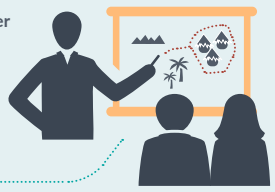
WHAT IS A CONTROLLED TEMPERATURE CHAIN (CTC)?

A controlled temperature chain is an optional method of transporting and storing vaccines in carriers **WITHOUT ICE PACKS** up to a specific number of days before the vaccines are administered. It is only recommended for vaccines **OFFICIALLY LABELED FOR THIS USE** where a pronounced need is apparent and **TRAINING AND SUPERVISION** are provided. Vaccines carried in a CTC must be monitored using a vaccine vial monitor (VVM) and peak temperature threshold indicator (PTTI) to indicate exposure to heat.



HOW ARE VACCINES APPROVED FOR CTC?

Not all vaccines can be used in a CTC. To be used in a CTC, four conditions should be met:

1 LAB
The vaccine must undergo and pass stability testing.

2 NATIONAL REGULATORY AUTHORITY
Appropriate regulatory authorities must license the vaccine for CTC use with a label that specifies the conditions of use.

3 WHO
The vaccine must be prequalified by the World Health Organization.

4 COUNTRY
The government of the country where the vaccine will be used must give its consent in advance.

THERMOSTABLE → LICENSED → PRE-QUALIFIED → APPROVED

FOR CTC APPROVED FOR CTC

HOW DOES A CTC COMPARE TO A TRADITIONAL COLD CHAIN?

TRADITIONAL COLD CHAIN	CONTROLLED TEMPERATURE CHAIN (CTC)
Vaccine label indicates +2°C to +8°C for **all** storage and transport.	Vaccine label indicates +2°C to +8°C for **initial** storage and transport, and permits up to **40°C** for at least 3 days prior to use.
VVM — Vaccine vial monitors protect potency and quality by monitoring cumulative exposure to heat.	VVM + PTTI — Vaccine vial monitors and peak temperature threshold indicators protect potency and quality by monitoring cumulative and peak exposure to heat.
Conditioned ice packs or cool water packs are required in vaccine carriers.	No ice packs or cool water packs are required in vaccine carriers. Reduced risk of freezing.
No need for additional training, monitoring or supervision.	Health workers need additional training, monitoring and supervision.
When implemented correctly, preserves the safety and potency of the vaccine.	When implemented correctly, preserves the safety and potency of the vaccine.
Requires cooling equipment, transport, and human resources at all levels to maintain cold chain.	Half the cost.[1] Fewer freezers, fewer journeys and less staff time are needed to manage and maintain cold chain requirements.

WHY IS CTC USEFUL?

FEWER RESOURCES

80 Number of ice packs **needed daily** to vaccinate 1,000 people.[2]

5 **Number of freezers needed** to freeze 80 ice packs in 24 hours.[3]

22% Percentage of health facilities in surveyed countries that have **no refrigerators**.[4]

12% Percentage of cold chain equipment in surveyed countries that is **non-functional**.[4]

INCREASED COVERAGE

Number of days that health workers can remain in the field to reach more remote communities.[7]

3 or more, depending on the antigen

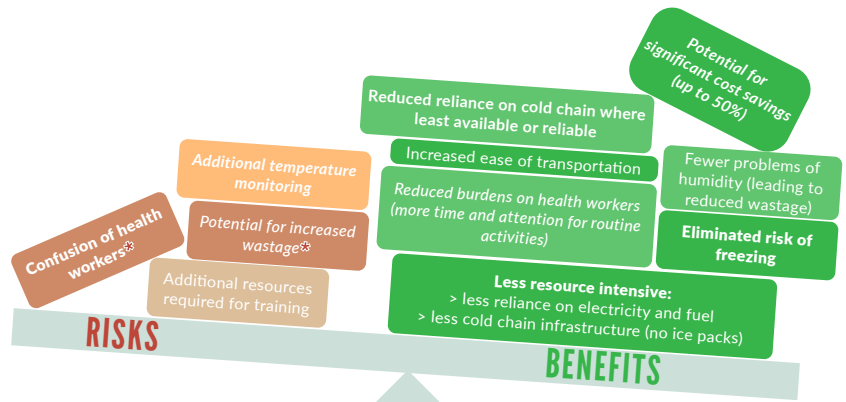
98.7% Percentage of vaccinators in Benin who agreed that CTC was useful or very useful in allowing them to vaccinate more persons.[6]

EASIER OUTREACH

1.6kg Weight of vaccine carrier **without** ice packs.[5]

4.0kg Weight of carrier loaded with **conditioned ice packs.**[5]

CONSIDERATIONS FOR CTC UPTAKE



* Easily mitigated through adequate training and supervision – no evidence of this problem in all CTC experience to date.

CHOLERA & CTC: QUICK FACTS

Shanchol™ was licensed and WHO-Prequalified in 2018 for use in a CTC: permitting a single removal from the cold chain into ambient temperatures not exceeding 40°C for up to 14 days prior to administration.

Numerous countries have already successfully delivered OCV through a CTC approach, including Bangladesh, Cameroon, Mozambique, and Zambia.

Immunization programmes should **contact the GTFCC for potential technical and financial support**, should a CTC approach be of interest.

#ENDCHOLERA #CTC_VACCINES

World Health Organization

Want to know more about CTC? Email **vaccines@who.int** or visit: **www.who.int/immunization/programmes_systems/supply_chain/**

1 Lydon P, et al. Economic benefits of keeping vaccines at ambient temperature during mass vaccination: the case of meningitis A in Chad. WHO Bulletin. 2014;92:86-92.

2 Assuming each vaccination team requires 8 ice packs per day to vaccinate 100 people. Need 10 teams to vaccinate 1,000 people. Translates to 80 ice packs to vaccinate 1,000 people in a day.

3 A commonly-used WHO pre-qualified freezer can freeze around 7.2 kg of ice packs in 24 hours. Five of these freezers are required to freeze 80 ice packs in 24 hours.

4 WHO EVM Database: data from the most recent EVM assessments in 64 countries across 6 WHO regions, 2010-2014.

5 A commonly-used WHO pre-qualified vaccine carrier with a capacity of 1.7 L weighs 1.6 kg when empty and 4.0 kg when fully loaded with ice packs.

6 Zipursky S, et al. Benefits of using vaccines out of the cold chain: Delivering Meningitis A vaccine in a controlled temperature chain during the mass immunization campaign in Benin. 2014. Vaccine;32:1431-1435.

7 Vaccines for different antigens may allow for excursions of an even higher number of days.