# Module 9
## Administration of Immunizing Agents

1. Competency .................................................................................................................. 1
2. Skills Assessment............................................................................................................. 1
3. Learning Objectives ......................................................................................................... 1
4. Introduction ...................................................................................................................... 1
5. Safety in Clinics ................................................................................................................. 1
6. Seven Rights of Immunization .......................................................................................... 3
7. Administration of Immunizing Agents ............................................................................... 5
8. Summary ........................................................................................................................... 11
9. Required Reading ............................................................................................................. 11
10. Optional Reading ............................................................................................................. 12
11. References ....................................................................................................................... 12
12. Quiz ................................................................................................................................. 12
13. Quiz Answers ................................................................................................................... 14
14. Appendix .......................................................................................................................... 15
1. Competency
Prepares and administers immunizing agents correctly.

2. Skills Assessment
- Demonstrate the steps involved in immunizing agent preparation, including reconstitution if appropriate, administration and disposal.
- Choose the correct needle length and gauge for the age and size of the client
- Demonstrate the age appropriate injection sites and proper client positioning used for immunization
- Demonstrate the appropriate technique for immunization

3. Learning Objectives
By the end of this module you will be able to:
- Name the resources that are used to guide immunization administration process and decision making.
- Describe actions taken to increase safety in immunization clinics related to the provider, the recipient and the environment.
- Name the 7 “Rights” of immunization: right client, right reason, right product, right time, right dose, right route and right documentation.
- Describe the steps involved in immunizing agent preparation, including reconstitution if appropriate, administration and disposal.
- Choose the correct needle length and gauge for the age and size of the client.
- Describe the age appropriate injection sites and proper client positioning used for immunization.
- Describe techniques to reduce the pain associated with immunization.

4. Introduction
Appropriate vaccine administration is a key element to ensuring the optimal safety and efficacy of vaccines.

5. Safety in Clinics
The following provides conditions for a safe clinic environment.
5.1 Standard Principles

- Gloves are not required when administering vaccines unless the vaccinator has open hand lesions or will come into contact with potentially infectious body fluids.
- Wash hands well or use a sanitizer between clients.
- To prevent accidental needle stick injury:
  - use safety needle with safety mechanism to recap needle
  - if not using a safety needle, do not recap needle
- Discard uncapped needle or safety needle and syringe in hard sided sharps container.
- Position sharps container out of reach of client and children.
- Report percutaneous (needle stick) injuries immediately to supervisor for consideration of possible post-exposure immunoprophylaxis.

5.2 Positioning of Client

Immunization positions should be explained to a client prior to the administration of an injection.

- Expose and immobilize the injection site in order to prevent injury to the client and to the immunizer.
- Have the client sit (or an infant held) during immunization.
- Have the client lie down if the client has a history of fainting.

5.3 Pain and Anxiety Reduction Techniques

Pain associated with immunizations is generally described as mild and short-lived, and no specific pharmaceutical pain reduction strategies are recommended for routine use. However, clients may have increased levels of pain or anxiety regarding injections. You can help a client deal with pain and anxiety by using the following age dependent techniques.

<table>
<thead>
<tr>
<th>Age</th>
<th>Technique</th>
</tr>
</thead>
<tbody>
<tr>
<td>Infants/Younger Child</td>
<td>Comforting the child by:</td>
</tr>
<tr>
<td></td>
<td>• Swaddling</td>
</tr>
<tr>
<td></td>
<td>• Holding or sucking (pacifier or nursing)</td>
</tr>
<tr>
<td>Children</td>
<td>Distract the child with:</td>
</tr>
<tr>
<td></td>
<td>• Books</td>
</tr>
<tr>
<td></td>
<td>• Toys</td>
</tr>
<tr>
<td></td>
<td>• Blowing bubbles</td>
</tr>
<tr>
<td></td>
<td>• Counting</td>
</tr>
<tr>
<td>Adults</td>
<td>• Relaxation exercises such as deep breathing</td>
</tr>
<tr>
<td></td>
<td>• Reposition to reduce muscle tension.</td>
</tr>
</tbody>
</table>
5.4 Post Immunization Practices
Instruct the client to wait in the clinic area for 15 minutes after the vaccination in case of an allergic reaction. Where recipients of an immunizing agent choose not to remain under supervision after immunization, inform them of the signs and symptoms of anaphylaxis and instruct them to obtain immediate medical attention should symptoms occur.

6. Seven Rights of Immunization
The College of Registered Nurses of BC (CRNBC) practice standards describe the seven (7) rights of immunization:

6.1 Right Client
Each of the factors listed below must be assessed.

- Health Status
  - Past health history
  - Current state of health, including presence of a health condition that is an indication for specific publicly-funded vaccines

- Contraindications
  A contraindication is a condition that significantly increases the chance that a serious adverse event will occur if the vaccine is given. Below are some contraindications:
  - anaphylaxis to a component of the vaccine
  - significant immunosuppression (live vaccines only)
  - pregnancy (live vaccines only)

- Precautions
  A precaution is a condition that may:
  - increase the chance of an adverse reaction following immunization; or
  - compromise the ability of the vaccine to produce immunity.

Examples of Precautions:
- history of receipt of blood transfusion or blood product in the past year (if administering a live vaccine)
- receipt of a live vaccine in previous 4 weeks (if administering a live vaccine)
- immunocompromised

6.2 Right Reason
Taking into consideration the client's age, health status and history review the client's immunization record to determine which immunizing agents are recommended.
6.3 Right Product

- When choosing the right vaccine, review client history and potential immunization precautions/contraindications.

- Check the correct immunizing agent THREE times:
  - when removing from fridge
  - when drawing up/reconstituting or removing preloaded syringe from cooler
  - before immunizing agent administered

- Check the product for irregularities, damage, or particulate matter

- Reconstitution
  - use only the diluent supplied to reconstitute a lyophilized (freeze dried) vaccine
  - mix with a careful swirling motion until a uniform suspension is achieved

- For specific immunizing agent reference:

6.4 Right Time

Follow the recommended schedule for intervals between doses in a series. Consider the timing with respect to Immunoglobulin and live vaccines. The following provides resources for schedules and specific immunizing agent schedules:


6.5 Right Dose

Review the dosages for administration of the particular product. Dosages and schedule may vary with age of client. The following provides resources for schedules and specific immunizing agent schedules:


6.6 Right Route

- Needle Selection and Injection Site
  Use nursing judgment to select appropriate injection site and needle size. This nursing assessment is based upon:
  - recommended route of administration for the biological
  - client's age
  - adequacy of muscle mass
  - volume and viscosity of biological product to be administered

- Inspection of Injection Site
  Inspect the injection site for the things which may interfere with the absorption of the immunization agent. Things to look for include:
– bruises
– scars
– inflammation

6.7 Right Documentation
Documentation is required. Complete guidelines on documentation are covered in Module 12.

7. Administration of Immunizing Agents

7.1 Clinic Supplies
Prepare necessary materials for clinic:

- sterile syringes/needles
- 70% isopropyl alcohol
- cotton swabs/ bandages
- supplies for the management of anaphylaxis
- sharps container

7.2 Multiple Injections
When administering two biological products in the same limb, separate the two injections by a distance of at least 1 - 2 inches so that local reactions are unlikely to overlap.

7.3 Intradermal Injections

<table>
<thead>
<tr>
<th>Table 2 - Intradermal Injections</th>
</tr>
</thead>
</table>
| **Needle** | • 1 ml TB syringe  
• 27 gauge needle  
• 1/2 inch length |
| **Sites** | • The usual site for intradermal injections is the flexor surface of the forearm. |
| **Position** | • Have client rest their arm on a firm surface, forearm turned up. |

<table>
<thead>
<tr>
<th>Table 3 - Intradermal (ID) Injection Technique</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>PROCEDURE</strong>:</td>
</tr>
</tbody>
</table>

| **IMPORTANT POINTS**: |

<table>
<thead>
<tr>
<th>PROCEDURE</th>
<th>IMPORTANT POINTS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>• Use correct length and size of needle</td>
<td>• Allow skin to air dry to avoid a burning sensation on insertion of the needle.</td>
</tr>
<tr>
<td>• Clean the site with a cotton pad/swab moistened with 70% isopropyl alcohol.</td>
<td></td>
</tr>
</tbody>
</table>

| • Gently stretch the skin in the selected region between the thumb and index finger. |

| • Insert the needle with the bevel facing upwards, at a constant angle of 15° until the bevel disappears. | • The needle should be clearly visible beneath the skin. |
| • Inject the biological product slowly with controlled pressure. |
| • A white elevated wheal (bleb) 6-8 mm in size should appear. |
| • If an elevated wheal does not appear, repeat the procedure, (use the other arm). |
| • Remove the needle quickly and sponge the injection point with a dry cotton pad/swab/ball. |
| • Do not apply a Band-Aid after Tb skin test |
| • Injection of the solution in the dermis may cause a burning and prickling sensation. |
| • This indicates the product was not administered intradermally. |
| • Use of dry cotton pad/swab will minimize discomfort associated with alcohol on non-intact skin. |
| • A bandaid can mark the skin and confuse skin test readings. |

- Because of the decreased antigenic mass administered with ID injections, attention to technique is essential to ensure that the material is not injected subcutaneously.

### 7.4 Subcutaneous Injections

| Table 4 - Subcutaneous Injections |
### Table 5 - Subcutaneous (SC) Injection Technique

<table>
<thead>
<tr>
<th>Needle</th>
<th>Sites</th>
</tr>
</thead>
<tbody>
<tr>
<td>• 25 – 27 gauge</td>
<td>• Lateral aspect of the upper arm</td>
</tr>
<tr>
<td>• 5/8 – 7/8 inch needle</td>
<td></td>
</tr>
</tbody>
</table>

**Sites**
- Lateral aspect of the upper arm
- Acromion
- SC injection
- Elbow

**Position**
- When immunizing a child in the upper arm, have the parent/caregiver hold the child in a “cuddle” position
### 7.5 Intramuscular Injections

<table>
<thead>
<tr>
<th>PROCEDURE:</th>
<th>IMPORTANT POINTS:</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Use correct length and size of needle</td>
<td>• Pinching skin elevates SC tissue and ensures that the needle will be injected into SC tissue.</td>
</tr>
<tr>
<td>• Be sure needle size is correct. Grasp a skinfold of fatty tissue at site with thumb and forefinger. Measure skinfold from top to bottom; be sure needle is approximately one half this length.</td>
<td>• Allow the skin to air dry prior to injection to avoid a burning sensation on insertion of the needle.</td>
</tr>
<tr>
<td>• Clean the site with a cotton pad/swab/ball moistened with 70% isopropyl alcohol.</td>
<td></td>
</tr>
<tr>
<td>• Insert the needle quickly and firmly, with the bevel facing upwards, at a constant angle of 45°.</td>
<td>• Quick, firm insertion minimizes discomfort.</td>
</tr>
<tr>
<td>• For an obese client, use a longer needle and inject at a 90° angle to reach SC tissue.</td>
<td>• Injecting into compressed tissue irritates nerve fibres.</td>
</tr>
<tr>
<td>• Release the skin.</td>
<td>• Rapid injection reduces pain</td>
</tr>
<tr>
<td>• Rapidly inject the biological product.$^{1,2}$</td>
<td>• Minimizes discomfort during needle withdrawal. Alcohol on a cotton pad/swab can irritate non-intact skin.</td>
</tr>
<tr>
<td>• Remove the needle in one swift motion, immediately applying pressure to the injection site with a <strong>dry</strong> cotton pad/swab/ball.</td>
<td>• Massage can damage underlying tissue</td>
</tr>
<tr>
<td>• Do not massage the injection site</td>
<td></td>
</tr>
</tbody>
</table>

1. Rapid injection is recommended for all vaccines injected subcutaneously

2. Aspiration is not recommended as there is not data documenting its necessity
Table 6 - Intramuscular Injections

**Needle**
- Use a needle length sufficient to reach the largest part of the muscle. This is to prevent the biological being deposited in subcutaneous tissue and to decrease or prevent abscess formation.
- 21 to 25 gauge needle (depending on the viscosity of the biological product)
- For infants and toddlers use 7/8 – 1 inch needle (depending on the muscle size and the amount of subcutaneous tissue)
- For older children and adults use 1 – 1 ½ inch needle

<table>
<thead>
<tr>
<th>Sites:</th>
<th>Infants less than 12 months of age</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Vastus lateralis (anterolateral thigh)</td>
</tr>
<tr>
<td></td>
<td>Define the site by dividing the space between the trochanter major of the femur and the top of the knee into three parts; draw a horizontal median line along the outer surface of the thigh.</td>
</tr>
<tr>
<td></td>
<td>The injection site is in the middle third, just above the horizontal line.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Sites:</th>
<th>Children &gt; 12 months of age</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Deltoid muscle</td>
</tr>
<tr>
<td></td>
<td>If child has a small deltoid use vastus lateralis</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Sites:</th>
<th>Adults</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Deltoid muscle</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Sites:</th>
<th>Large volumes of immune globulin</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Sites for IM injection of large volumes of immune globulin preparations e.g., IG, HBIG, RIG, TIG</td>
</tr>
</tbody>
</table>
### Table 6 - Intramuscular Injections

<table>
<thead>
<tr>
<th>Position</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ventrogluteal: Can be used in those over 7 months of age</td>
<td></td>
</tr>
<tr>
<td>Dorsogluteal: Only used for individuals over five years of age</td>
<td></td>
</tr>
<tr>
<td>See Appendix</td>
<td></td>
</tr>
<tr>
<td>When immunizing an infant, have the parent/caregiver hold the infant in a “cuddle” or semi-recumbent position on their lap</td>
<td></td>
</tr>
<tr>
<td>For an older child, the injection arm should be held close to the child’s body while the other arm is tucked behind the parent’s/caregivers back.</td>
<td></td>
</tr>
<tr>
<td>To relax the muscle, an older child/adult may be seated with their elbow bent and their forearm resting on the arm of the chair.</td>
<td></td>
</tr>
</tbody>
</table>
Table 7 - Intramuscular (IM) Injection Technique

<table>
<thead>
<tr>
<th>PROCEDURE:</th>
<th>IMPORTANT POINTS:</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Use correct length and size of needle</td>
<td>• Allow skin to air dry to avoid a burning sensation on insertion of the needle.</td>
</tr>
<tr>
<td>• Clean the site with a cotton pad/swab/ball moistened with 70% isopropyl alcohol.</td>
<td></td>
</tr>
<tr>
<td>• Insert needle quickly at a 90° angle into muscle.</td>
<td></td>
</tr>
<tr>
<td>• If client’s muscle mass is small, grasp body of muscle between thumb and fingers before and during the injection</td>
<td>• Ensures that biological product reaches the muscle mass.</td>
</tr>
<tr>
<td>• Rapidly inject the biological product</td>
<td>• Rapid injection reduces pain</td>
</tr>
<tr>
<td>• Remove the needle in one swift motion, immediately applying pressure to the injection site with a <strong>dry</strong> cotton pad/swab/ball.</td>
<td>• Minimizes discomfort during needle withdrawal. Alcohol on a cotton pad/swab can irritate non-intact skin.</td>
</tr>
<tr>
<td>• Continue to apply pressure for 30 seconds.</td>
<td>• Minimize bruising.</td>
</tr>
<tr>
<td>• Do not massage injection site.</td>
<td>• Massage can damage underlying tissue.</td>
</tr>
</tbody>
</table>

1 Rapid injection is recommended for all vaccines injected intramuscular. It is not recommended for more viscous biological products such as immune globulin preparations or those for which the manufacturer recommends a slower administration.
2 Aspiration is not recommended as there is no data documenting its necessity.

8. Summary
The seven "7" rights of immunization must be considered when administering immunizing agents.

9. Required Reading
British Columbia Centre for Disease Control. Section IIB - contraindications and precautions for immunization, Chapter 2 Immunization program. Communicable Disease Control Manual

NSDHW Immunization Manual Chapter 8 Immunization Techniques

Part 1: General Guidelines
- Vaccine administration practices
- Timing of vaccine administration

10. Optional Reading

11. References
College of Registered Nurses of British Columbia. Medications, publication 408

12. Quiz

Question #1
Instruct client to wait in the clinic area after immunization for 15 minutes.
A. True
B. False

Question #2
A precaution is a condition in a recipient that requires an assessment of benefit-risk before immunizing.
A. True
B. False

Question #3
Which one of the following is the appropriate route for an adult Tetanus/diphtheria (Td) booster?
A. Ventrogluteal
B. Dorsogluteal
C. Deltoid
D. Lateral aspect of the upper arm

**Question #4**
History of an anaphylactic reaction to a previous dose or component of the vaccine is a precaution for immunization with that vaccine.

A. True
B. False

**Question #5**
Which one of the following is TRUE about multiple vaccine injections?

A. To reduce the number of injections, it is acceptable to mix any 2 inactivated vaccines in the same syringe
B. To reduce the number of injections, it is acceptable to mix any 2 live vaccines in the same syringe
C. Because of the chance of increased local reactions, do not inject two inactivated vaccines in the same limb
D. When administering two vaccines in the same limb, separate the two injections by 1 - 2 inches

**Question #6**
The ventrogluteal muscle is an appropriate site for subcutaneous vaccine injections in infants > 12 months of age.

A. True
B. False

**Question #7**
It is necessary to aspirate prior to administration of an intramuscular vaccine injections.

A. True
B. False
13. Quiz Answers

Question #1
Answer: True
Most instances of anaphylaxis and fainting occur shortly after an injection of vaccine.

Question #2
Answer: True
A precaution is a circumstance where if the vaccine was given it may not be as affective or there may be complications.

Question #3
Answer: C
The Deltoid muscle is the correct route for an IM Inactivated vaccine such as Td.

Question #4
Answer: False
History of an anaphylactic reaction to a previous dose or component of the vaccine is a contraindication for immunization with that vaccine.

Question #5
Answer: D
Separating two injections by a distance of at least 1 - 2 inches will reduce the chance that local reactions will overlap.

Question #6
Answer: False
The lateral aspect of the arm is the appropriate site for subcutaneous vaccine injections for infants > 12 months of age.

Question #7
Answer: False
There are no studies that assessed the need for aspiration prior to IM injection of vaccines in relation to vaccine safety.
14. Appendix

**Ventricular Positioning**
- 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.

**Dorsogluteal Positioning**
- Encourage a posture that will provide muscular relaxation and reduce discomfort (i.e. turning toes inward when prone, flexing the upper leg at hip and knee when lying on the side, flexing knees and leaning upper body against a support when standing).
- Define the site by dividing the buttock into 4 quadrants. The injection site is the centre of the upper outer quadrant.