepB vaccines must be used to give the birth dose of HepB vaccine.

Combination vaccines that include HepB vaccine must not be used to give the birth dose of HepB vaccine because DTP and Hib vaccines are not recommended to be given at birth.

Combination vaccines can be given whenever all of the antigens in the vaccine are indicated.

Introducing hepatitis B vaccine into national immunization services

[WHO/V&B/01.28](#)

page 2

HepB vaccine schedules are very flexible; thus, there are multiple options for adding the vaccine to existing national immunization schedules without requiring additional visits for immunization. (See Appendix 20_5.)

Programmatically, it is usually easiest if the 3 doses of HepB vaccine are given at the same time as the 3 doses of DTP (Option I). This schedule will prevent infections acquired during early childhood, which account for most of the HBV-related disease burden in high endemic countries, and also will prevent infections acquired later in life. However, this schedule will not prevent perinatal HBV infections because it does not include a dose of HepB vaccine at birth. Two schedule options can be used to prevent perinatal HBV infections: a 3-dose schedule of monovalent HepB vaccine, with the 1st dose given at birth and the 2nd and 3rd doses given at the same time as the 1st and 3rd doses of DTP vaccine (Option II); or a 4-dose schedule in which a birth dose of monovalent HepB vaccine is followed by 3 doses of a combination vaccine, e.g. DTP HepB (Option III).

The 3-dose schedule (Option II) is less expensive, but may be more complicated to administer, because infants receive different vaccines at the 2nd immunization visit than at the 1st and 3rd visits. The 4-dose schedule (Option III) may be easier to administer programmatically, but is more costly, and vaccine supply issues may make it unfeasible.

Introducing hepatitis B vaccine into national immunization services

[WHO/V&B/01.28](#)

page 2

HepB vaccine is given by intramuscular injection in the anterolateral aspect of the thigh (infants) or deltoid muscle (older children).
If HepB vaccine is given on the same day as another injectable vaccine, it is preferable to give the two vaccines in different limbs.

Introducing hepatitis B vaccine into national immunization services

[WHO/V&B/01.28](#)

page 2

HepB vaccine can safely be given at the same time as other vaccines (e.g. DTP, Hib, measles, OPV, BCG, and yellow fever).

Introducing hepatitis B vaccine into national immunization services

[WHO/V&B/01.28](#)

page 3

For administering HepB vaccine:

- _ 0.5 ml auto-disable (AD) syringes are recommended.
- _ In immunization services where sterilizable syringes are still used, a 0.5ml sterilized syringe should be used.
- _ If neither AD or sterilizable syringes are available, standard disposable syringes (1.0ml or 2.0ml) must be used ONCE ONLY, and safely disposed of after use.

Introducing hepatitis B vaccine into national immunization services

[WHO/V&B/01.28](#)

page 3

The storage temperature for HepB vaccine is the same as for DTP vaccine, from 2C to 8C. HepB vaccine should never be frozen.

Introducing hepatitis B vaccine into national immunization services

[WHO/V&B/01.28](#)

page 3

Since hepatitis B vaccines are more expensive than the traditional EPI vaccines, it is important to monitor HepB vaccine wastage and to develop and implement strategies to reduce wastage.

Strategies to reduce wastage include:

- _ careful planning of vaccine ordering and distribution;
- _ implementation of WHO's multidose vial policy;
- _ appropriate use of single-dose and multi-dose vials;
- _ careful maintenance of the cold chain;
- _ attention to vaccine security; and
- _ reducing missed opportunities for immunization.

Introducing hepatitis B vaccine into national immunization services

[WHO/V&B/01.28](#)

page 3

HepB vaccine procured through The Vaccine Fund will be supplied with AD syringes and safety boxes. Managers at each level are responsible for ensuring that adequate supplies are available at all times so that each injection is given with a sterile injection device. Attention should also be given to proper use and disposal of safety boxes to collect these materials.

Introducing hepatitis B vaccine into national immunization services

[WHO/V&B/01.28](#)

page 3

Important elements of integrating HepB vaccine into national immunization programmes are:

_ Revising training and informational materials, immunization cards and forms used to monitor and evaluate immunization services.

_ Training for health care staff is essential because these staff are responsible for handling and administering HepB vaccine and they are a major source of information for parents and others in the general public.

_ Advocacy and communication efforts are important in order to generate support and commitment for the new vaccine. The primary target audiences are decision-makers/opinion leaders, health care staff, and the general public including parents.

Introducing hepatitis B vaccine into national immunization services

[WHO/V&B/01.28](#)

page 4

Adequate seroprevalence data needed to assess HepB disease burden are generally available in all countries, or from adjacent countries with similar HBV endemicity. Thus, additional seroprevalence studies are usually not needed.

Introducing hepatitis B vaccine into national immunization services

[WHO/V&B/01.28](#)

page 4

In phasing HepB vaccine into the existing infant immunization services, a strategy in which HepB vaccine is given to infants who have not yet completed the DTP vaccine series at the time HepB vaccine is introduced is generally the most feasible to implement.

Introducing hepatitis B vaccine into national immunization services

[WHO/V&B/01.28](#)

page 4

Issues to consider in choosing a monovalent or combination HepB vaccine for national immunization schedules include:

flexibility in adding the vaccine to the national immunization schedule; impact on cold chain capacity; the number of injections per visit; vaccine security; impact on local vaccine production; and cost.

Use of combination vaccines (e.g. DTP-HepB vaccine) may offer certain programmatic advantages. These include: a decreased number of injections required per visit (and thus decrease the number of needles and syringes required); and a decrease in the amount of space required for cold chain storage and transport.

Thermostability of vaccines

[WHO/GPV/98.07](#)

page 12

If it is suspected that adsorbed DTP, DT, TT or hepatitis B vaccines have been frozen they should be examined for physical changes. Where these are found the vaccines should be discarded.

Thermostability of vaccines

[WHO/GPV/98.07](#)

page 14

HB vaccine should always be protected from being frozen, especially at the end of the cold chain when it is transported in cold boxes and may come into close contact with cold packs. HB vaccine thought to have been frozen should not be used.

Thermostability of vaccines

[WHO/GPV/98.07](#)

page 16

Although HB vaccine is extremely heat stable, there are not yet enough data to recommend using it entirely outside the cold chain. There is, however, scope for developing a management instruction that would allow removal of the vaccine from the cold chain in emergencies, or in outreach activities of short duration, provided that a high temperature indicator was attached to each vial.

Getting started with vaccine vial monitors

[WHO/V&B/02.35](#)

page 9

A policy permitting the use of vaccine outside the cold chain can be implemented either generally for all routine immunization activities or on a limited basis in certain areas or under special circumstances, such as:

- national immunization days;
- hard-to-reach geographical areas;
- immunizations provided in the home;
- cool seasons;
- storage and transportation of freeze-sensitive vaccines (DTP, TT, DT, Td, hepatitis B and Hib vaccines) where the risk of freezing is greater than the risk of heat exposure.

Immunization in practice: a practical resource guide for Health workers 2004 update_____Module 1: Target diseases

[WHO/IVB/04.06](#)

page 25

It is recommended that all infants receive three doses of hepatitis B vaccine during the first year of life. More recently, some countries have been using a combination vaccine that includes vaccines for diphtheria, tetanus, pertussis, hepatitis B (hepB), and sometimes Haemophilus influenzae type b (Hib). Programmatically, it is usually easiest if the three doses of hepatitis B vaccine are given at the same time as the three doses of DTP. In countries where hepatitis B is highly endemic, where feasible, a birth dose of hepB is included in the schedule to prevent perinatal hepatitis B infection. Some countries also recommend immunizing adolescents, health workers and other risk groups.

Immunization in practice: a practical resource guide for Health workers 2004 update_____Module 2: The vaccines

[WHO/IVB/04.06](#)

page 16

Only monovalent HepB vaccine should be used as a birth dose, the dose given within the first week of life. Combination vaccines should not be used at birth, but may be used in subsequent doses.

Do not use DTP-HepB+Hib as a birth dose. You may use the vaccine for subsequent doses.

Immunization in practice: a practical resource guide for Health workers 2004 update_____Module 2: The vaccines

[WHO/IVB/04.06](#)

page 16

Administration summary: HepB vaccine and Administration summary: DTP-HepB combination vaccine (see Appendix 2_12.)

Immunization in practice: a practical resource guide for Health workers 2004 update_____Module 2: The vaccines

[WHO/IVB/04.06](#)
page 24

Typical immunization schedule for children (see Appendix 2_19.)

WHO-UNICEF effective vaccine store management initiative: Modules 1 - 4

[WHO/IVB/04.16-20](#)
page 1

WHO recommended vaccine storage conditions (Appendix 17_3).

Immunization in practice: a practical resource guide for Health workers 2004 update_____Module 6: Holding an immunization session

[WHO/IVB/04.06](#)
page 4

Check the freeze indicator in the refrigerator. If it warns of freezing or you suspect that a freeze-sensitive vaccine (DTP, DT, TT, Td, HepB, DTP-HepB, liquid Hib and DTP-HepB+Hib vaccines) has been frozen, you should perform the shake test.

Immunization in practice: a practical resource guide for Health workers 2004 update_____Module 6: Holding an immunization session

[WHO/IVB/04.06](#)
page 19

See Appendix 6_19 for chart entitled, "Administering vaccines to infants" BCG, DTP, DTP-HepB, HepB, measles, yellow fever, OPV"

Hepatitis B vaccines (WHO position paper)

[WER 2004, vol. 79, 28, pp 255-263](#)
page 255

Routine vaccination of all infants against HBV infection should become an integral part of national immunization schedules worldwide. High coverage with the primary vaccine series among infants has the greatest overall impact on the prevalence of chronic HBV infection in children and should be the highest HBV-related priority.

Hepatitis B vaccines (WHO position paper)

[WER 2004, vol. 79, 28, pp 255-263](#)
page 255

(I)n countries where a high proportion of HBV infections are acquired perinatally, the first dose of hepatitis B vaccine should be given as soon as possible (<24 hours) after birth.

In countries where a lower proportion of HBV infections are acquired perinatally, the relative contribution of perinatal HBV infection to the overall disease burden, and the feasibility and cost-effectiveness of providing vaccination at birth, should be carefully considered before a decision is made on the optimal vaccination schedule.

Hepatitis B vaccines (WHO position paper)

[WER 2004, vol. 79, 28, pp 255-263](#)
page 255

(Hepatitis B vaccine catch-up) strategies targeted at older age groups or groups with risk factors for acquiring HBV infection should be considered as a supplement to routine infant vaccination in countries of intermediate or low hepatitis B endemicity. In such settings, a substantial proportion of the disease burden may be attributable to infections acquired by older children, adolescents and adults.

In countries of high endemicity, large-scale routine vaccination of infants rapidly reduces the transmission of HBV. In these circumstances, catch-up vaccination of older children and adults has relatively little impact on chronic disease because most of them have already been infected.

Hepatitis B vaccines (WHO position paper)

[WER 2004, vol. 79, 28, pp 255-263](#)
page 257

In highly endemic areas, HBV is most commonly spread from mother to child at birth, or from person to person in early childhood. In countries with low HBV endemicity, sexual transmission and the use of contaminated needles, especially among injecting drug users, are the major routes of infection. However, perinatal transmission may account for 15% of HBV-related deaths, even in low-endemic areas.

Hepatitis B vaccines (WHO position paper)

[WER 2004, vol. 79, 28, pp 255-263](#)
page 258

Two types of hepatitis B vaccines are available: plasmaderived vaccines and recombinant vaccines. The two vaccines show no differences in terms of reactogenicity, efficacy or duration of protection. Their thermostability is also similar: both should be shipped and stored at 2-8 C; freezing must be avoided as it dissociates antigen from the alum adjuvant.

Hepatitis B vaccines (WHO position paper)

[WER 2004, vol. 79, 28, pp 255-263](#)
page 258

When immunizing against HBV at birth, only monovalent hepatitis B vaccine should be used: the other antigens found in combination vaccines are currently not approved for use at birth (DTwP, DTaP, Hib, hepatitis A and IPV.)

Hepatitis B vaccines (WHO position paper)

[WER 2004, vol. 79, 28, pp 255-263](#)
page 259

The minimum recommended interval between (hepatitis B vaccine) doses is four weeks. Longer dose intervals may increase the final anti-HBs titres but not the seroconversion rates.

More than 3 doses of the vaccine are not required, regardless of duration (> 4 weeks) of the interval between them.

Hepatitis B vaccines (WHO position paper)

Recommended schedules for (hepatitis B) vaccination can be divided into those that include a birth-dose and those that do not. Schedules with a birth-dose call for the first vaccination at birth, followed by a second and third dose at the time of the first and third diphtheria/tetanus/pertussis (DTP) vaccination, respectively (see Appendix 55_9, column II.) Alternatively, a four-dose schedule may be used where the dose at birth is followed by three additional doses; these doses may be given either as monovalent vaccine or as a combination (e.g. with DTP and/or Hib) following the schedules commonly used for those vaccines (see Appendix 55_9, column III.) These schedules will prevent most perinatally acquired infection.

[WER 2004, vol. 79, 28, pp 255-263](#)
page 259

Hepatitis B vaccines (WHO position paper)

Some countries have chosen not to implement universal (hepatitis B) immunization and instead use comprehensive HBsAg screening of pregnant women with immunization of newborn infants born to HBsAg-positive women. This strategy is usually not feasible in developing countries with high prevalence of disease and may not be the most reliable and convenient option even in countries where HBsAg screening in pregnancy is well established.

[WER 2004, vol. 79, 28, pp 255-263](#)
page 259

Hepatitis B vaccines (WHO position paper)

When administered without the birth-dose, hepatitis B vaccine is usually given at the same time as DTP, either as a monovalent presentation or in combination with DTP and/or Hib vaccine (see Appendix 55_9, column I) .

[WER 2004, vol. 79, 28, pp 255-263](#)
page 259

Hepatitis B vaccines (WHO position paper)

Countries that opt for schedules with a birth-dose (of hepatitis B vaccine) should vaccinate preterm infants at birth and subsequently enter the respective national hepatitis B vaccination schedule. However, if the birth weight is <2000 g, the vaccine dose at birth should not be counted towards the primary series, and three additional doses should be given.

[WER 2004, vol. 79, 28, pp 255-263](#)
page 260

Hepatitis B vaccines (WHO position paper)

Immunocompromised children and adults can also benefit from vaccination (with hepatitis B vaccine.) However, the immune response may be reduced and additional injections of the vaccine may be required. Where possible, the anti-HBs antibody titres should be followed up after immunization of immunocompromised individuals.

[WER 2004, vol. 79, 28, pp 255-263](#)
page 260

Hepatitis B vaccines (WHO position paper)

[WER 2004, vol. 79, 28, pp 255-263](#)
page 260

The recommended dose (of hepatitis B vaccine) varies by product and with the age of the recipient. In most cases, infants and adolescents receive 50% of the adult dose.

The vaccine is administered by intramuscular injection in the anterolateral aspect of the thigh (infants and children aged <2 years) or in the deltoid muscle (older children and adults). Administration in the buttock is not recommended because this route of administration has been associated with decreased protective antibody levels as well as injury to the sciatic nerve. Intradermal administration is not recommended because the immune response is less reliable, particularly in children.

The hepatitis B vaccine does not interfere with the immune response to any other vaccine, and vice versa. Specifically, the birth-dose of hepatitis B can be given safely together with bacillus Calmette-Gurin (BCG) vaccine; BCG does not interfere negatively with the response to hepatitis B vaccine. However, unless formulated as fixed combinations, hepatitis B vaccine and other vaccines administered during the same visit should be given at different injection sites.

Hepatitis B vaccines (WHO position paper)

[WER 2004, vol. 79, 28, pp 255-263](#)
page 260

Testing to determine antibody responses is not necessary after routine vaccination (with hepatitis B vaccine.) However, when feasible, knowledge of response to vaccination is important in the following groups:

(i) persons at risk of occupationally acquired infection; (ii) infants born to HBsAg-positive mothers; (iii) immunocompromised persons; and (iv) sexual partners of HBsAg-positive persons.

Testing for anti-HBs should be performed by a method that allows determination of whether the anti-HBs concentration is protective (>10 mIU per ml). Adults should be tested 1-2 months after completion of the vaccination series. In settings where resources are available, infants born to HBsAg-positive mothers should be tested at 8-15 months of age, after completion of the vaccination series. Persons found to be antibody-negative after the primary series should be referred for appropriate follow-up.

Hepatitis B vaccines (WHO position paper)

[WER 2004, vol. 79, 28, pp 255-263](#)
page 261

(Following hepatitis B vaccination,) reports of severe anaphylactic reactions are very rare.

Available data do not indicate a causal association between hepatitis B vaccine and Guillain-Barr syndrome, or demyelinating disorders including multiple sclerosis, nor is there any epidemiological data to support a causal association between hepatitis B vaccination and chronic fatigue syndrome, arthritis, autoimmune disorders, asthma, sudden infant death syndrome, or diabetes.

Hepatitis B vaccines (WHO position paper)

All children and adolescents aged less than 18 years and not previously vaccinated should receive the (hepatitis B) vaccine. Hepatitis B vaccination is also indicated for certain groups at high risk of contracting HBV infection, including persons with high-risk sexual behaviour, partners and household contacts of HBsAg-positive persons, injecting drug users, persons who frequently require blood or blood products, recipients of solid organ transplantation, those at occupational risk of HBV infection, including health care workers, as well as for international travellers to HBV-endemic countries.

[WER 2004, vol. 79, 28, pp 255-263](#)
page 261

Hepatitis B vaccines (WHO position paper)

Hepatitis B vaccine is contraindicated for individuals with a history of allergic reactions to any of the vaccines components.

Neither pregnancy nor lactation is a contraindication for use of this vaccine.

[WER 2004, vol. 79, 28, pp 255-263](#)
page 261

Hepatitis B vaccines (WHO position paper)

Temporary immunity may be obtained using hepatitis B immune globulin (HBIG) for post-exposure prophylaxis. HBIG prophylaxis may be indicated (i) for newborn infants whose mothers are HBsAg-positive, (ii) following percutaneous or mucous membrane exposure to HBsAg-positive blood or body fluids, (iii) following sexual exposure to an HBsAg-positive person, and (iv) to protect patients from recurrent HBV infection following liver transplantation. As a rule, HBIG should be used as an adjunct to hepatitis B vaccine. However, in full-term newborns, the protection against perinatally acquired infection achieved by immediate (<24 hours) hepatitis B vaccination is not significantly improved by the addition of HBIG.

[WER 2004, vol. 79, 28, pp 255-263](#)
page 261

Hepatitis B vaccines (WHO position paper)

In countries of high disease endemicity (HBsAg prevalence >8%), HBV is mainly spread from mother to infant at birth or from child to child during early childhood (<5 years). In this epidemiological setting, schedules providing the first vaccine dose at birth are recommended.

[WER 2004, vol. 79, 28, pp 255-263](#)
page 262

Hepatitis B vaccines (WHO position paper)

Routine infant hepatitis B vaccination should also be given high priority in countries of intermediate or low HBV endemicity (HBsAg prevalence of >2- <8% or <2%, respectively) because, even in these settings, an important proportion of chronic infections are acquired through HBV transmission during early childhood.

[WER 2004, vol. 79, 28, pp 255-263](#)
page 262

Hepatitis B vaccines (WHO position paper)

Although HBsAg screening of all pregnant women and vaccination at birth only of infants born to HBsAg-positive mothers may be an option in areas with low HBV transmission, this strategy may be only partially effective, since women at highest risk of infection often fail to attend prenatal clinics.

[WER 2004, vol. 79, 28, pp 255-263](#)
page 262

Hepatitis B vaccines (WHO position paper)

Generally, it is easier to deliver hepatitis B vaccine at birth to infants who are born in health facilities. However, availability of monovalent hepatitis B vaccine in pre-filled singledose injection devices facilitates the administration of the vaccine by health care workers and birth attendants to infants born at home.

[WER 2004, vol. 79, 28, pp 255-263](#)
page 263

Hepatitis B vaccines (WHO position paper)

Catch-up vaccination (with hepatitis B vaccine of older age groups, including adolescents and adults) should be considered only if the continuity of the infant vaccination programme can be ensured.

[WER 2004, vol. 79, 28, pp 255-263](#)
page 263

WHO recommended standards for surveillance of selected vaccine-preventable diseases

Hepatitis B is targeted by WHO for reduced incidence/prevalence.

[WHO/V&B/03.01](#)
page 1

WHO recommended standards for surveillance of selected vaccine-preventable diseases

Recommended types of surveillance for acute viral hepatitis:
_ Routine monthly reporting of aggregated data on suspected cases, and, if available, the number of confirmed cases of each type of hepatitis should be reported from the peripheral level to the intermediate and central levels.
_ Designated reporting sites at all levels should report at a specified frequency (e.g. weekly or monthly) even if there are zero cases (often referred to as zero reporting).

[WHO/V&B/03.01](#)
page 2

WHO recommended standards for surveillance of selected vaccine-preventable diseases

Serological testing for documenting (hepatitis B) seroconversion in children is usually unnecessary.

[WHO/V&B/03.01](#)
page 3

Immunization in practice: a practical resource guide for Health workers 2004 update _____ Module 3: The cold chain

The freeze indicator is used to warn of freezing and is packed with vaccines that are sensitive to freezing temperatures: DTP, TT, DT, Td (freezing point of -6.5C), hepatitis B (-0.5C), liquid Hib and their combinations (DTP-HepB, and DTP-HepB+Hib vaccines) and JE.
Every refrigerator storing vaccines should have a freeze indicator (Freeze Watch). It is strongly recommended that one freeze indicator be placed in each cold box during vaccine transport and distribution. This is critical in places subject to low temperatures.

[WHO/IVB/04.06](#)
page 13

Immunization in practice: a practical resource guide for Health workers 2004 update_____Module 3: The cold chain

[WHO/IVB/04.06](#)
page 26

The shake test can help give an idea whether adsorbed vaccines (DTP, DT, Td, TT or hepatitis B) have been subjected to freezing temperatures likely to have damaged them. The test should be conducted for all boxes where freeze indicators are found to be activated or temperature recordings show negative temperatures.

Identify and separate all vaccines that may have been frozen and ensure that none are distributed or used.

Introducing hepatitis B vaccine into national immunization services

[WHO/V&B/01.28](#)
page 3

Adding HepB vaccine to the national immunization schedule will require cold chain assessments at all administrative levels:

_ to assure adequate storage capacity is available, and

_ to assure policies and procedures are in place to prevent freezing of HepB vaccine.

Vaccine introduction guidelines. Adding a vaccine to a national immunization programme: decision and implementation

[WHO/IVB/05.18](#)
page 32

WHO recommends the following schedule for infants (Appendix 39_5).

Vaccine introduction guidelines. Adding a vaccine to a national immunization programme: decision and implementation

[WHO/IVB/05.18](#)
page 45

WHO recommends (hepatitis B vaccine) introduction in all countries.

Introduction of hepatitis B vaccine into childhood immunization services. Management guidelines, including information for health workers and parents

[WHO/V&B/01.31](#)
page 6

In order to prevent perinatal HBV transmission the first dose of hepatitis B vaccine should be given as soon as possible after birth, preferably within 24 hours.

Introduction of hepatitis B vaccine into childhood immunization services. Management guidelines, including information for health workers and parents

[WHO/V&B/01.31](#)

page 7

In all countries: Achieving a high level of completion of the hepatitis B vaccine series among all infants should be the highest priority. This has the greatest overall impact on the prevalence of chronic HBV infection in children, regardless of whether it is feasible to administer a birth dose.

In countries where a high proportion of chronic HBV infections is acquired perinatally (e.g. in south-east Asia): A birth dose should be given to infants who are delivered in hospitals when hepatitis B vaccine is introduced. Efforts should also be made in these countries to give hepatitis B vaccine as soon as possible after birth to infants delivered at home.

In countries where a lower proportion of chronic HBV infections is acquired perinatally (e.g. in Africa): The administration of a birth dose may be considered after evaluating:

- the relative contribution of perinatal HBV infections to the overall disease burden;
- the feasibility and cost-effectiveness of providing a birth dose.

Introduction of hepatitis B vaccine into childhood immunization services. Management guidelines, including information for health workers and parents

[WHO/V&B/01.31](#)

page 9

Monovalent hepatitis B vaccine **MUST BE USED** for the birth dose.

Combination vaccines that include hepatitis B vaccine **MUST NOT BE USED** to give the birth dose of hepatitis B vaccine because DTP and Hib vaccines should not be administered at birth.

Either monovalent hepatitis B vaccine or combination vaccines may be used for later doses in the hepatitis B vaccine schedule. Combination vaccines can be given whenever all the antigens in the vaccines are indicated.

Introduction of hepatitis B vaccine into childhood immunization services. Management guidelines, including information for health workers and parents

[WHO/V&B/01.31](#)

page 10

If hepatitis B vaccine is administered on the same day as another injectable vaccine, it is preferable to give the two vaccines in different limbs. If more than one injection has to be given in the same limb, the thigh is the preferred site of injection because of the greater muscle mass, and the injection sites should be 2.5 cm to 5 cm apart so that any local reactions are unlikely to overlap.

Introduction of hepatitis B vaccine into childhood immunization services. Management guidelines, including information for health workers and parents

[WHO/V&B/01.31](#)

page 11

Hepatitis B vaccine SHOULD NOT be given in the buttock as this route of administration has been associated with decreased protective antibody levels, probably because of inadvertent subcutaneous injection or injection into deep fat tissue. In addition there may be a risk of injury to the sciatic nerve.

Hepatitis B vaccine SHOULD NOT be administered intradermally because this route of administration does not produce an adequate antibody response in children.

Hepatitis B vaccine SHOULD NOT be mixed in the same syringe with other vaccines unless specifically recommended by the manufacturer. (Note: pentavalent DTP-HepB+Hib vaccine is supplied in two separate vials, one containing DTP-HepB vaccine (liquid), the other containing Hib vaccine (lyophilized). The manufacturer recommends mixing the contents of the two vials and giving DTP-HepB+Hib vaccine in the same syringe.)

Introduction of hepatitis B vaccine into childhood immunization services. Management guidelines, including information for health workers and parents

[WHO/V&B/01.31](#)

page 12

All infants aged under 1 year should receive a full series of hepatitis B vaccine. The need for catch-up immunization of older age groups and for targeted risk groups varies between countries.

Introduction of hepatitis B vaccine into childhood immunization services. Management guidelines, including information for health workers and parents

[WHO/V&B/01.31](#)

page 12

A child with a history of a severe allergic reaction (e.g. generalized urticaria, difficulty in breathing, swelling of the mouth and throat, hypertension, shock) to a previous dose of hepatitis B vaccine should not receive another dose.

The following are NOT contraindications:

- minor illness, such as respiratory tract infection or diarrhoea with temperature below 38.5C;
- allergy or asthma;
- family history of convulsions;
- treatment with antibiotics;
- infection with HIV;
- breastfeeding;
- history of seizures (convulsions, fits);
- chronic illnesses such as chronic diseases of the heart, lung, kidney or liver;
- stable neurological conditions such as cerebral palsy and Down syndrome;
- prematurity or low birth weight;
- history of jaundice at birth.

Introduction of hepatitis B vaccine into childhood immunization services. Management guidelines, including information for health workers and parents

[WHO/V&B/01.31](#)
page 13

Programmatically, it is usually easiest if the three doses of hepatitis B vaccine are given at the same time as the three doses of DTP (See Appendix 36_9 for options for adding hepatitis B vaccine to childhood immunization schedules.)

Introduction of hepatitis B vaccine into childhood immunization services. Management guidelines, including information for health workers and parents

[WHO/V&B/01.31](#)
page 22

According to the WHO multidose vial policy (WHO/V&B/00.09), opened multidose vials of hepatitis B vaccine may be reused in subsequent immunization sessions for up to four weeks in fixed health facilities if all the following conditions are met.

The expiry date has not passed.

The vial has been stored under appropriate cold chain conditions (i.e. refrigerated between 2 C and 8 C).

The vaccine vial septum (where the needle is put in to withdraw doses) has not been submerged in water (to prevent this from happening, well-sealed ice packs should be used in vaccine carriers and water should not be allowed to accumulate where the vials are stored).

An aseptic technique has been used to withdraw all doses.

The vaccine vial monitor (VVM), if attached, has not reached the discard point.

Introduction of hepatitis B vaccine into childhood immunization services. Management guidelines, including information for health workers and parents

[WHO/V&B/01.31](#)
page 23

(O)utreach sessions, opened multidose vials of hepatitis B vaccine may be reused in subsequent immunization sessions for up to four weeks if:

all the conditions for reuse of multidose vials in fixed health facilities are met;

a VVM is attached to the vial.

Introduction of hepatitis B vaccine into childhood immunization services. Management guidelines, including information for health workers and parents

[WHO/V&B/01.31](#)
page 25

If a three-dose hepatitis B vaccine schedule is used (Appendix 36_9, Options I and II), HepB3 completion should be defined as completion of the third hepatitis B vaccine dose.

If a four-dose hepatitis B vaccine schedule is used, with a birth dose of monovalent vaccine and three doses of a combination vaccine (Appendix 36_9, Option III), HepB3 completion should be defined as completion of the third dose of the combination vaccine.

Introduction of hepatitis B vaccine into childhood immunization services. Management guidelines, including information for health workers and parents

[WHO/V&B/01.31](#)
page 26

All serious adverse events (suspected by health workers or the public to be associated with hepatitis B immunization) should be reported to the district health authorities and then to national immunization staff in the health ministry of the country in question.

Hepatitis B vaccines (WHO position paper)

[WER 2004, vol. 79, 28, pp 255-263](#)
page 258

Two types of hepatitis B vaccines are available: plasmaderived vaccines and recombinant vaccines. The two vaccines show no differences in terms of reactogenicity, efficacy or duration of protection. The two types of hepatitis B vaccine can be used interchangeably

The use of opened multi-dose vials of vaccine in subsequent immunization sessions (WHO Policy Statement)

[WHO/V&B/00.09](#)
page 0

See "Multi-Dose Open Vial" section of the "General" chapter in this catalogue for policies relevant for DTP, DT, TT, DTP-hepB, DTP-hepB-Hib, hepatitis B, liquid formulations of Hib and OPV.

Temperature sensitivity of vaccines

[WHO/IVB/06.10](#)
page 2

The recommended conditions for storing vaccines used in immunization programmes are shown in Appendix 81_1. This diagram also indicates the maximum times and temperatures in each case. At the higher levels of the cold chain, i.e., at national (primary), and regional or province level, OPV must be kept frozen between -15oC and -25oC. Freeze-dried vaccines (i.e., BCG, measles, MMR and yellow fever) may also be kept frozen at -15oC to -25oC if cold chain space permits, but this is neither essential nor recommended. At other levels of the cold chain (intermediate vaccine stores and health facilities), these vaccines should be stored between +2oC and +8oC. All other vaccines should be stored at between +2oC and +8oC at all levels of the cold chain. Liquid formulations of vaccines containing diphtheria, pertussis, tetanus, hepatitis B, Haemophilus influenzae type b, IPV and their combinations should not be frozen.

Temperature sensitivity of vaccines

[WHO/IVB/06.10](#)
page 6

WHO recommends that a policy permitting the use of vaccine outside the cold chain can be implemented either generally for all routine immunization activities or on a limited basis in certain areas or under special circumstances, such as:

- national immunization days;
- hard-to-reach geographical areas;
- immunizations provided in the home;
- cool seasons;

storage and transportation of freeze-sensitive vaccines (DTP, TT, DT, Td, hepatitis B and Hib vaccines) where the risk of freezing is greater than the risk of heat exposure.

Temperature sensitivity of vaccines

[WHO/IVB/06.10](#)

page 16

The freezing temperature of HepB vaccine is -0.5 C and freezing destroys potency, a result of destruction of the aluminum lattice. HepB vaccine should be protected from being frozen; vaccine thought to have been frozen should not be used

Vaccine introduction guidelines. Adding a vaccine to a national immunization programme: decision and implementation

[WHO/IVB/05.18](#)

page 45

HepB vaccine is sensitive to low temperatures and can be damaged by freezing. On the other hand, it is quite heat stable and use with a vaccine vial monitor (VVM) allows greater flexibility in transportation and storage.

Immunization in practice: a practical resource guide for Health workers 2004 update_____Module 2: The vaccines

[WHO/IVB/04.06](#)

page 25

Wait at least four weeks between doses of OPV, DTP, Hib, and HepB vaccines.

Vaccine introduction guidelines. Adding a vaccine to a national immunization programme: decision and implementation

[WHO/IVB/05.18](#)

page 45

(Considerations for hepatitis B vaccine schedule:)

A determination of the role of perinatal transmission (useful for birth dose considerations) can be made based on the overall seroprevalance of HBsAg, age-specific prevalence of HBsAg, and the prevalence of the HBeAg in pregnant women.

Combination products may not be used at birth; therefore, programmes including the birth dose will need to include monovalent HepB vaccine in the supply.

WHO recommended standards for surveillance of selected vaccine-preventable diseases

[WHO/V&B/03.01](#)

page 2

(A)cute viral hepatitis:

_ All outbreaks should be investigated immediately and confirmed serologically.

Immunization in practice: a practical resource guide for Health workers 2004 update_____Module 2: The vaccines

[WHO/IVB/04.06](#)

page 16

HepB and DTP-HepB vaccines

_ HepB vaccine should never be frozen.

_ If the vaccine fails the shake test you must discard it.

Immunization in practice: a practical resource guide for Health workers 2004 update_____Module 2: The vaccines

[WHO/IVB/04.06](#)

page 16

Options for adding hepatitis B vaccine to childhood immunization schedules (Appendix 2_35.)

Introducing hepatitis B vaccine into national immunization services

[WHO/V&B/01.28](#)

page 3

For administering HepB vaccine:

_ A 25 mm, 22 or 23 gauge needle is recommended.

_ The standard paediatric dose is 0.5 ml.

Polio

Immunization in practice: a practical resource guide for Health workers 2004 update_____Module 2: The vaccines

[WHO/IVB/04.06](#)

page 24

Typical immunization schedule for children (see Appendix 2_19.)

WHO-UNICEF effective vaccine store management initiative: Modules 1 - 4

[WHO/IVB/04.16-20](#)

page 1

WHO recommended vaccine storage conditions (Appendix 17_3).

Immunization in practice: a practical resource guide for Health workers 2004 update_____Module 6: Holding an immunization session

[WHO/IVB/04.06](#)

page 19

See Appendix 6_19 for chart entitled, "Administering vaccines to infants" BCG, DTP, DTP-HepB, HepB, measles, yellow fever, OPV"

Vaccine introduction guidelines. Adding a vaccine to a national immunization programme: decision and implementation

[WHO/IVB/05.18](#)

page 32

WHO recommends the following schedule for infants (Appendix 39_5).

The use of opened multi-dose vials of vaccine in subsequent immunization sessions (WHO Policy Statement)

[WHO/V&B/00.09](#)

page 0

See "Multi-Dose Open Vial" section of the "General" chapter in this catalogue for policies relevant for DTP, DT, TT, DTP-hepB, DTP-hepB-Hib, hepatitis B, liquid formulations of Hib and OPV.

Temperature sensitivity of vaccines

[WHO/IVB/06.10](#)

page 2

The recommended conditions for storing vaccines used in immunization programmes are shown in Appendix 81_1. This diagram also indicates the maximum times and temperatures in each case. At the higher levels of the cold chain, i.e., at national (primary), and regional or province level, OPV must be kept frozen between -15oC and -25oC. Freeze-dried vaccines (i.e., BCG, measles, MMR and yellow fever) may also be kept frozen at -15oC to -25oC if cold chain space permits, but this is neither essential nor recommended. At other levels of the cold chain (intermediate vaccine stores and health facilities), these vaccines should be stored between +2oC and +8oC. All other vaccines should be stored at between +2oC and +8oC at all levels of the cold chain. Liquid formulations of vaccines containing diphtheria, pertussis, tetanus, hepatitis B, Haemophilus influenzae type b, IPV and their combinations should not be frozen.

Immunization in practice: a practical resource guide for Health workers 2004 update_____Module 2: The vaccines

[WHO/IVB/04.06](#)
page 25

Wait at least four weeks between doses of OPV, DTP, Hib, and HepB vaccines.

Pregnant Women

Hepatitis B vaccines (WHO position paper)

[WER 2004, vol. 79, 28, pp 255-263](#)
page 261

Hepatitis B vaccine is contraindicated for individuals with a history of allergic reactions to any of the vaccines components.

Neither pregnancy nor lactation is a contraindication for use of this vaccine.

Program Management

Introducing hepatitis B vaccine into national immunization services

[WHO/V&B/01.28](#)
page 3

Since hepatitis B vaccines are more expensive than the traditional EPI vaccines, it is important to monitor HepB vaccine wastage and to develop and implement strategies to reduce wastage.

Strategies to reduce wastage include:

- _ careful planning of vaccine ordering and distribution;
- _ implementation of WHO's multidose vial policy;
- _ appropriate use of single-dose and multi-dose vials;
- _ careful maintenance of the cold chain;
- _ attention to vaccine security; and
- _ reducing missed opportunities for immunization.

Introducing hepatitis B vaccine into national immunization services

[WHO/V&B/01.28](#)
page 3

HepB vaccine procured through The Vaccine Fund will be supplied with AD syringes and safety boxes. Managers at each level are responsible for ensuring that adequate supplies are available at all times so that each injection is given with a sterile injection device. Attention should also be given to proper use and disposal of safety boxes to collect these materials.

Introducing hepatitis B vaccine into national immunization services

[WHO/V&B/01.28](#)
page 4

Issues to consider in choosing a monovalent or combination HepB vaccine for national immunization schedules include:

flexibility in adding the vaccine to the national immunization schedule; impact on cold chain capacity; the number of injections per visit; vaccine security; impact on local vaccine production; and cost.

Use of combination vaccines (e.g. DTP-HepB vaccine) may offer certain programmatic advantages. These include: a decreased number of injections required per visit (and thus decrease the number of needles and syringes required); and a decrease in the amount of space required for cold chain storage and transport.

WHO recommended standards for surveillance of selected vaccine-preventable diseases

[WHO/V&B/03.01](#)
page 1

Hepatitis B is targeted by WHO for reduced incidence/prevalence.

Introducing hepatitis B vaccine into national immunization services

[WHO/V&B/01.28](#)
page 3

Adding HepB vaccine to the national immunization schedule will require cold chain assessments at all administrative levels:

- _ to assure adequate storage capacity is available, and
- _ to assure policies and procedures are in place to prevent freezing of HepB vaccine.

Rubella

Temperature sensitivity of vaccines

[WHO/IVB/06.10](#)
page 2

The recommended conditions for storing vaccines used in immunization programmes are shown in Appendix 81_1. This diagram also indicates the maximum times and temperatures in each case. At the higher levels of the cold chain, i.e., at national (primary), and regional or province level, OPV must be kept frozen between -15oC and -25oC. Freeze-dried vaccines (i.e., BCG, measles, MMR and yellow fever) may also be kept frozen at -15oC to -25oC if cold chain space permits, but this is neither essential nor recommended. At other levels of the cold chain (intermediate vaccine stores and health facilities), these vaccines should be stored between +2oC and +8oC. All other vaccines should be stored at between +2oC and +8oC at all levels of the cold chain. Liquid formulations of vaccines containing diphtheria, pertussis, tetanus, hepatitis B, Haemophilus influenzae type b, IPV and their combinations should not be frozen.

Schedule

Introducing hepatitis B vaccine into national immunization services

[WHO/V&B/01.28](#)
page 1

Prevention of perinatal HBV transmission should be considered depending on the epidemiology of HBV transmission in a particular country.

In order to prevent HBV transmission from mother to infant, the first dose of HepB vaccine needs to be given as soon as possible after birth (preferably within 24 hours). In countries where a high proportion of chronic infections is acquired perinatally (e.g. South-East Asia), a birth dose should be given to infants. It is usually most feasible to give HepB vaccine at birth when infants are born in hospitals. Efforts should also be made in these countries to give HepB vaccine as soon as possible after delivery to infants delivered at home. In countries where a lower proportion of chronic infections is acquired perinatally (e.g. Africa), the highest priority is to achieve high DTP3 and HepB3 vaccine coverage among infants. In these countries, use of a birth dose may also be considered after disease burden, cost-effectiveness, and feasibility are evaluated.

Introducing hepatitis B vaccine into national immunization services

[WHO/V&B/01.28](#)

page 2

Catch up vaccination of older persons should be considered depending on the epidemiology of HBV transmission in a particular country. (Note: The Vaccine Fund does not provide vaccine for catch-up immunization).

In countries with a high endemicity of chronic HBV infection (hepatitis B surface antigen [HBsAg] prevalence >8%), catch-up immunization is not usually recommended because most chronic infections are acquired among children <5 years of age, and thus, routine infant vaccination will rapidly reduce HBV transmission. In countries with lower endemicity of chronic HBV infection, a higher proportion of chronic infections may be acquired among older children, adolescents and adults; catch-up immunization for these groups may be considered.

Introducing hepatitis B vaccine into national immunization services

[WHO/V&B/01.28](#)

page 2

Monovalent HepB vaccines must be used to give the birth dose of HepB vaccine.

Combination vaccines that include HepB vaccine must not be used to give the birth dose of HepB vaccine because DTP and Hib vaccines are not recommended to be given at birth.

Combination vaccines can be given whenever all of the antigens in the vaccine are indicated.

Introducing hepatitis B vaccine into national immunization services

[WHO/V&B/01.28](#)

page 2

HepB vaccine schedules are very flexible; thus, there are multiple options for adding the vaccine to existing national immunization schedules without requiring additional visits for immunization. (See Appendix 20_5.)

Programmatically, it is usually easiest if the 3 doses of HepB vaccine are given at the same time as the 3 doses of DTP (Option I). This schedule will prevent infections acquired during early childhood, which account for most of the HBV-related disease burden in high endemic countries, and also will prevent infections acquired later in life. However, this schedule will not prevent perinatal HBV infections because it does not include a dose of HepB vaccine at birth. Two schedule options can be used to prevent perinatal HBV infections: a 3-dose schedule of monovalent HepB vaccine, with the 1st dose given at birth and the 2nd and 3rd doses given at the same time as the 1st and 3rd doses of DTP vaccine (Option II); or a 4-dose schedule in which a birth dose of monovalent HepB vaccine is followed by 3 doses of a combination vaccine, e.g. DTP HepB (Option III).

The 3-dose schedule (Option II) is less expensive, but may be more complicated to administer, because infants receive different vaccines at the 2nd immunization visit than at the 1st and 3rd visits. The 4-dose schedule (Option III) may be easier to administer programmatically, but is more costly, and vaccine supply issues may make it unfeasible.

Immunization in practice: a practical resource guide for Health workers 2004 update_____Module 1: Target diseases

[WHO/IVB/04.06](#)
page 25

It is recommended that all infants receive three doses of hepatitis B vaccine during the first year of life. More recently, some countries have been using a combination vaccine that includes vaccines for diphtheria, tetanus, pertussis, hepatitis B (hepB), and sometimes Haemophilus influenzae type b (Hib). Programmatically, it is usually easiest if the three doses of hepatitis B vaccine are given at the same time as the three doses of DTP. In countries where hepatitis B is highly endemic, where feasible, a birth dose of hepB is included in the schedule to prevent perinatal hepatitis B infection. Some countries also recommend immunizing adolescents, health workers and other risk groups.

Immunization in practice: a practical resource guide for Health workers 2004 update_____Module 2: The vaccines

[WHO/IVB/04.06](#)
page 16

Only monovalent HepB vaccine should be used as a birth dose, the dose given within the first week of life. Combination vaccines should not be used at birth, but may be used in subsequent doses.

Do not use DTP-HepB+Hib as a birth dose. You may use the vaccine for subsequent doses.

Immunization in practice: a practical resource guide for Health workers 2004 update_____Module 2: The vaccines

[WHO/IVB/04.06](#)
page 24

Typical immunization schedule for children (see Appendix 2_19.)

Hepatitis B vaccines (WHO position paper)

[WER 2004, vol. 79, 28, pp 255-263](#)
page 255

(I)n countries where a high proportion of HBV infections are acquired perinatally, the first dose of hepatitis B vaccine should be given as soon as possible (<24 hours) after birth.

In countries where a lower proportion of HBV infections are acquired perinatally, the relative contribution of perinatal HBV infection to the overall disease burden, and the feasibility and cost-effectiveness of providing vaccination at birth, should be carefully considered before a decision is made on the optimal vaccination schedule.

Hepatitis B vaccines (WHO position paper)

[WER 2004, vol. 79, 28, pp 255-263](#)
page 255

(Hepatitis B vaccine catch-up) strategies targeted at older age groups or groups with risk factors for acquiring HBV infection should be considered as a supplement to routine infant vaccination in countries of intermediate or low hepatitis B endemicity. In such settings, a substantial proportion of the disease burden may be attributable to infections acquired by older children, adolescents and adults.

In countries of high endemicity, large-scale routine vaccination of infants rapidly reduces the transmission of HBV. In these circumstances, catch-up vaccination of older children and adults has relatively little impact on chronic disease because most of them have already been infected.

Hepatitis B vaccines (WHO position paper)

In highly endemic areas, HBV is most commonly spread from mother to child at birth, or from person to person in early childhood. In countries with low HBV endemicity, sexual transmission and the use of contaminated needles, especially among injecting drug users, are the major routes of infection. However, perinatal transmission may account for 15% of HBV-related deaths, even in low-endemic areas.

[WER 2004, vol. 79, 28, pp 255-263](#)
page 257

Hepatitis B vaccines (WHO position paper)

When immunizing against HBV at birth, only monovalent hepatitis B vaccine should be used: the other antigens found in combination vaccines are currently not approved for use at birth (DTwP, DTaP, Hib, hepatitis A and IPV.)

[WER 2004, vol. 79, 28, pp 255-263](#)
page 258

Hepatitis B vaccines (WHO position paper)

The minimum recommended interval between (hepatitis B vaccine) doses is four weeks. Longer dose intervals may increase the final anti-HBs titres but not the seroconversion rates. More than 3 doses of the vaccine are not required, regardless of duration (> 4 weeks) of the interval between them.

[WER 2004, vol. 79, 28, pp 255-263](#)
page 259

Hepatitis B vaccines (WHO position paper)

Recommended schedules for (hepatitis B) vaccination can be divided into those that include a birth-dose and those that do not. Schedules with a birth-dose call for the first vaccination at birth, followed by a second and third dose at the time of the first and third diphtheria/tetanus/pertussis (DTP) vaccination, respectively (see Appendix 55_9, column II.) Alternatively, a four-dose schedule may be used where the dose at birth is followed by three additional doses; these doses may be given either as monovalent vaccine or as a combination (e.g. with DTP and/or Hib) following the schedules commonly used for those vaccines (see Appendix 55_9, column III.) These schedules will prevent most perinatally acquired infection.

[WER 2004, vol. 79, 28, pp 255-263](#)
page 259

Hepatitis B vaccines (WHO position paper)

Some countries have chosen not to implement universal (hepatitis B) immunization and instead use comprehensive HBsAg screening of pregnant women with immunization of newborn infants born to HBsAg-positive women. This strategy is usually not feasible in developing countries with high prevalence of disease and may not be the most reliable and convenient option even in countries where HBsAg screening in pregnancy is well established.

[WER 2004, vol. 79, 28, pp 255-263](#)
page 259

Hepatitis B vaccines (WHO position paper)

When administered without the birth-dose, hepatitis B vaccine is usually given at the same time as DTP, either as a monovalent presentation or in combination with DTP and/or Hib vaccine (see Appendix 55_9, column I) .

[WER 2004, vol. 79, 28, pp 255-263](#)
page 259

Hepatitis B vaccines (WHO position paper)

Countries that opt for schedules with a birth-dose (of hepatitis B vaccine) should vaccinate preterm infants at birth and subsequently enter the respective national hepatitis B vaccination schedule. However, if the birth weight is <2000 g, the vaccine dose at birth should not be counted towards the primary series, and three additional doses should be given.

[WER 2004, vol. 79, 28, pp 255-263](#)
page 260

Hepatitis B vaccines (WHO position paper)

Immunocompromised children and adults can also benefit from vaccination (with hepatitis B vaccine.) However, the immune response may be reduced and additional injections of the vaccine may be required. Where possible, the anti-HBs antibody titres should be followed up after immunization of immunocompromised individuals.

[WER 2004, vol. 79, 28, pp 255-263](#)
page 260

Hepatitis B vaccines (WHO position paper)

All children and adolescents aged less than 18 years and not previously vaccinated should receive the (hepatitis B) vaccine. Hepatitis B vaccination is also indicated for certain groups at high risk of contracting HBV infection, including persons with high-risk sexual behaviour, partners and household contacts of HBsAg-positive persons, injecting drug users, persons who frequently require blood or blood products, recipients of solid organ transplantation, those at occupational risk of HBV infection, including health care workers, as well as for international travellers to HBV-endemic countries.

[WER 2004, vol. 79, 28, pp 255-263](#)
page 261

Hepatitis B vaccines (WHO position paper)

Temporary immunity may be obtained using hepatitis B immune globulin (HBIG) for post-exposure prophylaxis. HBIG prophylaxis may be indicated (i) for newborn infants whose mothers are HBsAg-positive, (ii) following percutaneous or mucous membrane exposure to HBsAg-positive blood or body fluids, (iii) following sexual exposure to an HBsAg-positive person, and (iv) to protect patients from recurrent HBV infection following liver transplantation. As a rule, HBIG should be used as an adjunct to hepatitis B vaccine. However, in full-term newborns, the protection against perinatally acquired infection achieved by immediate (<24 hours) hepatitis B vaccination is not significantly improved by the addition of HBIG.

[WER 2004, vol. 79, 28, pp 255-263](#)
page 261

Hepatitis B vaccines (WHO position paper)

In countries of high disease endemicity (HBsAg prevalence >8%), HBV is mainly spread from mother to infant at birth or from child to child during early childhood (<5 years). In this epidemiological setting, schedules providing the first vaccine dose at birth are recommended.

[WER 2004, vol. 79, 28, pp 255-263](#)
page 262

Hepatitis B vaccines (WHO position paper)

Routine infant hepatitis B vaccination should also be given high priority in countries of intermediate or low HBV endemicity (HBsAg prevalence of >2- <8% or <2%, respectively) because, even in these settings, an important proportion of chronic infections are acquired through HBV transmission during early childhood.

[WER 2004, vol. 79, 28, pp 255-263](#)
page 262

Hepatitis B vaccines (WHO position paper)

Although HBsAg screening of all pregnant women and vaccination at birth only of infants born to HBsAg-positive mothers may be an option in areas with low HBV transmission, this strategy may be only partially effective, since women at highest risk of infection often fail to attend prenatal clinics.

[WER 2004, vol. 79, 28, pp 255-263](#)
page 262

Hepatitis B vaccines (WHO position paper)

Catch-up vaccination (with hepatitis B vaccine of older age groups, including adolescents and adults) should be considered only if the continuity of the infant vaccination programme can be ensured.

[WER 2004, vol. 79, 28, pp 255-263](#)
page 263

Vaccine introduction guidelines. Adding a vaccine to a national immunization programme: decision and implementation

WHO recommends the following schedule for infants (Appendix 39_5).

[WHO/IVB/05.18](#)
page 32

Introduction of hepatitis B vaccine into childhood immunization services. Management guidelines, including information for health workers and parents

In order to prevent perinatal HBV transmission the first dose of hepatitis B vaccine should be given as soon as possible after birth, preferably within 24 hours.

[WHO/V&B/01.31](#)
page 6

Introduction of hepatitis B vaccine into childhood immunization services. Management guidelines, including information for health workers and parents

[WHO/V&B/01.31](#)
page 7

In all countries: Achieving a high level of completion of the hepatitis B vaccine series among all infants should be the highest priority. This has the greatest overall impact on the prevalence of chronic HBV infection in children, regardless of whether it is feasible to administer a birth dose.

In countries where a high proportion of chronic HBV infections is acquired perinatally (e.g. in south-east Asia): A birth dose should be given to infants who are delivered in hospitals when hepatitis B vaccine is introduced. Efforts should also be made in these countries to give hepatitis B vaccine as soon as possible after birth to infants delivered at home.

In countries where a lower proportion of chronic HBV infections is acquired perinatally (e.g. in Africa): The administration of a birth dose may be considered after evaluating:

- the relative contribution of perinatal HBV infections to the overall disease burden;
- the feasibility and cost-effectiveness of providing a birth dose.

Introduction of hepatitis B vaccine into childhood immunization services. Management guidelines, including information for health workers and parents

[WHO/V&B/01.31](#)
page 9

Monovalent hepatitis B vaccine **MUST BE USED** for the birth dose. Combination vaccines that include hepatitis B vaccine **MUST NOT BE USED** to give the birth dose of hepatitis B vaccine because DTP and Hib vaccines should not be administered at birth. Either monovalent hepatitis B vaccine or combination vaccines may be used for later doses in the hepatitis B vaccine schedule. Combination vaccines can be given whenever all the antigens in the vaccines are indicated.

Introduction of hepatitis B vaccine into childhood immunization services. Management guidelines, including information for health workers and parents

[WHO/V&B/01.31](#)
page 12

All infants aged under 1 year should receive a full series of hepatitis B vaccine. The need for catch-up immunization of older age groups and for targeted risk groups varies between countries.

Introduction of hepatitis B vaccine into childhood immunization services. Management guidelines, including information for health workers and parents

[WHO/V&B/01.31](#)
page 13

Programmatically, it is usually easiest if the three doses of hepatitis B vaccine are given at the same time as the three doses of DTP (See Appendix 36_9 for options for adding hepatitis B vaccine to childhood immunization schedules.)

Immunization in practice: a practical resource guide for Health workers 2004 update_____Module 2: The vaccines

[WHO/IVB/04.06](#)
page 25

Wait at least four weeks between doses of OPV, DTP, Hib, and HepB vaccines.

Vaccine introduction guidelines. Adding a vaccine to a national immunization programme: decision and implementation

[WHO/IVB/05.18](#)
page 45

(Considerations for hepatitis B vaccine schedule:)

A determination of the role of perinatal transmission (useful for birth dose considerations) can be made based on the overall seroprevalance of HBsAg, age-specific prevalence of HBsAg, and the prevalence of the HBeAg in pregnant women.

Combination products may not be used at birth; therefore, programmes including the birth dose will need to include monovalent HepB vaccine in the supply.

Immunization in practice: a practical resource guide for Health workers 2004 update_____Module 2: The vaccines

[WHO/IVB/04.06](#)
page 16

Options for adding hepatitis B vaccine to childhood immunization schedules (Appendix 2_35.)

Tetanus

Thermostability of vaccines

[WHO/GPV/98.07](#)
page 12

If it is suspected that adsorbed DTP, DT, TT or hepatitis B vaccines have been frozen they should be examined for physical changes. Where these are found the vaccines should be discarded.

Getting started with vaccine vial monitors

[WHO/V&B/02.35](#)
page 9

A policy permitting the use of vaccine outside the cold chain can be implemented either generally for all routine immunization activities or on a limited basis in certain areas or under special circumstances, such as:

- national immunization days;
- hard-to-reach geographical areas;
- immunizations provided in the home;
- cool seasons;
- storage and transportation of freeze-sensitive vaccines (DTP, TT, DT, Td, hepatitis B and Hib vaccines) where the risk of freezing is greater than the risk of heat exposure.

Immunization in practice: a practical resource guide for Health workers 2004 update_____Module 6: Holding an immunization session

Check the freeze indicator in the refrigerator. If it warns of freezing or you suspect that a freeze-sensitive vaccine (DTP, DT, TT, Td, HepB, DTP-HepB, liquid Hib and DTP-HepB+Hib vaccines) has been frozen, you should

perform the shake test.

Immunization in practice: a practical resource guide for Health workers 2004 update_____Module 3: The cold chain

[WHO/IVB/04.06](#)

page 13

The freeze indicator is used to warn of freezing and is packed with vaccines that are sensitive to freezing temperatures: DTP, TT, DT, Td (freezing point of -6.5C), hepatitis B (-0.5C), liquid Hib and their combinations (DTP-HepB, and DTP-HepB+Hib vaccines) and JE.

Every refrigerator storing vaccines should have a freeze indicator (Freeze Watch). It is strongly recommended that one freeze indicator be placed in each cold box during vaccine transport and distribution. This is critical in places subject to low temperatures.

Immunization in practice: a practical resource guide for Health workers 2004 update_____Module 3: The cold chain

[WHO/IVB/04.06](#)

page 26

The shake test can help give an idea whether adsorbed vaccines (DTP, DT, Td, TT or hepatitis B) have been subjected to freezing temperatures likely to have damaged them. The test should be conducted for all boxes where freeze indicators are found to be activated or temperature recordings show negative temperatures.

Identify and separate all vaccines that may have been frozen and ensure that none are distributed or used.

The use of opened multi-dose vials of vaccine in subsequent immunization sessions (WHO Policy Statement)

[WHO/V&B/00.09](#)

page 0

See "Multi-Dose Open Vial" section of the "General" chapter in this catalogue for policies relevant for DTP, DT, TT, DTP-hepB, DTP-hepB-Hib, hepatitis B, liquid formulations of Hib and OPV.

Temperature sensitivity of vaccines

[WHO/IVB/06.10](#)

page 2

The recommended conditions for storing vaccines used in immunization programmes are shown in Appendix 81_1. This diagram also indicates the maximum times and temperatures in each case. At the higher levels of the cold chain, i.e., at national (primary), and regional or province level, OPV must be kept frozen between -15oC and -25oC. Freeze-dried vaccines (i.e., BCG, measles, MMR and yellow fever) may also be kept frozen at -15oC to -25oC if cold chain space permits, but this is neither essential nor recommended. At other levels of the cold chain (intermediate vaccine stores and health facilities), these vaccines should be stored between +2oC and +8oC. All other vaccines should be stored at between +2oC and +8oC at all levels of the cold chain. Liquid formulations of vaccines containing diphtheria, pertussis, tetanus, hepatitis B, Haemophilus influenzae type b, IPV and their combinations should not be frozen.

Temperature sensitivity of vaccines

[WHO/IVB/06.10](#)

page 6

WHO recommends that a policy permitting the use of vaccine outside the cold chain can be implemented either generally for all routine immunization activities or on a limited basis in certain areas or under special circumstances, such as:

- national immunization days;
- hard-to-reach geographical areas;
- immunizations provided in the home;
- cool seasons;
- storage and transportation of freeze-sensitive vaccines (DTP, TT, DT, Td, hepatitis B and Hib vaccines) where the risk of freezing is greater than the risk of heat exposure.

Travellers

Hepatitis B vaccines (WHO position paper)

[WER 2004, vol. 79, 28, pp 255-263](#)

page 261

All children and adolescents aged less than 18 years and not previously vaccinated should receive the (hepatitis B) vaccine. Hepatitis B vaccination is also indicated for certain groups at high risk of contracting HBV infection, including persons with high-risk sexual behaviour, partners and household contacts of HBsAg-positive persons, injecting drug users, persons who frequently require blood or blood products, recipients of solid organ transplantation, those at occupational risk of HBV infection, including health care workers, as well as for international travellers to HBV-endemic countries.

VPD Surveillance

WHO recommended standards for surveillance of selected vaccine-preventable diseases

[WHO/V&B/03.01](#)

page 2

Recommended types of surveillance for acute viral hepatitis:

_ Routine monthly reporting of aggregated data on suspected cases, and, if available, the number of confirmed cases of each type of hepatitis should be reported from the peripheral level to the intermediate and central levels.

_ Designated reporting sites at all levels should report at a specified frequency (e.g. weekly or monthly) even if there are zero cases (often referred to as zero reporting).

Vaccine Administration

Introducing hepatitis B vaccine into national immunization services

[WHO/V&B/01.28](#)

page 2

HepB vaccine is given by intramuscular injection in the anterolateral aspect of the thigh (infants) or deltoid muscle (older children).

If HepB vaccine is given on the same day as another injectable vaccine, it is preferable to give the two vaccines in different limbs.

Introducing hepatitis B vaccine into national immunization services

[WHO/V&B/01.28](#)

page 2

HepB vaccine can safely be given at the same time as other vaccines (e.g. DTP, Hib, measles, OPV, BCG, and yellow fever).

Immunization in practice: a practical resource guide for Health workers 2004 update _____ Module 2: The vaccines

[WHO/IVB/04.06](#)

page 16

Administration summary: HepB vaccine and Administration summary: DTP-HepB combination vaccine (see Appendix 2_12.)

Immunization in practice: a practical resource guide for Health workers 2004 update _____ Module 6: Holding an immunization session

[WHO/IVB/04.06](#)

page 19

See Appendix 6_19 for chart entitled, "Administering vaccines to infants" BCG, DTP, DTP-HepB, HepB, measles, yellow fever, OPV"

Hepatitis B vaccines (WHO position paper)

[WER 2004, vol. 79, 28, pp 255-263](#)

page 260

The recommended dose (of hepatitis B vaccine) varies by product and with the age of the recipient. In most cases, infants and adolescents receive 50% of the adult dose.

The vaccine is administered by intramuscular injection in the anterolateral aspect of the thigh (infants and children aged <2 years) or in the deltoid muscle (older children and adults). Administration in the buttock is not recommended because this route of administration has been associated with decreased protective antibody levels as well as injury to the sciatic nerve. Intradermal administration is not recommended because the immune response is less reliable, particularly in children.

The hepatitis B vaccine does not interfere with the immune response to any other vaccine, and vice versa. Specifically, the birth-dose of hepatitis B can be given safely together with bacillus Calmette-Gurin (BCG) vaccine; BCG does not interfere negatively with the response to hepatitis B vaccine. However, unless formulated as fixed combinations, hepatitis B vaccine and other vaccines administered during the same visit should be given at different injection sites.

Hepatitis B vaccines (WHO position paper)

[WER 2004, vol. 79, 28, pp 255-263](#)

page 260

Testing to determine antibody responses is not necessary after routine vaccination (with hepatitis B vaccine.) However, when feasible, knowledge of response to vaccination is important in the following groups:

(i) persons at risk of occupationally acquired infection; (ii) infants born to HBsAg-positive mothers; (iii) immunocompromised persons; and (iv) sexual partners of HBsAg-positive persons.

Testing for anti-HBs should be performed by a method that allows determination of whether the anti-HBs concentration is protective (>10 mIU per ml). Adults should be tested 1-2 months after completion of the vaccination series. In settings where resources are available, infants born to HBsAg-positive mothers should be tested at 8-15 months of age, after completion of the vaccination series. Persons found to be antibody-negative after the primary series should be referred for appropriate follow-up.

Hepatitis B vaccines (WHO position paper)

[WER 2004, vol. 79, 28, pp 255-263](#)
page 263

Generally, it is easier to deliver hepatitis B vaccine at birth to infants who are born in health facilities. However, availability of monovalent hepatitis B vaccine in pre-filled singledose injection devices facilitates the administration of the vaccine by health care workers and birth attendants to infants born at home.

Introduction of hepatitis B vaccine into childhood immunization services. Management guidelines, including information for health workers and parents

[WHO/V&B/01.31](#)
page 10

If hepatitis B vaccine is administered on the same day as another injectable vaccine, it is preferable to give the two vaccines in different limbs. If more than one injection has to be given in the same limb, the thigh is the preferred site of injection because of the greater muscle mass, and the injection sites should be 2.5 cm to 5 cm apart so that any local reactions are unlikely to overlap.

Introduction of hepatitis B vaccine into childhood immunization services. Management guidelines, including information for health workers and parents

[WHO/V&B/01.31](#)
page 11

Hepatitis B vaccine SHOULD NOT be given in the buttock as this route of administration has been associated with decreased protective antibody levels, probably because of inadvertent subcutaneous injection or injection into deep fat tissue. In addition there may be a risk of injury to the sciatic nerve.

Hepatitis B vaccine SHOULD NOT be administered intradermally because this route of administration does not produce an adequate antibody response in children.

Hepatitis B vaccine SHOULD NOT be mixed in the same syringe with other vaccines unless specifically recommended by the manufacturer. (Note: pentavalent DTP-HepB+Hib vaccine is supplied in two separate vials, one containing DTP-HepB vaccine (liquid), the other containing Hib vaccine (lyophilized). The manufacturer recommends mixing the contents of the two vials and giving DTP-HepB+Hib vaccine in the same syringe.)

Hepatitis B vaccines (WHO position paper)

[WER 2004, vol. 79, 28, pp 255-263](#)
page 258

Two types of hepatitis B vaccines are available: plasmaderived vaccines and recombinant vaccines. The two vaccines show no differences in terms of reactogenicity, efficacy or duration of protection. The two types of hepatitis B vaccine can be used interchangeably

Introducing hepatitis B vaccine into national immunization services

[WHO/V&B/01.28](#)
page 3

For administering HepB vaccine:

- _ A 25 mm, 22 or 23 gauge needle is recommended.
- _ The standard paediatric dose is 0.5 ml.

Vaccine Handling

Introducing hepatitis B vaccine into national immunization services

[WHO/V&B/01.28](#)

page 3

The storage temperature for HepB vaccine is the same as for DTP vaccine, from 2C to 8C. HepB vaccine should never be frozen.

Thermostability of vaccines

[WHO/GPV/98.07](#)

page 12

If it is suspected that adsorbed DTP, DT, TT or hepatitis B vaccines have been frozen they should be examined for physical changes. Where these are found the vaccines should be discarded.

Thermostability of vaccines

[WHO/GPV/98.07](#)

page 14

HB vaccine should always be protected from being frozen, especially at the end of the cold chain when it is transported in cold boxes and may come into close contact with cold packs. HB vaccine thought to have been frozen should not be used.

Thermostability of vaccines

[WHO/GPV/98.07](#)

page 16

Although HB vaccine is extremely heat stable, there are not yet enough data to recommend using it entirely outside the cold chain. There is, however, scope for developing a management instruction that would allow removal of the vaccine from the cold chain in emergencies, or in outreach activities of short duration, provided that a high temperature indicator was attached to each vial.

Getting started with vaccine vial monitors

[WHO/V&B/02.35](#)

page 9

A policy permitting the use of vaccine outside the cold chain can be implemented either generally for all routine immunization activities or on a limited basis in certain areas or under special circumstances, such as:

- national immunization days;
- hard-to-reach geographical areas;
- immunizations provided in the home;
- cool seasons;
- storage and transportation of freeze-sensitive vaccines (DTP, TT, DT, Td, hepatitis B and Hib vaccines) where the risk of freezing is greater than the risk of heat exposure.

WHO-UNICEF effective vaccine store management initiative: Modules 1 - 4

[WHO/IVB/04.16-20](#)

page 1

WHO recommended vaccine storage conditions (Appendix 17_3).

Immunization in practice: a practical resource guide for Health workers 2004 update_____Module 6: Holding an immunization session

[WHO/IVB/04.06](#)

page 4

Check the freeze indicator in the refrigerator. If it warns of freezing or you suspect that a freeze-sensitive vaccine (DTP, DT, TT, Td, HepB, DTP-HepB, liquid Hib and DTP-HepB+Hib vaccines) has been frozen, you should perform the shake test.

Hepatitis B vaccines (WHO position paper)

[WER 2004, vol. 79, 28, pp 255-263](#)

page 258

Two types of hepatitis B vaccines are available: plasmaderived vaccines and recombinant vaccines. The two vaccines show no differences in terms of reactogenicity, efficacy or duration of protection. Their thermostability is also similar: both should be shipped and stored at 2-8 C; freezing must be avoided as it dissociates antigen from the alum adjuvant.

Immunization in practice: a practical resource guide for Health workers 2004 update_____Module 3: The cold chain

[WHO/IVB/04.06](#)

page 26

The shake test can help give an idea whether adsorbed vaccines (DTP, DT, Td, TT or hepatitis B) have been subjected to freezing temperatures likely to have damaged them. The test should be conducted for all boxes where freeze indicators are found to be activated or temperature recordings show negative temperatures.

Identify and separate all vaccines that may have been frozen and ensure that none are distributed or used.

Temperature sensitivity of vaccines

[WHO/IVB/06.10](#)

page 2

The recommended conditions for storing vaccines used in immunization programmes are shown in Appendix 81_1. This diagram also indicates the maximum times and temperatures in each case. At the higher levels of the cold chain, i.e., at national (primary), and regional or province level, OPV must be kept frozen between -15oC and -25oC. Freeze-dried vaccines (i.e., BCG, measles, MMR and yellow fever) may also be kept frozen at -15oC to -25oC if cold chain space permits, but this is neither essential nor recommended. At other levels of the cold chain (intermediate vaccine stores and health facilities), these vaccines should be stored between +2oC and +8oC. All other vaccines should be stored at between +2oC and +8oC at all levels of the cold chain. Liquid formulations of vaccines containing diphtheria, pertussis, tetanus, hepatitis B, Haemophilus influenzae type b, IPV and their combinations should not be frozen.

Temperature sensitivity of vaccines

[WHO/IVB/06.10](#)

page 6

WHO recommends that a policy permitting the use of vaccine outside the cold chain can be implemented either generally for all routine immunization activities or on a limited basis in certain areas or under special circumstances, such as:

- national immunization days;
- hard-to-reach geographical areas;
- immunizations provided in the home;
- cool seasons;
- storage and transportation of freeze-sensitive vaccines (DTP, TT, DT, Td, hepatitis B and Hib vaccines) where the risk of freezing is greater than the risk of heat exposure.

Temperature sensitivity of vaccines

[WHO/IVB/06.10](#)

page 16

The freezing temperature of HepB vaccine is -0.5 C and freezing destroys potency, a result of destruction of the aluminum lattice. HepB vaccine should be protected from being frozen; vaccine thought to have been frozen should not be used

Vaccine introduction guidelines. Adding a vaccine to a national immunization programme: decision and implementation

[WHO/IVB/05.18](#)

page 45

HepB vaccine is sensitive to low temperatures and can be damaged by freezing. On the other hand, it is quite heat stable and use with a vaccine vial monitor (VVM) allows greater flexibility in transportation and storage.

Immunization in practice: a practical resource guide for Health workers 2004 update _____ Module 2: The vaccines

[WHO/IVB/04.06](#)

page 16

- HepB and DTP-HepB vaccines
- _ HepB vaccine should never be frozen.
- _ If the vaccine fails the shake test you must discard it.

Yellow Fever

Immunization in practice: a practical resource guide for Health workers 2004 update _____ Module 2: The vaccines

[WHO/IVB/04.06](#)

page 24

Typical immunization schedule for children (see Appendix 2_19.)

WHO-UNICEF effective vaccine store management initiative: Modules 1 - 4

[WHO/IVB/04.16-20](#)

page 1

WHO recommended vaccine storage conditions (Appendix 17_3).

Immunization in practice: a practical resource guide for Health workers 2004 update _____ Module 6: Holding an immunization session

See Appendix 6_19 for chart entitled, "Administering vaccines to infants"

BCG, DTP, DTP-HepB, HepB, measles, yellow fever, OPV"

Vaccine introduction guidelines. Adding a vaccine to a national immunization programme: decision and implementation

[WHO/IVB/05.18](#)
page 32

WHO recommends the following schedule for infants (Appendix 39_5).

Temperature sensitivity of vaccines

[WHO/IVB/06.10](#)
page 2

The recommended conditions for storing vaccines used in immunization programmes are shown in Appendix 81_1. This diagram also indicates the maximum times and temperatures in each case. At the higher levels of the cold chain, i.e., at national (primary), and regional or province level, OPV must be kept frozen between -15oC and -25oC. Freeze-dried vaccines (i.e., BCG, measles, MMR and yellow fever) may also be kept frozen at -15oC to -25oC if cold chain space permits, but this is neither essential nor recommended. At other levels of the cold chain (intermediate vaccine stores and health facilities), these vaccines should be stored between +2oC and +8oC. All other vaccines should be stored at between +2oC and +8oC at all levels of the cold chain. Liquid formulations of vaccines containing diphtheria, pertussis, tetanus, hepatitis B, Haemophilus influenzae type b, IPV and their combinations should not be frozen.