# Vaccine Administration

Appropriate vaccine administration is a critical component of a successful immunization program. The following information provides general guidance for those who administer vaccines and should be used in conjunction with professional standards of medication administration and vaccine manufacturers' guidelines.

The “Rights of Medication Administration” should be applied to each encounter when vaccines are administered. These rights include:

the right patient;
the right vaccine or diluent;
the right time*;
the right dosage;
the right route, needle length, and technique;
the right site; and,
the right documentation.

*(includes administering at the correct age, the appropriate interval, and before vaccine or diluent expires)

## Staff Training and Education

All personnel who will administer vaccines should receive competency-based training and education on vaccine administration before providing vaccines to patients. Providers need to orient new staff to vaccines used in their office and validate staff’s knowledge and skills about vaccine administration with a skills checklist (refer to “Skills Checklist for Immunization” at www.eziz.org/assets/docs/IMM-694.pdf). Providers should remember to include temporary personnel who may be filling in on days when the facility is short staffed or helping during peak times such as flu season. Continuing education should be provided for all staff on the use and administration of new vaccines, new schedules, and new or revised recommendations.

## Patient Preparation and Care

Patients should be prepared for vaccination with consideration for their age and stage of development. Parents/guardians and patients should be encouraged to take an active role before, during and after the administration of vaccines (see “Be There for Your Child During Shots” poster at www.eziz.org/assets/docs/IMM-686ES.pdf).

• **Screening** - All patients should be screened for contraindications and precautions every time a vaccine is administered, even if the patient has previously received a dose of that vaccine. The patient’s status can change from one visit to the next or a new contraindication or precaution may have been added. Screening questions that should be asked of every patient are included in Chapter 2. Many state immunization programs and other organizations have developed standardized screening tools (see screening questionnaires at www.immunize.org/handouts/screening-vaccines.asp).

• **Vaccine Safety & Risk Communication** - There have been safety concerns about vaccines since the 18th century when the first smallpox vaccination campaigns began. Specific vaccine concerns have changed through time. An increasing number of parents, even those who support vaccination, are beginning to raise vaccine safety concerns. Parents/guardians and patients are exposed to information about vaccines through the media, internet, family members, and friends. Some of this information is inaccurate and misleading.

A provider's recommendation for vaccination is a powerful motivator. Healthcare providers are consistently identified as the most trusted source of vaccine information by parents and patients. Immunization providers should be prepared to discuss the benefits and risks of vaccines, as well as the risks of vaccine-preventable diseases (VPD), using Vaccine Information Statements (VIS) and other reliable resources. Establishing an open dialogue promotes a safe, trust-building environment in which individuals can freely evaluate information, discuss vaccine concerns and make informed decisions regarding immunizations. Providers are also encouraged to discuss after care instructions with patients or parents/guardians (see additional information in Chapter 4 and Appendices E and F).

• **Atraumatic Care** - Vaccine safety issues and the need for multiple injections have increased the concerns and anxiety associated with immunizations. Healthcare providers need to display confidence and establish an environment that promotes a sense of security and trust for the patient and family, utilizing a variety of techniques to minimize the stress and discomfort associated with receiving injections. This is particularly important when administering vaccines to children. Although pain from immunizations is, to some extent, unavoidable, there are some things that parents and healthcare providers can do to help when children need vaccines. Everyone involved should work to provide immunizations in the safest and least stressful way possible. Simple strategies that can be used by both parents and providers to make the process of receiving vaccines easier include:

- displaying a positive attitude through facial expressions, body language, and comments;
- using a soft and calm tone of voice;
- making eye contact, even with small children;
- explaining why vaccines are needed (e.g., "this medicine will protect you from getting sick" or "this shot is a shield to protect your body against infection"); and,
- being honest and explaining what to expect (e.g., do not say that the injection will not hurt).

• **Positioning & Comforting Restraint** - The healthcare provider should accommodate for the patient's comfort, safety, age, activity level, and the site of administration when considering patient positioning and restraint. A parent/guardian should be encouraged to hold the child during administration. Parent participation has been shown to increase the child's comfort. The parent/guardian should be instructed on how to help the child stay still so the vaccine can be administered safely. If the parent is uncomfortable, another person may assist or the patient may be positioned safely on an examination table (refer to "Comforting Restraint for Immunizations" at www.eziz.org/assets/docs/IMM-720ES.pdf).

Research supports the belief that children are less fearful and experience less pain when receiving an injection if they are sitting up rather than lying down. The mechanism behind this

phenomenon may be that the child's anxiety level is reduced, which in turn reduces the child's perception of pain.

All providers who administer vaccines to older children, adolescents, and adults should be aware of the potential for syncope (fainting) after vaccination and take measures to prevent it. Clinicians should (1) make sure the person who is being vaccinated is always seated or lying down; (2) be aware of symptoms that precede fainting (weakness, dizziness, pallor, etc.); and (3) provide supportive care and take appropriate measures to prevent injuries if such symptoms occur. The Advisory Committee on Immunization Practices (ACIP) also recommends that providers consider observing the patient (with patient seated or lying down) for 15 minutes after vaccination.

• **Comfort Measures** - Concern and anxiety about injections are common for all ages. Fear of injections and needlestick pain are often cited as reasons why children and adults, including healthcare personnel, refuse vaccines. Pain is a subjective phenomenon influenced by multiple factors, including an individual's age, anxiety level, previous healthcare experiences, and culture. Managing the pain associated with immunizations has the potential to improve satisfaction with the immunization experience for children, adolescents, and adults. Consideration for these factors is important as the provider develops a planned approach to management of injection pain. Immunization providers are encouraged to determine the patient's previous experiences with needlesticks. Evidence-based strategies to ease the injection process include:

**Antipyretics** - An age-appropriate dose of a non-aspirin-containing pain reliever may be considered to decrease discomfort and fever if it should occur after vaccination. ACIP does not recommend the prophylactic use of analgesics before or at the time of vaccination.

**Distraction techniques** – Age-appropriate, non-pharmacologic techniques may provide distraction from pain associated with injections. Psychological interventions such as distraction in children have been demonstrated to be effective at reducing stress and the perception of pain during the injection process. Parents should be encouraged to use distraction methods. Distraction can be accomplished through a variety of techniques (e.g., playing music, books, pretending to blow away the pain, deep breathing techniques).

**Ingestion of sweet-tasting liquids or breastfeeding** – Several studies have demonstrated a reduction in crying after injections when young children (1 year or younger) ingest a small amount (a few drops to half a teaspoon) of a sugary solution prior to administration of the vaccine. This is a short-acting, inexpensive, easy-to-administer analgesic. Breastfeeding has also been demonstrated as a soothing measure for young children receiving injections and there is some evidence that breastfeeding can decrease the incidence of fever after immunizations.

**Order of injections** – Injecting the most painful vaccine (e.g., MMR, PCV, or HPV) last when multiple injections are being administered may also decrease the pain of injections.

**Tactile stimulation** – Rubbing or stroking the skin near the injection site with moderate intensity may decrease pain in older children (4 years and older) and adults.

**Administration technique** – Performing intramuscular injections rapidly without aspiration has also demonstrated a reduction in pain.

**Topical analgesia** may be applied to decrease pain at the injection site. These products (e.g., 5% lidocaine-prilocaine emulsion or refrigerant spray) should be used only for the ages recommended and as directed by the product manufacturer.

Also see:
"After the Shots" at www.immunize.org/catg.d/p4014.pdf , and
"After Receiving Vaccines" at
www.aimtoolkit.org/adult/After_Receiving_Vaccine_D_112309%20AIM.pdf.

Following are other techniques used by some providers. There is insufficient evidence to recommend these techniques as evidence-based strategies to relieve the pain associated with vaccine administration.

**Dual administrators** – Some providers favor the technique of two individuals simultaneously administering vaccines at separate sites. The premise is that this procedure may decrease anxiety from anticipation of the next injection(s). There are other healthcare personnel, some who specialize in pain management, who feel that this technique actually increases pain since the child feels overpowered and vulnerable, with no control. The evidence for or against this technique is insufficient to make a recommendation for or against at this time.

**Routes of administration** – As of January, 2011, there are two FDA licensed vaccines that are approved for administration by either the subcutaneous or intramuscular route (IPV and PPSV). There is insufficient evidence to support one route more than the other in reducing the pain associated with injection. The manufacturer's instructions should be followed for the route of administration of any vaccine. When there is more than one option, the number of vaccines to be administered and available injection sites may influence the vaccinator's choice.

## Infection Control

Healthcare providers should follow Standard Precautions to minimize the risks of spreading disease during the administration of vaccines.

• **Handwashing** - Handwashing is critical to prevent the spread of illness and disease. Hands should be washed thoroughly with soap and water or cleansed with an alcohol-based waterless antiseptic before vaccine preparation, between patients, and any time hands become soiled, e.g. diapering or cleansing excreta.

• **Gloves** - Occupational Safety and Health Administration (OSHA) regulations do not require gloves to be worn 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 the hands. If gloves are worn, they should be changed between patients. Gloves will not prevent needlestick injuries. Any needlestick injury should be reported immediately to the site supervisor, with appropriate care and follow-up given as directed by local/state guidelines.

• **Equipment Disposal** - Used needles should not be recapped, cut, or detached from the syringes before disposal. All used syringe/needle devices should be placed in puncture proof containers to prevent accidental needlesticks and reuse. Empty or expired vaccine vials are considered medical waste and should be disposed of according to state regulations.

## Vaccine Preparation

Proper vaccine handling and preparation is critical in maintaining the integrity of the vaccine during transfer from the manufacturer's vial to the syringe and ultimately to the patient.

• **Equipment Selection**

- **Syringe Selection** - A separate needle and syringe should be used for each injection. A parenteral vaccine may be delivered in either a 1-mL or 3-mL syringe as long as the prescribed dosage is delivered. OSHA requires that safety-engineered injection devices (e.g., needle-shielding syringes or needle-free injectors) be used for injectable vaccination in all clinical settings to reduce risk for injury and disease transmission. Personnel who will be using these products should be involved in evaluation and selection of these products and should receive training with these devices before using them in the clinical area.

- **Needle Selection** - Vaccine must reach the desired tissue site for optimal immune response to occur. Therefore, needle selection should be based on the prescribed route, size of the individual, volume and viscosity of the vaccine, and injection technique. A supply of needles in varying lengths appropriate for the facility's patient population should be available to staff. Typically, vaccines are not highly viscous so a fine gauge needle (22-25 gauge) can be used.

- **Needle-Free Injection** - A new generation of needle-free vaccine delivery devices (jet injectors) has been developed in an effort to decrease the risks of needlestick injuries to healthcare personnel and to prevent improper reuse of syringes and needles. For more information on use of needle-free injection devices, see the ACIP General Recommendations on Immunization: www.cdc.gov/mmwr/pdf/rr/rr6002.pdf (page 16), and the FDA website: www.fda.gov/BiologicsBloodVaccines/Vaccines/QuestionsaboutVaccines/ucm276773.htm.

• **Inspecting Vaccine** - Each vaccine and diluent vial should be carefully inspected for damage or contamination prior to use. The expiration date printed on the vial or box should be checked. Vaccine can be used through the last day of the month indicated by the expiration date unless otherwise stated on the package labeling. The expiration date or time for some vaccines changes once the vaccine vial is opened or the vaccine is reconstituted. This information is available in the manufacturer's product information. Regardless of expiration date, vaccine and diluent should only be used as long as they are normal in appearance and have been stored and handled properly. Expired vaccine or diluent should never be used.

• **Reconstitution** - Several vaccines are prepared in a lyophilized (freeze-dried) form that requires reconstitution with a liquid diluent. Vaccines should be reconstituted according to manufacturer guidelines using only the specific diluent supplied by the manufacturer for that vaccine. Each diluent is specific to the corresponding vaccine in volume, sterility, pH, and

chemical balance. If the wrong diluent is used, the vaccine dose is not valid and will need to be repeated using the correct diluent.

Reconstitute vaccine just before using. Use all of the diluent supplied for a single dose and then draw up all of the vaccine after it is thoroughly reconstituted. Once reconstituted, the vaccine must be either administered within the time guidelines specified in the manufacturer's product information or discarded. Changing the needle between drawing vaccine from the vial and administering the vaccine is not necessary unless the needle is contaminated or damaged (see "Preparing Reconstituted Vaccine" at www.eziz.org/assets/docs/IMM-897.pdf) and "Vaccine with Diluents: How to use them" at www.immunize.org/catg.d/p3040.pdf.

• **Filling Syringes** - Agitate (shake) the vial to mix the vaccine thoroughly and obtain a uniform suspension prior to withdrawing each dose. Whenever solution and container permit, inspect vaccine visually for particulate matter and/or discoloration prior to administration. If problems are noted (e.g., vaccine cannot be resuspended), the vaccine should not be administered.

Standard medication preparation guidelines should be followed for drawing a dose of vaccine into a syringe. A vaccine dose should not be drawn into the syringe until it is to be administered. When syringes are filled, the type of vaccine, lot number, and date of filling should be labeled on each syringe and the doses should be administered as soon as possible after filling. Sometimes providers prefill many syringes themselves. This practice is strongly discouraged by CDC (see Vaccine Preparation in the Storage and Handling chapter).

Single-dose vials and manufacturer-filled syringes are designed for single-dose administration and should be discarded if vaccine has been withdrawn or reconstituted and subsequently not used within the time frame specified by the manufacturer. Typically, the maximum time for inactivated vaccines is no longer than the same work day. CDC also recommends that when the rubber diaphragm on a single-dose vial is exposed, the vaccine in the vial should be used that work day or discarded. It is difficult to tell if a needle has punctured the rubber diaphragm and single-dose vials do not contain a preservative. The same guideline applies to manufacturer-filled syringes that have been activated (i.e., syringe cap removed or needle attached) because the sterile seal has been broken.

Vaccines should never be combined in a single syringe except when specifically approved by the FDA and packaged for that specific purpose. Most combination vaccines will be combined by the manufacturer. As of March, 2011 there are only two combination vaccines that must be combined by the provider at the time of administration, i.e., DTaP-IPV/Hib (Pentacel) and MCV4 (Menveo).

Vaccine should never be transferred from one syringe to another. Partial doses from separate vials should not be combined into a single dose. Both of these practices increase the risk of contamination. Instilling air into a multidose vial prior to withdrawing a vaccine dose may not be necessary. It could cause a "spritz" of vaccine to be lost each time the air is injected, which through time can decrease the amount of vaccine in the vial and lead to the loss of a dose (e.g., obtaining only 9 full doses from a 10-dose vial).

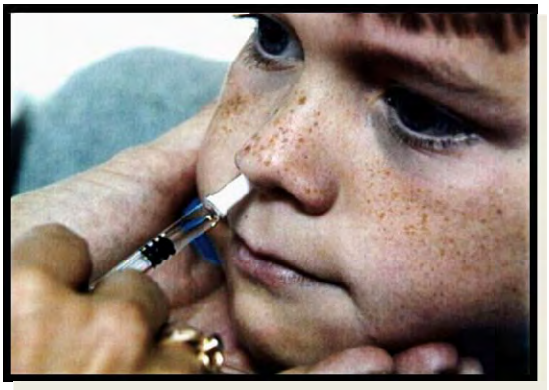
Also see “Drawing Up Ready-to-Use Vaccine” at www.eziz.org/assets/docs/IMM-896.pdf.

## Route and Site

The recommended route and site for each vaccine are based on clinical trials, practical experience and theoretical considerations. This information is included in the manufacturer’s product information for each vaccine. There are five routes used in the administration of vaccines. Deviation from the recommended route may reduce vaccine efficacy or increase local adverse reactions.

• **Oral (PO) Route -** Rotavirus vaccines (RV1/Rotarix, RV5/RotaTeq) and oral typhoid (TY21a/Vivotif) are the only U.S.-licensed vaccines that are administered by the oral route. RV1/Rotarix requires reconstitution prior to oral administration. Oral vaccines should generally be administered prior to administering injections or performing other procedures that might cause discomfort. Administer the liquid slowly down one side of the inside of the cheek (between the cheek and gum) toward the back of the infant’s mouth. Care should be taken not to go far enough back to initiate the gag reflex. Never administer or spray (squirt) the vaccine directly into the throat. Detailed information on oral delivery of these vaccines is included in each manufacturer’s product information.

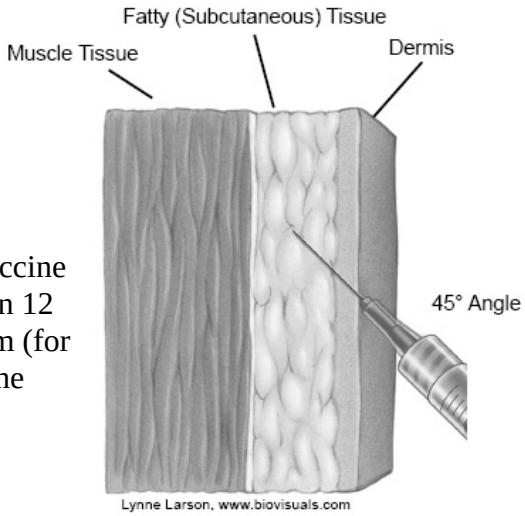
ACIP does not recommend readministering a dose of rotavirus vaccine to an infant who regurgitates, spits out, or vomits during or after administration. No data exist on the benefits or risks associated with readministering a dose. The infant should receive the remaining recommended doses of rotavirus vaccine following the routine schedule (with a 4-week minimum interval between doses). There are no restrictions on the infant’s consumption of breast milk or any other liquid before or after administration of either of these vaccines.



• **Intranasal (NAS) Route -** The live attenuated influenza vaccine (LAIV, FluMist) is currently the only vaccine administered by the nasal route. The vaccine dose (0.2 mL) is inside a special sprayer device. A plastic clip on the plunger divides the dose into two equal parts. The patient should be seated in an upright position with head tilted back. Instruct the patient to breathe normally. The provider should gently place a hand behind the patient’s head. The tip of the nasal sprayer should be inserted slightly into the naris. Half of the contents of the sprayer (0.1 mL) are sprayed into the nostril. The dose-divider clip is then removed and the procedure is repeated in the other naris. Detailed information on the nasal administration of LAIV is included in the manufacturer’s product information. The dose does not need to be repeated if the patient coughs, sneezes, or expels the dose in any other way.

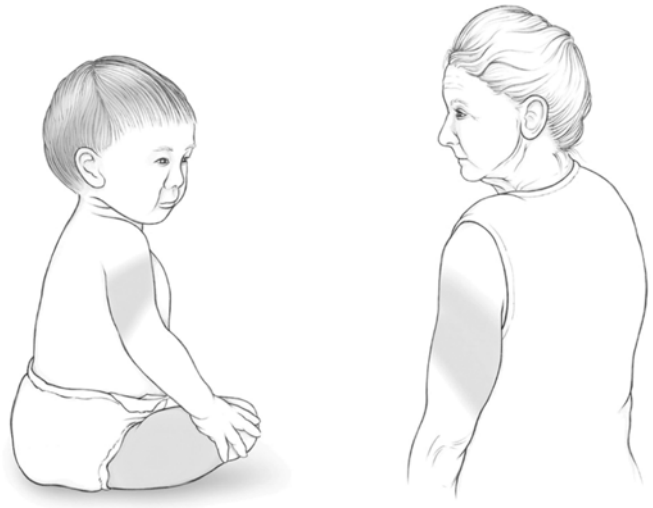
It is possible for the LAIV spray to cause low-level contamination of the environment with vaccine virus, but there have been no reports of vaccine virus transmission by this route. No instances have been reported of illness or attenuated vaccine virus infections among

inadvertently exposed healthcare personnel or immunocompromised patients. Only healthcare personnel with severe immunosuppression (i.e., who require a protective environment, such as for hematopoietic cell transplant) should not administer LAIV. Healthcare personnel with this level of immunosuppression would not be administering vaccines. Other healthcare personnel at higher risk for influenza complications can administer LAIV. These include persons with underlying medical conditions placing them at higher risk or who are likely to be at risk, including pregnant women, persons with asthma, and persons aged 50 years and older.




• **Subcutaneous** (**subcut) Route.** Subcutaneous injections are administered into the fatty tissue found below the dermis and above muscle tissue.

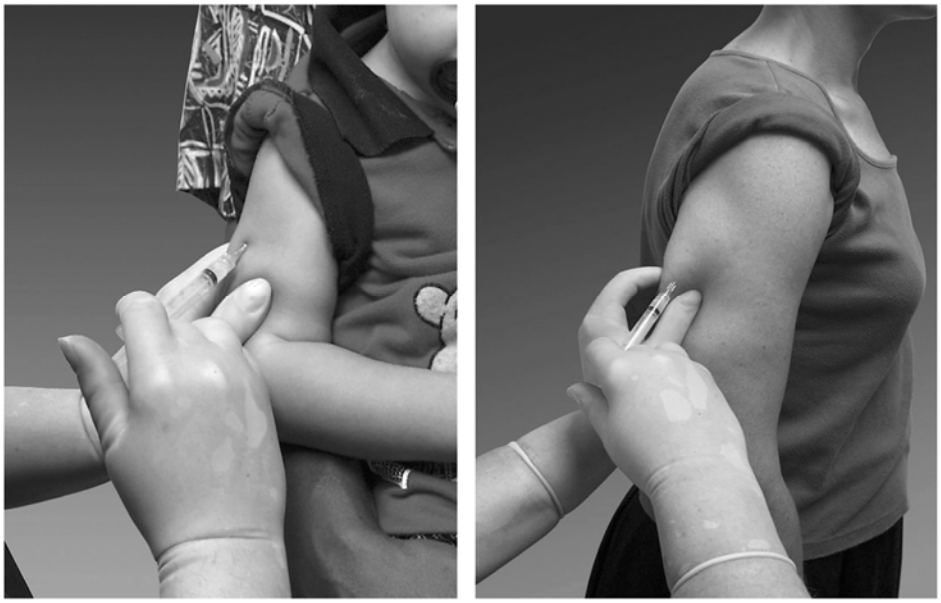
- **Site** - The recommended subcutaneous sites for vaccine administration are the thigh (for infants younger than 12 months of age) and the upper outer triceps of the arm (for persons 12 months of age and older). If necessary, the upper outer triceps area can be used to administer subcutaneous injections to infants.



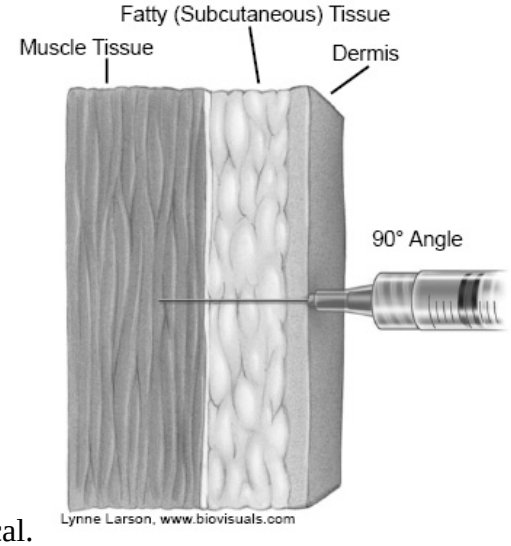
- **Needle Gauge & Length** - 5/8-inch, 23- to 25-gauge needle

- **Technique**
  - Follow standard medication administration guidelines for site assessment/selection and site preparation.
  - To avoid reaching the muscle, pinch up the fatty tissue, insert the needle at a 45° angle and inject the vaccine into the tissue.

- Withdraw the needle and apply light pressure to the injection site for several seconds with dry cotton ball or gauze.



**Subcutaneous Administration Techniques**

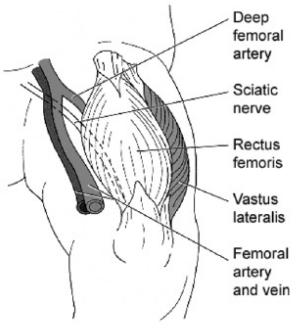



• **Intramuscular (IM) Route**. Intramuscular injections are administered into muscle tissue below the dermis and subcutaneous tissue.

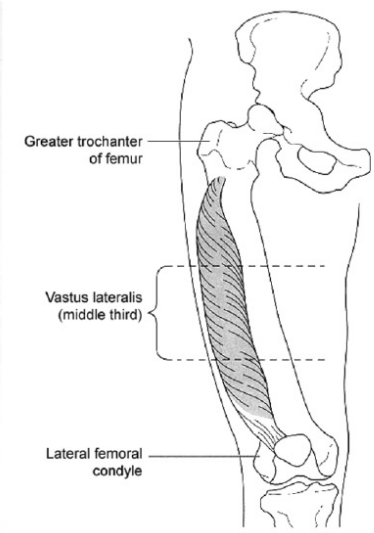
- **Site** - All inactivated vaccines, with the exception of one formulation of meningococcal polysaccharide vaccine (MPSV4), are administered by the intramuscular route. Many inactivated vaccines contain an adjuvant, which is a vaccine component that enhances the immune response to the antigen. Adjuvants can cause an exaggerated local reaction (e.g., pain, swelling, redness) if not injected into the muscle, so proper technique is critical.

There are only two routinely recommended IM sites for administration of vaccines, the vastus lateralis muscle (anterolateral thigh) and the deltoid muscle (upper arm). Injection at these sites reduces the chance of involving neural or vascular structures. The site depends on the age of the individual and the degree of muscle development.

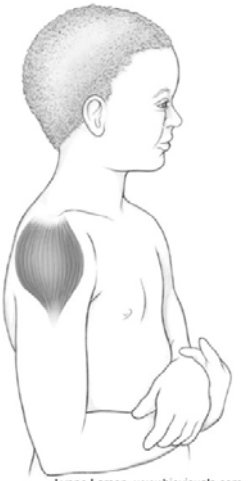
Because there are no large blood vessels in the recommended sites, aspiration before injection of vaccines (i.e., pulling back on the syringe plunger after needle insertion but before injection) is not necessary. A study published in *Archives of Disease in Childhood* in 2007 found that when a vaccine was administered and the needle was withdrawn rapidly without aspiration there was less evidence of pain than when the vaccine was injected and withdrawn slowly with aspiration. Also, some safety-engineered syringes do not allow for aspiration.

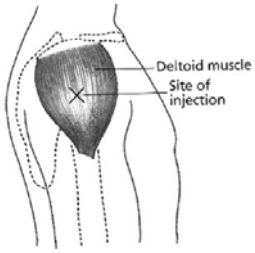



The vastus lateralis muscle of the upper thigh used for intramuscular injections.




The vastus lateralis site of the right thigh, used for an intramuscular injection.




- **Needle Gauge** - 22- to 25-gauge needle

- **Needle Length** - The needle should be long enough to reach the muscle mass and prevent vaccine from seeping into subcutaneous tissue, but not so long as to involve underlying nerves, blood vessels, or bone. The vaccinator should be familiar with the anatomy of the area into which the vaccine will be injected.

Decisions on needle size and site of injection must be made for each person on the basis of the size of the muscle, the thickness of adipose tissue at the injection site, the volume of the material to be administered, and injection technique.

***- Infants (Younger Than 12 Months)***

For the majority of infants, the anterolateral aspect of the thigh is the recommended site for injection because it provides a large muscle mass. The muscles of the buttock are not used for administration of vaccines in infants and children because of concern about potential injury to the sciatic nerve, which is well documented after injection of antimicrobial agents into the buttock. If the gluteal muscle must be used, care should be taken to define the anatomic landmarks.*

Injection technique is the most important parameter to ensure efficient intramuscular vaccine delivery. If the subcutaneous and muscle tissue are bunched to minimize the chance of striking bone, a 1-inch needle is required to ensure intramuscular administration in infants aged 1 month and older. For the majority of infants, a 1-inch, 22-25-gauge needle is sufficient to penetrate muscle in an infant's thigh. For neonates (first 28 days of life) and preterm infants, a 5/8 inch needle usually is adequate if the skin is stretched flat between thumb and forefinger and the needle inserted at a 90-degree angle to the skin.

*If the gluteal muscle is chosen, injection should be administered lateral and superior to a line between the posterior superior iliac spine and the greater trochanter or in the ventrogluteal site, the center of a triangle bounded by the anterior superior iliac spine, the tubercle of the iliac crest, and the upper border of the greater trochanter.

***- Toddlers (12 Months through 2 Years)***

For toddlers, the vastus lateralis muscle in the anterolateral thigh is preferred. The needle should be at least 1-inch long. The deltoid muscle can be used if the muscle mass is adequate. A 5/8-inch needle is adequate only for the deltoid muscle and only if the skin is stretched flat between thumb and forefinger and the needle inserted at a 90° angle to the skin.

**- Children/*Adolescents (3 through 18 Years)***

The deltoid muscle is preferred for children aged 3 through 18 years of age. The needle size for deltoid injections can range from 22-25 gauge and from 5/8- to 1-inch, depending on technique. Most young children in this age range require a 5/8- or 1-inch needle. In general, older children and adolescents require a 1-inch needle. One study found that obese adolescents may need a 1½-inch needle in order to reach muscle tissue. If there is any doubt, knowledge of body mass may be helpful in estimating the appropriate needle length. The vastus lateralis muscle in the anterolateral thigh is an alternative site if the deltoid sites cannot be used. A 1- or 1¼-inch needle will be sufficient to reach muscle tissue in most older children and adolescents.

***- Adults (19 Years and Older)***

For adults, the deltoid muscle is recommended for routine intramuscular vaccinations. The anterolateral thigh also can be used. For men and women weighing less than 130 lbs (60 kg) a 5/8- to 1-inch needle is sufficient to ensure intramuscular injection into the deltoid

muscle if a 90-degree angle is used and the tissue is not bunched. For men and women who weigh 130-152 lbs (60-70 kg), a 1-inch needle is sufficient. For women who weigh 152-200 lbs (70-90 kg) and men who weigh 152-260 lbs (70-118 kg), a 1- to 1½-inch needle is recommended. For women who weigh more than 200 lbs (more than 90 kg) or men who weigh more than 260 lbs (more than 118 kg), a 1½-inch needle is recommended. As with adolescents, the vastus lateralis muscle in the anterolateral thigh is an alternative site if the deltoid sites cannot be used.

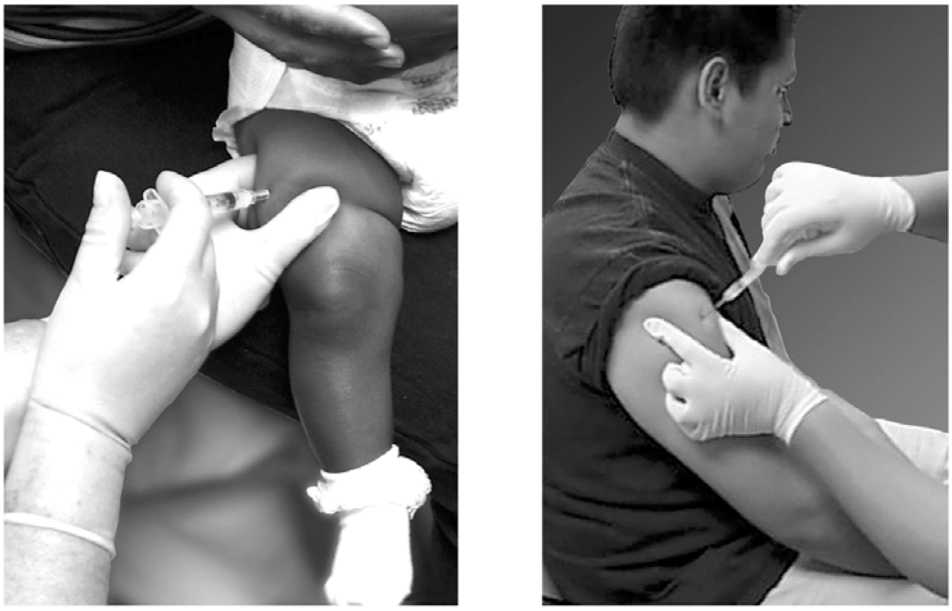
- **Technique**

  - Follow standard medication administration guidelines for site assessment/selection and site preparation.

  - To avoid injection into subcutaneous tissue, spread the skin of the selected vaccine administration 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 the vaccine into the tissue.

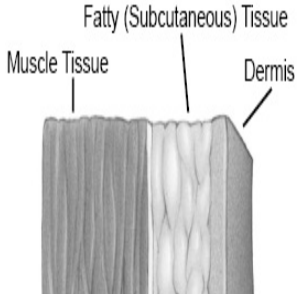
  - Withdraw the needle and apply light pressure to the injection site for several seconds with a dry cotton ball or gauze.



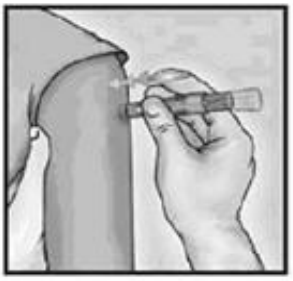
**Intramuscular Administration Techniques**

Also see the following job aids:
"Injectable Vaccine Administration Table for Children Birth-6 Years" at
www.michigan.gov/documents/mdch/3Inject_VA_Table_Children_Birth_6_121809_v2_RF_306160_7.pdf
"Injectable Vaccine Administration Table for Children 7-18 Years" at
www.michigan.gov/documents/mdch/36Injectable_Vaccine_Administration_for_Children_7_18AimKit2010_322030_7.pdf

"Tips for Immunizing Pre-Teens and Adolescents" at
www.michigan.gov/documents/mdch/6._TipsForImmunizingAdolescents_344993_7.pdf
"Injectable Vaccine Administration for Adults" at
www.michigan.gov/documents/mdch/17InjectTableAdult_121207_233733_7.pdf
"Anatomic Sites for Administration" at www.eziz.org/assets/docs/IMM-685.pdf




• **Intradermal (ID) Route**. Fluzone Intradermal is the only U.S.-licensed vaccine that is administered by the intradermal route. It is approved only for use in persons 18 through 64 years of age. This Fluzone formulation is not the same as intramuscular formulations of inactivated influenza vaccine (TIV). Other TIV formulations should NOT be administered by the intradermal route.



- **Site** - The site of administration is the deltoid region of the upper arm. The patient should be seated with the arm bent at the elbow and the hand on the hip to ensure that the site of administration is prominent.

- **Needle Gauge and Length** - A manufacturer prefilled microinjection syringe is used to administer a 0.1 mL dose into the dermal layer of the skin. The syringe contains a 30-gauge, 1.5 milliliter microneedle.

- **Technique**

The syringe should be gently shaken before the needle cap is removed. Hold the syringe between the thumb and the middle finger. Using a short quick motion insert the needle perpendicular to the skin into the deltoid region of the upper arm. Push on the plunger with the index finger without aspirating. Because the needle is very short the vaccine will be delivered just under the skin into the dermal layer. This vaccine should NOT be administered into the volar aspect of the forearm or by the intradermal technique used to administer a tuberculin skin test.


After the vaccine is delivered, remove the syringe and point it away from anyone. Push firmly on the plunger with the thumb until a click is heard. A protective shield will cover the needle and the syringe can be disposed of in a sharps container.

## Special Situations

• **Multiple Vaccinations** - If multiple vaccines are administered at a single visit, administration of each preparation at a different anatomic site is desirable. For infants and younger children, if more than two vaccines are injected in a single limb, the thigh is the preferred site because of the greater muscle mass. For older children and adults, the deltoid muscle can be used for more than one intramuscular injection. The injection sites should be separated by 1 inch or more, if possible, so that any local reactions can be differentiated. Vaccines that are the most reactive (e.g., tetanus-containing and PCV) should be administered in different limbs if possible. Use of combination vaccines can reduce the number of injections.
(See "Giving All Doses to Children Under 12 Months of Age" at www.aimtoolkit.org/children/immun/9_Giving_all_doses_under_12_mths.pdf; "Giving All Doses 12 Months of Age and Older" at www.aimtoolkit.org/children/immun/10_Giving_all_the_doses_12_mths.pdf; and "Giving All Doses 11-12 Years of Age" at www.aimtoolkit.org/adolescents/immun/Giving_All_the_Doses_011811.pdf

If a vaccine and an immune globulin preparation are administered simultaneously (e.g., Td/Tdap and tetanus immune globulin [TIG] or hepatitis B vaccine and hepatitis B immune globulin [HBIG]), separate anatomic sites should be used.

The location of all injection sites should be documented in the patient's medical record. Healthcare practices should consider using a vaccination site map so that all persons administering vaccines routinely use the same anatomic site for each different vaccine.

• **Vaccinating Persons with Bleeding Disorders** - Individuals with a bleeding disorder or who are receiving anticoagulant therapy may develop hematomas in IM injection sites. When any intramuscularly administered vaccine is indicated for a patient with a bleeding disorder, the vaccine should be administered intramuscularly if a physician familiar with the patient's bleeding risk determines that the vaccine can be administered by this route with reasonable safety. Prior to administration of IM vaccines the patient or family should be instructed about the risk of hematoma formation from the injection. If the patient periodically receives antihemophilia or similar therapy, IM vaccine administration should be scheduled shortly after such therapy is administered. A 23-gauge or finer needle should be used and firm pressure applied to the site for at least 2 minutes after injection. The site should not be rubbed or massaged. Patients receiving anticoagulation therapy presumably have the same bleeding risk as patients with clotting factor disorders and providers should follow the same guidelines for intramuscular administration.

• **Nonstandard Administration** - CDC discourages deviating from the recommended route, site, dosage, or number of doses for any vaccine. Deviation can result in reduced protection and increase the risk of an exaggerated local reaction. For certain vaccines, the ACIP recommends revaccination if a nonstandard route or site is used.

Larger than recommended dosages can be hazardous because of excessive local or systemic concentrations of antigens or other vaccine constituents deposited into the tissue.

Administering volumes smaller than recommended (e.g., inappropriately divided doses) might result in inadequate protection. Using reduced doses administered at multiple vaccination visits that equal a full dose or using smaller divided doses is not recommended. In addition, some vaccines (e.g., TIV, hep B, hep A) require different dosages (amount) based on the patient's age. Any vaccination using less than the standard dose should not be counted, and the person should be revaccinated according to age unless serologic testing indicates that an adequate response has developed. If a partial dose of a parenteral vaccine is administered because the syringe or needle leaks or the patient jerks away, the dose should be repeated.

Hepatitis B vaccine administered by any route other than the intramuscular route, or in adults at any site other than the deltoid or anterolateral thigh, should not be counted as valid and should be repeated. Doses of rabies vaccine administered in the gluteal site should not be counted as valid doses and should be repeated. All vaccines should be administered by the manufacturer's recommended route, but there are no ACIP recommendations to repeat doses of other vaccines administered by another route. (See ACIP General Recommendations for more detail).

• **Managing Acute Vaccine Reactions -** Severe, life-threatening anaphylactic reactions following vaccination are rare. Thorough screening for contraindications and precautions prior to vaccination can often prevent reactions. Staff must have in place and be familiar with procedures for managing a reaction. Staff should be familiar with the signs and symptoms of anaphylaxis because they usually begin within minutes of vaccination. These signs and symptoms can include, but are not limited to: flushing, facial edema, urticaria, itching, swelling of the mouth or throat, wheezing, and difficulty breathing. Each staff member should know their role in the event of an emergency and all vaccination providers should be certified in cardiopulmonary resuscitation (CPR). Epinephrine and equipment for maintaining an airway should be available for immediate use. Additional drugs may also be used (see ACIP General Recommendations, Table 8 for more detailed information). After the patient is stabilized, arrangements should be made for immediate transfer to an emergency facility for additional evaluation and treatment. (See "Medical Management of Vaccine Reactions in Children and Teens" at http://www.immunize.org/catg.d/p3082a.pdf and "Medical Management of Vaccine Reactions in Adult Patients" at http://www.immunize.org/catg.d/p3082.pdf.

## Documentation

All vaccines administered should be fully documented in the patient's permanent medical record. Healthcare providers who administer vaccines covered by the National Childhood Vaccine Injury Act are required to ensure that the permanent medical record of the recipient indicates:

1) date of administration
2) vaccine manufacturer
3) vaccine lot number
4) name and title of the person who administered the vaccine and the address of the facility where the permanent record will reside
5) vaccine information statement (VIS)
   a. date printed on the VIS
   b. date VIS given to patient or parent/guardian

Best practice documentation guidelines for medications also include the vaccine type (ACIP list of U.S. vaccine abbreviations, www.cdc.gov/vaccines/recs/acip/vac-abbrev.htm), route, dosage, and site. Accurate documentation can help prevent administration errors and curtail the number and costs of excess vaccine doses administered. Providers also should update patients' permanent medical records to reflect any documented episodes of adverse events after vaccination and any serologic test results related to vaccine-preventable diseases (e.g., those for rubella screening and antibody to hepatitis B surface antigen). Participation in immunization information systems is encouraged. (See additional documentation resources at www.immunize.org/handouts/document-vaccines.asp ) The patient or parent/guardian should be provided with an immunization record that includes the vaccines administered, including the dates of administration. It is also important to document when parents refuse vaccines. The American Academy of Pediatrics and other organizations have developed forms to document when vaccines are refused. (See "Documenting Parental Refusal to Have Their Children Vaccinated" at www.aap.org/immunization/pediatricians/pdf/RefusaltoVaccinate.pdf)

## Strategies to Prevent Administration Errors

Vaccine administration errors can result in a patient receiving an ineffective immunization. This can leave the person vulnerable to infection. In addition to strict adherence to the "Rights of Medication Administration" and ongoing training and education of staff, listed below are other strategies that can be implemented to help prevent administration errors.

When possible, involve staff in the selection of vaccine products to be used in your facility. Different brands of the same vaccine can have different schedules, age indications, or other indications. Stocking multiple brands might lead to staff confusion and vaccine administration errors.

Keep current reference materials available for staff on each vaccine used in your facility. Keep reference sheets for timing and spacing, recommended sites, routes, and needle lengths posted for easy reference in your medication preparation area.

Rotate vaccines so that those with the shortest expiration dates are in the front of the storage unit. Use these first and frequently check the storage unit to remove any expired vaccine.

Consider the potential for product mix-ups when storing vaccines. Do not store sound-alike and look-alike vaccines next to each other (e.g., DTaP and Tdap). Consider color coding labels on vaccine storage containers and/or including the vaccine type and age indications.

Administer only vaccines that you have prepared for administration. **Triple check** your work before you administer a vaccine and ask other staff to do the same.

Counsel parents and patients about vaccines to be administered and on how important it is for them to maintain immunization records on all family members. Educated clients may notice a potential error and help prevent it.

The California Department of Health Services' Immunization Branch
has developed a complete package of resources on vaccine administration, available at
www.eziz.org/pages/vaccineadmin.html.
A DVD, "Immunization Techniques: Best Practices with Infants, Children, and Adults"
is also available for order at www.immunize.org/shop/toolkit_iztechdvd.asp.