

Step 5: Administering Vaccines

Now you've got your supplies and your properly stored vaccine inventory. You are starting to assess your patients' vaccination status and history. The gaps in their records—and memories—are reminding you just why your practice is now incorporating vaccination services. It's time to administer vaccine. Remember, adults might ask more questions about the vaccination process than pediatric patients, but luckily they probably won't shriek and they probably will sit still! Chances are, they are behind on their vaccinations and they are grateful that you are helping them get up to date. Don't be intimidated; even if you are new at giving shots, this will soon be second nature to you. Actually, the hardest part may not be technical—it may be getting patients back into your office at the right times for second and third doses of vaccines given in a series.

Step-by-Step Vaccine Administration Tasks

- Always provide a Vaccine Information Statement (VIS)
- Give the vaccine properly
 - Use the proper site of injection
 - Examine and prepare the vaccine (and diluent)
 - Use the proper needle gauge and length
 - Load the syringe with vaccine
 - Give injections by the correct route – IM or SC
 - Give all needed vaccines at the same visit
 - Safely dispose of the needle and syringe
- Prepare and watch for an allergic reaction (anaphylaxis)
 - Always report anaphylaxis
- Communicate about appointments for subsequent doses
 - Understand proper spacing of doses

Always provide a Vaccine Information Statement (VIS)

Since 1994, health care providers who administer any vaccine covered by the National Childhood Vaccine Injury Act (Section 2125 of the Public Health Service Act [42 U.S.C. §300aa-26]) are required to provide a copy of the relevant federal Vaccine Information Statement (VIS) *before* administering certain vaccines to infants, children, and adults. You will probably want to give patients even more information on the disease that the vaccine prevents, but this is the bare minimum required. You can learn more about this federal requirement in “Step 6. Documenting and Related Issues” on pages 61–63.

Give the vaccine properly

Remember, if you don’t give it properly, you might as well not give a vaccine injection at all. You’ve gone to a lot of trouble to keep your vaccine “viable,” and your patients need this protection, so what a waste it would be for the vaccine not to get where it is supposed to go. And that happens. We know of one clinic that tested a group of vaccinated people for hepatitis B seroconversion and found that none of them had developed immunity. The most likely reason was found to be improper

Materials for you to use

- How to Administer IM and SC Injections to Adults (58)
- Immunization Techniques: Safe, Effective, Caring (video), Presenter’s Notes, and Skills Checklist (all supplied with this guide)
- Administering Vaccines to Adults: Dose, Route, Site, Needle Size, and Preparation (59)
- Vaccination for Adults—You’re Never Too Old to Get Shots! (109)
- Summary of Recommendations for Adult Immunization (42–43)

administration. Too short a needle was being used (an “SC” needle, as you will soon learn), and the vaccine was going into fat instead of into muscle. (You may hear that some vaccines will usually still work if given via the wrong route, and will merely cause more temporary local discomfort. That may be true for some—but for others, such as hepatitis B and hepatitis A vaccines, the correct route is essential to obtaining an adequate immune response.)

Please note that in this guide, we will not be dealing with oral vaccines nor the details of the live, intranasal influenza vaccine. Needle-free jet technologies have been developed for vaccinations, but at this point, almost all vaccines are still given as “shots.”

After you read through this chapter, watch the enclosed video “Immunization Techniques: Safe, Effective, Caring” and read the video presenter’s notes accompanying the video. These materials reinforce and build upon what you will learn below. Unlike our adults-only text, the video covers infant and child injections as well as adult injections. This will give you an idea of the differences, as well as the similarities, involved. It will remind you that it really is simpler to vaccinate adults only.

Use the proper site of injection

For adult vaccinations, all you need to give an injection is the patient’s upper arm. (For infant vaccinations, thighs are generally used as injection sites.) Vaccine injections are either intramuscular (IM) or subcutaneous (SC). If you are giving an intramuscular injection, you will inject directly into the deltoid muscle, below the shoulder on the upper arm (see photo on page 51). If you are giving a subcutaneous injection, you will inject directly into the fatty tissue (under the skin and overlying the

muscle) on the back of the upper arm (see photo on page 52). In either case, expose the entire area of the upper arm so that sleeves do not obstruct the injection. Wipe the injection area with an alcohol swab to clean away skin dirt (this prevents the needle from dragging skin dirt into the tissue), using an outward spiraling motion in an imaginary circle from the center to a two- or three-inch diameter.

You may wear gloves, but gloving is not required for giving injections. Please note that, although the patient in our photo showing an SC injection is standing, it's best to have patients sit. Occasionally, a patient may feel faint at the sight of a needle or during an injection, and if the patient is sitting instead of standing, you will lessen the chance of the patient falling.

Examine and prepare the vaccine (and diluent)

Before you can withdraw the vaccine into a syringe, you'll need to shake the vial vigorously and visually inspect it for particulate matter. If it cannot be shaken into a relatively even suspension (i.e., it will not disperse), it should not be used. This is one more way to give assurance that the vaccine hasn't been exposed to improper storage conditions.

If you are giving an MMR, varicella, or meningococcal vaccination, you will need to reconstitute the vaccine with the diluent provided by the vaccine manufacturer (see "Administering Vaccines to Adults: Dose, Route, Site, Needle Size, and Preparation" on page 59). Do not substitute saline, sterile water, or any other liquid! Use only the diluent provided with the vaccine you are preparing.

- Start by wiping the rubber stoppers of the diluent and

vaccine vials with an alcohol swab.

- Then draw up the diluent into the syringe barrel.
- Next, inject the diluent directly into the vaccine vial and mix by manually rotating the vaccine vial or shaking gently.
- If the appearance matches the description of the reconstituted vaccine, then, using the same needle, draw up the reconstituted vaccine from the vial.

Please note: Pre-filling your syringes yourself—whether the vaccine is reconstituted or not—is not recommended. Prepare and draw up vaccine only when you are going to administer it.

Use the proper needle gauge and length

Again, for adults, this is pretty straightforward: an intramuscular injection calls for a longer needle than a subcutaneous injection. Once you know if an injection is supposed to be IM or SC, you pretty much know what length and gauge needle you need.

For almost all IM injections with almost all adults, you will need a 1"–2", 22–25 gauge needle. If a patient is particularly large, you may need to use a 2" needle.

For SC injections, you will need a 5/8"–3/4" needle, 23–25 gauge.

Load the syringe with vaccine

Vaccine vials are labeled with the number of doses they contain (e.g., a 10-dose vial contains 10 doses). Single-dose vials are most widely used. Manufacturers may also have pre-filled syringes available, instead of vials, in which case you can skip

ahead to the section on giving injections. If you are going to use vaccine from a multidose vial, draw (think of “withdraw”) just the required amount for the dose into the syringe, using the following proper syringe-loading technique (also see the “Immunization Techniques” video provided with this guide for an excellent point-by-point demonstration!).

First, you should always double check the vial label to make sure you have the specific vaccine you want to administer. If you are using a multidose vial, you will need to inject air into the vial—the same volume of air as the dose of vaccine to be drawn, for instance, a half cc—to equalize pressure in the vial once the dose has been removed. To inject air into a multidose vial, hold the vaccine vial right side up, wipe the rubber stopper with an alcohol swab, pull back on the plunger of your syringe to the amount of vaccine you are going to withdraw, insert the needle into the center of the rubber stopper, and push on the plunger. Then invert (turn upside-down) the vial, holding the syringe, and draw the required amount of vaccine into the barrel of the syringe. In a multidose vial, slightly overfill the syringe with vaccine and, while keeping the needle inserted in the inverted vial, gently tap the syringe so the bubbles move to the tip of the syringe barrel. Then, push out all air bubbles and vaccine until the volume in the syringe measures exactly what is needed (e.g., 0.5 cc). Careful filling of the syringe will prevent vaccine wastage and enable you to use all the doses contained in the multidose vial. When the syringe is filled with the right amount of vaccine and all air bubbles are tapped into the vial, continue to hold the syringe pointed upward (still inserted in the vial). Then withdraw the needle from the vial and recap the needle. This is the only time you can safely recap a needle—before it has been used on a patient.

If you are preparing more than one vaccine for a patient, be sure

to label which syringe contains which vaccine. As you will see in the “Immunization Techniques” video, a simple way to label the vaccines is to use a silverware tray with permanently labeled separate “slots” for Td, influenza, hepatitis B, and other vaccine syringes. Or, keep small sticky labels on hand (these can be preprinted) with vaccine names, and attach the appropriate vaccine label to the syringe containing that vaccine.

Give injections by the correct route – IM or SC

There are several reasons for differentiating between IM and SC injections. SC doses are absorbed more slowly than IM doses. If you give an IM vaccine SC by mistake, the antibody “titers” that result may be much lower than they otherwise would be, and the injection may also be more painful. Some vaccines that have “adjuvants” in them (ingredients that enhance the immune response to the antigens) must be given IM to avoid the local irritation, inflammation, or other reactions that can occur if they are administered SC. For our purposes here, the important thing to remember is that the type of injection matters. It is not arbitrary.

IM in deltoid



90° angle
1" or longer needle

Intramuscular Injections

Intramuscular injections go into the deltoid, which is a large triangular muscle that wraps over the shoulder into the upper arm—for injecting, we use the part of the deltoid just below the shoulder but above armpit-level in the upper arm. It seems like a large “target,” but care must be taken not to hit the underlying bone, blood vessels, and nerves. (You need to watch someone experienced doing this before you attempt it.)

Grasp the muscle between the thumb and fingers of your noninjecting hand. The needle should then be inserted perpendicularly (that is, at a 90-degree angle) into the thickest part of the muscle. Insertion should be quick yet firm and steady. After the needle is inserted (usually all the way down to the hub of the syringe), depress the plunger slowly so that the muscle can absorb the fluid.

Vaccines that you will give IM are:

- Hepatitis A
- Hepatitis B
- Td
- Influenza, inactivated
- Pneumococcal polysaccharide (can also be given SC)

For IM injection technique review, see the chart on page 58.

Subcutaneous Injections

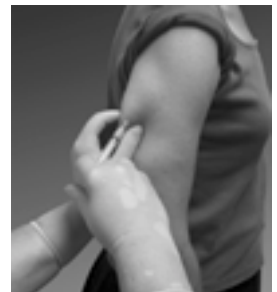
To administer a vaccine with a subcutaneous injection, you want to “pinch up” the subcutaneous tissue on the back of the upper arm with your noninjecting hand and inject the needle at a 45-degree angle—a much narrower angle than that for an IM injection.

Vaccines that you will give SC are:

- MMR
- Varicella
- Meningococcal
- Pneumococcal polysaccharide (can also be given IM)

For SC injection technique review, see the chart on page 58.

SC in outer arm



45° angle
5/8" needle

Give all needed vaccines at the same visit

All you have to do is look at a vaccine schedule (see pages 42–43) to realize that it is complicated. Several factors make it complicated. Some vaccines (usually inactivated ones) require more than one or two doses to create the proper immune response in an individual. Also, in some cases, if you are giving two different live attenuated vaccines, they must either be administered on the same day or be separately administered at least 4 weeks apart in order to reduce immune response interference. For your adult population, the most common combination of two live vaccines would be varicella and MMR, in which case you need to take extra care in “dose spacing.” It’s always best to give MMR and varicella vaccines at the same visit, but if for some reason this is not possible, space them at least 4 weeks apart.

Administration of doses of multiple vaccines at a single visit does not result in decreased antibody responses or increased reactions. In fact, simultaneous administration is encouraged because it is convenient and efficient for both patient and practitioner.

For scheduling purposes, this means that if you have decided to give a patient two different vaccines—perhaps influenza and hepatitis B—you can go ahead and administer both on the first visit, and then give the other two doses of hepatitis B vaccine at the proper intervals later. If you are going to give a patient three different vaccines—perhaps influenza, hepatitis B vaccine, and varicella vaccine—you can give all at the first visit, hepatitis B and varicella at the second visit 4 weeks later, and just hepatitis B at the third visit 4 to 6 months after the first.

But how should you physically administer more than one injec-

tion per visit? If you are giving just two injections, the patient may prefer one in each arm. If you are giving three or more injections, you will need to give the patient at least two in the same area. The distance between IM injection sites in the same extremity should be at least 1 inch apart. When administering Td, you may want to give it in an arm by itself because it is known to cause more soreness and swelling than other vaccines.

Some clinics use “site maps” to routinize specific vaccination location sites on their patients. Use of a site map can simplify the process of administering vaccines by reducing on-the-spot decision-making, and it can also make treating localized reactions easier because you will know exactly where you injected each vaccine. It creates consistency within your clinic practice and assists you in documenting the site of administration along with the vaccine and dose in your patient’s chart. See the example of an adult site map on page 92 in Appendix A.

Two different SC injections can be given in opposite arms unless the patient wants both in the same one. In that case, the SC injections also should be at least 1 inch apart from each other.

Safely dispose of the needle and syringe

After you have administered vaccine via an injection, remove the needle in a smooth motion at the same angle at which you inserted it. Do not recap the needle after use. Then discard the uncapped used needle, still attached to the syringe, into a sharps container, keeping your eyes on the needle continuously until it is inside the container. This is part of OSHA occupational safety protocol; needlestick injuries are serious, and they are easily avoided.

Apply pressure to the injection site with a cotton ball and put an adhesive bandage over it if blood is present.

Consult with your local health department or your organization's waste disposal service regarding the frequency of pick-up and replacement of the sharps container.

Prepare and watch for an allergic reaction (anaphylaxis)

Some localized itching and/or redness following any injection is perfectly normal and should not cause alarm. And live attenuated vaccines sometimes are followed by systemic symptoms a week or two after vaccination such as generalized mild rash or low-grade fever. What must be treated promptly is an acute allergic reaction (anaphylaxis) caused by a vaccine.

Thorough screening usually prevents allergic reactions to vaccine components. If a person is known to be severely allergic to eggs (e.g., a contraindication to influenza vaccine) or baker's yeast (e.g., a contraindication to hepatitis B vaccine), these vaccines should not be administered. Acute anaphylactic reactions are extremely rare, occurring after approximately 1 out of every 500,000 doses of vaccine. When they do occur, however, you have to take immediate action. Anaphylaxis can be life-threatening. No vaccine should ever be administered if epinephrine and the other emergency supplies listed on the checklist found on page 75 are not on hand and if staff are not familiar with the anaphylaxis protocol as described on page 85 in Appendix A and with cardiopulmonary resuscitation (CPR). There are not a lot of steps involved, but the situation demands a trained, prepared response.

After you have administered any vaccine to a patient, instruct the patient to report any itching, redness (with or without hives), difficulty breathing, or abdominal pain within several minutes of the injection. Having the patient wait for 20 minutes in a special postvaccination area is sometimes suggested, but it is not officially recommended. Usually, severe reactions happen within minutes.

Always report anaphylaxis

Anaphylaxis, any event listed on the “VAERS Table of Reportable Events Following Vaccination” (page 97), or any other adverse event requiring medical attention within 30 days after receipt of a vaccine must be reported to the Vaccine Adverse Events Reporting System (VAERS), a requirement of the National Vaccine Injury Compensation Program. It is not necessary for you to be certain that the event was related to the vaccination in order to report it. There is more information on VAERS on pages 64–65 and a copy of the VAERS reporting form is on pages 98–99.

Communicate about appointments for subsequent doses

Don't forget to schedule the patient's next appointment if subsequent doses of a series are indicated! Give the patient a personal vaccination record (use IAC's wallet-sized cards, for example) and record the dose(s) given and date(s) the patient should return for subsequent doses. And while you are at it, be sure to give your patient a copy of “Vaccinations for Adults . . . You're Never Too Old to Get Shots!” on page 109. This handout will give them basic information about other vaccinations they might still need now or in the future—and when.

Understand proper spacing of doses

For the most current guidelines on vaccine dose intervals, see the “schedule” column of IAC’s “Summary of Recommendations for Adult Immunization” on pages 42–43. Remember that increasing the interval between doses in a 2-dose or 3-dose series will not diminish the effectiveness of the vaccine. It may, however, delay protection against disease. You need not start a series over if a delay has occurred. It is more serious to decrease the interval for patient scheduling convenience. This could prevent a full antibody response from occurring. But one dose is better than no dose, so even if you fear that a patient will not return for a second or third dose, go ahead and give that first one. It will provide some protection.

This guide does not cover intervals between vaccines and immune globulin preparations or other immunobiologics. Once again, our purpose is to teach relatively new vaccinators the fundamentals of (a) routine preventive vaccination for all healthy adults ages 19–64 and 65 and up and (b) targeted preventive vaccination for those younger and middle-aged adults at high risk for certain vaccine-preventable diseases.

To review the basics of vaccine administration covered in this text and in the “Immunization Techniques” video, make a copy of the “Skills Checklist for Immunization” that is included inside the Video Presenter’s Notes and fill out the self-assessment section. Note that supervisors can use the two-page checklist to help assure that staff are fully trained in providing immunizations.

To access the current, ready-to-copy version of this piece, visit
www.immunize.org/catg.d/p2020A.pdf

How to Administer IM and SC Injections to Adults

For Intramuscular (IM) Injections

Vaccines administered via IM route:

Tetanus-diphtheria (Td), hepatitis A, hepatitis B, and inactivated influenza are given IM. PPV23 may be given either IM or SC.

Injection site:

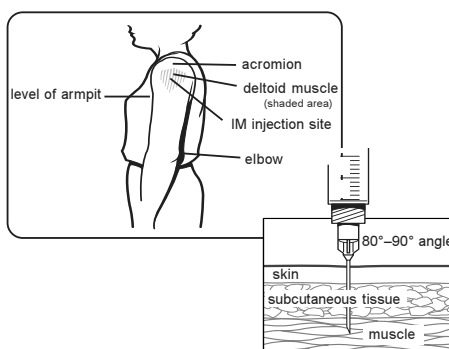
Give in the thickest and central portion of the deltoid—above the level of the armpit and below the acromion (see the diagram).

Needle size:

22–25 gauge, 1" to 1-1/2" needle

Needle insertion:

- Use a needle long enough to reach deep into the muscle.
- Insert the needle at an 80°–90° angle to the skin with a quick thrust.
- Two injections given in the same deltoid muscle should be separated by a minimum of 1", if possible.



For Subcutaneous (SC) Injections

Vaccines administered via SC route:

MMR, varicella, and meningococcal vaccines are given SC. PPV23 may be given either SC or IM.

Injection site:

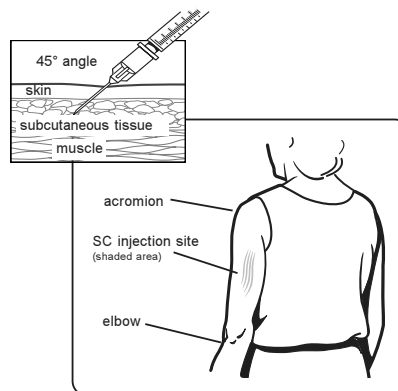
Posterolateral aspect of upper arm

Needle size:

23–25 gauge, 5/8" needle

Needle insertion:

- Pinch up on the tissue to prevent injection into muscle. Insert the needle at a 45° angle to the skin.
- Two injections given in the same area of fatty tissue should be given a minimum of 1" apart.



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Administering Vaccines to Adults: Dose, Route, Site, Needle Size, and Preparation

Vaccine	Dose	Route	Site	Needle Size	Vaccine Preparation	
Tetanus-diphtheria (Td)	0.5 mL	IM	Deltoid	22–25g, 1–2"	Shake vial vigorously to obtain a uniform suspension prior to withdrawing each dose. Inspect vaccine visually for particulate matter and/or discoloration prior to administration (whenever solution and container permit). If problems are noted (e.g., vaccine cannot be resuspended), the vaccine should not be administered.	
Hepatitis A (HepA)	≤18 yrs.: 0.5 mL ≥19 yrs.: 1.0 mL	IM	Deltoid	22–25g, 1–2"		
Hepatitis B (HepB)	≤19 yrs.: 0.5 mL ≥20 yrs.: 1.0 mL	IM	Deltoid	22–25g, 1–2"		
HepA + HepB (Twinrix)	≥18 yrs.: 1.0 mL	IM	Deltoid	22–25g, 1–2"		
Influenza, trivalent inactivated (TIV)	0.5 mL	IM	Deltoid	22–25g, 1–2"		
Pneumococcal polysaccharide (PPV)	0.5 mL	IM	Deltoid	22–25g, 1–2"	Reconstitute just before using. Use only the diluent supplied with the vaccine. Inject the volume of the diluent shown on the diluent label into the vial of lyophilized vaccine and agitate to mix thoroughly. Withdraw and administer immediately after reconstitution or store reconstituted vaccine vial at 35–46°F (2–8°C). Note: for reconstituted meningococcal vaccine, use single-dose vial within 30 minutes, use multidose vial within 35 days; for reconstituted MMR vaccine, discard if not used within 8 hours. Do not freeze reconstituted vaccine.	
		SC	Posterolateral upper arm	23–25g, 5/8–3/4"		
Meningococcal (Men)	0.5 mL	SC	Posterolateral upper arm	23–25g, 5/8–3/4"		
Measles, mumps, rubella (MMR)	0.5 mL	SC	Posterolateral upper arm	23–25g, 5/8–3/4"		
Varicella (Var)	0.5 mL	SC	Posterolateral upper arm	23–25g, 5/8–3/4"		
Influenza, live, attenuated (LAIV)	0.5 mL (0.25 mL into each nostril)	Intranasal spray	Intranasal	NA		Consult package insert.

Please note: Always refer to the package insert included with each biologic for complete vaccine administration information. The Advisory Committee on Immunization Practices (ACIP) statement for the particular vaccine should be reviewed as well.

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