Maintain the Cold Chain

A learning module for those who transport and handle vaccines

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Introduction

- This learning module was developed using the *Vaccine Storage and Handling Guidelines (2021).*
- It is intended for staff who transport and/or handle publicly funded vaccines in health care provider offices, hospitals, long term care homes, pharmacies and any other facility that stores and handles publicly funded vaccines.

Learning Objectives

- Understand what the cold chain is and why it’s important to maintain.
- Learn how to maintain the cold chain.
- Learn how to recognize a cold chain incident as well as what to do if one happens.

The Cold Chain - What is it?

- The **cold chain** refers to ALL materials, equipment and procedures used to ensure vaccines remain within the required temperature range from the time it is manufactured until the vaccine is administered to the client.

Source:
Vaccine Storage and Handling Guidelines - Ontario Ministry of Health and Long Term Care

Maintaining the Cold Chain

- By maintaining the cold chain, health care providers play an important role in making sure vaccines are safe, effective and help protect the health of the public.
- Every person transporting, handling and storing vaccines do their part to maintain the cold chain.
- During this module, you will learn how to do your part to deliver effective vaccines to your clients.

Why is it so important?

- Vaccines are sensitive biological substances and they can lose their potency and effectiveness if they are exposed.
- Vaccines are considered exposed if they are not stored between 2°C to 8°C.
- If an exposed vaccine is administered to a client, their immune system may not fully respond.
- This means the client may not be protected against the disease(s) they are being vaccinated against.
- Exposed vaccines can also cause increased injection site reactions.

R.T.T. to Remember

R =
Refrigeration

T =
Thermometer

T =
Temperature Log

R = Refrigeration

- If vaccines are offered at your office or facility, a refrigerator must be designated specifically for vaccine storage.

Dedicated Fridge

- Make sure the refrigerator is large enough to accom-modate your vaccine supply.
- Do not store more than a one month supply of vaccine at any given time.

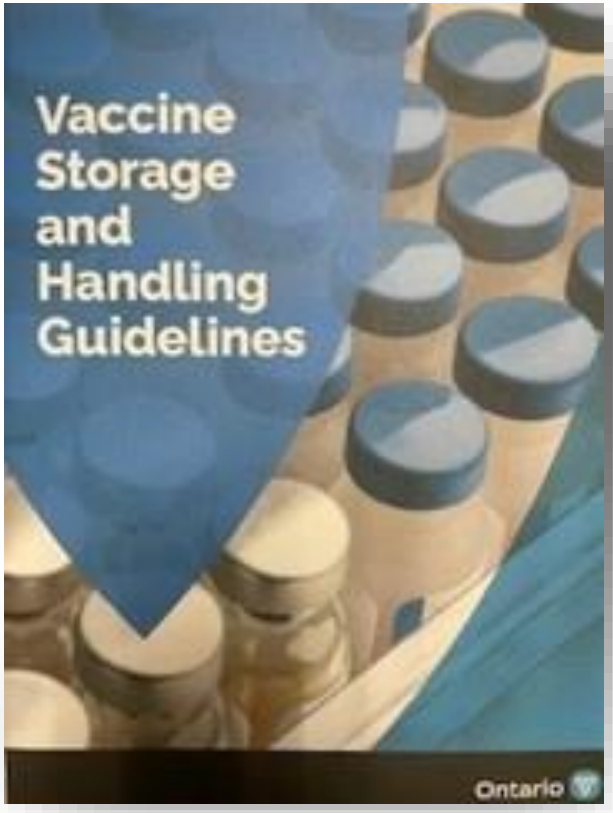
Beverages, food and medical/laboratory samples MUST NOT BE STORED in your vaccine refrigerator.

Refrigeration TIPS

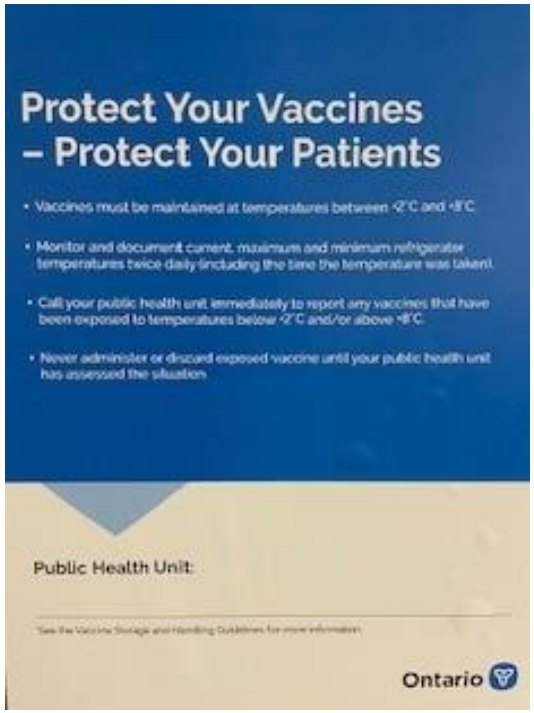
- Store vaccines in the middle of the refrigerator and organize by vaccine product.
- Vaccines with the earliest expiry dates at the front.
- Store in original packaging to protect from the light.
- Leave space between packages to allow air to circulate.
- Check expiry dates regularly and use vaccines with earlier expiry dates first.
- Store diluent with the corresponding vaccine.

Storage and Handling Guidelines

- Make the *Vaccine Storage and Handling Guidelines (2021)* document available to all staff handling vaccines.
- Download document here.



Poster

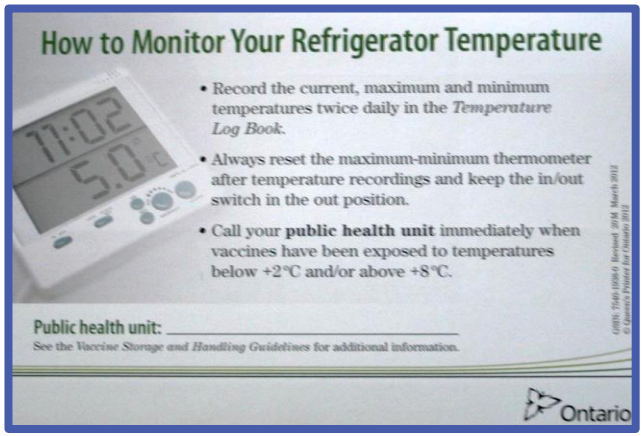


- Display the “Protect Your Vaccines – Protect Your Patients” poster on all vaccine refrigerators.

This poster will remind staff about the important steps to maintaining the cold chain (2°C to 8°C). It also reminds staff to call the Health Unit if the temperature is out of the range of 2°C to 8°C.

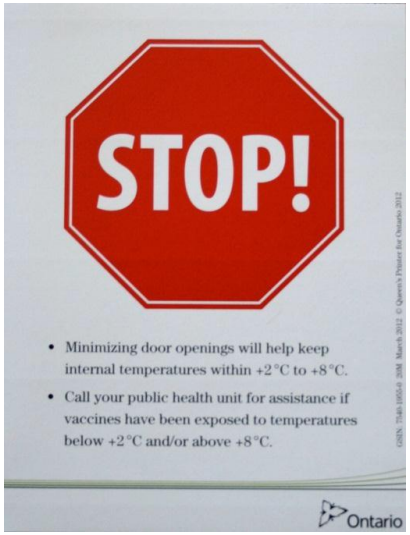
How to Monitor Sticker

- Post the “How to Monitor Your Refrigerator Temperature” sticker on all vaccine refrigerators.



This sticker will remind staff about the steps to follow in monitoring fridge temperatures. It also reminds staff to call the Health Unit if the temperature is out of the range of 2°C to 8°C.

STOP Sticker



Post the “STOP” sticker on all vaccine refrigerators.

This sticker will remind staff about the importance of maintaining the cold chain by limiting the number of times the door is opened. It also reminds staff to call the Health Unit if the temperature is out of the range of 2°C to 8°C.

DO NOT UNPLUG Sticker

- Place the “DO NOT UNPLUG” sticker beside the electrical outlet (e.g. plug-in) where it can be seen clearly so that the refrigerator is never unplugged or turned off.

Water Bottles

- Keep water bottles on the inside of the door and on the shelves of your refrigerator to help stabilize the refrigerator temperature.

Defrosting a Freezer

- Defrost the freezer when there is more than 1 cm or 3/8 inch of ice buildup present.

Why?

Ice buildup in the freezer can cause fluctuations or variations in the refrigerator temperatures.

Frozen Ice Packs

- Use ice packs to transport vaccines.
- Keep them in the freezer so they are ready to use.
- Use ice packs if you have a refrigerator malfunction or if the power goes out. Place a few inside the refrigerator as this may help keep the temperature from rising.

T = Thermometer

- Use a digital minimum-maximum thermometer to monitor fridge temperature.
- Thermometer must read to a tenth degree, example 4.3°C not just 4°C”.

Data Loggers

- Data loggers are continuous temperature recording devices, which offer a historical account of refrigerator temperatures.
- These devices store temperature readings which can be downloaded onto a computer.
- When using a data logger, the minimum, maximum and current temperatures still need to be recorded manually as a timely alert to any breach in the cold chain.
- The data logger display should be equipped with a digital display screen so the temperature can be visually checked whenever going into the refrigerator. This will also allow for troubleshooting if temperatures are at +3 ºC or +7 ºC.
- The data loggers should record temperature increments by 0.1 ºC

Thermometer Placement

- Secure your thermometer to your refrigerator OR place in a safe location where it will not be moved or bumped.
- Thermometer can be secured in place once ideal location has been determined.

Thermometer Placement

- Place a thermometer sensor inside an empty vaccine box to provide protection from short- term temperature fluctuations (i.e. after the door is opened and closed).

Label the vaccine box “DO NOT USE” so that the sensor will not accidentally be moved.

Thermometer Batteries

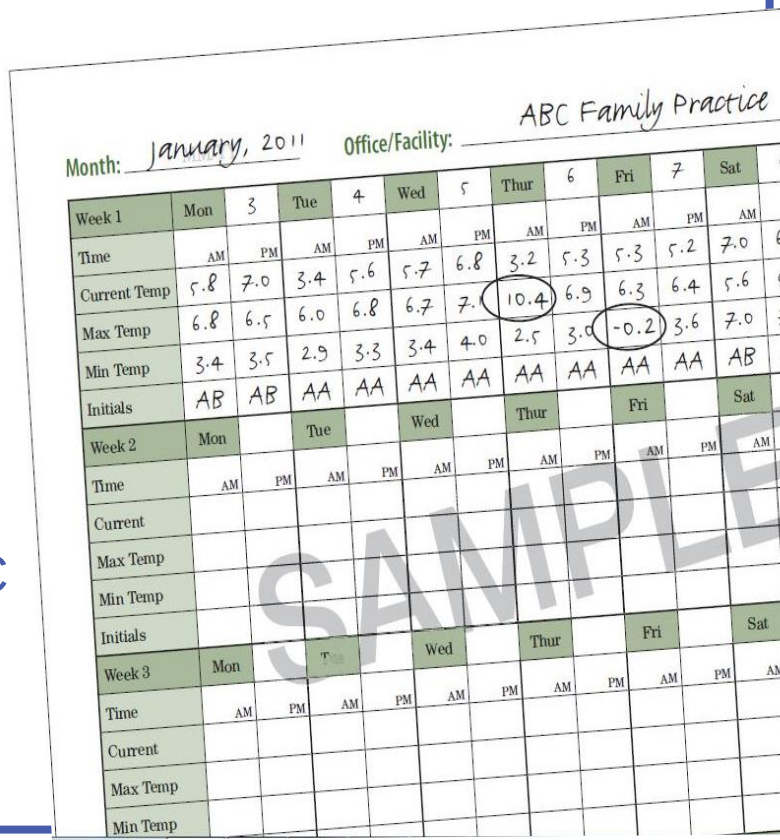
- Change the batteries in your digital thermometer EVERY SIX MONTHS (i.e. daylight savings) and record the in your temperature log book.
- Make sure you always have spare batteries on hand.

Try changing the battery if your thermometer is not working properly.

T = Temperature Log

- Make sure your temperature log is kept up- to-date.
- Use the information to help you make the right adjustments to the refrigerator in order to keep the vaccines safe and effective.

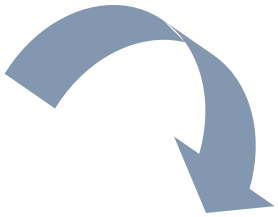
All temperatures below 2°C and above 8°C must be reported to the health unit


Month: January, 2011 Office/Facility: ABC Family Practice

Week 1	Mon	3	Tue	4	Wed	5	Thur	6	Fri	7	Sat	
Time	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	
Current Temp	5.8	7.0	3.4	5.6	5.7	6.8	3.2	5.3	5.3	5.2	7.0	
Max Temp	6.8	6.5	6.0	6.8	6.7	7.(	10.4	6.9	6.3	6.4	5.6	
Min Temp	3.4	3.5	2.9	3.3	3.4	4.0	2.5	3.(	-0.2	3.6	7.0	
Initials	AB	AB	AA	AA	AA	AA	AA	AA	AA	AA	AB	
Week 2	Mon		Tue		Wed		Thur		Fri		Sat	
Time	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	
Current												
Max Temp												
Min Temp												
Initials												
Week 3	Mon		Tue		Wed		Thur		Fri		Sat	
Time	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	
Current												
Max Temp												
Min Temp												

T = Temperature Log

The information in the temperature log is essential if there is a break in the cold chain (e.g. the temperature is not kept between 2˚C and 8˚C).



This information will help Health Unit staff determine if any exposed vaccines can still be used.

You will need to submit a copy of your temperature log each time you order vaccines from the Health Unit.

Transporting Vaccine

- Transport vaccines in a monitored, insulated hard sided cooler to ensure they stay in the temperature range between 2°C to 8°C.
- Use an insulated hard sided cooler with icepacks, a thermometer, cryopak and a protective layer of bubble wrap to pick up vaccines from the Health Unit.

The Cooler

Use an insulated hard sided cooler for:

- Transporting vaccines.
- Temporary storage of vaccines during equipment maintenance
  (e.g. defrosting refrigerator).
- Emergency storage of vaccines during equipment or electrical failure
  (e.g. power outage).

Getting the cooler ready…

Step 1:
Approved insulated hard sided cooler.

Step 2:
Cover the bottom of the cooler with frozen ice packs. Then cover with one of layer bubble wrap.

Getting the cooler ready…

Step 3:
Place refrigerated cryopak blanket on bubble wrap and place thermometer probe (in a vaccine box) on the blanket.

Step 4:

Fold cryopak blanket over thermometer probe, close lid of cooler.

Getting the cooler ready…

Step 5:
Monitor until temperature is between 2° and 8° C.

Step 6:

Once desired temperature range has been reached, place vaccine between layers of cryopak blanket, fold blanket over vaccine.

Getting the cooler ready…

Step 7:

Close lid, cooler is now ready for transportation.

DO NOT PUT the cooler in the trunk of a vehicle – this puts vaccines at risk for exposure to extreme temperatures outside the 2˚C to 8˚C range.

Cold Chain Incidents

- A cold chain incident happens if the current, minimum or maximum temperature inside a vaccine refrigerator or insulated hard sided cooler falls **below 2˚C or rises above 8˚C**.

All cold chain incidents must be reported to the Health Unit right away.

Reporting a Cold Chain Incident

Step 1

Contact the Health Unit's Vaccine Preventable Disease Program:

705-721-7520

or toll-free at 1-877-721-7520

Extension 8806

Reporting a Cold Chain Incident

Step 2

- Complete the Vaccine Cold Chain Incident Exposure/Wastage Report Form faxed to you by the immunization nurse.
- Follow the directions on the cover sheet.

Make sure all information is easy to read and include the brand names of all vaccines involved.

Reporting a Cold Chain Incident

Step 3

- Fax two documents to the Vaccine Preventable Disease Program (number on the fax cover sheet).
    1. Vaccine Cold Chain Incident Exposure/ Wastage Report form, which must include a list of the vaccine inventory.
    2. A copy of your temperature log book.

Health Unit staff will use all information to determine if the vaccine is viable.

Reporting a Cold Chain Incident

Step 4

After the report form has been reviewed and assessed follow the directions provided by Health Unit staff.

How to Prevent Incidents

- Store vaccines in the middle of the refrigerator.
- Vaccines with the earliest expiry dates at the front.
- Order a two weeks supply at a time.
- Keep refrigerator door closed during a power outage to try and keep temperatures within range.
- Record the time.
- Record current minimum and maximum temperatures of the refrigerator.
- Re-set the thermometer.

Contact the Health Unit if temperature goes outside of the 2˚C to 8˚C range.

Exposed and Expired Vaccines

Exposed When:

- It is stored or handled at temperatures below 2˚C or above temperatures of 8˚C for any period of time.
- It is not stored according to the manufacturer's recommendations.

Expired When:

- It is past the expiration date listed on the vial.

The Vaccine Return Authorization form must be completed when returning expired or exposed vaccine.

Storing Multi-dose Vials

- Mark the date the first dose was drawn on all multi-dose vials.

All multi-dose vials are stable for a specified period of time after the first dose is drawn. Please refer to the product monograph for this information.

Storing Multi-dose Vials

- Put any unused vaccine back into the refrigerator immediately after the required dose is drawn up.

Storing Multi-dose Vials

- Return any vaccine that is past the specified date by using the Vaccine Return Authorization form.
- See information on exposed and expired vaccines.

QUIZ

Test Your Knowledge

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Question 1

Universal immunization is one of the most cost-effective ways to prevent disease.

- True
- False

Question 2

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The cold chain refers to:

A All of the materials, equipment, and procedures used to keep vaccines at the proper storage temperature.

B The temperature logs used to monitor vaccine temperatures.

C The chain used in a refrigerator motor that keeps vaccine storage temperatures stable.

Question 3

How many times a day should you record your current, minimum and maximum temperatures in your temperature log book:

A Once a week using a digital thermometer.

B Twice a day using any type of thermometer, as long as it's the same one each time.

C Once a month or whenever someone gets around to it.

D Twice a day using a digital thermometer that records current, minimum and maximum temperatures.

Question 4

- Most vaccines should be stored between:

A 3ºC and 10ºC

B 1ºC and 6ºC

C 2ºC and 8ºC

D 0ºC and 4ºC

Question 6

When picking up your vaccines at the Health Unit, they will only be dispensed to you if the temperature inside your cooler is between 2 - 8°C.

- True
- False

Question 7

Once vaccines are exposed to temperatures outside of the 2 - 8°C range, the Health Unit should be contacted right away.

- True
- False

Question 8

- Ice build-up in the freezer of the fridge doesn’t cause fluctuations in temperatures.

  - True
  - False

Question 9

- Once opened, multi-dose vials are stable for a specified period of time after the first dose is drawn. This information can be found in the product monograph.

- True
- False

How did you do?

- Question 1 = True
- Question 2 = a
- Question 3 = d
- Question 4 = c
- Question 5 = True
- Question 6 = True
- Question 7 = True
- Question 8 = False
- Question 9 = True

According to the Canadian Public Health Association (CPHA), infectious diseases were the leading cause of death worldwide one hundred years ago. Today, the situation is much different.

Thanks to immunization programs, infectious diseases now cause less than 5% of all deaths. Immunization has probably saved more lives in Canada in the last 50 years than any other health intervention.

Resources

Copies of all of the resources listed
in this learning module are available by calling

Health Connection

at 705-721-7520

or toll-free 1-877-721-7520, ext. 8806

www.simcoemuskokahealth.org/JFY/HPPortal/PCPCategories/Immunization.aspx