

# Administration of Medicine and Vaccine to Cattle

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Every cattle producer needs to give various drugs and vaccines to animals on a regular basis. This fact sheet provides information about the care of drugs and vaccines, the instruments required to administer these materials and techniques for getting the medication into cattle. A veterinarian is the producer's best source of information about the type of drug needed and method of administration.

Clostridial organisms, the cause of blackleg and many other cattle diseases, are everywhere in the farm environment and can easily contaminate equipment for treating animals, such as syringes and needles. Blood-borne infections, such as anaplasmosis, are commonly spread by contaminated needles, knives and dosing instruments in the hands of careless producers and veterinarians. Many other organisms, such as staphylococci, streptococci and coliform types, commonly infect cattle because of unsanitary equipment.

Syringes and needles in manufacturers' packages can be considered free of disease-causing organisms. All others should be sterilized before use by boiling for 15 minutes or immersion for 30 minutes in a sterilizing solution such as chlorhexidine quaternary ammonium compounds or similar products recommended by a veterinarian.

Large instruments such as balling guns, dose syringes and rubber and plastic instruments which, because of size and composition, cannot be boiled, need to be cleaned with detergent and water after use and then immersed in a bactericidal solution. Because of its activity in the presence of organic matter, chlorhexidine (Nolvasan) is considered one of the best for the purpose.

Modified live virus vaccines (MLV) are extremely sensitive to chemicals used for sterilization of instruments. Only instruments sterilized by boiling and then dried should be used to administer these vaccines.

## Instruments

Hypodermic syringes, (Figures 1 and 2) usually called syringes or "guns," are used to inject material

through the skin into various parts of the body. The most desirable syringes are those made of synthetic materials such as polyethylene. These are designed to be used once and then discarded. If reused, they should be thoroughly washed and boiled or disinfected with a solution before use.

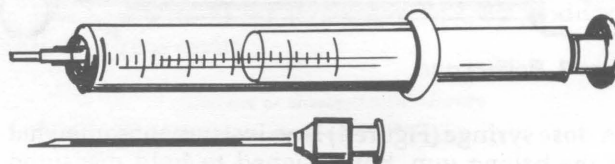


Figure 1. Glass or plastic syringe and needle.

When a large number of animals is to be given a common vaccine or other small-volume substance, a metal syringe (Figure 2) with pistol grip and dose metering apparatus can be used. This instrument is made of steel with a glass barrel and a steel or rubber plunger. Rubber gaskets seal the ends of this device. To ensure sanitary conditions, this instrument must be totally disassembled after each use, all components thoroughly scrubbed and the parts disinfected, either by boiling or immersion in a disinfectant solution. Replacement parts are available, so broken or damaged components can be replaced readily.

Needles are usually steel or aluminum of various diameters (gauge) and lengths to suit various animals and the material being injected.

Needle diameters range from 10- to 26-gauge with the diameter becoming smaller as the number becomes

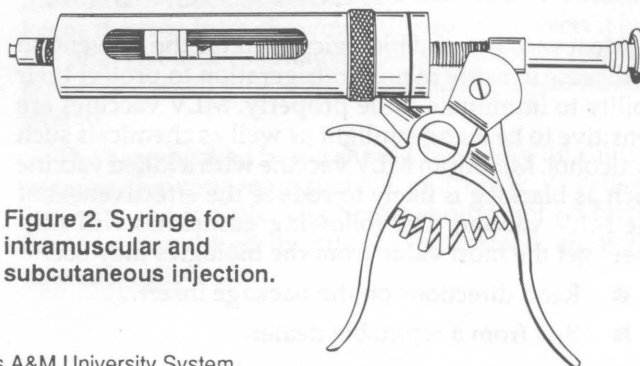


Figure 2. Syringe for intramuscular and subcutaneous injection.

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larger. Some manufacturers color code their needles to make location of the proper size easier.

Disposable needles (Figure 1) of high quality are cheap and readily available. They should be used once and discarded with the disposable syringe. Stainless steel needles are available but should be sterilized after each use in the same manner as steel syringes. After repeated use, these will become blunt and burred, but the use of a whetstone can restore their sharpness.

The **balling gun** (Figure 3) is a tubular device with plunger for introducing pills or boluses into the mouth and pharynx of cattle. Usually made of aluminum, it may have a mouth of soft plastic to lessen the chance of injury to the soft palate of the animal. The balling gun should be used with a good deal of caution because the soft tissues of the mouth and pharynx can be easily penetrated with this instrument.

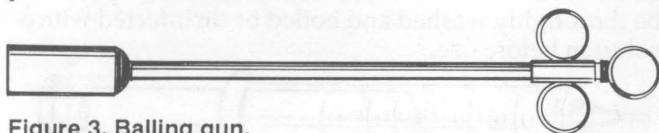


Figure 3. Balling gun.

A **dose syringe** (Figure 4) is an instrument somewhat like the balling gun, but designed to hold measured amounts of liquids and suspensions for insertion into the pharynx of cattle. Here again, extreme caution must be used to avoid damage to soft tissues. Liquid also can be drawn into the lungs if the dose syringe is used improperly.

Veterinarians use many other pieces of equipment such as the stomach tube and pump, gravity intravenous outfit and intrauterine infusion device to give medicine to cattle. Seek the instruction of a veterinarian or qualified animal health technician to learn how to use them efficiently and without harm to the animal.

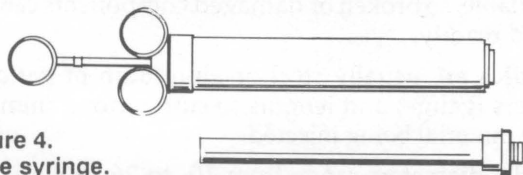


Figure 4. Dose syringe.

## Care of Vaccines and Biologics

Most vaccines and biologics used for the prevention of disease in cattle require refrigeration to protect their ability to immunize cattle properly. MLV vaccines are sensitive to heat and sunlight as well as chemicals such as alcohol. Mixing an MLV vaccine with a killed vaccine such as blackleg is likely to reduce the effectiveness of the MLV vaccine. The following guidelines will help users get the most value from the biologics they use:

- Read directions on the package insert.
- Buy from a reputable dealer.
- Buy only from a supplier who keeps materials under adequate refrigeration.

- Be cautious about special "deals." The materials may be short-dated or have been stored improperly.

- Store vaccines and biologics as indicated by the package insert.

## Restraint

To give medicine to cattle effectively without injury to either the animals or the person giving medicine, the animals must be confined. This restraint may be a narrow chute into which a number of animals may be crowded, preventing their escape or injury to the person giving medicine. A single animal can often be crowded behind a gate to be given an injection. If work about the head and mouth is required, the animal should be restrained in a head gate or cattle chute with head catcher.

## Medicine Administration

### Intramuscular

Many antibiotics and some vaccines and serums are given by the intramuscular (IM) method (Figure 5). Because of the vigorous blood supply to muscle tissue, substances injected into muscles are picked up by the blood and spread to all tissues of the body rapidly.

A needle 1 to 1 1/2 inches in length and 16 gauge in diameter is best for making IM injections. The neck is the preferred region for IM injections since some medicines and vaccines cause tissue irritation that results in abscesses and scars. This area is less costly to trim than areas of the loin and hindquarter. It is also recommended that no more than 10 cc of product be injected in any one site. IM injections should be avoided when there are other labeled routes of administration.

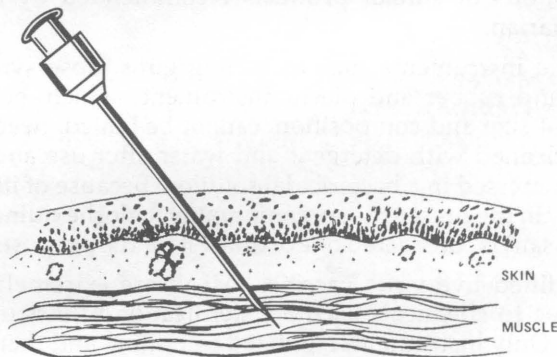


Figure 5. Intramuscular injection.

### Subcutaneous

Most vaccines and a few antibiotics are given subcutaneously (sub Q) because absorption is slower from subcutaneous tissues (Figure 7). It is not necessary that these substances be picked up by the blood as rapidly as those given by the IM method, and it may be desirable that they be absorbed more slowly.

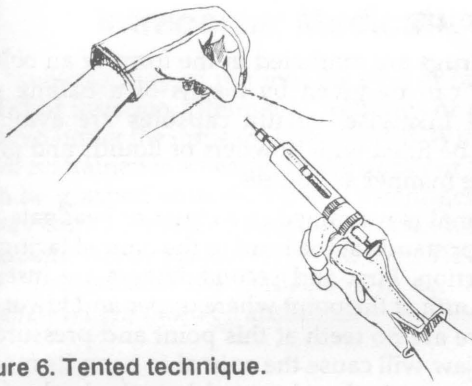


Figure 6. Tented technique.

A needle 3/4 to 1 inch in length and 16-gauge in diameter is best for sub Q. Sub Q injections need to be given in the neck using the "tented" technique (Figure 6). Grasp the skin with the thumb and forefinger to create a subcutaneous space beneath the skin in which to deposit the medicine (Figure 7).

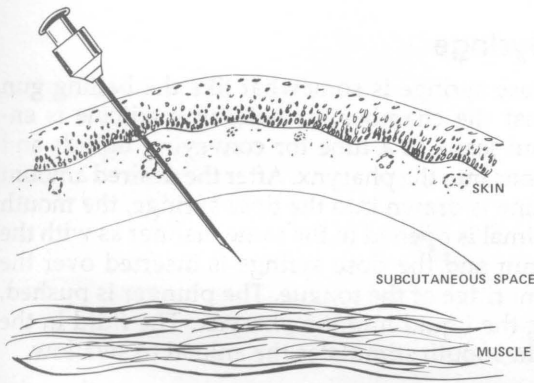


Figure 7. Subcutaneous injection.

### Intraperitoneal

Occasionally, medicines are put into the peritoneal cavity (Figure 8). Large volumes of fluids can be given by this method, and absorption is almost as rapid as by the intravenous route. A sharp 2- to 3-inch needle, 14- to 16-gauge in diameter, is best for this procedure. On the right side of the animal, the operator should locate the triangular region bounded by the last rib, lumbar processes and hip bone (Figure 9). Direct the needle into the center of this triangle straight toward the middle of the animal at a 45-degree angle. A sharp thrust of the hand and wrist should drive the needle through skin, muscle and peritoneum with one motion. Move the needle slightly to be sure it is not embedded in fat or other abdominal tissue. Then, attach the syringe or other device for delivering the medication to the hub of the needle and force the medicine into the cavity. With an intravenous tubing outfit, gravity can be used to deliver large volumes of fluid. Fluids should be warmed before injecting them into the peritoneum.

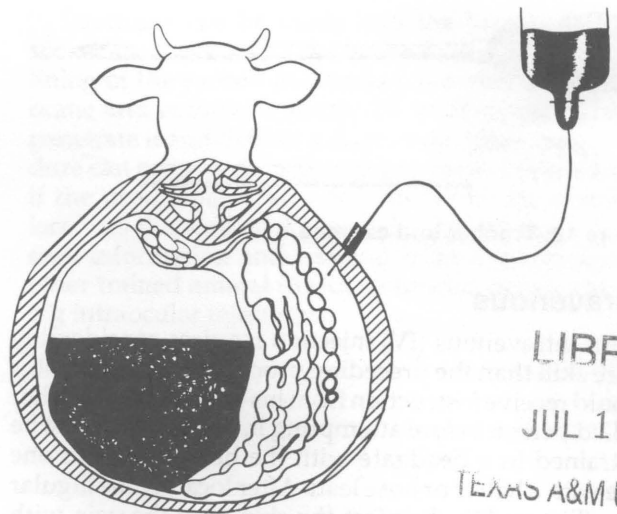


Figure 8. Intraperitoneal injection.

Irritating substances such as the sodium solutions of sulfa drugs and Terramycin should not be given by this method because of the inflammation they produce in the peritoneal cavity.

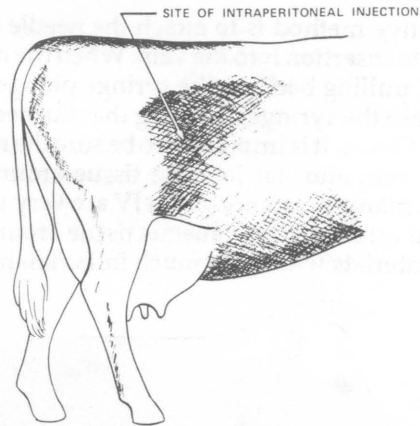


Figure 9. Site of intraperitoneal injection.

### Intraruminal

Liquid medicine is routinely put into the rumen through the mouth via a stomach tube or long-necked bottle. The Frick speculum, a hollow cylinder of metal or plastic about 2 feet long, is placed in the mouth and the stomach tube passed through it. The Frick speculum keeps the cow from chewing the tube and directs it into the pharynx and esophagus. Once in place, a stomach pump or drench gun is attached and the liquid administered.

The long-necked bottle should be used with caution because the cow may chew it and break it, causing injury to the mouth. The liquid should not be forced because it could go into the lungs. Instead, allow the cow to swallow it.

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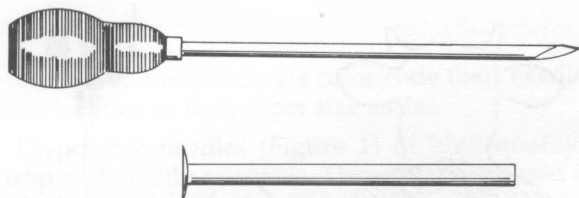


Figure 10. Trochar and cannula.

## Intravenous

An intravenous (IV) injection requires considerably more skill than the preceding procedures. The operator should receive instruction from his veterinarian or other skilled person before attempting it. The animal must be restrained in a headgate with the head turned to one side with a halter or nose lead. After locating the jugular vein (Figure 11), disinfect the skin over the vein with alcohol or "tamed" iodine. One hand compresses the vein near the point of the shoulder while the other hand thrusts a 3-inch, 16- to 18-gauge needle sharply into the vein. As soon as blood flows freely from the needle, its full length is threaded up the vein toward the head. A syringe can be attached, and medicine introduced into the blood stream or blood withdrawn as needed.

An alternative method is to attach the needle to the syringe prior to insertion into the vein. When the needle is in the vein, pulling back on the syringe plunger will draw blood into the syringe, showing that the needle is properly positioned. It is important to be sure the needle is within the vein and not in loose tissue around the vein, because many substance given IV are very irritating. If injected into the subcutaneous tissue around the vein, these materials will cause much inflammation.

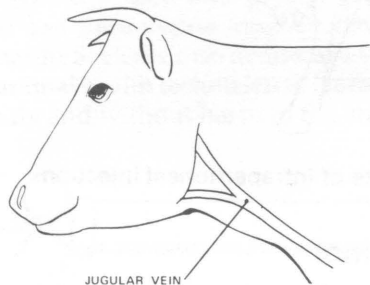


Figure 11.

## Medication by Mouth

### In Feed

Some drugs and antibiotics can be administered to cattle by mixing them with feed or water. More often than not, this method is not feasible because the medicine is not palatable, the animal is too sick to eat or drink or a higher level of drug is needed than can be conveniently mixed in feed or water. In these instances, it is necessary to dose the animal by pill, bolus or liquid drench.

## Pill or Bolus

Many drugs are marketed in the form of an oblong bolus that can be given by means of a balling gun (Figure 3). Likewise, gelatin capsules are available which can be filled with powders or liquids and given in the same manner as boluses.

The animal is restrained in a chute or headgate and the operator stands at the head of the animal facing the same direction. First and second fingers are inserted into the mouth at the point where upper and lower lips meet. There are no teeth at this point and pressure on the upper jaw will cause the animal to open its mouth. The balling gun is then inserted into the back of the mouth and passed over the prominent ridge at the back of the tongue, where some resistance may be felt. Gentle pressure usually causes the balling gun to pass over the ridge and into the pharynx where the bolus or capsule should be expelled from the balling gun. A small piece of paper towel or facial tissue wrapped around the bolus will help retain it in the balling gun until it is ejected, and also will stimulate swallowing when it is placed in the pharynx. Boluses also may be lubricated with mineral oil or cooking oil to ease passage down the gullet.

## Dose Syringe

The dose syringe is somewhat like the balling gun except that the chamber for holding medicine is enclosed and leads to a tube for conveying liquids and suspensions into the pharynx. After the desired amount of medicine is drawn into the dose syringe, the mouth of the animal is opened in the same manner as with the balling gun and the dose syringe is inserted over the prominent ridge of the tongue. The plunger is pushed, expelling the liquid into the pharynx. The fluid in the back of the mouth stimulates the animal to swallow.

It is extremely important not to ram or otherwise abuse the mouth with the tube of the dose syringe because it is quite easy to penetrate the soft tissues and deposit the medicine there rather than in the back of the mouth.

## Intranasal Medication

Certain vaccines are designed for injection into the nasal passages of cattle. These products usually are supplied with plastic cannulas which resemble blunt needles and can be attached to a syringe. The syringe is filled with a dose of the vaccine and the cannula is attached. The animal is restrained with headgate or chute and the operator grasps the muzzle with one hand while directing the syringe with the cannula into the nostril. When inserted well into the nostril, the material is expelled from the syringe. It usually is recommended that one-half of the dosage be placed in each nostril. A fresh, sterile cannula should be used on each animal to avoid transfer of infection such as IBR between animals.

## **Intraocular Medication**

Medicine may be put into the eyes of cattle by ointment or injection. Ointments, solutions or powders are placed under the upper or lower eyelid. With the animal well restrained in a headgate, the upper or lower eyelid can be grasped with thumb and forefinger and pulled away from the eyeball, forming a pocket into which the medicine can be placed. When the eyelid is released, the lid traps most of the medication in contact with the eyeball where it can be absorbed.

Injections can be made into the lining of the eye socket and covering of the eyeball. The conjunctiva, or lining of the eyeball and socket, is a very tough membrane and requires a sharp, 10- to 22-gauge needle to penetrate it and deliver a dose of medicine. This procedure can cause serious damage to the eye of the animal if the needle penetrates the interior of the eyeball or lacerates the wall of the eyeball. The producer should seek information and training from a veterinarian or other trained animal health technician before attempting intraocular injections.

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