



**GIVING INJECTIONS: SUBCUTANEOUS (SC), INTRAMUSCULAR (IM) AND INTRAVENOUS (IV)**

**1. PURPOSE**

- 1.1. This Standard Operating Procedure (SOP) instructs farm workers and students on how to safely administer common injections to cattle at the UBC Dairy Education and Research Centre.

**2. SCOPE**

- 2.1. This SOP will describe the method used to safely give subcutaneous, intramuscular and intravenous injections to cattle.
- 2.2. This document will also provide a general overview of important points to remember that impact the welfare of the animal.

**3. RESPONSIBILITY**

- 3.1. The Operations Manager is responsible for reviewing and updating this procedure as required.
- 3.2. The Operations Manager is responsible for transferring all entries made in the dairy day book to the herd management software.
- 3.3. The Operations Manager is responsible for ensuring all staff who are responsible for giving injections are trained in this procedure.
- 3.4. Training will include animal handling. See SOPs on Student Training, Moving and Chasing Cattle, Handling Cattle and Giving Vaccinations.

**4. DEFINITIONS**

- 4.1. Subcutaneous (SC or SQ) – under the skin
- 4.2. Intramuscular (IM) – into the muscle
- 4.3. Intravenous (IV) – into the vein
- 4.4. Withdrawal time: required time interval between the last treatment and the slaughter of the animal for food or sale of milk



**GIVING INJECTIONS: SUBCUTANEOUS (SC), INTRAMUSCULAR (IM) AND INTRAVENOUS (IV)**

**5. SAFETY PRECAUTIONS**

- 5.1. All personnel entering the cattle holding area will wear personal protective equipment -coveralls, and dedicated facility footwear.
- 5.2. Disposable gloves are also to be worn when giving injections.
- 5.3. Care will be taken when handling sharps. Needles and syringes will be disposed of in an appropriate sharps container.
- 5.4. All personnel must know how to safely move cattle from pen to pen.
- 5.5. Always thoroughly wash hands with soap and water when leaving the barn.

**6. GENERAL**

- 6.1. All injections will be recorded in the day book located in the vet room, to be transferred to the herd management software by the Operations Manager.
- 6.2. Administer material as per label directions for amount and delivery method. **Read the label!**
- 6.3. Ensure you have the correct product name, drug concentration, dosage and route for the species receiving the injection.
  - 6.3.1. It is recommended to **triple check** the label: once when getting the product off the shelf, once when drawing up the product, and once when about to administer.
  - 6.3.2. Prepare the injections in the vet room (adjacent to the sorting area) or on a table beside the sorting pen if there are multiple cows receiving the same injections (as may be the case with hormone injections).
  - 6.3.3. Label the syringe with the number of the cow(s) receiving the injection, and place in a tray until needed.
- 6.4. Store bottle as per label directions.
- 6.5. Respect any withdrawal times for the product being given.
- 6.6. Place a red leg band on animals given antibiotics. Animals with coloured leg bands will have their milk diverted from the main line. (See SOP 016 – Milking Procedures)

**7. MATERIALS AND EQUIPMENT**

- 7.1. Needles – 14 - 20 gauge, 1-2” in length



## GIVING INJECTIONS: SUBCUTANEOUS (SC), INTRAMUSCULAR (IM) AND INTRAVENOUS (IV)

- 7.2. IV kit
- 7.3. Syringes of appropriate size
- 7.4. 4x4" sterile gauze
- 7.5. 70% isopropyl alcohol
- 7.6. Material for injection – calcium, dextrose, anti-inflammatories, antibiotics, hormones
- 7.7. Headlock and/or halter for restraint

### 8. PROCEDURE-GENERAL

- 8.1. Identify animal(s) that need an injection.
- 8.2. Unless animal is 'down' or perceived to be weak, ensure the animals are restrained in a headlock. See SOPs on Moving and Chasing Cattle, and Handling Cattle.
- 8.3. Retrieve the required supplies from the vet room while the animals are "locking up" (entering the head lock) and eating.
- 8.4. Clean hands thoroughly with soap and hot water before injection and when leaving the barn.
- 8.5. Disinfect the top of the bottle with alcohol. Gently mix the bottle as per the label to suspend contents.
- 8.6. Draw up the required volume according to the label/veterinarian's directions.

Split large volumes into smaller amounts and inject in different locations. Generally, for IM injections, limit is 10-15 ml/site; for SC injections, limit is 20 ml/site. If more than the recommended limit/site is required, split the dose in half and administer in 2 locations.

- 8.7. Use a fresh sterile needle and syringe for each injection.

Use the smallest needle gauge and syringe possible (dependent on size of animal, location, viscosity and volume of product).

Use the correct needle length for the location of the injection.

- 8.8. Clean the injection site thoroughly with alcohol and the cotton gauze before administering. **Do not inject through dirty skin!**



## GIVING INJECTIONS: SUBCUTANEOUS (SC), INTRAMUSCULAR (IM) AND INTRAVENOUS (IV)

### 9. PROCEDURE – SUBCUTANEOUS INJECTIONS

- 9.1. Subcutaneous injections are given in the neck area (see Figure 1)
- 9.2. For personal safety, move to the outside of the pen (by cow's head) to administer the injection.
- 9.3. Use a 16-20 gauge needle, 1 inch long.

Use the smallest gauge possible for the size of animal and viscosity of the solution.

- 9.4. Tent the skin, and advance the needle under the skin at a 30-45 degree angle in the triangular area of the neck as shown in Figure 1.
- 9.5. Draw back on the syringe to ensure no blood enters the syringe. If not, then inject. If blood is present, remove needle and try again in a nearby location.

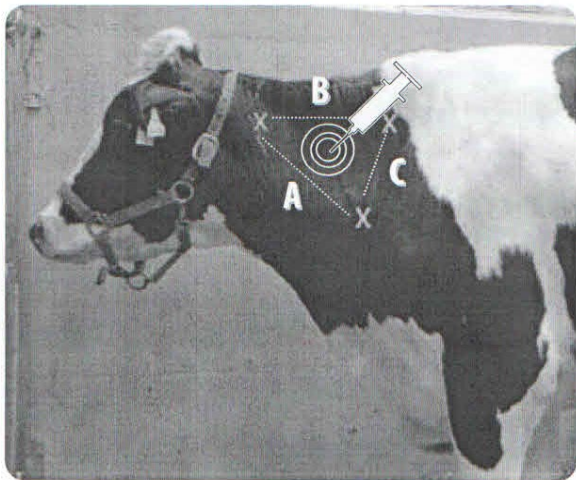
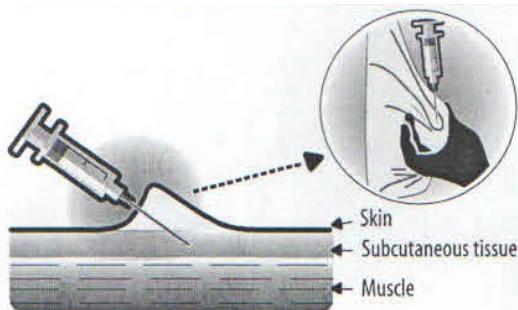


Photo credit: CAMBRN and Clinique ambulatoire, CHUV, Faculté de médecine vétérinaire, Université de Montréal

**Fig 1. Subcutaneous Injections**

- SC injections are given in the neck.
- Tent skin to ensure you are not in the muscle.
- Advance the needle under the skin at 30-45 degree angle into the centre of the triangle area, bounded by the spine A, ligament of the neck B, and shoulder line C.
- Draw back. If no blood visible, inject. If blood present, remove needle and reattempt.



### SUBCUTANEOUS - SC

In order to minimize carcass damage, insert the needle in a skin fold of the neck, forward of the shoulder. Use a 16 to 20 gauge needle, 2.5 cm long (1 inch).



## GIVING INJECTIONS: SUBCUTANEOUS (SC), INTRAMUSCULAR (IM) AND INTRAVENOUS (IV)

### 10. PROCEDURE – INTRAMUSCULAR INJECTIONS

- 10.1. Intramuscular injections are given in the caudal thigh (back of thigh - see Figure 2).
- 10.2. For personal safety, stand close and to the side of the animal's back end to administer the injection. Standing close will minimize injury if the animal was to kick.
- 10.3. Use a 16-20 gauge needle, 1.5 inch long.  
  
Use the smallest gauge possible for the size of animal and viscosity of the solution.  
  
Needle length must be long enough to penetrate past the skin and fat layer into the muscle.
- 10.4. Poke skin with needle perpendicular (at right angles) to the skin.
- 10.5. Draw back on the syringe to ensure no blood enters the syringe. If not, then inject. If blood is present, remove needle and try again.

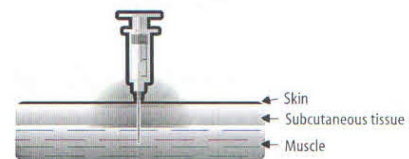
#### 1. The muscle area behind the thigh

(semitendinosus / semimembranosus)



- Inject a small volume per site: no more than 10 to 15 ml (follow label directions).
- Repeated injections in this area may cause inflammation and pain.

**Fig 2. Intramuscular Injections**  
Are given in the thigh muscle  
(x on photo) perpendicular to the  
skin.



**INTRAMUSCULAR - IM**



**GIVING INJECTIONS: SUBCUTANEOUS (SC), INTRAMUSCULAR (IM) AND INTRAVENOUS (IV)**

**11. PROCEDURE-INTRAVENOUS INJECTIONS**

- 11.1. Intravenous injections are given into the jugular vein of the neck (see Figures 3 & 4).
- 11.2. Use a 14-20 gauge needle, 1-2 inch long.
- 11.3. Intravenous injections can be made directly into the vein with a syringe (up to 60cc) or infused via an IV line for larger volumes.
- 11.4. Have your equipment set up before restraining the animal.

**DIRECT ADMINISTRATION**

- 11.4.1. Draw the required amount of medication into the syringe, and hold the needle/syringe with the point of the needle pointing up. Tap on the syringe barrel to move any air bubbles up into the needle. The air can then be removed by slowly depressing the plunger until a droplet of liquid appears.
- 11.4.2. Bring the animal up to the sorting area and allow her to lock up (see SOP on Handling Cattle). Once the animal is secured, place a halter on her head to restrain her. Animals that are 'down' will still need to be restrained to prevent any sudden moves. Gently turn her head and secure in position by tying the halter to the rails to expose the injection area.

For personal safety, remain outside of the pen (by the cow's head) to administer the injection.
- 11.4.3. Find the jugular vein. It is located in the groove below the neck muscle. Put pressure on the lower part of the vein and tap it – this will make it 'pop' out more and help visualize it. See Fig 3 & 4.
- 11.4.4. Clean the injection area over the jugular vein with a 70% isopropanol swab. In addition to cleaning the area, this will wet the hair and make the vein more visible.
- 11.4.5. Apply pressure to the jugular groove to "raise" the vein and make it more visible, and insert the needle into the cow's jugular vein. Enter about ½ the needle length perpendicular to the vein to avoid the needle sliding over the top of the vein, or going right through it. Verify that blood is flowing out of the needle, then angle the needle and push it parallel to the length of the vein to secure it in place.
- 11.4.6. Draw back the plunger to ensure the needle is in the vein (blood will come up the needle), then inject ½ of the drug.



## GIVING INJECTIONS: SUBCUTANEOUS (SC), INTRAMUSCULAR (IM) AND INTRAVENOUS (IV)

- 11.4.7. Verify that you are still in the vein by pulling back on the plunger. If there is blood present, continue administering the medication. If not, reposition the needle, and verify that you are in the vein before finishing administering the medication.
- 11.4.8. Remove the needle and apply pressure to the injection site.
- 11.4.9. When finished giving the injections, go outside of the holding area and release the headlocks. Do not release them from inside the pen as the cows may back up quickly and knock you over.
- 11.5. Return cow to her pen.

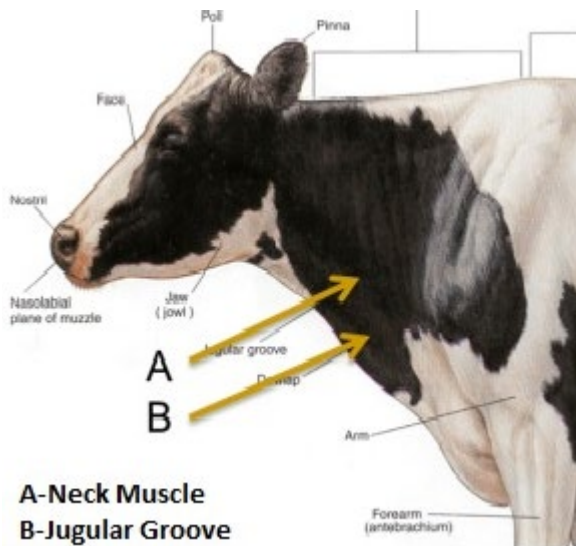


Fig 3 & 4. Locating the jugular vein (in the jugular groove), and turning the cow's head to make the injection.

### IV INFUSION

- 11.6. Gather all materials before restraining animal.
- 11.7. Secure animal as in section 11.4.2 above.
- 11.8. Connect the medication bottle to an IV line. Remove the cap and top from the bottle of medication and place the rubber IV tube on the open end of the bottle. Hold medication



## GIVING INJECTIONS: SUBCUTANEOUS (SC), INTRAMUSCULAR (IM) AND INTRAVENOUS (IV)

bottle high, and upside down and allow the fluid to flow through the rubber IV tube. Keep supplies sterile.

11.8.1. Once the liquid has filled the rubber tube, pinch it off with the white clasp. Ensure there is **no air present in the IV tubing.** It is now ready to attach to the needle after the needle is inserted into the vein.

11.8.2. Apply pressure to the jugular groove to “raise” the vein and make it more visible, clean area with alcohol wipe and insert the needle into the cow’s jugular vein. Enter about ½ the needle length perpendicular to the vein to avoid the needle sliding over the top of the vein, or going right through it. Verify that blood is flowing out of the needle, then angle the needle and push it parallel to the length of the vein to secure it in place.

11.8.3. Once blood is visible, quickly attach the IV line to the needle, open the line and ensure fluid is flowing. Allow the medication to run into the vein by gravity flow at an appropriate rate for the substance being administered. The flow rate can be adjusted as necessary by manipulating the roller clamp on the tubing.

11.8.4. Periodically check the injection site to make sure the area is not becoming swollen which would indicate that the needle has come out of the vein and the liquid is going into the surrounding tissue. If the area is becoming swollen, stop the flow of medication and remove the needle. Detach the needle from the IV line, redirect the needle into the vein, and verify that you are in the vein by visualizing blood coming out of the needle. Reconnect the tubing and continue administering the fluid.

11.8.5. Check that the medication is flowing well at the appropriate rate, as indicated by the level going down in the bottle.

11.8.6. Remove the needle once all of the medication has been given, and apply pressure to the injection site to stop further bleeding.

11.8.7. Remove the halter and release the headlock. Return animal to her pen.

## 11. REFERENCES

12.1 CCAC Guidelines on the Care and Use of Farm Animals in Research, Teaching and Testing. CCAC. 2009.

12.2 Code of Practice for the Care and Use of Dairy Cattle. National Farm Animal Care Council. 2009

12.3 OMAFRA website. Giving Medication to Animals by Injection. Fact Sheet. Accessed Nov 2019.





**GIVING INJECTIONS: SUBCUTANEOUS (SC), INTRAMUSCULAR (IM) AND INTRAVENOUS (IV)**

**12. RELATED SOPS**

- 13.1. SOP-General-001 Student Training
- 13.2. SOP-Cow-006 Moving and Chasing Cattle
- 13.3. SOP-Cow-013 Giving Calcium
- 13.4. SOP-Cow-016 – Milking Procedures
- 13.5. SOP-Cow-023 Handling Cattle

**14. APPROVAL AND REVISION HISTORY**

Author/Approver	Date	Signature
<b>History</b>		
Document #	Revision #	Changes