Slide 1

Hello and welcome to this webinar. My name is Lieutenant Commander Neil Murthy, and I am a U.S. public health service medical officer at the Centers for Disease Control and Prevention. Vaccines are critical tools that we have to protect populations, and in this webinar, we’re going to discuss how you as frontline healthcare workers can employ best practices to store and transport vaccines once you receive them at your practice.

Slide 2

The ongoing COVID-19 pandemic has placed a great strain on our nation’s public health and healthcare system. As of March 2021, there have been over 27 million cases and over half a million deaths from this disease.

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Public interest in vaccines has renewed ever since the Food and Drug Administration authorized the use of multiple COVID-19 vaccines under emergency use authorization.

Slide 4

Some of these products require two doses

Slide 5

While other products only require a single dose.

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Regardless of the type of vaccine, frontline healthcare workers are responsible for storing, handling and transporting vaccines once you receive them at your practice site. How you store, handle and transport vaccines is critical to ensure that vaccines remain safe and effective at protecting patients and saving lives.

Slide 7

In this webinar, we will review the best practices on storing, handling and transporting vaccines, so that you can avoid errors and build public trust in vaccines.

Slide 8

You play a critical role in ending the COVID-19 pandemic. Let’s get started!

Slide 9

Let’s first begin with an overview of the cold chain.

Slide 10

The cold chain is a schematic framework that describes how vaccines should be kept at appropriate temperatures all the way from the point of manufacturing to the shot in a patient’s arms. Depending on the severity of a break in the cold chain, vaccinations may need to be counted as invalid, resulting in extra doses for patients, increased costs for healthcare providers, and damage to public confidence in vaccines.

Slide 11

As a healthcare provider, you are responsible for the last three circles in this cold chain. From the moment the vaccine arrives at your facility to the moment it is delivered in a patient’s arm, you are responsible for maintaining the cold chain to ensure vaccine safety and potency, since once lost, vaccine potency cannot be restored.

Slide 12

Before you receive vaccine at your facility, you will need to make sure that you have the three main elements to maintain an effective cold chain. These elements are

Slide 13

having a well-trained staff,

Slide 14

reliable storage and temperature monitoring equipment,

Slide 15

and accurate vaccine inventory management.

Slide 16

These three elements are especially important if you plan to locally transport the vaccine to meet the needs of your patient population. There are many instances when you may need to locally transport the vaccine.

Slide 17

For instance, once you receive the vaccine, you may need to transport the vaccine to pharmacies

Slide 18

To non-traditional vaccination centers like schools or churches

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To satellite, drive-through clinics or mobile outreach units

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Or even to homes during home visits.

Slide 21

So what are the best practices that you as a healthcare provider can employ to maintain the cold chain during all stages of vaccine storing, handling and transport?

Slide 22

CDC has provided recommendations for healthcare providers to help maintain the cold chain.

Slide 23

Every healthcare facility receiving vaccines should develop and maintain clearly written, detailed, and up-to-date vaccine storage and handling standard operating procedures. For templates that serve as examples, please refer to the "Additional Resources" slide at the end of this presentation.

Slide 24

Facilities should also train staff on vaccine storage and handling during both normal operations and in emergency situations,

Slide 25

And finally, health care facilities should designate a primary and secondary vaccine coordinator who is responsible for ensuring all vaccines are stored and handled properly and can serve as an expert at the facility.

Slide 26

We will now delve into specific considerations for vaccine storage, handling and transport that you might face as a healthcare provider.

Slide 27

Let’s start with special considerations that you should be aware of when the vaccine arrives at your facility.

Slide 28

As soon as a vaccine shipment arrives at your facility, the delivery requires your immediate attention. Never leave a vaccine shipping container unpacked and unattended, because if vaccines and diluents get too warm, they cannot be used. Never place an unopened or unpacked shipment box directly in a vaccine storage unit because the cool packs shipped with the vaccine may make the packaged vaccine too cold if placed immediately inside the storage unit. And finally, staff members who accept vaccine deliveries should be trained to immediately notify the vaccine coordinator or alternate coordinator when deliveries arrive.

Slide 29

Immediately examine the contents of the shipment for any signs of damage, and to guarantee receipt of the correct vaccine types and quantities. Additionally, check both vaccine and diluent expiration dates to ensure that you have not received any expired or soon-to-expire products. And lastly, check the cold chain monitor, a device used to monitor vaccine temperatures during transport, for any indication of a temperature excursion during transit, since a temperature excursion may not be readily apparent.

Slide 30

It’s important to note that for vaccines that are normally stored at ultra-cold temperatures, there are specific unpacking instructions, which may differ from those for other types of vaccines. Always refer to the manufacturer instructions for unpacking such vaccines.

Slide 31

The vaccine coordinator should rotate vaccine stock and check for expired doses at least once a week. Any expired vaccines and diluents should be removed immediately to avoid inadvertently administering them. Arrange your vaccine stock so that doses with the earliest expiration dates are placed in front of those with later expiration dates.

Slide 32

Let us now move on to refrigerator and freezer recommendations

Slide 33

There are many kinds of vaccine storage units that can be used to store vaccines. Ideally, vaccines should be stored in units that are designed to store biologics. However, household grade units are acceptable to refrigerate many types of vaccines. Do not store vaccines in dormitory-style or bar-style units. Vaccines and their diluents should be stored in separate containers with lids closed until ready for administration.

Slide 34

Always make sure that the door of the storage unit is properly closed or sealed. A door left open not only affects the temperature in a unit, but it also exposes vaccines to light, which can reduce vaccine potency. Consider using safeguards to ensure the doors of the unit remain closed—for example, self-closing door hinges, door alarms, or door locks.

Slide 35

Refrigerator or freezer thermostats should be set at the factory-set or midpoint temperatures, which will decrease the likelihood of temperature excursions. Always be mindful of how much time has elapsed if a vaccine is left unrefrigerated. As a reminder, the Pfizer-BioNTech, Moderna and Janssen Johnson & Johnson Covid-19 vaccine temperature ranges are all presented here.

Slide 36

To monitor temperatures, CDC recommends using a Digital Data Logger or DDL. A DDL provides the most accurate storage unit temperature information, including details on how long a unit has been operating outside the recommended temperature range. DDLs use a buffered temperature probe, which is an accurate way to measure actual vaccine temperatures, instead of inadvertently measuring air temperatures. If you are monitoring ultra-cold temperatures, like for the Pfizer BioNTech COVID-19 vaccine, make sure your DDL and probe is appropriate for ultra-cold monitoring. Finally, if your DDL does not read minimum and maximum temperatures, then check and record the temperature at least twice a day.

Slide 37

Maintaining a power supply is so critical since a power outage can destroy the entire vaccine supply! Because maintaining a power supply is so important, you must have emergency back up plans in case there is a power failure. Emergency plans can include having a working relationship with at least one alternative storage facility to transfer vaccines, even if you have a generator as backup equipment. Since emergencies can arise outside of normal business hours, make sure all clinic staff members are trained and are familiar with emergency protocols to salvage vaccines. Finally, you must implement engineering controls to prevent accidental power outages. Use a safety-lock plug or an outlet cover to prevent the unit from being accidentally unplugged. Post “DO NOT UNPLUG” warning signs at outlets and on storage units to alert staff, custodians, electricians, and other workers not to unplug units. Here’s an example of a “DO NOT UNPLUG” sign. And finally, label fuses and circuit breakers to alert people not to turn off power to a storage unit.

Slide 38

And if a power outage results in a temperature excursion as recorded by your digital data logger, notify the vaccine coordinator immediately. Label exposed vaccines as "DO NOT USE" and place them in a separate container. Contact your immunization program or vaccine manufacturer per your standard operating protocol for further guidance on whether to use affected vaccines. And finally, as a reminder, NEVER refreeze vaccine that is already thawed.

Slide 39

Now let's give you an opportunity to check your knowledge so far. What do you think? What is the most reliable source for specific unpacking instructions for vaccines that arrive at ultra-cold temperatures? We will give you a few seconds to think about the question…

Slide 40

The most reliable source for guidelines for unpacking vaccines at ultra-cold temperatures is the manufacturer's instructions, because unpacking directions may differ from other types of vaccines.

Slide 41

Let us now move on to transport considerations for distributing vaccines locally.

Slide 42

As mentioned earlier, there are many reasons to locally transport vaccines to satellite clinics, pharmacies, or offsite locations to meet the needs of your patient population.

Slide 43

But it is during that short transport between locations when vaccine supplies can be compromised if appropriate measures are not taken.

Slide 44

In order to protect your vaccine supply during transport, establish protocols beforehand that clearly outline the transport process. Identify trained staff to pack vaccines as well as primary and backup vehicles and drivers in advance. Consider renting a refrigerated truck if you have a large quantity of vaccines or need to transport vaccines an extended distance.

Slide 45

Certain vehicle considerations apply to both emergency and routine off-site clinic transport. You should always use the passenger compartment for transport as opposed to the vehicle trunk because it is easier to monitor the vehicle temperature. If possible, avoid exposing the vaccine to direct sunlight during the transport, and upon arrival move the vaccines into the storage unit.

Slide 46

For transport to an off-site location, either use a portable vaccine refrigerator or freezer, or a qualified container with packout. You should definitely use a temperature monitoring device, preferably a DDL with a buffered probe to ensure your vaccines stay in range for the whole transport process. Transport diluents with their corresponding vaccines to ensure there are always equal amounts of vaccines and diluents for reconstitution. Only in emergencies should you ever use the manufacturer’s original shipping container to transport vaccine, but never use a food or beverage cooler.

Slide 47

There are further considerations that must be taken into account when transporting COVID-19 vaccines. To protect these vaccines as much as possible, never shake, drop or vibrate the vials. Always try to transport the vials in cartons, but if individual vials must be transported, place the vials with padding materials such as bubble wrap. Secure the storage containers and keep the vials upright whenever possible.

Slide 48

Now let's give you another opportunity to check your knowledge so far. What do you think? What considerations should you think about when you are transporting vaccines in a vehicle?

We will give you a few seconds to think about the question…

Slide 49

As discussed earlier, when transporting vaccines, you should always use the passenger compartment when transporting vaccines as opposed to the vehicle's trunk. If possible, avoid exposing the vaccine to direct sunlight during transport, and upon arrival move the vaccines into the storage unit.

Slide 50

Finally, let us discuss preparing the vaccine for administration.

Slide 51

Vaccine preparation is the final step in the cold chain before administration. Handling vaccines with care is equally as important as storing them properly.

Slide 52

Prepare vaccines in a designated area away from any space where potentially contaminated items are placed.

Slide 53

Only prepare vaccines when you are ready to administer them, and only administer vaccines that you have prepared.

Slide 54

Always check expiration dates on both diluents and vaccines before reconstituting them and before vaccine administration.

Slide 55

These are all quality control and patient safety checks that are considered best practices and standards of medication administration.

Slide 56

Let us now turn to special considerations for the COVID-19 vaccines authorized by the FDA under emergency use.

Slide 57

It is important to note that instructions for handling COVID-19 vaccines are evolving and may be different from those of routinely administered vaccines. For the most up to date specific guidance on how to store, transport, handle, and administer COVID-19 vaccines, please refer to the COVID-19 Vaccine Addendum of CDC’s Vaccine Storage and Handling Toolkit, linked here.

Slide 58

Additional resources for storage, handling and transporting vaccines are provided here.

Slide 59

Slide 60

I would like to thank the CDC COVID-19 Vaccine Task Force Clinical Education Team for their contributions to this webinar

Slide 61

This concludes this webinar, and thank you so much for your attention.