



Chapter 8

Vaccine Administration

8.1 Objectives

- To understand how to prepare vaccines for immunisation
- To understand how to administer vaccines
- To understand what are true contraindications for vaccine administration and describe common false contraindications for vaccine administration
- To identify the correct route of administration
- To identify the correct site of administration of all vaccines for each age group
- To identify the correct needle length
- To understand how to position clients of different ages for safe and effective vaccination
- To learn how to prepare and dispose of vaccines and injecting equipment.

8.2 Vaccine Preparation

Vaccines should be stored in accordance with Cold Chain requirements. Vaccines should not be drawn up in advance of an immunisation session but should be reconstituted and drawn up when required. This ensures that errors in vaccine administration are not made and also maintains vaccine efficacy and stability.

Before administration:

The vaccine's colour and composition must be examined to ensure that it conforms to the description in vaccine's Summary of Product Characteristics (SPCs) as described by the manufacturer. Each vaccine should be checked to ensure the right vaccine is used and the correct dose is drawn up. The expiry date on the vaccine should be checked. ***Vaccines should not be used beyond their expiry date***

Freeze-dried vaccines should be used only with the diluent supplied and used within the specified time as described in the vaccine's SPCs. Some vaccine packs include two needles, one for drawing up and the other for administration. For those without needles included diluent should be drawn up using a green (21G) needle and added slowly to vaccine to avoid frothing. A new needle of a size appropriate to the individual client should be used to inject the vaccine.

8.3 Vaccine administration

Prior to administration of the vaccine the vaccinator should

- Verify the client's name, date of birth and previous vaccination history
- Verify that the client is old enough to have the vaccine that is about to be administered. If a vaccine is administered too early to a client, then vaccination may need to be repeated
- Provide information on the diseases that are being vaccinated against
- Outline the process of vaccination and how to deal with common side effects post immunisation
- Ensure that informed consent for vaccination has been given
- Ensure that there are no contraindications to vaccines being given
- It is best practice to double check the vaccine details. This could be done by checking vaccine name and expiry date with the parent.

8.4 Conditions that are contraindications to immunisation

Anaphylaxis to a previous vaccine or to one of its components.

8.5 Conditions that are NOT contraindications to immunisation

- Family history of any adverse reactions following immunisation
- Minor infections without fever or systemic upset
- Personal or family history of convulsions. Appropriate antipyretic measures are advisable following immunisation of children under 5 years with a history of febrile convulsions
- History of meningitis, pertussis, measles, rubella or mumps infection
- Prematurity or low birth weight
- Stable neurological conditions such as cerebral palsy.
- Contact with an infectious disease
- Treatment with antibiotics
- Asthma, eczema, hay fever migraine and food allergy
- Treatment with antibiotics or locally-acting (e.g. topical or inhaled) steroids
- Child's mother is pregnant
- Child being breast fed
- History of jaundice after birth
- Child over the age recommended in immunisation schedule
- Corticosteroid replacement therapy
- Recent or imminent surgery.

If an individual is acutely unwell immunisation may be postponed

8.6 Route of injection

Vaccines should not be given intravenously. Most vaccines should be given intramuscularly: The exceptions are BCG vaccine which should be given intradermally and varicella and yellow fever vaccine which are for subcutaneous administration.

Intramuscular injections reduce the chance of local reactions and lead to better immune response to the vaccine. Muscle also has a better blood supply resulting in quicker processing of antigens and optimum antibody delivery.

Individuals with a mild bleeding disorder should have firm pressure applied to the injection site for 2-3 minutes to reduce the risk of bleeding. Individuals with more severe bleeding disorders may need to be immunised in hospital.

8.7 Injection site

The choice of vaccine site is determined by the route used, the amount of the vaccine to be injected and the age and size of the client.

- For infants under 1 year the anterolateral aspect of the thigh is preferred site as it provides a large muscle mass
- For older infants and adults the deltoid area of upper arm generally preferred but anterolateral aspect of thigh can also be used (Table 8.1)

Table 8.1: Recommendations regarding preferred site and needle size from intramuscular injections

Patients Age	Site	Needle size
Infants (Birth to 12 Months of age)*	Anterolateral aspect of middle or upper thigh	25mm needle 23-25 gauge
Toddlers (12 to 36 months)	Anterolateral aspect of middle or upper thigh until deltoid has developed adequate muscle mass	25 mm needle 23-25 gauge
Children > 36 months and adults	Most dense portion of the deltoid muscle-between acromion and muscle insertion	25 mm needle 23-25 gauge

***Note: Use a 16mm length needle in infants under 2.5- 3kgs.**

The anterolateral thigh and deltoid regions are chosen to avoid major nerves and blood vessels. Immunisations should not be given into the buttock due to risk of damage to the sciatic nerve and also of injecting in to fat instead of muscle which can reduce the effectiveness of some vaccines.

BCG vaccine should be administered over the insertion of the left deltoid muscle to reduce the risk of keloid formation. This site is lower than that used for intramuscular injections. When BCG vaccine is administered, no other vaccine should be given in that arm for a period of three months.

When 2 or more injections need to be given at the same time, they should be given at separate sites at least 2.5cm apart. The site at which each vaccine was given should be recorded so that local side-effects of the different vaccines can be determined.

Clean skin does **NOT** require cleansing. Visibly dirty skin should only be washed with soap and water. If alcohol and other disinfecting agents are used, skin must be allowed to dry as these could inactivate live vaccines

For intramuscular injection the needle needs to be long enough to ensure vaccine is injected into muscle. In most cases a 25 mm needle is used. A 16mm needle is used for those weighing 2.5-3kgs. A 37mm needle is used in those weighing >95-100kgs.

- The needle selected for injection must be long enough to reach deep into muscle (Table 1). The needle should be inserted at a 90° angle to the skin
- The skin should be stretched flat (NOT bunched)
- It is not necessary to aspirate the syringe after the needle is put into the muscle.

8.8 Recording of information post vaccination

The following information should be recorded following vaccination.

- Vaccine(s) name(s), batch number, manufacturer and expiry date
- Dose administered
- Site(s) used – including clear description of which injection was administered in each site, especially where two injections were administered in the same limb
- Date immunisation(s) were given
- Signature of the vaccinator.

8.9 How to hold a child during immunisation

Babies and young children:

- Sit child sideways on parent's lap (Figure 8.1)
- Ensure child is held securely
- If anterolateral aspect of thigh being used: parent to 'cuddle' child closely and place child's nearest arm around parent's back. The other arm is controlled by the parent's arm and hand. Both legs are anchored with the child's feet held firmly between the parents thighs and controlled by the parent's other arm
- If deltoid being used: parent to hold arm to be injected close to child's body and tuck other arm behind parent's back. Tuck child's legs between parent's legs.

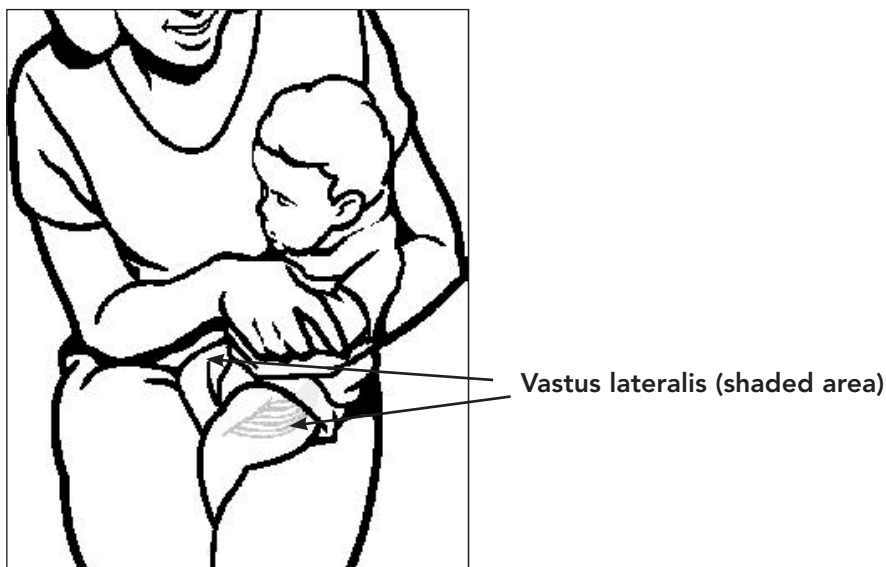


Figure 8.1 IM site for infants and toddlers (birth to 36 months of age)

8.10 Post vaccination observations and reactions

The vaccine recipients should be observed for immediate adverse reactions. Due to the unpredictable nature of anaphylactic reactions it is not possible to define a particular time period over which all individuals should be observed following immunisation. When possible, clients should remain in the vicinity of the place of vaccination for up to 15 minutes as typically onset of anaphylaxis occurs within minutes. It is not uncommon for a child to have a minor local reaction (redness or swelling) around the injection site or to have a mild fever or be irritable post vaccination. There is no need to rub the injection site post vaccination.

Parents should be advised to administer paracetamol or ibuprofen in accordance with manufactures guidance. Parents should also ensure that their child drinks plenty of fluids and that clothes are not

rubbing against the injection site. Parent should be advised to contact their general practitioner or HSE health centre if their child does not settle following these measures

Suspected adverse drug reactions should be reported to the Irish Medicines Board using the Yellow Form which is available on their website.

8.11 Disposal of vaccines and other injecting equipment

All reconstituted vaccines, opened single and multidose vials, empty vials and ampoules and needles and syringes should be disposed of in yellow sharps bins.

Sharps bins should be replaced once-two thirds full.

8.12 Useful resources

Diggle L, Deeks JJ, Pollard AJ. Effect of needle size on immunogenicity and reactogenicity of vaccines in infants: randomised controlled trial.

BMJ. 2006 Sep 16;333(7568):571.

Diggle L, Deeks JJ. .Effect of needle length on incidence of local reactions to routine immunisation in infants aged 4 months: randomised controlled trial.

BMJ. 2000 Oct 14;321(7266):931-3.

National Immunisation Office. Health Service Executive, Ireland. www.immunisation.ie.

Royal College of Physicians of Ireland. Immunisation Guidelines for Ireland.

Available at www.hpsc.ie.