

PROCUREMENT GUIDELINES

VACCINE CARRIERS AND COLD BOXES

Procurement Guidelines

Vaccine Carriers and Cold Boxes

Key information for UNICEF staff and partners, ensuring effective and efficient procurement of Cold Chain equipment.

This module gives guidance to the procurement of Vaccine Carriers and Cold Boxes for vaccine distribution.

Always make sure that you have the latest version of this document by checking the [CCSP website](#).

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Acronyms

CCSP	Cold Chain Support Package
CO	Country Office
LTA	Long Term Arrangement
OPV	Oral Polio Vaccine
PCM	Phase Change Material
PHC	Primary Health Care
PQS	Performance Quality and Safety
PS	Procurement Services
SD	Supply Division (UNICEF)
VC	Vaccine Carrier
VVM	Vaccine Vial Monitor
WHO	World Health Organization

1 Introduction to Vaccine Carriers and Cold Boxes

Cold boxes, vaccine carriers and coolant packs are used for keeping vaccines cold during transportation. In comparison with cold boxes, vaccine carriers have a smaller volume, suitable for use by health workers during immunization campaigns and out-reach services. As these are passive devices, coolant packs are accessories for both cold boxes and vaccine carriers providing the cooling energy/warming for a limited time period.

The products are, in principle, fairly simple. Overall, there is a low level of skills required to use them. Coolant packs are put into the boxes/carriers packed with the vaccine vials, in accordance with the instructions provided with the product (drawings inside the cover of the box/carrier). It is always recommended to order a second set of coolant packs for every cold box/ vaccine carrier, to be readily available for an interrupted service delivery at all levels.



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Carrying a 'cold box' filled with polio vaccines, a health worker passes other travelers on a dirt road as he journeys to Pakur Village, in Unity State. Cold boxes play a critical role in preserving the 'Cold Chain', the series of temperature controls required to maintain vaccine potency from manufacture through inoculation.

Cold boxes are insulated containers that can be lined with coolant packs to keep vaccines and diluents cold during transportation and/or short period storage. Cold boxes are used to collect and transport vaccine supplies from one fixed vaccine store to another, and from vaccine stores to health facilities. They are also used to temporarily store vaccines when the refrigerator is out of order or being defrosted.

The vaccine storage capacity of cold boxes are between 5.0 and 25.0 litres. There are two types of cold boxes:

- **Short range:** With a minimum cold life of 48 hours.
- **Long range:** With a minimum cold life of 96 hours.

Vaccine carriers are insulated containers that, when lined with coolant packs, keep vaccines and diluents cold during transportation. They are smaller than cold boxes and are easier to carry when walking. They are used for transporting vaccines from health facilities with refrigeration to outreach sessions where refrigeration and ice are not available. They are typically carried by a single health worker travelling on foot or by other means, where the combined journey time and immunization activity ranges from a few hours to a whole day. The vaccine storage capacity of vaccine carriers are between 0.1 and 5.0 litres.

All pre-qualified vaccine carriers and cold boxes are listed on the [WHO website](#) for pre-qualified equipment.

2 Terminology

Cold life: The empty container is stabilized at +43°C and loaded with icepacks. Cold life is measured from the moment when the container lid is closed until the temperature of the warmest point in the vaccine storage compartment first reaches +10°C, at a constant ambient temperature of +43°C.

Cool life: The empty container is stabilized at +43°C and loaded with coolant packs which have been stabilized at + 5°C for a minimum of 24 hours. Cool life is measured from the moment when the container is closed, until the temperature of the warmest point inside the vaccine storage compartment first reaches +20°C, at a constant ambient temperature of +43°C.

Cool-pack: A water-pack pre-cooled to a temperature between + 2°C to +8°C before use.

Ice-pack: A water-pack frozen to a temperature between -5°C and -20°C before use. Ice-packs are used frozen for the transport of oral polio vaccine (OPV), and used conditioned (see procedure for conditioning further down) for the transport of all other vaccines.

Temperature Stability: The vaccine carriers and cold boxes are tested for temperature stability at ambient temperatures of 43°C and -20°C in WHO-accredited laboratories to ensure that at field conditions the equipment will perform optimally. The frequency and duration of door openings will raise the internal temperature of the boxes, and will shorten the Cold life and Cool life.



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Health Workers travel by boat across the Indus River to remote Shah Nawaz Village in Shikarpur District in Sindh Province. They are on their way to vaccinate children under age five in the flood-affected village. One of the women carries an insulated cold box.

3 Choice of Equipment

The most suitable cold boxes for a particular health facility are determined by:

- The vaccine storage capacity needed;
- The cold life needed, that is, the longest time that vaccine will be stored in the box;
- The weight and the volume of the box, which depends on the mode of transport, by motor vehicle, bicycle, or hand; and
- Number of coolant packs compatible with cold box to realize its rated cold life.

4 Coolant Packs

4.1 Using Coolant Packs

Coolant packs (often called ice packs) are flat, square plastic bottles that are filled with water and cooled. They are used to keep vaccines cool inside the vaccine carrier or cold box. The number of coolant packs required for a cold box or vaccine carrier varies according to the type of cold box or vaccine carriers. Every cold box or vaccine carrier should have at least two sets of coolant packs. One set of the packs could be cooled, while the other set is being used in the cold box or vaccine carrier. Note that one set of coolant packs is provided with each procured cold box or vaccine carrier, so that only one additional set needs to be ordered.

4.2 New Development: PCM

The term “Phase Change Material” (PCM) is used to describe materials that use phase changes (e.g., solidify, liquefy, evaporate or condense) to absorb or release large amounts of latent heat at relatively constant temperature. PCM leverage the natural property of latent heat to help maintain products temperature for extended periods of time. Research and industrial development of PCM based temperature control for insulated vaccine storage boxes is showing encouraging results.

5 Vaccine Carriers and Cold Boxes supplied by UNICEF SD

UNICEF Supply Division (SD) only supplies Vaccine Carriers and Cold Boxes that fulfil the quality requirements set by WHO, documented in the [WHO PQS manual](#).¹ UNICEF SD procures Cold Chain products via Long Term Arrangements (LTAs)².

Table 1. Vaccine Carriers, Cold Boxes and Coolant Packs supplied by UNICEF SD (LTA, 2014)

Product Description
Vaccine Carrier, small, 0.9 ltrs
Vaccine Carrier, large 1-2 ltrs
Vaccine Carrier, X large >2 ltrs
Cold Box, small, short range 5-15 ltrs
Cold Box, small, long range 5-15 ltrs
Cold Box, large, short range 15-25 ltrs
Cold Box, large, long range 15-25 ltrs
Ice Packs 0.3 ltrs
Ice Packs 0.4 ltrs
Ice Packs 0.6 ltrs

Currently available on Direct Order Arrangement (DOA) are:

Table 2. Products Available on Direct Order Arrangement (DOA):

Product Description
Vaccine Cold Box, small, short range
Vaccine Cold Box, small, long range
Vaccine Cold Box, large, short range
Vaccine Cold Box, large, long range
Vaccine Carrier, small
Vaccine Carrier, large
Vaccine Carrier, large >2L
Ice Packs 0.3 ltrs
Ice Packs 0.4 ltrs
Ice Packs 0.6 ltrs

¹ UNICEF SD procures pre-qualified and listed equipment that conform to WHO standards. These standards are documented in the WHO PQS (Performance, Quality and Safety) manual, which is accessible online.

² UNICEF SD establishes Long Term Arrangements (LTAs) with product suppliers, usually for a period of 24 months. Refer to the document General Procurement Guideline for further details on LTAs.

6 How to Order

6.1 The Ordering Process

Refer to the [General Procurement Guidelines](#) and the [UNICEF SD Procurement Services](#) website for general guidance on how to order products. Please contact the [Supply Division Cold Chain Unit](#) for specific queries related to ordering Vaccine Carriers and Cold Boxes.

6.2 Considerations for Country Offices

- a) Due to the relatively large volume of Vaccine Carriers and especially Cold Boxes the standard mode of shipment is usually by sea freight. If in doubt, COs can contact UNICEF SD for detailed information on the weight and volume of the different makes and models. Estimated Weight and Volume for standard Vaccine Carriers and Cold Boxes are stated in the item specifications in the UNICEF Supply Division Supply Catalogue.
- b) Requests for non-standard items can add an additional 2-3 months to the procurement process due to necessary tender processing. Supplier lead times may be longer than for LTA standard devices.
- c) Based on technical review of incoming country requests for non-standard items, SD may suggest alternative standard items to be procured instead, unless specific reasons prevent the use of standard items.

Please contact the [Supply Division Cold Chain Unit](#) for any related queries.

6.3 Delivery lead time

Refer to the section 'When to Order' for further information, refer to the Section 'Estimation of Arrival Date' in the document '[General Procurement Guidelines](#)'.

Annex 1: Additional Resources

Links to additional resources on Vaccine Carriers and Cold Boxes.

Description	Source
Handbook for Vaccine and Cold Chain Handlers	UNICEF Website (India)
Improved Freeze-Safe Vaccine Carriers	PATH Website (2014)
Preventing Freezing in Cold Boxes and Vaccine Carriers	PATH Website (2013)

Note: Users of this manual are invited to suggest additional resource materials, to add to this list.

Annex 2: Record of Revisions

Date	Description	By
April 1, 2012	First draft of this manual, by UNICEF SD\HTC\Cold Chain Unit	GK,DH,AS
June 26, 2014	Second draft of this manual	BR
August 9, 2014	Update, minor corrections	BR
October 28, 2014	Minor corrections	BR
October 06, 2016	Minor corrections	ANM