Vaccine Cold Chain Management

Overview

Vaccination is a response measure that may be implemented in an animal health emergency. Most vaccines must be kept cold (or rarely frozen) before administration to remain effective. This handout explains how to keep vaccines at the proper temperature at all points in the supply chain using a system known as the cold chain.

What is the Vaccine Cold Chain?

The cold chain ensures proper temperature maintenance during vaccine manufacturing, distribution, storage and handling, transport, and administration. Excessive heat or cold can damage a vaccine, reducing its potency (strength) and, in some cases, rendering it completely ineffective. Light also damages some vaccines.

Vaccine Storage and Handling

Once vaccines have arrived at the distribution site, animal health personnel are responsible for maintaining the cold chain. Not all vaccines have the same temperature requirements. Always refer to the manufacturer's recommendations for specific vaccine storage and handling requirements.

- **Refrigerated vaccines** must be stored at 35 to 46°F (2 to 8°C) in a household or commercial refrigerator. Refrigerated vaccines should never be frozen.
- **Frozen vaccines** must be stored at 5°F (-15°C) or lower in a household or commercial freezer.
- **Diluents** (used to reconstitute dried vaccines) do not always require refrigeration. However, they should be stored in the vaccine storage unit with their corresponding vaccine.

Vaccines must be stored in the main compartment of refrigerators or freezers. Do not store vaccines in refrigerator/freezer doors, vegetable bins, or on the top shelf. Small, dormitory-style units should not be used for long-term vaccine storage. Dry ice should not be used for vaccine storage, even temporarily.

Arrange vaccines and diluents in rows with space between them so cold air can circulate. Keep vaccines and diluents with the earliest expiration dates in front so they are used first. Vaccines in storage units should be rotated and checked for expired doses regularly. Vaccines past the expiration date should never be used.

Newly installed or repaired refrigerators and freezers take time to reach the required temperatures for vaccine storage. Once in use, the storage temperature should be monitored and recorded twice daily using an internal calibrated thermometer, ideally at the start and end of the workday.

Vaccine Transport

Portable refrigerator or freezer units are preferred for transport to the vaccination site, but if unavailable in an emergency, products can be packed using the following:

- **Qualified containers**: original shipping box from the manufacturer, Styrofoam cooler, or a hard-sided insulated cooler (no soft-sided, collapsible coolers).
- **Coolants**: gel packs or frozen water bottles (do not reuse gel packs or coolant packs from the original vaccine shipment or loose or bagged ice).
- **Insulating materials**: cushioning materials (bubble wrap, packing foam, or Styrofoam) to place above and below the vaccine, and cardboard cut to fit the interior dimension of the cooler.

The transport package should include a temperature monitoring device or a cold chain monitor. Heat indicators determine if temperatures have exceeded a temperature limit (for example, 50°F or 10°C), and for how long. Freeze indicators do not show the time exposed to freezing temperatures, only that the vaccine has dropped below 32°F (0°C). Immediately upon arrival at the destination, vaccines should be unpacked and placed in a refrigerator or freezer as required.

You cannot tell if a vaccine has been damaged by looking. If there has been a temperature reading outside of the recommended range during transport, contact animal health officials before using the vaccine. Label the vaccine DO NOT USE and store at appropriate temperatures until further guidance is received from officials. DO NOT IMMEDIATELY DISCARD THE VACCINE, as vaccines may be in short supply in the event of an outbreak.

Key Points

- Manufacturers, distributors, and animal health personnel all play a role in maintaining the vaccine cold chain.
- Always check the vaccine label to determine temperature requirements. If a temperature failure occurs, consult animal health officials before discarding vaccines.

Additional Just-In-Time training resources can be found on the CFSPH website.

Development of this resource was funding through
the USDA National Animal Health Preparedness and Response Program.

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Iowa State University College of Veterinary Medicine