

New York City VacScene

New York City VacScene is published  
by the Bureau of Immunization  
New York City Department of Health  
and Mental Hygiene

2 Lafayette Street, 19th Floor, CN21

New York, NY 10007

212-676-2259

FAX: 212-442-8091

[nyc.gov/health](http://nyc.gov/health)



Michael R. Bloomberg  
Mayor

Thomas R. Frieden, MD, MPH,  
Commissioner

#### Editorial Staff:

Stephen Friedman, MD, MPH  
Assistant Commissioner

Jane R. Zucker, MD, MSc  
Medical Director

Sheila L. Palevsky, MD, MPH  
Medical Specialist-Provider Liaison

#### Written by

Sheila L. Palevsky, MD, MPH  
Medical Specialist-Provider Liaison

Save the Date:

April 22, 2004

Immunization Conference  
to kick off  
National Infant  
Immunization Week!

## INTRODUCTION:

The continued success of immunization in reducing morbidity and mortality against vaccine-preventable disease is dependent upon the proper storage and handling of vaccines. Vaccines are fragile biological substances and must be maintained at specific temperatures to ensure potency from the time the vaccine leaves the manufacturer until the vaccine is administered. This process is known as maintaining the “cold chain”. Exposure of vaccine product to temperatures outside of the recommended ranges can adversely affect the potency of such vaccine, thereby reducing its effectiveness. Storage guidelines, based on manufacturer studies of product stability, are included in package inserts with each vial of vaccine. Studies<sup>1,2,3,4,5,6</sup> have demonstrated that up to one-third of medical offices where vaccines are regularly administered have vaccines that are improperly stored, most often below recommended temperatures. This issue of VacScene addresses key points about vaccine storage and handling in the medical office or clinic. Recent experience with the blackout in August 2003 reinforces the importance of these guidelines.

## RECOMMENDED STORAGE TEMPERATURES:

The two different types of vaccines - inactivated vaccine and live virus vaccine - have different properties and thus different storage requirements (Table 1).

### Inactivated Vaccines:

All of the inactivated vaccines must be stored at temperatures between 35°F-46°F (2°C-8°C).<sup>7,8,9</sup> These vaccines must *not* be exposed to freezing temperatures because they can be irreversibly damaged. Certain of these freeze-sensitive vaccines contain an aluminum adjuvant that may precipitate when exposed to freezing temperatures resulting in the loss of the adjuvant effect and resultant diminished vaccine potency.<sup>7</sup> Morphological and structural changes induced by such freezing are visible under the electron microscope.<sup>9</sup> Sometimes granules or flocculation may be seen by the naked eye; however physical changes are not always apparent after exposure to freezing temperatures.<sup>7</sup> There may be no way to distinguish such cold-damaged vaccine except through regular monitoring of storage temperatures.

Although storage temperatures that are too warm can adversely affect the potency of most inactivated vaccines, these effects are usually more gradual and predictable.<sup>7,9</sup>

Table 1: Vaccine storage temperature requirements

35°F to 46°F (2°C to 8°C)	
Vaccine	Instructions
Diphtheria-, tetanus-, or pertussis-containing vaccine (DTaP, DT, Td) <i>Haemophilus conjugate vaccine (Hib)*</i> Hepatitis A vaccine (Hep A) Hepatitis B vaccine (Hep B) Inactivated polio vaccine (IPV) Inactivated influenza vaccine Pneumococcal conjugate vaccine (PCV 7) Pneumococcal polysaccharide vaccine (PPV 23)	Do not freeze or expose to freezing temperatures
35°F to 46°F (2°C to 8°C) or 5°F (-15°C) or colder	
Vaccine	Instructions
Measles, mumps, and rubella in the lyophilized (freeze-dried) state (MMR)	Not affected by freezing
5°F (-15°C) or colder	
Vaccine	Instructions
Live attenuated influenza vaccine (LAIV) Varicella vaccine (Var)	Maintain in continuously frozen state with no freeze-thaw cycles

\*ActHIB (AventisPasteur) in the lyophilized state is not expected to be detrimentally affected by freezing temperatures, although no data are available.

### Live Virus Vaccines:

Among vaccines, MMR vaccine is unique in that the lyophilized, unreconstituted vaccine may be stored either at refrigerator temperatures of 35°F-46°F (2°C-8°C) or in the freezer at 5°F (-15°C) or colder.<sup>10</sup> Ideally, MMR vaccine should be reconstituted just before use, although it can be reconstituted up to 8 hours before being administered if kept in the refrigerator at 35°F-46°F (2°C-8°C).<sup>8</sup> It is also important to note that MMR is light sensitive; exposure to light may inactivate the virus and render the vaccine ineffective. Exposure to elevated temperatures will also render this vaccine ineffective.

Varicella vaccine must be stored in a continuously frozen state, 5°F (-15°C) or colder, with no freeze-thaw cycles.<sup>7</sup> If stored above these temperatures, vaccine will lose potency.<sup>8,10</sup> Varicella vaccine must be administered within 30 minutes of reconstitution to maintain potency or it should be discarded. Both lyophilized vaccine and reconstituted vaccine must be protected from light.

Neither MMR nor varicella vaccine that have been reconstituted should be frozen.

Live attenuated influenza vaccine (LAIV) must also be stored in a continuously frozen state, 5°F (-15°C) or colder, with no freeze-thaw cycles to ensure potency.<sup>7</sup>

### Diluents:

Diluents for MMR and varicella vaccine may be stored at refrigerator temperatures or at room temperature. They must never be frozen.<sup>10</sup> Reconstituting MMR and varicella vaccine with warm diluent may cause degradation of the live virus vaccine.<sup>9</sup>

## VACCINE STORAGE UNITS:

Vaccine storage units must be selected carefully and must be adequate to maintain temperatures within recommended ranges. Combination refrigerator-freezer units may be appropriate for vaccine storage if there are separate sealed units with separate doors for the refrigerator and for the freezer compartments.<sup>7</sup> Dormitory-style or under-counter units are acceptable only for refrigerator storage of vaccines. Household-style refrigerator-freezers are often designed to have several temperature zones in the unit; they are not designed for the specific temperature needs of vaccines. In combination refrigerator-freezer units, cooling is accomplished by directing chilled air from the cooling unit into both the refrigerator and freezer compartments. The

freezer thermostat controls the freezer temperature and the refrigerator thermostat regulates the amount of cold air from the freezer entering the main refrigerator unit resulting in different temperature zones in the refrigerator unit. When adjustments are made to maintain cold freezer temperatures, temperatures in the refrigerator compartment may routinely fall below the recommended ranges for inactivated vaccines.<sup>11</sup> Refrigerators without freezers and stand-alone freezers are better able to maintain temperatures within a precise range as required for vaccine storage. Such single-purpose units are sold for home use. Commercial vaccine storage units are available with separate refrigerator and freezer units; these units are designed to maintain specific and narrow temperature ranges in the two compartments. Although more costly, they are more reliable and better suited for vaccine storage.

Any refrigerator or freezer used for vaccine storage must maintain the required temperature range year-round, despite seasonal fluctuations in room temperature. The door gaskets must maintain a good seal without air leakage. To ensure proper functioning of the refrigerator unit, air should be able to circulate freely on all sides of the unit. The refrigeration coils should be kept free of excessive dust through routine cleaning.

Vaccine should be stored in a refrigerator dedicated to biologics. Food and beverages should not be stored with

First in - first out

Vaccine supply should always be rotated such that vaccine with the shortest expiration date is used first.

biologics, as the frequent opening of the refrigerator to access such food results in wide temperature fluctuations.

Vaccines should be stored centrally in the refrigerator and freezer units, away from the walls, in order to allow air circulation. The vaccine should be placed on the shelves or in open labeled containers or baskets on the shelves.<sup>7</sup> Vaccine should not be stored near the cold air vent that directs air from the freezer into the refrigerator, as this area may be colder than the rest of the refrigerator compartment. Vaccine should not be stored in the “crispers” or in bottom of the refrigerator unit as these areas may be subjected to excessive cooling. Vaccine should not be stored in the door as this area is subject to warming. It is sometimes recommended to remove the “crispers” or storage bins from the refrigerator to prevent accidental placement of vaccine in these bins.

Plastic bottles of water or salt water (to prevent algae growth), placed in the bottom of the refrigerator unit where the storage bins have been removed, and in the door, can help to help stabilize the temperature of the refrigerator.<sup>11</sup> Similarly, freezer blocks or ice packs can be placed on the sides of the freezer unit and in the freezer door to stabilize the freezer temperature.<sup>11</sup>

The electrical outlet and the power cable for the refrigerator should be clearly marked “Do Not Unplug” to minimize the chance for accidental disconnection during maintenance or cleaning. The use of plug guards can prevent accidental dislodging of the wall plug. If possible, use an outlet that is supplied by a back-up emergency generator. Mark the circuit breaker “Do Not

Do a physical count of vaccines at least once a month. Compare this with the number of doses administered each month. This will allow you to anticipate vaccine needs and monitor vaccine usage.

Turn Off”. Do not use an outlet with a ground-flow interrupter (GFI) or one activated by a wall switch.

## TEMPERATURE MONITORING:

Temperature monitoring is essential to assuring cold chain management and assuring viable vaccine. Thermometers should be placed in the refrigerator and freezer units in a central location next to the vaccine itself. Temperatures should be read, documented and charted on logs at the beginning and end of each day that staff are in the office. Immediate action must be taken if storage temperatures are out of the recommended ranges: the unit should be rechecked every two hours to reassess any corrective action and to determine if additional steps must be taken to protect vaccine supply. Vaccine that has been mishandled and subjected to temperatures outside of the recommended range should not be administered. It is also recommended to record the room temperature on the temperature logs if there is a problem with the refrigerator or freezer temperature, as this information may be helpful in discussions with the vaccine manufacturers.<sup>7</sup>

Temperature logs should be maintained for at least three years. Review of these logs may help to identify recurring problems, particularly as refrigerator units age.

There are many different kinds of thermometers available for monitoring vaccine temperatures (Table 2). Standard fluid-filled thermometers are the simplest and least expensive products available; however, they may be the least accurate. These thermometers provide a reading at a single point in time and do not provide a minimum/maximum reading or continuous reading and record over time. Thermometers enclosed in bio-safe liquids (referred to as product temperature thermometers) may reflect vaccine temperatures more accurately. Minimum/maximum (min-

Table 2: Comparison of thermometers used to monitor vaccine temperatures<sup>7</sup>

Thermometer type	Advantages	Disadvantages
Fluid-filled	<ul style="list-style-type: none"> <li>*Inexpensive and simple to use</li> <li>*Thermometers encased in bio-safe liquids can reflect vaccine temperatures more accurately</li> </ul>	<ul style="list-style-type: none"> <li>*Less accurate (+/-1°C)</li> <li>*No information on duration of out of specification exposure</li> <li>*Cannot be recalibrated</li> <li>*Inexpensive models might perform poorly</li> </ul>
Minimum-maximum (min-max)	<ul style="list-style-type: none"> <li>*Inexpensive</li> <li>*Monitors temperature range</li> </ul>	<ul style="list-style-type: none"> <li>*Less accurate (+/-1°C)</li> <li>*No information on duration of out of specification exposure</li> <li>*Cannot be recalibrated</li> </ul>
Continuous chart recorder	<ul style="list-style-type: none"> <li>*Most accurate</li> <li>*Continuous 24-hour readings of temperature range and duration</li> <li>*Can be recalibrated at regular intervals</li> </ul>	<ul style="list-style-type: none"> <li>*Most expensive</li> <li>*Requires most training and maintenance</li> </ul>

max) thermometers monitor temperature ranges but cannot provide any information on how long a temperature has been out-of-range. Continuous chart recording thermometers are the most accurate, and although more expensive, they are preferred for monitoring vaccine temperatures. These provide a continuous 24-hour reading of the temperature in the storage unit and can be recalibrated.<sup>7</sup> In the event that vaccines are exposed to out-of-range temperatures, these recording devices can provide valuable information about the maximum and minimum temperatures and duration of the exposure to help determine if the vaccine can still be used. Many come with battery back-up to continue recording in the event of a power failure. Alarm systems can be connected to the temperature recording device to alert staff of problems with refrigeration units during evening and weekends or when the office is closed. In addition to thermometers, temperature indicator products may be used as a back-up monitoring system but do not replace twice daily temperature readings and documentation.

## IN THE EVENT OF A POWER FAILURE

The blackout in the eastern United States on August 14, 2003 serves to remind us that electrical power outages can have a significant impact on vaccine storage. A survey of storage practices among 36 providers in New York City after the power outage demonstrated that respondents used many different approaches in their practices to protect their vaccine supply. Many were unfamiliar with existing recommendations and others took actions that were not correct [BOI unpublished data].

Table 3 is information that was provided after this power outage and may be a useful tool in the future (see [www.nyc.gov/html/doh/pdf/hcp/03hn01.pdf](http://www.nyc.gov/html/doh/pdf/hcp/03hn01.pdf)).

## GUIDELINES FOR VACCINE STORAGE IN THE EVENT OF A POWER FAILURE<sup>12</sup>

- *Do not open* freezers and/or refrigerators until power is restored. This will help to preserve the cold temperature inside the unit. Each time the door is opened, warm room air raises the temperature of the storage unit, reducing the viability of the vaccine.

- If alternative storage with a reliable power source is available, such as a hospital with generator power, transfer the vaccine to that facility using proper cold chain transport techniques.<sup>11</sup> Measure the temperature when the vaccine is removed from the refrigerator or freezer and follow proper cold chain procedures for storage and handling during transport.
- Do not adjust the thermostats to colder temperatures; this will risk subjecting inactive vaccines to temperatures that are too cold when power is restored.
- Immediately after power is restored, record the temperatures in the refrigerator and freezer. Continue to monitor the refrigerator and freezer temperatures until they reach the normal ranges.
- Document the duration of the power outage in the office. If possible, record the room temperature. This will help in providing data on the maximum temperature and maximum duration of exposure to elevated temperatures.
- Clearly mark any vaccine vials exposed to out-of-range temperatures and continue to store these vaccines at the proper temperatures, i.e., for inactivated vaccines, in the refrigerator at 35°F-46°F (2°C-8°C) or, for varicella and live attenuated influenza vaccine keep frozen, at 5°F (-15°C) or colder. Keep these exposed vaccine product(s) separated and clearly marked from any new product received.
- Do not discard any exposed vaccine. Any vaccine determined not to be viable may be returned to your vaccine supplier.
- Contact the manufacturers and/or the Bureau of Immunization at the NYC Department of Health and Mental Hygiene for additional assistance.

If compromised vaccine has inadvertently been administered, all patients who have received such mishandled vaccine should be recalled for administration of a dose of viable vaccine. Explanation should be provided to the patient or parent/guardian that, because the vaccine was stored at improper temperatures, the vaccine cannot be guaranteed to provide the intended protection. The mishandled vaccine dose should be discounted and a valid dose of vaccine should be administered no sooner than 28 days after the mishandled dose of vaccine.

**Table 3: Vaccine Stability at Elevated Temperatures** (Information provided by manufacturers.)

Vaccine	Brand Name	Manufacturer	Information available	Phone number for additional information
DTaP	DAPTACEL	Aventis Pasteur	If vaccine was stored at normal recommended temperatures prior to power outage AND the refrigerator remained closed during the outage AND the outage lasted less than four days AND the vaccines were properly refrigerated after power was restored, the manufacturer has data to indicate that the potency will be adequate to support use.	1-800-432-2463
DTaP	Tripedia	Aventis Pasteur		1-800-432-2463
DT	DT	Aventis Pasteur		1-800-432-2463
Td	Td	Aventis Pasteur		1-800-432-2463
Polio	IPOL	Aventis Pasteur		1-800-432-2463
Hib	TriHIBit	Aventis Pasteur		1-800-432-2463
DTaP/Hib	ActHIB	Aventis Pasteur		1-800-432-2463
DTaP	Infanrix	GlaxoSmithKline	Stable at 68-77°F (20-25°C) for at least 96 hours	1-888-825-5249
Hepatitis B	Engerix-B (10mcg)	GlaxoSmithKline	Stable at 98.6°F (37°C) for 7 days	1-888-825-5249
Hepatitis B	Engerix-B (20mcg)	GlaxoSmithKline	Stable at 113°F (45°C) for 7 days	1-888-825-5249
Hepatitis A	Havrix	GlaxoSmithKline	Stable at 98.6°F (37°C) for 4 days	1-888-825-5249
Hepatitis A/B	Twinrix	GlaxoSmithKline	Stable at 68-77°F (20-25°C) for at least 96 hours	1-888-825-5249
DTaP/HepB/IPV	Pediarix	GlaxoSmithKline	Stable at 68-77°F (20-25°C) for up to 24 hours	1-888-825-5249
Hepatitis A	VAQTA	Merck	Call the manufacturer	1-800-672-6372
Hepatitis B	Recombivax	Merck	Call the manufacturer	1-800-672-6372
Hepatitis B/Hib	COMVAX	Merck	Call the manufacturer	1-800-672-6372
Hib	PedvaxHIB	Merck	Call the manufacturer	1-800-672-6372
MMR	MMR II	Merck	Call the manufacturer	1-800-672-6372
Varicella	VARIVAX	Merck	Call the manufacturer	1-800-672-6372
PPV23	Pneumovax	Merck	Call the manufacturer	1-800-672-6372
PCV7	Prevnar	Wyeth	Stable up to 100°F for not more than 72 hours	1-800-999-9384

Any vaccine that has been exposed to temperatures out of normal storage range but determined to still be viable should be used first. Wyeth has stated that PCV7 (Prevnar) exposed to elevated temperatures must be used within 6 months. Specific information about the other vaccines has not been provided.

Tuberculin Purified Protein Derivative solution (PPD) should be stored at 35°F-46°F (2°C-8°C) and must be discarded if frozen. PPD is light sensitive.\* For additional information about PPD, please contact the NYC DOHMH Bureau of Tuberculosis Control at 212-442-9968.

Information about vaccine storage and handling or additional information on vaccines and immunization guidelines can be found at the NYC DOHMH website ([www.nyc.gov/health](http://www.nyc.gov/health)), the Centers for Disease Control and Prevention ([www.cdc.gov/nip](http://www.cdc.gov/nip)), or from the Immunization Action Coalition ([www.immunize.org](http://www.immunize.org)). Videos that can be used for staff training that address vaccine storage and handling are available at [www.immunize.org/videos/index.htm](http://www.immunize.org/videos/index.htm) and [www.ppho.cdc.gov/phtn/webcast/imm-encounter/webcast.asp](http://www.ppho.cdc.gov/phtn/webcast/imm-encounter/webcast.asp).

**References:**

- Lewis PR, Reimer RF, Dixon AJ. Evaluating the efficacy of vaccine storage in the general practice setting. *Aust N Z J Public Health.* 2001;25:547-50.
- Jeremijenko A, Kelly A, Sibthorpe B, Attewell R. Improving vaccine storage in general practice refrigerators. *BMJ.* 1996;312:1651-1652.
- Bell KN, Hogue CJ, Manning C, Kendal AP. Risk factors for improper vaccine storage and handling in private provider offices. *Pediatrics.* 2001;107:e100.
- Yuan L, Daniels S, Naus M, Brcic B. Vaccine storage and handling. Knowledge and practice in primary care physicians' office. *Can Fam Physician.* 1995;41:1169-76.
- Bishai DM, Bhatt S, Miller LT, Hayden GF. Vaccine storage practices in pediatric offices. *Pediatrics.* 1992;89:193-196.
- Gazmararian JA, Oster NV, Green DC, et al. Vaccine storage practices in primary care physician offices. *Am J Prev Med.* 2002;23:246-53.
- CDC. Guidelines for maintaining and managing the vaccine cold chain. *MMWR.* 2003;52:1023-1025.
- Grabenstein JD. *ImmunoFacts: Vaccines and Immunologic Drugs.* St. Louis, MO: Wolters Kluwer Health. 2004.
- World Health Organization. *Thermostability of vaccines.* Geneva, Switzerland: World Health Organization, 1998; publication no. WHO/GPV/98.07. Available at <http://www.who.int/vaccines-documents/DocsPDF/www9661.pdf>.
- CDC. *Vaccine Management: Recommendations for Handling and Storage of Selected Biologicals.* January 2001. Available at [http://www.cdc.gov/nip/publications/vac\\_mgt\\_book.pdf](http://www.cdc.gov/nip/publications/vac_mgt_book.pdf).
- Commonwealth Department of Health and Aged Care. *Keep it cool: the vaccine cold chain. Guidelines for immunisation providers on maintaining the cold chain,* 2nd ed. Canberra, Australia: Commonwealth of Australia, 2001. Available at <http://www.immunise.health.gov.au/cool.pdf>.
- CDC. National Immunization Program. *Impact of power outage on vaccine storage.* <http://www.cdc.gov/nip/news/PowerOutage.htm> Accessed 9/3/2003.

# Checklist for Safe Vaccine Handling and Storage

Here are the 20 most important things you can do to safeguard your vaccine supply. Are you doing them all? Reviewing this list can help you improve your clinic's vaccine management practices.

- | Yes                      | No                       |   |
|--------------------------|--------------------------|---|
| <input type="checkbox"/> | <input type="checkbox"/> | 1. We have a designated person in charge of the handling and storage of our vaccines.   |
| <input type="checkbox"/> | <input type="checkbox"/> | 2. We have a back-up person in charge of the handling and storage of our vaccines.  |
| <input type="checkbox"/> | <input type="checkbox"/> | 3. A vaccine inventory log is maintained that documents:<br><input type="checkbox"/> Vaccine name and number of doses received.<br><input type="checkbox"/> Date the vaccine was received.<br><input type="checkbox"/> Arrival condition of vaccine.<br><input type="checkbox"/> Vaccine manufacturer and lot number.<br><input type="checkbox"/> Vaccine expiration date.  |
| <input type="checkbox"/> | <input type="checkbox"/> | 4. Our refrigerator for vaccines is either household-style or commercial-style, NOT dormitory style. The freezer compartment has a separate door.   |
| <input type="checkbox"/> | <input type="checkbox"/> | 5. We do NOT store any food or drink in the refrigerator or freezer.  |
| <input type="checkbox"/> | <input type="checkbox"/> | 6. We store vaccines in the middle of the refrigerator or freezer, and NOT in the door.   |
| <input type="checkbox"/> | <input type="checkbox"/> | 7. We stock and rotate our vaccine supply so that the newest vaccine of each type (with the longest expiration date) is placed behind the vaccine with the shortest expiration date.  |
| <input type="checkbox"/> | <input type="checkbox"/> | 8. We check vaccine expiration dates and we first use those that will expire soonest.   |
| <input type="checkbox"/> | <input type="checkbox"/> | 9. We post a sign on the refrigerator door showing which vaccines should be stored in the refrigerator and which should be stored in the freezer.   |
| <input type="checkbox"/> | <input type="checkbox"/> | 10. We always keep a thermometer in the refrigerator.   |
| <input type="checkbox"/> | <input type="checkbox"/> | 11. The temperature in the refrigerator is maintained at 35-46°F (2-8°C).   |
| <input type="checkbox"/> | <input type="checkbox"/> | 12. We keep extra containers of water in the refrigerator to help maintain cold temperatures.   |
| <input type="checkbox"/> | <input type="checkbox"/> | 13. We always keep a thermometer in the freezer.  |
| <input type="checkbox"/> | <input type="checkbox"/> | 14. The temperature in the freezer is maintained at +5°F (-15°C) or colder.   |
| <input type="checkbox"/> | <input type="checkbox"/> | 15. We keep ice packs and other ice-filled containers in the freezer to help maintain cold temperatures.  |
| <input type="checkbox"/> | <input type="checkbox"/> | 16. We post a temperature log on the refrigerator door on which we record the refrigerator and freezer temperatures twice a day - first thing in the morning and at clinic closing time - and we know whom to call if the temperature goes out of range.  |
| <input type="checkbox"/> | <input type="checkbox"/> | 17. We have a "Do Not Unplug" sign next to the refrigerator's electrical outlet.  |
| <input type="checkbox"/> | <input type="checkbox"/> | 18. In the event of a refrigerator failure, we take the following steps:<br><input type="checkbox"/> Assure that the vaccines are placed in a location with adequate refrigeration.<br><input type="checkbox"/> Mark exposed vaccines and separate them from unaffected vaccines.<br><input type="checkbox"/> Note the refrigerator or freezer temperature and contact the manufacturer or local health department to determine how to handle the affected vaccines.<br><input type="checkbox"/> Follow the manufacturer's or health department's instructions as to whether the affected vaccines can be used, and, if so, we mark the vials with the revised expiration date provided by the manufacturer or health department. |
| <input type="checkbox"/> | <input type="checkbox"/> | 19. We have obtained a detailed written policy for general and emergency vaccine management from our local health department.   |
| <input type="checkbox"/> | <input type="checkbox"/> | 20. If all above answers are "yes," we are patting ourselves on the back. If not, we have assigned someone to implement needed changes!   |

Item #P3035 (11/01)

# Don't Be Guilty of These Errors in Vaccine Storage and Handling

The following are frequently reported errors in vaccine storage and handling. Some of these errors are much more serious than others, but none of them should occur. Be sure your clinic or practice is not making errors such as these.

## Error #1: Designating only one person in the office to be responsible for storage and handling of vaccines, instead of a minimum of two.

It's important to train at least one back-up person to learn proper storage and handling of vaccines. The back-up person should be familiar with all aspects of vaccine storage and handling, including knowing how to handle vaccines when they arrive, how to properly record refrigerator and freezer temperatures, and what to do in case of an equipment problem or power outage.

## Error #2: Recording temperatures only once per day.

Temperatures fluctuate throughout the day. Temperatures in the refrigerator and freezer should be checked at the beginning and end of the day to determine if the unit is getting too cold or too warm. Ideally, you should have continuous thermometers that measure and record temperatures all day and all night. A less expensive alternative is to purchase maximum/minimum thermometers. It's also a good idea to record the room temperature on your temperature log in case there is a problem with the refrigerator or freezer temperature. This information may be helpful to the vaccine company's telephone consultant in ascertaining whether your vaccine can still be used.

## Error #3: Recording temperatures for only the refrigerator or freezer.

If your facility administers varicella vaccine, you should have thermometers in both the refrigerator and the freezer. Rather than buying cheap thermometers that may not accurately measure the temperature, buy quality thermometers that will last for years.

## Error #4: Documenting out-of-range temperatures on vaccine temperature logs and not taking action.

Documenting temperatures is not enough. Acting on the information is even more important! So, what should you do? Notify your supervisor whenever you have an out-of-range temperature. Safeguard your vaccines by moving them to another location and then determine if they are still viable. Check the condition of the unit for problems. Are the seals tight? Is there excessive lint or dust on the coils? After you have made the adjustment, document the date, time, temperature, what the problem was, the action you took, and the results of this action. Redcheck the temperature every two hours. Call maintenance or a repair person if the temperature is still out of range.

## Error #5: Throwing away temperature logs at the end of every month.

It's important that you keep your temperature logs for at least three years. As the refrigerator ages, you can track recurring problems. If

temperatures have been documented out of range, you can determine how long this has been happening and take appropriate action. It's also a great way to lobby for a new refrigerator.

## Error #6: Storing vaccine in the wrong part of the refrigerator (e.g., vegetable bin, plastic container, the door, bottom, or near the cold air outlet from the freezer).

The temperature in these areas may differ significantly from the temperature in the body of the refrigerator. Always place vaccines on the shelves in open, labeled containers, so that air can circulate around the vaccines.

## Error #7: Storing varicella vaccine in a dorm-style refrigerator.

Varicella must be stored in a freezer that has its own external door separate from the refrigerator. No matter how hard you try to adjust the temperature to +5°F in a dorm-style refrigerator's freezer, you won't be able to reach this low temperature in the freezer, and you'll probably freeze the rest of your vaccines in the refrigerator!

## Error #8: Inadvertently leaving the refrigerator or freezer door open or having inadequate seals.

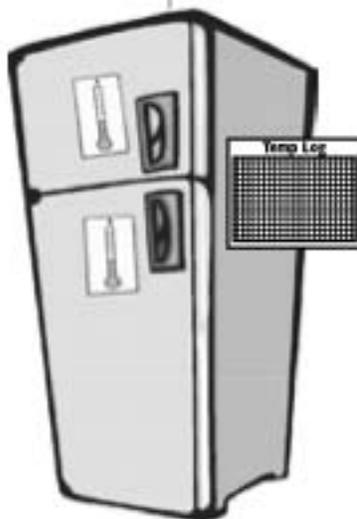
Remind staff to close the unit doors tightly each time they open them. Also, check the seals on the doors on a regular schedule, and if there is any indication the door seal may be cracked or not sealing properly, have it replaced. The cost of replacing a seal is much less than replacing a box of pneumococcal conjugate or varicella vaccine.

## Error #9: Discarding multi-dose vials 30 days after they are opened.

Don't discard your vaccines prematurely. Almost all multi-dose vials of vaccine have preservatives in them and can be used until the expiration date on the vial unless there is visible contamination. However, you must discard multi-dose vials of reconstituted vaccine (e.g., meningococcal, yellow fever) if they are not used within a defined period after reconstitution. Refer to the vaccine package inserts for additional information.

## Error #10: Not having emergency plans for a power outage or natural disaster.

Every clinic should have a written Disaster Recovery Plan that identifies a refrigerator with a back-up generator in which to store vaccine in the event of a power outage or natural disaster. Consider contacting a local hospital or similar facility to be your back-up location if you should need it.



**NYC DEPARTMENT OF HEALTH AND MENTAL HYGIENE BUREAU OF IMMUNIZATION**

- Immunization Registry .....212-676-2323
- Vaccines for Children Program (VFC).....212-447-8175
- Immunization Disease (Case) Reporting .....212-676-2284/88  
after hours.....212-POISONS
- Vaccine Adverse Event Reporting .....212-676-2284/88  
or 1-800-822-7967  
or [www.vaers.org](http://www.vaers.org)
- Immunization Medical Consultation .....212-676-2263
- Perinatal Hepatitis B Program .....718-520-8245
- Adult Immunization Initiatives .....212-676-9936
- Public Health Education and Training .....212-676-2292
- Bureau of Immunization Hotline .....212-676-2273
- Bureau of Immunization – all other inquiries .....212-676-2259
- For other DOHMH inquiries:  
Providers should call .....866-NYC-DOH1  
Public should call .....3-1-1

Free Subscription Order Form

**Yes!** Add me to the mailing list of the **New York City VacScene**

New Subscription  Address/Name Change only

Name .....

Title .....

Organization .....

Address .....

Telephone .....

**Please fax or mail to:**

NYC Department of Health and Mental Hygiene,  
Bureau of Immunization  
2 Lafayette Street, 19th Floor, CN21  
New York, NY 10007  
Fax: 212-442-8091

To order free Lifetime Health Records or Immunization Cards (providers only), call the NYC Department of Health and Mental Hygiene Public Health Literature Services Line at 212-788-5294.

**NYCVACSCENE**

New York City Department of Health and Mental Hygiene  
Bureau of Immunization  
2 Lafayette Street, 19th Floor, CN21  
New York, NY 10007  
212-676-2259  
FAX: 212-442-8091  
[nyc.gov/health](http://nyc.gov/health)

PRST STD  
U.S. POSTAGE  
**PAID**  
NEW YORK, NY  
PERMIT NO. 6174