



The Requirements

Vaccine storage units must be selected carefully and used properly. The CDC and Oregon VFC highly recommended the selection of stand-alone refrigerator and stand-alone freezer units suitable for vaccine storage rather than combination (refrigerator+freezer) units not designed for storing fragile biologics. Dorm-style or bar-style refrigerator/freezers are not allowed for ANY type of vaccine storage.

As required by the CDC and Oregon VFC program, any unit housing VFC vaccine must have the following:

1. **Enough room to store the year's largest inventory without crowding.**
2. **Enough room to store water bottles (in the refrigerator) and frozen coolant 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 significant latent heat released from water prior to freezing.**
3. **A calibrated thermometer centrally located in each storage unit.**
4. **The ability to reliably maintain the appropriate vaccine storage temperatures year-round.**
5. **A unit dedicated to the storage of vaccines only. Food and beverages must NOT be stored in a vaccine storage unit. This practice results in frequent door opening and temperature destabilization.**

The Requirements Explained

Stand-alone vs. combined

It is strongly recommended that you use stand-alone, refrigerator and freezer units for your vaccine storage. Separating the units helps to mitigate the risk of catastrophic loss and reduces wear on vital components like compressors and condensers. Most importantly, separating the refrigerator and freezer eliminates the troublesome cold air tug-of-war so common to combined units (and so detrimental to vaccine storage).

Household vs. biomedical-grade

According to studies commissioned by the CDC and conducted by National Institute of Standards and Technology (NIST), household style, single-condenser combination refrigerator/freezer units are less capable of simultaneously maintaining proper storage temperatures in the refrigerator and freezer compartments. This is due to the imprecise mechanism used to divert chilled air from the freezer directly into the refrigerator compartment. This leads to sub-zero temperatures being blown directly onto sensitive vaccines. By far, the best practice is to choose separate refrigerator and freezer units purpose-built for the precise storage of sensitive biologics. **Simply put: household-style units are designed for your kitchen not your clinic.** If you choose to use a household unit, CDC recommends that you use only the refrigerator portion of the unit for vaccine storage and purchase a separate under counter unit for storing frozen vaccine.

Dorm-style & bar-style refrigerator/freezers

Small single-door combined refrigerator-freezer units should never be used for ANY type of vaccine storage. The freezer compartment is incapable of maintaining temperatures appropriate for varicella and zoster vaccine storage. Furthermore, cold air from the freezer compartment is often vented down into the main compartment causing unstable and inconsistent refrigerator temperatures.



Equipment Options

With the above guidelines in mind, we have compiled a short list of equipment options that meet or exceed Oregon VFC and CDC requirements. The list covers a wide range of price points and configurations to fit any clinic size or budget. This guide is far from exhaustive and is only meant as an overview (with examples) of the *types* of storage units to consider during your search.

As always, the Oregon Immunization Program is here to help. Don't hesitate to contact our VFC health educators with any question you have about these requirements or the storage options you are considering.

Disclaimer

As a state agency, we are precluded from endorsing any specific brand or product. Ultimately, the terms and conditions of your purchase are between you and your vendor.

Manufacturers to Consider

Panasonic Biomedical
www.sanyobiomedical.com

Lab Research Products
www.labresprod.com

Follett
www.follettice.com

Gem Scientific
www.gemref.com

Helmer
www.helmerinc.com

Fisher Scientific
www.fishersci.com

Thermo Scientific
www.thermo.com

Sun Frost (energy efficient)
www.sunfrost.com

Used and Refurbished Equipment

There are several used and remanufactured equipment vendors online. Prices are often 30-50% off retail. Also consider calling your manufacture of choice and asking about less expensive used units. Helmer, for example, has a rotating inventory of scratch and dent units that come with a much lower price tag and a full warranty. As with any large purchase, only buy from reputable vendors and get all guarantees/warranties in writing.

Alliance Analytical

<http://www.aisolutions.com>

Lab X

<http://www.labx.com>

Ace Laboratory Systems

<http://www.ancelabsystems.com>

Labequip

<http://www.labequip.com/>

Equipment Repair

If your refrigerator or freezer malfunctions, the following companies serve various regions throughout Oregon. They may either assist you with repairs or refer you to another area.

Household-style units:

Appliance and Refrigeration Hospital

503-281-0041

www.appliancehospital.com

Biomedical-grade units:

Commercial Refrigeration

503-234-6445

www.cri-pdx.com

Undercounter Refrigerators and Freezers

Undercounter refrigerators and freezers are an excellent choice for clinics with limited space. Benefits of undercounter units include:

- **Lower risk:** Separate compressors and condensers decrease the risk of a total vaccine loss that might occur in a single combined unit.

- **Flexibility:** Small and easy to relocate, undercounter units can be positioned in multiple ways depending on the need.
- **No vent:** traditional combined units use a cold air vent to blow frozen air into the refrigerator compartment. Separate units mean separate compressors and no need for cold air venting.
- **Cost effective:** If a clinic is looking to add to its existing refrigerator or freezer capacity, this option allows for the purchase of only what is needed. A single under-counter refrigerator or freezer might negate the need to buy a larger, more expensive replacement unit.

Panasonic SR-L6111W & SF-L6111W: Undercounter Laboratory Refrigerator and Freezer

Panasonic's pharmaceutical refrigerators and freezers offer a complete and integrated solution for the strict and exact storage temperatures needed for pharmaceuticals, medicines and temperature-sensitive biologicals. Numerous available sizes and styles ensure a fit for any application.



FEATURES:

Laboratory and Clinical Design

- Door mounted controller
- Digital input of temperature allows end user temperature flexibility
- Integrated electronic and microprocessor technology for proven quality
- Stable temperature and uniformity for scientific grade preservation

Microprocessor Temperature Controls

Comprehensive temperature set point with adjustable range, preset alarm at +/- 3°C from temperature setpoint, monitoring based on SANYO-built microprocessor controller with digital display.

Accessibility and Safety

- Easy to read, angled LED display and keypad
- Remote alarm contacts for connecting to a centralized alarm monitoring system
- Automatic tracking alarm around setpoint monitors critical temperature variances
- Door ajar alarm with alarm delay timer eliminates nuisance alarms

Secured Door

Keyed door is lockable. Optional padlock hasp allows for additional security.

GEM Model CTR: Undercounter Laboratory/Pharmacy Refrigerator

Gem pharmacy laboratory refrigerators meet the demands of uniform temperature and tight tolerances. GEM units are designed to maximize the storage capacity within the refrigerators. The expansion valve mechanical systems found on most GEM refrigerators respond quickly to reduce heat loads, thereby assuring product integrity.



FEATURES:

- 5.1 Cubic-Foot Interior
- Expansion Valve Refrigeration System Provides Quick Recovery After Door Openings with 1/4 HP Condensing Unit
- Uniform Cabinet Temperature of 2°C to 4°C
- Two (2) Adjustable, Vinyl-Coated Wire Shelves
- Double-Pane Glass Door for Superior Insulation
- Key Lock Handle for Added Security
- 2" Foamed-in-Place Insulation
- Stainless Steel Interior and Exterior

Full sized, stand-alone Refrigerators and Freezers

Biomedical-grade refrigerators and freezers are considered the best, most secure option for vaccine storage. As with most “gold-standard” products, they require a larger investment and are most often found in health departments, laboratories and hospitals. However, many of the biologic-grade manufacturers also produce refrigerators and freezers in an array of sizes and price points. For example, Sanyo produces very large, vaccine/blood refrigerators (see first picture above) but they also produce more moderately priced under-counter models ideally suited for small clinics.

Helmer iLR120: Laboratory Refrigerator

The iLR120 is a single door i.Series® Laboratory Refrigerator. It features advanced security and monitoring with the i.Center® Integrated Monitoring System, superior cabinet construction, and maximum temperature uniformity with a heavy-duty, forced-air refrigeration system.

FEATURES

- i.Center Integrated Monitoring System with advanced monitoring of temperature, door openings, and critical refrigerator functions
- Password protection
- Automatic high and low alarm testing at the touch of a button
- Dual temperature probes
- Adjustable alarm volume and tone
- Digital display of upper and lower chamber temperature
- LCD temperature graph with 24 continuous hours of data
- Bacteria-resistant powder coated interior, exterior and door handle
- Dual-pane glass door
- Innovative Sure-Seal door system with magnetic closure
- Access port with interior and exterior plugs
- Dual, swivel locking casters
- Key lock



Follett REF20-LB Medical-grade Refrigerator

High-performance upright refrigerators designed specifically for healthcare. Advanced features augment other offerings to deliver superior performance, long-term reliability and user-friendly features.

FEATURES:

- Custom-designed, modular refrigeration system with microprocessor controller provides a $\pm 1^{\circ}\text{C}$ performance throughout
- Industry-exclusive plenum air distribution delivers cold air at six different levels
- Frost-free and auto-condensate evaporation
- Easy-to-read LCD shows temperature and provides navigation to feature programming
- All the alarms you need: high/low temperature, door open, power failure, low battery
- RS-485 port and dry contacts for data streaming and remote alarming
- Full stainless steel interior and exterior provide outstanding resistance to rust and corrosion
- Dished stainless floor contains spills for easy clean-up
- 2.75" of CGC-free foam insulation throughout



Panasonic MPR-215F: Pharmaceutical Refrigerator with Freezer

One unit with dual temperature zone needs only minimal installation space. The two door design reduces air loss during door openings. The triple or double-pane windows with heat reflection film reduce condensation. To provide easier validation services calibration adjustment through the control panel is available.

FEATURES

- Microprocessor control for accurate temperature management.
- Dual, specially designed compressors
- Mechanical convection airflow- ducts and plenums achieve uniform temperature regardless of product loading, with quick temperature recovery following door openings.
- Unique refrigerator defrost system prevents temperature variations during defrost cycle.
- Secondary temperature deviation safety device prevents over temperature or under temperature condition.

- High and low temperature alarm includes audible and visual warning with alarm ring back.
- Remote alarm contacts allow connection to remote alarm system.
- Open door indicator light with 15 minute delayed audible alarm adds to safety.
- Keyed door locks contribute to inventory security.



Extras

This section was created to showcase additional equipment, add-ons and services you might consider when assessing your vaccine storage and monitoring needs.

Portable cold storage

These are excellent options for emergency storage or use during day clinics in the field.

AcuTemp PX1L: Bio-medical carrier



The AcuTemp PX1L (formerly VaxiPac®) ice-free carrying case can transport chilled vaccines, drugs, specimens and other bio-medical material safely to the point of use.

Designed with ThermoCor® high performance insulation technology and used with AcuTemp® PXC coolant packs, the AcuTemp PX1L is capable of extensive hold times with no active cooling. As a result, the integrity of the critical products transported in the AcuTemp PX1L is ensured.

AcuTemp: www.acutemp.com/products/index.asp

FridgeFreeze: portable vaccine refrigerators and freezers

All FridgeFreeze portable vaccine refrigerators and freezers work with 12/24 and 110/240 volts. All units include an internal fan to prevent thermal layering and keep a consistent temperature throughout the entire FridgeFreeze. For precise temperature control, a digital thermostat is standard with built-in temperature alarms. All units come with a lockable latch and your choice of a smooth or diamond plated finish.



FridgeFreeze: www.fridgefreeze.com

Alarm phone dialers

Now a relatively old technology, these units still have a place in clinics with limited internet connectivity or recurrent power outages. They are sold by several manufacturers with varied models, styles and prices to choose from. Designed to call pre-determined phone numbers when temperatures go out of range, they are a simple



and reliable alarm option. Keep in mind, the system is only useful if it's accurate. Maintaining a temperature reading that mirrors your current calibrated continuous logger is imperative to its usefulness.

This style of unit is offered by several manufacturers. Below are a few examples:

Sensaphone: www.sensaphone.com

Dickson: www.dicksondata.com

United Security Products: www.unitedsecurity.com

Refrigerator / Freezer power back-up

Disruption in power supply is one of the most frequent causes of costly vaccine loss. It doesn't take long for a refrigerator and freezer to begin to warm once the power has been cut. With this in mind, a clinic might consider adding a secondary power source in case of emergency. If a clinic already has a back-up system, it is highly recommended that you have your refrigerator placed on that emergency power circuit.

For those clinics without one, a small back-up generator can provide an extra layer of protection. Backup generators should be of a sufficient capacity to run continuously for 72 hours if necessary. Plans should be made to ensure that an adequate supply of fuel is on hand. Some examples include:



There are many manufacturers and vendors selling generators. Below are a few examples:

Peterson Power Systems (Oregon vendor): www.petersonpower.com

Olympian (CAT) Generators: www.olympianpower.com

Winco Generators: www.wincogen.com

Generac Generators: www.generac.com