



Vaccine Quality Procurement Global Supply Immunization Financing Vaccine Management

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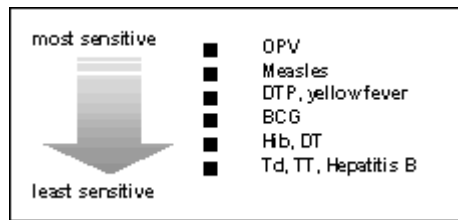


What are the correct conditions for storing EPI vaccines?

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Sensitivity to heat

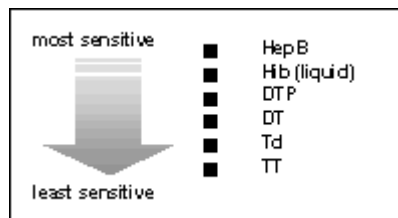
All vaccines are **sensitive to heat** to some extent, but some are more sensitive than others. The commonly used EPI vaccines may be ranked according to their sensitivity to **heat** as follows:



(Note however, that all freeze-dried vaccines become **much** more heat-sensitive after they have been reconstituted, and it is then even more important that they are not exposed to heat. For details, see "[Vaccine Reconstitution and Administration](#)")

Sensitivity to cold

Some vaccines are also sensitive to being **too cold**. For these vaccines, freezing or exposure to temperatures below zero degrees centigrade (0°C) can also cause loss of potency, and again, the vaccine will become useless. For these vaccines, it is therefore essential to protect them not only from **heat**, but also from **freezing**. The vaccines sensitive to **freezing** (as well as to heat) are:



Sensitivity to light

And finally, some vaccines are also very sensitive to **strong light**. For these vaccines, exposure to ultraviolet light will also cause loss of potency, so they must always be protected against sunlight or fluorescent (neon) light. BCG, measles, MR, MMR and rubella vaccines are sensitive to light (as well as to heat). Normally, these vaccines are supplied in vials made from dark brown glass, which gives them some protection against light damage, but care must still be taken to keep them covered and protected from strong light at all times.

[Recommended storage temperatures for vaccines](#)

The recommended conditions for storing EPI vaccines are shown in below Figure. This diagram indicates the maximum times and temperatures in each case. At the higher levels of the cold chain, i.e., at national (central), and regional or province level, OPV must be kept frozen between **minus 15 and minus 25 degrees centigrade** (-15°C to -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, these vaccines should be stored between **plus 2 and plus 8 degrees centigrade** (+2°C and +8°C). All other EPI vaccines should be stored at **between +2°C and +8°C** at all levels of the cold chain.

WHO recommended vaccine storage conditions

	Primary	Intermediate		Health Centre	Health Post
	6 months ^a	Region	District	1 month	Daily use
		3 months	1 month		
OPV	-15°C to -25°C		+2°C to +8°C		
BCG	WHO no longer recommends that freeze-dried vaccines be stored at -20°C. Storing them at -20°C is not harmful but it is unnecessary. Instead, these vaccines should be kept in refrigeration and transported at +2°C to +8°C.				
Measles					
MMR					
MR					
Yellow Fever					
Hib freeze-dried					
HepB					
DTP-HepB					
Hib liquid					
DTP					
DT					
TT					
Td					
<i>Diluent vials must NEVER be frozen. When the manufacturer supplies a freeze-dried vaccine packed together with its diluent, ALWAYS store the product at between +2°C and +8°C. Where space permits, diluents supplied separately from the vaccine may safely be stored in the cold chain at between +2°C to +8°C</i>					
<i>Note a. 6 months is the maximum recommended storage time at primary level. This includes the period required to obtain clearance from the National Regulatory Authority.</i>					

Remember, if a vaccine is damaged by heat and loses some of its potency, this loss can never be restored, and the damage is **permanent**. Each time heat damage occurs, the loss of potency accumulates, and eventually, if the cold chain is not correctly maintained, all potency will be lost, and the vaccine becomes useless.

Expiry date

Even when stored at the correct temperature, vaccines do not retain their potency for ever, and all vaccines have an **expiry date**. This is the date by which the vaccine must be used, and will be printed on all vials and packets during manufacture. The expiry date shown on each vaccine vial and on each packet assumes the vaccine has been properly stored and transported at all times, in accordance with the guidelines shown in the above Figure. If the vaccine has been damaged by heat or other causes however, its potency will be reduced even **before** the expiry date shown on the vial or packet is reached.

Only vaccine stocks which are fit for use should be kept in the vaccine cold chain. Any expired vials, heat damaged vials or vials with VVMs beyond the discard point should **not** be kept in the cold store, refrigerator or freezer, as they may be confused with good quality vaccines. If unusable vaccines need to be kept for a period before disposal, for example, until accounting or auditing procedures have been completed, such vials should be kept outside the cold chain, separated from all usable stocks and carefully labeled to avoid mistaken use.

Correct conditions for storing diluents for EPI vaccines

Diluents for vaccines are less sensitive to storage temperatures than the vaccines with which they are used, but may be kept in the cold chain between **+2°C to +8°C** if space permits. When vaccines are reconstituted, the diluent should be at same temperature as the vaccine, so sufficient diluent for daily needs should be kept in the cold chain at the point of vaccine use (health centre or vaccination post). At other levels of the cold chain (central, provincial or district stores) it is not necessary to keep any diluent in the cold chain unless it is planned to use it for reconstituting vaccine within the next 24 hours. However, diluent vials **must never be frozen**. This will risk cracking the glass and allowing contamination of the contents, so diluent vials must never be kept in a freezer, or allowed to be in contact with any frozen surface.

Freeze-dried vaccines and their diluents should always be distributed **together** in matching quantities. The vaccines must be kept in the cold chain between +2°C and +8°C at all times, or optionally, at -15°C to -25°C **if cold chain space permits**. For each distribution link, the cold chain will normally comprise cold boxes or vaccine carriers with ice packs. The diluents do not need to be kept in the cold chain unless they will be used for [reconstituting vaccines](#) within the next 24 hours. However, diluents must travel with the vaccine **at all times**, and the diluent must **always** be of the correct type, and from the **same manufacturer** as the vaccine which it is accompanying. This is essential to ensure that the health worker always has equal numbers of vaccine vials and diluent vials for reconstituting them, and that he/she has the correct type of diluent for the vaccine being used.

Diluents may appear to be simple water, but in fact usually contain a variety of salts, chemicals and additives required to stabilize a specific vaccine after reconstitution. Each vaccine requires a specific diluent and therefore, diluents are **not** interchangeable. Therefore, diluent made for measles vaccine, for example, must **not** be used for reconstituting BCG, yellow fever or any other type of vaccine. Likewise, diluent made by one manufacturer for use with a certain vaccine **cannot** be used for reconstituting the same type of vaccine produced by another manufacturer. This means that diluent for measles vaccine made by company 'A' **cannot** be used for reconstituting measles vaccine made by company 'B'.

Some combination vaccines comprise a freeze-dried component (such as Hib) which is designed to be reconstituted by a liquid vaccine (such as DTP or DTP-HepB liquid vaccine) instead of a normal diluent. For such combination vaccines, it is again vital that **ONLY** vaccines manufactured and licensed for this purpose are combined. Note also that for combination vaccines where the diluent is itself a vaccine, **ALL** components must now be kept in the cold chain between +2°C and +8°C at all times. As for all other freeze dried vaccines, it is also essential that the 'diluent' travels with the vaccine **at all times**.

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Contact us directly

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