

The Vaccine Cold Chain

Guidelines for storing and handling vaccines

by Agency for Integrated Care

Enhanced subsidies for nationally recommended adult and childhood vaccinations will be available to Singaporeans at all CHAS GPs from 1 November 2020 as announced by the Ministry of Health (MOH). In this article, let's take a look at some best practices for storing and handling vaccines in your clinic.

What is the vaccine cold chain?

It is a system for storing and transporting vaccines within the temperature ranges recommended by the World Health Organization (WHO). The cold chain ensures that product quality is maintained from the time of manufacture until the point of administration.

The need for the cold chain

Vaccines are sensitive biological products, which can lose their potency when exposed to incorrect temperatures. Clinic staff who handle vaccines should be well-informed on their temperature sensitivities and how to maintain vaccine quality using the cold chain. Some vaccines are sensitive to heat, others to freezing or light.



HEAT SENSITIVE VACCINES

Although all vaccines are sensitive to heat, some are more sensitive than others. Opened multi-dose vials should be kept cooled between +2 °C and +8 °C during the immunisation session, or within six hours after opening, whichever comes first.

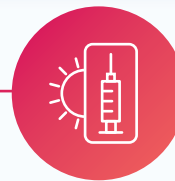
Examples:
Oral Polio Vaccine (OPV), Influenza, Inactivated poliovirus (IPV), Measles (freeze-dried), Cholera, Rotavirus (liquid and freeze-dried), Yellow fever (freeze-dried)



FREEZE SENSITIVE VACCINES

Should be protected from sub-zero temperatures.

Examples:
Cholera, DTaP-hepatitis B-Hib-IPV, DTwP or DTwP-hepatitis B-Hib, Hepatitis B, Hib (liquid), Human papillomavirus (HPV), Inactivated poliovirus (IPV), Influenza, Pneumococcal, Rotavirus (liquid and freeze-dried), Tetanus, DT, Td



LIGHT SENSITIVE VACCINES

Should be protected against sunlight or any strong artificial light and should be kept in their secondary packaging for as long as possible.

Examples:
BCG, Measles, Mumps and Rubella (MMR) and Rubella Pneumococcal, Rotavirus (liquid and freeze-dried), Tetanus, DT, Td

3 key practices

Clinic staff can protect vaccines by:

- 1 Keeping vaccines in appropriate vaccine refrigeration equipment.
- 2 Transporting vaccines to immunisation sessions in a vaccine carrier, using coolant packs.
- 3 Using temperature monitoring devices to ensure temperatures remain between the recommended range of +2 °C and +8 °C.

Essential equipment

Clinics should be adequately furnished with the following cold chain equipment:

REFRIGERATORS	
How to use	How to monitor temperature
<ul style="list-style-type: none">• Store vaccines in a refrigerator to ensure the temperature remains consistently between +2 °C and +8 °C.• Avoid adjusting the thermostat, even if the temperature occasionally rises a degree or so above +8 °C after a power cut or in hot weather.• The refrigerator must never be packed solid – leave plenty of space around the vaccines and diluents to allow air to circulate freely.	<ul style="list-style-type: none">• Ideally, refrigerators should be equipped with a 30-day temperature logger which shows a complete history of the refrigerator temperature.• Integrated digital thermometers are required to indicate the temperature at the time of a manual reading.• A stem thermometer can serve as a back-up device.• A temperature-recording chart should be attached to the door or lid of every vaccine refrigerator. Readings should be taken twice a day, preferably every day, including weekends and holidays.
COLD BOXES / VACCINE CARRIERS	
How to use	How to monitor temperature
<ul style="list-style-type: none">• Insulated cold boxes / vaccine carriers can be lined with water packs to keep vaccines and diluents in the required temperature range during transport or for short-term storage. For example, to store opened multi-dose vials during immunisation sessions.	<ul style="list-style-type: none">• If ice packs are being used to transport freeze-sensitive vaccines, an electronic freeze indicator should be included to show if the vaccines have been exposed to sub-zero temperatures.• Freeze indicators are not needed if cool water packs are used because there is no freezing risk. In this case, a stem thermometer will suffice.• Vaccine Vial Monitors (VVMs), where supplied, show whether the individual vaccine container has been exposed to excessive heat during storage and transport.
WATER PACKS	
How to use	How to monitor temperature
<ul style="list-style-type: none">• Clinics must have a minimum of two complete sets of water packs for each of their cold boxes and vaccine carriers, so that one set can be prepared in the freezer or refrigerator while the other set is in use.• The appropriate temperature of the water pack will depend on the type(s) of vaccines, the ambient temperature and the duration of storage or transport.	To monitor with cold boxes / vaccine carriers

To ensure optimal performance, the cold chain equipment used should comply with the technical specifications defined by WHO¹ or as determined by MOH.

Clinics should also conduct basic maintenance² and preventative maintenance of the cold chain equipment on a regular basis.

¹ World Health Organization (WHO) Performance, Quality and Safety (PQS) prequalified devices and equipment catalogue https://www.who.int/immunization_standards/vaccine_quality/pqs_prequalified_devices/en/

² Immunization in Practice, Module 2: The Vaccine Cold Chain, Section 6: Basic maintenance of cold chain equipment https://www.who.int/immunization/documents/IIP2015_Module2.pdf