General Recommendations for Vaccine Storage in Health Unit Refrigerators

Vaccine refrigerators are for vaccine only. They must not be used to store drugs, serums, clinical samples, reagents, food, or beverages.

Conventional domestic refrigerators (including the "no-frost" models) have proved to be adequate for vaccine storage if:

- **Vaccine and diluents are organized in rows spaced 3 cm apart to allow the uniform circulation of cold air;**
- **The energy source is constant and permanent;**
- **Temperature is monitored twice daily, at the beginning and end of the day;**
- **Preventive maintenance is regularly performed;**
- **They are instaled in a cool and breezy place;**
- **The are placed in the shade and far from any heat sources;**
- **They are separated from the wall by 15-20 cm; and**
- **They are placed on a straight surface (especially the absoption system).**

To Avoid Heating or Freezing of Vaccines:

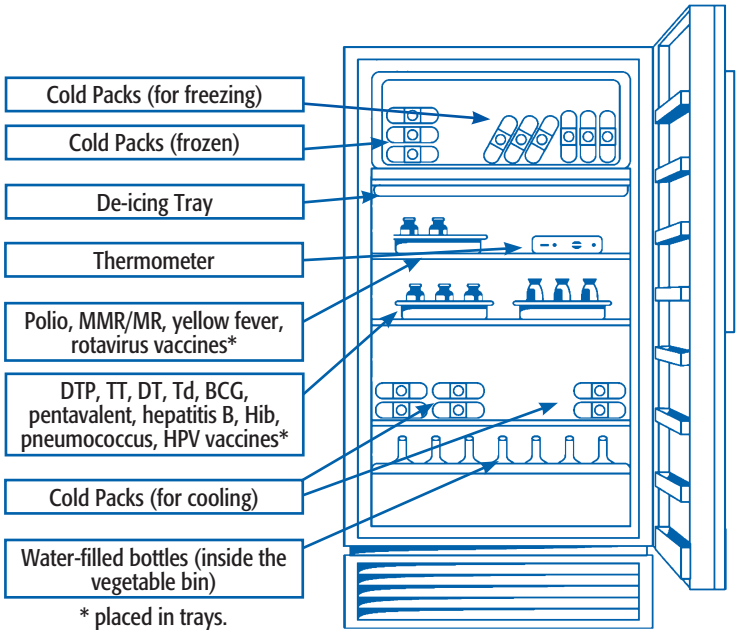
- The temperature inside the refrigerator must be maintained between 2° and 8° Celsius.
- The refrigerator door must be opened only twice a day, once in the morning and once in the afternoon.
- Written emergency or contingency plans must be available and describe the necessary steps to take if the refrigerator cannot maintain the required temperatures or because of mechanical failure.
- To avoid freezing of freeze-sensitive vaccines, the thermostat may have to be adjusted if the thermometer or other temperature device shows temperatures at or below 2 degree Celsius.

Organization of an Upright Refrigerator for Vaccine Storage

- Vaccines must not be stored in refrigerators for more than a month.
- Vaccines must not be stored in the refrigerator door.
- The refrigerator must be cleaned and defrosted each time the ice in the freezing compartment reaches a thickness of 5 mm.
- Bottles filled with cold water, or cold packs, must be placed in the lower part of the refrigerator.
- **Do not place the total volume of water-filled bottles at once in the refrigerator.** This will cause a rapid temperature increase in the refrigerator and it could take many hours for the temperature to return to a level adequate for vaccine storage. Place the equivalent of 2 to 4 liters of water-filled bottles or cold packs in the refrigerator at first. Then wait 24 hours before adding any more water-filled bottles or cold packs.

Freezing of Vaccines inside the Refrigerator

The cold air that goes through the evaporator comes out at the rear of the upper shelf, where, during morning hours, temperatures are liable to fall below 0° C. Therefore, the upper shelf is only suitable for storage of vaccines able to sustain accidental freezing (oral polio, measles-mumps-rubella, and yellow fever vaccines).



* placed in trays.

WHO References for Product Information

The Product Information Sheets (PIS) provide general information on the choice of equipment, and specific technical and purchasing data for individual selected items. A revision of the PIS system is underway to better keep pace with global developments. The new approach is based on three key criteria: Performance, Quality and Safety (PQS). All examples of a selected product must have performance characteristics that meet the relevant specification standards, quality and reliability characteristics that are appropriate for field conditions, and cradle-to-grave safety characteristics that ensure that no harm is caused to users, patients, or to the environment over the course of the product's life cycle. Draft PQS specifications and verification protocols are available for review.

- Product Information Sheets: http://www.who.int/immunization_standards/vaccine_quality/pis/en/index.html
- PQS: http://www.who.int/immunization_standards/vaccine_quality/pqs/en/index.html
- Draft PQS specifications and verification protocols: http://www.who.int/immunization_standards/vaccine_quality/specs_intro/en/index.html