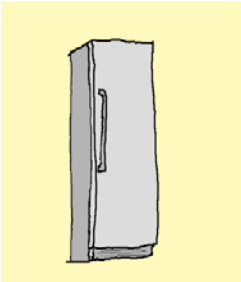
CHANGING
Maryland
for the Better

Clinical Logistics: Vaccine Administration, Storage, and Handling

Vaccine Administration, Storage, & Handling Objectives

- Vaccine Administration:
  - Proper techniques and procedures to implement during every encounter
  - Injection Safety

- Storage and Handling
  - Recommended temperature ranges
  - What to do if there is a suspected temperature excursion
  - Vital importance of storage and handling
  - Vaccine Emergencies



Vaccine Aseptic Technique and Hand Hygiene

- Maintain aseptic technique
- Proper hand hygiene- wash hands for a minimum of 20 seconds with warm water and soap or use an alcohol-based hand-sanitizer
- Use alcohol swab to clean rubber septum on medication vial- allow the alcohol to dry before inserting the needle to withdraw medication
- Use a new alcohol swab to clean patient's skin before injection, allow the alcohol to dry on the skin as well
- According to OSHA, gloves are not required to administer vaccinations, unless open sores are present on the hands of the person administering the vaccine or there is a likelihood of contact with bodily fluids
- Some needles and syringes indicate expiration dates, if so, verify the dates before use, and discard if expired
- Dispose of needles and syringes, after use, in a puncture-resistant biohazard container

Vaccine Administration Guidelines

- Ensure contraindications (i.e. No MMR for pregnant women) and allergy screening is complete
- Be knowledgeable about your emergency protocol and location of epinephrine
- Verify the vaccine for administration. Then, distribute the appropriate Vaccine Information Statement (VIS).
- Triple check the vial and expiration date prior to administration.
- Explain the vaccine and administration to the patient, and family, if present.

Screening Checklist for Contraindications to Vaccines

	yes	no	don't know
1. Are you sick today?	☐	☐	☐
2. Do you have allergies to medications, food, a vaccine component, or latex?	☐	☐	☐
3. Have you ever had a serious reaction after receiving a vaccination?	☐	☐	☐
4. Do you have a long-term health problem with heart disease, lung disease, asthma, kidney disease, metabolic disease (e.g., diabetes), anemia, or other blood disorder?	☐	☐	☐
5. Do you have cancer, leukemia, HIV/AIDS, or any other immune system problem?	☐	☐	☐
6. In the past 3 months, have you taken medications that affect your immune system, such as prednisone, other steroids, or anticancer drugs; drugs for the treatment of rheumatoid arthritis, Crohn's disease, or psoriasis; or have you had radiation treatments?	☐	☐	☐
7. Have you had a seizure or a brain or other nervous system problem?	☐	☐	☐
8. During the past year, have you received a transfusion of blood or blood products, or been given immune (gamma) globulin or an antiviral drug?	☐	☐	☐
9. For women: Are you pregnant or is there a chance you could become pregnant during the next month?	☐	☐	☐
10. Have you received any vaccinations in the past 4 weeks?	☐	☐	☐

FORM COMPLETED BY _____ DATE _____

FORM REVIEWED BY _____ DATE _____

Did you bring your immunization record card with you? yes ☐ no ☐

It is important for you to have a personal record of your vaccinations. If you don't have a personal record, ask your healthcare provider to give you one. Keep this record in a safe place and bring it with you every time you seek medical care. Make sure your healthcare provider records all your vaccinations on it.

Appropriate Needle Lengths for Adults 19 and Over

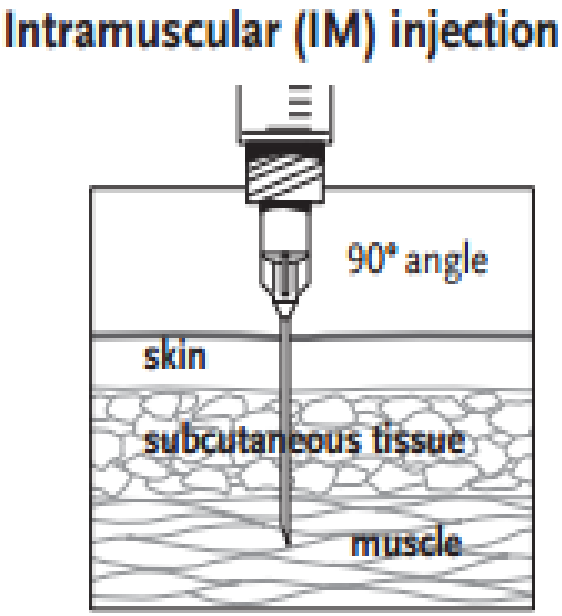
– Intramuscular injections with a 22-25 gauge needle (Deltoid):

	Needle Length (Inches)
• Female or male <130 lbs	⅝–1*
• Female or male 130–152 lbs	1
• Female 153–200 lbs	1–1½
• Male 130–260 lbs	1–1½
• Female 200+ lbs	1½
• Male 260+ lbs	1½

• Note: ACIP indicates that aspiration before injection is not required

Intramuscular Injections

Insert the needle at a 90^0 degree angle to ensure the vaccine is administered directly into the muscle.

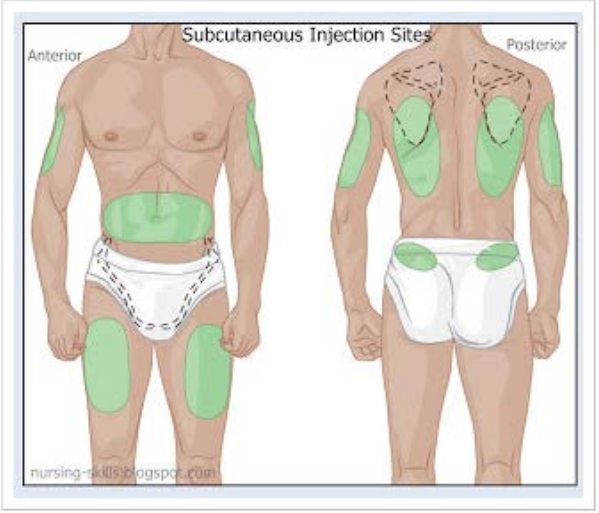


IM Route for the following vaccines:

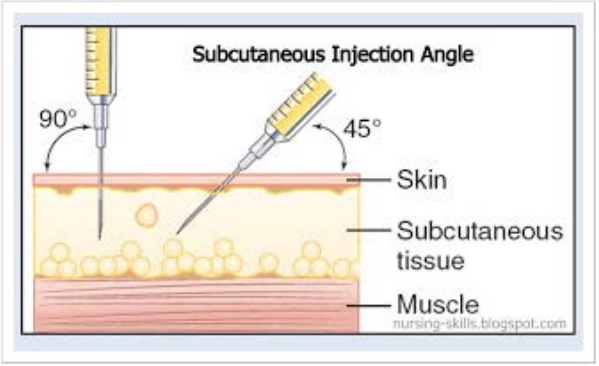
- Diphtheria, Tetanus, Pertussis (Td, Tdap)
- Haemophilus influenzae type b (HiB)
- Hepatitis B (Engerix B, Recombivax HB)
- Hepatitis A and Hepatitis B (Twinrix)
- Hepatitis A (Havrix, Vaqta)
- Human papillomavirus (HPV)
- Inactivated Influenza (IIV) (Intradermal formulation is also available)
- Meningococcal serogroups A, C, W, and Y (MenACWY; Menveo, Menactra)
- Meningococcal serogroup B (MenB; Trumenba, Bexsero)
- Pneumococcal conjugate (PCV13)
- Pneumococcal polysaccharide (PPSV23) (Can also be given Subcutaneously)
- Inactivated Polio (IPV) (Can also be given Subcutaneously)
- Hep A (Hep A; Havrix, Vaqta)

Subcutaneous Injections (Subcut)

Sites of Subcutaneous Injection



Subcutaneous Injection Syringe Angles



Subcut Route for the following vaccines:

- Measles, mumps, Rubella (MMR)
- Chickenpox (Varicella)
- Zoster (Shingles)
- Inactivated Polio (IPV) (can also be given IM)
- Meningococcal polysaccharide (MPSV4; Menomune)
- Pneumococcal polysaccharide (can also be given IM)

Injection Safety Can Save Lives!!

SAFETY STEPS

FOLLOW THESE INJECTION SAFETY STEPS FOR SUCCESS!

BEFORE THE PROCEDURE

Carefully ***read the label*** of the vial of medication.

- If it says single-dose and it has already been accessed(e.g. needle-punctured), ***throw it away.***
- If it says multiple-dose, ***double-check the expiration date*** and the beyond-use date if it was previously opened, and visually inspect to ensure no visible contamination.
- When in doubt, throw it out.

DURING THE PROCEDURE

Use aseptic technique.

- Use a new needle and syringe for every injection.

- Be sure to clean your hands immediately before handling any medication.
- Disinfect the medication vial by rubbing the diaphragm with alcohol.
- Draw up all medications in a clean medication preparation area.

AFTER THE PROCEDURE

Discard all used needles and syringes and SDVs after the procedure is over.

MDVs should be discarded when:

- the beyond-use date has been reached
- doses are drawn in a patient treatment area
- any time vial sterility is in question

Click for more information:

FAQs Regarding Safe Practices for Medical Injections

Injection Safety Can Save Lives, Money, and Ensure Accreditation

THE MANAGER

INFECTIONS CAN BE COSTLY.

EDUCATE YOUR TEAM!

Make sure your team uses single-dose and multiple-dose vials properly. Misuse of medicine puts your practice and patients at risk.

RISKY BUSINESS

First, do no harm. Improper reuse of SDVs has caused patient infections and deaths.

REALIZE WHAT'S AT STAKE

- A person's life and well-being
- Accreditation status
- Clinic license or certification

HAVE YOU CONSIDERED...? *(CLICK BELOW)*

Do you have enough supplies to ensure safe injections?

Is your medication preparation area separate from the patient care area?

Are you purchasing the safest available medication?

Do you arrange infection control training for your healthcare personnel?

Outbreaks Can Occur from Unsafe Injection Practices

THE PATIENT

WE ARE ALL PATIENTS.

50 OUTBREAKS AND COUNTING

Since 2001, at least 50 outbreaks involving unsafe injection practices were reported to CDC

- 90% (n=45) occurred in outpatient settings
- Many hundreds of infected patients
- Over 150,000 patients notified and tested

6% of U.S. health professionals have admitted to using single-dose vials for ***more than one patient.***

A recent study showed that 37% of new hepatitis infections in older adults may be due to unsafe medical injections.

3 QUESTIONS EVERY PATIENT SHOULD BE ENCOURAGED TO ASK:

As a provider, be prepared to answer your patients' questions about safe injection practices.

Did you wash your hands?

Did you use a clean needle and syringe to draw up this medication?

Is this medication from a single-dose-vial? Have you used this vial of medication on another person?

Dangerous Misperceptions About Injection Safety

Myth

1. Changing the needle makes a syringe safe for reuse
2. No blood in the syringe, means that the supplies are safe for reuse
3. It is acceptable to use leftover medicine from a single-dose vial for multiple patients

Facts

1. Every needle and syringe is for one time use only
2. Never reuse supplies, even when blood or bodily fluids are invisible to the naked eye, viruses and bacteria such as, Hepatitis C and MRSA are invisible to the naked eye, but can easily infect patients
3. Single-dose/single use vials should be used for one patient, regardless of remaining medication

Vaccine Administration and Production Myths

Myths

1. Vaccines cannot be administered to people who are sick
2. Vital signs should be checked before vaccines are administered
3. There is a limit to the number of vaccines that can be given at the same visit
4. Abortions are required to produce vaccines

Facts

1. Mild illness with or without a fever is not a contraindication to vaccinate
2. ACIP does not recommend temperature or other vital signs before vaccination
3. ACIP recommends administration of all recommended vaccines at the same visit
4. Two human cell lines provide the cultures for growing the viruses in the following vaccines: Hepatitis A, Varicella, Rubella, and Rabies. The donor fetuses were legally aborted in 1960, and the abortions did not occur to obtain these cells. No new fetal tissue is required.

Storage and Handling

- The new recommended "Fahrenheit" temperature range is 36^0F and 46^0F (2^0C and 8^0C)for refrigerators.
- The recommended "Fahrenheit" temperature range is -58^0F and +5^0F (-50^0C and -15^0C) for freezers.
- Use only purpose-built (pharmaceutical grade) or stand-alone household units. If the unit includes a freezer and refrigerator only use refrigerator portion to avoid cold spots that may occur if the freezer is in use as well.
- Never store vaccines in dormitory-style units, not even for a short period of time

Storage and Handling

- Ensure the storage units have enough space to store the largest inventory you may have
- Water bottles help to maintain stable temperatures as well
- Never keep food or drinks in vaccine storage units
- CDC now recommends the use of a continuous monitoring and recording digital data logger (DDL) with a current Certificate of Calibration Testing, set to record every 30 minutes. It can be set for less than 30 minutes, but should not be set for more than 30 minutes. The DDL should also have a buffered temperature probe.
  - NOTE: January 1, 2018, the aforementioned recommendation will be a requirement"

Storage and Handling

- Improper storage and handling of vaccines can reduce the potency of vaccines, in turn, patients may have inadequate immune responses and poor protection against diseases.
- Vaccine appearance is not an accurate indicator of vaccine potency.
- Perform routine cleaning and inspections of vaccine storage units to decrease bacterial and fungal growth, and ensure unit door seals are intact.
- Store vaccines according to vaccine type and expiration date.
  - Vaccines with earliest expiration date, should be in front and used first.
  - Expired vaccines should be removed immediately.
- A staff member should check and document the temperature of the vaccine storage units twice daily, when the facility is open.

Misperceptions in Vaccine Storage

Myths

1. Refrigerators keep the same temperature throughout.
2. A full refrigerator runs more efficiently.
3. All refrigerators maintain temperatures the same.

Facts

1. Temperatures vary throughout the unit, and are susceptible to the defrost cycle, opening/ closing door, and the amount of vaccine in the refrigerator.
2. Any overcrowded unit will decrease air circulation and cause fluctuations in temperatures. There should be space between vaccines and the compartment wall.
3. Dormitory-style units cannot maintain appropriate temperatures, cold air from the freezer can decrease refrigerator temperatures.

Important Messages for All Staff Members

- All staff should be able to see signs prohibiting adjustment of settings

Thermostat adjustments should only be made by the primary or alternate vaccine coordinator, based on information from digital data loggers and temperature monitoring logs.

- All staff should be able to see signs regarding not unplugging units

Storage and Handling Documentation and Communication with Receiving Facility

- Ensure that all staff are educated on Standard Operating Procedures for storage and handling of vaccines
- Obtain Standard Operating Procedure for transporting vaccines
- As soon as there is knowledge of an emergency or necessity to move vaccines, document all findings: Time, staff present, temperature of the vaccines, if water bottles are present in the refrigerator, plan to move vaccines

Transporting Vaccines

- If vaccines are being transported to an outside facility, ensure that the staff/facility is available and ready to receive the vaccine supply immediately. Document all communication with receiving facility.
- Indicate the temperature of vaccines upon arrival, and when the vaccines are placed in appropriate storage units.
- Vaccines should never be transported in the trunk of a vehicle.
- Multi-dose, partially used vials can be transported and used by the same provider. But, multi-dose, partially used vials cannot be used by another provider or taken across state lines.

Transporting Refrigerated Vaccines and Emergencies

- If a temperature excursion is suspected or in the event of an extended power outage or emergency, move vaccines to back up storage location immediately.
- Vaccines must be appropriately packed for transport.
  - Hard-sided coolers or Styrofoam vaccine shipping containers are required for transport.
  - Coolant materials, such as Phase change materials and frozen water bottles, must be used for refrigerated vaccines.
  - Do not use frozen gel packs or coolant packs, as they can freeze vaccines.
  - Bubble wrap or corrugated cardboard can be used to create two layers between vaccines and water bottles or phase change material
  - Use a calibrated temperature monitoring device and ensure it is close to the vaccines.
  - Remove all vaccines from temporary or transport containers to a storage unit as soon as possible.

Transporting Vaccines/Off-site Clinics (Non-emergent)

- The time vaccines are removed from the main storage units and transported off site for use, cannot exceed 8 hours.
- Vaccines used at off-site locations should be delivered directly to the facility, if not a portable vaccine refrigerator, with a temperature monitoring device placed with the vaccines, should be used. A last option for transport is qualified containers and pack-outs with a temperature monitoring device.
- Never transport vaccines in the trunk of vehicles.
- Vaccines should be stored in appropriate storage units, at the off-site clinic as soon as possible. Temperature monitoring and documenting should be done at least twice in the workday.
- If it is absolutely necessary for vaccines to be stored in a portable vaccine refrigerator, place a temperature monitoring device with a probe in a thermal buffer as soon as possible. In this case, temperatures must be monitored and documented hourly.
  - Keep the container closed as much as possible.
  - Remove only 1 multidose vial or 10 doses at a time for each person administering vaccines.

Packing and Storing Varicella-containing (Frozen) Vaccines

- The manufacturer does not recommend transporting frozen vaccines (varicella, zoster, MMRV).
- If they must be transported in emergent situations, a portable vaccine freezer unit or a pack-out that maintains temperatures between -50^0 C and -15^0 C (-58^0 F and 5^{0}F) is recommended
- Do not use dry ice.
- Remove all vaccines from temporary/transport containers as soon as possible.
- Varicella-containing vaccines that have not been reconstituted can be transported and stored at refrigerated temperatures for up to 72 continuous hours.
- Transported varicella-containing vaccines cannot be put back in the freezer, they must be used or discarded.

Guidelines for Safe Vaccination Clinics

TEN PRINCIPLES FOR HOLDING SAFE VACCINATION CLINICS AT SATELLITE, TEMPORARY, OR OFF-SITE LOCATIONS

DURING ALL STAGES (PRE-CLINIC, DURING THE CLINIC, AND POST-CLINIC):

1. **Keep vaccines at the correct temperature at all times** using proper procedures for vaccine transport, handling and storage. Document temperature monitoring at appropriate intervals during all stages. For further guidance: http://www.cdc.gov/vaccines/hcp/admin/storage/toolkit/storage-handling-toolkit.pdf.

PRE-CLINIC:

2. **Have vaccine shipped directly to the site.** If direct shipment is not possible, **transport vaccine using correct storage and handling guidelines.**

3. **Train staff to perform CPR and treat medical emergencies**, including anaphylaxis. Ensure supplies are on site, including an emergency medical kit and infection control supplies, as well as **enough Vaccine Information Statements (VISs)**.

DURING THE CLINIC:

4. Always **check for medical contraindications and allergies** before vaccinating anyone. **Provide VISs for all patients or guardians.**

5. **Only use vaccines that are not damaged, not expired, at the correct temperature, and prepared using aseptic technique**.

6. **Follow manufacturers' instructions for injection dose, site, and route**.

7. **Follow manufacturers' instructions and Advisory Committee on Immunization Practices guidelines for correct age and intervals** (for vaccines that require more than one dose).

8. **Follow safe injection practices,** including using a new needle and syringe for every injection. Dispose of all sharps in a sharps container.

9. **Document** every vaccination and give patients a copy.

POST-CLINIC:

10. Keep patient information **secure and private**. Record vaccinations in the Immunization Information System (IIS), if available.

    For further guidance, refer to the full checklist: https://www.izsummitpartners.org/content/uploads/2017/02/NAIIS-Vaccination-Clinic-Checklist_v2.pdf.
    ***This document is NOT intended to replace use of the checklist.**

Staff Training

- CDC recommends storage and handling training be conducted:
  - New employee orientation
  - Annually for all staff responsible for immunizations
  - When new vaccines are available
  - When updated recommendations are released

- CDC offers online training module, “You Call the Shots: Vaccine Storage and Handling.”

Summary

- Providers should ensure proper hand hygiene before every patient encounter.
- Providers should ensure the right needle length is used for the patient's weight before each vaccine administration.
- Providers should ensure staff are competent and educated on best practices for vaccine administration, storage and handling, and how to manage emergencies.
- Providers should have standard operating procedures available for all staff to use as a reference or refresher at all times.
- Remember, "One and Done," for needle and syringe usage.
- Never use dry ice while storing or transporting vaccines.
- Important temperature ranges for storage units are:
  - The new recommended "Fahrenheit" temperature range is 36^0F and 46^0F (2^0C and 8^0C)for refrigerators.
  - The recommended "Fahrenheit" temperature range is -58^0F and +5^0F (-50^0C and -15^0C) for freezers.

References

Administering Vaccines to Adults: Dose, Route, Site, and Needle Size. (2015, September). Retrieved May 26, 2017, from http://www.immunize.org/catg.d/p3084.pdf
Immunization Action Coalition

Checklist for Safe Vaccine Storage and Handling. (n.d.). Retrieved May, 2017, from http://www.immunize.org/catg.d/p3035.pdf

Common Immunization Myths and Misconceptions: Talking Points and Resources for Busy Healthcare Professionals. (2016, June). Retrieved May 25, 2017, from http://www.immunize.org/catg.d/s8035.pdf
Immunization Action Coalition

(2016, June). Retrieved May, 2017, from www.cdc.gov/vaccines/hcp/admin/storage/toolkit/storage-handling-toolkit.pdf

References

Nursing Skills Nursing Core of Medical Field. (n.d.). Retrieved May, 2017, from http://nursing-knowhows.blogspot.com/2010/02/subcutaneous-injection.html

One and Only Campaign. (n.d.). Retrieved May, 2017, from http://www.oneandonlycampaign.org/single-dose-multi-dose-vial-infographic

Safe Storage and Handling. (n.d.). Retrieved May 25, 2017, from http://www.in.gov/isdh/files/Storage_Handling.pdf
ISDH Immunization Program

Screening Checklist for Contraindications to Vaccines for Adults. (n.d.). Retrieved May, 2017, from http://www.immunize.org/catg.d/p4065.pdf

Tools to Assist Satellite, Temporary, and Off-Site Vaccination Clinics. (2017). Retrieved May 25, 2017, from
https://www.izsummitpartners.org/naiis-workgroups/influenza-workgroup/off-site-clinic-resources/
National Adult and Influenza Immunization Summit