MODULE 5-B: Vaccine Storage and Handling
Vaccine Storage Equipment

Storage and Handling

Even a small practice is likely to have thousands of dollars' worth of vaccine in the refrigerator at a time. Think of your vaccine storage equipment as an insurance policy to protect patients' health and your facility against costly vaccine replacement, inadvertent administration of compromised vaccine, and other potential consequences (e.g., the costs of revaccination and loss of patient confidence in your practice). Vaccines must be stored appropriately in order to maintain potency. A temperature controlled environment used to maintain and transport vaccines in optimal condition is called the vaccine cold chain. The vaccine cold chain relies on three main elements:

- Effectively trained personnel
- Appropriate transportation and storage equipment
- Efficient management procedures

A staff member at each facility must be designated as the vaccine coordinator who will be responsible for ensuring that all vaccines are stored and handled correctly. One back-up vaccine coordinator must be designated who can assume the same responsibilities in the absence of the primary vaccine coordinator.

Vaccine Storage Units

Providers must have appropriate equipment that is used only for vaccine storage (i.e., no food or drink is in the unit) and maintains proper temperature required conditions for vaccine storage.

Refrigerators and Freezers

It is highly recommended that providers use stand-alone refrigerator and freezer units, meaning a self-contained unit that only refrigerates or freezes and is suitable for vaccine storage. These units can vary in size, from a compact, under-the-counter style to a large, stand-alone, pharmaceutical grade storage unit. However, a combination refrigerator/freezer unit sold for home use is acceptable for vaccine storage if the unit has **dual controls** (i.e., the refrigerator and freezer thermostats are controlled separately) and the refrigerator and freezer compartments each have **separate external doors**.

The refrigerator and freezer units must:

- Have enough room to store the year's largest inventory without storing vaccines against the walls, floor, ceiling, and vents of unit.
- Have enough room to store water bottles (in the refrigerator) and frozen gel packs (in the freezer) to stabilize the temperatures and minimize temperature excursions that can impact vaccine potency. The addition of

water bottles in the refrigerator (not coolant packs) reduces the risk of freezing due to the tremendous latent heat released from water prior to freezing.

- Have a calibrated thermometer with Certificate of Traceability and Calibration Testing centrally located with the vaccine inside each storage unit.
- Reliably maintain the appropriate vaccine storage temperatures year-round.
- Be dedicated to the storage of vaccines. Food and beverages should NOT be stored in a vaccine storage unit because this practice results in frequent opening of the door and destabilization of the temperature.

Please note: Beginning on March 1, 2016, providers will be required to use a continuous temperature monitoring device with a probe buffered material in all of their VFC vaccine storage units. The temperature readings are required to be uploaded into Florida SHOTS. The VFC Program is supplying providers with a Log Tag for each of their VFC vaccine storage units to meet this new requirement. If a provider would like to purchase their own continuous monitoring device they will need to contact the VFC Program for more information.

Protecting Power Supply

To prevent problems with the power supply, take the following steps:

- Plug only one storage unit into an outlet to avoid triggering a safety switch and turning off power, and to avoid creating a fire hazard.
- Use a safety-lock plug or an outlet cover to prevent unplugging.
- Post warning signs at plugs and on storage units alerting staff, custodians, electricians, or other workers not to unplug units (Do NOT unplug).
- Label fuses and circuit breakers to alert people not to turn off power to storage units. Labels should include immediate steps to take if power is interrupted. If your building is owned by a third party and you do not have access to circuit breakers, work with your building manager.

Avoid using power outlets with:

- Built-in circuit switches (they have little red reset buttons).
- Outlets that can be activated by a wall switch.
- Multi-outlet power strips.

These can be tripped or switched off, resulting in loss of electricity to the storage unit.

Dormitory or bar-style refrigerators are not permitted for ANY vaccine storage. A dormitory or bar-style refrigerator is defined as a small combination refrigerator/freezer unit that is outfitted with one external door and has an evaporator plate (cooling coil) which is usually located inside the "freezer" within the refrigerator. Dormitory or bar-style refrigerators place vaccine at a high risk of freezing.

Storage Unit Placement

Good air circulation around the storage unit is essential. Place the unit(s) in a well-ventilated room with space around the sides and top. Allow at least 4 inches (10 cm) of space between unit and wall. Nothing should block the cover of the motor compartment, which is normally located at the back or side of the unit. Make sure the unit stands firm and level and wheels or leveling legs are adjusted so the bottom of the unit is 1 to 2 inches (2.5 to 5 cm) above the floor. Refer to the manufacturer-supplied owner's manual for additional guidance on placement.

Storage Unit Temperatures

Refrigerator storage units must maintain temperature between 35°F and 46°F (2°C and 8°C) at all times. Setting the temperature control to achieve an average of 40°F will provide the best safety margin.

Freezer storage units must maintain temperatures between -58°F and +5°F (-50°C and -15°C) at all times.

It is recommended that water bottles are placed in the refrigerator and gel packs are placed in the freezer to help stabilize internal temperatures, including those times in which power outages occur. (Additionally, this practice will provide readily available cold packs for storing or moving vaccine in the event you need to activate your emergency plan.) Label water bottles with "Do NOT drink."

Vaccine Storage and Handling Best Practices

The Centers for Disease Control and Prevention's Vaccine Storage and Handling Toolkit is a comprehensive resource for providers on vaccine storage and handling recommendations and best practice strategies. It includes considerations for equipment both storage units and temperature monitoring devices, strategies for

maintaining the cold chain, routine storage and handling practices, inventory management and emergency procedures for protecting vaccine inventories. The toolkit can be found at: **www.cdc.gov/vaccines/recs/storage/toolkit/default.htm**.

Vaccine Storage

Always refer to the manufacturer's product information/package insert for the most up-to-date storage and handling recommendations for specific vaccines and diluents.

- Placement and organization within the storage unit is vital to maintaining vaccine stability. Store vaccines away from walls, floor, ceiling, and vents. The thermometer or probe is required to be centrally located in the storage unit.
- Avoid storing vaccines on top shelf. If top shelf of refrigerator must be used, place water bottles close to vent and only store vaccines that are not sensitive to coldest temperatures (e.g., MMR).
- Place the vaccines in the center of the refrigerator, leaving adequate space, 2 to 3 inches from wall, for air circulation. (Some areas of the refrigerator—e.g., in the door or near the sides— may hold different temperatures than the center of the unit.) Vaccines must be stored on the shelves of the refrigerator or freezer, not in the door or in crisper drawers. (Crisper drawers should be removed from the refrigerator.)
- Small trays may be used to help quickly move stock within a refrigerator, reducing the amount of time the door must remain open, potentially exposing vaccines to warmer air temperatures.
- Clearly identify the location of each specific vaccine type and diluent by attaching labels to shelves, trays, or containers/ bins where each is stored. Label pediatric and adult versions of the same vaccine to avoid confusion.
- Store all vaccines in their **original** box. Protect the following vaccines from light: Varivax, Zostavax, ProQuad, M-M-R II, Hiberix, Gardasil, Gardasil9 Afluria, Agriflu, Fluarix, Flublok, Flucelvax, FluLaval, Fluvirin, IPOL, MenHibrix, Menveo, Rotarix, and RotaTeq.
- VFC vaccines must be segregated and/or marked in such a way that they are easily distinguished from privately purchased vaccines. This does NOT mean that VFC and privately purchased vaccines must be stored in separate refrigerator(s) or freezer(s).
- Do not store food or drink in vaccine refrigerators or freezers.
- Do not place the vaccine directly under the outlet that blows air from the freezer into the refrigeration area.

Diluents

Some diluents must be stored in the refrigerator. Other diluents have an option of being stored at room temperature (no warmer than 77°F [25°C]) or in the refrigerator. Whenever possible, store diluent with the corresponding refrigerated

vaccine. Diluents for Pentacel (DTaP-IPV-Hib combination vaccine) and Menveo (meningococcal conjugate vaccine) contain antigen. They are packaged together with the corresponding lyophilized vaccine and must be stored together. NEVER store diluent in the freezer.

Medications and Other Biologic Products

If possible, other medications and biologic products should not be stored inside the vaccine storage unit. If there is no other choice, these products should be stored below the vaccines on a different shelf. This prevents contamination of the vaccines should the other products spill, and reduces the likelihood of medication errors. NEVER store these products in the same tray or container/bin as vaccines.