

Section 6	Vaccine Administration Standards	Standard # 06.100	
Created and approved by	Provincial Immunization Program		
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Preamble

Primary Care Alberta (PCA) Provincial Immunization Program, Public Health, CDC & Screening provides Public Health and other partners who administer provincially funded vaccines with ongoing and timely information relating to Provincial Immunization Program Standards and Quality. These standards are based on currently available evidence-based information, Primary and Preventative Health Services (PPHS) policy, and provincial and national guidelines.

Background

Proper vaccine administration is a key element to ensuring the optimal safety and effectiveness of vaccines. Vaccine administration practices are based on clinical trials that determine the dose, route and schedule for each vaccine to optimize vaccine effectiveness and reduce the risk of local reactions or other adverse events. There may be situations where vaccine administration decisions need to be reviewed and assessed on a case-by-case basis.

Immunizers should receive educational and competency-based training on vaccine administration before immunizing. Professional standards for medication and vaccine administration and federal/provincial/territorial policies and procedures also guide immunization practices. It is the individual immunizer's professional responsibility to ensure they are following these standards.

There are many components in the immunization process, for example, counselling and risk communication, informed consent, assessing if the individual is fit to immunize, reporting of adverse events following immunization, recognition and management of anaphylaxis, and immunization documentation. These topics will be addressed in detail in other sections of the manual.

Purpose

This standard is an important resource for immunizers to use for a consistent approach to vaccine administration. It summarizes information available related to vaccine administration. This standard is not intended to replace information contained in the individual vaccine biological pages.

Applicability

This standard applies to all immunizers providing provincially funded vaccine to members of the public.

Competency

In November 2008 the Public Health Agency of Canada published the *Immunization Competencies for Health Professionals* with a goal of promoting safe and competent practices for immunization providers. The following competencies outlined in that document are applicable to this standard:

- Types of Immunizing Agents and Their Composition:
 - Applies knowledge of the components and properties of immunizing agents as needed for safe and effective practice.
- Administration of Immunizing Agents:

- Prepares and administers immunization agents correctly. This includes knowledge and understanding of techniques to reduce the pain associated with immunization.

Definitions

Beyond-use date: new expiry date after opening a multi-dose vial. A beyond-use date must never extend beyond the manufacturer's expiration date.

Manufacturer's expiration date: expiry date printed on the vaccine/biological by manufacturer. If the expiry date is only a month and year, the last day of the month is used as the expiry date.

Infant: birth up to and including 11 months of age.

Toddler: 12 months of age up to and including three years of age.

Preschooler: four years of age up to and including six years of age.

School Age: children in grade 1 up to the end of grade 12.

Adolescent: 12 years of age up to and including 17 years of age.

Adult: 18 years of age and older.

Subcutaneous (SC) injection: injection of a biological product into the layer of fatty tissue between the skin and muscle.

Intramuscular (IM) injection: injection of a biological product into muscular tissue.

Intradermal (ID) injection: injection of a small quantity (for example, 0.1 mL) of a biological product just under the dermis.

Section 1: Standard Precautions and General Product Considerations

Standard Precautions:

- Biological products, syringes and needles are considered sterile once manufactured. Immunizers must use aseptic techniques when preparing these products.
- Vial stoppers are not considered sterile even if the protective caps are in place. Swab vaccine vial stoppers (single and multidose) with isopropyl alcohol prior to use.
- Perform hand hygiene prior to preparing biological products and between clients using soap and water if hands are visibly dirty or using an alcohol-based hand rub.
- If used, gloves must be changed between clients. Perform hand hygiene after doffing and before donning new gloves. Use gloves when:
 - The immunizer will encounter body fluids
 - The skin on the immunizer's hands is not intact.
- Use separate, single use sterile safety engineered device (SED) for each injection.
 - Engage the safety mechanism on needles using a one-handed technique immediately following administration of the biological product.
 - Immediately discard the syringe/needle into a biomedical waste container that is within arm's reach and easy view of the immunizer but placed safely away from clients and children.
 - Never recap needles or transfer used needles/syringes from one biomedical waste container to another.
- Discard cotton balls into the regular garbage. If saturated with blood, dispose into a biomedical waste container.
- Lock and change biomedical waste containers when less than 2/3 full to avoid overfilling/packing of contents.
- When transporting biomedical waste containers:
 - Ensure they are closed securely by snapping them closed.
 - Avoid excess pressure on containers.
 - Reopen later for continued use if less than 2/3 full.

General Product Considerations:

- If immunizing more than one individual at the same clinic appointment, draw up and administer all the immunizations for one individual before proceeding to the next person.
- Check the expiry date of all products being administered, including diluent. Never administer expired products.

- Vaccine should only be withdrawn from the vial by the immunizer administering the vaccine.
- Never combine different vaccines in the same syringe, unless following manufacturer guidelines for combination vaccines.
- Do not preload disposable syringes with vaccines or biologicals from vials. They are not meant for storage of vaccines and biologicals due to the:
 - Uncertainty of vaccine stability in disposable syringes
 - Risk of contamination
 - Increased potential for vaccine administration errors and vaccine wastage.
- Reconstitute and draw up live vaccines just prior to administration. They are unstable and begin to deteriorate immediately after reconstitution. Refer to the product monograph for specific instructions.
- Only change the needle between drawing up and administering the vaccine/biological if the needle is damaged, contaminated, or if the integrity or sharpness of the needle is in question.
- For viscous products use blunt fill or larger bore needles. Change the needle before administration. Do not use blunt fill or large bore needles to administer vaccines.

Section 2: Product Preparation Instructions

General Considerations

- When preparing any biological product, consider the 7 Rights of vaccine administration:
 1. Right product (biological, vaccine and diluents)
 2. Right client (use at least two patient identifiers per the [AHS Patient Identification Policy](#))
 3. Right dose
 4. Right time (date and interval)
 5. Right route, needle length and technique
 6. Right reason (for example, meet vaccine eligibility criteria)
 7. Right documentation.
- Check the name, dosage and expiry date of the vaccine/biological and diluent at three points in time prior to administration:
 1. When removing the product from the fridge or insulated container
 2. When drawing up/reconstituting the product
 3. Right before administering the product.
- Always refer to the vaccine specific biological page and product monograph for detailed preparation instructions.
- Prepare necessary materials including, but not limited to, safety engineered device (SED), vaccine/biological, isopropyl alcohol, biomedical waste container, and anaphylaxis management supplies.
- Visually inspect the vaccine/biological to ensure it appears as expected and there is no particulate. Do not administer if there is particulate that does not dissolve.
- Only use diluent supplied by the manufacturer for the same manufacturer's vaccine product.
 - Diluents may contain a variety of components, such as stabilizers, bactericides, pH buffers, or chemicals to assist in dissolving the specific vaccine.
 - Diluent supplied for a vaccine are a specific volume.

Vials

Step 1

- Ensure you have the correct product before removing the plastic cap covering the vial.
 - If the plastic cap is removed from a single-dose vial and then the vial is not subsequently punctured, maintain cold chain and use or discard the contents of the vial by the end of the clinic day.
 - If the plastic cap is removed from a multi-dose vial, maintain cold chain and use until the beyond-use-date.

Step 2

- Clean the surface of the vial stopper with an isopropyl alcohol swab and allow to dry. Some vaccine can be inactivated by alcohol.

- For a previously opened multi-dose vial, clean the surface of the vial stopper with an isopropyl alcohol swab and allow to dry before each subsequent use.

Step 3

- For liquid products that do not require reconstitution, draw into the syringe a volume of air equal to the quantity of biological product to be removed.
 - Do not inject air into the purified protein derivative (PPD) vial prior to drawing up, as this can cause oxidation of the biological and leakage from the vial stopper.
- For lyophilized (freeze-dried) products such as MMR that require reconstitution, do not inject air into the vial as the diluent acts as the air in the vial.

Step 4

- Place the vial right side up and insert the needle through the centre of the rubber stopper.
 - Inject air into the vial for products that do not require reconstitution, except for PPD.
 - Inject diluent into the vial for products that require reconstitution and mix according to the vaccine specific biological page or product monograph.

Step 5

- Hold the vial upside down and withdraw the required quantity of biological product into the syringe.
- Ensure end of the needle is below fluid level and situated in the groove of the vial stopper to assist with withdrawing of product.

Step 6

- Return vial to right side up position, remove the needle from the vial and expel air bubbles.
 - Never detach the needle from the syringe and never leave it in a multi-dose vial to draw up further doses.
 - Once vaccine has been withdrawn from a vial, it cannot be returned to the vial.

Step 7

- Once the vaccine or biological has been administered, discard empty vial, needle, and syringe in a biomedical waste container.
- Document the lot number from the box.

Note:

- For single dose vials only:
 - Single-dose vials can be combined if the lot numbers are the same and dose required exceeds the amount in the vial (for example, rabies immunoglobulin).
 - Single-dose vials cannot be combined if lot numbers are different. Separate syringes and different injection sites must be used.
- For multi-dose vials only:
 - Multi-dose vials cannot be combined. If a full dose cannot be withdrawn from a multi-dose vial (for example, influenza vaccine), it cannot be combined with another vial. Discard partial dose and open a new vial.
 - When puncturing a multi-dose vial for the first time, record the date opened on the vial using the format: yyyy= 4 digit year, Mon= 3 letter month, dd= 2 digit date. For example: 2025 Jan 05.
 - Immediately return vaccine to a temperature-controlled storage container after vaccine has been withdrawn from a multi-dose vial.

Ampoules

Step 1

- Tap the ampoule lightly to ensure that the contents are in the lower part of the ampoule.

Step 2

- Wrap an unopened isopropyl alcohol package around the neck of the ampoule to protect your hands. Snap the top off by breaking it away from your body.
 - For one point cut (OPC) ampoules, there is a painted dot on the bulb head indicating a score breakage point around the ampoule neck.
- Discard the neck of the ampoule in the biomedical waste container.

Step 3

- Withdraw the contents of the ampoule with a sterile syringe and needle.
- Do not add air to the ampoule.
- Filter needles are not routinely indicated for drawing up biological products or epinephrine from ampoules because:
 - Filter needles could potentially filter out particulate matter such as adjuvants or other active ingredients, making a vaccine less effective.
 - Vaccines and biologicals are supplied in small ampoules, which minimizes glass shards being introduced into the ampoule.
 - Small bore needles such as 23 G, 25 G, 27 G, decrease the likelihood of glass shards entering into the needle.
 - The risk of glass shards entering the ampoule is reduced by using an unopened isopropyl alcohol package to open the ampoule.

Step 4

- Expel air bubble(s) from the syringe.

Step 5

- Once the vaccine has been administered, discard the ampoule, needle, and syringe in a biomedical waste container.
- Document the lot number from the box.

Prefilled Syringe

Step 1

- For separate needles and syringes:
 - Remove protective plunger-cap and firmly attach the SED onto the syringe with a push and clockwise twist.
- For syringes with needle attached:
 - Rotate needle-cap slowly until loosened and slide off the cap.
 - Use caution with products that have special safety engineered shields.
- If the syringe has been activated (for example, needle-cap removed or needle attached) but unused, the sterile seal has been broken. Use or discard by the end of clinic day.

Step 2

- Expel air bubble(s) from the syringe.
- If plunger is hard to push, hold syringe in one hand with the needle pointing up, and slowly rotate plunger clockwise while pushing it into the barrel.
 - Do not rotate the plunger counterclockwise as this may cause the plunger to detach.

Step 3

- Once the vaccine or biological has been administered, discard syringe and needle in a biomedical waste container.
- Document the lot number from the box.

Oral Applicator

Step 1

- Remove protective cap from oral applicator.

Step 2

- Once the oral vaccine has been administered, discard the applicator in the biomedical waste container.
- Document the lot number from the box.

Section 3: Injection Site, Route, Volume, and Equipment

Choose an injection site

Select an appropriate injection site and needle size. Consider the following:

- Individual's age
- Adequacy of muscle mass
 - For individuals with insufficient deltoid muscle mass, use the anterolateral thigh muscle.

- Individual's unique characteristics, such as using an alternate limb for individuals with mastectomy
 - Do not inject vaccine where there are bruises, scars, inflammation, masses, edema or tenderness as there might be interference with absorption of the biological.
 - Both IM and SC vaccines may be given through a tattoo.
- Volume of biological product to be administered
 - Refer to [Table 1: Injection Site, Age, Volume and Equipment Guidelines](#).
- Viscosity of biological product
- Recommended route of administration for the biological
- Number of products to be administered
 - If multiple parenteral injections are required, use separate anatomic injection sites (different limbs) whenever possible.
 - Immunoglobulin preparations and non-live vaccines for post-exposure prophylaxis may be given on the same day but must be administered in different limbs.
 - Multiple immunoglobulin preparations may be administered at the same visit but must be administered in different limbs.
 - If multiple injections in the same limb are required, separate the injection sites by at least 2.5 cm (1 inch). This assists in differentiation of local adverse events following immunization.

Choose a Route

Give vaccines by the route recommended by the manufacturer. Safety and efficacy data of alternate routes is limited.

- The IM route is preferred when a vaccine product monograph indicates an immunization can be given by either SC or IM.
- Alternate routes may be considered in special circumstances. Consult the MOH/MOH designate.
- If a vaccine has been inadvertently given by a route other than that recommended by the manufacturer, refer to [Standard For Recommended Immunization Schedules](#) Section 8: Immunization Following Vaccine Administration Errors. Consult the MOH/MOH designate for recommendations as needed.

Choose an appropriate gauge and needle length to ensure that the vaccine is deposited within the proper tissue layer. This decreases the chance of local adverse events and ensures efficacy.

Most non-live vaccines are given via the IM route, with a few exceptions.

Administer vaccines containing adjuvant by IM route to avoid irritation, induration, skin discoloration, inflammation, and granuloma formation.

Table 1: Injection Site, Age, Volume, and Equipment Guidelines

Route	Site	Age	Needle Size / Length ^{1 2}		Volume per Muscle ³
Intramuscular (IM) Immunoglobulin may be administered in any IM site.	Vastus Lateralis	Infant up to and including 11 months	22 -25G	5/8" - 1"	0.5 –1.5 mL
		12 months up to and including preschool	22 -25G	1"	0.5 –2mL
		School age up to and including 17 years	22 -25G	1"–1½"	0.5 –4 mL
		18 years and older	22 -25G	1" –1½"	0.5 –5 mL
	Deltoid	12 months up to and including preschool	22 -25G	5/8"–1"	0.5 –1 mL
		School age up to and including 17 years	22 -25G	1"	0.5 –1.5 mL
		18 years and older	22 -25G	1" –1½"	0.5 –2 mL
	Ventrogluteal (Not for vaccine administration. Use for immunoglobulin products only)	7 months of age up to and including preschool ⁴	22G or 23G	1"	0.5 –1.5 mL

¹ Adjust needle length based on assessment of muscle size and SC tissue present. Use the following technique to assess needle length for IM injections for clients who fall outside the average range for weight and height or muscle mass.

- If using the deltoid or vastus lateralis muscle, grasp the muscle between thumb and index finger. One half the distance between the thumb and index finger is the approximate length of the needle required to penetrate that muscle.
- If using the ventrogluteal muscle or dorsogluteal muscle, pick up the layer of fat and skin above the muscle. This layer of tissue moves easily off the underlying muscle. One half of the distance between thumb and index finger will be the approximate length of the needle to reach the muscle.

² A larger bore needle (for example, 23 gauge) may be required when administering viscous products such as immunoglobulin preparations.

³ Adjust maximum volume injected per muscle according to muscle size. Consult the MOH/MOH designate if amount required exceeds the maximum volume to be injected per muscle.

⁴ For the majority of infants up to 12 months of age, the vastus lateralis is the recommended site for injection because it provides a large muscle mass. In extremely rare situations, for infants 7 to 12 months of age, where the ventrogluteal muscle must be used, care should be taken to define the anatomic landmarks for the ventrogluteal site to avoid injury of the sciatic nerve.

Route	Site	Age	Needle Size / Length ^{1 2}		Volume per Muscle ³
		School age up to and including 17 years	22G or 23G	1" – 1½"	0.5 – 2.5 mL
		18 yrs and older	22G or 23G	1½"	2.0 – 5 mL
	Dorsogluteal⁵ (Not for vaccine administration. Use for immunoglobulin products only) The dorsogluteal site is only to be used for the IM injection of large volumes of immunoglobulin preparations when the ventrogluteal and vastus lateralis sites have had maximum volumes of an immunoglobulin preparation injected and an additional volume still needs to be administered.	5 years and older	22G	1½"	0.5 – 4 mL
Subcutaneous (SC)	Usually given into the SC tissue of the upper outer triceps area of the arm . Other sites may be used if needed (for example, antero-lateral thigh). ⁶	All ages	25G	5/8"	0.5 – 1 mL
Intradermal (ID)	Flexor surface of the inner forearm (TB skin test)	All ages	26G - 27G	3/8" - 5/8"	0.1 mL
	Mid Deltoid (rabies)				
	Scapula (alternate site)				

⁵ Do not use the dorsogluteal site for vaccine administration as it can be less immunogenic and increase the likelihood of sciatic nerve injuries.

⁶ For infants up to 12 months of age, the recommended site for SC administration of vaccine is the anterolateral thigh but the upper triceps area of the arm may also be used.

Special Considerations

Limb Integrity

Do not administer an immunizing agent in a limb that is likely to be affected by lymphatic system impairment. Injection of a vaccine into an area where lymphatic circulation may be impaired, could theoretically result in an altered immune response due to changes in vaccine absorption. Examples include local lymphedema, lymphangioma, axillary lymph node dissection, A-V fistula (vascular shunt for hemodialysis), upper limb paralysis, and mastectomy with lymph node curettage.

Limb Accessibility

If a preferred immunization site is not accessible, (for example, bilateral leg casts), routine immunization should be delayed until the preferred site is accessible. Consult MOH/MOH designate for urgent immunization situations.

Bleeding Disorders and Anticoagulant Therapy

Individuals with a bleeding disorder or who are receiving anticoagulant therapy may develop hematomas in IM injection sites. Ways to reduce the risk of a hematoma include:

- Give one injection per muscle mass.
- Choose a 23-gauge or finer needle.
- Stabilize limb and inject slowly.
- Apply firm pressure to the site for at least 5 to 10 minutes after injection.
- Do not rub or massage injection site.
- Instruct individual or parent/guardian to monitor injection site and report any concerns to their primary care provider/hematologist immediately.

Note:

- Individuals receiving long-term warfarin or heparin are not considered to be at higher risk of bleeding complications following immunization.
 - They may be safely immunized through either the IM or SC route without discontinuation of their anticoagulation therapy.
 - There is a lack of evidence on whether there is an increased risk of bleeding complications following immunization with the newer types of anticoagulants, such as antiplatelet agents. There is no reason to expect that there is a greater risk of bleeding complications than with other anticoagulants.

Section 4: Vaccine Administration Routes, Landmarking, and Stabilization

General Vaccine Administration Route Considerations

- Vaccines and biologicals are administered by IM, SC, ID and oral routes.
 - Administer oral vaccines before parenteral vaccines due to the increased likelihood of excessive crying after parenteral injections.
- Perform hand hygiene using soap and water or an alcohol-based hand rub.
- Parenteral Vaccine Administration:
 - Choose an area of skin that is intact with good integrity.
 - Cleanse the injection site with an isopropyl alcohol swab by circling from the centre of the site outward for 1-2 inches and let skin dry.
 - If alcohol is contraindicated due to allergy, alcohol-free 10% povidone-iodine may be used. Cleanse skin for a minimum of 1 minute using friction and wait until dry prior to injection.
 - Select the appropriate syringe and needle size for parenteral injections (See [Table 1: Injection Site, Age, Volume, and Equipment Guidelines](#)).
 - Draw up vaccine or biological according to the vaccine specific biological page or product monograph.
 - Do not massage the area after injection. This can cause bruising and reduce immune response.
 - Application of bandages is not routinely recommended but may be accommodated when requested.

General Stabilization Considerations

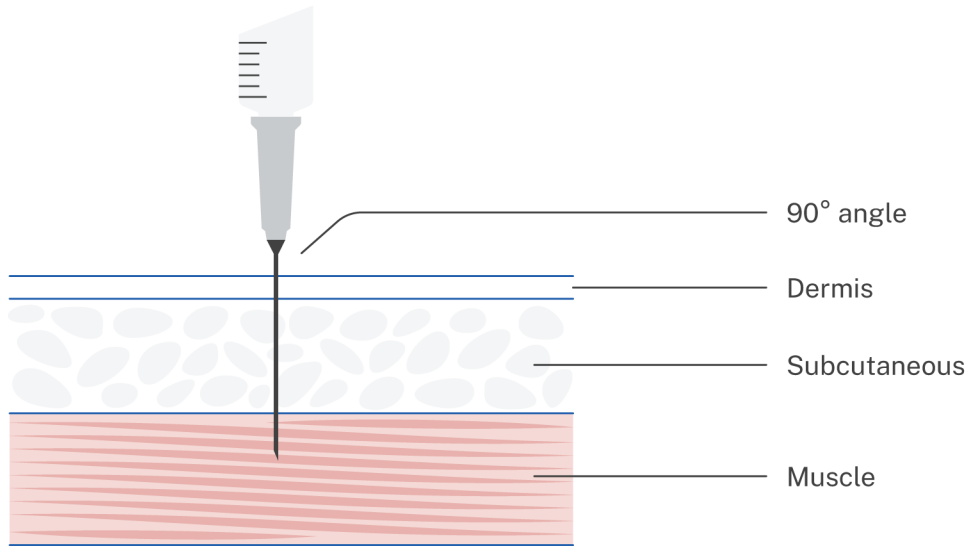
- Stabilization measures are necessary to protect the client, minimize discomfort, and provide safety during the immunization procedure. Choice of stabilization method depends on type of injection, site and age of client.
- Do not assume that a particular client will be able to remain still during immunization.
- Carefully explain the immunization procedure and stabilization guidelines to the client or parent/guardian prior to immunization.
 - Ensure that the parent/guardian is aware that their role is to hold the child to keep them still and stabilize the limb, while the nurse's role is to immunize.
- Get assistance from another nurse when necessary to ensure adequate stabilization.
- When immunizing in the school, make every effort to enlist the child's cooperation. Some children will require extra time and explanation.
- Do not use excessive physical restraint.
 - Defer immunization if client cooperation cannot be obtained. Immunize when normal stabilization measures can be accomplished.
 - If immunizations are deferred within a school setting, notify the parent/guardian and make alternate arrangements for immunization.

4.1 Intramuscular (IM) Injection Technique

Table 2: Intramuscular (IM) Injection Technique Procedure

Procedure	Rationale
Use correct length and gauge of needle.	See Table 1: Injection Site, Age, Volume, and Equipment Guidelines .
Insert needle quickly at a 90° angle into the muscle. If client's muscle mass is small, grasp body of muscle between thumb and fingers before and during the injection.	Ensures that biological product reaches the muscle mass.
Do not aspirate.	Aspiration may increase the time it takes to immunize and is more painful for the client. It is not supported by evidence.
Inject biological product by firmly pushing the plunger down slowly.	Rapid injection is no longer recommended as there is a lack of evidence supporting the effect of rapid injection on reduction of immunization pain.
Remove the needle in one swift motion. Immediately apply pressure to the injection site with a dry cotton ball. Do not massage injection site.	Minimizes discomfort and bruising during needle withdrawal. Massage can damage underlying tissue.
Activate the safety mechanism and discard into biomedical waste container.	Minimizes risk of needlestick injury and potential exposure to infectious diseases.
Once all documentation is complete, discard all empty vials into the biomedical waste container.	Improper disposal of biological products can contaminate the environment.
IM injection video links.	Immunize BC videos: • IM vastus lateralis infant injection (54 sec) • IM ventrogluteal adult injection (1 min 32 sec) • IM deltoid adult and child injection (54 sec). Immunize Canada video: • IM and SC adult and child injection (9 min 13 sec).

Figure 1: IM injection needle position



4.2 Intramuscular (IM) Landmarking and Stabilization

The two primary IM sites for immunization are the vastus lateralis (anterolateral thigh) and the deltoid muscle. Only use the ventrogluteal and dorsogluteal sites for immunoglobulin.

IM injections of vaccine are administered into the vastus lateralis in infants up to and including 11 months of age. The vastus lateralis or the deltoid muscle can be used for toddlers and older children. The deltoid is often selected as the injection site in these age groups as temporary muscle pain in the vastus lateralis muscle post-immunization may affect ambulation. However, when selecting a site, it is important to also consider available muscle mass.

4.2.1 Vastus Lateralis Landmarking

- This site is recommended for infants up to and including 11 months of age.
 - The vastus lateralis may be used for clients older than 12 months of age if requiring immunoglobulin products or multiple injections.
- Draw an imaginary line from the greater trochanter to the lateral femoral condyle of the knee.
 - See [Figure 2: Vastus lateralis landmarking](#) and [Figure 3: Vastus lateralis landmarking in infant stabilization hold](#).
- The middle third portion of the vastus lateralis is a safe area for injection.
- Insert needle at a 90° angle.
 - See [Figure 1: IM injection needle position](#).

Figure 2: Vastus lateralis landmarking

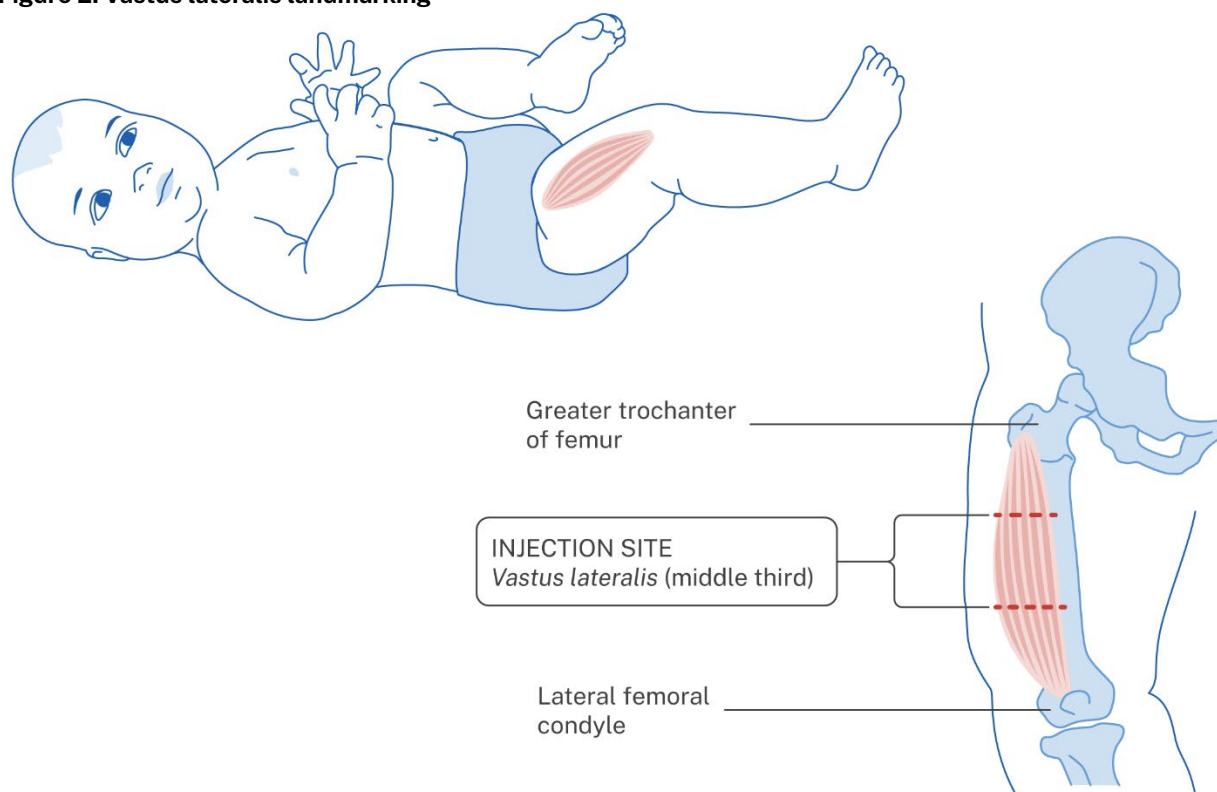
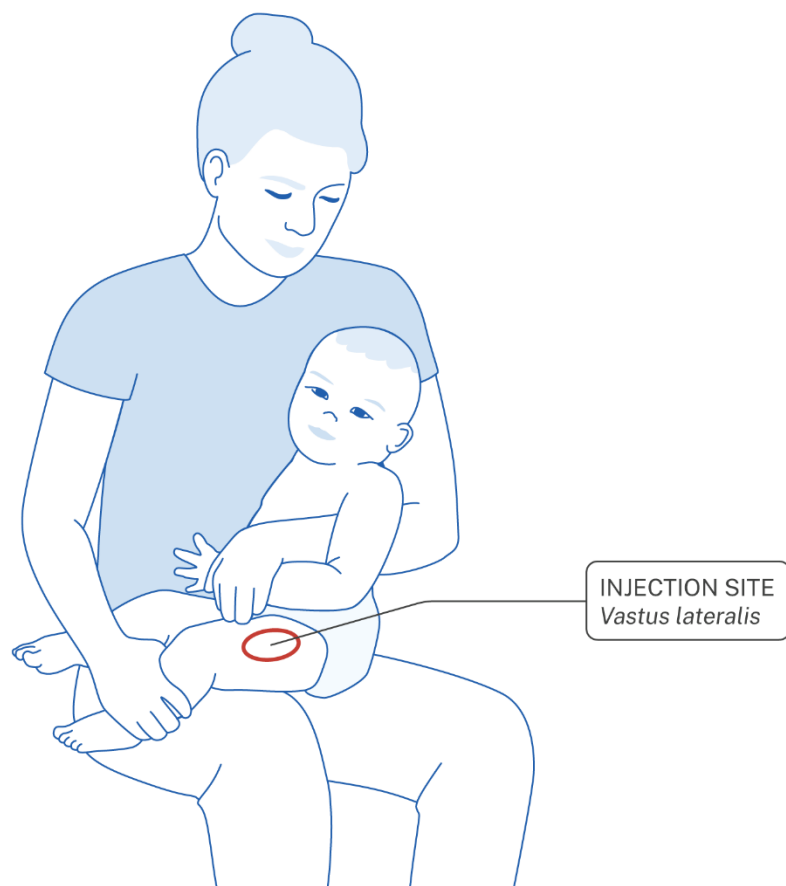


Figure 3: Vastus lateralis landmarking in infant stabilization hold



4.2.2 Vastus Lateralis Stabilization

- Ask the parent/guardian to hold the child on their lap in a seated or semi-recumbent position so that the vastus lateralis site is clearly visible, with the child's arm tucked behind the parent/guardian.
 - See [Figure 4: Stabilization technique for vastus lateralis](#).
- The child's head should rest on the parent/guardian's arm with the outside arm being held.
- Instruct the parent/guardian to hold the child's outside leg around the calf or knee. Alternatively, the parent/guardian may place the child's feet between their legs and secure the child's legs with their hand. If using this method, ensure parent/guardian sits forward in chair so the child cannot push their feet against the chair.
- The immunizer should hold the thigh to ensure proper stability of the site.
- Ensure the child's arm that is positioned closest to the caregiver, is tucked into the parent/guardian's side or placed behind the caregiver's back. The child's other arm is controlled with the parent/guardian's arm and hand placed over it. For children under 1 year of age, the caregiver can control both arms with one hand.
- Instruct and guide the caregiver to firmly hold the child's legs and feet and control them with their free hand. The caregiver's hand may be placed over the child's knee to prevent the leg from being raised by the child during the immunization.

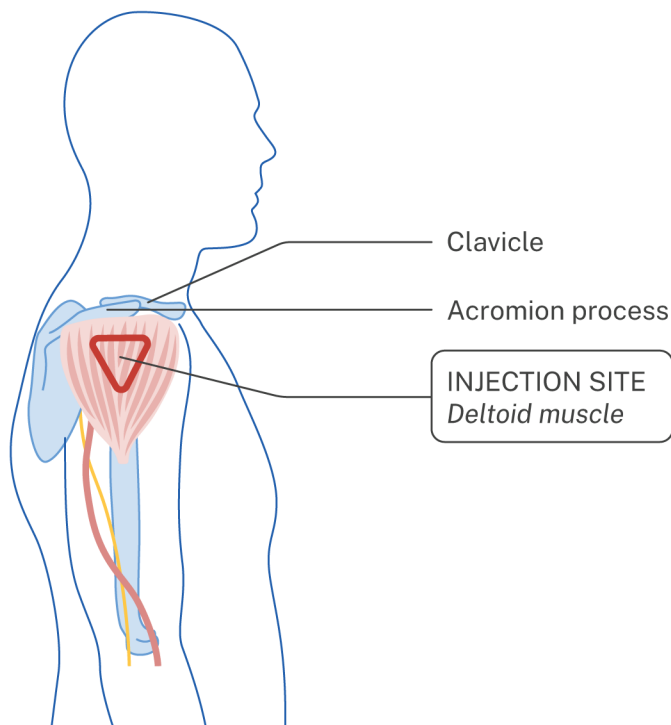
Figure 4: Stabilization technique for vastus lateralis



4.2.3 Deltoid Landmarking

- Expose the shoulder completely.
- Define the site by drawing a triangle with its base at the lower edge of the acromion process and its peak above the insertion of the deltoid muscle. The injection site is in the center of the triangle.
 - See [Figure 5: Deltoid landmarking illustration](#).
- Accurate landmarking is very important to avoid causing an injury.
 - Incorrect landmarking may lead to shoulder injury related to vaccine administration (SIRVA). SIRVA occurs when an IM injection intended for the deltoid muscle has been administered too high for example, in the shoulder joint, which initiates an inflammatory process, causing damage to the bursae, tendons, and ligaments.
 - Injections that occur below the deltoid muscle can puncture the radial nerve and those that are too far to the side of the deltoid muscle can cause injury to the axillary nerve. Both landmarking errors may result in paralysis or neuropathy that does not always resolve.
- The upper border of the deltoid muscle is located one to two finger widths below the acromion process. The bottom point of the deltoid muscle can be located by drawing an imaginary line across the arm from the crease of the axilla at the front to the crease of the axilla in the back.
- The target zone for injection is 4 cm below the acromion process for adults and 3-5 cm below the acromion process for children 3-17 years of age.

Figure 5: Deltoid landmarking illustration



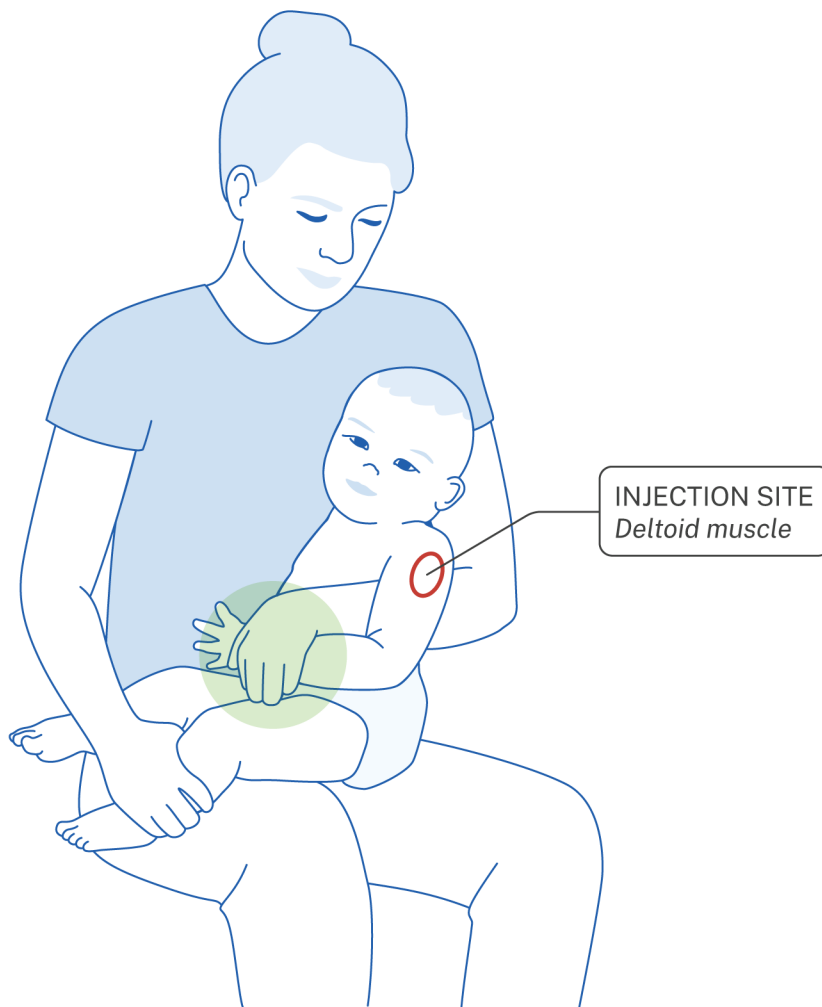
4.2.4 Stabilization Technique for the Deltoid

Toddler & Preschooler:

- Ask the parent/guardian to hold the child so that the deltoid site is clearly visible, and the child is firmly stabilized to prevent movement during the immunization.
- Ask the parent/guardian to fully uncover the child's arm and hold the child in a seated or semi-recumbent position on their lap.
 - See [Figure 6: Deltoid stabilization technique](#).

- Ensure the child's arm that is positioned closest to the caregiver is tucked into the parent/guardian's side or placed behind their back. The child's other arm is controlled with the parent/guardian's arm and hand placed over it as pictured above.
- Ask the parent/guardian to firmly hold the child's legs and feet, and control them with their free hand, if necessary.

Figure 6: Deltoid stabilization technique



Older Children & Adults:

- Advise older children and adults to sit in a straight-back chair and position their arm in a manner that exposes the deltoid muscle and relaxes the arm.
- Encourage the child/adult to place their forearms and hands in a relaxed position on their upper thigh.
- Ensure the deltoid site is clearly visible and sufficiently stabilized with non-immunizing hand to prevent as much movement as possible during immunization.

4.2.5 Ventrogluteal Landmarking

Do not use this site for vaccine administration. The ventrogluteal site is the preferred site for the IM injection of large volumes of immunoglobulin preparations such as IG, HBIG, RIG, TIG, VZIG.

- This site can be used in those over 7 months of age for immunoglobulins.
- This muscle is accessible in the supine, prone, and side lying position.
 - Position client lateral (side-lying) with the upper leg flexed and slightly in front of the lower leg. If the prone or supine position is preferred, the client should turn their toes toward the midline of the body, also known as “toe-in”, to relax the muscles.

- The right hand is used for locating the site on the left hip; the left hand is used for locating the site on the right hip.
- Place heel of the hand over the greater trochanter of the client's hip with wrist almost perpendicular to the femur.
- Point the thumb toward the client's groin and the fingers toward the client's head. Point index finger to the anterior superior iliac spine and extend the middle finger back along the iliac crest toward the buttock.
- The index finger, the middle finger, and the iliac crest form a V-shaped triangle. The injection site is the center of the triangle.
 - See [Figure 7: Ventrogluteal landmarking illustration](#) and [Figure 8: Ventrogluteal landmarking photo](#).

Figure 7: Ventrogluteal landmarking illustration

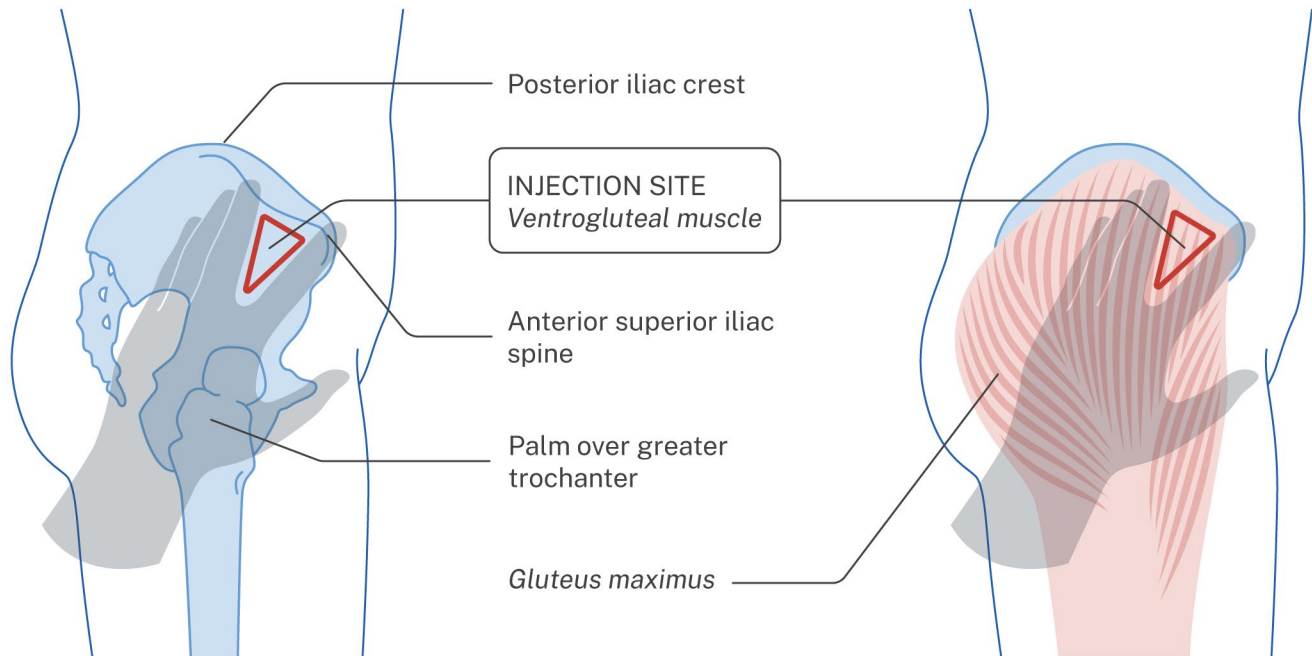
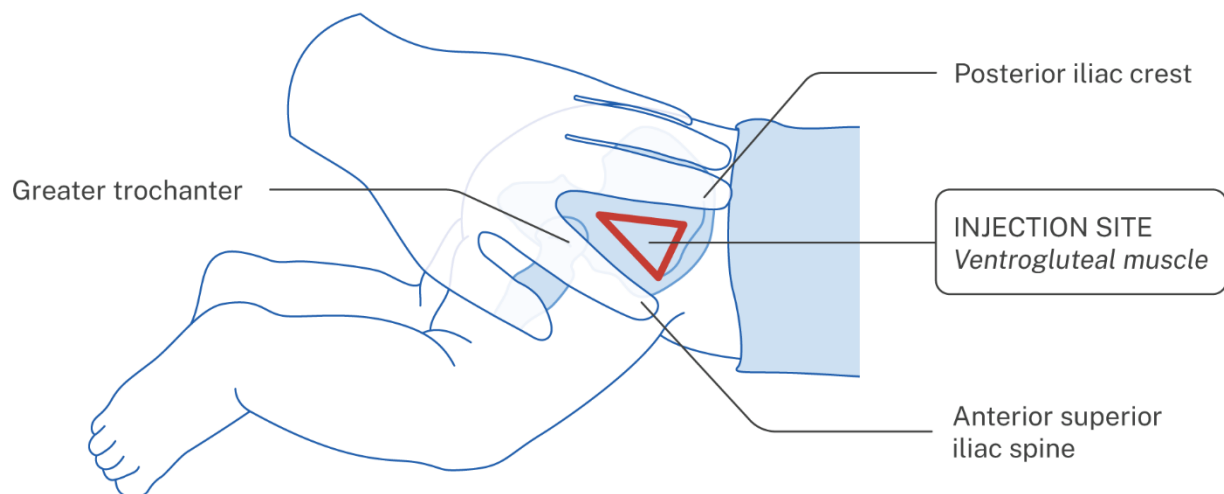


Figure 8 Ventrogluteal landmarking photo



4.2.6 Ventrogluteal Stabilization

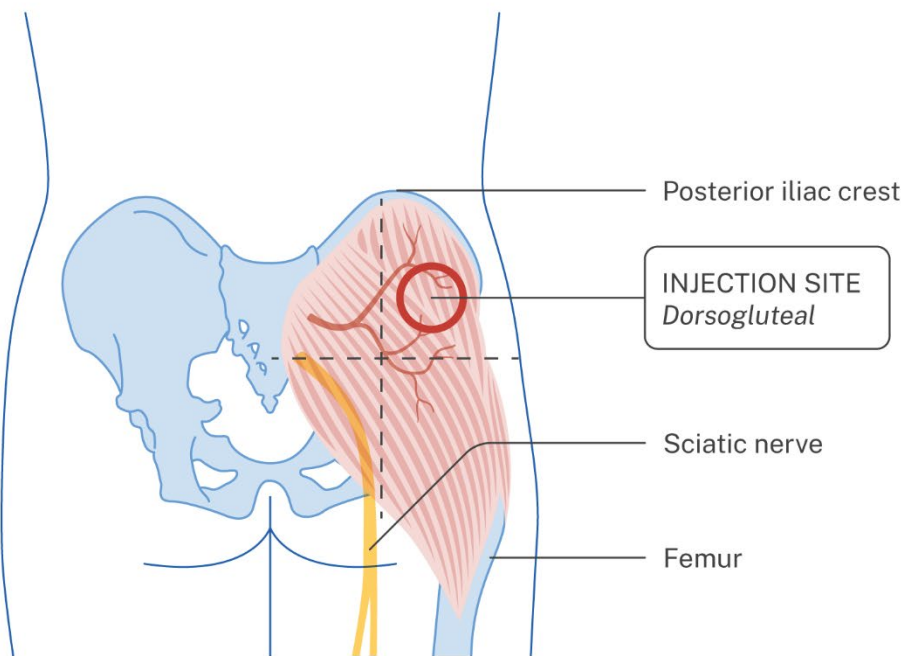
- Ensure client is comfortable in a lateral (side-lying), prone, or supine position.
- Stabilize area with non-dominant (non-immunizing) hand.
- If client is unable to remain still, encourage a support person or Public Health Nurse to assist with stabilization.

4.2.7 Dorsogluteal Landmarking

Only use the dorsogluteal as an alternative site for IM injection of large volumes of immunoglobulin preparations, when the ventrogluteal and vastus lateralis sites have had maximum volumes administered. The ventrogluteal site is the preferred site for the IM injection of large volumes of immunoglobulin preparations.

- Only use this site for those 5 years of age and older.
- Do not use the dorsogluteal site for vaccine administration, as it can be less immunogenic and increases the likelihood of sciatic nerve injuries.
- Place client in a prone, side lying, or standing position.
- Position client in a posture that will encourage muscular relaxation and reduce discomfort when:
 - Prone, turn toe toward the midline known as “toe-in”
 - Lateral side lying, flex the upper leg at hip and knee
 - Standing, flex the knees and lean upper body against a support.
- Divide the buttock into four quadrants to landmark the site. The injection site is the centre of the upper outer quadrant
 - See [Figure 9: Dorsogluteal landmarking](#).
- Direct the needle anteriorly (for example, if the client is lying prone, direct the needle perpendicular to the table's surface, not perpendicular to the skin plane).

Figure 9: Dorsogluteal landmarking



4.2.8 Dorsogluteal Stabilization

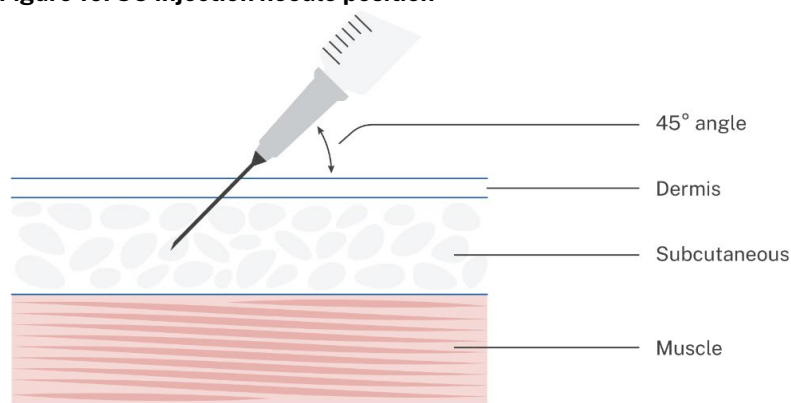
- Ensure client is comfortable in a lateral side-lying, prone position or standing.
- Stabilize area with non-dominant (non-immunizing) hand.
- If client is unable to remain still encourage a support person or Public Health Nurse to assist with stabilization.

4.3 Subcutaneous (SC) Injection Technique

Table 3: Subcutaneous (SC) Injection Technique Procedure

Procedure	Rationale
Use correct length and gauge of needle.	See Table 1: Injection Site, Age, Volume, and Equipment Guidelines .
Pinch up on the SC tissue, using the thumb and forefinger.	Prevents injection into the muscle.
Insert needle quickly and firmly at a 45° degree angle. See Figure 10: SC Injection needle position . For larger clients, use a longer needle and inject at a 90° angle to reach SC tissue.	Quick, firm insertion minimizes discomfort.
Do not aspirate.	Aspiration is not recommended as there is no data to document its necessity prior to SC injection of biological products.
Inject biological product.	Rapid injection is no longer recommended as there is a lack of evidence supporting the effect of rapid injection on reduction of immunization pain.
SC injection video link	Immunize Canada video: IM and SC adult and child injection (9 min 13 sec)
Remove the needle in one swift motion. Immediately apply pressure to the injection site with a dry cotton ball. Do not massage injection site.	Minimizes discomfort and bruising during needle withdrawal. Massage can damage underlying tissue.
Activate the safety mechanism and discard into biomedical waste container.	Minimizes risk of needlestick injury and potential exposure to infectious diseases.
Once all documentation is complete, discard all empty vials into the biomedical waste container.	Improper disposal of biological products can contaminate the environment.

Figure 10: SC Injection needle position



4.4 Subcutaneous (SC) Landmarking & Stabilization

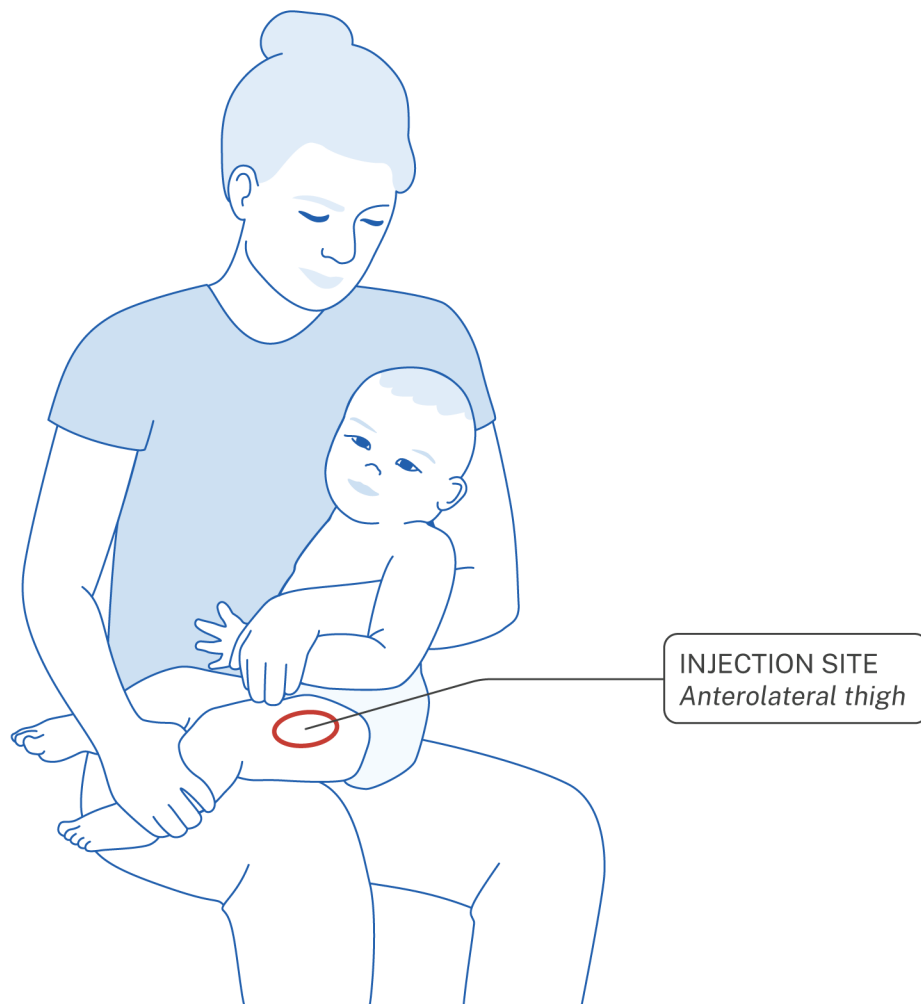
The two primary SC administration sites are the anterolateral thigh and the upper triceps area of the arm.

- Infants (birth up to and including 11 months of age):
 - The anterolateral thigh is the preferred site.
 - If necessary, the upper triceps area of the arm may be used.
- Clients 12 months of age and older:
 - The upper triceps area of the arm is the preferred site.

4.4.1 Anterolateral Thigh Landmarking

- Administer SC injections into the fatty tissue found below the dermis and above the muscle of the anterolateral outer middle third of the thigh.
 - See [Figure 11: Anterolateral thigh landmarking](#).

Figure 11: Anterolateral thigh landmarking for SC injection



4.4.2 Anterolateral Thigh Stabilization

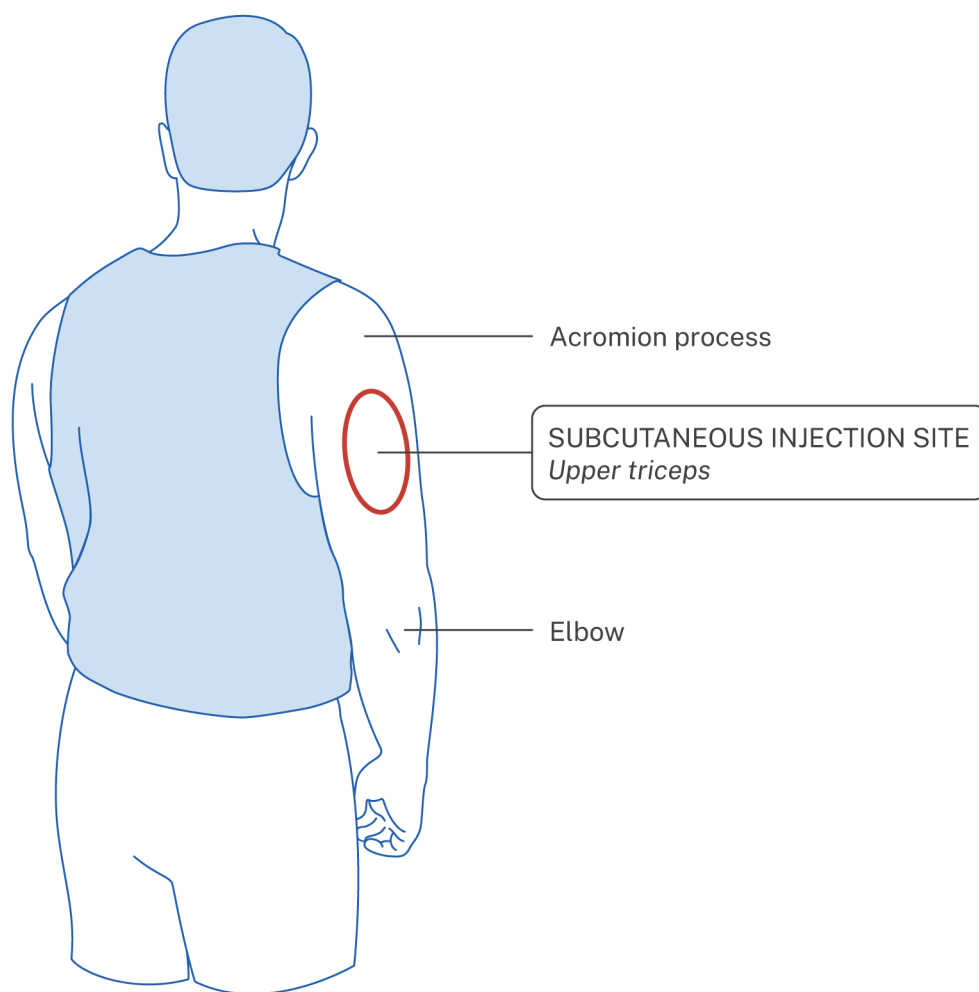
Refer to [vastus lateralis](#) stabilization techniques section.

4.4.3 Upper Triceps Landmarking

Administer SC injections into the fatty tissue found below the dermis and above the muscle of the upper triceps dorsal part of the upper arm.

- See [Figure 12: Upper triceps landmarking](#).

Figure 12: Upper triceps landmarking for SC injection



4.4.4 Upper Triceps Stabilization

Refer to [deltoid stabilization](#) techniques section.

4.5 Intradermal (ID) Injection Technique

Table 4: Intradermal (ID) Injection Technique Procedure

Procedure	Rationale
Use correct length and gauge of needle.	See Table 1: Injection Site, Age, Volume, and Equipment Guidelines .
Gently stretch the skin with non-dominant hand in the selected region between thumb and index finger. TB Skin Tests: The inner forearm is the preferred site for TB skin tests. - The scapula is an alternate site if the forearm is contraindicated (see Figure 16: Landmarking sites for ID administration of rabies vaccine) Rabies Vaccine: The mid-deltoid is the preferred site for rabies vaccine given ID. - Alternatively, the anterolateral area of the thighs and suprascapular areas can be used as well (see Figure 16: Landmarking sites for ID administration of rabies vaccine)	Ensures that biological product reaches the ID layer of skin.
Insert the needle with the bevel facing upwards, at an angle of 5° to 15° until the bevel is under the skin. See Figure 13: Intradermal injection needle position. Hold the syringe in place with your thumb and forefinger. Stability of limb and needle needs to be maintained at all times.	Ensures that the sharp tip pierces the skin first making for easier injection. Minimizes discomfort for the client.
Do not aspirate.	Ensures needle remains situated in dermis.
Inject biological product slowly with controlled pressure.	Injection of the solution in the dermis may cause a burning and prickling sensation.
A pale elevated wheal (bleb) 6-8 mm in size should appear. (See Figure 14: Intradermal injection photo)	This indicates product was administered intradermally.
If an elevated wheal (bleb) does not appear, repeat the procedure using an alternate anatomical site (different limb).	This indicates the product was not administered intradermally. If leakage occurs at the injection site, the needle bevel may not have been inserted far enough into the skin.
Remove the needle in one swift motion and gently sponge the injection site with a dry cotton ball. Do not apply any adhesive bandages.	Minimizes discomfort and interference with wheal (bleb).
Activate the safety mechanism and discard into biomedical waste container.	Minimizes risk of needlestick injury and potential exposure to infectious diseases.
Once all documentation is complete, discard all empty vials into the biomedical waste container.	Improper disposal of biological products can contaminate the environment.
ID injection video links	Centers for Disease Control and Prevention – United States Government videos Mantoux tuberculin skin test (26 min 37 sec) ID injection in forearm, deltoid and scapula (min 49 sec)

Figure 13: Intradermal injection needle position

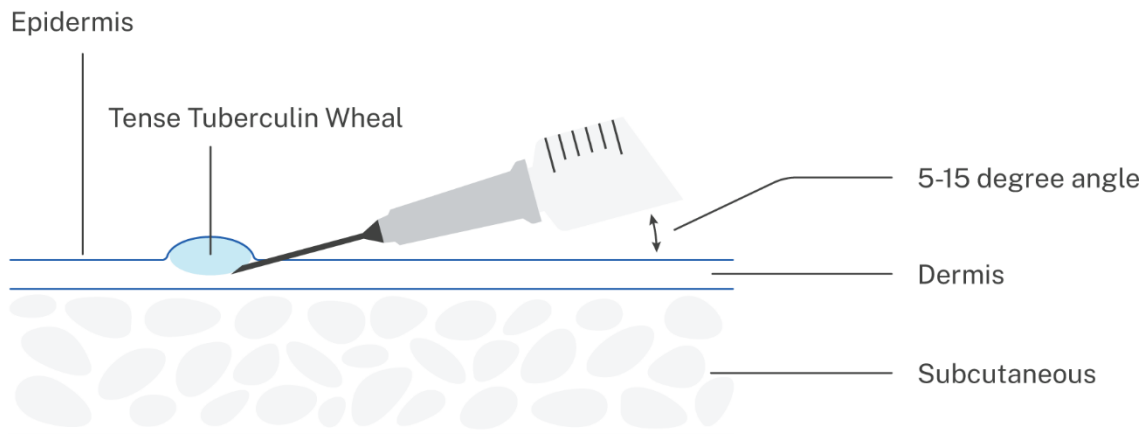


Figure 14: Intradermal injection photo



Image retrieved from: U.S. Centers for Disease Control and Prevention Public Health Image Library (PHIL)
<https://phil.cdc.gov/details.aspx?pid=6806>

4.6 Intradermal (ID) Landmarking & Stabilization

Administer ID injections into the dermis, just below the epidermis.

- The flexor (inner) surface of the forearm is the preferred site for TB skin tests.
- The mid-deltoid is the preferred site for rabies vaccine given ID.
- Choose an injection site that is free from lesions, rashes, moles, or scars, which may alter the visual inspection of the test results.

4.6.1 Intradermal (ID) Landmarking (TB skin test)

Flexor (inner) surface of the forearm.

- Correct positioning of the client is a critical step in ensuring the biological product is administered in the correct site.
 - See [Figure 15: Forearm landmarking for TB skin test.](#)

Figure 15: Forearm landmarking for TB skin test



Retrieved from: <https://wtcs.pressbooks.pub/nursingskills/chapter/18-4-administering-intradermal-medication/>

4.6.2 Intradermal (ID) Stabilization

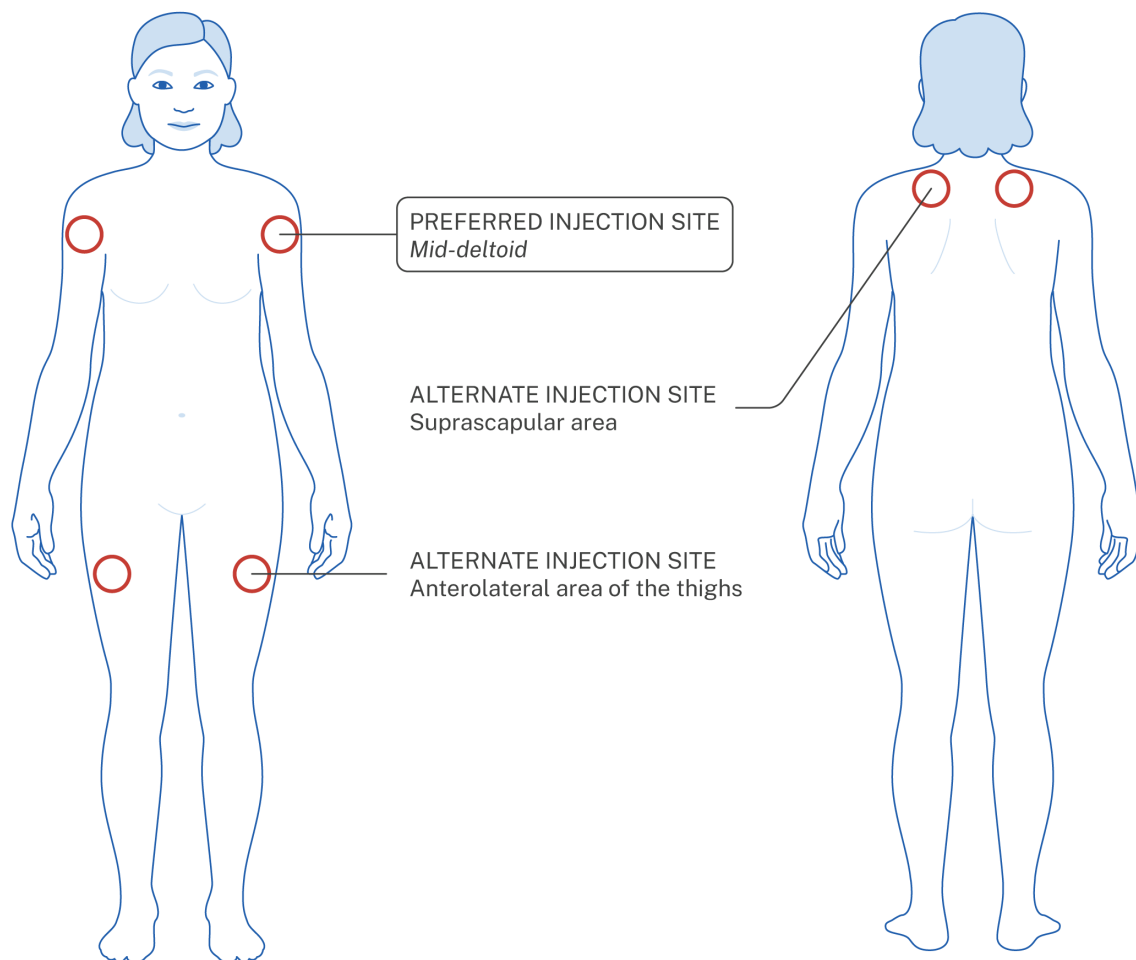
- Advise older children and adults to sit in a straight-backed chair with the inner surface of the forearm area exposed. Encourage client to keep forearm in a relaxed position on a stable surface.
- Instruct the parent/guardian to hold the child such that the injection site is clearly visible to the immunizer and the child is sufficiently stabilized to prevent as much movement as possible during the injection.

4.6.3 Mid-Deltoid Landmarking (Rabies ID)

Administer ID rabies vaccine in the mid-deltoid area of the arms.

- See [Figure 16: Landmarking sites for ID administration of rabies vaccine.](#)
- The anterolateral area of the thighs and suprascapular areas can be used as alternative sites.
- When two or more doses of vaccine are administered at the same visit, different sites/limbs should be used for each dose.

Figure 16: Landmarking sites for ID administration of rabies vaccine



4.6.4 Mid-Deltoid Stabilization (Rabies ID)

Refer to [deltoid stabilization](#) techniques section.

4.7 Oral Administration Technique

Table 5: Oral Administration Technique Procedure

Procedure	Rationale
Use oral applicator provided by manufacturer.	
Refer to manufacturer's instructions for detailed information on administration.	Administration of Rotarix vaccine in an oral applicator Administration of Rotateq vaccine in an oral applicator
Administer the liquid slowly down one side of the inside of the cheek (between the cheek and gum) toward the back of the mouth.	To avoid the initiating the gag reflex. Never administer or spray (squirt) the vaccine directly into the throat.
Once all documentation is complete, discard all empty vials into the biomedical waste container.	Improper disposal of biological products can contaminate the environment.

4.8 Alternative Oral Administration Technique through a Nasogastric (NG), Nasojejunal (NJ), or Percutaneous Endoscopic Gastrostomy (PEG) Tube

- Rotavirus vaccine can be administered via a NG/NJ/PEG tube.
Parent/caregiver should be engaged in ensuring appropriate tube placement and flushing of tube pre and post administration of vaccine. It is the responsibility of the health care provider to administer the vaccine.

Table 6: Vaccine Administration for Vaccines Typically Given by the Oral Route: Technique Through a Nasogastric (NG), Nasojejunal (NJ), or Percutaneous Endoscopic Gastrostomy (PEG) Tube Procedure

Procedure	Rationale
Hold infant in upright (30° angle) and cradling position.	To avoid aspiration.
Parent to ensure correct NG/NJ/PEG tube placement in the stomach.	
Parent to flush NG/NJ/PEG tube with water to prepare for vaccine administration typically given by the oral route. Disconnect the syringe from the feeding tube and recap while you prepare the vaccine.	Ensures NG/NJ/PEG tube is patent
Preparation of vaccine for administration - Remove barrel of the syringe - Reconnect the syringe to NG/NJ/PEG tube - Squeeze vaccine into syringe and allow to settle into syringe - Reconnect plunger into barrel of syringe - Slowly inject vaccine at a rate of 1 mL/minute - Disconnect syringe once all vaccine is pushed into the NG/NJ/PEG tube Recap the end of the NG/NJ/PEG tube while preparing the post-vaccine administration flush	Ensures air stays above the vaccine in the syringe to avoid excess gastric air. To prevent spillage of vaccine from open end of NG/NJ/PEG tube.
Parent to flush NG/NJ/PEG tube with water after vaccine administration.	Ensures all vaccine is delivered into stomach.
Once all documentation is complete, discard all empty vials into the biomedical waste container.	Improper disposal of biological products can contaminate the environment.

Section 5: Client Observation

Advise clients to stay at the clinic for 15 minutes after all immunization appointments to monitor for signs and symptoms of anaphylaxis.

Extend the observation period to 30 minutes when a person has a history of anaphylactic reaction to any agent (for example, vaccines, biologicals, medication, food, and/or environment).

Section 6: Reducing Immunization Injection Pain

Commitment to Comfort

Immunizations can be a source of distress for individuals of any age. Unaddressed pain and anxiety associated with immunization can increase fear leading to avoidance of future medical procedures and lack of adherence to immunization schedules. It is estimated that up to 25 percent of adults and 60 percent of children have a fear of needles. Efforts to minimize pain can help promote satisfaction and trust in health care providers and potentially prevent

the development of needle fears. Evidence exists for effective pharmacologic, physical, and psychological interventions to manage pain during immunization.

When immunizing infants and children, it is important to recognize that the parent/guardian may also be stressed and may have difficulty knowing how to support their child. Health care providers can coach parents/guardians to empower them with the skills to comfort their child during the immunization procedure. Additionally, health care providers can share written materials on strategies to reduce pain before the immunization appointment

[AHS Commitment to Comfort](#) supports people of all ages to have a more comfortable healthcare experience and can help to lessen pain and distress experienced during immunization.

The five [Commitment to Comfort](#) (CTC) principles include:

1. Make a Comfort Plan
2. Use Numbing Cream
3. Position Comfortably
4. Use Distraction
5. Use Positive Language.

Pain Management Strategies

Physical

- Position of client
 - Ensure proper and comfortable positioning of client using stabilization strategies.
 - Individuals greater than or equal to 7 years of age with a history of fainting, can be immunized lying down.
- Breastfeeding/Bottle feeding
 - Provides a non-pharmacological method to help reduce pain and anxiety during immunization that combines skin-to-skin contact, sucking, distraction, and sweet taste.
 - Infants who are breastfed/bottle fed during immunization do not experience aspiration, vomiting, cyanosis or respiratory changes during the procedure.
- Non-nutritive sucking
 - Provides pain relief and distraction.
 - May be combined with sweet tasting solutions to enhance analgesic effects.

Procedural

- Do not aspirate before the injection.
 - This can increase the length of time the needle is in the tissue and potentiate the shearing action of the needle. It is not necessary because the immunization sites do not have large blood vessels.
- Order of vaccines
 - Give the most painful vaccine last to decrease overall pain from injections. This strategy is recommended for all age groups.
 - Give Rotavirus vaccine first because it has a high concentration of sucrose.

Note:

Simultaneous injections (immunizing with two nurses at the same time) are not recommended due to a lack of evidence of effectiveness and lack of feasibility.

Psychological

- Verbals/Non-verbals
 - Provide a verbal signal prior to immunization as this will help decrease the chance of sudden movements in individuals being immunized.
 - Be aware of individuals that prefer to disengage and do not want a prompt as it might increase their stress.
 - Use positive language when describing immunization procedure
 - Suggestions include: “You will feel some pressure / squeezing / a twinge...” versus “You will feel a sting / stab / ache.”
 - Maintain a neutral facial expression and avoid negative expressions such as grimacing.

- Parent/Guardian Coaching
 - Remind parents/guardians that they can decrease children's pain-related distress by remaining calm, being matter of fact, include humour, and redirect the child's attention.
- Distraction
 - Involves taking attention away from the procedure and may reduce pain.
 - Choose age-appropriate distraction techniques such as parent supplied toys, electronics, music, talking, and deep breathing.
- Environment
 - Establish a calm environment which facilitates trust and respect.
 - Provide a private room when possible.
 - Immunize the most anxious child or client first.

Note:

It is not the expectation for the PHN to provide counselling regarding severe needle phobia.

Pharmacological

- Topical anesthetics
 - May reduce pain from cutaneous needle procedures.
 - Do not use with ID administration. May use with IM and SC administration.
 - If parent/guardian wishes to use topical anesthetics, they should be referred to their physician or pharmacist for product recommendations and instructions for use.
 - The Public Health Nurse can educate the individual/parent/guardian about the exact site for topical anesthetic application.
- Oral analgesics
 - Oral analgesics/antipyretics such as acetaminophen or ibuprofen can be used for treatment of minor common reactions such as fever or injection site discomfort that might occur following immunization.
 - There is no evidence that antipyretics prevent febrile seizures and therefore there is no need to recommend prophylactic antipyretic use.
 - Not recommended for prophylactic pain management.
 - Advise parents/guardians to follow the instructions on the label of the product they are using and to be aware of the concentration of medication. Parents may consult pharmacist and/or primary healthcare provider if unsure of appropriate dosage.

Education

- All immunizers should be educated in pain management techniques.
- Provide pain management strategies such as verbal instruction, pamphlet or videos.
- Resources for Parents related to pain management strategies include:
 - Immunize Canada:
 - [Pain Management During Immunizations for Children](#)
 - [Immunize Canada YouTube Channel](#)
 - [Addressing Vaccination Anxiety for Children: Strategies for Vaccine Recipients and Caregivers](#)
 - [Reduce the Pain of Vaccination in Children Under 3 Years: A Guide for Parents.](#)

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