

Excerpt from "The Immunization Encounter: Critical Issues"  
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#### Vaccine Administration Segment

ATKINSON:

Appropriate vaccine administration is critical to vaccine effectiveness. The recommended site, route and dosage for each vaccine are based on clinical trials, practical experience and theoretical considerations. Vaccines may not protect your patient if they are administered incorrectly. If the wrong site or needle length is used to administer a vaccine, there may be an increased risk of a local adverse reaction. So an education plan that includes competency based training on vaccine administration should be considered for everyone in your office who administers vaccines. Judy, will you get us started with some vaccine administration fundamentals?

SCHMIDT:

Thanks, Bill. Delivering vaccine into the appropriate tissue promotes optimal antibody response to a vaccine and reduces the risk of local adverse reactions. So let's talk a little more about route, site and needle length.

This is a list of vaccines that should be administered by the subcutaneous route. Those vaccines are anthrax; inactivated polio; Japanese encephalitis; measles, mumps and rubella-containing vaccines; meningococcal; pneumococcal polysaccharide; varicella; and yellow fever.

This is a list of vaccines that should be administered by the intramuscular route. Vaccines given IM include diphtheria, tetanus and pertussis-containing vaccines; Haemophilus influenzae type b; hepatitis A; hepatitis B; inactivated polio; influenza; pneumococcal conjugate; pneumococcal polysaccharide; rabies and typhoid Vi.

Inactivated polio and pneumococcal polysaccharide vaccines are listed on both tables because they can be administered by either the subcutaneous route or the intramuscular route. Neither the vaccine manufacturer nor the ACIP recommends one route over the other for either vaccine. With IPV and pneumococcal

polysaccharide, it's the clinician's choice.

Subcutaneous injections are administered into the fatty tissue found below the dermis and above muscle tissue. Subcutaneous tissue is present all over the body. The usual subcutaneous sites for vaccine administration are the thigh and the upper outer triceps of the arm. The upper outer triceps area can be used to administer subcutaneous injections to infants. The recommended needle size for subcutaneous injections in all age groups is a 23- to 25-gauge 5/8 inch needle. A longer needle could penetrate the muscle, particularly if given at an incorrect angle. To avoid reaching the muscle, the fatty tissue is pinched up and the needle is inserted at a 45-degree angle. A more perpendicular approach is used for IM injection.

The majority of vaccines administered by injection are given by the intra muscular route. Incorrect intramuscular technique can reduce vaccine effectiveness and increase local adverse reactions, so proper technique is critical. Intramuscular injections are administered into muscle tissue below the dermis and subcutaneous tissue. The amount of overlying subcutaneous tissue depends on the person and the site. Although there are several IM injection sites on the body, the recommended IM sites for vaccine administration are the vastus lateralis muscle in the antero-lateral thigh and the deltoid muscle in the upper arm. Injection at these sites reduces the chance of involving neural or vascular structures. The site depends on the age of the person and the degree of muscle development. The deltoid muscle is most commonly used in older children and adults. The deltoid muscle can be used in toddlers if the muscle mass is adequate. It's important to use anatomical landmarks to locate the site so that the injection is given into the center of the muscle.

The buttock should NEVER be used to administer vaccines, although it can be used to administer large doses of immune globulin. Injection in the gluteus risks damage to nerve tissue.

The recommended needle for intramuscular injections is 22 to 25 gauge. The needle length must be adequate to reach the muscle and is based on the size of the individual. The recommended needle length for an infant is 7/8 to 1 inch. The recommended needle length for toddlers and older children is a 7/8 to 1 and one-fourth inch. Adults will typically need a 1 to 1 and a half inch needle. To avoid injection into subcutaneous tissue, the skin of the selected site can be spread 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. The needle should be inserted fully into the muscle at a 90-degree angle.

There are a few other issues related to vaccine administration that seem to generate a lot of questions. Donna, could you review these issues?

WEAVER:

Yes, Judy, I will. We do receive a lot of questions about vaccine administration. Many of them concern infection control.

Handwashing is recommended between each patient. When working at a site where it's not feasible to wash your hands before each patient, an alcohol-based waterless antiseptic can be used between patients and in situations where your hands become soiled.

Gloves are not mandatory for vaccine administration unless there is the potential for exposure to blood or body fluids, the person giving the shot has open lesions on the hands, or it is an agency policy. But remember, gloves cannot prevent a needle-stick injury.

In November 2000, to reduce the risk of needle-stick injury and the potential for blood-borne diseases acquired from patients, the Needle-stick Safety and Prevention Act was signed into law. The act directs the Occupational Safety and Health Administration, better known as OSHA, to strengthen its existing bloodborne pathogen standards. Those standards were revised and became effective in April 2001. These federal regulations require use of safer injection devices and documentation of injuries caused by medical sharps. They also require nonmanagerial staff involvement in the evaluation and selection of safer devices before they are purchased. Needle-shielding and needle-free devices that may meet these OSHA requirements for vaccine injections are available and are listed on several websites. We will include these websites on the broadcast resource web page.

Of course, you should never EVER detach, recap or cut a used needle before disposal. All used syringe and needle devices should be placed in puncture proof containers to prevent needle sticks and reuse. Empty or expired vaccine vials are considered infectious medical waste and should be disposed of according to state regulations.

Here are a few more points about vaccine administration. It's not necessary to change the needle between reconstitution or drawing the vaccine and administering it unless the needle is

contaminated or bent. Modern steel needles are not dulled by entry into a vaccine vial.

When administering multiple vaccines, NEVER mix vaccines in the same syringe unless they are approved for mixing by the Food and Drug Administration. Very few vaccines are approved for mixing. Those that are will be packaged together or indicated in the package insert. Use a new syringe and needle to draw up each vaccine to be administered.

If more than one vaccine is to be administered in the same limb, the injection sites should be separated by at least an inch, if possible. This separation allows any local reactions to be differentiated. Vaccines that contain tetanus and diphtheria may cause more soreness than other vaccines, so you may want to give this vaccine alone or in the limb with a subcutaneous injection.

Aspiration is the process of pulling back on the plunger of the syringe prior to injection to ensure that the medication is not injected into a blood vessel. Although this practice is advocated by some experts, and most nurses are taught to aspirate before injection, there is no evidence that this procedure is necessary. If your procedure includes aspiration and blood appears, the needle should be withdrawn, and a new site selected.

Many people, particularly health care providers, claim to have latex allergies. Latex allergy is most often a contact-type allergy. There has only been one published report of an anaphylactic allergic reaction following vaccine administration in a patient with known severe allergy to latex. A person with an anaphylactic allergy to latex should not generally receive vaccines supplied in vials or syringes that contain natural rubber, unless the benefit of vaccination outweighs the risk of an allergic reaction to the vaccine. People with latex allergies that are not anaphylactic allergies, such as contact allergy to latex gloves, can be vaccinated with vaccines supplied in vials or syringes that contain dry natural rubber or natural rubber latex.

With the number of injections that we are giving in immunization practice today, both health care providers and parents are concerned about adequate pain control. Comfort measures and distraction techniques may help children cope with the discomfort associated with vaccination. Remember that pain is a subjective phenomenon influenced by multiple factors including a person's age, anxiety level, previous health care experiences, and culture. A variety of measures ranging from topical anesthetics to diversionary techniques are discussed in both the recently

updated ACIP General Recommendations on Immunization, and a vaccine administration document available on our broadcast resource website. Bill?

ATKINSON:

Donna, just to clarify this issue- does ACIP recommend that providers aspirate or not aspirate before injection?

WEAVER:

Bill, ACIP doesn't recommend anything about aspiration. Without data indicating the need for aspiration, ACIP is basically leaving this decision to the person giving the vaccine.

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