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TECHNICAL BULLETIN No.10

GIVING INJECTIONS TO SHEEP AND GOATS

ESGPIP

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FOREWORD

This Technical Bulletin titled "*giving injections to sheep and goats*" is the tenth in a series produced by the Ethiopia Sheep and Goat Productivity Improvement Program (ESGPIP). The ESGPIP is a USAID funded Project with the objective of improving the productivity of Ethiopian sheep and goats.

The administration of medicaments in a proper and prescribed manner is important to optimize the effect of medication and also to minimize damage to tissue of the animal and carcass quality.

This Technical Bulletin is intended to serve as an extension aid for animal health professionals at the grass roots level that are authorized to provide treatment to animals. The information contained in this Technical Bulletin is also relevant to other higher health professionals and also administration of medication to other types of farm animals.

At this juncture, I would like to thank all those involved in the preparation and review of this technical Bulletin.

Desta Hamito (Prof.)
Chief of Party
ESGPIP

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GIVING INJECTIONS TO SHEEP AND GOATS

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1. Introduction

Administering drugs via injection is a common herd health procedure but one that must be done correctly to reduce the chance of injury or formation of injection site lesions and to prevent infection of animals. Use proper equipment and procedures to deliver the correct medicine dosage and volume at each injection site. Giving injections properly will minimize animal stress. Proper sanitation will ensure that you don't inject vaccines or antibiotics contaminated with bacteria into your sheep or goat that can cause severe infection. Dirty needles and syringes should never be used.

2. Dosage

If drugs are used incorrectly, disease organisms can build up resistance making drugs ineffective. This usually happens from underdosing or overdosing drugs. It is best to calculate the correct dosage based upon the weight of each animal determined by using a scale or estimated by using heartgirth measurement. In some situations, such as group treatment, the dosage is estimated based on the weight of the heaviest animal or the average weight of the flock. In these cases, some animals will be overdosed and some underdosed.

2.1. Dose calculation

Dosage should be calculated according to the manufacturers recommendations based on the weight of the animal. The following example shows the steps needed to calculate the correct dosage.

- An animal is estimated to weigh 50 kg.
- The manufacturer recommends 10 mg/kg bodyweight of oxytetracycline.
- Multiply the animal's weight, 50 kg, by the dose rate (10 mg/kg) to calculate the amount of drug required. In this example, 500 mg of oxytetracycline. (50 kg x 10 mg/kg = 500 mg).
- Calculate the amount of injectable solution required. The bottle label states that the injectable solution contains 50 mg/mℓ of oxytetracycline (which means that 50 mg of actual medicine is available in each mℓ of the solution).
- Divide the amount of actual medicine the animal needs (500 mg) by the strength of the medicine (50 mg/ mℓ) to find that the animal needs 10 mℓ of medicine (500 mg divided by 50 mg/ mℓ = 10 mℓ of injectable solution).
- 10 mℓ of the oxytetracyline injectable solution is needed to provide 500 mg of actual drug.

3. Proper equipment

Proper injection technique includes selection of an appropriate size syringe and needle. Common syringe sizes are 3 mℓ, 5 mℓ, 10 mℓ, and 20 mℓ. The syringe should have volume markers that ensure administration of the correct amount of drug. It is best to use a syringe that has an appropriate volume to correctly measure the drug. For example, if giving 2.8 mℓ of a drug, a 3 mℓ syringe will measure the amount more accurately than a 20 mℓ syringe.

Needle length and gauge should be considered as it relates to injection type and thickness or viscosity of drug. In general, 18 to 20 gauge needles (as gauge number increases, needle diameter decreases), 12 or 15 mm in length are sufficient.

Figure 1. Different size needles and syringes.

Photo used with permission from the Meat Goat Production Handbook, Langston University, 2007.

Recommended needle sizes used in sheep and goats

Age	*Gauge*
< 4 weeks old	20
4 to 16 weeks	20
4 to 6 months	20
> 6 months	18 to 20

4. Preparing the syringe

- Always check the recommended dose on the medicine bottle label and ensure that your calculations are correct.
- Assemble the syringe and needle.

- Shake the medicine bottle, and swab the cap with clean surgical spirit or 70% alcohol.
- Draw a volume of air into the syringe slightly more than the volume of liquid to be withdrawn.
- Thrust the needle through the rubber cap of the bottle.
- Turn the bottle upside down and push the plunger to inject a couple mℓ of air into the bottle (you will have difficulty withdrawing the dose if you do not do this).
- Make sure that the needle tip is below the surface of the fluid.
- Pull the plunger down, drawing slightly more liquid into the syringe than required.
- Push the plunger slightly to expel any air bubbles and adjust to the correct dose.
- Detach the syringe, leaving the needle in the cap for next dose withdrawal.
- Finally, attach a second needle to the syringe and expel any air from the needle.
- Needles should be changed between every 5 - 10 sheep/goats. If a blood-borne disease is suspected in the flock, a new needle must be used with each animal.
- Never use dirty syringes or needles.
- Some medicines must be kept cold or out of the sunlight to remain effective. Bottles should be stored in a cooler in the shade. Return the bottles to the cooler after drawing medicine into the syringe.

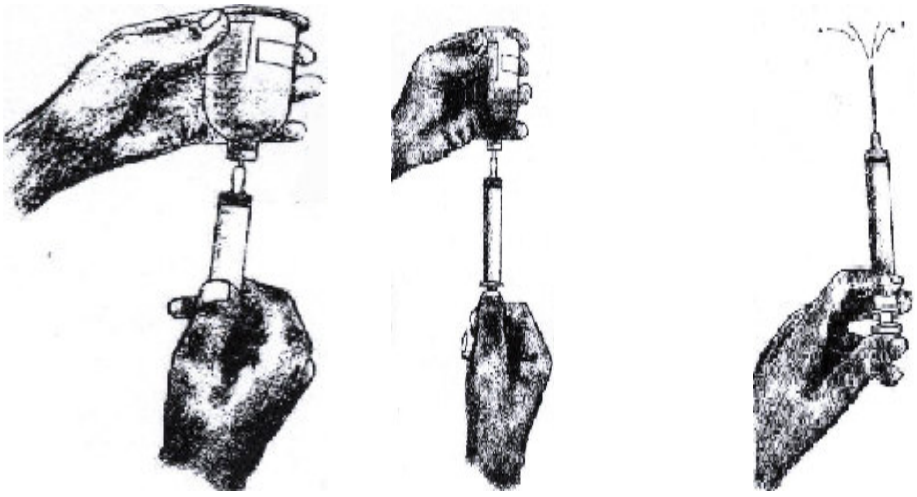

Figure 2. Filling a syringe with medicine.

5. Care of syringe and needles

- Immediately after use the syringe should be dismantled, thoroughly cleansed, and then sterilized by boiling in clean water for twenty minutes.
- Always discard partly-used bottles of medicine at the end of the day.
- Do not inject animals within four weeks of slaughter.
- Never vaccinate animals in wet conditions. Wet fleece carries a greater risk of infection.

6. Proper injection sites

All animals are considered as food animals and injections done in ways to prevent injection site lesions from damaging meat. Injection site defects are lesions or scars found in cuts of meat that result from tissue irritation caused by the administration of intramuscular or sometimes subcutaneous injections. In addition to the scarred tissue, tenderness of the meat is also significantly reduced in the affected area surrounding the site. Injection site lesions are a major product quality concern for the export market. All injections should be given in the neck area and no injections should be given in the hind quarters or along the loin muscle.

7. Common injection methods

The three most common injection methods are subcutaneous (SC, under the skin), intramuscular (IM, in the muscle), and intravenous (IV, into a blood vessel, usually the jugular vein). Subcutaneous injections are the easiest to give and intravenous the most difficult. Whenever a drug or vaccine lists SC as an option for injection use the SC route. Only experienced personnel should attempt to give an intravenous injection and professional assistance should be used in most instances. Intravenous injections provide the fastest absorption of a drug by the animal while subcutaneous the slowest.

7.1. Subcutaneous injections

Subcutaneous injections are given under the skin using a short needle, 1 - 2.5 cm long. To inject subcutaneously:

- Pull up a pinch of skin making a tent.
- Insert the needle into the tent taking care not to pierce through the other side.
- Depress the plunger slowly.
- Injecting with the needle pointing towards the ground will lessen the likelihood of the drug leaking out of the hole left by the needle.
- Massage the injected area.
- If administering large amounts of a drug, over 3 mℓ, it is best to divide the dose among two or more sites not giving more than 2 or 3 mℓ per site.

The preferred site for SC injections is the skin just behind the elbow, although they can also be given in the triangular area in front of the shoulders between the top and bottom of the shoulder blade and corner of the jaw. Vaccines often cause swellings or "knots" and a knot behind the elbow indicates an injection site whereas a knot in the neck in front of the shoulder could possibly be confused with a caseous lymphadenitis abscess.

Figure 3. Tenting procedure for subcutaneous injection. Photo used with permission from the Meat Goat Production Handbook, Langston University, 2007.

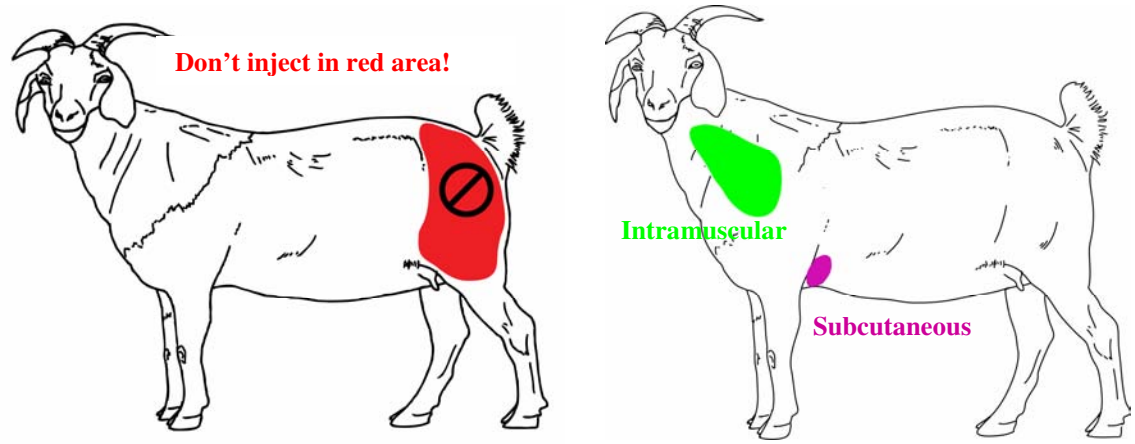

Figure 4. Proper sites for subcutaneous and intramuscular injections.
Illustrations used with permission from the Meat Goat Production Handbook, Langston University, 2007. Drawings by K. Williams.

7.2. Intramuscular

Intramuscular injections are the most common injection method and require the needle to be inserted into a muscle. Intramuscular injections are commonly given in the triangular area of the neck, in front of the shoulder. Do not give intramuscular injections in the loin or hind leg of sheep and goats that are used for meat to prevent injection site blemishes that lower the value of the meat. Never give an injection near the spine to prevent accidentally causing nerve damage. Use an 18-gauge needle, 2-3 cm long, to inject antibiotics. In small, young lambs and young goats a smaller 20-gauge needle should be used. Volume given in the muscle should not be more than 3 mℓ per site.

- To give an injection:
  - Gently tap/hit the muscle two or three times with your fist to accustom the sheep/goat.
  - Insert the needle quickly, straight into the muscle.
  - Before injecting, draw the plunger out slightly to check if the needle has entered a blood vessel. If blood enters the syringe, withdraw the needle slightly and redirect into the muscle.
  - When a correct spot has been entered, slowly press the plunger down.
  - Remove the needle from the animal and rub the injection site or press with cotton to prevent excess bleeding. This will also help the medicine to stay in the muscle.

7.3. Intravenous

An intravenous injection requires skill to locate a vein, usually the jugular vein in the neck, insert the needle, and ensure that the needle remains in the vessel while

the drug is given. These injections should always be given by a veterinarian or experienced animal health technician. Animals may react quickly to drugs given in this fashion due to rapid absorption. Very few drugs need to be given intravenously; however, blood samples often need to be collected and the technique is the same. Intravenous injections are usually done using an 18 or 20 gauge hypodermic needle.

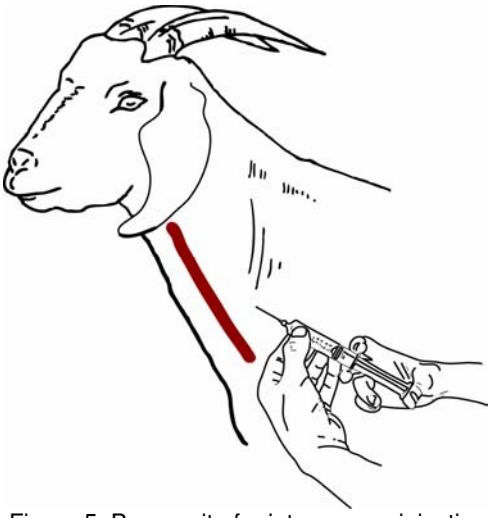

Figure 5. Proper site for intravenous injection
Illustration used with permission from the Meat Goat Production Handbook, Langston University, 2007. Drawing by K. Williams.

To give an intravenous injection:

- Have someone straddle the goat to hold it securely.
- The holder should elevate the goat's head up and to the side.
- Feel for the trachea on the neck. The area between the trachea and the muscles of the neck is the "jugular groove" and is where the jugular vein lies.
- Put pressure at the bottom of the groove and you will see the groove swell from your finger up to the jaw of the goat. The vein is now filled with blood.
- Using an 18 to 20 gauge needle, direct it at a 45 degree angle then stab through the skin.
- Pull back on your syringe and see if there is blood present. If not, adjust the depth (deeper or more shallow) or move up or down the side of the groove until blood is obtained. The presence of blood signifies that the needle is inside the vein.
- Administer drugs slowly and monitor the animal for evidence of respiratory or cardiac distress. If there is any adverse reaction to the injection, it should be stopped**.**

When you are injecting drugs IV, it is important to ensure that all of the drug enters the vein. The jugular vein will take the administered drug straight to the heart and at high concentrations many drugs can cause heart problems. IV drugs given around the vein instead of in the vein can cause an irritation or inflammation of the vein.

8. Summary

All animals will require injections, such as vaccines or antibiotics. Proper dosage, equipment, and technique are essential to prevent drug resistance, minimize animal stress and prevent injection site lesions. Drug labels should be read to determine the correct amount of medicine to give and to correctly calculate dosage of the injectable solution. Proper syringe and needle sizes will ensure the correct amount of drug given in an effective manner. The three main types of injections are subcutaneous (SC, under the skin), intramuscular (IM, in the muscle) and intravenous (IV, in the vein). Only experienced animal technicians or veterinarians should give intravenous injections. All SC and IM injections should be given in front of the point of the shoulder or under the

skin behind the front leg. Injections should never be given in the hind muscle, shoulder muscle or the loin. This will prevent injection site lesions from occurring in the most valuable cuts of meat. Always consult an animal health office before administering drugs and injections.

References

Dawson, L., J. Allen and B. Olcott. 2007. Meat Goat Herd Health Procedures and Prevention. In: T.A. Gipson, R.C. Merkel, K. Williams and T. Sahlu (eds.). Meat Goat Production Handbook. Langston University. 65-96 pp.