

# **Make No Mistake: Vaccine Storage/Handling & Administration**

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## **Disclosures**

- ❑ **JoEllen Wolicki is a federal government employee with no financial interest in, or conflict with, the manufacturer of any product named in this presentation.**
- ❑ **The speaker will not discuss the off-label use of any vaccines.**
- ❑ **The speaker will not discuss a vaccine not currently licensed by the FDA.**

## General Recommendations

- ❑ Failure to adhere to recommendations for storage and handling of vaccines can reduce or destroy their potency, resulting in inadequate or no immune response in the recipient.
- ❑ Recommendations for route, site, and dosage of vaccines are derived from data from clinical trials, practical experience, preventative health care visits schedule, and theoretical considerations.
- ❑ Immunization providers should be thoroughly familiar with proper vaccine storage and handling and administration practices.

MMWR 2011;60(2):17



## VACCINE ADMINISTRATION

## Preparing the Patient

- ❑ **Obtain complete immunization history at every health care visit:**
  - Accept only written, dated records (except self-reports of influenza and PPSV23).
  - Use recommended schedule to determine vaccines needed based on age, medical condition, and risk factors.
- ❑ **Screen for contraindications and precautions prior to administering any vaccine.**
- ❑ **Discuss vaccine benefits and risks and vaccine-preventable disease risks using VISs and other reliable resources.**
- ❑ **Provide after-care instructions.**

[www.immunize.org/catg.d/p4060.pdf](http://www.immunize.org/catg.d/p4060.pdf)  
[www.immunize.org/catg.d/p4065.pdf](http://www.immunize.org/catg.d/p4065.pdf)  
<http://publichealth.lacounty.gov/ip/immunization/parents/comfort-bethereE.pdf>

## Vaccine Administration Best Practices

- ❑ **Maintain proper infection control practices while preparing and administering vaccines.**
  - Always use aseptic technique.
- ❑ **Use proper hand hygiene techniques before preparing vaccines.**
- ❑ **Prepare vaccines in a clean, designated medication area away from any area where potentially contaminated items are placed.**
- ❑ **Prepare vaccines just prior to administration.**

## Vaccine Preparation Best Practices

- ❑ Use a new sterile syringe for each injection.
- ❑ Select a separate sterile needle for each injection based on route, patient size, and injection technique.
- ❑ Use only the manufacturer-supplied diluent to reconstitute a vaccine.
- ❑ Inspect vaccine and diluent vials for damage or contamination.
- ❑ Check the expiration dates for the vaccine and diluent. Also, check the expiration dates on the alcohol prep wipe, syringe, needle, if present.

## Provider Predrawn Syringes

- ❑ **Predrawing vaccine is not recommended:**
  - Increases risk for administration errors
  - May lead to vaccine waste
  - Can cause growth of microorganisms in vaccines that do not contain a preservative
  - Administration syringes are not designed for storage
- ❑ **Consider using manufacturer-filled syringes for large immunization events because they are designed for both storage and administration.**

## Provider Predrawn Syringes

- ❑ At clinic site, no more than 1 multidose vial or 10 doses should be drawn up at one time by each vaccinator.
- ❑ If more than one vaccine type is being administered, set up separate administration stations for each vaccine type to prevent medication errors.
- ❑ Patient flow should be monitored to avoid drawing up unnecessary doses.
- ❑ Discard any remaining vaccine in syringes predrawn by providers at end of workday.

## Vaccine Preparation

- ❑ **Use a single-dose vial for 1 patient ONLY.**
  - Discard any leftover vaccine.
  - Do NOT administer it to another patient.
- ❑ **Open a single-dose vial only when ready to use.**
  - Once protective cap is removed, vaccine must be used. If not used, discard unused vaccine at end of workday.



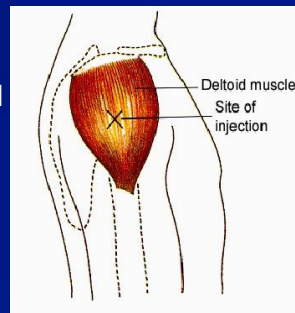
## Vaccine Preparation

- Once a manufacturer-filled syringe is activated, vaccine should be used or discarded at end of workday.
  - Activated = syringe cap removed or needle attached



## Intramuscular (IM) Route

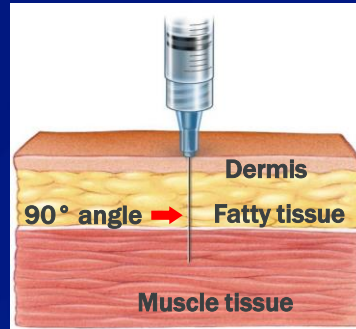
- **Site:**
  - Deltoid muscle (upper arm) is preferred.
  - Vastus lateralis muscle (anterolateral thigh) may be used.
- **Needle gauge:**
  - 22- to 25-gauge
- **Needle length:**
  - Varies related to size of patient
- **Vaccines (IM route):**
  - Influenza
  - Tdap
  - HepA
  - HepB
  - HPV
  - MenACWY
  - MenB
  - PCV13
  - PPSV23\*
  - Polio\*



\* IM or Subcut

## Intramuscular (IM) Route

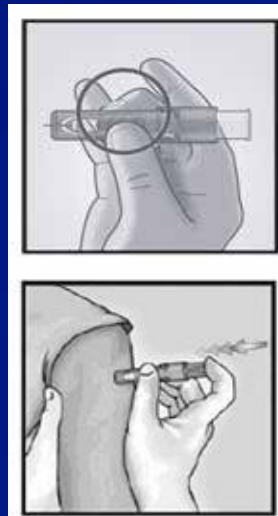
- ❑ Spread the skin of the site taut between the thumb and forefinger, to isolate the muscle.
- ❑ Another technique, used mostly for geriatric patients, is to grasp the tissue and “bunch up” the muscle.
- ❑ Insert the needle fully into the muscle at a 90° angle and inject.



**Aspiration is NOT required**

## Intradermal (ID) Route

- ❑ **Site:**
  - Deltoid region of upper arm
- ❑ **Needle gauge and length:**
  - 30-gauge, microneedle
- ❑ **Technique:**
  - Hold syringe between thumb and middle finger and use short, quick motion to insert needle perpendicular to skin.
- ❑ **Vaccine (ID):**
  - ❑ Fluzone Intradermal ONLY



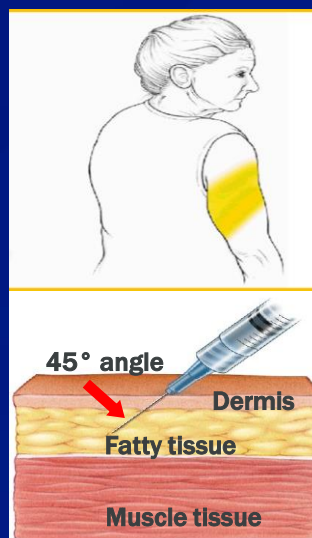
## Intranasal (NAS) Route

- ❑ **Site:**
  - Nostrils
- ❑ **Technique:**
  - Insert tip of sprayer in nostril and spray half the dose; then remove the dose divider clip and spray rest of dose in other nostril.
- ❑ **Vaccine (NAS):**
  - LAIV (FluMist) ONLY



## Subcutaneous (Subcut) Route

- ❑ **Site:**
  - Upper outer triceps area of arm for adults.
- ❑ **Needle gauge and length:**
  - 23- to 25-gauge needle, 5/8-inch
- ❑ **Technique:**
  - To avoid reaching the muscle, pinch up the fatty tissue, insert the needle at a 45° angle, and inject the vaccine into the tissue.
- ❑ **Vaccines (Subcut):**
  - Zoster
  - MMR
  - Varicella
  - PPSV23





## VACCINE STORAGE AND HANDLING

### Vaccine Storage and Handling Best Practices Storage Equipment

- ❑ **A vaccine storage unit should:**
  - Maintain the required temperatures
  - Store the largest inventory without crowding
  - Be used for storing vaccines only
- ❑ **CDC recommends the following units:**
  - Purpose-built (stand-alone or combination)
  - Household stand-alone
- ❑ **Dormitory-style units are not recommended for storing vaccines.**

**Dormitory-style  
NOT Allowed for VFC Vaccines or  
Recommended for ANY Vaccine Storage**



**Recommended Temperatures**

- ❑ **Refrigerator:**
  - Between 2°C and 8°C (between 35°F and 46°F)
  - Average 40°F (5°C)
- ❑ **Freezer:**
  - Between -50°C and -15°C (between -58°F and +5°F)
- ❑ **Refer to manufacturers' package inserts:**
  - [www.immunize.org/packageinserts/](http://www.immunize.org/packageinserts/)

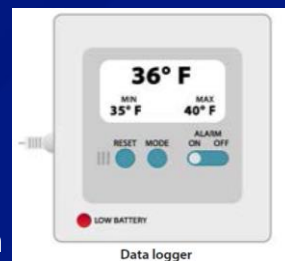
## Vaccine Storage and Handling Best Practices Temperature Monitoring Equipment

### ❑ CDC recommends:

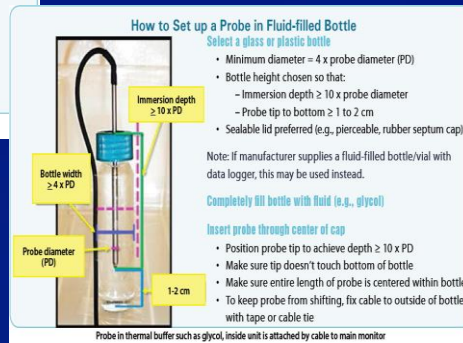
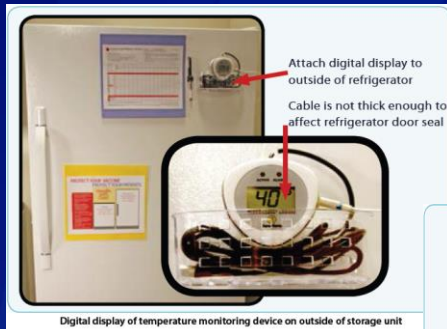
- Calibrated temperature monitoring devices with a Certificate of Calibration Testing (also known as Report of Calibration)
  - Calibration testing every 1 to 2 years from last calibration testing or according to manufacturer's suggested timeline
- Continuous temperature monitoring devices (digital data logger [DDL])

## DDL Recommended Characteristics

- ❑ Measures and displays current temperature
- ❑ Accuracy within  $\pm 0.5^{\circ}\text{C}$  ( $\pm 1^{\circ}\text{F}$ )
- ❑ Low battery indicator
- ❑ Current, minimum, and maximum temperatures
- ❑ Detachable probe in buffered material
- ❑ Alarm for out-of-range temperatures
- ❑ Logging interval (or reading rate that can be programmed by user)



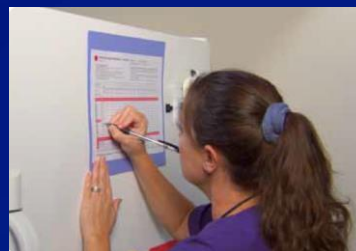
## Digital Data Loggers



## Temperature Monitoring

### □ CDC recommends:

- Review and record unit temperature at least 2 times each workday (morning and end of day).
- Post log on storage unit.
- Download and review stored temperature log data at least 1 time each week.
- Keep logs and downloaded data at least 3 years or according to state record retention requirements.



Sample log at: [www.immunize.org/handouts/vaccine-storage-handling.asp](http://www.immunize.org/handouts/vaccine-storage-handling.asp)

## Expiration Dates

### ❑ Multidose vials (MDVs)

- Most MDVs may be used through the expiration date on the vial unless contaminated or compromised in some way.
- Some MDVs have a specified time frame for use once the vial is entered.

For the multi-dose vial, use a sterile needle and sterile syringe to withdraw the 0.5-mL dose from the multi-dose vial and administer intramuscularly. A sterile syringe with a needle bore no larger than 23 gauge is recommended for administration. It is recommended that small syringes (0.5 mL or 1 mL) be used to minimize any product loss. Use a separate sterile needle and syringe for each dose withdrawn from the multi-dose vial.

Between uses, return the multi-dose vial to the recommended storage conditions, between 2° and 8°C (36° and 46°F). Do not freeze. Discard if the vaccine has been frozen. Once entered, a multi-dose vial, and any residual contents, should be discarded after 28 days.

[www.immunize.org/packageinserts/](http://www.immunize.org/packageinserts/)

## Vaccine Transport Best Practices

- ❑ **CDC recommends that vaccine be delivered directly to an off-site/satellite facility.**
- ❑ **If vaccine must be transported to the facility, DO:**
  - Transport in a portable refrigerator or qualified container/packout.
  - Limit the amount of vaccine to only what is needed for that workday.
  - Use a calibrated temperature monitoring device with continuous monitoring and recording capabilities during transport.
  - Transport the vaccine container in the vehicle (not the trunk).
  - Limit the total transport and workday time to no more than 8 hours.

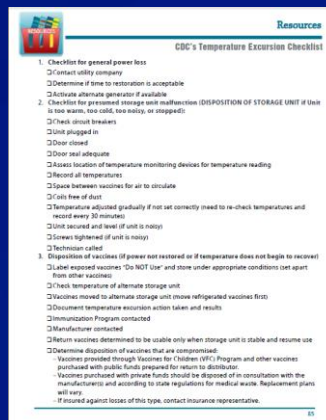
[www.cdc.gov/vaccines/recs/storage/default.htm?s\\_cid=cs\\_000](http://www.cdc.gov/vaccines/recs/storage/default.htm?s_cid=cs_000)

## Temperature Monitoring Best Practices

- ❑ **Record temperature inside the packed container, along with date, time, and your initials:**
  - At the beginning of transport
  - Upon arrival at facility
  - When any remaining vaccines are returned to primary storage facility
  
- ❑ **Upon arrival at facility, immediately transfer vaccines to a refrigerator that maintains recommended temperature range and record the temperature, time, and initials.**
  - Record the temperature at least twice during workday.

## Temperature Excursions

- ❑ **If stored vaccines have been exposed to temperatures outside recommended ranges.**
  - Store the vaccines properly
  - Separate from other vaccine supplies.
  - Mark "Do NOT Use."
  - Contact immunization program, vaccine manufacturer(s), or both for guidance



[www.cdc.gov/vaccines/recs/storage/toolkit/storage-handling-toolkit.pdf](http://www.cdc.gov/vaccines/recs/storage/toolkit/storage-handling-toolkit.pdf)



## **Common S&H and Administration Errors**

- ❑ **Leaving storage unit door ajar**
- ❑ **Failing to:**
  - Take immediate action when vaccines are exposed to inappropriate temperatures
  - Follow safe injection and/or infection control practices.
  - Use an age-appropriate vaccine formulation
- ❑ **Administering by an incorrect route or site**
- ❑ **Administering inappropriately stored or expired vaccine**

## Reporting Vaccination Errors to Vaccine Adverse Event Reporting System (VAERS)

- ❑ VAERS accepts all reports.
- ❑ VAERS encourages reports of clinically significant adverse health events.
- ❑ Providers are encouraged to report vaccination errors without health events if they believe the error may pose a safety risk.

• <https://vaers.hhs.gov/esub/index>



**BEST PRACTICES  
TRAINING AND EDUCATION**

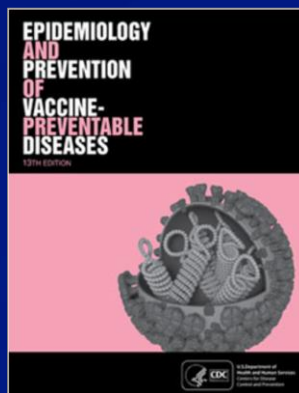
## CDC Resources for Staff Education

- ❑ **Competency-based education for staff is critical.**
  - ❑ **Multiple education products available free through the CDC website:**
    - Immunization courses
    - Netconferences
    - You Call the Shots self-study modules
  - ❑ **Continuing education is available.**
- [www.cdc.gov/vaccines/ed/default.htm](http://www.cdc.gov/vaccines/ed/default.htm)



## Epidemiology and Prevention of Vaccine-Preventable Diseases Webinar Series

- ❑ **Provides:**
    - Information about vaccine-preventable diseases and the vaccines that prevent them
    - Opportunities for live Q and A.
  - ❑ **15-week series starting in June.**
    - 2015 sessions available online.
  - ❑ **Free continuing education is available.**
  - ❑ **For more information:**
- [www.cdc.gov/vaccines/ed/webinar-epv/index.html](http://www.cdc.gov/vaccines/ed/webinar-epv/index.html)



View, print, or download course text online (bound copies may be purchased)

## How to Comply with Best Practices

- All staff who administer vaccines should:

- Complete a skills checklist for staff administering vaccines regularly.

**Skills Checklist for Immunization**

The Skills Checklist is a self-assessment tool for health care staff who administer immunizations. To complete it, review the competency area below and the clinical skills, techniques, and procedures applied for each of these. Be sure you read the Self-Assessment column. If you check **Needs Improvement**, you indicate further study, practice, or change is needed. When you check **Meets or Exceeds**, you indicate you believe you are performing at the expected level of competency, or higher.

**Supervisor:** Use the Skills Checklist to help assign/monitor and report/track for staff who administer vaccines. When you use it for performance reviews, give staff the opportunity to score themselves in advance. Next, observe their performance as they provide immunizations to several patients and score in the **Supervisor Review column**. If improvement is needed, meet with them to develop a **Plan of Action** so that they will help them achieve the level of competency you expect, unless directed otherwise or written to others.

The 2012 "Immunization Challenges: Best Practices with Infants, Children, and Adults" course that staff administer vaccines correctly. Order online at [www.immunization.org/ed](http://www.immunization.org/ed)

Competency	Clinical Skills, Techniques, and Procedures	Self-Assessment		Supervisor Review	
		Meets or Exceeds	Needs Improvement	Meets or Exceeds	Needs Improvement
A. Patient/Parent Education	1. Welcome patients/parents, establish rapport, and answer any questions.				
	2. Explain what vaccines will be given and which agency of infection will be done.				
	3. Accommodate religious or family beliefs and parental fears of side-effects to help them know the importance and effectiveness of the procedure.				
	4. Verify patient/parents' understanding of vaccine information statements by asking questions and help them to read and understand.				
	5. Screen for contraindications. (PVA, special risk not applicable if this is PC provider)				
B. Medical Procedures	6. Review correct technique and other data not address with patients/parents, family questions.				
	7. Identify the location of the injection site, immunization protocol, appropriate product, volume, storage.				
	8. Identify the location of the glycerine, its administration technique, and correct administration to the infant or toddler.				
C. Vaccine Handling	9. Maintain up-to-date CIP certification.				
	10. Investigate the need to report any medication errors and to manage a safety recall if:				
	1. Check expiration date. Double-check via label and compare prior to administration.				
	2. Maintain aseptic technique throughout.				
	3. Check the correct handle size for PIV-2 IC.				
4. Check bottle for proper identification and that seal has been opened. Check via label and draw up correct dose of vaccine. Handle via skin.					
5. Label each final syringe or dose according to help them identify.					
6. Document handling of vaccine according to policy. Practice proper disposal of all syringes/needles.					

Immunization Action Coalition • San Francisco • (415) 476-1000 • [www.immunization.org](http://www.immunization.org) • [www.immunization.org/ed](http://www.immunization.org/ed) • See #1000000000 page 40

## How to Comply with Best Practices

- Clinic supervisors should:
  - Review the skills checklist of all staff administering vaccines
  - Provide comprehensive, competency-based training to address gaps in skills
  - Put accountability checks in place to ensure policies and procedures are followed

## How to Comply with Best Practices

### Human resources personnel should:

- Assess the contractor or hiring agency's training policies and procedures for vaccine storage, handling, and administration.
- Ensure the contractor or agency can demonstrate that the policies and procedures are in place and have documentation that they are assessed routinely.

## CDC Vaccine Administration and Vaccine Storage and Handling Resources

The image displays three overlapping screenshots of the CDC website. The top-left screenshot shows the 'Injection Safety' page, which includes sections for 'Safe Injection Practices to Prevent TB to Patients', 'High Injection Practices', and 'CDC Direct Recommendation: Standard Precaution'. The top-right screenshot shows the 'Vaccines and Immunizations' page, featuring 'Vaccine Administration Recommendations and Guidelines' and 'On the Page' links. The bottom-right screenshot shows the 'Vaccine Storage & Handling' page, which includes 'At a Glance' information, 'Resources on Proper Vaccine Storage and Handling', and 'For Travelers' information.

- CDC Injection Safety [www.cdc.gov/injectionsafety/IP07\\_standardPrecaution.html](http://www.cdc.gov/injectionsafety/IP07_standardPrecaution.html)
- CDC Vaccine Administration [www.cdc.gov/vaccines/recs/vac-admin/default.html](http://www.cdc.gov/vaccines/recs/vac-admin/default.html)
- CDC Vaccine Storage & Handling [www.cdc.gov/vaccines/recs/storage/default.html](http://www.cdc.gov/vaccines/recs/storage/default.html)

## CDC Immunization Apps for Health Care Personnel



### Vaccine Schedules

[www.cdc.gov/vaccines/schedules/hcp/schedule-app.html](http://www.cdc.gov/vaccines/schedules/hcp/schedule-app.html)



### Influenza information

[www.cdc.gov/flu/apps/cdc-influenza-hcp.html](http://www.cdc.gov/flu/apps/cdc-influenza-hcp.html)



### Morbidity and Mortality Weekly Report (MMWR)

[www.cdc.gov/mobile/applications/mobileframework/mmwrprom.html](http://www.cdc.gov/mobile/applications/mobileframework/mmwrprom.html)



### Travel Well

[www.nc.cdc.gov/travel/page/apps-about](http://www.nc.cdc.gov/travel/page/apps-about)

## Vaccine and Immunization Resources

### ❑ Questions? E-mail CDC

- Providers [nipinfo@cdc.gov](mailto:nipinfo@cdc.gov)
- Parents and patients [www.cdc.gov/cdcinfo](http://www.cdc.gov/cdcinfo)

❑ CDC website [www.cdc.gov/vaccines](http://www.cdc.gov/vaccines)

❑ Twitter for health care personnel @CDCIZlearn

❑ Influenza [www.cdc.gov/flu](http://www.cdc.gov/flu)

❑ Vaccine Safety [www.cdc.gov/vaccinesafety](http://www.cdc.gov/vaccinesafety)

### ❑ State Immunization Programs

[www.cdc.gov/vaccines/imz-managers/awardee-imz-websites.html](http://www.cdc.gov/vaccines/imz-managers/awardee-imz-websites.html)