

# Contraindications and Vaccine Technique



# Contraindications to vaccinations

There are only 2 absolute contraindications applicable to all vaccines:

1. Anaphylaxis following a previous dose of the relevant vaccine

and

2. Anaphylaxis following any component of the relevant vaccine

# There are 2 further contraindications applicable to live (both parental and oral) vaccines:

1. Live vaccines should not be administered to individuals with impaired immunity, regardless of whether the impairment is caused by disease or treatment
  - The exception is that MMR can be administered to HIV infected individuals in whom impaired immunity is mild (***refer to the Australian Immunisation Handbook 9<sup>th</sup> ed.***)
2. In general Live Vaccines should not be administered during pregnancy, and women should be advised not to become pregnant within 4 weeks of receiving a live vaccine

# False contraindications to vaccination

- Conditions listed are not contraindications to vaccination
- People with these conditions should be vaccinated with all recommended vaccines in the National Immunisation Program

- Mild illness without fever ( $<38.5^{\circ}\text{C}$ )
- Family history of any adverse events following immunisation
- Past history of convulsions
- Treatment with antibiotics
- Treatment with locally acting (inhaled/low-dose topical) steroids
- Replacement corticosteroids
- Asthma, eczema, atopy, hay fever or snuffles
- Previous pertussis – like illness, measles, rubella, mumps or meningococcal disease
- Prematurity (vaccination should not be postponed)
- History of neonatal jaundice

- Low weight in an otherwise healthy child
- Any neurological conditions including cerebral palsy and Down syndrome
- Contact with an infection disease
- Childs mother is pregnant
- Child to be vaccinated is being breastfed
- Woman to be vaccinated is breastfeeding
- Recent or imminent surgery
- Poorly documented vaccination history

# Ensure Cold Chain has been maintained

- More about cold chain later

# Preparing vaccine provided in a pre-filled syringe, ampoule or liquid vial

- Vial – remove cap carefully to maintain sterility of the rubber bung
  - Do not wipe the rubber bung
  - Use a 19 or 21 gauge needle to draw up the recommended dose through the bung
- Ampoule – use a 23 gauge, 25 mm needle to draw up the recommended dose
- Needles should be changed after drawing up from a vial with a rubber bung, but it is not necessary to change needles between drawing up a vaccine from an ampoule and giving the injection (hence the above point)
- Small air bubbles do not need to be extruded through the needle
- A needle or syringe that has already been used to inject an individual must never come into contact with the vial because of cross contamination

# Preparing vaccines requiring reconstitution

- Reconstitute the vaccine as needed immediately before administration.
- Never mix other vaccines together in the one syringe (unless that is the manufacturer's registered recommendation, eg. Infanrix hexa).
- Never mix a local anaesthetic with a vaccine.
- A sterile 21 gauge needle should be used for reconstitution and a separate 23 or 25 gauge needle, 25 mm in length, should be used for administration of the vaccine in most circumstances.
- Use only the diluent supplied with the vaccine; do not use sterile water for injection instead of a supplied diluent. Ensure that the diluent and vaccine are completely mixed.

# Reconstitution cont'd....

- Reconstituted vaccines should be checked for signs of deterioration, such as a change in colour or clarity.
- Reconstituted vaccines may deteriorate rapidly and, in general, should be administered as soon as practicable after they have been reconstituted.
- **Never freeze a vaccine.**

# Route of administration

- Almost all vaccines are given by either IM or SC injection, and a few vaccines are given orally
- Rotavirus vaccines are **ONLY** available for oral administration and must never be injected
- Special training is required for intradermal administration, which is important for several vaccines (eg Q fever, Tuberculosis and a new Influenza vaccine called Intanza)

| Intramuscular (IM) injection                                     | Subcutaneous (SC) injection  | IM or SC injection                                     | Oral              |
|--|--|--|-------------------|
| Diphtheria, tetanus vaccine (dT)                                 | Inactivated polio vaccine (IPV)*                                   | Influenza vaccine <sup>†</sup>                         | Rotavirus vaccine |
| Diphtheria, tetanus, acellular pertussis vaccine (DTPa and dTpa) | Meningococcal polysaccharide vaccine (4vMenPV)                     | Measles, mumps, rubella vaccine (MMR)                  | Cholera vaccine   |
| DTPa- and dTpa-combination vaccines                              | Varicella vaccine (VV)   | Rubella vaccine  | Typhoid vaccine   |
| Hepatitis A vaccine  | Q fever vaccine <sup>‡</sup>                                       | 23-valent pneumococcal polysaccharide vaccine (23vPPV) |                   |
| Hepatitis B vaccine  | Japanese encephalitis vaccine                                      | Rabies vaccine (HDCV)                                  |                   |
| Hepatitis B combination vaccines                                 | Measles, mumps, rubella, varicella vaccine (MMRV) (when available) | Yellow fever vaccine                                   |                   |
| <i>Haemophilus influenzae</i> type b (Hib) vaccine               |  |  |                   |
| Human papillomavirus vaccine (HPV)                               |  |  |                   |
| IPV-containing combination vaccines <sup>†</sup>                 |  |  |                   |
| 7-valent pneumococcal conjugate vaccine (7vPCV)                  |  |  |                   |
| Typhoid Vi polysaccharide vaccine                                |  |  |                   |
| Meningococcal C conjugate vaccine (MenCCV)                       |  |  |                   |
| Rabies vaccine (PCECV)   |  |  |                   |

# Preparing for vaccine administration

## SKIN CLEANING

- Provided the skin is visibly clean, there is no need to wipe it with an antiseptic (e.g. alcohol wipe)
- If you decide to clean the skin, or if the skin is visibly not clean, alcohol and other disinfecting agents **MUST** be allowed to dry before vaccine injection
- *Otherwise there may be some increased infection pain*

# DID YOU KNOW!!!!!!

- Topical anaesthetic agents, including vapocoolant sprays, are available but to be effective must be applied at the correct time before vaccine administration
- Topical anaesthetics such as EMLA, are not recommended for routine use, but could be considered in a child with excessive fear or dislike of needles and require application 30 to 60 minutes before injection
- Vapocoolant sprays are applied 15 seconds before vaccination
- Topical lignocaine/prilocaine is not recommended for children younger than 6 months due to the risk of methaemoglobinaemia

# Vaccine injection technique

## IM INJECTION TECHNIQUE

- For IM injection, a 25 mm needle should be used in most cases ( either 23 or 25 gauge 25mm in length)
- The 25 mm needle should pierce the skin at an angle or 90 degrees to the skin and can be safely inserted to the hub
- Provided an injection angle of  $>70$  degrees is used, the needle should reach the muscle layer
- Studies have demonstrated that for most vaccines, local adverse events are minimised and immunogenicity enhanced by ensuring vaccine is deposited into the muscle and not into the subcutaneous layer.
- Some vaccines eg Monovalent IPV, varicella and meningococcal polysaccharide vaccines are only licensed for SC administration

- Clinical trials demonstrated that long (25mm) needles (with the skin stretched flat and the needle inserted at 90 degrees) for infant vaccination were associated with significantly fewer local adverse events while achieving comparable immunogenicity
- If using a 25 gauge needle for an IM injection, ensure the vaccine is injected slowly over a count of 5 seconds to avoid injection pain and muscle trauma
- It is not considered necessary to draw back on the syringe plunger before injecting the vaccine. However, if this is done, and a flash of blood appears in the needle hub, the needle should be withdrawn and a new site selected for injection.

## **SC INJECTION TECHNIQUE**

- SC injections are usually administered at a 45 degree angle to the skin
- The standard needle for administering vaccines by SC injection is a 25 or 26 gauge needle, 16 mm in length

## **INTRADERMAL INJECTION TECHNIQUE**

- For BCG or Q fever skin test vaccine, a 26 or 27 gauge, 10 mm needle is recommended
- Intradermal injection technique requires special training and should only be performed by a trained provider.

**Table 1.4.2: Recommended needle size, length and angle for administering vaccines**<sup>5,10,12,14,19</sup>

| Age or size of child/adult   | Needle type                                      | Angle of needle insertion |
|--|--|---------------------------|
| Infant, child or adult for IM vaccines                                       | 23 or 25 gauge,*<br>25 mm in length <sup>†</sup> | 90° to skin plane         |
| Preterm babies (<37 weeks' gestation) up to age 2 months; very small infants | 23 or 25 gauge,*<br>16 mm in length              | 90° to skin plane         |
| Very large or obese patient  | 23 gauge, 38 mm in length                        | 90° to skin plane         |
| Subcutaneous injection in all individuals                                    | 25 or 26 gauge,<br>16 mm in length               | 45° to skin plane         |

\* If using a narrow 25 gauge needle for an IM vaccination, ensure vaccine is injected slowly over a count of 5 seconds to avoid injection pain and muscle trauma.

† The use of short needles for administering IM vaccines may lead to inadvertent subcutaneous (SC) injection and increase the risk of significant local adverse events, particularly with aluminium-adsorbed vaccines (eg. hepatitis B vaccine, DTPa, DTPa-combinations or tetanus vaccine).

### 1.4.6 Recommended injection sites

The choice of injection sites depends primarily upon the age of the individual being vaccinated. The 2 anatomical sites recommended as routine injection sites

# Recommended injection Sites

- The choice of injection sites depends primarily upon the age of the individual being vaccinated
- The two anatomical sites recommended as routine injection sites are:
  - Anterolateral thigh
  - Deltoid muscle
- All practitioners should ensure that they are familiar with the landmarks used to identify any anatomical sites used for vaccination

# Infants < 12 months of age

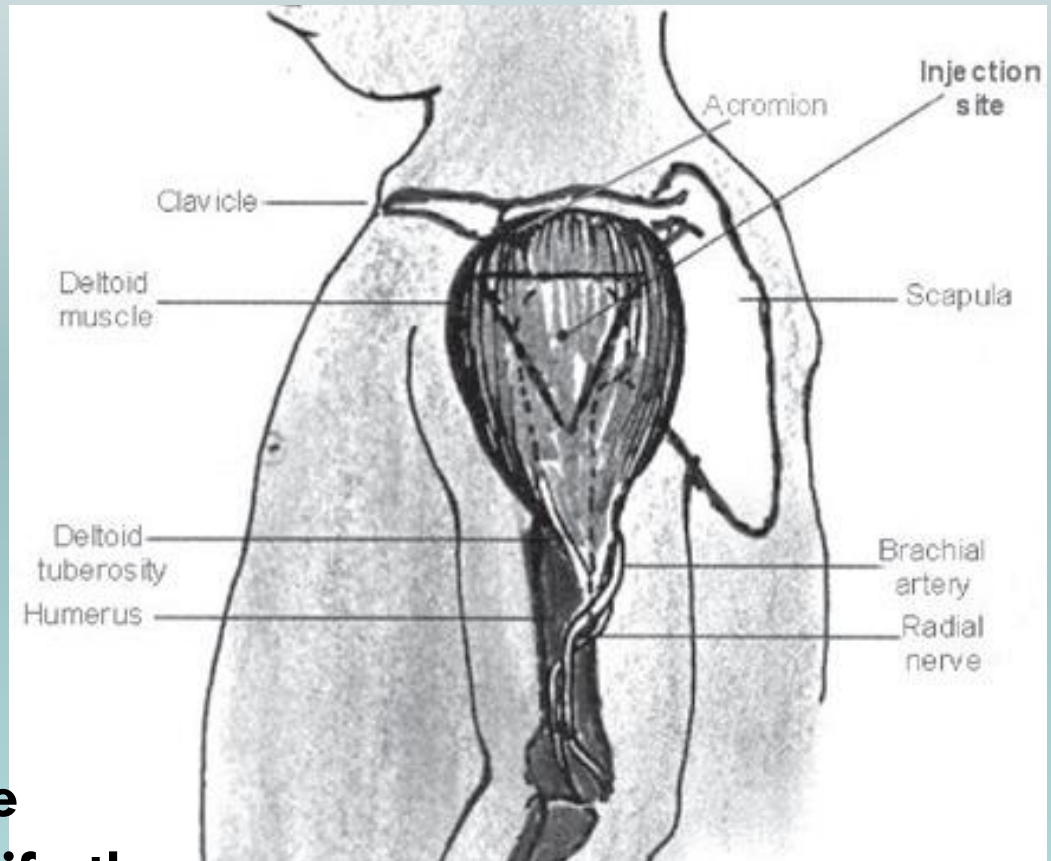
- The vastus lateralis muscle in the anterolateral thigh is the recommended site for IM vaccination in infants.



**Figure: Photograph of the thigh showing the recommended (vastus lateralis) injection site (X)**

# Children $\geq 12$ months of age

- The deltoid muscle is the recommended site for IM vaccination in children  $\geq 12$  months of age



**Figure: Diagram showing the anatomical markers to identify the deltoid injection site**

# Adolescents and adults

- The deltoid muscle is the recommended site for IM vaccination in adolescents and adults
- The anterolateral thigh can also be used in older children and adults

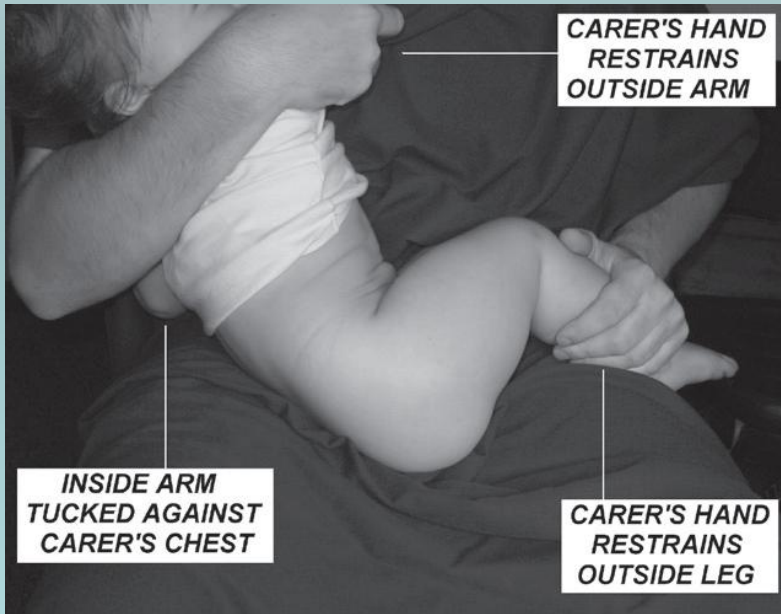
# PRECAUTION

- Vaccine injections should not be given in the dorsogluteal site or upper outer quadrant of the buttock because of the possibility of a suboptimal immune response
- Immunoglobulin can be administered intramuscularly into the upper outer quadrant of the buttock, but care must be taken to ensure that the other quadrants are not used.

# What positions are there?

## POSITIONING OF INFANTS <12 MONTHS OF AGE

Cuddle position for infants and infant on examination table



# Positioning of children $\geq 12$ months of age

Cuddle position for older children and straddle position

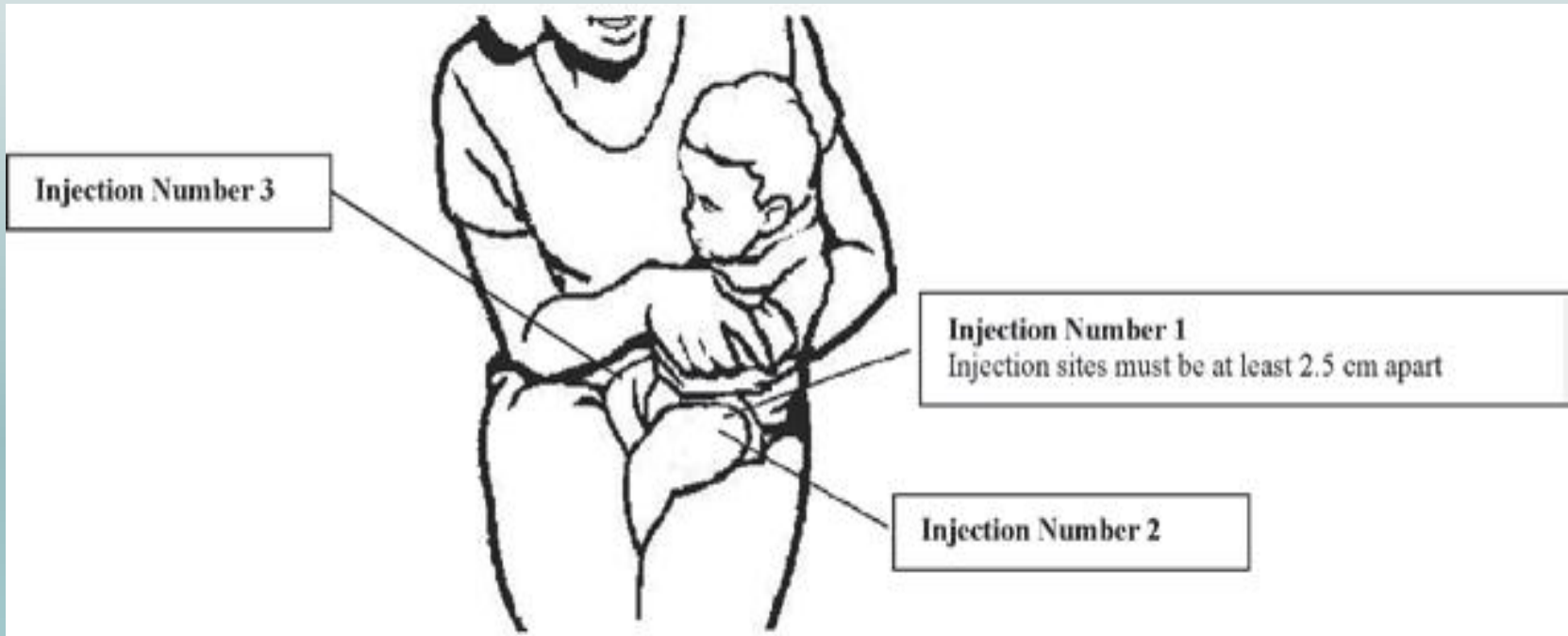


# Administering multiple vaccine injections at the same visit

- The location of each separate injection given should be recorded, so that if a local adverse event occurs, the implicated vaccine(s) can be identified
- Each practice should have a protocol in place and use the same sites across the practice

# Infants < 12 months of age

- The suitable sites for this age group are the:
  - Anterolateral thighs and
  - **Ventrogluteal areas** (not discussed) **refer to Handbook** – but should only be used if trained to do so
- Two vaccines can be given into the same anterolateral thigh, separated by at least 2.5cm



**Figure: Recommended technique for giving multiple vaccine injections to an infant <12 months of age into the anterolateral thigh**

# Children $\geq 12$ months of age

- A single injection can be given into each deltoid muscle
- When 3 or 4 IM injections are to be given to a child at the same visit, the options will depend on the muscle mass of the child's deltoid
- If the deltoid mass is adequate:
  - a further injection can be given into each deltoid muscle separated by 2.5 cm from the initial vaccine
- If the deltoid muscle is small
  - further injections can be given into either the anterolateral thighs (2.5cm apart for 2 vaccines)
- For younger children, the cuddle or straddle position are suitable for accessing multiple limbs during the one vaccination encounter