

Colorado Immunization Manual

SECTION 2

Returning/Storing and Handling Vaccines



Colorado Immunization Manual

ISSUED: 9/1/98

REVISED: 7/1/05

SECTION-PAGE: 2-1

SUBJECT: CONTENTS

SECTION 2

Storing, Handling and Returning Vaccines

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SUBJECT: FAILURE OF VACCINE COLD-CHAIN

Procedure for Responding to Failure of Cold Chain

Purpose: Steps to be followed when the cold chain of vaccine storage is interrupted (e.g., refrigerator unplugged)

1. Re-establish cold chain immediately.
2. Determine cause and length of interruption in cold chain.
3. Notify the Colorado Department of Public Health and Environment (CDPHE), Immunization Program at 303-692-2798 or 303-692-2334 immediately. CDPHE will decide whether the vaccines are wasted or can still be used.
4. If the vaccines are deemed unusable, the following must be done within 1 week from the date of excessive wastage:
 - ✓ Vaccines must be returned to CDPHE along with a completed Vaccine Return form
 - ✓ Both a letter explaining how the excessive wastage occurred and a written plan detailing how such wastage will be avoided in the future must be sent to:

VFC Coordinator

Colorado Department of Public Health & Environment
Immunization Program, DCEED-IMM-A4
4300 Cherry Creek Drive South, Denver CO 80246-1530

5. A CDPHE representative may visit your agency to ensure that vaccines are being stored and handled adequately. You will be contacted in advance of any visit.

Remember: VACCINES ARE EXPENSIVE! Look at what they cost per dose:

	CDC Cost	Private Sector
DTaP	\$13.75	\$21.44
Hepatitis A	\$12.25	\$30.37
Hepatitis B-Hib	\$24.50	\$43.56
Hepatitis B (Pediatric)	\$9.35	\$23.20
Hib	\$10.22	\$22.86
Injectable Polio	\$10.42	\$21.80
MMR	\$16.67	\$40.37
Pneumococcal 7-valent	\$54.12	\$65.95
Varicella	\$52.25	\$66.81
DTaP-Hep B-IPV	\$38.34	\$70.72
Meningococcal	\$68.00	\$82.00

VACCINE RETURN FORM

IMPORTANT NOTE: THIS FORM IS FOR THE RETURN OF NONVIABLE VACCINE ONLY! IF THE VACCINE IS USABLE, PLEASE CALL 303-692-2334 IMMEDIATELY!

Returning all vaccines that are not usable is very important for accountability to The Centers For Disease Control and Prevention, National Immunization Program. Returning unusable vaccine also allows the Colorado Immunization Program to receive excise tax credit.

Return nonviable vaccine to:

COLORADO DEPARTMENT OF PUB. HEA. & ENV.
DCEED A4/IMM 3620
4300 CHERRY CREEK DRIVE SOUTH
DENVER, CO 80246-1530

1. **Do not call GIV.** Do not send unusable vaccine before notifying The Colorado Immunization Program @ 303-692-2796 or 303-692-2334.
2. Complete this form when returning unusable vaccine.
3. If returning unusable vaccine, select most efficient method. Packaging on ice is not necessary.

**CALL 303-692-2796 WITH EXPIRED VACCINE QUESTIONS.
CALL 303-692-2334 WITH ALL OTHER VACCINE QUESTIONS.**

VFC Pin : _____ **Date:** _____
Provider Name: _____ **Facility Name:** _____
Address: Street: _____ **City:** _____ **Zip Code:** _____
Contact Person: _____ **Phone:** _____ / _____

Please select for returning unusable vaccine:

- 1. Vaccine expired
- 2. Proper temperature not maintained due to:
 - *Refrigerator/Freezer failure
 - *Refrigerator/Freezer unplugged
 - *Power failure:
 - *Other _____
 - _____
 - _____
 - _____

Vaccine	Lot Number	Number of Doses
Menactra		
DTaP		
DTaP-Hep B-IPV		
DT		
Hep B-HIB		
Hep B Ped/Adol		
Hep B Adult		
Hep A Ped/Adol		
Hep A Adult		
HIB		
MMR		
IPV		
PNU-7		
TD		
Varicella		
TDaP		
Influenza		

Returning all vaccine that are not usable is very important for our accountability to The Centers For Disease Control, National Immunization Program and it allows the Colorado Immunization Program to receive excise credit for those vaccines.

Recommendations for Vaccine Storage and Handling

Contents

[DT, Td](#)

[DTaP, DTaP/Hib, DTaP/HepB/IPV](#)

[HBIG](#)

[Hepatitis Vaccines: Hepatitis A, Hepatitis B, Hepatitis A/B](#)

[Hib](#)

[IPV](#)

[TIV](#)

[LAIV](#)

[MMR, MR, Measles Virus Vaccine, Mumps Virus Vaccine, Rubella Virus Vaccine](#)

[Meningococcal Polysaccharide Vaccine, Groups A, C, Y, W-135](#)

[PCV](#)

[PPV](#)

[Varicella \(Chickenpox\) Vaccine](#)

DT: Diphtheria, Tetanus Toxoids—Pediatric Td: Tetanus, Diphtheria Toxoids—Adult

Shipping Requirements

Should be shipped in insulated container. Maintain temperature at 35° to 46°F (2° to 8°C). **Do not freeze or expose to freezing temperatures.**

Condition upon Arrival*

Should not have been frozen or exposed to freezing temperatures. Refrigerate on arrival.

Storage Requirements

Refrigerate immediately upon arrival. Store at 35° to 46°F (2° to 8°C). **Do not freeze or expose to freezing temperatures.**

Shelf Life

Check expiration date on vial or container.

Instructions for Use

Shake vial vigorously before withdrawal and use.

Shelf Life After Opening

The vaccine should be administered shortly after withdrawal from the vial. Unused portions of multidose vials may be refrigerated at 35° to 46°F (2° to 8°C) and used until outdated, if not contaminated.

Special Instructions

Rotate stock so that the earliest dated material is used first.

* If you have questions about the condition of the material at the time of delivery, you should 1) immediately place material in recommended storage; and 2) notify the [Quality Control office at the vaccine manufacturer](#); and 3) notify your state health department immunization program.

DTaP: Diphtheria Toxoid, Tetanus Toxoid, Acellular Pertussis Vaccine

DTaP/Hib: Diphtheria Toxoid, Tetanus Toxoid, Acellular Pertussis Vaccine Combined with *Haemophilus influenzae* type b Conjugate Vaccine*

DTaP/HepB/IPV: Diphtheria Toxoid, Tetanus Toxoid, Acellular Pertussis Vaccine, Hepatitis B Vaccine, Inactivated Polio Vaccine

Shipping Requirements

Should be shipped in insulated container. Maintain temperature at 35° to 46°F (2° to 8°C). **Do not freeze or expose to freezing temperatures.**

Condition upon Arrival**

Should not have been frozen or exposed to freezing temperatures. Refrigerate on arrival.

Storage Requirements

Refrigerate immediately upon arrival. Store at 35° to 46°F (2° to 8°C). **Do not freeze or expose to freezing temperatures.**

Shelf Life

Check expiration date on vial, container, or manufacturer-filled syringe.

Instructions for Reconstitution* or Use

Shake well before withdrawal and use. Do not use if resuspension does not occur with vigorous shaking.

Shelf Life After Reconstitution* or Opening

Single-Dose Vials: The vaccine should be administered shortly after withdrawal from the vial.

Manufacturer-Filled Syringes: The vaccine should be administered shortly after the needle is attached to the syringe.

Special Instructions

Rotate stock so that the earliest dated material is used first.

* ActHIB® (Aventis Pasteur) should be used within 24 hours of reconstitution if used alone. If Aventis Pasteur DTaP is used to reconstitute ActHIB®, the TriHibit® vaccine must be used within 30 minutes of reconstitution. Only Aventis Pasteur DTaP-Tripedia® or the diluent shipped with the product may be used to reconstitute the Aventis Pasteur ActHIB® product. Aventis Pasteur DAPTACEL® is not licensed for use in reconstitution of ActHIB®.

** If you have questions about the condition of the material at the time of delivery, you should 1) immediately place material in recommended storage; and 2) notify the [Quality Control office at the vaccine manufacturer](#); and 3) notify your state health department immunization program.

HBIG: Hepatitis B Immune Globulin

Shipping Requirements

Should be shipped in insulated container. Maintain temperature at 35° to 46°F (2° to 8°C). **Do not freeze or expose to freezing temperatures.**

Condition upon Arrival*

Should not have been frozen or exposed to freezing temperatures. Refrigerate on arrival.

Storage Requirements

Refrigerate immediately upon arrival. Store at 35° to 46°F (2° to 8°C). **Do not freeze or expose to freezing temperatures.**

Shelf Life

Check expiration date on vial or container.

Instructions for Reconstitution or Use

Shake vial vigorously before withdrawal and use.

Shelf Life After Reconstitution or Opening

Use until outdated, if not contaminated.

Special Instructions

Rotate stock so that the earliest dated material is used first.

Hepatitis Vaccines: Hepatitis A, Hepatitis B, Hepatitis A/B

Shipping Requirements

Should be shipped in insulated container. Maintain temperature at 35° to 46°F (2° to 8°C). **Do not freeze or expose to freezing temperatures.**

Condition upon Arrival*

Should not have been frozen or exposed to freezing temperatures. Refrigerate on arrival.

Storage Requirements

Refrigerate immediately upon arrival. Store at 35° to 46°F (2° to 8°C). **Do not freeze or expose to freezing temperatures.**

Shelf Life

Check expiration date on vial, container or manufacturer-filled syringe.

Instructions for Use

Shake vial vigorously before withdrawal and use.

Shelf Life After Opening

Single-Dose Vials: The vaccine should be administered shortly after withdrawal from the vial.

Manufacturer-Filled Syringes: The vaccine should be administered shortly after the needle is attached to the syringe.

Special Instructions

Rotate stock so that the earliest dated material is used first.

* If you have questions about the condition of the material at the time of delivery, you should 1) immediately place material in recommended storage; and 2) notify the [Quality Control office at the vaccine manufacturer](#); and 3) notify your state health department immunization program.

Hib: *Haemophilus influenzae* type b Conjugate Vaccine

Shipping Requirements

Should be shipped in insulated container. Maintain temperature at 35° to 46°F (2° to 8°C). **Do not freeze or expose to freezing temperatures.**

Condition upon Arrival*

Should not have been frozen or exposed to freezing temperatures. Refrigerate on arrival.

Storage Requirements

Refrigerate immediately upon arrival. Store at 35° to 46°F (2° to 8°C). **Do not freeze or expose to freezing temperatures.**

Shelf Life

Check expiration date on vial or container.

Instructions for Reconstitution** or Use

Shake vial vigorously before withdrawal and use. Do not use if resuspension does not occur with vigorous shaking.

Shelf Life After Reconstitution** or Opening

The vaccine should be administered shortly after withdrawal from the vial.

Special Instructions

Rotate stock so that the earliest dated material is used first.

IPV: Inactivated Polio Vaccine

Shipping Requirements

Should be shipped in insulated container. Maintain temperature at 35° to 46°F (2° to 8°C). **Do not freeze or expose to freezing temperatures.**

Condition upon Arrival*

Should not have been frozen or exposed to freezing temperatures. Refrigerate on arrival.

Storage Requirements

Refrigerate immediately upon arrival. Store at 35° to 46°F (2° to 8°C). **Do not freeze or expose to freezing temperatures.**

Shelf Life

Check expiration date on vial or container.

Instructions for Use

Multidose Vials: Shake vial vigorously before withdrawal and use. Withdraw 0.5 mL of vaccine into separate sterile needle and syringe for each immunization.

Shelf Life After Opening

The vaccine should be administered shortly after withdrawal from the vial. Doses remaining in the vial may be used until outdated if not contaminated.

Special Instructions

Rotate stock so that the earliest dated material is used first.

* If you have questions about the condition of the material at the time of delivery, you should 1) immediately place material in recommended storage; and 2) notify the [Quality Control office at the vaccine manufacturer](#); and 3) notify your state health department immunization program.

**ActHIB® (Aventis Pasteur) should be used within 24 hours of reconstitution if used alone. If Aventis Pasteur DTaP is used to reconstitute ActHIB®, the TriHibit® vaccine must be used within 30 minutes of reconstitution. Only Aventis Pasteur DTaP-Tripedia® or the diluent shipped with the product may be used to reconstitute the Aventis Pasteur ActHIB® product. Aventis Pasteur DAPTACEL® is not licensed for use in reconstitution of ActHIB®.

TIV: Trivalent Inactivated Influenza Vaccine

Shipping Requirements

Should be shipped in insulated container. Maintain temperature at 35° to 46°F (2° to 8°C). **Do not freeze or expose to freezing temperatures.**

Condition upon Arrival*

Should not have been frozen or exposed to freezing temperatures. Refrigerate on arrival.

Storage Requirements

Refrigerate immediately upon arrival. Store at 35° to 46°F (2° to 8°C). **Do not freeze or expose to freezing temperatures.**

Shelf Life

Formulated for use during current influenza season.

Instructions for Use

Shake vial vigorously before withdrawal and use.

Shelf Life After Opening

Multidose Vials: The vaccine should be administered shortly after withdrawal from the vial.

Manufacturer-Filled Syringes: Sterile until removal of hub cap.

Special Instructions

Rotate stock so that the earliest dated material is used first.

* If you have questions about the condition of the material at the time of delivery, you should 1) immediately place material in recommended storage; and 2) notify the [Quality Control office at the vaccine manufacturer](#); and 3) notify your state health department immunization program.

LAIV: Live Attenuated Influenza Vaccine

Shipping Requirements

Should be shipped frozen in insulated container with dry ice. at 4°F (-20°C) or colder. Shipment includes WarmMark™ temperature indicator.

Condition upon Arrival*

Should be frozen at -20°C (4°F) or colder; **must not have thawed in shipment.** (All windows in WarmMark™ indicator should be white. If any indicator windows are red, do not use the product. Call the manufacturer for further instructions.)

NOTE: The manufacturer-supplied freezer box must have been placed in the separately sealed frost-free freezer compartment for at least 4 consecutive days before the arrival of the vaccine shipment. The freezer box can hold up to 80 doses of vaccine at one time (8 cartons of 10 doses each).

Storage Requirements

On arrival, immediately store in manual defrost freezer or in manufacturer-supplied freezer box placed in a separately sealed frost-free freezer compartment with its own exterior door.

Must be maintained in a continuously frozen state at 5°F (-15°C) or colder. No freeze/thaw cycles are permitted with this vaccine. May be stored in either a manual defrost freezer or in a freezer box placed in a frost-free freezer compartment. **A frost-free freezer is not appropriate for storage without a freezer box.**

In order to maintain the temperature of 5°F (-15°C) or colder in the freezer, it will be necessary in most refrigerator/freezer models to turn the temperature dial down to the coldest setting. This may result in the refrigerator compartment temperature

being lowered as well. Careful monitoring of the refrigerator temperatures will be necessary to avoid freezing killed or inactivated vaccines.

Shelf Life

Formulated for use during current influenza season.

Instructions for Use

Thaw sprayer in palm of hand before administering. May also be thawed in a refrigerator and stored at 35° to 46°F (2° to 8°C) for no more than 60 hours prior to use. **Do not refreeze after thawing.**

Shelf Life After Thawing

The vaccine should be administered shortly after thawing. Vaccine thawed in the refrigerator and stored at 35° to 46°F (2° to 8°C) that is not used within 60 hours must be discarded in an impenetrable sharps container.

Special Instructions

Rotate stock so that the earliest dated material is used first.

NOTE: all materials used for administering live virus vaccines should be burned, boiled, or autoclaved prior to disposal.

The LAIV freezer box is intended for LAIV storage only. It is not intended for transport or for use outside the freezer.

* If you have questions about the condition of the material at the time of delivery, you should 1) immediately place material in recommended storage; and 2) notify the [Quality Control office at the vaccine manufacturer](#); and 3) notify your state health department immunization program.

MMR: Measles/Mumps/Rubella Vaccine, MR: Measles/Rubella Vaccine, Measles Virus Vaccine, Mumps Virus Vaccine, Rubella Virus Vaccine

Shipping Requirements

Vaccine: Use insulated container. Must be shipped with refrigerant. Maintain at 10°C (50°F) or less. If shipped with dry ice, diluent must be shipped separately.

Diluent: May be shipped with vaccine, but do not place in container with dry ice.

Condition upon Arrival*

Should be at or below 50°F (10°C). If above this temperature, see instructions (*) below. **Do not use warm vaccine.** Refrigerate on arrival.

Storage Requirements

Vaccine may be stored separately from diluent. Store as follows:

Vaccine: Refrigerate immediately upon arrival. Store at 35° to 46°F (2° to 8°C). Protect from light at all times, since such exposure may inactivate the virus.

Diluent: May be refrigerated or stored at room temperature (68° to 77°F [20° to 25°C]). **Do not freeze or expose to freezing temperatures.**

NOTE: Freeze-dried (lyophilized) MMR vaccine may be maintained at freezer temperatures.

Shelf Life

Check expiration date on container or vial.

Instructions for Reconstitution and Use

Reconstitute just before using. Use only the diluent supplied to reconstitute the vaccine. Inject diluent into the vial of lyophilized vaccine and agitate to ensure thorough mixing. Withdraw entire contents into syringe and inject total volume of vaccine subcutaneously.

Shelf Life After Reconstitution, Thawing or Opening

After reconstitution, use immediately or store in a dark place at 35° to 46°F (2° to 8°C). **Discard if not used within 8 hours.**

Special Instructions

Rotate stock so that the earliest dated material is used first.

NOTE: all materials used for administering live virus vaccines should be burned, boiled, or autoclaved prior to disposal.

* If you have questions about the condition of the material at the time of delivery, you should 1) immediately place material in recommended storage; and 2) notify the [Quality Control office at the vaccine manufacturer](#); and 3) notify your state health department immunization program.

Meningococcal Polysaccharide Vaccine, Groups A, C, Y, W-135

Shipping Requirements

Should be shipped in insulated container. Maintain temperature at 35° to 46°F (2° to 8°C). **Do not freeze or expose to freezing temperatures.**

Condition upon Arrival*

Should not have been frozen or exposed to freezing temperatures. Refrigerate on arrival.

Storage Requirements

Refrigerate immediately upon arrival. Store at 35° to 46°F (2° to 8°C). **Do not freeze or expose to freezing temperatures.**

Shelf Life

Check expiration date on vial or container.

Instructions for Reconstitution and Use

Reconstitute gently. This is a white powder that yields a clear, colorless liquid when reconstituted with 0.6 ml (single-dose vial) or 6 ml (10-dose vial) of sterile distilled water.

Shelf Life After Reconstitution or Opening

Single-Dose Vials: Use within 30 minutes of reconstitution.

Multidose Vials: Unused portions of multidose vials may be refrigerated at 35° to 46°F (2° to 8°C) and used up to 35 days after reconstitution.

Special Instructions

Diluent to be used is sterile, distilled water for injection; diluent for 10-dose vial also contains 0.01% thimerosal. Reconstituted vaccine should be injected subcutaneously. Do not inject intradermally, intramuscularly, or intravenously.

Rotate stock so that the earliest dated material is used first.

* If you have questions about the condition of the material at the time of delivery, you should 1) immediately place material in recommended storage; and 2) notify the [Quality Control office at the vaccine manufacturer](#); and 3) notify your state health department immunization program.

PCV: Pneumococcal Conjugate Vaccine (7-Valent)

Shipping Requirements

Should be shipped in insulated container. Maintain temperature at 35° to 46°F (2° to 8°C). **Do not freeze or expose to freezing temperatures.**

Condition upon Arrival*

Should not have been frozen or exposed to freezing temperatures. Refrigerate on arrival.

Storage Requirements

Refrigerate immediately upon arrival. Store at 35° to 46°F (2° to 8°C). **Do not freeze or expose to freezing temperatures.**

Shelf Life

Check expiration date on vial or container.

Instructions for Use

Vaccine should appear as a homogenous white suspension after vigorous shaking. The vaccine should be administered intramuscularly only.

Shelf Life After Opening

The vaccine should be administered shortly after withdrawal from the vial.

Special Instructions

This vaccine is a suspension containing adjuvant and should not be used if the particles cannot be resuspended after vigorous shaking.

Rotate stock so that the earliest dated material is used first.

PPV: Pneumococcal Polysaccharide Vaccine (Polyvalent)

Shipping Requirements

Should be shipped in insulated container. Maintain temperature at 35° to 46°F (2° to 8°C). **Do not freeze or expose to freezing temperatures.**

Condition upon Arrival*

Should not have been frozen or exposed to freezing temperatures. Refrigerate on arrival.

Storage Requirements

Refrigerate immediately upon arrival. Store at 35° to 46°F (2° to 8°C). **Do not freeze or expose to freezing temperatures.**

Shelf Life

Check expiration date on vial or container.

Instructions for Use

Follow manufacturer's directions.

Shelf Life After Opening

Single-Dose Vials: The vaccine should be administered shortly after withdrawal from the vial.

Multidose Vials: Unused portions of multidose vials may be refrigerated at 35° to 46°F (2° to 8°C) and used until outdated, if not contaminated.

Special Instructions

Do not inject intravenously. Intradermal administration may cause severe local reactions and should be avoided.

Rotate stock so that the earliest dated material is used first.

* If you have questions about the condition of the material at the time of delivery, you should 1) immediately place material in recommended storage; and 2) notify the [Quality Control office at the vaccine manufacturer](#); and 3) notify your state health department immunization program.

Varicella (Chickenpox) Vaccine

Shipping Requirements

Vaccine: Use insulated container. Must be shipped with dry ice only, at 4°F (-20°C) or colder. Should be delivered within 2 days.

Diluent: May be shipped with vaccine, but do not place in container with dry ice.

Condition upon Arrival*

Should be frozen. Vaccine should remain at 4°F (-20°C) or colder until arrival at the healthcare facility. Dry ice should still be present in the shipping container when vaccine is delivered. See instructions (*) below.

Storage Requirements

Vaccine: Freeze immediately upon arrival. Maintain vaccine in a continuously frozen state at 5°F (-15°C) or colder. **No freeze/thaw cycles are allowed with this vaccine.** Vaccine should only be stored in freezers or refrigerator/freezers with separate doors and compartments. Acceptable storage may be achieved in standard household freezers purchased in the last 10 years, and standard household refrigerator/freezers with a separate, sealed freezer compartment. "Dormitory-style" units are not appropriate for the storage of varicella vaccine.

In order to maintain temperatures of 5°F (-15°C) or colder, it will be necessary in most refrigerator/freezer models to turn the temperature dial down to the coldest setting. This may result in the refrigerator compartment temperature being lowered as well. Careful monitoring of the refrigerator temperature will be necessary to avoid freezing killed or inactivated vaccines.

Diluent: May be refrigerated or stored at room temperature (68° to 77°F [20° to 25°C]). **Do not freeze or expose to freezing temperatures.**

Shelf Life

Check expiration date on container or vial.

Instructions for Reconstitution and Use

Reconstitute just before using. Use only the diluent supplied to reconstitute the vaccine.

Shelf Life After Reconstitution, Thawing or Opening

Protect from light. Discard if not used within **30 minutes** of reconstitution.

Special Instructions

If this vaccine is stored at a temperature warmer than 5°F (-15°C), it will result in a loss of potency and a reduced shelf life. If a power outage or some other situation occurs that results in the vaccine storage temperature rising above the recommended temperature, the healthcare provider should contact Merck, the vaccine manufacturer, at 1-800-609-4618 for a reevaluation of the product potency before using the vaccine.

Rotate stock so that the earliest dated material is used first.

NOTE: all materials used for administering live virus vaccines should be burned, boiled, or autoclaved prior to disposal.

* If you have questions about the condition of the material at the time of delivery, you should 1) immediately place material in recommended storage; and 2) notify the [Quality Control office at the vaccine manufacturer](#); and 3) notify your state health department immunization program.

Manufacturer Quality Control Office Telephone Numbers

Manufacturer/Distributor	Telephone Number	Products
sanofi pasteur www.us.aventispasteur.com	800-822-2463	DTaP, DTaP-Hib, DT, Td, TT, Hib, MCV4, MPSV4, Influenza (TIV), IPV
Bayer Biological Products www.bayerbiologicalsusa.bayerhealthcare.com/products.asp	800-288-8371	IGIM, HBIG, TIG
Centers for Disease Control & Prevention Drug Service www.cdc.gov/ncidod/srp/drugs/drug-service.html	404-639-3670	Distributor for Diphtheria antitoxin
Chiron www.chiron.com/products/vaccines/index.html	800-200-4278 (medical information pharmacist) 800-244-7668 (customer support)	Influenza (TIV)
GlaxoSmithKline www.gsk.com/products/vaccines.jsp	866-475-8222 (customer support) 888-825-5249 (customer support)	DTaP, DTaP-HepB-IPV, HepA, HepB, HepA-HepB
Massachusetts Biological Labs	617-983-6400	Td, TT, IGIM, VZIG
MedImmune, Inc. www.medimmune.com	877-358-6478 (LAIV customer support) 877-633-4411 (general customer support)	Influenza (LAIV)
Merck www.merck.com	800-609-4618 (customer support) 800-672-6372 (customer support)	Hib, Hib-HepB, PPV23, HepA, HepB, MMR, Measles, Mumps, Rubella, Varicella
Nabi Biopharmaceuticals www.nabi.com	800-635-1766	HBIG
Wyeth www.wyeth.com	800-999-9384 (storage) 800-934-5556 (customer support) 800-666-7248 (customer support)	Hib, PCV7

Protect Your Vaccines: Check Temperatures Twice a Day! Mo./Yr.: _____ Days 1-15

Instructions: Place an "X" in the box that corresponds with the temperature. The hatched zones represent unacceptable temperature ranges. If the temperature recorded is in the hatched zone: 1. **Store the vaccine** under proper conditions as quickly as possible, 2. **Call the vaccine manufacturer(s)** to determine whether the potency of the vaccine(s) has been affected, 3. **Call the immunization program at your local health department** for further assistance: (_____) _____, and 4. **Document the action taken** on the reverse side of this log.

Day of Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Exact Time	am pm	am pm	am pm	am pm	am pm	am pm	am pm	am pm	am pm	am pm	am pm	am pm	am pm	am pm	am pm
°F Temp	≥49°														
	48°														
	47°														
	46°														
	45°														
	44°														
	43°														
	42°														
	41°														
	40°														
	39°														
	38°														
	37°														
	36°														
	35°														
34°															
33°															
32°															
31°															
30°															
29°															
≤28°															
≥8°															
7°															
6°															
5°															
4°															
≤3°															
Room temp															
Staff Initials															

Adapted by the Immunization Action Coalition courtesy of the Michigan Department of Community Health

www.immunize.org/catg.d/p3039.pdf • Item #P3039 (7/02)

Please follow the instructions below if temperatures are outside the ranges.
Knowledgable, trained staff determine action(s), which may include:

1. Notify supervisor
2. Attempt to adjust thermostat
3. Check condition of storage unit (i.e., electrical supply, seals, lint on coils)
4. Recheck the temperature in two hours
5. Call Maintenance if ineffective
6. Move contents to controlled storage

DATE	TIME	TEMP.	PROBLEM	ACTION TAKEN	RESULTS	INITIAL

Protect Your Vaccines: Check Temperatures Twice a Day! Mo./Yr.: _____ Days 16–31

Instructions: Place an “X” in the box that corresponds with the temperature. The hatched zones represent unacceptable temperature ranges. If the temperature recorded is in the hatched zone: 1. **Store the vaccine** under proper conditions as quickly as possible, 2. **Call the vaccine manufacturer(s)** to determine whether the potency of the vaccine(s) has been affected, 3. **Call the immunization program at your local health department** for further assistance: (_____) _____, and 4. **Document the action taken** on the reverse side of this log.

Day of Month	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Exact Time	am pm	am pm	am pm	am pm	am pm	am pm	am pm	am pm	am pm	am pm	am pm	am pm	am pm	am pm	am pm	am pm
°F Temp																
≥49°																
48°																
47°																
46°																
45°																
44°																
43°																
42°																
41°																
40°																
39°																
38°																
37°																
36°																
35°																
34°																
33°																
32°																
31°																
30°																
29°																
≤28°																
≥8°																
7°																
6°																
5°																
4°																
≤3°																
Room temp																
Staff Initials																

Adapted by the Immunization Action Coalition courtesy of the Michigan Department of Community Health

**Please follow the instructions below if temperatures are outside the ranges.
 Knowledgeable, trained staff determine action(s), which may include:**

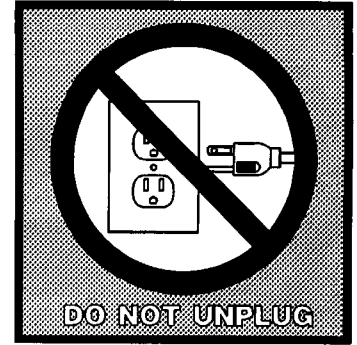
1. Notify supervisor
2. Attempt to adjust thermostat
3. Check condition of storage unit (i.e., electrical supply, seals, lint on coils)
4. Recheck the temperature in two hours
5. Call Maintenance if ineffective
6. Move contents to controlled storage

DATE	TIME	TEMP.	PROBLEM	ACTION TAKEN	RESULTS	INITIAL

WARNING

**Do not unplug refrigerator/
freezer or break circuit.**

Expensive vaccine in storage.

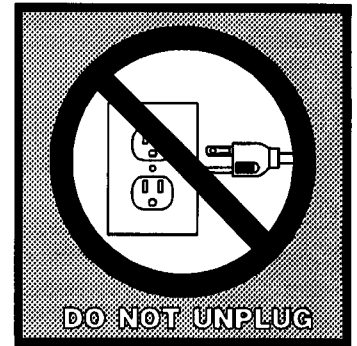


In event of electrical problem, immediately contact:

WARNING

**Do not unplug refrigerator/
freezer or break circuit.**

Expensive vaccine in storage.

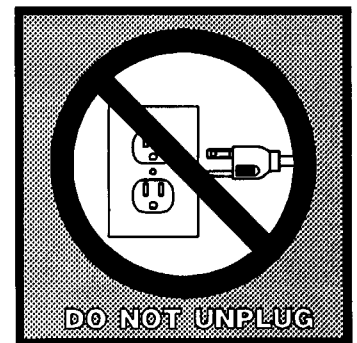


In event of electrical problem, immediately contact:

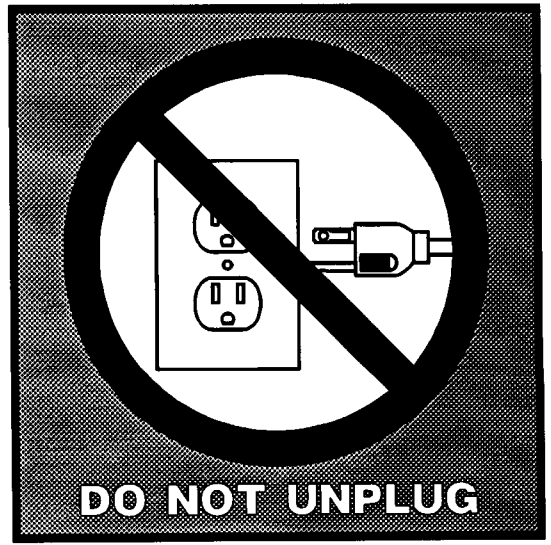
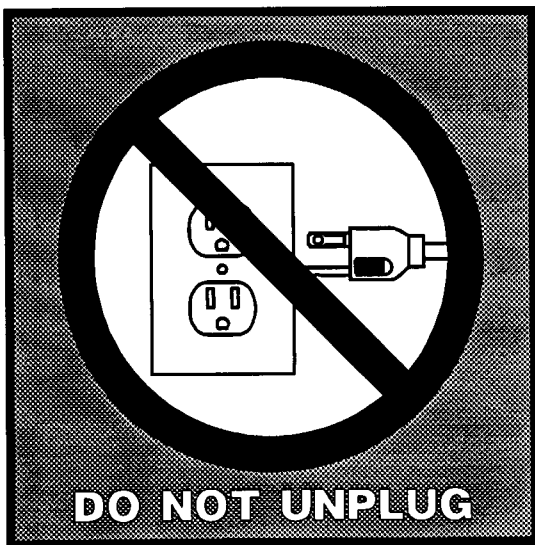
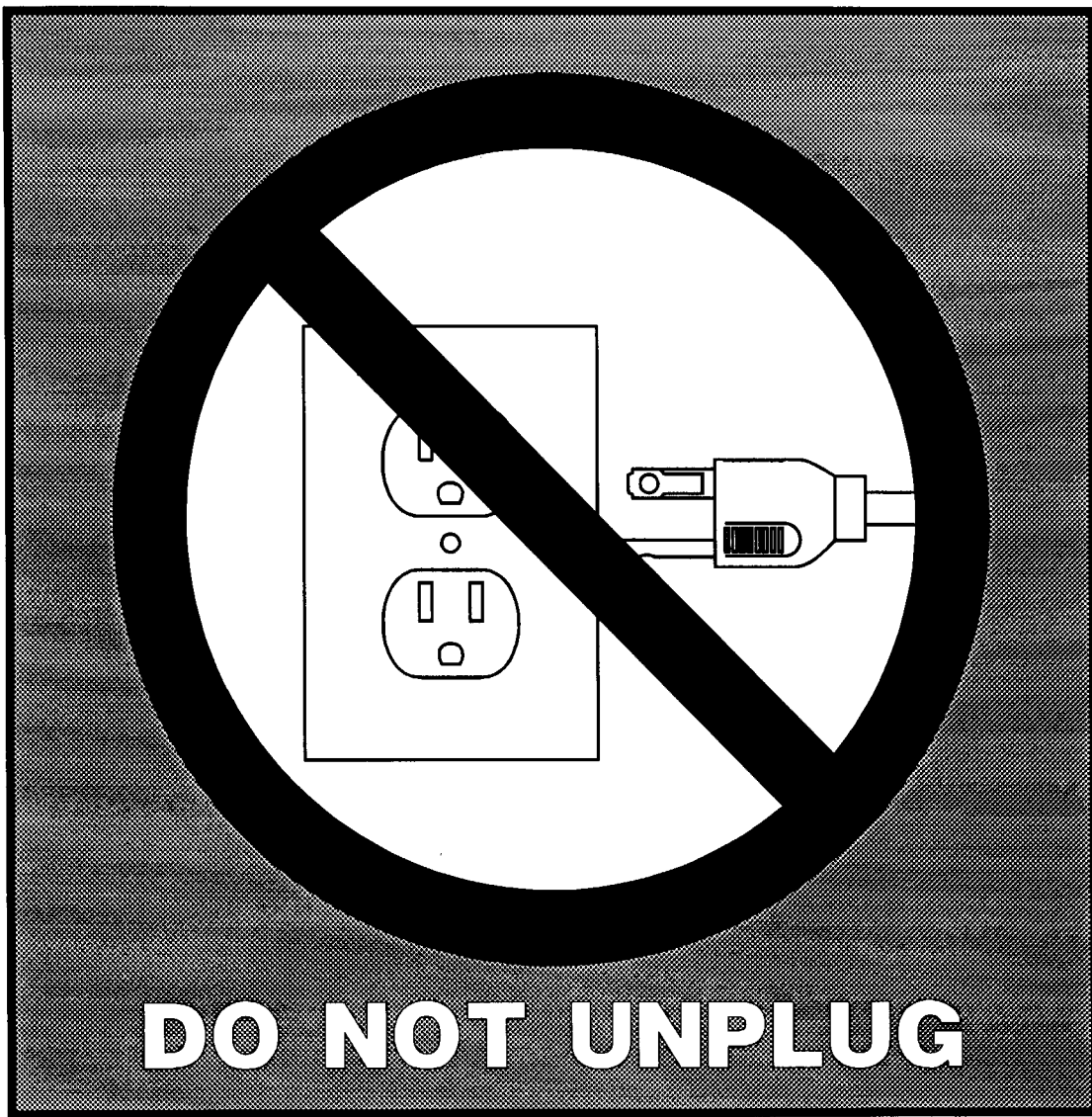
WARNING

**Do not unplug refrigerator/
freezer or break circuit.**

Expensive vaccine in storage.



In event of electrical problem, immediately contact:



PROTECT VACCINE

Handle with Care!

Store in Freezer
5°F (-15°C) or colder

Varicella*
Live Attenuated
Influenza

Store in Refrigerator
35°–46°F (2°–8°C)

Inactivated
Combination Vaccines
Vaccines containing
Diphtheria, Tetanus,
and/or Acellular Pertussis

Hepatitis A

Hepatitis B

Hib

IPV

Pneumococcal (PCV & PPV)

Inactivated Influenza

Meningococcal (MCV4 & MPSV4)

MMR^{*,**}

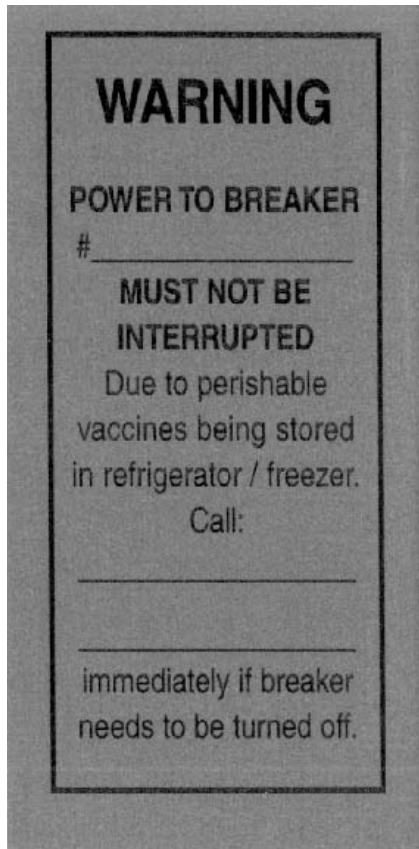
* Do not expose to light.

** Unreconstituted lyophilized (freeze-dried)
MMR may be frozen.

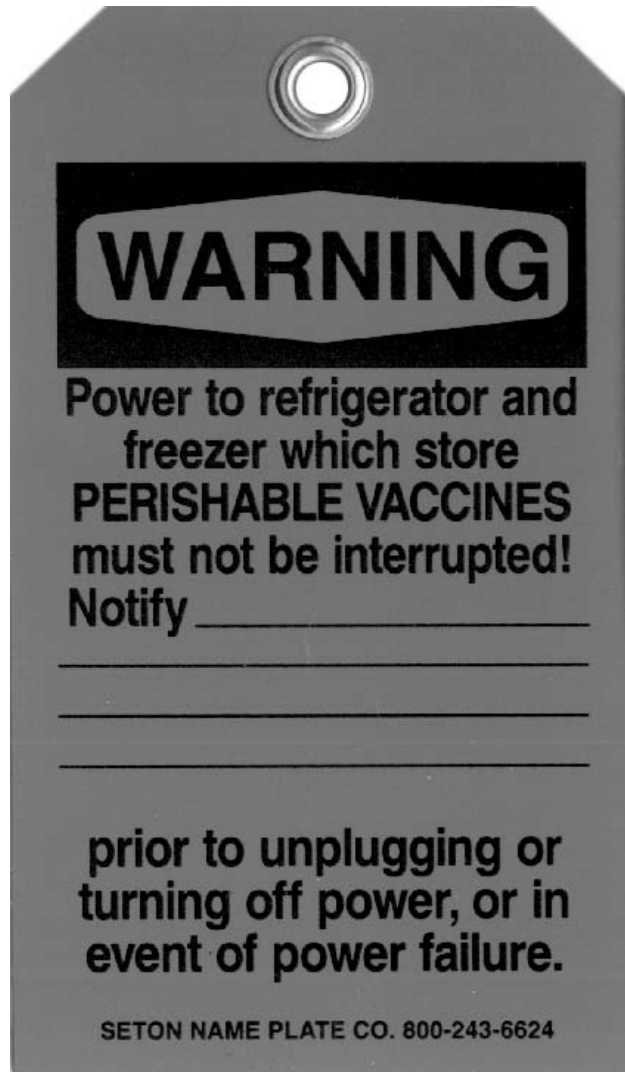
- Keep your refrigerator and freezer within the proper temperature ranges.
- Keep your vaccine within the proper temperature ranges.
 - Measure and record refrigerator and freezer temperatures twice daily.
 - Take *immediate action* if temperatures are out of range.
- Keep MMR vaccine cold and protected from light.
- Keep varicella vaccine frozen and protected from light.
- Keep live attenuated influenza vaccine (LAIV) frozen.
- Rotate your vaccine stocks.

Vaccine Storage Rules

PROTECT PATIENTS



(Pink, fluorescent sticker tag)



(Orange, hard-plastic tag)

These tags are available through the Colorado Department of Public Health & Environment, Immunization Program, 303-692-2797.

Vaccine Storage and Handling FAQs (page 1 of 7)

Vaccine Potency

What happens to vaccine contents when vaccines are not properly stored (i.e., not refrigerated?)

Excessive heat or cold exposure damages vaccine, resulting in loss of potency. Excessive cold exposure is as bad, if not worse than excessive heat exposure for most vaccines. Once potency is lost, it can never be restored. Furthermore, each time vaccine is exposed to excessive heat or cold, the loss of potency increases and eventually, if the cold chain is not correctly maintained, all potency will be lost, and the vaccine becomes useless. Measles, mumps, and rubella (MMR) vaccine and varicella vaccine are sensitive to light, which also causes loss of potency of these particular vaccines. If you have concerns about your vaccine supply, contact the vaccine manufacturer and the state health department immunization program.

How can you determine if vaccine has been out of the safe temperature range long enough to affect its efficacy? Is there a set amount of time that is a guideline for vaccine thresholds?

It depends on the vaccine, the length of time it was outside of recommended storage conditions, and the environment it was in (temperature and light). The National Immunization Program of the Centers for Disease Control and Prevention recommends that whenever there is any doubt about the integrity of a vaccine it should be clearly marked “Do Not Use” and stored under appropriate conditions in a properly functioning vaccine storage unit until the integrity of the vaccine is determined. Contact the vaccine manufacturer and the state health department immunization program for further guidance. Do not assume that vaccine inappropriately exposed to light or to excessive temperatures cannot be salvaged.

Refrigerator and Freezer Requirements

What are the exact measurements required by the National Immunization Program (NIP) for a refrigerator to hold vaccines?

NIP has never made a recommendation based on size. NIP recommends that any refrigerator, freezer, or combined refrigerator/freezer unit used to store vaccine must:

- Be able to maintain required vaccine storage temperatures year-round;
- Be large enough to hold the year’s largest inventory;
- Have a certified calibrated thermometer inside each storage compartment; and
- Be dedicated to the storage of vaccines.

Refrigeration units for vaccine storage are all available in various sizes and shapes. Some stand free and others fit under counters. If an under-counter unit has separate exterior

Vaccine Storage and Handling FAQs (page 2 of 7)

doors for the refrigerator and freezer compartments and can maintain appropriate temperatures in these compartments, both the refrigerator and freezer compartments may be used for vaccine storage. However, the size of an under-counter unit limits the amount of vaccine that can be stored. Be sure that the capacity is sufficient to store the vaccine supply while still allowing for air circulation within the unit. Avoid overstocking the unit because this impedes air flow and leads to temperature fluctuations that may expose the vaccines to inappropriate temperatures. If you need to store large quantities of vaccine, then additional under-counter units or a full-size unit would be needed.

Small single-door (dormitory-style or bar-style) combined refrigerator/freezer units should not be used for vaccine storage. The freezer compartment in this type of unit is incapable of maintaining temperatures cold enough to store varicella and live attenuated influenza vaccines. If attempts are made to cool the freezer compartment to the appropriate temperature, the temperature in the refrigerator compartment will fall below the recommended range, potentially freezing the refrigerated vaccines. However, this type of unit may be adequate for storing **small quantities** of inactivated and MMR vaccines in the refrigerator compartment (not the freezer compartment) **if** the refrigerator compartment can maintain temperatures at 35° to 46°F (2° to 8°C). Make sure not to overstock the unit and impede cold air circulation.

When is a “dormitory- style” refrigerator not adequate for storing vaccines?

This type of unit is not acceptable for storing varicella or live attenuated influenza vaccines because the freezer compartment is incapable of maintaining temperatures at 5°F (-15°C) or colder. However, a dormitory refrigerator may be used for storing small quantities of vaccines that require only refrigeration if the unit can maintain temperatures at 35° to 46°F (2° to 8°C) **and** if the volume of vaccine stored in the unit is small enough to allow adequate cold air circulation.

We work in a mobile van that has a dorm-like refrigerator for vaccine storage. I have been unable to find a refrigerator and a separate freezer that would meet the vaccine storage temperature requirements. What do you advise?

A dormitory-style refrigerator may be used for storing small quantities of vaccines that require only refrigeration if the unit can maintain temperatures at 35° to 46°F (2° to 8°C) **and** if the volume of vaccine stored in the unit is small enough to allow adequate cold air circulation. If you store varicella vaccine in a refrigerator it **must** be used within 72 hours or discarded and it cannot be refrozen. Live attenuated influenza vaccine stored in a refrigerator must be used within 60 hours or discarded and it also cannot be refrozen.

Vaccine Storage and Handling FAQs (page 3 of 7)

Vaccine Storage Locations

I was told that vaccine stored in a refrigerator could not be stored on the top or bottom shelf and the vaccine could only be in the very middle of the shelves. Is this true?

The temperature inside the refrigerator compartment is not consistent throughout. The temperature in the vegetable bins, on the floor, next to the walls, in the door, and near the cold air venting from the freezer may differ significantly from the temperature in the main body of the refrigerator. Ideally, vaccines should be situated on the middle shelves, away from these areas.

Many combined refrigerator/freezer units use a cooling system that directs cold air from the freezer compartment into the main refrigerator compartment through a vent, which is usually located above the top shelf. Refrigerated vaccines should always be stored far enough away from the air venting from the freezer compartment to avoid freezing the vaccines. If the vaccines can be situated away from the cold air vent and the temperature in this area is within the recommended range of 35° to 46°F (2° to 8°C), the vaccines may also be stored on the upper shelf. If the upper shelf must be used for vaccine storage, it would be best to place MMR on this shelf because MMR is not sensitive to freezing temperatures like the other refrigerated vaccines.

We have a large quantity of vaccines, and space is always an issue. Since we cannot put vaccines in the vegetable bins, can we remove the bins and then put vaccines in that space?

Vaccines should not be stored in the vegetable bins or in the space occupied by the vegetable bins because the temperature near the floor of the refrigerator is not stable and differs from that in the middle of the compartment. The National Immunization Program recommends that you remove the vegetable bins and put bottles of water in that space to help maintain a constant temperature in your refrigerator.

Is it safe to store vaccines and other biologics in the same refrigerator with lab specimens?

If possible, other medications and other biologic products should not be stored inside the vaccine storage unit. If there is no other choice, these products must 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.

What are the guidelines for storing vaccine during off-site clinics?

It does not matter whether the vaccine is being stored at a traditional office or off-site. Vaccines **must** be stored at the temperatures recommended by the manufacturers regardless of where they are.

Vaccine Storage and Handling FAQs (page 4 of 7)

Ideally, vaccines should be stored at the recommended temperatures inside a properly functioning storage unit (e.g., refrigerator, freezer, refrigerator/freezer combination) at the off-site clinic. If such a unit is not available and the vaccine must be maintained in an insulated cooler during the off-site clinic, keep the cooler closed as much as possible. A thermometer must be kept in the cooler with the vaccines, and temperatures should be checked and recorded periodically to ensure that the cold chain is not broken. The National Immunization Program of the Centers for Disease Control and Prevention recommends that, at a minimum, vaccine temperatures be checked and recorded **hourly**.

Temperature Monitoring

How often should temperatures be recorded for refrigerator and freezer compartments where vaccines are stored?

Temperatures inside refrigerator and freezer compartments should be measured and recorded at least twice a day, once at the start of the clinic day and a second time before the clinic is closed for the day. Immediate action must be taken if the temperature is outside the recommended range for either compartment.

How long do you need to monitor temperatures after a refrigerator or freezer thermostat is adjusted before you know the temperatures are within the recommended range and you can safely store vaccines in them?

After the thermostat in a working refrigerator or freezer has been adjusted, check the temperature in both the refrigerator **and** freezer (if using a combined unit) **every half hour** until the temperature stabilizes. If the temperature rises or falls rapidly or is outside the recommended range, adjust the thermostat inside the unit and repeat the process.

As a general guideline, the National Immunization Program also suggests that you monitor temperatures inside the refrigerator and freezer for a week in any new (or newly repaired) unit before it is used for vaccine storage. This practice allows you to check that the unit is performing well and allows time to make any necessary adjustments before expensive vaccines are put at risk. Of course, twice daily temperature monitoring should be an ongoing practice as well.

Our clinics use a digital thermometer in the refrigerators where vaccines are stored (battery powered and National Institute of Standards and Technology certified). These thermometers also have alarm capability and can show the temperature range since the thermometer was last checked and cleared. Is it still necessary to record temperatures twice a day or will once a day be adequate?

The National Immunization Program (NIP) still recommends twice daily temperature monitoring and recording. Alarms and continuous recording thermometers add another layer of protection and are a great addition but they are not a substitute for manually checking and recording the temperatures twice daily. Relying solely on alarms can lead to complacency and inappropriate temperatures may not be discovered in a timely manner

Vaccine Storage and Handling FAQs (page 5 of 7)

(e.g., alarm battery failure). Temperatures may be recorded continuously by some thermometers but, unless someone physically checks the recordings twice a day, inappropriate storage temperatures may not be detected and corrected in a timely manner. Therefore, NIP recommends checking and recording the temperatures first thing in the morning to be sure there has not been a problem overnight. Check and record the temperatures at the end of the clinic day to make sure there has not been a problem during the day (which acts as a backup for the alarm in case it is not working or in case no one heard it). This end-of-the-day temperature reading also gives you a reference point should there be a subsequent temperature problem overnight. Recording twice daily temperatures also gives you a record over time of how well your refrigerator and freezer are working so you can spot trends in temperature during the day or overnight. Vaccines are expensive and if they have been damaged because of storage at inappropriate temperatures you may not be protecting your patients. Manually checking and recording the temperatures twice daily takes very little time and is worth the extra effort.

Why is it recommended that we keep temperature logs for 3 years?

By keeping temperature logs for at least 3 years, you can track recurring temperature problems and determine how long they have been happening. This information allows you to better define the time frame in question and take appropriate action. For example, out-of-range temperature problems are sometimes detected after-the-fact. A record review can determine how long temperatures have been out of range, which vaccines may have been compromised, and which vaccine recipients may need to be recalled. Archived temperature logs also show how well the vaccine storage unit is working over time and can be used to determine when a unit may need adjustment, maintenance, or replacement, such as when temperatures are consistently at the limit or sometimes beyond the limit of the recommended temperature range.

Vaccine Expiration

When the expiration date of a vaccine indicates a month and year, does the vaccine expire on the first or last day of the month?

When the expiration date is marked with only a month and year, the vaccine or diluent may be used up to and including the last day of the month indicated on the vial. Any unused vaccine or diluent should not be used after this month has passed.

When a multidose vial is opened and a dose is withdrawn, how long can that vial be retained for use?

Certain vaccines are distributed in multidose vials. When opened, the remaining doses from partially used multidose vials can be administered until the expiration date printed on the vial or vaccine packaging, provided that the vial has been stored correctly and that the vaccine is not visibly contaminated.

Vaccine Storage and Handling FAQs (page 6 of 7)

Some multidose vaccine vials contain lyophilized (freeze-dried) vaccine. Once reconstituted, the life of each vaccine varies from product to product and the new expiration date and time most likely will differ from that printed on the vial of lyophilized vaccine. Consult the package insert for the most up-to-date information about expiration dates and times following reconstitution. Unused reconstituted vaccines kept beyond these limits should **not** be administered.

Our state supplies us with 2 mL vials of Immune Globulin (Human) USP. Often we only use parts of the vial. I read in the package insert that because the Immune Globulin does not contain a preservative the vial should be entered only once for administration purposes. Do we need to throw away a vial if it is partially used?

Multiple doses may be withdrawn from this vial during that same clinic day because bacterial growth from contamination is unlikely during that short interval. However, this vial must be discarded at the end of the clinic day—it must not be kept overnight for use the next day. This is the same recommendation as that for the use of single-dose vials of vaccine. Single-dose vials with broken seals (either the metal tab or the rubber stopper) should be discarded at the end of the clinic day.

How long is a vaccine dose viable if it has been stored in the refrigerator in a syringe?

There are inadequate data to answer this question. Disposable syringes are meant for administration of immunobiologics not for storage. The National Immunization Program (NIP) strongly discourages prefilling syringes and has identified the following problems associated with this practice:

- Once vaccine is inside the syringe, it is difficult to tell which vaccine is which; this may lead to **administration errors**.
- Prefilling syringes leads to **vaccine wastage** and increases the risk of vaccine **storage under inappropriate conditions**.
- Most syringes are designed for immediate administration and not for vaccine storage. **Bacterial contamination and growth** can occur in syringes you prefill with vaccines that do not contain bacteriostatic agents, such as the vaccines supplied in single-dose vials.
- No stability data are available for vaccine stored in plastic syringes. Vaccine components may interact with the plastic syringe components with time and thereby **reduce vaccine potency**.
- Finally, prefilling syringes is a violation of medication administration guidelines, which state that an individual should only administer medications s/he has prepared and drawn up. This is a **quality control and patient safety problem** because if you do not draw up the vaccine yourself you cannot be sure of the composition and sterility of the dose you are administering.

Vaccine Storage and Handling FAQs (page 7 of 7)

Because of the lack of data concerning the stability and sterility of vaccine stored in syringes prefilled by providers and because of the other reasons just listed, NIP recommends that vaccines drawn into syringes be discarded at the end of the clinic day. This does not apply to manufacturer-supplied prefilled glass syringes.

Vaccine Packing and Transport

In our county we have a number of district offices that are located a significant distance away from the main office where the vaccines are stored. Some offices are as far as 2 hours away from the main office. Nurses in these offices place monthly orders; the orders are filled and the vaccines are transported with ice packs to these offices (not always in a Styrofoam container or ice chest). Are guidelines available that outline how the vaccines should be packaged and transported?

Contact the vaccine manufacturer and the state health department immunization program for detailed instructions on packing vaccine for transport. In general, vaccines should be packed and transported in properly insulated containers. You may use the shipping containers the vaccines arrived in from the manufacturer. Alternatively, you may use hard-sided plastic insulated coolers or Styrofoam coolers with at least 2-inch thick walls. Thin-walled Styrofoam coolers, such as those purchased at grocery stores to hold beverages, are not acceptable. Pack the vaccines with an adequate supply of refrigerated/frozen packs. Be sure to place insulating material (e.g., bubble wrap, crumpled paper) between the refrigerated/frozen packs and the vaccine to prevent accidental freezing. Use properly placed thermometers in each container. The thermometers should be placed along side the vaccine and should not be in direct contact with the refrigerated/frozen packs. Frozen vaccines (i.e., varicella and live attenuated influenza vaccines) require dry ice and special procedures for transport. The manufacturers' storage guidelines should be maintained throughout packing and transport and vaccines should be transferred to properly functioning refrigerators/freezers upon arrival.

How to Read a Fluid-Filled Biosafe Liquid Thermometer

(page 1 of 2)

How It Works

Fluid-filled biosafe liquid (bottle) thermometers consist of two parts. The first part is a glass sensing bulb connected to a glass tube with a numbered scale printed along the tube. Inside the tube is a liquid (usually mercury or colored alcohol) that rises and falls as the temperature changes in the immediate area of the sensing bulb. The second part is a bottle containing a biosafe liquid, such as glycol. The glass sensing bulb is immersed in the liquid. The liquid provides a buffer around the sensing bulb so that the reading does not fluctuate when the refrigerator or freezer door is opened or closed.



A fluid-filled biosafe liquid thermometer.

How to Read It

1. Examine the scale that is marked on the side. Determine if it is in Fahrenheit or Celsius or both.
2. When reading the temperature, the thermometer should be vertical and your eyes should be level with the top of the liquid in the glass tube. It is preferred that the thermometer is read while still inside the vaccine storage unit. However, if this is not possible, the thermometer may be removed from the unit, read at eye level, and quickly replaced.

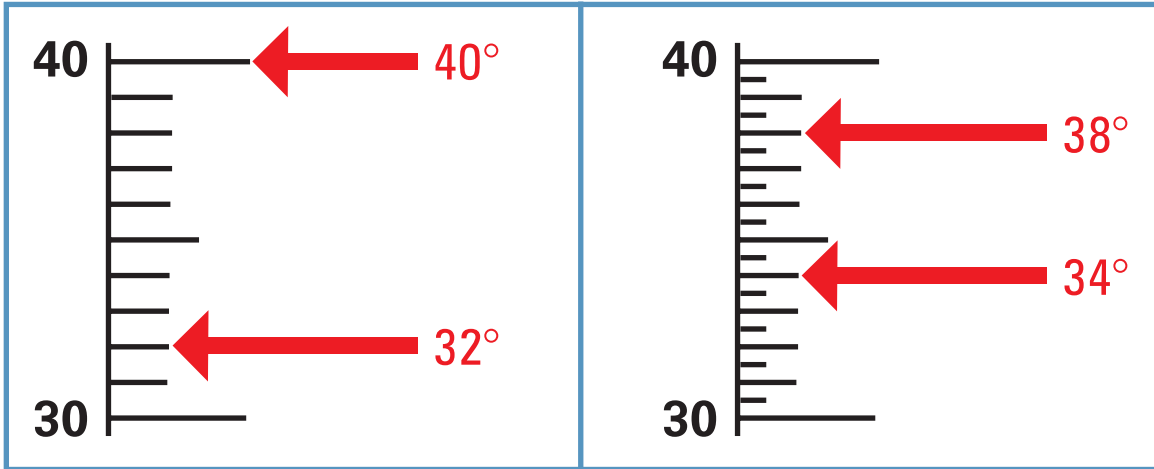


Reading a fluid-filled biosafe liquid thermometer.

How to Read a Fluid-Filled Biosafe Liquid Thermometer

(page 2 of 2)

- The position of the top of the liquid along the scale indicates the temperature. Read the thermometer to the appropriate number of significant digits. Shown below are temperatures indicated on one-degree and half-degree Fahrenheit scales.



One-degree scale (sample readings)

Half-degree scale (sample readings)

- Record the current temperature on the temperature log. Note any out-of-range temperatures and the action taken on the back of the log.

Temperature Log for Vaccines (Fahrenheit) Month/Year: August, 2004 Days 1-15


*Instructions: Place an "X" in the box that corresponds with the temperature. The hatched zones represent unacceptable temperature ranges. If the temperature recorded is in the hatched zone: 1. Store the vaccine under proper conditions as quickly as possible. 2. Call the vaccine manufacturer(s) to determine whether the potency of the vaccine(s) has been affected. 3. Call the immunization program at your local health department for further assistance: 404-555-8212. and 4. Document the action taken on the reverse side of this log.

Day of Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Room Temp															
Refrigerator temperature	X	X	X	X	X										
Freezer Temp	X	X	X	X	X										

Note: A red arrow points to an 'X' in the 32°F box on the refrigerator temperature row, which is in a hatched zone.

Adapted by the Immunization Action Coalition courtesy of the Michigan Department of Community Health
www.immunize.org/cdc/505331.pdf • form #73019 (8/04)
Immunization Action Coalition • 1573 Selby Ave., Ste. 234 • St. Paul, MN 55104 • (651) 647-9009 • www.immunize.org • admin@immunize.org

Front: Temperature Log for Vaccines.

Note:  **Immediate action must be taken to correct improper vaccine storage conditions.**

Vaccine Storage Troubleshooting Record

Date	Time	Storage Unit Temp	Room Temp	Problem	Action Taken	Results	Initials
8/20/04	8:00 am	Refrigerator 38°F	70°F	Refrigerator temperature 2° lower than acceptable.	Supervisor notified and thermostat adjusted. Temperature in refrigerator and freezer monitored every half hour. State contacted.	Refrigerator temperature stabilized at 38°F and freezer temperature stabilized at 5°F	AW

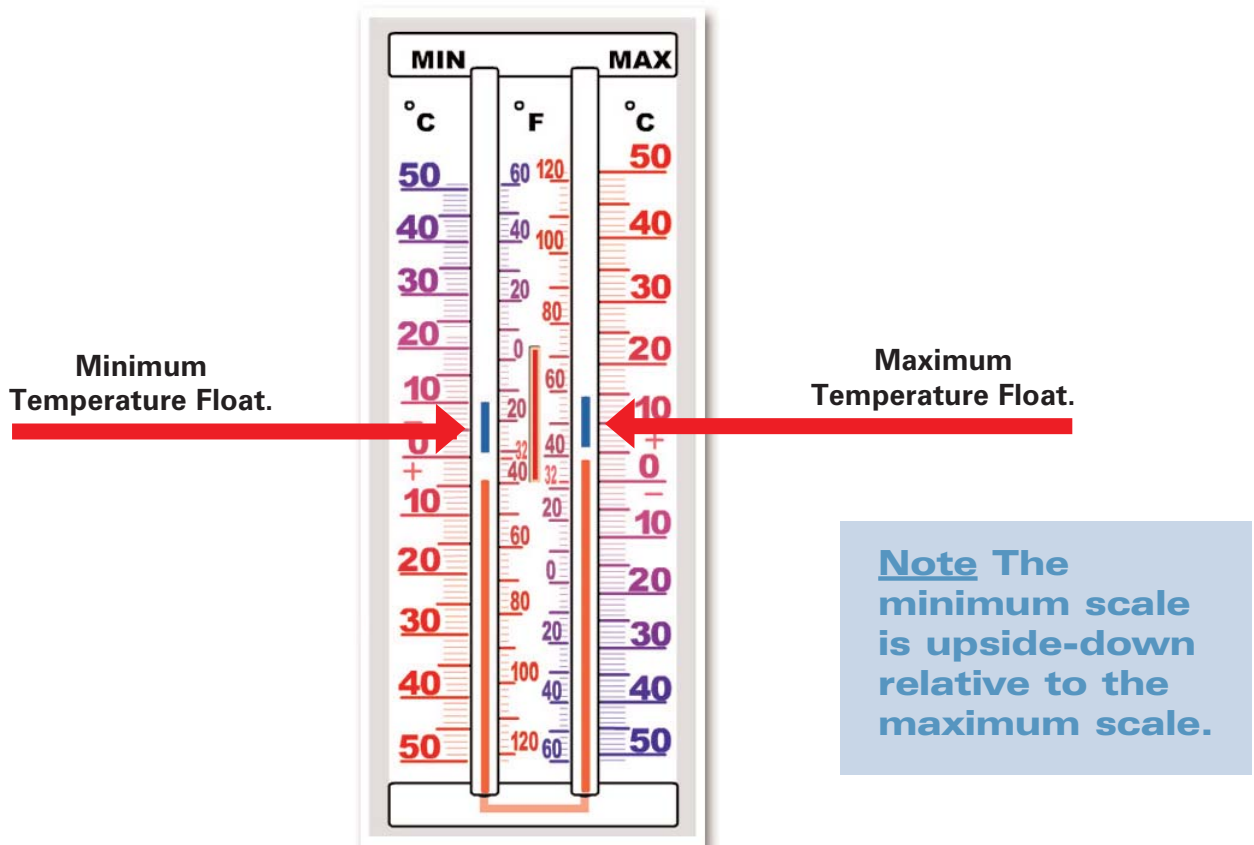
Reverse: Vaccine Storage Troubleshooting Record.

How to Read a Liquid Minimum/Maximum Thermometer

(page 1 of 5)

How It Works

Liquid minimum/maximum thermometers consist of 2 interconnected glass columns containing a mercury-free liquid. As the temperature changes, the liquid rises in one column and falls an equal distance in the other column. Each column has one or two numbered scales beside it (Fahrenheit and/or Celsius). These scales run in opposite directions so that the scale beside the "minimum" column is upside down compared to the scale beside the "maximum" column. As the mercury-free liquid rises and falls with the change of temperature, the maximum and minimum temperatures are captured for any given time period by means of two colored floats. The maximum temperature column has a scale indicating warmer temperatures on the top and colder temperatures on the bottom. The minimum temperature scale is upside down, indicating colder temperatures on the top and warmer temperatures on the bottom. Make sure that the liquid minimum/maximum thermometer is reset (see step 7) when it is first placed inside the refrigerator or freezer and following each temperature check.



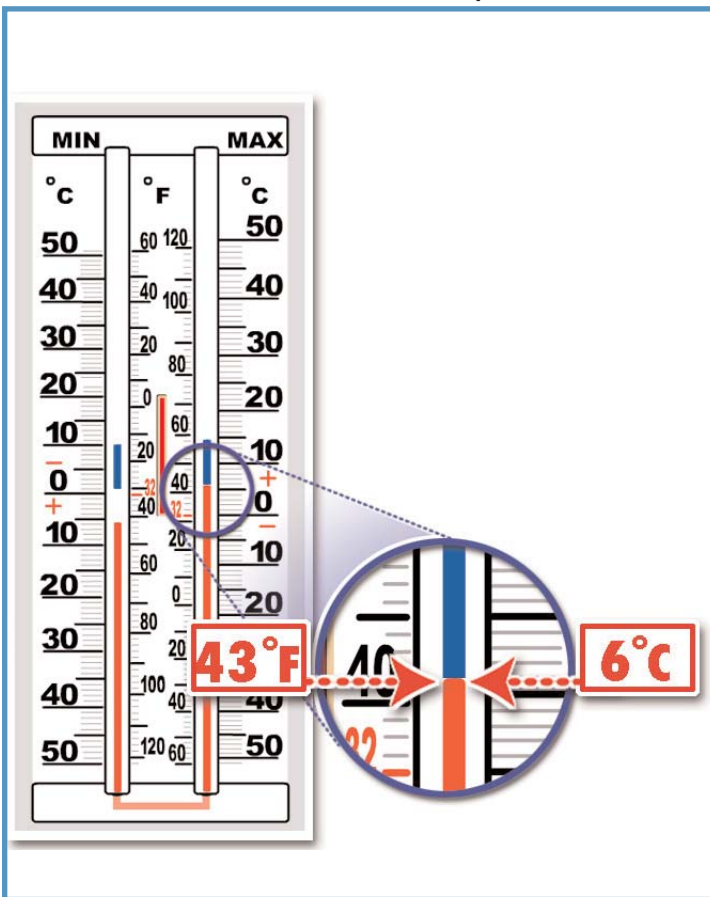
Minimum/maximum thermometer.

How to Read a Liquid Minimum/Maximum Thermometer

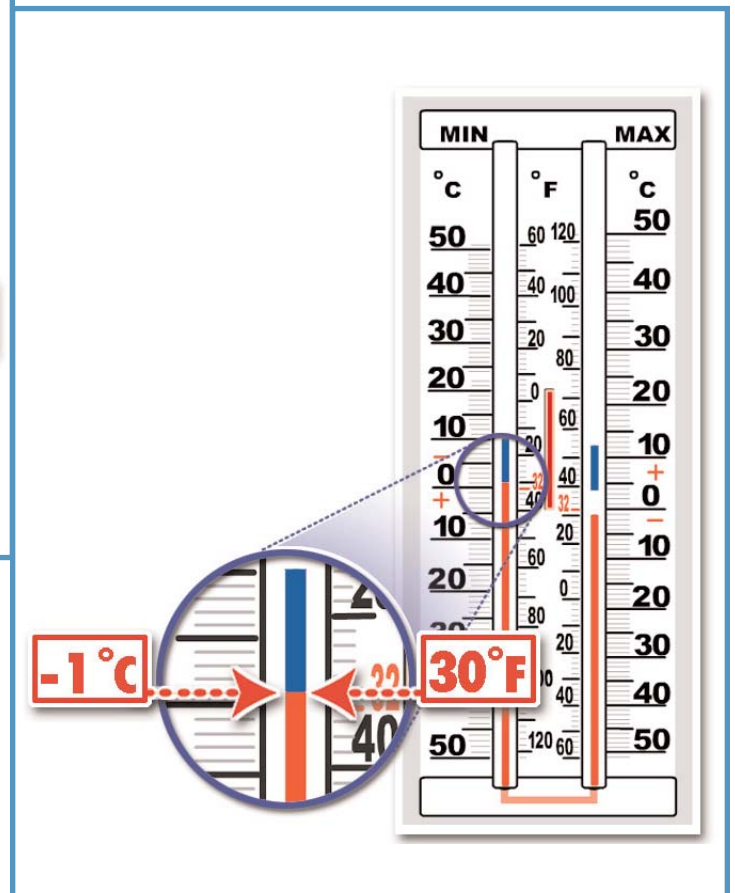
(page 2 of 5)

How to Read It

1. As the temperature changes, the floats are moved by the liquid columns. The floats “stick” at the highest and lowest temperatures until reset with the reset button.
2. The bottom of the float registers the maximum temperature on the right side and the minimum temperature on the left. Note that the minimum temperature scale is upside down.



Example of maximum temperature reached: 43°F (6°C).

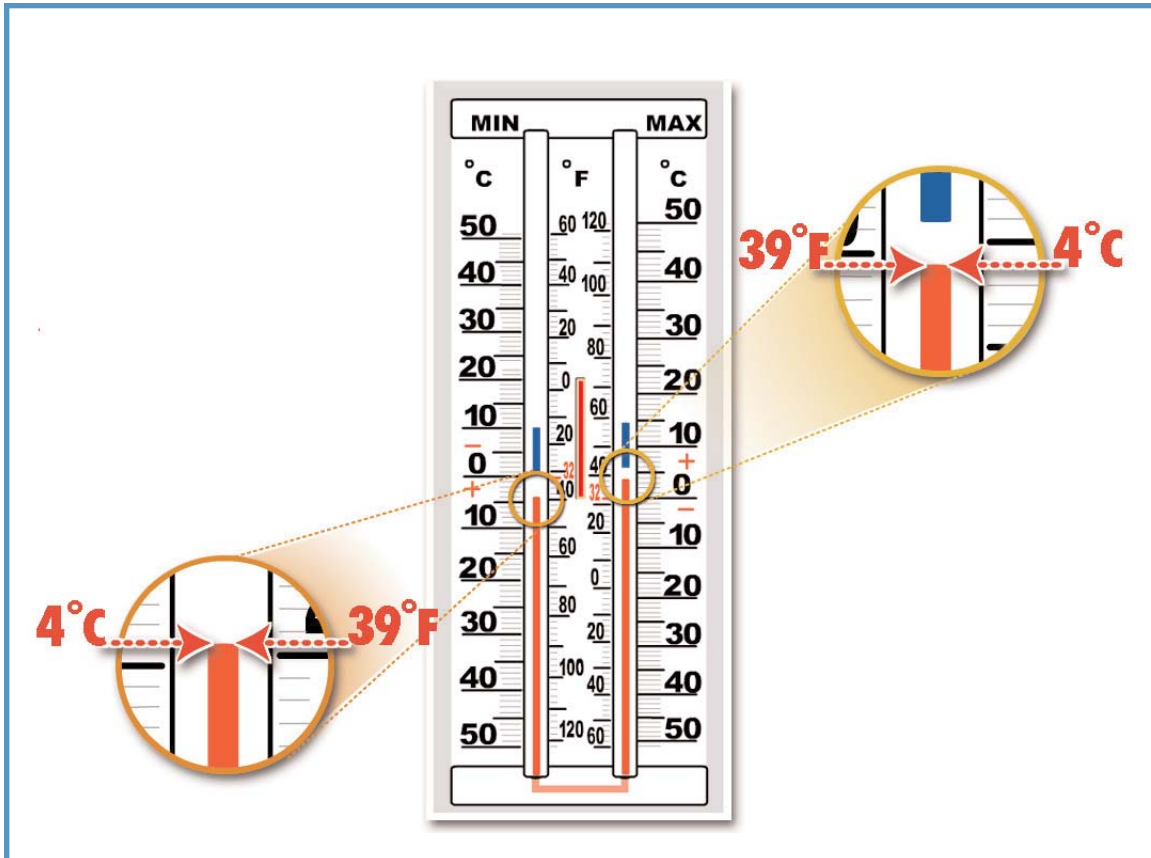


Example of minimum temperature reached: 30°F (-1°C).

How to Read a Liquid Minimum/Maximum Thermometer

(page 3 of 5)

3. The current temperature can be read using either the minimum or maximum column because they should indicate the same temperature.



Example of current temperature: 39°F (4°C).

4. When reading the temperature, the thermometer should be vertical and your eyes should be level with the top of the liquid in the glass tube. It is preferred that the thermometer is read while still inside the vaccine storage unit. However, if this is not possible, the thermometer may be removed from the unit, read at eye level, and quickly replaced. Do not touch the liquid column and expose it to body heat because this will cause a falsely elevated temperature reading.

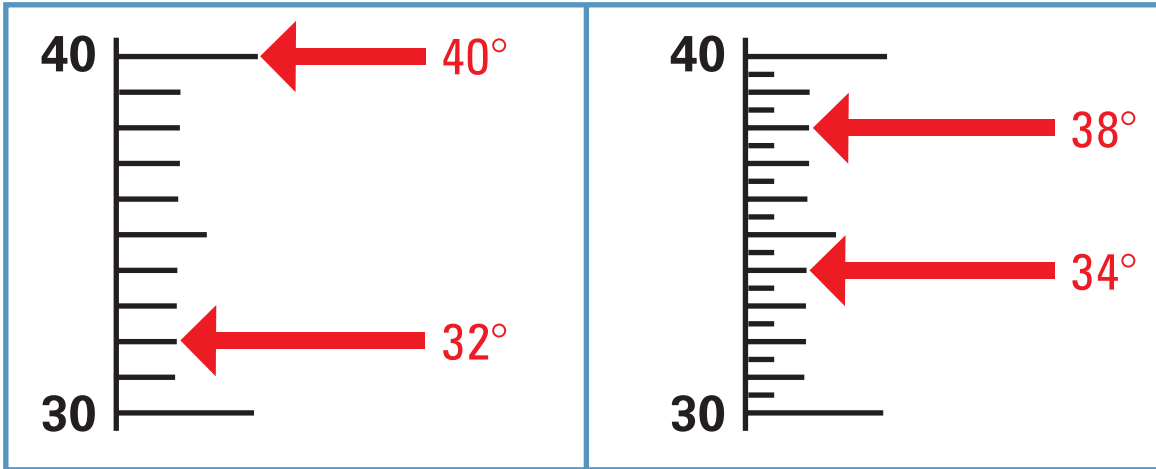
When reading the temperature, the thermometer should be vertical and your eyes should be level with the top of the liquid in the glass tube.



How to Read a Liquid Minimum/Maximum Thermometer

(page 4 of 5)

- Read the thermometer to the appropriate number of significant digits. If there is more than one scale printed on the thermometer, always read the same scale (either °F or °C). Shown below are temperatures indicated on one-degree and half-degree Fahrenheit scales.



One-degree scale (sample readings).

Half-degree scale (sample readings).

Note Read the thermometer to the appropriate number of significant digits.

- Record the current temperature on front of the temperature log. Note any out-of-range temperatures and the action taken on the back of the log.

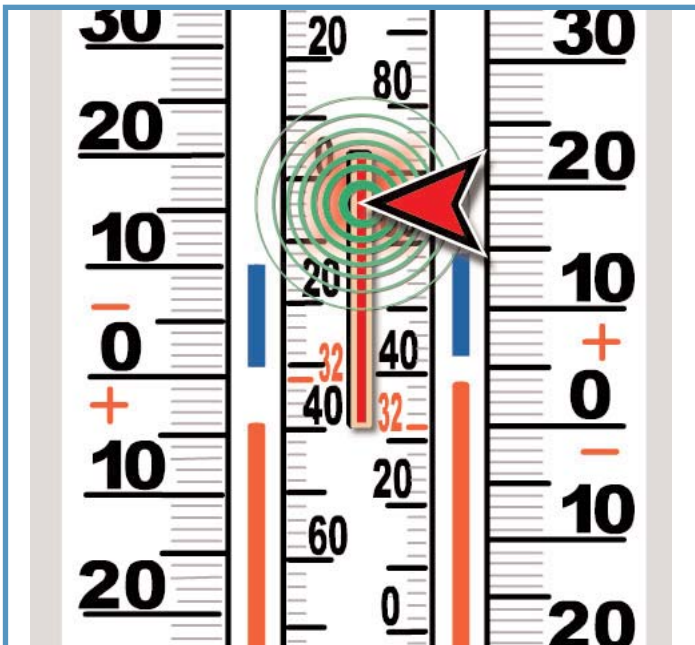
Record the current temperature on front of the temperature log.

Note any out-of-range temperatures and the action taken on the back of the log.

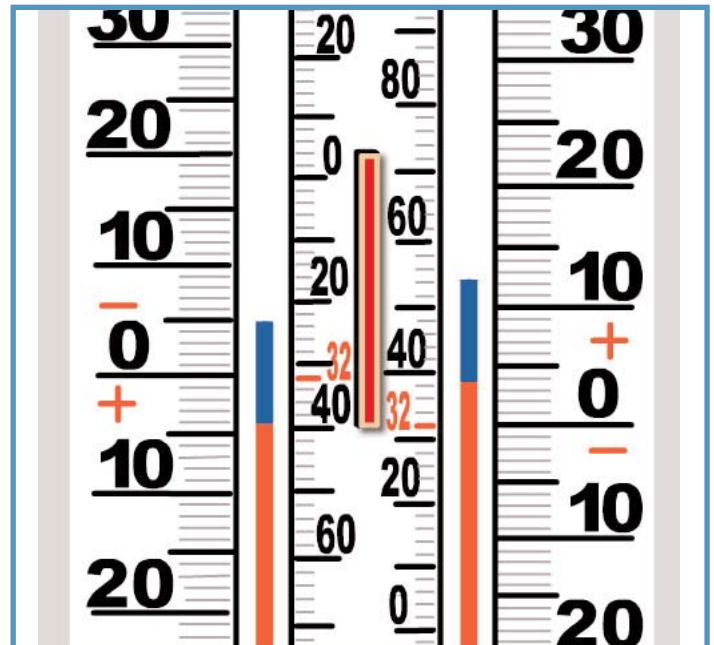
How to Read a Liquid Minimum/Maximum Thermometer

(page 5 of 5)

7. Reset the thermometer only after the current, minimum, and maximum temperatures have been checked. To reset the minimum/maximum thermometer, press the reset button to bring the colored floats to rest on the top of the liquid columns on both the right and left sides. The starting temperature for both floats should be the same.



Press the Reset Button to reset the minimum/maximum thermometer.



Resetting the thermometer brings the two floats to rest at the current temperature.

How to Read a Chart Recorder

(page 1 of 4)

How It Works

Chart recorders consist of a graph wheel with replaceable graph paper and ink pens. The pens mark the temperature on the graph paper as the wheel turns. The current temperature is at the end of the line. Temperatures are recorded continuously, 24 hours a day. The wheels of the most common models used for vaccine temperature monitoring make one full rotation every seven days. The graph paper has Fahrenheit or Celsius scales on it and the temperature is read where the ink line falls on the scale. Follow manufacturer instructions for loading the chart to ensure that the chart references the correct time.

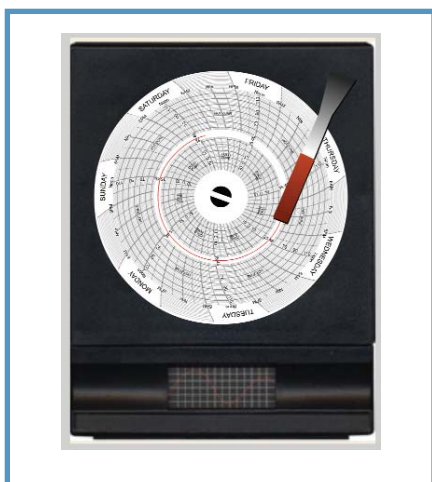
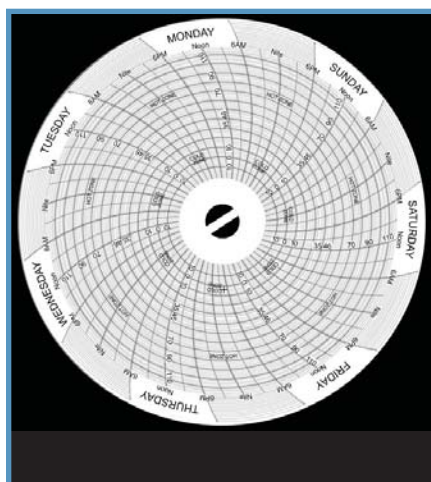
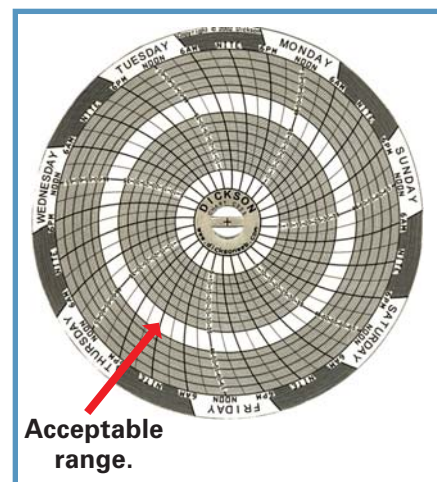


Chart recorder.



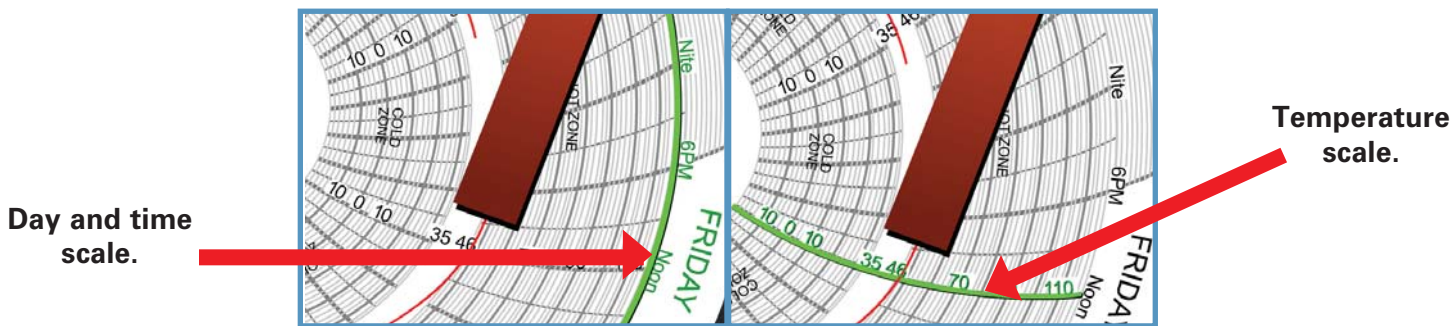
Graph paper—
two-degree increments.



Graph paper—range.

How to Read It

1. The graph contains two scales: one along the outer border of the paper that indicates the day of the week and the time; the other radiating from the center of the graph, like the spokes of a wheel, that indicates the temperature. The temperature will either be in Fahrenheit or Celsius.

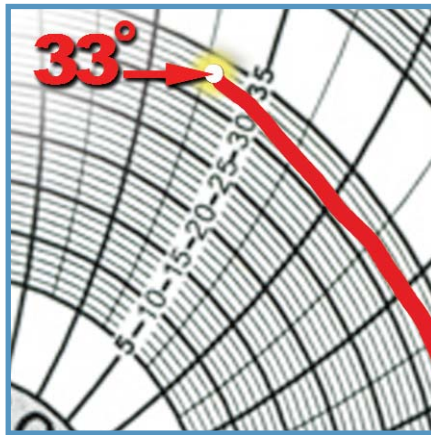


Each graph contains two scales.

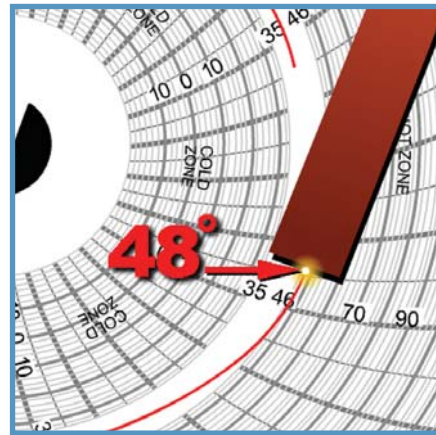
How to Read a Chart Recorder

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- To read the temperature for any point of interest along the recorded ink line, find the nearest graph line that circles the center of the graph. Follow that circular graph line to the temperature scale. The temperature is indicated by where the circular graph line intersects the scale. Temperature scales come in different increments. On some graphs, the circular graph lines represent 1-degree increments on the temperature scale. On other graphs, the circular graph lines represent 2-degree increments.

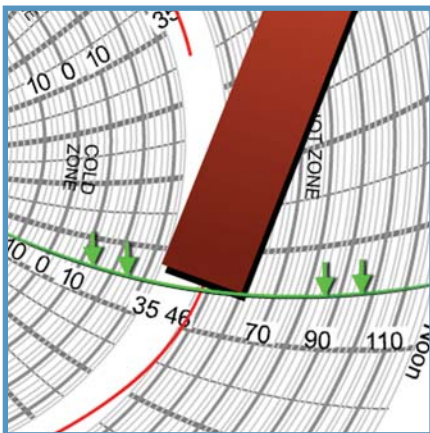


Current temperature is 33°F (end of red line). Each circular graph line represents 1 degree.

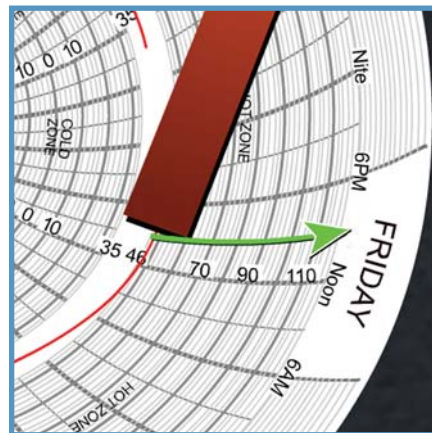


Current temperature is 48°F (end of red line). Each circular graph line represents 2 degrees.

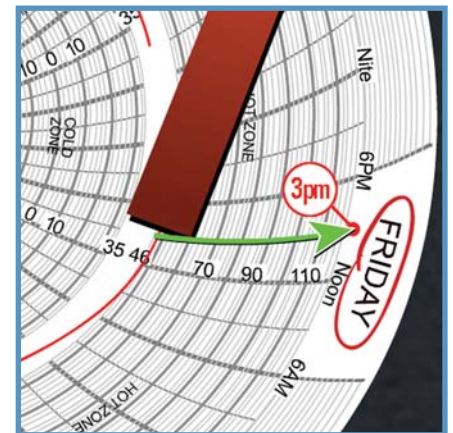
- To read the day for any point of interest along the recorded ink line, find the nearest curved line flowing from the center of the graph to the outside border. Follow the curved line to the outside border to read the day of the week. Estimate the time of day from the nearest curved line. The curved lines usually progress in 3-hour increments.



Nearest curved line to temperature of interest (current temperature at end of red line).



Follow curved line to outside border to reach the day and time scale.

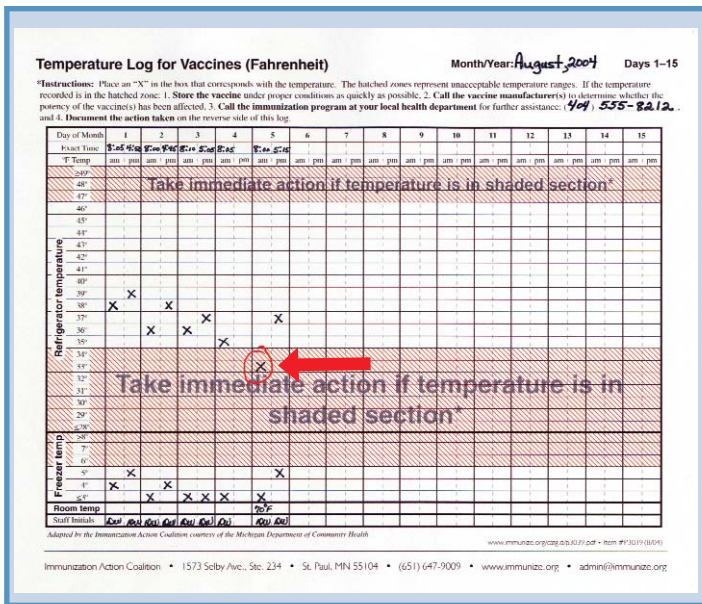


Current temperature falls on the line halfway between the curved lines "Noon" and "6PM" under "FRIDAY", indicating Friday, 3 p.m.

How to Read a Chart Recorder

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- Record the current temperature on the temperature log. Note any out-of-range temperatures and the action taken on the back of the log.



Note: **Immediate action must be taken to correct improper vaccine storage conditions.**

Vaccine Storage Troubleshooting Record

Date	Time	Storage Unit Temp	Room Temp	Problem	Action Taken	Results	Initials
8/20/04	8:00 am	Refrigerator 35°F	70°F	Refrigerator temperature 2° lower than acceptable.	Supervisor notified and thermostat adjusted. Temperature in refrigerator and freezer monitored every 24 hours. State contacted.	Refrigerator temperature stabilized at 37°F and freezer temperature stabilized at 5°F	BD

Front: Temperature Log for Vaccines.

Reverse: Vaccine Storage Troubleshooting Record.

- Some charts (such as the one shown here) may have only a white band (without circular graph lines) indicating the recommended temperature range for vaccine storage. In this case, you must still document that the temperatures were checked twice daily and were in range. You may either:
 - Make a mark in the unshaded area of the temperature log that corresponds to the position of the line on the chart recorder graph (an approximation is acceptable, so long as the recorded temperature is within the recommended range); or
 - Write "graph in range" or some similar notation in the appropriate column of the temperature log.

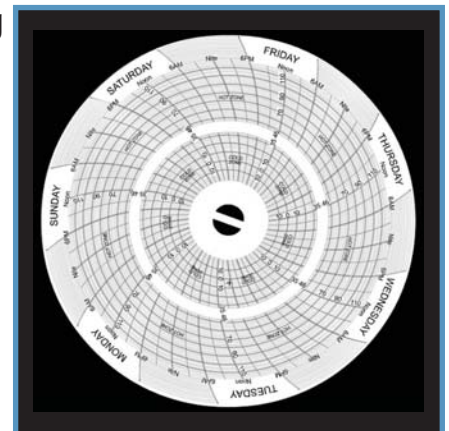


Chart with only a white band (without circular graph lines) indicating the recommended temperature range.

How to Read a Chart Recorder

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6. All charts from recording thermometers must be kept with the temperature logs for a minimum of 3 years. Charts should always be labeled with the date range before they are placed in the chart recorder and when they are removed.
7. Some graphing thermometers have both a recording wheel and a digital temperature display. The reading from the digital display may not be the same as the temperature recorded on the chart. In case of discrepancies, the charted reading on the certified calibrated chart recorder is preferred over the digital reading, which uses a separate, uncertified sensor.

Stock Record (Sample)

Instructions: At the end of each stock record page and at the end of each month, conduct a physical check of the inventory and compare it with the recorded balance, looking for any discrepancies. If the cause of the discrepancy cannot be discovered and corrected, make a note of this. Start a new stock record page by recording the physical count from the previous page. Use the correct physical count for the starting balance. Use the remaining lines to record new shipments of vaccines and weekly accounts of doses used. The Colorado Immunization program encourages the use of this form but DOES NOT require doses administered reporting as benchmarking is the standard for Colorado.

Vaccine Type: PPV August 2004

Date Received or Usage Tallied	Person Receiving Shipment *	Arrival Condition **	Vaccine or Diluent Name	Manufacturer	Vial Type (S, M, Y) ***	Lot Number	Expiration Date	Expiration Date After Reconstitution	Doses Received/Balance Forward	Doses Used †	Balance (Doses)	
BEGINNING BALANCE FOR THE MONTH												
08/02/04									2	N/A	2	
08/09/04										1	1	
08/15/04	LST	✓	Pneumovax 23	Merck	M	0395B	09/18/05	N/A	5	3	3	
08/22/04										1	2	
08/29/04										0	2	
									Vaccine Totals	7	5	2
											††	

* The initials of the person who unpacked and checked the vaccine and/or diluent upon arrival.

** ✓ = vaccine arrived in good condition;

X = condition of vaccine questionable and state health department immunization program and vaccine manufacturer contacted. Document details/outcome on reverse side of Stock Record.

*** S = single-dose vial;

M = multidose vial;

Y = manufacturer-filled syringe.

† Includes number of doses administered, wasted, spoiled, expired, or transferred.

†† Enter the sum of "Total Doses Received/Balance Forward" minus "Total Doses Used"

Physical Stock Check (In Doses)	2
Difference ("Balance" minus "Physical Stock Check")	0
Balance Carried Forward (In Doses)	2

Some state or local health department immunization programs have developed their own stock records for vaccine providers. Contact program staff for information. If stock records are not available from the state or local health department immunization program, this stock record may be used (see [Stock Record](#) in the Resources section for a blank version).