Vaccine Storage and Handling and Vaccine Administration

Chapters 5 and 6

1

Vaccine Storage and Handling

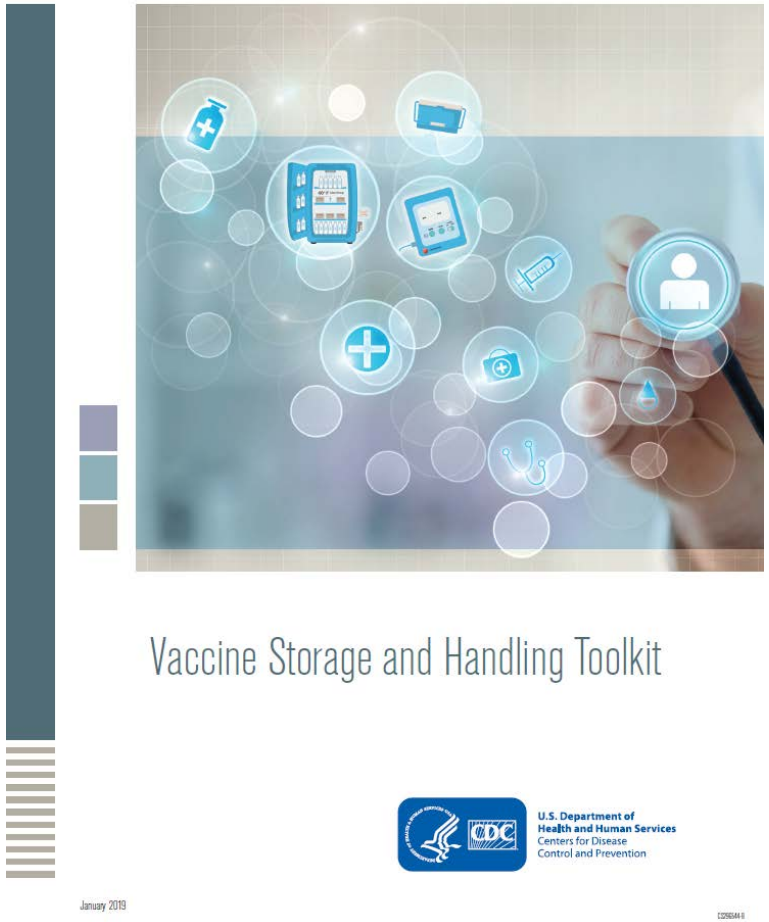
Do Storage and Handling Matter?

- **Yes**
  - Potency
  - Confidence
  - Cost (time, products, etc.)

Storage and Handling Recommendations

Vaccine Storage and Handling Toolkit

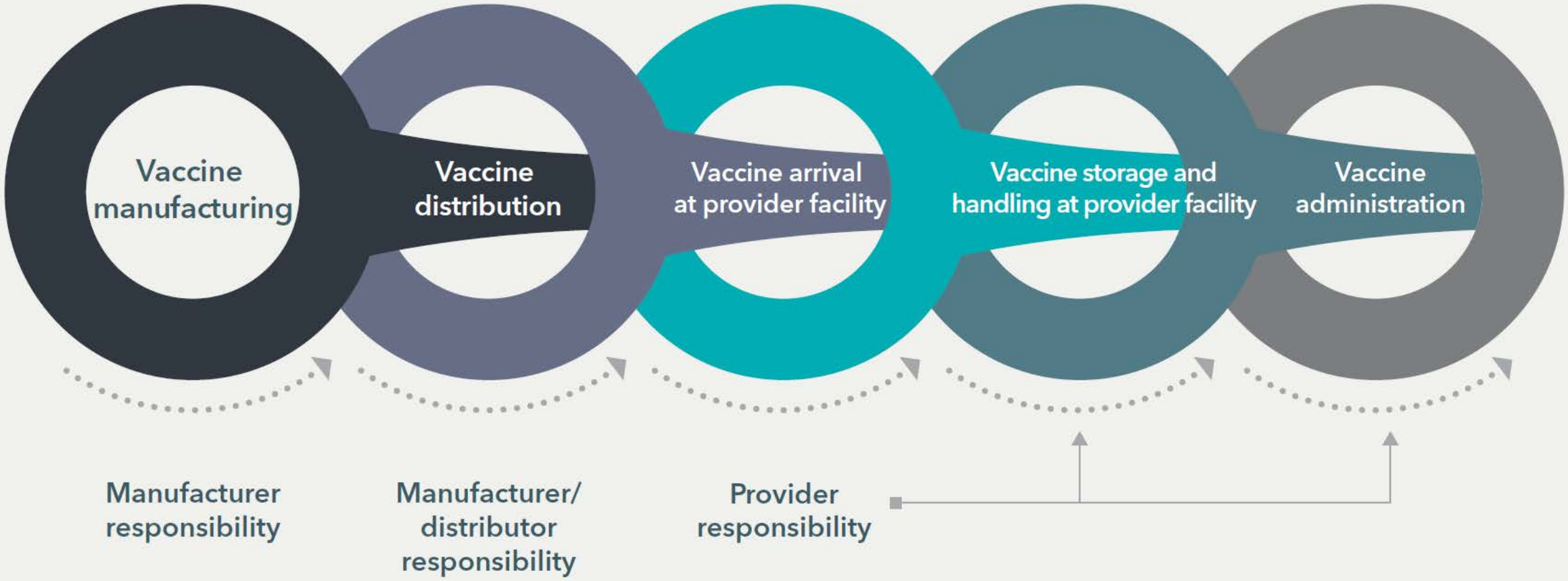
- **Primary source for CDC storage and handling recommendations**
  - Most current recommendations
  - Other materials updated based on toolkit contents



www.cdc.gov/vaccines/hcp/admin/storage/toolkit/storage-handling-toolkit.pdf

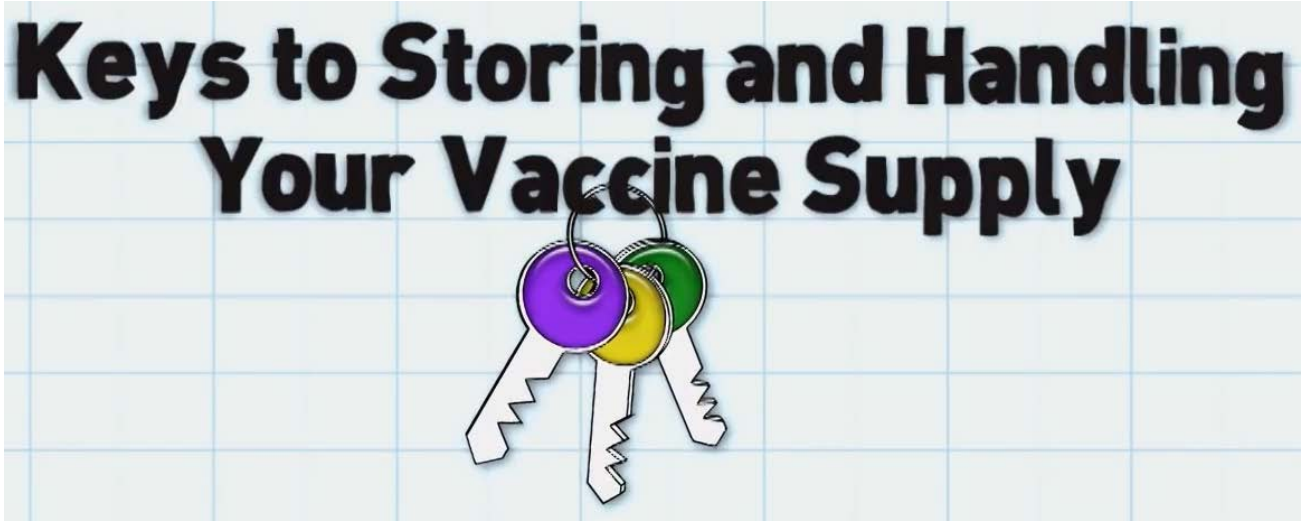
Vaccine Cold Chain

Cold Chain Flowchart



Three Keys to Cold Chain Management

- Well-trained staff
- Reliable storage and temperature monitoring equipment
- Accurate vaccine inventory management



www2.cdc.gov/vaccines/ed/shvideo/

Staff and Training

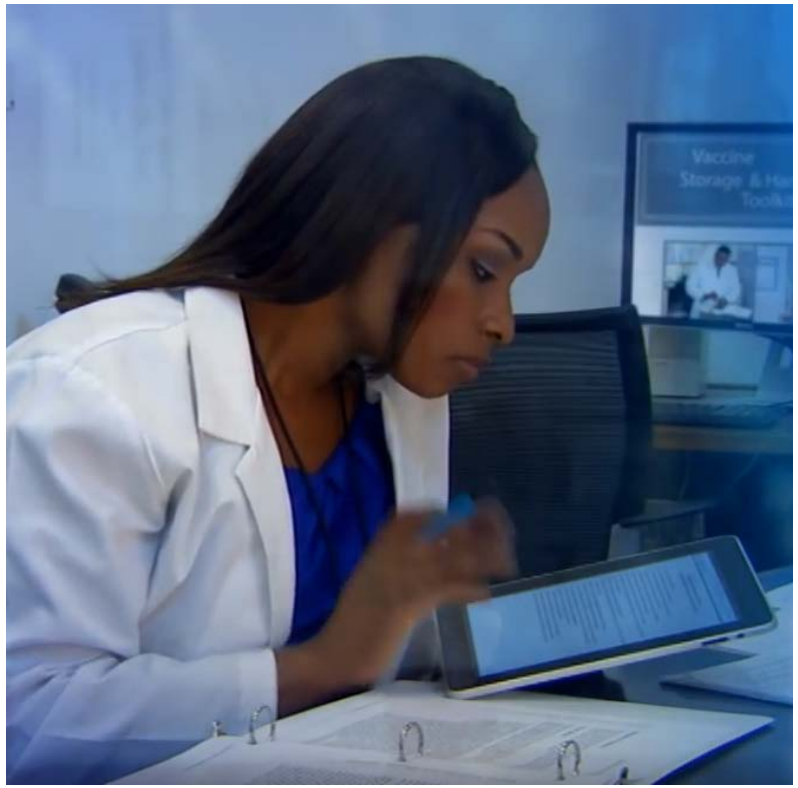
Staff Training

- **SOPs**
  - Routine
  - Emergency
- **Complete training:**
  - As part of employee orientation
  - Annually
  - When new vaccines are added
  - When recommendations change

www.cdc.gov/vaccines/hcp/admin/storage/toolkit/storage-handling-toolkit.pdf
www.cdc.gov/vaccines/ed/youcalltheshots.html

Primary and Alternate Coordinator Duties

- **Primary coordinator**
  - Responsible for ensuring all vaccines are stored and handled properly
  - Expert on routine and emergency SOPs
  - Review and update SOPs annually
- **Alternate coordinator**
  - Expert that can assist primary and fulfill duties in their absence
- **All other staff**
  - May delegate duties to trained staff



Equipment

Equipment: Vaccine Storage Units

- **Purpose-built or pharmaceutical-grade (large or compact)**
- **Household-grade**
  - Do not use freezer

Equipment: Vaccine Storage Units

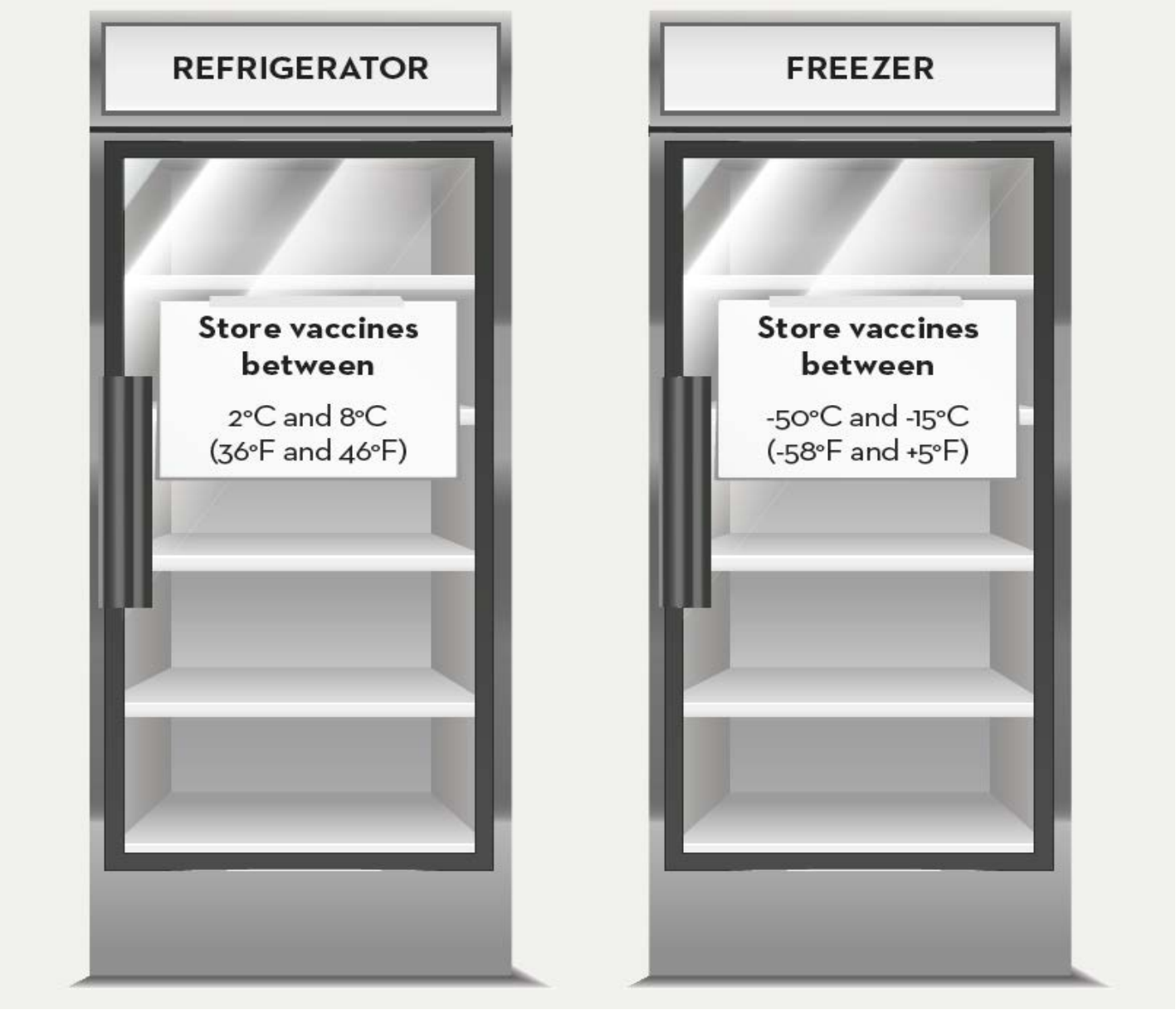
Compact, purpose-built unit:

Yes

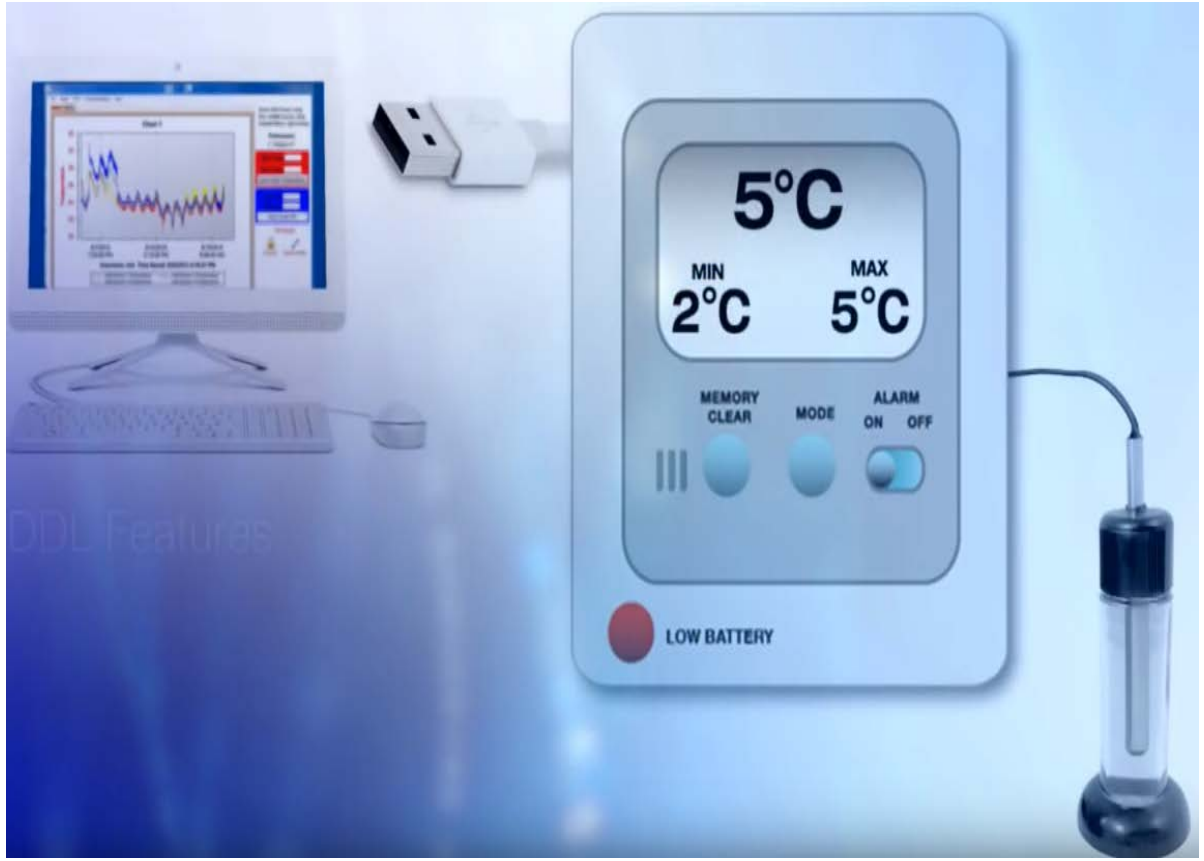
Dormitory-style unit:

No

Equipment: Vaccine Storage Units



Equipment: Temperature Monitoring Devices (TMDs)



- **Recommended features**
  - Detachable buffered probe
  - Alarm
  - Low battery indicator
  - Min/max display
  - Uncertainty of +/-0.5° C (+/-1° F)
  - 30-minute reading rate

TMDs Not Recommended for Use

- Alcohol or mercury thermometers
- Bimetal stem TMDs
- TMDs used for food
- Chart recorders
- Infrared TMDs
- TMDs without Certificate of Calibration Testing

CDC does NOT recommend these temperature monitoring devices

Certificate of Calibration

- **Should include:**
  - Model/device name or number
  - Serial number
  - Date of calibration
  - Confirmation that the instrument passed testing
  - Recommended uncertainty of +/-0.5° C (+/-1° F) or less

Monitoring Storage Unit Temperatures

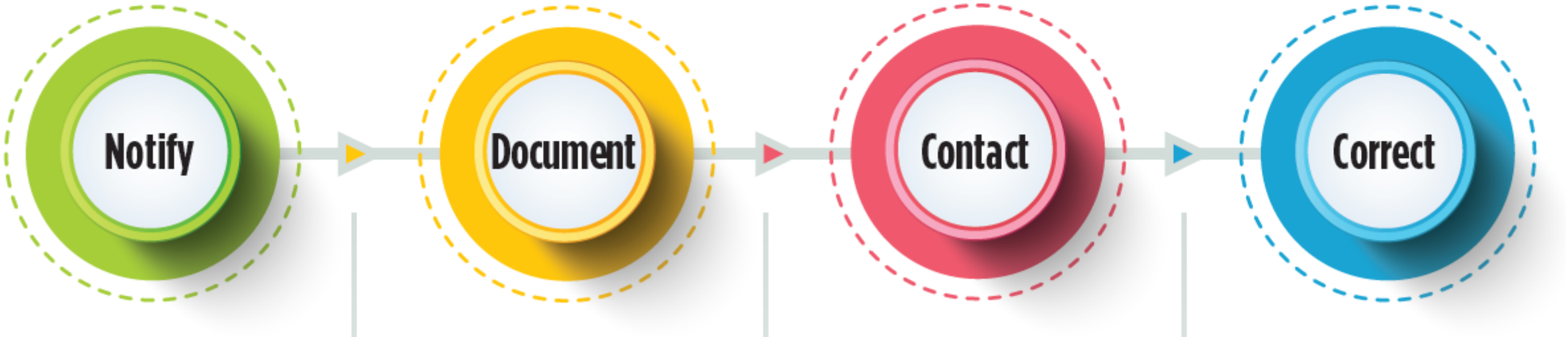
- **Device displays min/max, preferably a DDL with buffered probe:**
  - Check and record min/max temperature at the start of each workday
- **Device does not display min/max:**
  - Check and record current temperature 2 times, at the start and end of the workday

IAC Temperature monitoring logs: www.immunize.org/handouts/temperature-logs.asp

Temperature Excursion

Handling a Temperature Excursion in Your Vaccine Storage Unit

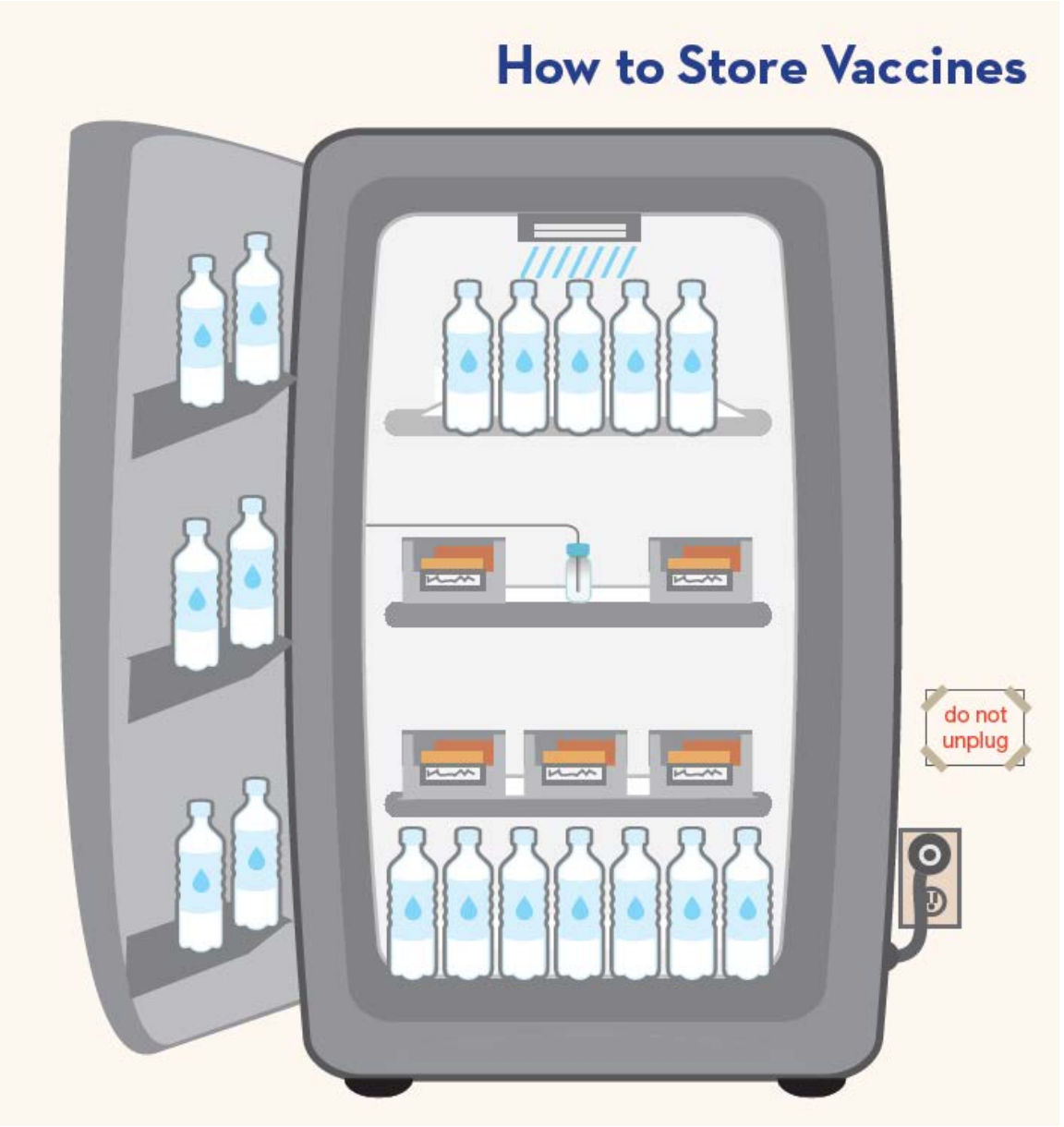
Any temperature reading outside ranges recommended in the manufacturers' package inserts is considered a temperature excursion. Identify temperature excursions quickly and take immediate action to correct them. This can prevent vaccine waste and the potential need to revaccinate patients.



www.cdc.gov/vaccines/hcp/admin/storage/toolkit/storage-handling-toolkit.pdf
www.cdc.gov/vaccines/hcp/admin/storage/downloads/temperature-excursion-508.pdf
www.immunize.org/handouts/temperature-logs.asp
www.immunize.org/catg.d/p3041.pdf

Organization

- Danger zones
- Labels
- Look-alike/sound-alike
- Air circulation
- Expiring products
- Water bottle placement



Vaccine Inventory Management

Vaccine Delivery

- **Maintain cold chain; immediately check and store vaccines upon arrival**
  - Unpack
  - Examine and document
    - Damage
    - Receipt of order
    - Expiration dates
    - Diluents
    - Cold chain monitor
  - Immediately store at recommended temperature
  - Notify manufacturer or others as appropriate if any issues

Vaccine Inventory and Stock Records

- **Stock record**
  - Delivery date
  - Name or initials of person who unpacked delivery
  - Manufacturer
  - Lot number and expiration date
  - Number of doses
  - Delivery cold chain monitor reading
  - Number of doses used and balance

Other Inventory Issues

- **Rotate stock so that vaccines that expire first are used first**
  - Rotate stock weekly and when there are deliveries
  - Remove expired stock and handle per policy (return, discard, etc.)
- **Avoid overstocking of vaccine supply**
  - Check stock and anticipate upcoming patient needs (i.e., flu season, back to school, community event, etc.)
  - Reorder at approximately 4 weeks worth of inventory

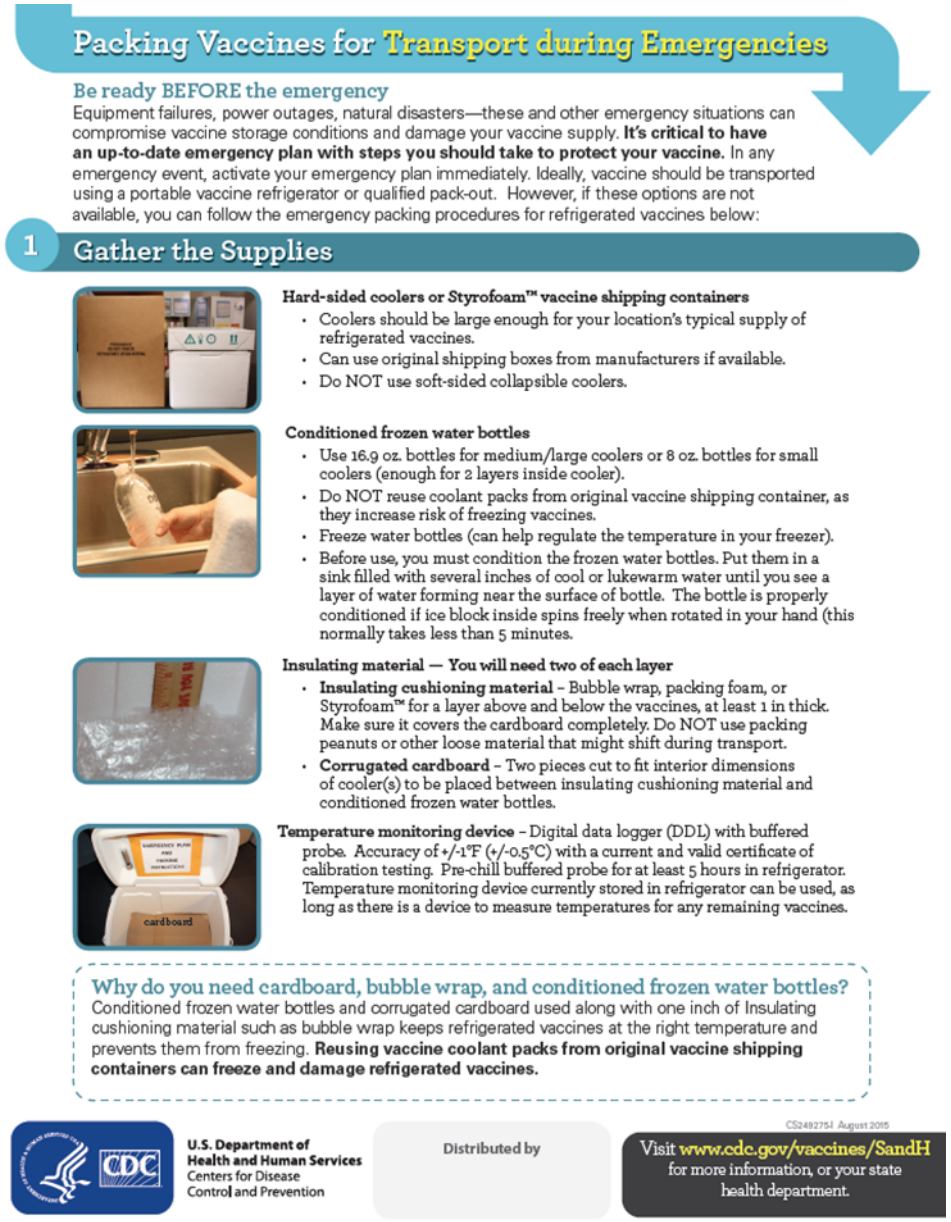
Vaccine Disposal

- Expired or compromised vaccine
- Open or broken vials and manufacturer prefilled syringes
- Empty vaccine vials
- Medical waste disposal

Vaccine Transport

Transport Situations

- Off-site or satellite facilities
- Shipping
- Emergency



Packing Vaccines for Transport during Emergencies

Be ready BEFORE the emergency

Equipment failures, power outages, natural disasters—these and other emergency situations can compromise vaccine storage conditions and damage your vaccine supply. **It's critical to have an up-to-date emergency plan with steps you should take to protect your vaccine.** In any emergency event, activate your emergency plan immediately. Ideally, vaccine should be transported using a portable vaccine refrigerator or qualified pack-out. However, if these options are not available, you can follow the emergency packing procedures for refrigerated vaccines below:

1 Gather the Supplies

Hard-sided coolers or Styrofoam™ vaccine shipping containers

- Coolers should be large enough for your location's typical supply of refrigerated vaccines.
- Can use original shipping boxes from manufacturers if available.
- Do NOT use soft-sided collapsible coolers.

Conditioned frozen water bottles

- Use 16.9 oz. bottles for medium/large coolers or 8 oz. bottles for small coolers (enough for 2 layers inside cooler).
- Do NOT reuse coolant packs from original vaccine shipping container, as they increase risk of freezing vaccines.
- Freeze water bottles (can help regulate the temperature in your freezer).
- Before use, you must condition the frozen water bottles. Put them in a sink filled with several inches of cool or lukewarm water until you see a layer of water forming near the surface of bottle. The bottle is properly conditioned if ice block inside spins freely when rotated in your hand (this normally takes less than 5 minutes.

Insulating material — You will need two of each layer

- **Insulating cushioning material** – Bubble wrap, packing foam, or Styrofoam™ for a layer above and below the vaccines, at least 1 in thick. Make sure it covers the cardboard completely. Do NOT use packing peanuts or other loose material that might shift during transport.
- **Corrugated cardboard** – Two pieces cut to fit interior dimensions of cooler(s) to be placed between insulating cushioning material and conditioned frozen water bottles.

Temperature monitoring device – Digital data logger (DDL) with buffered probe. Accuracy of +/-1°F (+/-0.5°C) with a current and valid certificate of calibration testing. Pre-chill buffered probe for at least 5 hours in refrigerator. Temperature monitoring device currently stored in refrigerator can be used, as long as there is a device to measure temperatures for any remaining vaccines.

Why do you need cardboard, bubble wrap, and conditioned frozen water bottles?

Conditioned frozen water bottles and corrugated cardboard used along with one inch of Insulating cushioning material such as bubble wrap keeps refrigerated vaccines at the right temperature and prevents them from freezing. **Reusing vaccine coolant packs from original vaccine shipping containers can freeze and damage refrigerated vaccines.**

U.S. Department of Health and Human Services
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Visit www.cdc.gov/vaccines/SandH for more information, or your state health department.

CS249275-I August 2015

www.cdc.gov/vaccines/recs/storage/downloads/emergency-transport.pdf

Transport Systems

Transport System Recommendations

	Emergency Transport	Transport for Off-Site Clinic, Satellite Facility, or Relocation of Stock
Portable Vaccine Refrigerator or Freezer	Yes	Yes
Qualified Container and Packout	Yes	Yes
Conditioned Water Bottle Transport System†	Yes	No
Manufacturer's Original Shipping Container	Yes (last resort only)	No
Food/Beverage Coolers	No	No

Transport Planning

- **Protocols**
  - Identify trained staff
  - Vehicles
  - Inventory
  - Documentation
  - Contact emergency vaccine storage facility
  - Suspend operations prior to emergency
- **Vehicle considerations**
  - Company or personal vehicle
  - Use passenger compartment
  - Avoid sunlight
  - Monitor vaccine temperature
  - Move vaccines into storage unit upon arrival

Temperature Monitoring during Transport

- **For any type of transport:**
  - Use a temperature monitoring device (DDL preferred)
  - Place buffered probe with vaccines
  - Keep display on top

Emergency Vaccine Storage and Handling

Emergency Backup Equipment

- **Alternative storage facility**
  - Even if generator is on-site
- **Additional storage unit(s)**
  - In use or for emergency use
- **Backup generator**
  - May prevent need for transport
- **Backup battery power source**

Alternative Facility Inaccessible

- **Keep storage units and containers closed**
- **Use TMDs**
- **Use one of the following containers:**
  - Qualified containers and packouts
  - Portable vaccine unit (if power source available)
  - *Packing Vaccines for Transport during Emergencies* system

Power Outage

- **Record room temperature**
- **Record min/max storage unit temperatures**
  - As soon as the power goes out AND during the outage
- **Avoid temperature excursions**
  - Shift to transport plan or use alternative containers
- **If temp reading can only be obtained by opening door and there is no alternative facility, wait until power is restored**
  - Record room and unit temperatures (min/max, if available)
  - Length of time power was off
  - Follow procedures for temperature excursion, if one occurred

Vaccine Preparation

Vaccine Preparation Best Practices

- Use designated clean preparation area
- Prepare vaccine only when ready to administer
- Use diluent supplied by manufacturer
- Verify, verify, then verify again
- Prepare your own vaccines

Predrawing Vaccines

- **Generally not recommended, but if you must…**
  - Prepare at site or event in clean area
  - Separate administration stations if multiple vaccines
  - One MDV or 10 doses per provider
  - Monitor patient flow
  - Additional guidance for reconstituted vaccines

- **Best practice: Use manufacturer prefilled syringes for large vaccination clinics**

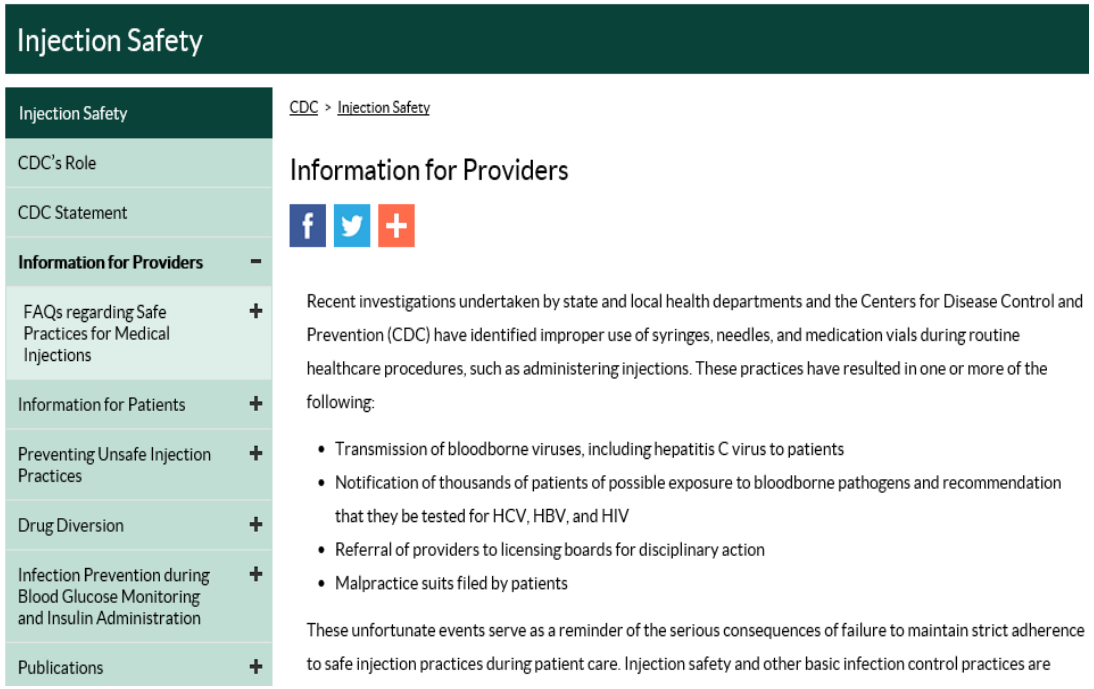
2

Vaccine Administration

Vaccine Administration

- **Key to ensuring vaccination is as safe and effective as possible**

- **Incorporate:**
  - Professional standards for medication administration
  - Manufacturers' vaccine-specific guidelines
  - Evidence-based safe injection practices on CDC's Injection Safety Information for Providers web page

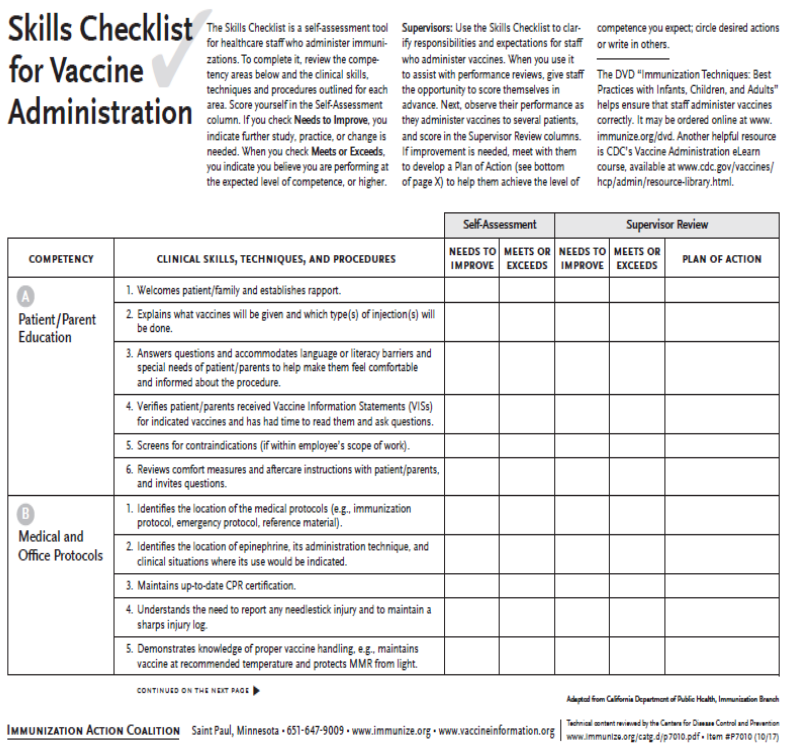


www.cdc.gov/injectionsafety/providers.html

Staff Training and Education

- **Before administering vaccines, all personnel who administer vaccines should:**
  - Receive competency-based training
  - Have knowledge and skills validated
- **Integrate competency-based training into:**
  - New staff orientation
  - Annual education requirements
- **Ongoing education:**
  - When vaccine administration recommendations are updated
  - When new vaccines are added to the inventory

Skills Checklist for Immunization: www.immunize.org/catg.d/p7010.pdf



Skills Checklist for Vaccine Administration

The Skills Checklist is a self-assessment tool for healthcare staff who administer immunizations. To complete it, review the competency areas below and the clinical skills, techniques and procedures outlined for each area. Score yourself in the Self-Assessment column. If you check **Needs to Improve**, 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 competence, or higher.

Supervisors: Use the Skills Checklist to clarify responsibilities and expectations for staff who administer vaccines. When you use it to assist with performance reviews, give staff the opportunity to score themselves in advance. Next, observe their performance as they administer vaccines to several patients, and score in the Supervisor Review columns. If improvement is needed, meet with them to develop a Plan of Action (see bottom of page X) to help them achieve the level of competence you expect; circle desired actions or write in others.

The DVD "Immunization Techniques: Best Practices with Infants, Children, and Adults" helps ensure that staff administer vaccines correctly. It may be ordered online at www.immunize.org/dvd. Another helpful resource is CDC's Vaccine Administration eLearn course, available at www.cdc.gov/vaccines/hcp/admin/resource-library.html.

		Self-Assessment		Supervisor Review		
COMPETENCY	CLINICAL SKILLS, TECHNIQUES, AND PROCEDURES	NEEDS TO IMPROVE	MEETS OR EXCEEDS	NEEDS TO IMPROVE	MEETS OR EXCEEDS	PLAN OF ACTION
A Patient/Parent Education	1. Welcomes patient/family and establishes rapport.					
	2. Explains what vaccines will be given and which type(s) of injection(s) will be done.					
	3. Answers questions and accommodates language or literacy barriers and special needs of patient/parents to help make them feel comfortable and informed about the procedure.					
	4. Verifies patient/parents received Vaccine Information Statements (VISs) for indicated vaccines and has had time to read them and ask questions.					
	5. Screens for contraindications (if within employee's scope of work).					
	6. Reviews comfort measures and aftercare instructions with patient/parents, and invites questions.					
B Medical and Office Protocols	1. Identifies the location of the medical protocols (e.g., immunization protocol, emergency protocol, reference material).					
	2. Identifies the location of epinephrine, its administration technique, and clinical situations where its use would be indicated.					
	3. Maintains up-to-date CPR certification.					
	4. Understands the need to report any needlestick injury and to maintain a sharps injury log.					
	5. Demonstrates knowledge of proper vaccine handling, e.g., maintains vaccine at recommended temperature and protects MMR from light.					

CONTINUED ON THE NEXT PAGE ▶

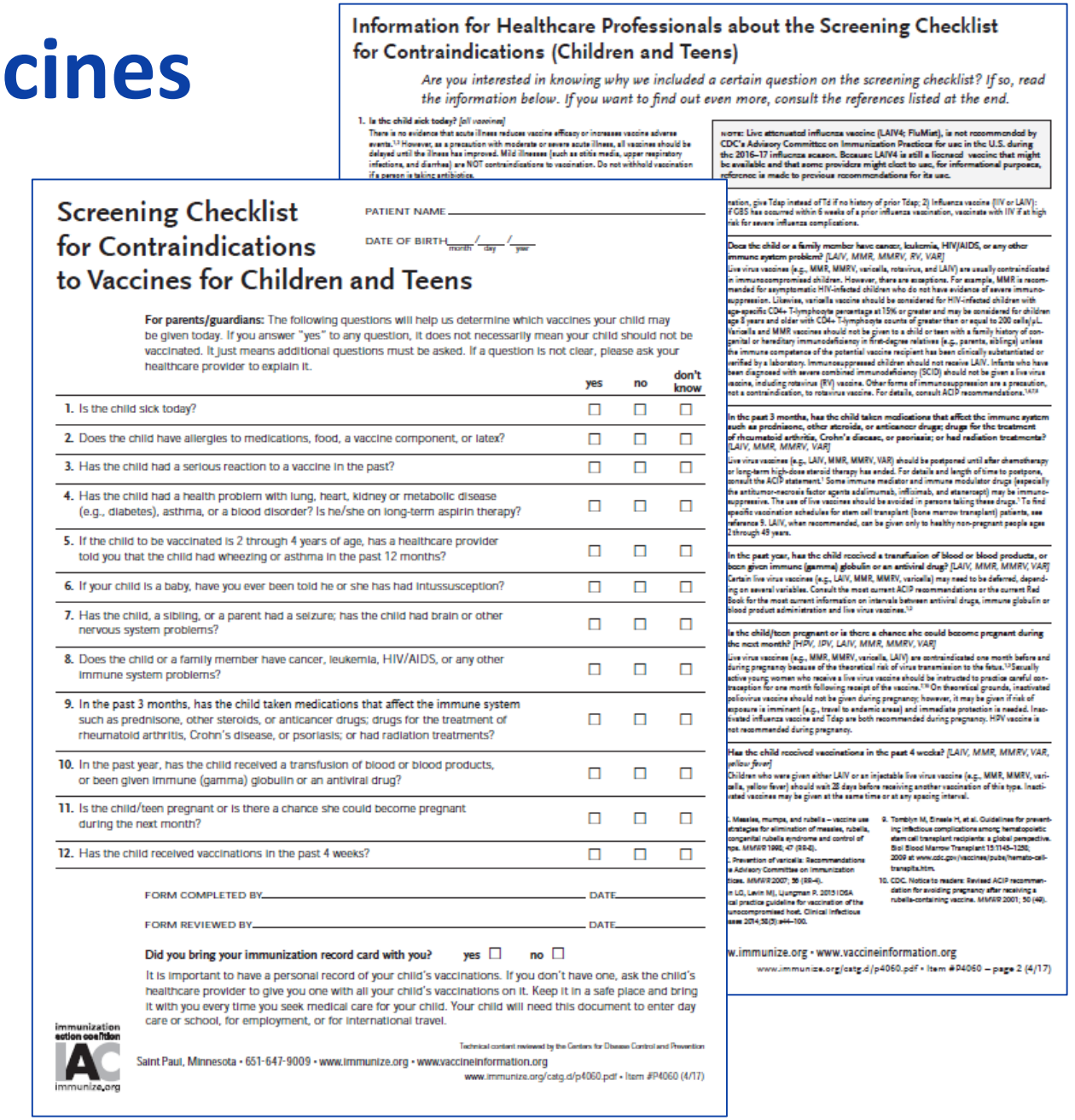
Adapted from California Department of Public Health, Immunization Branch

IMMUNIZATION ACTION COALITION Saint Paul, Minnesota • 651-647-9009 • www.immunize.org • www.vaccineinformation.org

Technical content reviewed by the Centers for Disease Control and Prevention
www.immunize.org/catg.d/p7010.pdf • Item #P7010 (10/17)

Before Administering Vaccines

- **Review the immunization history:**
  - Accept only written, dated records (except influenza and PPSV23 self-report)
  - Use recommended schedule
- **Screen for contraindications and precautions**
- **Discuss vaccine benefits and risks and vaccine-preventable disease risks using VISs and other reliable resources**
- **Provide after-care instructions**



Information for Healthcare Professionals about the Screening Checklist for Contraindications (Children and Teens)

Are you interested in knowing why we included a certain question on the screening checklist? If so, read the information below. If you want to find out even more, consult the references listed at the end.

Screening Checklist for Contraindications to Vaccines for Children and Teens

PATIENT NAME _____

DATE OF BIRTH ___/___/___ (month / day / year)

For parents/guardians: The following questions will help us determine which vaccines your child may be given today. If you answer "yes" to any question, it does not necessarily mean your child should not be vaccinated. It just means additional questions must be asked. If a question is not clear, please ask your healthcare provider to explain it.

	yes	no	don't know
1. Is the child sick today?	☐	☐	☐
2. Does the child have allergies to medications, food, a vaccine component, or latex?	☐	☐	☐
3. Has the child had a serious reaction to a vaccine in the past?	☐	☐	☐
4. Has the child had a health problem with lung, heart, kidney or metabolic disease (e.g., diabetes), asthma, or a blood disorder? Is he/she on long-term aspirin therapy?	☐	☐	☐
5. If the child to be vaccinated is 2 through 4 years of age, has a healthcare provider told you that the child had wheezing or asthma in the past 12 months?	☐	☐	☐
6. If your child is a baby, have you ever been told he or she has had intussusception?	☐	☐	☐
7. Has the child, a sibling, or a parent had a seizure; has the child had brain or other nervous system problems?	☐	☐	☐
8. Does the child or a family member have cancer, leukemia, HIV/AIDS, or any other immune system problems?	☐	☐	☐
9. In the past 3 months, has the child taken medications that affect the immune system such as prednisone, other steroids, or anticancer drugs; drugs for the treatment of rheumatoid arthritis, Crohn's disease, or psoriasis; or had radiation treatments?	☐	☐	☐
10. In the past year, has the child received a transfusion of blood or blood products, or been given immune (gamma) globulin or an antiviral drug?	☐	☐	☐
11. Is the child/teen pregnant or is there a chance she could become pregnant during the next month?	☐	☐	☐
12. Has the child received 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 to have a personal record of your child's vaccinations. If you don't have one, ask the child's healthcare provider to give you one with all your child's vaccinations on it. Keep it in a safe place and bring it with you every time you seek medical care for your child. Your child will need this document to enter day care or school, for employment, or for international travel.

Technical content reviewed by the Centers for Disease Control and Prevention

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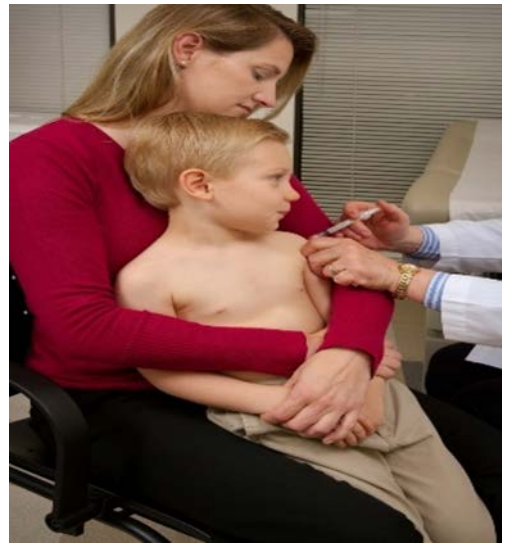
www.immunize.org/catg.d/p4060.pdf • Item #P4060 (4/17)

www.immunize.org • www.vaccineinformation.org

www.immunize.org/catg.d/p4060.pdf • Item #P4060 – page 2 (4/17)

www.immunize.org/catg.d/p4060.pdf
www.immunize.org/catg.d/p4065.pdf
www.cdc.gov/vaccines/parents/tools/tips-factsheet.pdf
immunize.org/handouts/discussing-vaccines-parents.asp

Positioning and Comforting Restraint



- **Encourage parent/guardian to hold child**
- **Sitting rather than lying down (young child)**
- **Be aware of syncope (fainting):**
  - Have patient seated or lying down during vaccination
  - Be aware of symptoms that precede syncope
  - If patient faints, provide supportive care and protect patient from injury
  - Observe patient (seated or lying down) for at least 15 minutes after vaccination

Procedural Pain Management Strategies

- **Pharmacological**
  - Topical anesthetics
  - Sweet-tasting solutions
- **Physical**
  - Breastfeeding
  - Positioning – parent holding the infant or young child
  - Sitting upright rather than lying down
  - Tactile stimulation

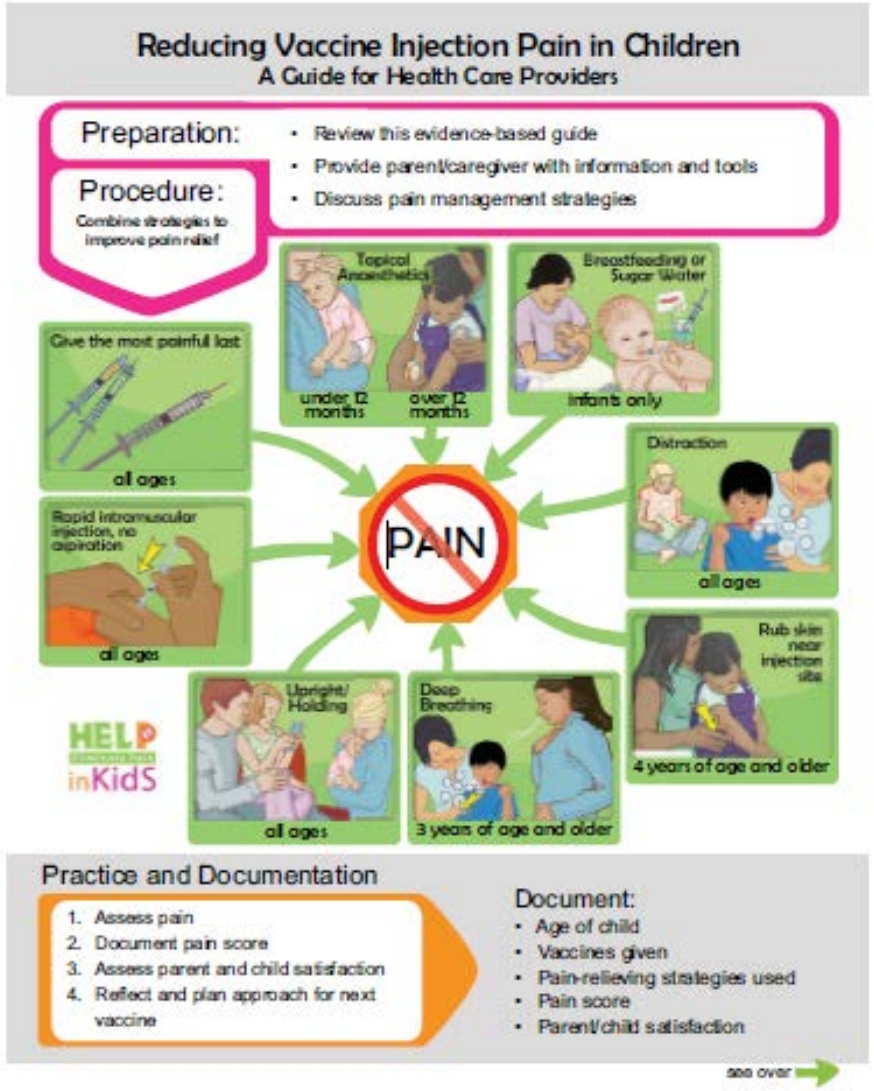
Taddio, Anna, et al. Reducing the pain of childhood vaccination: an evidence-based clinical practice guideline. *CMAJ* 2010;182:500–515

Procedural Pain Management Strategies

- **Psychological**
  - Distraction (i.e., games on smart phones)
  - Deep breathing (i.e., young children can blow bubbles)
- **Procedural**
  - Order of injection: Administer the vaccine most painful when injected last
  - Rapid injection without aspiration
- **Process intervention**
  - Educating and training staff; implementing a planned approach to address procedural pain management

Taddio, Anna, et al. Reducing the pain of childhood vaccination: an evidence-based clinical practice guideline. CMAJ 2010;182:500–515

Procedural Pain Job Aids



Reducing Vaccine Injection Pain in Children
A Guide for Health Care Providers

Preparation:
- Review this evidence-based guide
- Provide parent/caregiver with information and tools
- Discuss pain management strategies

Procedure:
Combine strategies to improve pain relief

Topical Anaesthetics — under 12 months / over 12 months

Breastfeeding or Sugar Water — infants only

Give the most painful last — all ages

Distraction — all ages

PAIN

Rapid intramuscular injection, no aspiration — all ages

Rub skin near injection site — 4 years of age and older

Upright/ Holding — all ages

Deep Breathing — 3 years of age and older

HELP inKidS

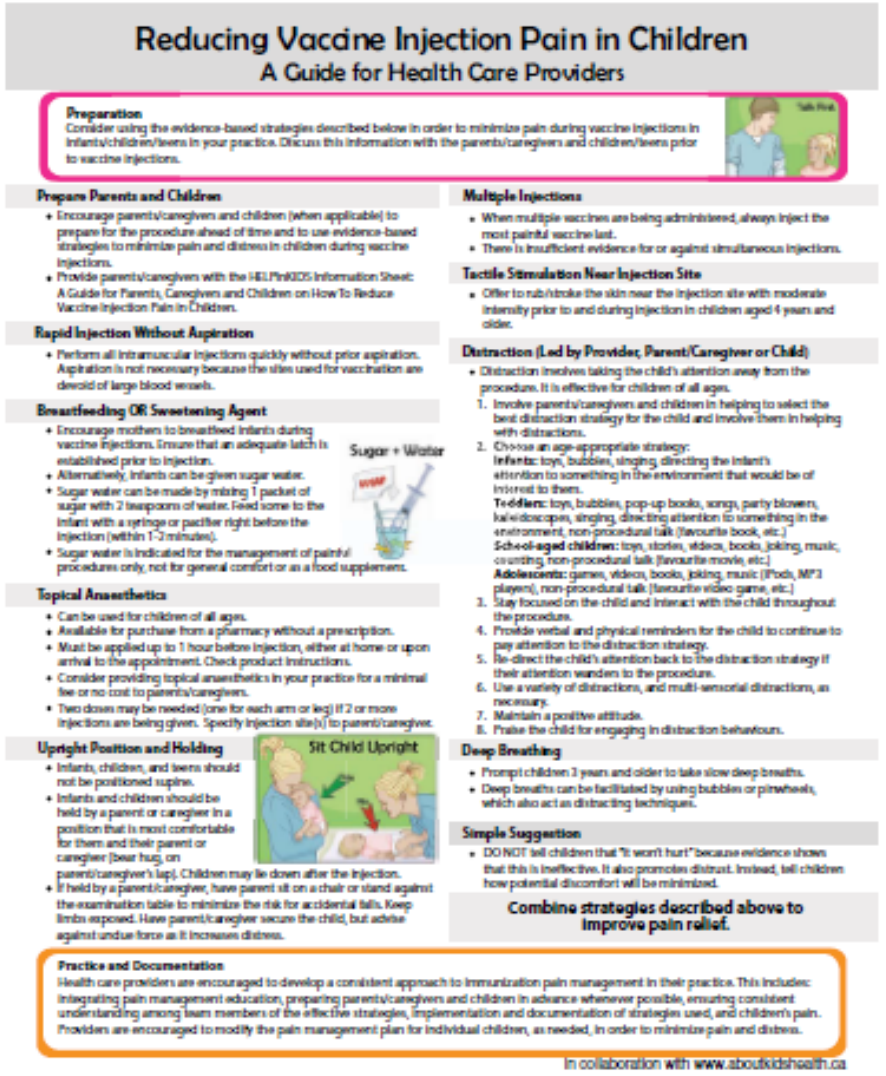
Practice and Documentation

1. Assess pain
2. Document pain score
3. Assess parent and child satisfaction
4. Reflect and plan approach for next vaccine

Document:
- Age of child
- Vaccines given
- Pain-relieving strategies used
- Pain score
- Parent/child satisfaction

see over

Appendix to Taddio A, Appleton M, Bortolussi R, et al. Reducing the pain of childhood vaccination: an evidence-based clinical practice guideline. CMAJ 2010. DOI 10.1503/cmaj.101720. Copyright © 2010 Canadian Medical Association or its licensors.



Reducing Vaccine Injection Pain in Children
A Guide for Health Care Providers

Preparation
Consider using the evidence-based strategies described below in order to minimize pain during vaccine injections in infants/children/teens in your practice. Discuss this information with the parents/caregivers and children/teens prior to vaccine injections.

Prepare Parents and Children
- Encourage parents/caregivers and children (when applicable) to prepare for the procedure ahead of time and to use evidence-based strategies to minimize pain and distress in children during vaccine injections.
- Provide parents/caregivers with the HELPinKIDS Information Sheet: A Guide for Parents, Caregivers and Children on How To Reduce Vaccine Injection Pain in Children.

Rapid Injection Without Aspiration
- Perform all intramuscular injections quickly without prior aspiration. Aspiration is not necessary because the sites used for vaccination are devoid of large blood vessels.

Breastfeeding OR Sweetening Agent
- Encourage mothers to breastfeed infants during vaccine injections. Ensure that an adequate latch is established prior to injection.
- Alternatively, infants can be given sugar water.
- Sugar water can be made by mixing 1 packet of sugar with 2 teaspoons of water. Feed some to the infant with a syringe or pacifier right before the injection (within 1–2 minutes).
- Sugar water is indicated for the management of painful procedures only, not for general comfort or as a food supplement.

Sugar + Water

Topical Anaesthetics
- Can be used for children of all ages.
- Available for purchase from a pharmacy without a prescription.
- Must be applied up to 1 hour before injection, either at home or upon arrival to the appointment. Check product instructions.
- Consider providing topical anaesthetics in your practice for a minimal fee or no cost to parents/caregivers.
- Two doses may be needed (one for each arm or leg) if 2 or more injections are being given. Specify injection site(s) to parent/caregiver.

Upright Position and Holding
- Infants, children, and teens should not be positioned supine.
- Infants and children should be held by a parent or caregiver in a position that is most comfortable for them and their parent or caregiver (bear hug, on parent/caregiver's lap). Children may lie down after the injection.
- If held by a parent/caregiver, have parent sit on a chair or stand against the examination table to minimize the risk for accidental falls. Keep limbs exposed. Have parent/caregiver secure the child, but advise against undue force as it increases distress.

Sit Child Upright

Multiple Injections
- When multiple vaccines are being administered, always inject the most painful vaccine last.
- There is insufficient evidence for or against simultaneous injections.

Tactile Stimulation Near Injection Site
- Offer to rub/stroke the skin near the injection site with moderate intensity prior to and during injection in children aged 4 years and older.

Distraction (Led by Provider, Parent/Caregiver or Child)
- Distraction involves taking the child's attention away from the procedure. It is effective for children of all ages.
1. Involve parents/caregivers and children in helping to select the best distraction strategy for the child and involve them in helping with distractions.
2. Choose an age-appropriate strategy:
   Infants: toys, bubbles, singing, directing the infant's attention to something in the environment that would be of interest to them.
   Toddlers: toys, bubbles, pop-up books, songs, party blowers, kaleidoscopes, singing, directing attention to something in the environment, non-procedural talk (favourite book, etc.)
   School-aged children: toys, stories, videos, books, joking, music, counting, non-procedural talk (favourite movie, etc.)
   Adolescents: games, videos, books, joking, music (iPods, MP3 players), non-procedural talk (favourite video game, etc.)
3. Stay focused on the child and interact with the child throughout the procedure.
4. Provide verbal and physical reminders for the child to continue to pay attention to the distraction strategy.
5. Re-direct the child's attention back to the distraction strategy if their attention wanders to the procedure.
6. Use a variety of distractions, and multi-sensorial distractions, as necessary.
7. Maintain a positive attitude.
8. Praise the child for engaging in distraction behaviours.

Deep Breathing
- Prompt children 3 years and older to take slow deep breaths.
- Deep breaths can be facilitated by using bubbles or pinwheels, which also act as distracting techniques.

Simple Suggestion
- DO NOT tell children that "it won't hurt" because evidence shows that this is ineffective. It also promotes distrust. Instead, tell children how potential discomfort will be minimized.

Combine strategies described above to improve pain relief.

Practice and Documentation
Health care providers are encouraged to develop a consistent approach to immunization pain management in their practice. This includes: integrating pain management education, preparing parents/caregivers and children in advance whenever possible, ensuring consistent understanding among team members of the effective strategies, implementation and documentation of strategies used, and children's pain. Providers are encouraged to modify the pain management plan for individual children, as needed, in order to minimize pain and distress.

In collaboration with www.aboutkidshealth.ca

Appendix to Taddio A, Appleton M, Bortolussi R, et al. Reducing the pain of childhood vaccination: an evidence-based clinical practice guideline. CMAJ 2010. DOI 10.1503/cmaj.101720. Copyright © 2010 Canadian Medical Association or its licensors.

www.cmaj.ca/content/suppl/2015/08/24/cmaj.150391.DC1

Infection Control

- **Perform hand hygiene:**
  - Before preparing vaccines
  - Between patients
  - Anytime hands become soiled
- **Gloves are not required when administering vaccines unless the person administering the vaccine is likely to come into contact with potentially infectious body fluids or has open lesions on hands:**
  - If gloves are worn, they should be changed between patients
  - Perform hand hygiene between patients even if wearing gloves
- **Equipment disposal:**
  - Puncture-proof biohazard container
  - Empty or expired vaccine vials are medical waste

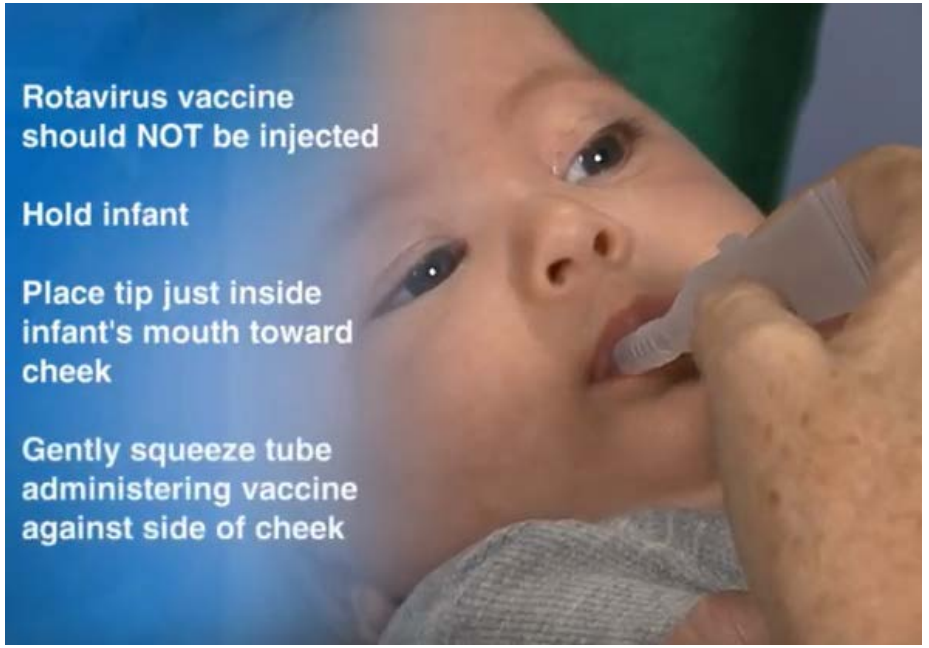
www.cdc.gov/handhygiene/index.html

Vaccine Preparation “Nevers”

- Never combine vaccines into a single syringe
- Never transfer vaccine from one syringe to another
- Never draw partial doses of vaccine from separate vials to obtain a full dose

Route and Site

- **Oral (PO):**
  - Administer liquid inside cheek slowly down one side (between cheek and gum) toward the back of infant's mouth

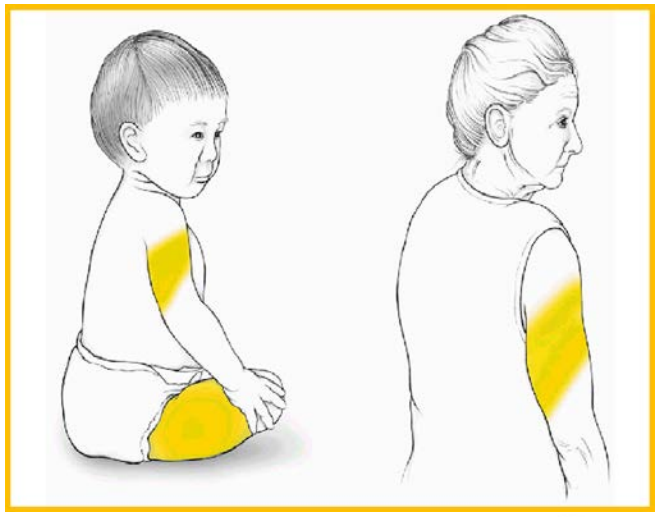


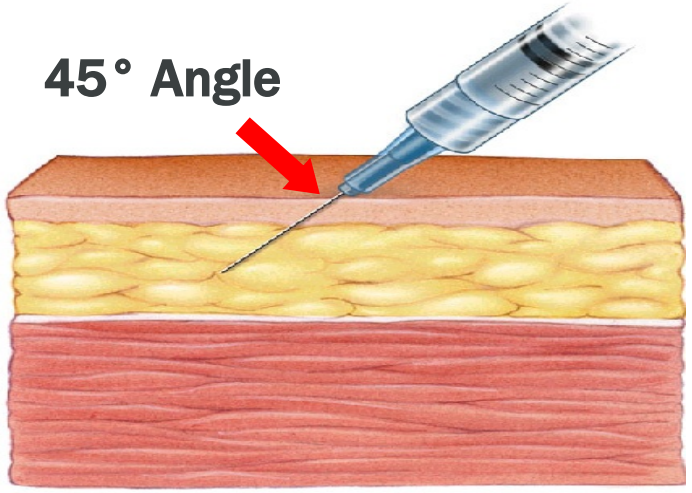
- **Intranasal (NAS):**
  - LAIV4 is the only vaccine administered by the intranasal route

www.cdc.gov/vaccines/hcp/admin/resource-library.html
www.cdc.gov/mmwr/preview/mmwrhtml/mm6304a4.htm?s_cid=mm6304a4_w

Subcutaneous Injection Route

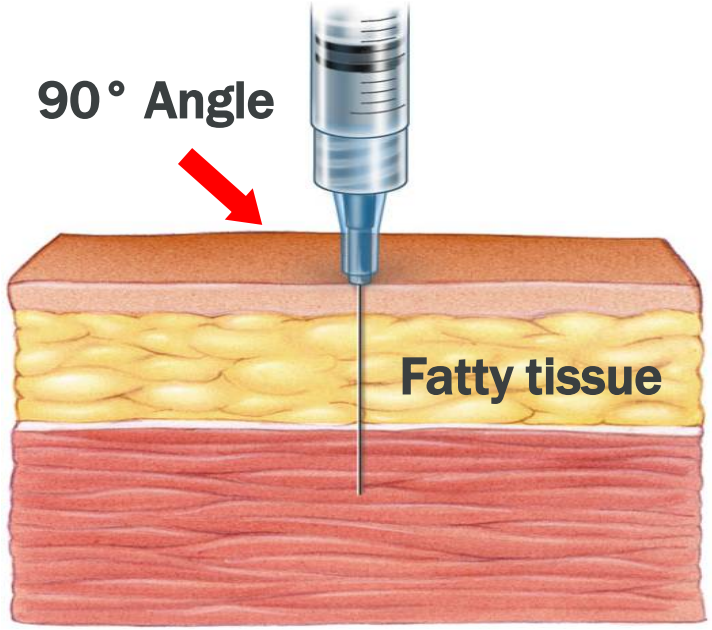
- **Site:**
  - Thigh for infants < 12 months of age
  - Upper outer triceps of arm for children > 12 months and adults (can be used for infants if necessary)
- **Needle gauge and length:**
  - 23–25 gauge needle, 5/8 inch
- **Technique:**
  - To avoid reaching the muscle, pinch up the fatty tissue, insert the needle at a 45° angle, and inject the vaccine into the tissue





Intramuscular Injection (IM) Route

- Spread the skin of the site taut between the thumb and forefinger, isolating the muscle
- Another technique, acceptable mostly for pediatric and 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



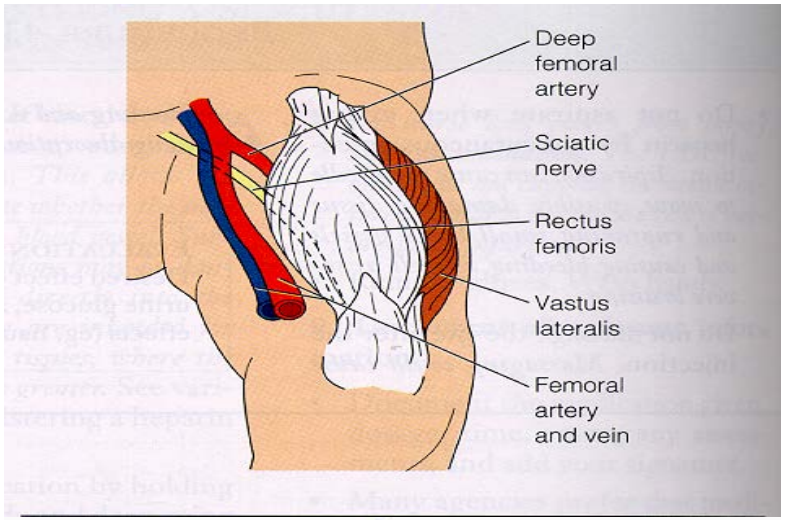
Aspiration is NOT required

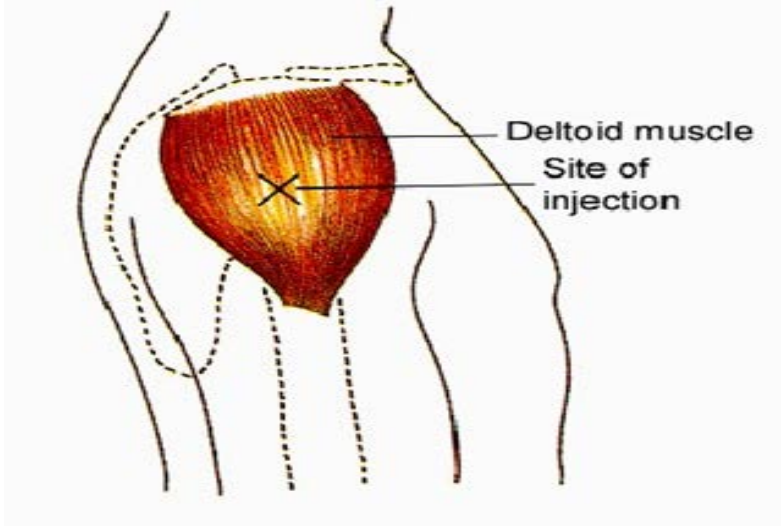
Intramuscular Injection (IM) Route: Infants ≤12 Months

- **Site:**
  - Vastus lateralis muscle (anterolateral thigh)
- **Needle gauge and length:**
  - 22–25 gauge
  - Neonates and preterm infants: 5/8 inch (adequate only if the skin is stretched flat between thumb and forefinger)
  - 1 month and older: 1 inch

Intramuscular Injection (IM) Route: 1–2 Years

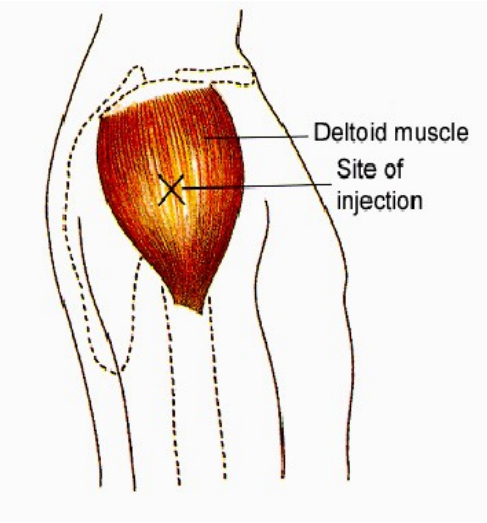
- **Site:**
  - Vastus lateralis muscle (anterolateral thigh) is preferred
  - Deltoid muscle (upper arm) may be used if the muscle mass is adequate
- **Needle gauge and length:**
  - 22–25 gauge
  - 5/8 to 1 inch (5/8 inch adequate only for the deltoid muscle and only if the skin is stretched flat between thumb and forefinger)

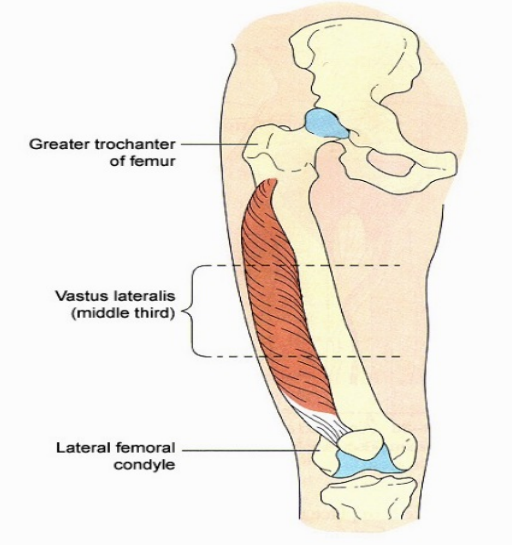




Intramuscular Injection (IM) Route: 3–18 Years

- **Site:**
  - Deltoid muscle (upper arm) is preferred
  - Vastus lateralis muscle (anterolateral thigh) may be used
- **Needle gauge and length:**
  - 22–25 gauge
  - 5/8 to 1 inch
- **Most young children in this age range require a 5/8 or 1 inch needle:**
  - 5/8 inch needle is adequate only for the deltoid muscle and only if the skin is stretched flat between thumb and forefinger
- **Older children and adolescents require a 1 inch needle**



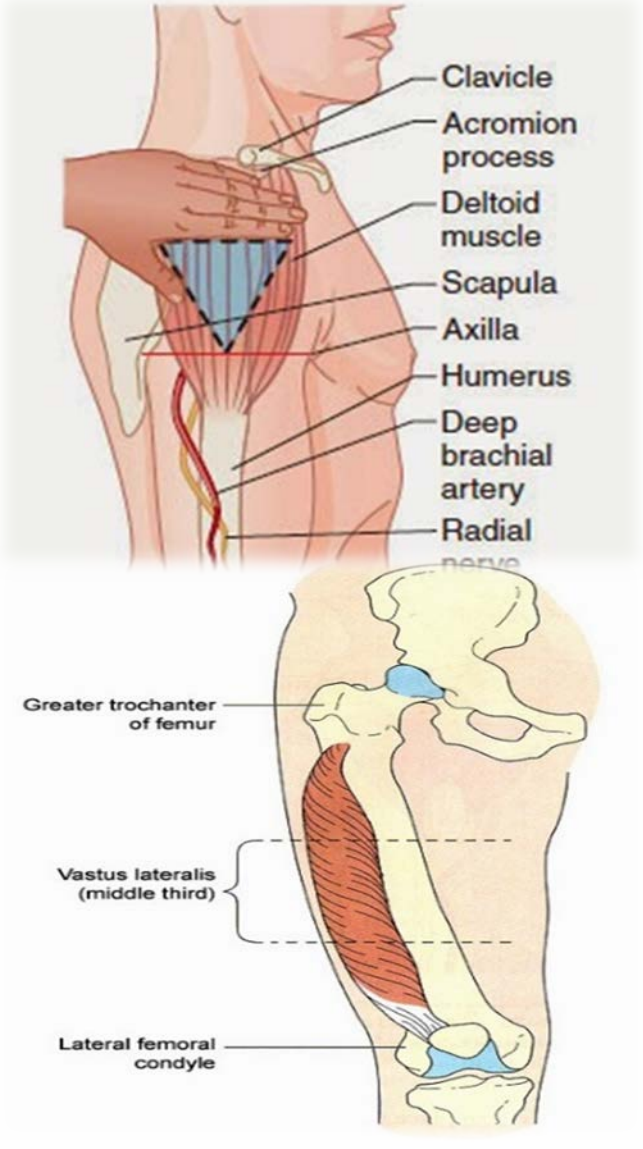


Intramuscular (IM) Route
Adults 19 Years and Older

- **Site:**
  - Deltoid muscle (upper arm) is preferred
  - Vastus lateralis muscle (anterolateral thigh) may be used

- **Needle gauge: 23–25 gauge**

- **Needle length varies with patient size**



Shoulder Injury Related to Vaccine Administration

- **Shoulder injury related to vaccine administration (SIRVA) was added to the Vaccine Injury Compensation Table in March 2017**
- **Shoulder injuries related to vaccine administration are injuries to the musculoskeletal structure of the shoulder, including the ligaments, bursa, and tendons**
  - They are thought to occur as a result of the unintended injection of vaccine antigen and/or trauma from the needle going into and around the underlying bursa of the shoulder
  - Symptoms include shoulder pain and limited mobility after the injection

Shoulder Injury Related to Vaccine Administration and Vaccine Administration Best Practices

- **When administering a vaccine by intramuscular (IM) injection in the deltoid muscle, use:**

  - Proper landmarks and technique to identify the injection site
  - Proper needle length based on the age, patient size, and injection technique

Clinical Resources for Shoulder Injury Related to Vaccine Administration

- **CDC vaccine administration web page for information and materials for health care personnel, including:**
  - IM demonstration video
  - Job aids and infographics

Vaccine Administration: www.cdc.gov/vaccines/hcp/admin/administer-vaccines.html

Multiple Vaccinations

- Separate injections by at least 1 inch (or more if possible)
- Use a separate limb for most reactive vaccines, if possible
- Use combination vaccines when appropriate to reduce the number of injections

http://www.aimtoolkit.org/health-care/vaccine-administration.php

Documentation

- **Federally required documentation:**
  - Date of administration
  - Vaccine manufacturer
  - Vaccine lot number
  - Name and title of person who administered vaccine and address of clinic or facility where permanent record will reside
  - Vaccine information statement (VIS)
    - Date printed on the VIS
    - Date VIS given to patient or parent/guardian
- **Best practice documentation:**
  - Vaccine type (ACIP abbreviation)
  - Route
  - Dosage (volume)
  - Site

3

Errors

Strategies to Prevent Errors

- Establish an environment that values reporting and investigating errors as part of risk management and quality improvement
- Use best practices for storing, handling, preparing, and administering vaccines
- Take immediate action and isolate affected vaccine(s) if there is a temperature excursion
- Promptly remove expired vaccines from the storage unit

Strategies to Prevent Errors

- Only administer vaccines you have prepared and triple-checked
- Be familiar with current recommended immunization schedules:

  www.cdc.gov/vaccines/acip/index.html
- Use standing orders when possible:
  www.immunize.org/standing-orders/

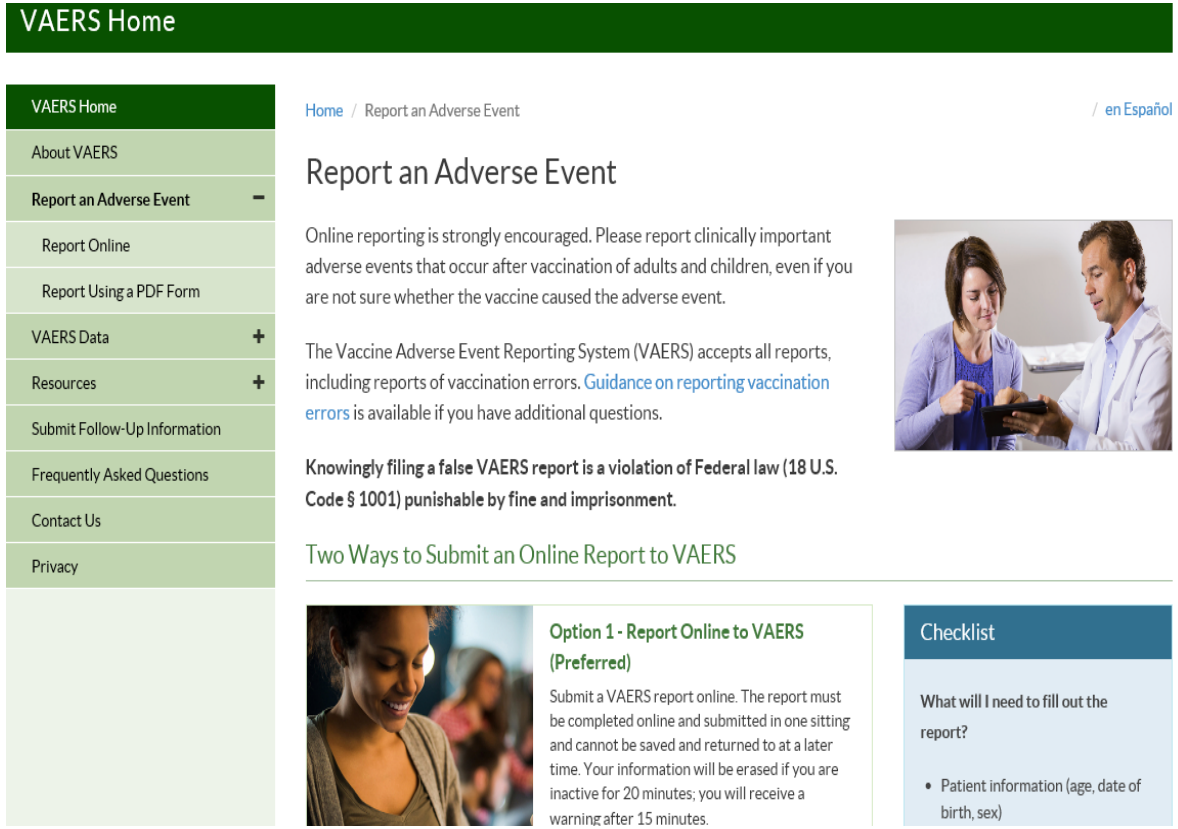
What if a Vaccination Error Occurs?

- **Inform the patient/parent of the error**
- **Determine the status of the patient**
- **Explain any needed next steps**
- **Know how to correct the error**
  - Contact your local health department, vaccine manufacturer, or nipinfo@cdc.gov for guidance
- **Record the vaccine as it was given on the medical administration record**

Reporting Vaccination Errors to VAERS

- Providers are encouraged to report vaccination errors without health events if they believe the error may pose a safety risk

- VAERS encourages reports of clinically significant adverse health events



vaers.hhs.gov/reportevent.html