



ANIMAL HEALTH CARE SERVICE

NTQF LEVEL –II

LEARNING GUIDE

**UNIT OF COMPETENCE: ADMINISTER MEDICATIONS TO
LIVESTOCK**
**MODULE TITLE: ADMINISTERING MEDICATIONS TO
LIVESTOCK**

OCTOBER, 2019
BAHIR DAR, ETHIOPIA

ANIMAL HEALTH CARE SERVICE

NTQF Level II

Learning Guide-1

**Unit of Competence: Administer Medications to
Livestock**

**Module Title: Administering Medications to
Livestock**

LG Code: AGR AHC2 M10 LO1-LG-01

TTLM Code: AGR AHC2 M10 TTLM 1019v1

**LO1: Prepare for treatment of
livestock**



Instruction Sheet	Learning Guide #1
--------------------------	--------------------------

This learning guide is developed to provide you the necessary information regarding the following **content coverage** and topics:

- Risks and OHS hazards
- Select and check equipment and materials
- Prepare livestock treatment site and facilities
- Livestock treatments

This guide will also assist you to attain the learning outcome stated in the cover page. Specifically, **upon completion of this Learning Guide, you will be able to:**

- Identify risk , assess ,controls and implement OHS hazards in the workplace
- Select, check equipment and materials for treating livestock for safe and sound operation and confirmed against work plan.
- Prepare livestock treatment site and facilities to industry standards in line with enterprise requirements.
- Prepare livestock treatments are and confirmed against work plan.

Learning Instructions:

1. Read the specific objectives of this Learning Guide.
2. Follow the instructions described below 3 to 6.
3. Read the information written in the information “Sheet 1, Sheet 2, Sheet 3 and Sheet 4”.
4. Accomplish the “Self-check 1, Self-check t 2, Self-check 3 and Self-check 4” **in page17, 31, 34 and 36** respectively.
5. If you earned a satisfactory evaluation from the “Self-check” proceed to “Operation Sheet 1, Operation Sheet 2 and Operation Sheet 3 ” **in page -37.**
6. Do the “LAP test” **in page – 38** (if you are ready).



Information Sheet-1	Risks and OHS hazards
----------------------------	------------------------------

1.1. Introduction

Occupational health and safety means all aspects of health and safety in the workplace, with a strong focus on primary prevention of hazards. Safety of personnel and animal owners should always be a priority. Personnel should take all necessary precautions to prevent animal-related injuries (e.g. bites, scratches), and all bite wounds should be taken seriously. Proper sharps handling practices should be emphasized to reduce the risk of needle-stick injuries.

1.2. Routine practices

A. Hand hygiene

Hand hygiene is the responsibility of all individuals involved in health care. Effective hand hygiene kills or removes microorganisms on the skin while maintaining hand health and skin integrity (i.e. prevents chapping and cracking of skin). Sterilization of the hands is not the goal of routine hand hygiene - the objective is to reduce the number of microorganisms on the hands, particularly the number of microorganisms that are part of the transient microflora of the skin, as these include the majority of opportunistic pathogens on the hands. These transient microbes may be picked up by contact with a patient, another person, contaminated equipment, or the environment.

There are two methods of removing/killing microorganisms on hands: washing with soap and running water or using an alcohol-based hand sanitizer. Hand hygiene is the single most important way to prevent infections in the healthcare setting.

Hand washing

Most transient bacteria present on the hands are removed during the mechanical action of washing, rinsing and drying hands. Hand washing with soap and running water must be performed when hands are visibly soiled. If running water is not available, use moistened towelettes to remove all visible dirt and debris, followed by an alcohol based hand rub.



Bar soaps are not acceptable in veterinary practice settings because of the potential for indirect transmission of Pathogens from one person to another. Instead, liquid or foam soap should be used

- soap should be dispensed in a disposable pump dispenser
- soap containers should not be refilled without being disinfected, since there is a risk of contamination
- antibacterial soaps should be used in critical care areas such as icu, and in other areas where invasive procedures are performed

Technique:

1. Remove all hand and arm jewelry.
2. Wet hands with warm (not hot) water. Hot water is hard on the skin, and will lead to dryness and additional skin damage.
3. Apply liquid or foam soap.
4. Vigorously lather all surfaces of hands for a minimum of 15 seconds.
5. Using a rubbing motion, thoroughly rinse soap from hands under warm running water. Residual soap can lead to dryness and cracking of skin.
6. Dry hands thoroughly by blotting hands gently with a paper towel.
7. Turn off taps with paper towel to avoid recontamination of your hands

NOTE: If air hand dryers are used, hands-free taps are necessary, as turning taps off without using paper towel as described will result in recontamination of hands after washing.

Alcohol-based hand sanitizers

Alcohol-based hand sanitizers/rubs are, with some exceptions, the preferred method for decontaminating hands that are not visibly soiled. They have superior ability to kill microorganisms on the skin than even hand washing with antibacterial soap, can quickly be applied, are less likely to cause skin damage, and can be made readily available at almost any point of care. Use of non-alcohol-based waterless hand sanitizers in healthcare settings is not recommended. Alcohol-based hand sanitizers should contain **70-90%** alcohol.

Technique:

1. Remove all hand and arm jewelry.
2. Ensure hands are visibly clean (if soiled, follow hand washing steps).



3. Apply between 1 to 2 full pumps or a 2-3 cm diameter pool of the product onto one palm.
 4. Spread the product over all surfaces of hands, concentrating on finger tips, between fingers, back of the hands, and base of the thumbs. These are the most commonly missed areas.
 5. Rub hands until product is dry. This will take a minimum of 15 to 20 seconds if sufficient product is used.
- ➔ **Hands** must be fully dry before touching the patient or patient's environment/equipment for the hand rub to be effective, and to eliminate the rare risk of flammability in the presence of an oxygen-enriched environment, as may occur in the presence of gas anesthetic machines.

B. Personal protective equipment (PPE)

Personal protective equipment (PPE) is an important routine infection control tool. PPE use is designed to reduce the risk of contamination of personal clothing, reduce exposure of skin and mucous membranes of veterinary personnel to pathogens, and reduce transmission of pathogens between patients by veterinary personnel. Some form of PPE must be worn in all clinical situations, including any contact with animals and their environment.

Personal protective outerwear is used to protect veterinary personnel and to reduce the risk of pathogen transmission by clothing to patients, owners, veterinary personnel and the public. Protective outerwear should be worn whenever there may be contact with an animal or when working in the clinical environment (including cleaning).

Lab coats

Lab coats are meant to protect clothing from contamination, but generally they are not fluid resistant, so they should not be used in situations where splashing or soaking with potentially infectious liquids is anticipated. These garments should be changed promptly whenever they become visibly soiled or contaminated with body fluids, and at the end of each day. Lab coats worn in the clinic should not be worn outside of the work environment. Lab coats worn when handling patients with potentially infectious diseases should be laundered after each use, because it is almost impossible to remove, store/hang and reuse a contaminated lab coat without contaminating hands, clothing or the environment.



Scrubs

Scrubs are often worn in veterinary clinics as a form of basic personal protective equipment. They have the advantage of being durable and easy to clean, and their use prevents contamination and soiling of the street clothes that personnel wear outside the clinic. Clinic scrubs should not be worn outside the clinic. They should not be taken home by personnel to be washed, rather they should be washed onsite, with other clinic laundry. Scrubs should be washed at the end of each day and whenever they become visibly soiled.

Designated scrubs should always be worn during surgery – these scrubs should not be worn during other procedures or when handling patients. Scrubs worn for surgery should be covered with a lab coat outside of the surgical suite.

Non-sterile gowns

Gowns provide more coverage for barrier protection than lab coats, and are typically used for handling animals with suspected or confirmed infectious diseases, that are housed in isolation. Permeable gowns can be used for general care of patients in isolation. Impermeable (i.e. waterproof) gowns should be used to provide greater protection when splashes or large quantities of body fluids are present or anticipated. Disposable gowns should not be reused, and reusable fabric gowns should be laundered after each use, because hanging/storing and reusing contaminated gowns inevitably leads to contamination of hands, clothing or the environment. Gloves should be worn whenever gowns are worn. Gowns (and gloves) should be removed and placed in the trash or laundry bin before leaving the animal's environment, and hands should be washed immediately afterwards.

Personnel should learn to remove gowns properly, in such a way as to avoid contaminating themselves and the environment. The outer (contaminated) surface of a gown should only be touched with gloves.

1. After unfastening or breaking the ties, peel the gown from the shoulders and arms by pulling on the chest surface while hands are still gloved.
2. Ball up the gown for disposal while keeping the contaminated surface on the inside.
3. Remove gloves and wash hands.
4. If body fluids soaked through the gown, promptly remove the contaminated underlying clothing and wash the skin.

Gloves



Gloves reduce the risk of pathogen transmission by providing barrier protection. They should be worn when contact with blood, body fluids, secretions, excretions and mucous membranes is possible. Gloves should also be worn when cleaning cages and environmental surfaces, as well as when doing laundry if gross contamination of items is present.

- Gloves should be removed promptly after use, avoiding contact between skin and the outer glove surface.
- Gloved hands should not be used to touch surfaces that will be touched by people with non-gloved hands.
- Care should be taken to avoid contamination of personal item such as telephones, pens and pagers.
- Hands should be washed or an alcohol-based hand sanitizer should be used immediately after glove removal. It is a common misconception that using disposable gloves negates the need for hand hygiene. Gloves do not provide complete protection against hand contamination; therefore hand hygiene immediately after removing gloves is essential.
- Disposable gloves should not be washed and reused.

Change gloves and perform hand hygiene when:

- Moving from contaminated areas to clean areas on the same animal
- Moving from dirty to clean procedures on the same animal
- After contact with large amounts of blood and/or body fluids
- Between individual animals

Face protection

Face protection prevents exposure of the mucous membranes of the eyes, nose and mouth to infectious materials. Face protection typically includes a nose-and-mouth mask (e.g. surgical mask) and goggles, or a full face shield, which should be used whenever exposure to splashes or sprays is likely to occur, including dental procedures, nebulization, and wound lavage.



Figure 1: Face protection, mouth mask.

Respiratory protection

Respiratory protection is designed to protect the respiratory tract from zoonotic infectious diseases transmitted through the air. The need for this type of protection is limited in veterinary medicine because there are few relevant airborne or aerosol zoonotic pathogens in companion animals, in most regions. The N95 rated disposable particulate respirator is a mask that is inexpensive, readily available, easy to use and provides adequate respiratory protection in most situations. However, people need to be fit-tested to ensure proper placement and fitting of N95 masks. Special N95 masks are required for people with beards.

Footwear

Closed toed footwear must be worn at all times to reduce the risk of injury from dropped equipment (e.g. scalpels, needles), scratches from being stepped on by dogs, and to protect the feet from contact with potentially infectious substances (e.g. feces, discharges and other body fluids).

C. Cleaning and disinfection

Cleaning and disinfection are two separate tasks. Cleaning involves the removal of visible organic matter with soap or detergent, whereas disinfection involves the application of a chemical or other procedure in order to kill the remaining microbes that cannot be adequately removed by cleaning. Cleaning is essential because the survival time of many infectious



agents outside the host is prolonged by the presence of organic matter, and organic matter also decreases the effectiveness of disinfectants. Depending on the level of disinfection used, disinfection kills or prevents the growth of many or most pathogens.

Equipment should be cleaned and disinfected according to its intended use, the manufacturer's recommendations, and practice policy. Equipment must be cleaned before sterilization or disinfection. Surfaces where animals are housed, examined, or treated should be made of non-porous, sealed, easy-to-clean materials to facilitate cleaning and disinfection and minimize infection transmission.

Cleaning

Cleaning entails the removal of all forms of organic matter (e.g. feces, urine, blood, food, dirt etc.) from a surface. Cleaning must always be done before a disinfectant is used.

Recommended cleaning procedures for common environmental surfaces:-

- Ensure all areas are well ventilated during cleaning.
- After cleaning, allow all surfaces to dry completely.

Gloves should be worn when cleaning and disinfecting, and hands should be washed after finishing any cleaning activity.

Disinfection

Disinfection can only be maximally effective if it is preceded by thorough cleaning. Some pathogens (e.g. clostridial spores) are highly resistant to disinfection, therefore cleaning in these cases is particularly crucial in order to mechanically remove the organisms.

- Ensure all areas are well ventilated during disinfection
- Gloves should be worn when handling disinfectants, but latex gloves will decompose and lose their integrity when exposed to many chemicals. For small jobs, disposable nitrile gloves should be used instead. For large jobs, heavier rubber gloves (e.g. common dishwashing gloves) can be used, but reusable gloves of this type must also be disinfected at the end of each task.
- Use of protective eye goggles is also recommended when handling disinfectants due to the splash risk.
- Always apply the selected disinfectant according to the product label, with particular attention to:
 - ➔ appropriate dilution



➡ required contact time

- If patients or personnel may have direct skin contact with the surface, or if the disinfectant used may damage a particular surface, the disinfectant may need to be rinsed off with clean water after an appropriate amount of time has elapsed.
- After disinfection, allow all surfaces to dry completely.

Cold sterilization

“Cold sterilization” is used to sterilize items through immersion in a sterilizing solution. Because of the toxicity of some cold sterile solutions, the time required to achieve sterilization using these chemicals, and the availability of autoclaves for sterilization, there is minimal indication for the use of cold sterilization. Its main indication is for sterilization of items that cannot tolerate steam sterilization, such as endoscopes.

Laundry

Although single-use, disposable items are ideal from an infectious disease control aspect, such items can also produce tremendous waste. Laundry is therefore a very important component of infectious disease control in the clinic setting. Although soiled linens are a potential source of microorganisms, with appropriate hygienic handling, storage and processing of clean and soiled linens, the risk of disease transmission from these items can be reduced to an almost negligible level.

D. Collection and handling

Except for linens potentially contaminated with infectious agents, all used linens can be handled in the same way. Heavily soiled linens should be rolled or folded to contain the heaviest contamination in the centre of the bundle, without contaminating personal clothing or the environment. Large amounts of solid debris, feces or blood clots should be removed from linen with a gloved hand and disposable tissue or paper towel, which are then immediately placed in the garbage. Excrement should not be removed by spraying with water or shaking as this may result in contamination of the surrounding area and personal clothing.

E. Bagging and containment

- Linens should be handled with a minimum of agitation and shaking.
- Always place soiled linens directly in a hamper or bag designated for dirty laundry.
- Never place soiled linens on the floor.



- Laundry bags should be tied securely and not over-filled.
- Carts and hampers should be cleaned after each use.
- Laundry bags should be washed after each use. They can be washed in the same cycle as the linens they contain.

F. Transport

Linen transported by cart should be moved in such a way that the risk of cross-contamination is minimized (e.g. avoid moving the cart from potentially contaminated areas (runs/kennel area) to cleaner areas (prep room, surgery)).

Clean linen should be transported and stored in a manner that prevents contamination. If laundry carts are used, separate carts should be used for clean and dirty linens.

1.3. Waste management

Veterinary biomedical waste is a potential source of both zoonotic and non-zoonotic infectious pathogens. Therefore, it is important to handle all such waste appropriately. Biomedical waste typically includes sharps, tissues (anatomic waste), highly contaminated (e.g. blood-soaked) materials, and dead animals.

Small clinics in rural areas, where biomedical waste disposal services are not readily available, may be able to make arrangements with a local human hospital or other healthcare institution to have their waste disposed of with that of the human facility.

Although it is beyond the scope of these guidelines to describe veterinary biomedical waste management in detail, the following basic information may be helpful:

- Used sharps are considered biomedical waste and should be disposed of in accordance with regulations from municipal and provincial/territorial authorities. Use approved, puncture-resistant sharps disposal containers to remove, store and dispose of used sharps such as needles, blades, razors and other items capable of causing punctures.
- Non-anatomical waste saturated or dripping with blood (e.g. blood-soaked lap sponges and gauze) are also best disposed of as biomedical waste.
- Liquid waste such as chest fluid, abdominal fluid, irrigating solutions, suctioned fluids, excretions and secretions usually may be poured carefully down a toilet or any drain connected to a sanitary sewer or septic tank.



- Provincial and territorial regulations may dictate the maximum volume of blood or body fluids that is permitted to be poured into the sanitary sewer. If there is likely to be splashes or sprays during this disposal process, appropriate personal protective equipment should be worn.
- All other waste, such as general office waste and non-sharp medical equipment, may be disposed of in the regular waste stream, and requires no special treatment other than containment during disposal and removal.
- Waste should be contained in a leak-proof container or bag that can be discarded with the waste (e.g. a plastic garbage bag).

1.4. Safety of clinic personnel

1.3.1. Bites and scratches

Bites and scratches are an inherent risk in veterinary medicine and a common cause of occupational injury and illness. In a survey of veterinarians from the USA, approximately two-thirds had sustained a major animal-related injury at one time. Bites and scratches accounted for just over one-third of these injuries. Up to 60% of dog bites and 80% of cat bites require medical attention. Approximately 3% to 18% of dog bites and 20% to 50% of cat bites become infected. Most dog and cat bite wound infections are caused by a mixture of aerobic and anaerobic bacteria.

If anyone is bitten or scratched by an animal:

- Immediately wash the wound thoroughly with plenty of soap and water.
- Report the incident to the local public health unit.
 - If a bite occurred, the rabies vaccination status of the animal must be noted
- Seek medical attention as soon as possible for any bite that:
 - is on a hand or is over a joint
 - is over a prosthetic device or an implant
 - is in the genital area
 - is over a tendon sheath, such as bite on the wrist or the ankle
 - causes a large amount of tissue damage (e.g. a deep tear or tissue “flap”)

1.3.2 Sharps

Injuries from needles and other sharp implements are common in veterinary medicine but are largely preventable. Although there is not the level of risk of blood borne pathogen exposure



in veterinary practice as there is in human medicine, serious outcomes can result following needle stick or other sharps injuries, including significant trauma, secondary infection and drug reaction (i.e. toxic, allergic, idiosyncratic).

Proper sharps handling practices are a practical yet effective way of reducing workplace injuries in veterinary clinics.

Use appropriate barriers (e.g. closed toed shoes) and safe work practices when using sharp instruments and devices (e.g. needles, scalpels, etc.), after procedures and when cleaning used instruments.

- Never remove needle caps by mouth.
- Do not bend or manipulate needles in any way.
- Do not pass uncapped needles to another person.
- Ensure proper animal restraint to reduce inadvertent needle stick injuries from animal movement.
- Do not recap needles by hand. If recapping is required, use the “one-handed scoop” technique (see below), forceps or a needle cap holder.
- Ensure that approved point-of-use sharps disposal containers are located everywhere needles are handled. These containers are puncture-resistant, leak-proof, and prevent removal (both accidental and intentional) of discarded sharps.
- Always dispose of sharps immediately in an approved sharps disposal container.
- Never dispose of needles or other sharps into anything other than an approved sharps container, even if they are capped or otherwise contained. This reduces the risk of accidental injury to veterinary personnel, patients, clients and non-veterinary personnel (e.g. waste disposal personnel).

1.3.3. Diagnostic specimen handling

Urine from animals with suspected urinary tract disease, and all feces, aspirates, and swabs should be treated as potentially infectious material. Protective outerwear (e.g. lab coat) and disposable gloves should be worn when handling these specimens. Gloves should be discarded and hands washed immediately after handling these items.

Care should be taken to avoiding touching clean items (e.g., microscopes, telephones, food) while handling specimens or before glove removal. A separate refrigerator should be used for diagnostic specimens, which should be cleaned on a regular basis.



A designated area of the clinic should be used for specimen processing. This should be separate from treatment and surgery areas so as to decrease the risk of contamination of these areas. After processing a specimen, materials should be disposed of or stored properly and promptly.

- Specimen processing areas should be cleaned and disinfected immediately after use.
- Samples from animals with suspected or known infectious diseases should be disposed of as infectious waste.
- Leak-proof plastic containers should be used for specimen storage in a designated refrigerator which does not contain food, vaccines or medications of any kind.
- Contamination of the outside of sample containers should be avoided. If the outside of a container becomes contaminated, it should be cleaned and disinfected prior to storage.
- Sharps such as microscope slides and glass pipettes should be disposed of in approved sharps containers

1.3.4. Necropsies

Necropsies are high risk procedures because of potential contact with infectious body fluids, aerosols, and contaminated sharps. Non-essential persons should not be present during necropsy procedures in order to minimize exposure of personnel to these hazards.

Personnel involved in or present at necropsies should wear:

- Protective outerwear (e.g. designated lab coat, designated scrubs)
- Disposable gloves
- Protective eye glasses/goggles, or a full face shield

1.5. Vaccination of personnel

Vaccination should be considered a final line of protection but is important for certain diseases. Decisions regarding vaccination policies should consider the risk of exposure, the severity of disease, whether the disease is treatable, the transmissibility of disease, as well as the quality and safety of the vaccine.

Rabies: Rabies vaccination is indicated for anyone who has a greater than average risk of exposure to the virus. All veterinary personnel that might have contact with animals should therefore be vaccinated against rabies, except in areas that have been formally declared



rabies-free (e.g. Hawaii). This includes lay staff that might have periodic animal contact, such as front office staff. Even animals that are kept indoors can be exposed to rabies by bats, and the disease may not be suspected on initial admission. Rabies vaccines for humans are generally considered safe and highly effective. In areas where rabies is endemic, rabies titres should be checked every 1-2 years to ensure that protective immunity is maintained, with re-vaccination provided as required.

Tetanus: Although bites and scratches are very low risk for tetanus infection, cuts and scratches from other objects or soil contamination of puncture wounds are still a risk. Therefore, tetanus vaccination is indicated in veterinary personnel. Boosters are generally administered every 10 years.

Influenza: Human influenza is a common and highly transmissible disease, even though it is not transmissible to companion animals. Infected veterinary personnel can rapidly infect their colleagues and veterinary clinics could act as sources of community infection if infected employees are present. It is reasonable for veterinary clinics to recommend annual influenza vaccination of all personnel and to ensure that personnel have time to visit their physician or a vaccination clinic for this purpose. Employees should also be encouraged to stay home if they are ill.

1.6. Training and education of personnel

Personnel training and education are essential components of an effective infection control program. All personnel, including temporary lay personnel, kennel staff, students and volunteers, should receive education and training about injury prevention and infection control during their initial orientation and periodically thereafter. Additional training should be provided as recommendations change or if problems with infection control practices are identified. Training should emphasize awareness of the hazards associated with individual work duties, and prevention of zoonotic disease exposure.



Self-Check -1

Written Test

Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

1. _____ an inherent risk in veterinary medicine and a common cause of occupational injury and illness. **(2points)**
2. What are routine practices which are used to minimize and control risk and hazards in work places? **(5points)**
3. List out personal protective equipment (PPE). **(5 points)**

Note: Satisfactory rating - 12 points

Unsatisfactory - below 12 points

You can ask you teacher for the copy of the correct answers.

Answer Sheet

Score = _____

Rating: _____

Name: _____

Date: _____

Short Answer Questions



Information Sheet- 2	Select and check equipment and materials
-----------------------------	---

2.1. Equipment and materials for treating livestock

Tools are particularly important in work. They are primarily used to put things together or to take them apart. Tools are often classified as hand tools and power tools.

Equipment has expanded from simple hand tools and transport facilities to complex machinery. Similarly, methods have changed. The following materials are selected and checked for treating livestock:

- New medical syringe and 16- to 21-gauge needle. (Note: 18-gauge needles and syringes that come with the needles attached and that are designed for one-time use are recommended.)
- Pens or pencils
- Disinfectant wipes or spray(Alcohol, Savlon)
- Disposable latex or nitrile gloves
- Sharps container, either commercial or homemade (a labeled, puncture proof container with a lid, duct-taped closed when done with the activity)
- Permanent marker
- Trash bag
- Drugs
- Paper towels (at least one sheet per participant)
- Cotton
- Gown
- Gauze

The following are commonly used equipments and materials for treatment

1. Drenching gun

Pistol grip 150 cc drench gun provides an economical way to drench cattle, sheep, and hogs with fluids, medication or wormer. Durable plastic frame with stainless steel probe.



Figure 2: drench gun 300 ml, Nozzle included.

Drench gun



Description:

A drench gun is a handheld syringe that is used to administer large doses of oral medication or in rehydrating livestock that will not drink.

2. Injection needles

The needle is built around the hole. Although some needles are manufactured by other methods, the most common process is to start with a strip, or ribbon, of stainless steel and form it into a tube by passing it through a series of rollers.

Types of needles

- Luer lock needle
- Screw needle



Figure 3: Luer lock



Figure 4:-Disposable needle

3. Syringes

Syringe: A medical device that is used to inject fluid into, or withdraw fluid from, the body. A medical syringe consists of a needle attached to a hollow cylinder that is fitted with a sliding plunger.

Types of syringes

- Reusable syringes
- Revolver syringes
- Plexiglass syringes
- Nylon syringes
- Disposable syringes



Figure 5: - Disposable syringe with needle



Figure 6: - Reusable syringe



Figure 7: Multidose syringe

4. Balling gun

A long metal instrument with a cup-shaped depression at one end for placing solid medicine in the posterior part of the mouth of a horse or ox so that it will have to be swallowed whole. called also balling gun.

Balling Gun



Description:

A balling gun is a device used in administering a bolus to an animal.



5. Stomach tube

Passing a **stomach tube** is the best treatment for gassy **bloat**. Once the gas has been released, the cause of the obstruction should be looked for. In a few cases a trochar and cannula punched through the side into the rumen will relieve gassy **bloat** when a **stomach tube** has not worked.



Figure 8: - Stomach tube

6. Trocar and Cannula

A trocar (or trochar) is a medical or veterinary device that is made up of an obturator (which may be a metal or plastic sharpened or non-bladed tip), a cannula (basically a hollow tube), and a seal. Trocars are placed through the abdomen during laparoscopic surgery. Trocar a sharp-pointed, needle-like instrument equipped with a cannula; used to puncture the wall of a body cavity and withdraw fluid or gas. An especially large bore trocar and cannula, 1.0 to 1.5 cm diameter, is used in the treatment of bloat in cattle.





Figure 9: Trocar and canula

7. Hoof knife

A cutting tool consisting of a relatively long, narrow blade with one edge sharpened and a handle. Various specialized knives are used in surgery and dissection.



8. Burdizzo /Emasculatome

The Burdizzo is a castration device which employs a large clamp designed to break the blood vessels leading into the testicles. Once the blood supply to the testicles is lost, testicular necrosis occurs, and the testicles shrink, soften, and eventually deteriorate completely. Emasculatome a pair of double-hinged pincers for castrating domestic animals bloodlessly by crushing the spermatic cord through the unbroken skin.



Figure 10:- Burdizzo/Emasculatome

9. Emasculator

An emasculator is a tool used in the castration of livestock. Its function is to simultaneously crush and cut the spermatic cord, preventing hemorrhaging while still detaching the testis from the animal.



Figure 11: Double crush emasculator



Emasculators



Description:

An emasculator is an instrument that has a broad surface and a cutting edge that is used in castrating livestock.



10. Drugs: An animal drug (also veterinary drug) refers to a drug intended for use in the diagnosis, cure, mitigation, treatment, or prevention of disease in animals.

Commonly used drugs

- Anti bacterial infection- penicillin, cephalosporin, tetracycline etc.
- Anti fungal infections- greseofulvin.
- Anti protozoal infections- diminazine Aceturate
- Anti helmenthics- albendazole
- Ectoparasitides- organo phosphates
- Anesthesia- ketamine



Figure 12: Antibacterial drug



Figure 13: Anesthetic drug



Figure 14: Albendazole 300mg.



Figure 15: Antihelminthics drug- Ivermectin.

2.2. Select the syringe or dosing gun

The difference between the two is that with a syringe, you manually control how much of the drug gets injected into the animal. The dosing gun dispenses pre-set volumes of medicine for administering them to more than one animal.



A syringe is made up of 3 parts: the **body** (that contains the drug), the **plunger** (that fits snugly inside the barrel), and the **needle**. Plastic syringes come in 1, 2, 3, 5, 12, 20, 35, and 60 cc (1 cc = 1 mL) sizes. Use the syringe size required for the dose you are giving. A dose in a syringe should only be used for 1 animal.

A dosing gun or pistol syringe has a glass barrel (loaded with multiple doses) with a plunger that has a thick rubber washer at the end to form a vacuum, a needle, and a handle-trigger that is the same as that on a caulking gun. Some guns have the option of attaching a bottle. Dosing guns come in 5, 12.5, 20, 25, and 50 mL sizes.

2.3. Selecting the needle

1. Choose a needle based on the animal's weight

Needle size is measured in 'gauges'. The gauge of a needle is inversely proportional to its diameter, so the lower the gauge, the bigger the needle. For instance, a calf's skin is thinner than that of an adult cow, so a finer and higher gauge needle can be used instead. Use the finest gauge possible to make sure that the cow feels as little pain as possible, but not so fine that risk of breaking the needle is significant.

- To give an injection to a calf weighing less than 500 pounds, an 18-20 gauge (g) needle with a 1 inch (2.5 cm) length is ideal.
- For larger animals weighing over 500 pounds, you will need a 16-18 g needle with of 1 ½ inch length.
- Breed can also play a part on determining needle gauge.

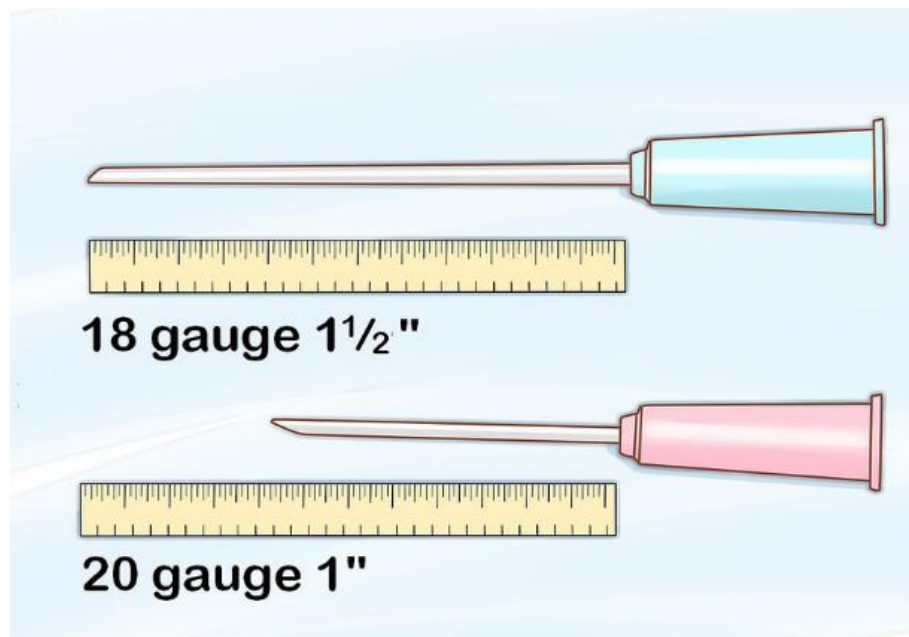


Figure16: Gauge of needle

2. Choose needle length based on the type of injection

A shorter needle will be need for subcutaneous injections, and a longer needle for intramuscular and intravenous injections.

- You won't need a needle longer than 1/2 inch (1.3 cm) to 1 inch (2.5 cm), for SQ injections because you only need to penetrate the skin.
- For IM and IV injections, needles that are around 1.5 inch (3.8 cm) or more are best.

3. Use a new, sterile needle for every 10 to 15 injections

It is acceptable to use the same needle for up to 15 injections as long as it remains sharp and straight. Always change to a new needle when drawing from a different bottle of medication because using the old needle may introduce contamination. Never attempt to straighten a bent or burred needle because it is much more likely to break on you or break off in the process of injection. Burred needles are also to never be straightened, but simply tossed into a bio-hazard bin.

**Self-Check -2****Written Test**

Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

- _____ refers to a drug intended for use in the diagnosis, cure, mitigation, treatment, or prevention of disease in animals. **(1 point)**
A. Syringe
B. Drug
C. Needle
D. Balling gun
- List some commonly used drugs with one example for each. **(5 points)**

Note: Satisfactory rating - 6 points

Unsatisfactory - below 6 points

You can ask you teacher for the copy of the correct answers.

Answer Sheet

Score = _____

Rating: _____

Name: _____

Date: _____

Short Answer Questions



Information Sheet-3	Prepare livestock treatment site and facilities
----------------------------	--

3.1. Prepare restrain material before giving the injection

It is much easier and safer to give injections to animal that are restrained. Use a head gate or squeeze chute (also called a crush) to restrain the animal. No matter what method of restraint use, make sure that the animal is restrained well enough that it will not be able to injure you or someone else.

A squeeze chute or crush is a narrow stall with adjustable sides wide enough for 1 adult animal. The panels prevent the animal from moving. It may also have a calming effect on the animal. There's also a gate in the front and back of the chute to keep the cow still. This makes the neck easily accessible for injections.

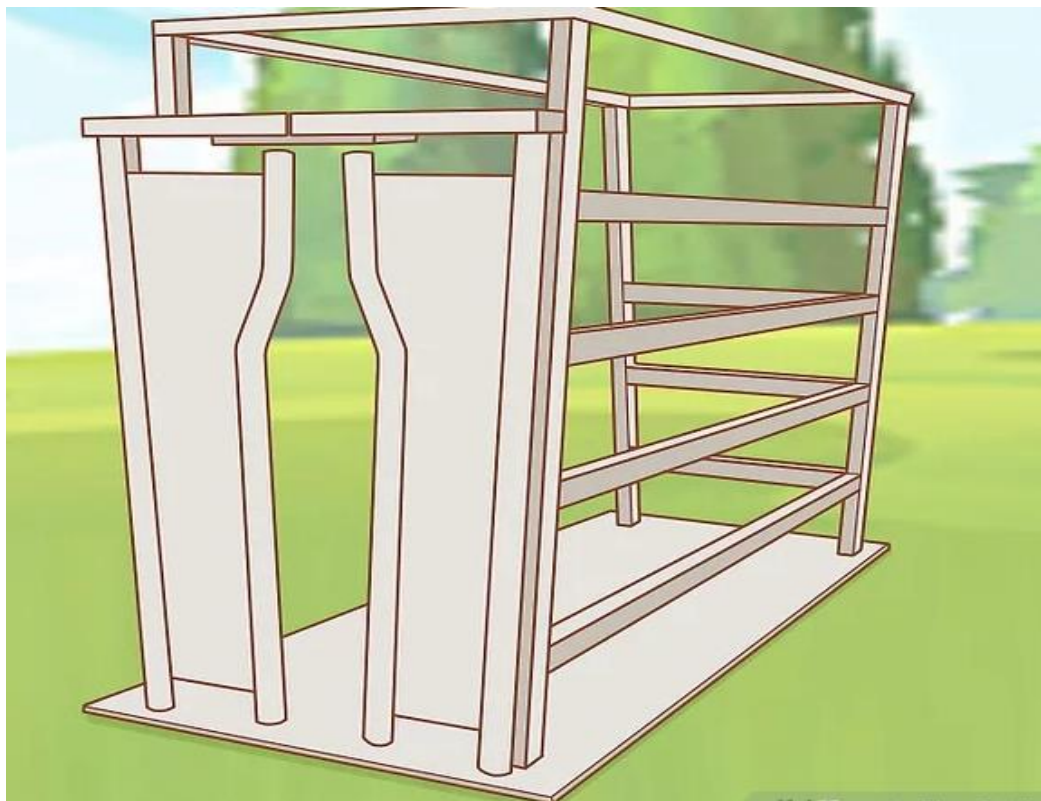


Figure 17: Crush for cattle

3.2. Read the label

Always read and follow the directions on the label of the medication or vaccination for the dosage and route of administration. The drug manufacturer is obliged by law to print



instructions on the injection bottle as well as warnings, information about the targeted microorganisms, and other important details.

If there is an option to choose between an intramuscular (IM) and subcutaneous (SQ) injection route, always go for the SQ as it is less invasive, which means it is less likely to damage valuable carcass meat. However, some drugs need to be given by IM injection to be properly absorbed.

3.3. Find the injection site

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.

The required site for injection, particularly in beef cattle, is a site called the "injection triangle." This triangular area is located on either side of the cow's neck and contains few vital structures (like blood vessels and nerves). The injection triangle is broadest at the shoulder and tapers up towards the ear. The retail value of meat from this site is lower than the rump, so you are less likely to lose money if you are planning on selling the meat. The landmarks for finding the triangle are:

- The upper boundary is located below the spinal column following the line of the neck crest.
- The lower or angular boundary runs along and above the jugular furrow, which is located in the middle of the neck.
- The posterior boundary (the one closest to the rear of the animal) follows the line above the point of the shoulder, which angles up towards the top-line or top of the shoulder.

**Self-Check -3****Written Test**

Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

1. What do you do during preparation of livestock for treatment?(**3points**)
2. Why all injections should be given in the neck area and no injections should be given in the hind quarters or along the loin muscle? (**3pontos**).

Note: Satisfactory rating – 6 points

Unsatisfactory - below 6 points

You can ask you teacher for the copy of the correct answers.

Answer Sheet

Score = _____

Rating: _____

Name: _____

Date: _____



Information Sheet-4	Livestock treatments
----------------------------	-----------------------------

4.1. Prepare for treatment of livestock

- Check equipments and materials for treating livestock for save and sound operation and confirming against the work plan.
- Prepare the livestock treatment sites and facilities to industry standards in line with enterprise requirements.
- Preparing livestock treatments and confirming them against work plan in line with manufacture's specifications and work plan
- Recognizing potential and existing OHS hazards in the work place, assessing the risk and controlling it in line with enterprise requirement.

4.2. Prepare treatment area

- The treatment area is separate from the reception area.
- Each such area is large enough to accommodate readily a veterinarian, an animal, any necessary assistants and the required equipment.
- The treatment area contains or has readily available:
 - electric hair clippers and a fine surgical blade or razor for hair removal
 - preparations for cleansing skin and other tissue prior to surgery, including a
 - skin cleaning solvent and an antiseptic skin-preparation solution
 - cold sterilization concentrate and a tray or container of cold sterilization solution, or sterilized packs with appropriate instrumentation
 - absorbable and non-absorbable sterile suture material
 - a drained sink with hot and cold running water
 - sterile intravenous catheters and administration sets
 - intravenous stand or equivalent
 - drainage tubes, irrigation solutions and irrigation application supplies
 - sterile needles and syringes, cotton, sterile gauze, bandages, and appropriate splinting devices, sterile urinary catheters
 - at least two appropriately sized stomach tubes
 - trocar and cannula



Self-Check -4	Written Test
----------------------	---------------------

Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

1. What do you do during preparation of livestock for treatment? **(5 points)**
2. List out readily available materials in treatment area. **(5points)**

Note: Satisfactory rating – 10 points

Unsatisfactory - below 10 points

You can ask you teacher for the copy of the correct answers.

Answer Sheet

Score = _____

Rating: _____

Name: _____

Date: _____

Short Answer Questions



Operation sheet 1	Risks and OHS hazards
--------------------------	------------------------------

Hand washing technique

Step1. Remove all hand and arm jewelry.

Step2. Wet hands with warm (not hot) water.

Step3. Apply liquid or foam soap.

Step4. Vigorously lather all surfaces of hands for a minimum of 15 seconds.

Step5. Using a rubbing motion, thoroughly rinse soap from hands under warm running water.

Step6. Dry hands thoroughly by blotting hands gently with a paper towel.

Step7. Turn off taps with paper towel to avoid recontamination of your hands

Operation sheet 2	Prepare livestock treatment site and facilities
--------------------------	--

Prepare livestock for treatment

Step1-Preparing restrains material the animal before giving the injection

Step 2- Read label of medication

Step3- Find the injection site



LAP Test	Practical Demonstration
-----------------	--------------------------------

Name: _____ Date: _____

Time started: _____ Time finished: _____

Instructions: Given necessary templates, tools and materials you are required to perform the following tasks within 2 hours.

Task 1. Apply hand washing technique

Task 2. Preparing livestock for treatment



List of Reference Materials

1. Canadian Committee on Antibiotic Resistance (2008): Infection Prevention and Control Best Practices for Small Animal Veterinary Clinics. Canadian Veterinary Medical Association, Centre for Public Health and Zoonoses, University of Guelph.
2. [https://en.wikipedia.org › wiki › Animal_drug](https://en.wikipedia.org/wiki/Animal_drug).
3. <https://medinstrum.com/veterinary-equipment/>.
4. OIE (2018): OIE Competency Guidelines for Veterinary Paraprofessionals. World Organisation for Animal Health, Paris, France.



ANIMAL HEALTH CARE SERVICE

NTQF LEVEL II

Learning Guide-2

**Unit of Competence: Administer Medications to
Livestock**

**Module Title: Administering Medications to
Livestock**

LG Code: AGR AHC2 M10 LO2-LG-02

TTLM Code: AGR AHC2 M10 TTLM 1019v1

LO 2: Treat livestock



Instruction Sheet	Learning Guide # 2
--------------------------	---------------------------

This learning guide is developed to provide you the necessary information regarding the following **content coverage** and topics:

- Inspection of livestock
- Observe and implement operating procedures to livestock handling
- Calculate dose rate and check equipments
- Administer treatment
- Identify and minimize environmental impacts

This guide will also assist you to attain the learning outcome stated in the cover page.

Specifically, **upon completion of this Learning Guide, you will be able to:**

- Muster safely, yard, control, inspect and identify livestock for treatment in line with enterprise requirements.
- Observe low risk operating procedures with regard to livestock handling and implement in line with enterprise requirements.
- Calculate dose rates, equipment calibration and check according to manufacturers' specification.
- Administer treatment in accordance with manufacturer's specifications and enterprise requirements including animal welfare.
- Identify and minimize environmental impacts associated with livestock husbandry practices according to enterprise procedures.

Learning Instructions:

1. Read the specific objectives of this Learning Guide.
2. Follow the instructions described below 3 to 6.
3. Read the information written in the information "Sheet 1, Sheet 2, Sheet 3, Sheet 4 and Sheet 5".
4. Accomplish the "Self-check 1, Self-check t 2, Self-check 3, Self-check 4 and Self-check 5" **in page -46, 48, 51, 69 and 72** respectively.
5. If you earned a satisfactory evaluation from the "Self-check" proceed to "Operation Sheet 1 and Operation Sheet 2" **in page -73**.
6. Do the "LAP test" **in page – 74** (if you are ready).



Information Sheet-1	Inspection of livestock
----------------------------	--------------------------------

1.1. Handling facilities

Good handling facilities are essential. Routine handling is necessary for dosing, vaccination, condition scoring, herd testing, etc.

The four professional areas of activity within a hospital are outpatient, inpatient, surgical, and support service.

Outpatient area: - The first area to be discussed is the outpatient area. This area is composed of the reception area, examination rooms, laboratory, pharmacy, and public restrooms.

Inpatient area: - The second work area is the inpatient area, consisting of a treatment area, patient wards and/or large animal stalls, isolation area, exercise area, an area in which necropsy is performed, a kitchen, and a bathing and grooming area. Animal security within the hospital must always be a high priority. Animals that escape are the legal responsibility of the hospital.

Surgical area: - The third work area in the hospital is the surgical area, which consists of the preparation room, operating rooms, radiology section, and recovery room. All four areas in the surgical section must be in close proximity to one another. The operating room (OR) must be used only for surgery and cannot be used as an examination or treatment room.

Support area: - The fourth work area of the hospital is the hospital support area. This area contains, somewhat by default, some of the "leftovers," but it also contains the planning and management areas of the hospital. The support area contains the professional offices, business management office, library, employee lounge, and storage-inventory areas.

An efficient, carefully planned handling unit will:

- Reduce labour requirements
- Improve working conditions
- Reduce the risk of injury to both stock and the clinician

The handling unit should be sited in a convenient location in relation to clinic buildings, roads and fields. Effluent or slurry from the handling unit must be collected, stored and properly disposed of. Handling facilities in or adjacent to buildings make control of effluent and slurry much easier by making cleaning easier and minimising the rainwater falling on soiled areas.

A satisfactory layout should include:

- collecting pen
- forcing pen
- race or chute
- crush
- holding/dispersal pen

1.2. Inspection

Inspection is the process of investigation of part of the body in question. It reveals changes in color, size, position, behavior, gait, posture and appearance etc. Example mucus membrane becomes pale color in anemic animal.

Inspection consists of two steps:

- Observe animals at rest
- Observe animals in motion

It is important to inspect the animals using both steps because certain abnormal signs, such as labored breathing, are easier to detect while the animals are at rest, while other abnormalities, such as lameness, are more easily detected while in motion. Observe all of the animals and note their general behavior while they're at rest. Determine if any of the animals show abnormal behavior patterns such as excessive excitability or severe depression. Look at the heads, necks, sides, rumps, and legs of as many animals as you can see. Make a note of any abnormalities. When you perform inmotion inspection of the animals, you should position yourself outside of the pen next to the open gate so that you can easily view the animals as they are driven by you. You should direct the establishment employee to move all of the animals slowly and individually out of the pen while you observe them for abnormalities by viewing the visible side of the head, neck, shoulder, flank, legs, and rump.

Inspection is the process of investigation of part of the body in question. It reveals changes in color, size, position, behavior, gait, posture and appearance etc. Example mucus membrane becomes pale color in anemic animal.

Inspection consists of two steps:

- ➡ Observe Animals at rest
- ➡ Observe Animals in motion

It is important to inspect the animals using both steps because certain abnormal signs, such as labored breathing, are easier to detect while the animals are at rest, while other abnormalities, such as lameness, are more easily detected while in motion.

Observe all of the animals and note their general behavior while they're at rest.

Determine if any of the animals show abnormal behavior patterns such as excessive excitability or severe depression. Look at the heads, necks, sides, rumps, and legs of as



many animals as you can see. Make a note of any abnormalities. When you perform in-motion inspection of the animals, you should position yourself outside of the pen next to the open gate so that you can easily view the animals as they are driven by you. You should direct the establishment employee to move all of the animals slowly and individually out of the pen while you observe them for abnormalities by viewing the visible side of the head, neck, shoulder, flank, legs, and rump.

1.3. Mustering

Mustering animal is hazardous. Example: - if cattle get worked up, they can run into and over people, causing serious injuries and death. Another hazard is using two-wheeled motorbikes or quad bikes during mustering. Riding a bike when your attention is divided (eg focusing on the stock and not where you're going) increases the chance of an accident.

- Muster early in the morning or towards nightfall when the temperatures are cooler and the animals have been grazing for a while.
- Use the flight zone to move them. Stay on the fringes and to one side so they don't panic and scatter.
- Only use well-trained dogs for cattle work. Use them for mustering, but tie them up once the cattle are in the yards.
- Move cows and calves slowly and handle them gently. Look out for aggressive mother cows. Try to avoid mustering beef cows with young calves.
- When closing a yard gate behind a mob of cattle, try to stand to the side. If you have to be behind the gate, hang on with both hands and use your boots to provide support in case an animal flings the gate backwards.

1.4. Working with animal in the yards

Many injuries happen in the yards. Working with animal like cattle in the yards is hazardous the cattle are in a restricted space and more agitated than normal. They can crush people against rails and fences, trample over fallen people or step on toes.

Factors that increase the risks are:

- agitated cattle
- inexperienced handlers
- new or infrequently handled animal
- poorly designed or maintained yards.



Before yarding animal, make sure the yards are properly set-up and free of rocks, rubbish and other debris. Remove any sharp objects that could injure or frighten people and livestock.

Too much mud is a slipping hazard for animal and humans. If possible, remove this before using the yards.

Before you take animal into the yards (especially yards you haven't worked in before), check:

- the fences and catwalks are in good condition
- there are no bolts or broken rails sticking out
- the layout and know how things work
- the head bail works smoothly and can adjust for the size of animal
- that gates latch and they can open or close quickly
- the yard is well lit, or there are torches for night work
- that rear race gates are used



Self-Check -1	Written Test
----------------------	---------------------

Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

1. What is significance of carefully planned handling unit? **(3points)**
2. Define inspection. **(2points)**
3. Write steps of inspection. **(2points)**.
4. What are factors that increase the risks working with yard? **(3points)**.

Note: Satisfactory rating - 10 points

Unsatisfactory - below 10 points

You can ask you teacher for the copy of the correct answers.

Answer Sheet

Score = _____

Rating: _____

Name: _____

Date: _____

Short Answer Questions



Information Sheet-2	Observe and implement operating procedures to livestock handling
----------------------------	---

2.1. Restraint and handling of animals

Good handling and restraint is the most important technique for correct administration. Proper restraining leads to successful administration and varies with the routes of administration. Assessing the situation before beginning any approach to an animal is necessary and extremely helpful to the practitioner. Protection of personnel involved in veterinary procedures may be the most important reason for the use of restraint. Clients often base their impression of the care their animals receive on the manner in which their animals are restrained. Veterinary personnel must try to make the reception and examination areas as safe as possible. The unfortunate truth is that clients will blame the veterinary practice and the people involved if their animals are injured during an examination.

Restraint for the purpose of physical examination or diagnostic or therapeutic procedures commonly performed on animals may be unpleasant for them, and most animals will attempt to escape or at least resist. To avoid excessive discomfort for the animal, the application of restraint should be to the minimum effective level. The procedure and the animal's response will determine the level of restraint. For example, the examination of a cat's mouth can usually be performed with a minimal hold on the animal, whereas the examination of a cow's mouth will require significant restraint to protect the cow and the examiner. A major reason for proper restraint and handling is to prevent the animal from harming itself during the procedure.

2.2. Animal behaviour

It is better to rely on animal behavioural principles instead of sheer force to restrain and control animals during handling. Fine tuning the design of animal handling facilities will enhance animal welfare and reduce stress and injuries.

All animals are aware of their environment and the changes occurring around them. They use their five senses just as we do, particularly sight, smell, and hearing. The question of how an animal senses your encroachment into its environment must be a primary consideration in approaching that animal.



Self-Check -2	Written Test
----------------------	---------------------

Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

1. What is the most important reason for the use of restraint? **(2 points)**
2. List out senses of animals. **(5 points)**

Note: Satisfactory rating - 7 points

Unsatisfactory - below 7 points

You can ask you teacher for the copy of the correct answers.

Answer Sheet

Score = _____

Rating: _____

Name: _____

Date: _____

Short Answer Questions



Information Sheet-3

Calculate dose rate and check equipments

3.1. Dose calculations

There is no need to fear calculations involved in the dose and the compounding of medications. Most are simple arithmetic. A methodical approach to each problem will simplify the concept and minimize the risk of error.

The metric system of international standard system of weights and measures is used. Weights and measures are expressed in multiples of ten, the standard being the kilogram and gram for weight and the liter for fluids.

- 1kg =1000gram (g)
- 1 liter (l) =1000mililiter (ml)
- 1g =1000miligram (mg)
- International unit (IU) = 0.6µg of penicillin
- 1 parts per million (PPM) =1mg/kg body weight.
- 1 percent (%) = 1gm/100ml

$$\text{Dose} : \frac{\text{Body weight} \times \text{Dose Rate}}{\text{Concentration}}$$

E.g. A 5 kg cat needs an antibiotic at a dose of 15 mg/kg. The antibiotic comes in liquid form at concentration of 25 mg/ml how many ml do you give?

Solution:

$$\text{Dose} : \frac{5\text{kg} \times 15\text{mg} / \text{kg}}{25\text{mg} / \text{ml}} = 3\text{ml}$$

- ✓ Recommended dose or labeled dose is given commonly in mg/kg body weight. Also labeled doses are given in ml/kg body weight.
- ✓ Use of labeled dose: To calculate the total amount of a drug to be administrated in to a given animal we need to estimate the body weight of the animal.
- ✓ 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. ($50 \text{ kg} \times 10 \text{ mg/kg} = 500 \text{ mg}$).
- 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 oxytetracycline injectable solution is needed to provide 500 mg of actual drug.



Self-Check -3	Written Test
----------------------	---------------------

Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

1. If A 400 kg cow needs an antibiotic at a dose of 15 mg/kg. The antibiotic comes in liquid form at concentration of 25 mg/ml. How many ml do you give for the cow? (5 points)

Note: Satisfactory rating – 5 points

Unsatisfactory - below 5 points

You can ask you teacher for the copy of the correct answers.

Answer Sheet

Score = _____

Rating: _____

Name: _____

Date: _____

Short Answer Questions



Information Sheet-4	Administer treatment
----------------------------	-----------------------------

4.1. Definitions

A **drug** is defined as any chemical agent that affects living processes. These agents may be used to prevent, diagnose, or treat diseases.

Toxic dose is a dose greater than the upper limit of the therapeutic range that causes poisonous or toxic symptoms.

Drug- is any chemical substance used for diagnosis, mitigation and treatments of diseases.

Dosage- is the determination and regulation of the size of the drug, the frequency of the drugs administration and the amount of dose to be administered.

Dose- is the quantity of drug that should be administered at one time. It expressed in terms of mg/kg or IU/kg.

4.2. Administer drug

To administer a drug is to make the drug accessible to the patient's body where the effect is desired. The drug therefore, is desired by the therapist to elicit or manifests an effect where it is desired. For this to occur, the drug must come in contact with the tissues of organs and cells of tissues by one way or the other, the way the drug comes in contact or is made accessible to the tissue fluids tissues, cells, extracellular and intra cellular fluids is the route of administration of drug.

4.2.1. Drawing Medication into the Syringe

1. Take a syringe and cap it with a needle. The needle will have a cap on it when you push it onto the end of the syringe, or should if it's a fresh, clean needle. Push the needle down on the syringe so the needle stays on and won't come off.

2. Remove the needle cap. Take the cap off the needle and have it ready to draw fluid into the syringe. You won't be able to get medication into the syringe if you have the cap still placed over the needle.

3. Take a new bottle and remove the aluminum cap. The aluminum cap protects the opening of the bottle and keeps the liquid from leaking out, such as if the bottle is tipped on



its side or upside down. Use your fingernails to remove the cap. Never use a knife or sharp object because you will compromise the rubber cap and invite contamination.

4. Poke the needle through the rubber cap. Before you do so, draw the same amount of air into the syringe as you want to draw from the bottle.[10] This makes it easier for you to draw in the contents. Then, you can poke the needle into the rubber cap.

The rubber cap will act as a vacuum to keep air out of the bottle, and when the needle is pushed through, this vacuum will not be disrupted.

5. Draw the medication into the syringe. After you have pushed the air in your syringe into the bottle, raise the bottle up so that it is almost vertical above the syringe, and slowly pull back on the plunger. Draw the fluid into the syringe up to the desired amount.

It's important to raise the bottle above the syringe to allow gravity to draw the fluid in, and so that you're not drawing in air instead.

6. Lower the bottle and slowly remove the needle. Lowering the bottle moves the liquid to the bottom (via gravity) and introduces the "air" component of the bottle. Removing the needle then ensures that liquid won't drip out.

7. Place the bottle upright in a safe place for future use. Store the bottle in a place where it's cool and dry and won't get damaged, like in a cooler or toolbox meant for storing your cattle medicating equipment.

8. Point the needle upwards to allow any air bubbles present to float to the top. Flick your finger against the barrel for any bubbles that don't automatically float up. Slowly and carefully push the plunger to eject the air bubbles.

This especially important if you are going to administer IM or IV injections.

4.3. Choice of route of administration

Several methods are available for administering drugs to animals. Each route of administration has advantages and disadvantages. The route selected will depend on a number of factors, including the patient's size, disease state, temperament, and unique species characteristics; the characteristics and commercial formulation of the drug; and the expertise and knowledge of the individual administering the drug. The cost of drugs should be a factor in the selection of a route of administration when all other clinical factors have been considered. This is based on the way the drug is preferred for administration i.e.

1. Based on the drug dosage forms. Drugs are administered in various dosage forms: as solid – e.g. oxtetracycline capsule.



2. Based on the nature of the drug, oil based, organic. Polar, non polar solvent etc.
3. The desired bioavailability of the therapist.
4. Desired onset of action
5. Duration of action – If a duration is required to be long; the drug is administered 2-4 times daily.

4.4. Routes of drug administration

Drugs prepared in tablet, bolus, and powder form may be given peros (po) through mouth. Lotions, spray, ointments and powders for external use can be applied topically on the skin, eye, ear or wound based on their usage. The routes of drug administration for systemic effect may be divided into two major groups: **Oral** (enteral) and **parenteral** (systemic). When the gastrointestinal tract is by-passed by injection or introduction into the lungs (inhalation). When the drug is effect is desired locally it is administered topically, that is on the skin.

Oral or enteral administration of drug

Oral ingestion is the most ancient method of drug administration, another organ where the substance or drug to be administered is placed is the rectum. The drug could be placed in the mouth, under the tongue. The drug could be administered directly into the stomach using intragastric tube.

Parenteral administration

Parenterally “par” means beyond “enteral” means intestinal. This is the route of administration of drug without crossing the intestinal mucosa.

This is possible when the drug is directly into the blood or tissue fluid using needle and syringe.

The most important and most frequently used parenteral routes are I.V. (intravenous route), intramuscular route and SC (subcutaneous) route respectively.

Other less frequent routes are:

- Tissue infiltration
- Intra-articular
- Intradermal
- Epidural
- Intra-arterial
- Intrathecal
- Intrathoracic
- Intracardiac
- Intramedullary
- Intratesticular
- Subconjunctival
- Intramammary



Intravenous route: The drug is injected slowly; sometimes it could be infused rapidly as bodies. This method provides accurate, reliable dosage of drug directly into the circulation. It means that the bioavailability of drug is 100% when administered intravenously.

To give an intravenous injection:

- Have someone straddle the animal to hold it securely(restrain the animal).
- The holder should elevate the animal'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 animal. 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 shallower) 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.



Arrow points to approximate location of groove



Figure 1:-Intravenous (IV) injection site in cattle

Intramuscular: The drug is injected deep in the belly of a large skeletal muscle. The muscles that are usually used are detoid, triceps, Gluteus, Maximus, rectus, femurs depending on the specie of animal. The muscle is less richly supplied with sensory nerves.

There are three preferred sites for intra-muscular injections:

1. Neck – in the triangle of muscle demarcated by the nuchal ligament, the dorsal border of the cervical spine and the cranial border of the scapula. Alternatively a hand can be placed on the neck with the base at the junction of the neck and the shoulder, half-way between the crest and the ventral side of the neck: the hand will be covering the area suitable for injection

2. Gluteal muscles – in the centre of the muscular square bordered by the tuber coxae, tuber ischii, sacrum and base of tail. Do not inject caudal to the femur asthis may damage the sciatic nerve. For gluteal injections ensure safety when administering the injection by maintaining body position as close to the animal as possible; use a spare hand on the animal's body to detect sudden movements.



3. Pectoral muscle (horses only) – in thickest part. Maximum volume is 5 ml per site and do not inject potentially irritating drugs in this area as it will affect movement.

To give an injection:

- Gently tap/hit the muscle two or three times with your fist to accustom the animal.
- 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.



Figure 2:- The white tape outlines the area safe for IM injection of the neck in horse.

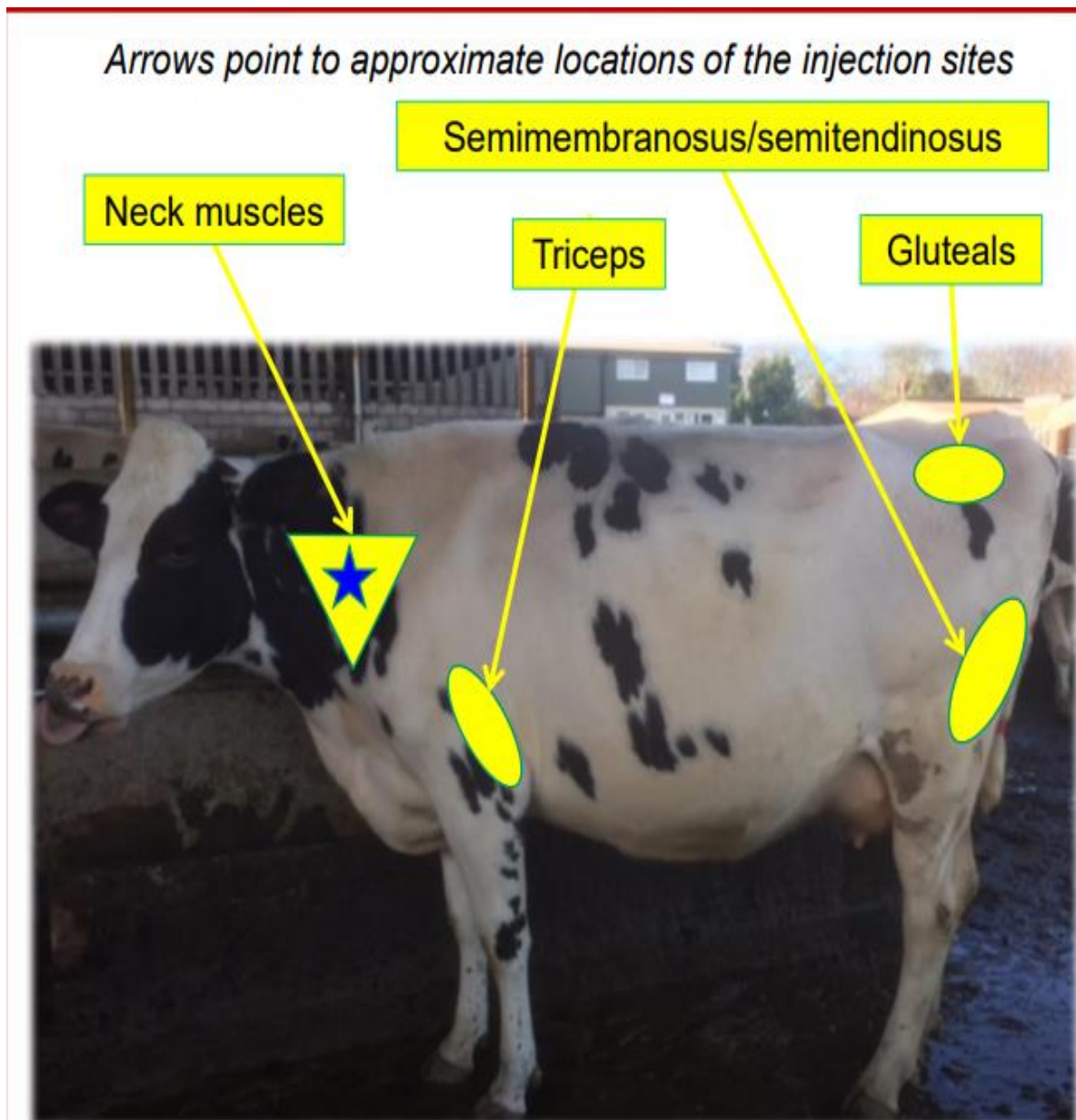


Figure 3:- Intramuscular (IM) injection sites in cattle

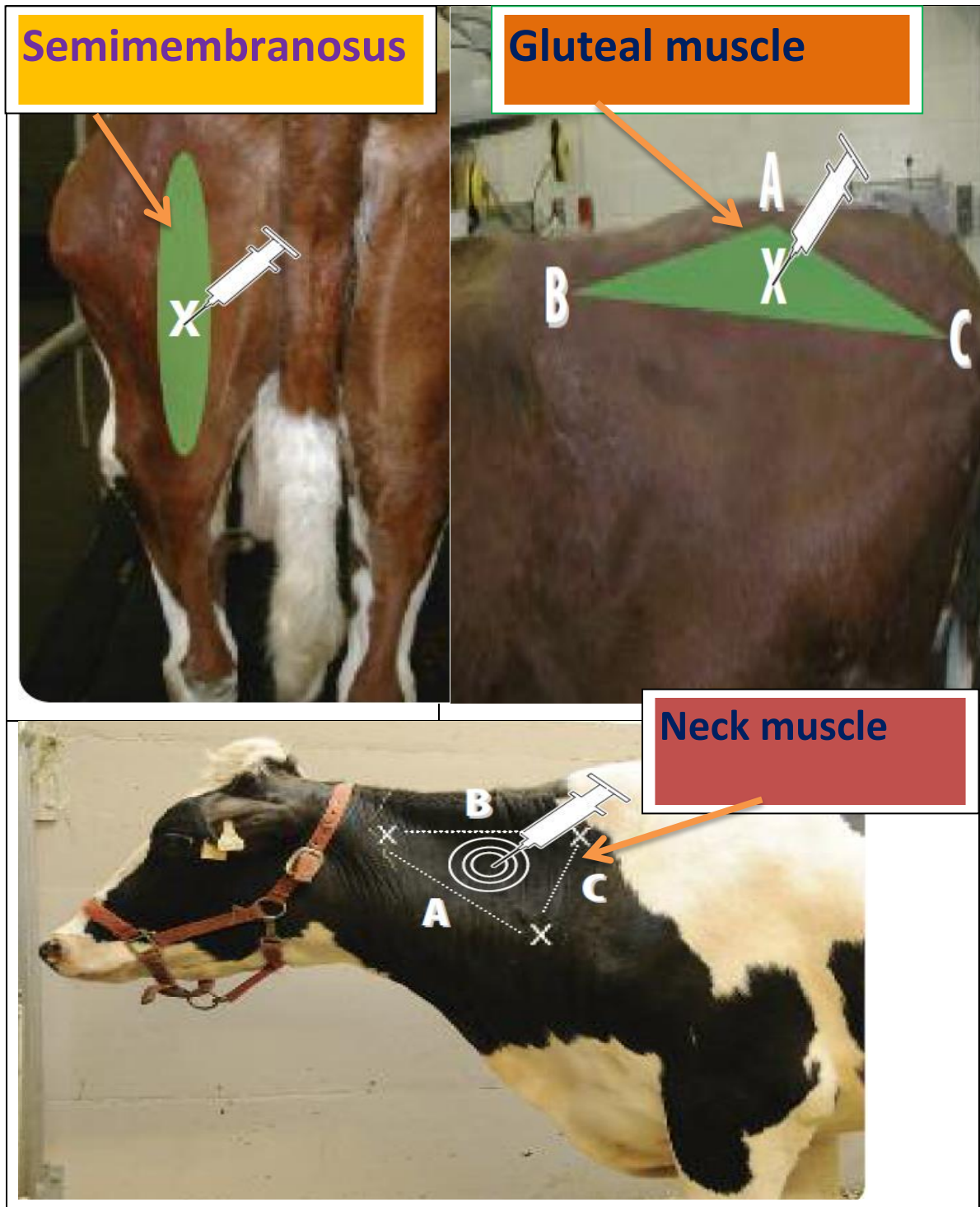


Figure 4: Different site of IM in cattle.

Subcutaneous: The drug is deposited in the loose subcutaneous tissue that is richly supplied with nerves but less vascular. The rate of absorption is slower than the intramuscular route. Any skin site may be used, but preferred areas are the neck and pectoral regions where there is looser skin covering the body. Using a short needle (one inch), pinch the skin and introduce the needle almost parallel to the skin surface to avoid placement in underlying muscle, there should be little resistance to injection. The depot of drug under the skin leaves a small swelling, which disappears as the drug is absorbed.



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 in sheep, it is best to divide the dose among two or more sites not giving more than 2 or 3 ml per site.

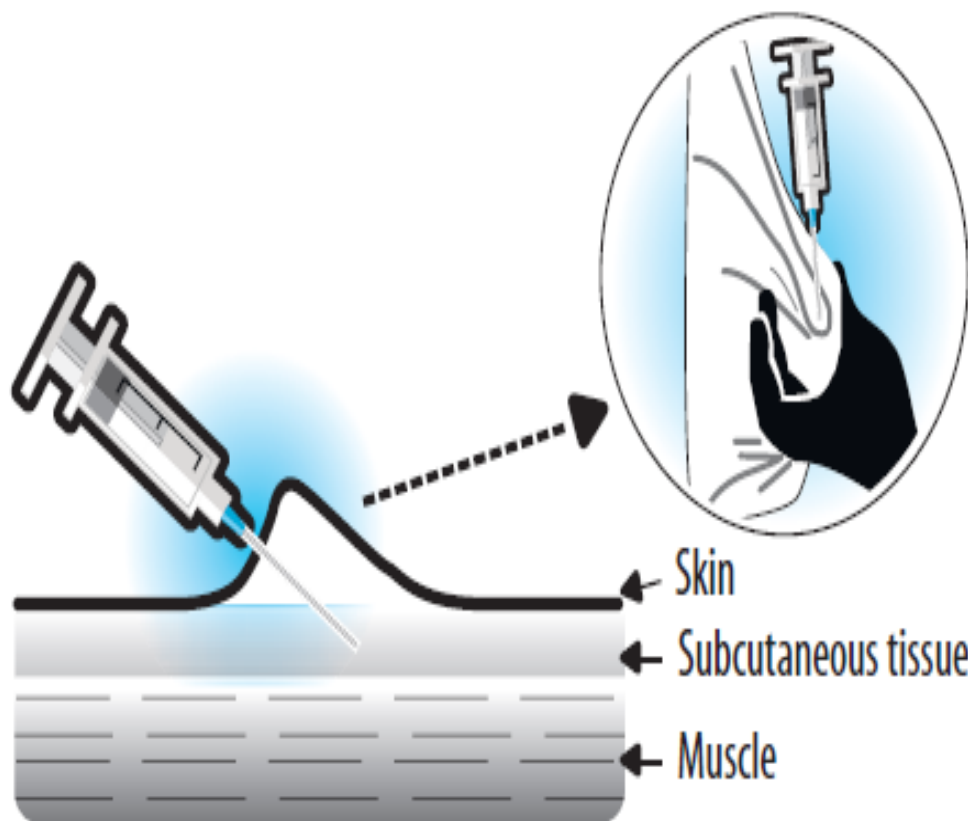


Figure 5: Diagram to insert needle into subcutaneous route.



Arrows point to approximate locations of the injection sites

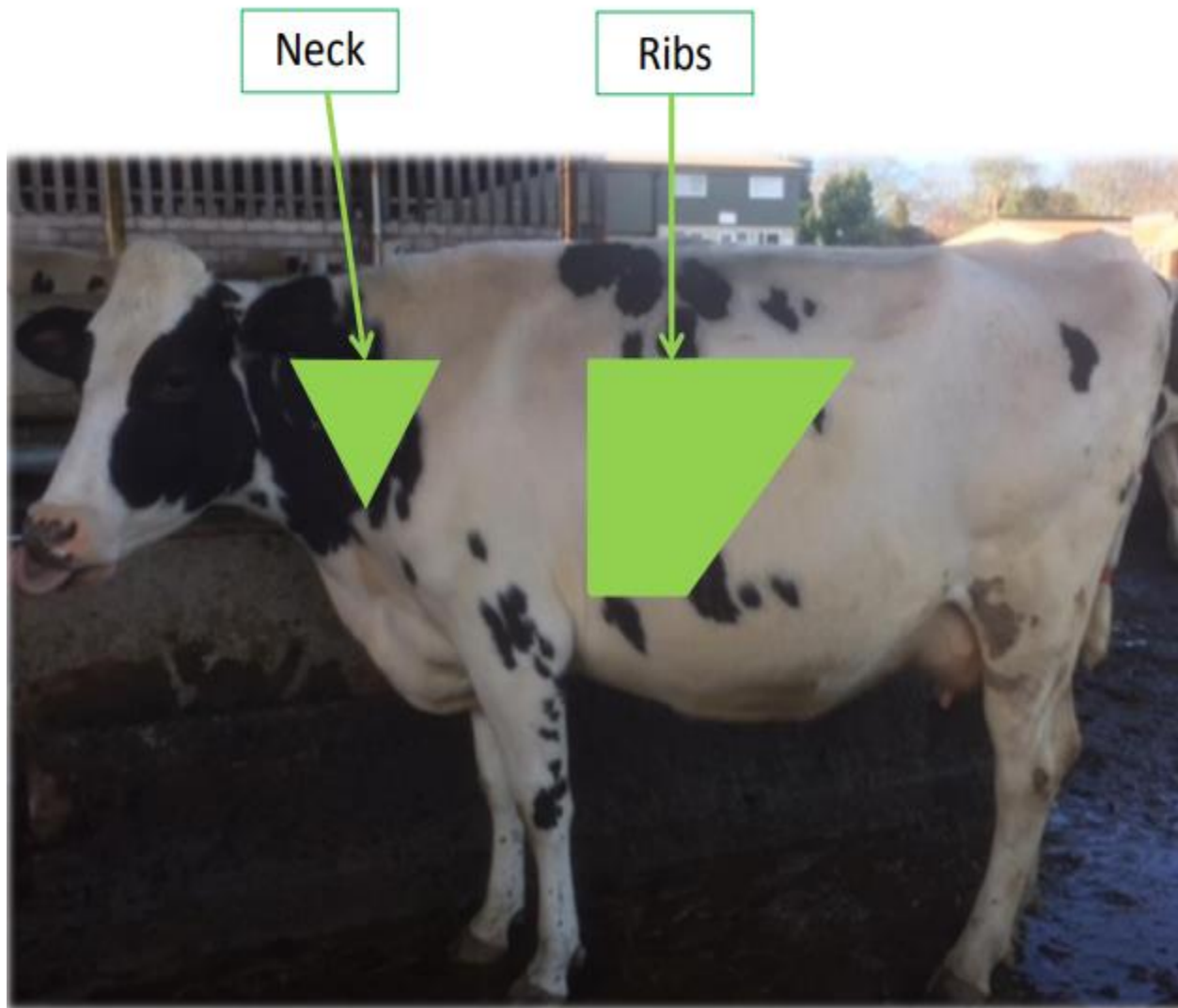


Figure 6: - Subcutaneous (SC) injection sites in cattle

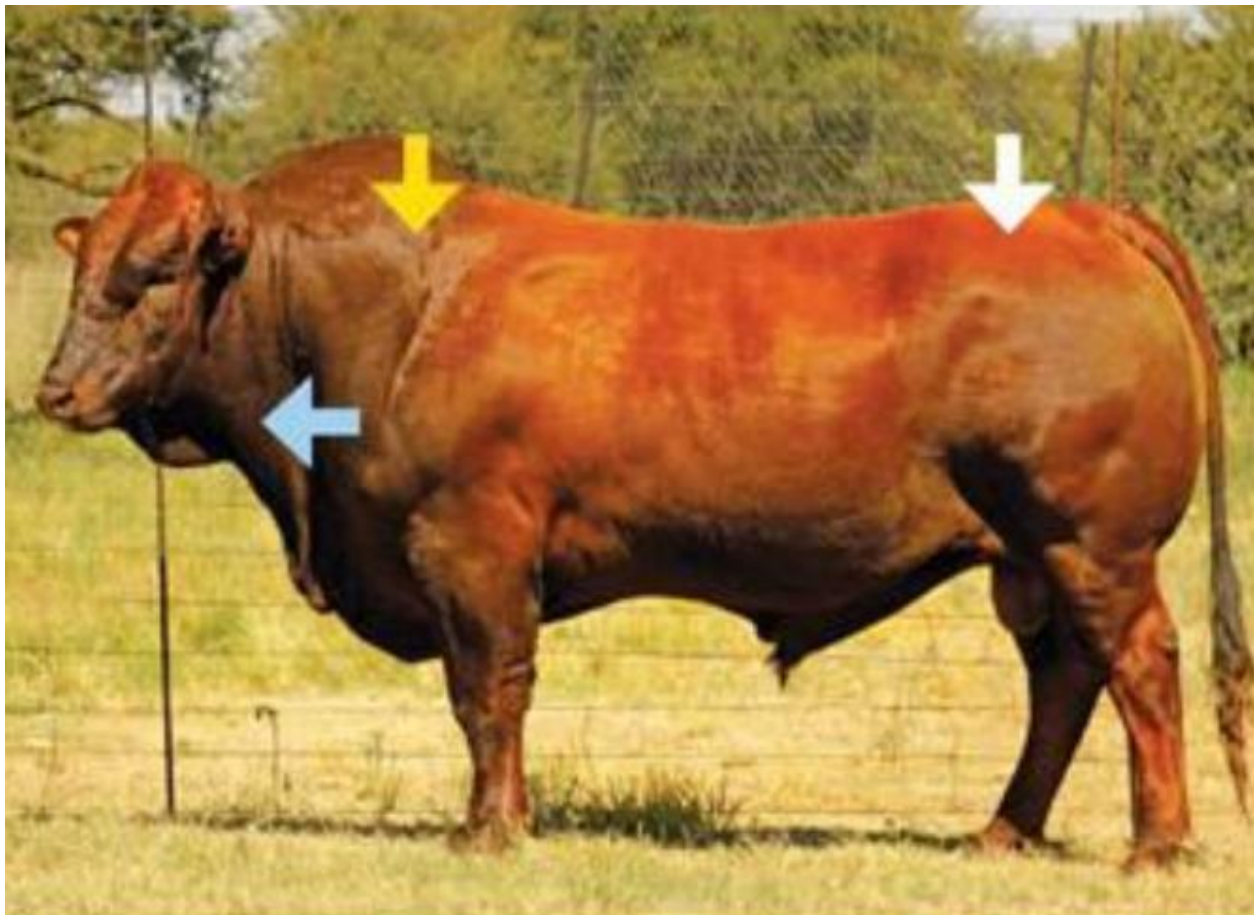


Figure 7: Injection sites on a bull. The white arrow is for intramuscular injections, the yellow for subcutaneous; and the blue arrow for intravenous.

NB: For all cattle, and especially beef cattle, the preferred site to give IM injections is into the neck muscles to avoid damage to higher price cuts of meat or the risk of damaging the sciatic nerve (particularly in thinner cattle).

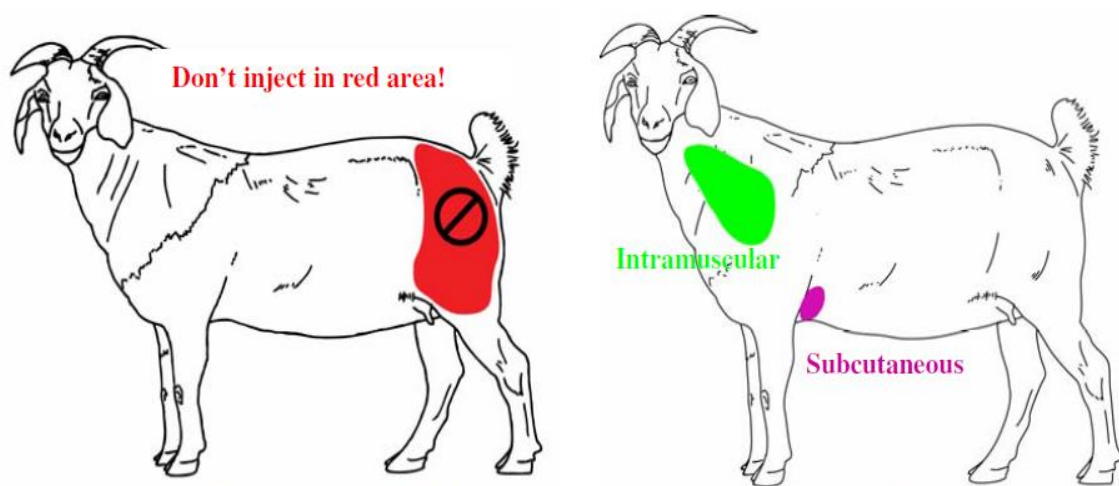


Figure 8: Proper sites for subcutaneous and intramuscular injections in goat.



Intra-arterial route: Drugs and diagnostic agents are administered via this route. The diagnostic media e.g. (Contrast media in angiography) is injected directly into the artery. This is also of great use in treatment of limb malignancies.

Intraperitoneal: - The peritoneum possess a cavity that offers a large absorptive area for drugs. The peritoneum is highly vascularized. This route is used in laboratory animals administration and large animal practice for administration of large volumes of fluid. The injection is made via the sublumbar fossa.

Intrathecal:- This is a route of administration of drug in which the effects of the drug is desired in the C.N.S. The blood brain barrier and the blood cerebrospinal fluid barrier often slow the entrance of drug into the C. N. S.

The drug will be accessible to the meninges and cerebrospinal axis. The injection made in the lumbar area or in the cisterna magna. These routes are primarily for diagnostic procedures (e.g. myelography), and treatment of meningoencephalitis. Local anaesthetics are sometimes administered intrathecally to produce region or spinal anaesthesia

Intradermal: the drug is injected into the skin raising a bleb. This route is used in diagnosis of tuberculosis (tuberculin testing in cattle) and (allergen sensitivity testing).

Intra-articular: Intra-articular injection of anti-inflammatory preparation (e.g. steroids) may be justified in some forms of lameness due to acute inflammation or trauma e.g. (swollen bursa or tendon sheath)

Other routes of drug injection include **intra-medullary**, which is used for blood transfusion directly into the bone marrow. This is done in neonates when other is difficult.

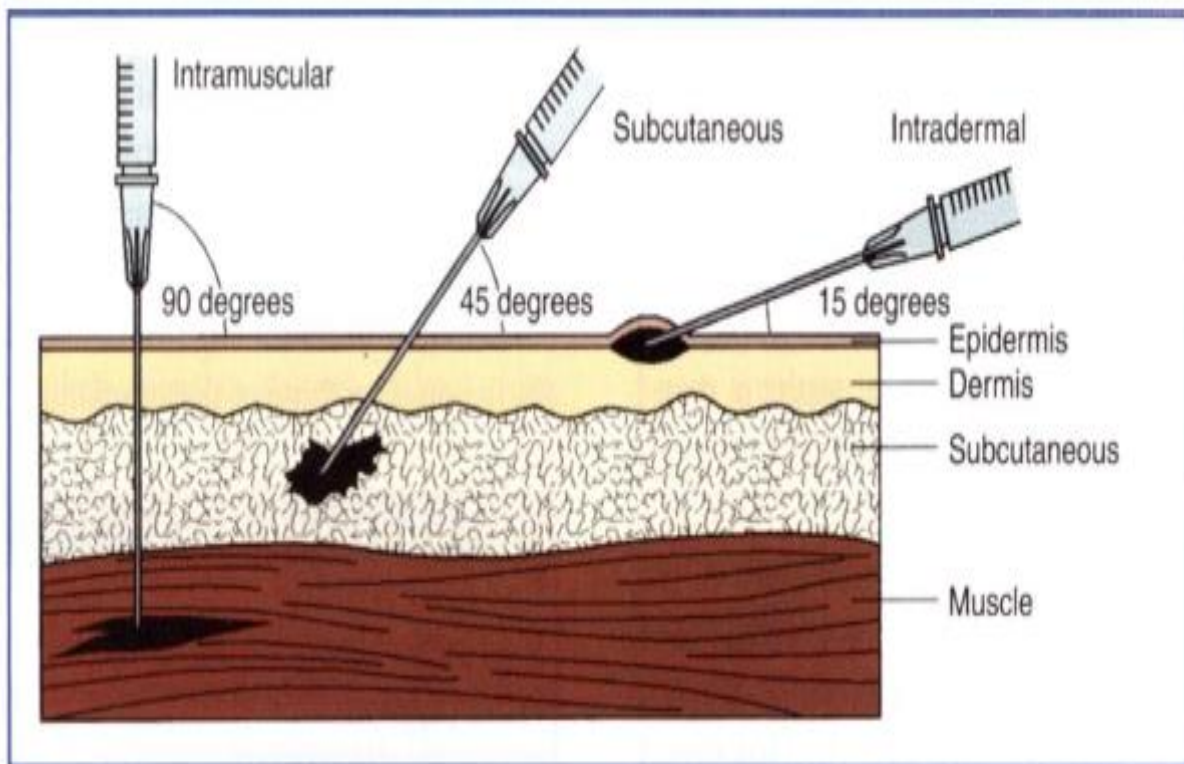


Figure 10: Comparison of an angel of injection and location of deposit medication for IM, SC and ID injection.

Pulmonary Route (Inhalation)

Gases, volatile liquids, and aerosols (fine droplets ion air). Some drugs such as ventoline are administered using a neubilizer or inhalers. Anaesthesia such as halothane, sevoflurane are vaporized and made to be atomized by a process atomization – This is delivered into the respiratory passages with the aid of anaesthetic machine or vapourizer. The vapourised anaesthesia is inhaled to cause anaesthesia and thus is eliciting its effect.

4.5. Livestock vaccination

Vaccines can dramatically reduce losses when used correctly to prevent disease in animals. There are different types of vaccines: **live vaccines** give long immunity after a single dose, while; **inactivated vaccines** need booster doses to maintain immunity. Anti-toxins are not vaccines - they provide immediate but short-term protection against a disease.

Most cattle are routinely vaccinated for the common respiratory viruses and clostridial diseases. In addition, breeding animals should receive protection against leptospirosis and campylobacteriosis, and heifers should be vaccinated for brucellosis.



4.5.1. Selecting the right vaccine

It is important to know which diseases animals should be vaccinated against. There are some common diseases that animals should be routinely protected against such as **tetanus** in horses or **botulism** in cattle. In some circumstances, disease should be diagnosed by a private veterinarian who will advise whether vaccination is recommended. Vaccine use should be part of a whole herd or flock health management program, incorporating biosecurity and disease prevention measures.

Some diseases may have several strains of causal organisms and some vaccines cover several disease complexes, so it is important to buy the correct vaccine for the situation. This is particularly relevant where more than one type of vaccine is available (e.g. five-in-one or seven-in-one vaccine for cattle). Seven-in-one vaccine is a five-in-one vaccine that has been combined with two strains of leptospirosis vaccine. Leptospirosis is a contagious bacterial disease that affects young calves and breeding females, causing stillbirths and abortion in late pregnancy. It is more expensive than the five-in-one vaccine so its use should be targeted to reduce costs.

It is also important to check that a vaccine is registered for the stock being vaccinated (e.g. there is a three-in-one and a six-in-one vaccine registered for sheep and lambs only, as well as two similar products which are registered for goats and kids in addition to sheep and lambs).

Some vaccines registered for the same disease but manufactured by different companies have different dosage regimes and booster recommendations (e.g. botulism vaccines for cattle and infectious bronchitis and Newcastle disease vaccines for poultry).

4.5.2. Storing vaccines

As vaccines are biological products they will slowly lose their potency, even when stored under ideal conditions. The manufacturer has determined the expiry date for each batch of vaccine and provided it is stored correctly, it will retain its full potency up to the date shown.

4.5.3. Follow label instructions

Vaccines must pass rigorous examination of their efficacy and safety before they can be sold. They are produced under the most stringent conditions and if they are not handled and administered correctly after leaving the production facility, their effectiveness can be reduced or non-existent.



The label on the vaccine carries important information about using the vaccine correctly: dosage; injection site; recommended vaccination program; and storage instructions. Users of veterinary chemicals are required by law to follow the label instructions unless they are using the chemical according to an approved permit or as directed in written instructions from a veterinarian. Vaccines are expensive and the label instructions should be followed to make the most of your investment.

4.5.4. Use sterile and safe equipment

Vaccines are usually administered by a syringe and needle although some are administered in the water supply or intranasally. Many vaccines are packaged in multi-dose containers for use with automatic syringes, which must be calibrated to deliver the right dose.

Needles should be sharp and as short as possible when vaccinating subcutaneously. Long needles may break or deposit the vaccine into the muscle instead of under the skin.

It is important that infection is not introduced when vaccinating animals. Equipment can be sterilised between use in a pressure cooker for 15 minutes, or by boiling in an open pan for 40 minutes. Chemicals, such as disinfectants or methylated spirits, should not be used as they may make the vaccine ineffective. After syringes and needles have been sterilised they should be kept in a covered container to protect them from dust.

4.5.5. Administering vaccines

Vaccination should only be undertaken in healthy animals which are not compromised by poor nutritional or husbandry conditions or in other ways. The animals should not be stressed either by the environment in which they are living or from being handled or from the administration of the vaccine. Stressed animals are less likely to produce a good immune response.

Methods of administration

The routes of vaccine administration will depend on various factors including:-

- the easiest method of introducing the antigen to a particular species
- the labour involvement
- the type of immunity required
- whether the vaccine is live or dead
- any adjuvants present that will alter the duration of exposure.

The ease of administration is a very important practical consideration of their usefulness.



At one time most inactivated vaccines were given by injection. However it is now possible to administer some of them by mouth via the food or water, as a spray or through the skin

Injections: - Most injected vaccines are given either subcutaneously (SC) or intramuscularly (IM). The former will usually remain at site longer than the latter.

Intra-dermal injections: - This method of application is unusual and is mainly used in contagious pustular dermatitis (orf) in sheep.

Oral: - A common route of application and it is used in particular with parasitic infections such as lungworm in cattle and coccidiosis in poultry. Many live viral poultry vaccines are placed in the water.

Aerosol (nebulisation or fogging):- Mainly used for mass poultry vaccination of young birds.

Intranasal: - This is undertaken for respiratory diseases in cattle.

Eye drop: - Sometimes used on young birds with a live viral vaccine.

Water application: - This provides vaccination for fish using their environment to distribute the vaccine.

Feed application: - Occasionally vaccines are used in the feed of pigs, poultry and sometimes fish.

Egg (In-ovo) injection: - Some vaccines are injected into the egg on the transfer into the hatchery to allow the chick shortly after birth to have some specific immunity to the infection.

Preparing the Vaccine

- Follow all the advice provided on the package insert.
- Check the dose or dilution rate.
- Ensure that the tops of all vials and bottles of diluent are sterile.
- Ensure with injectable vaccines a sterile needle is used to enter both vaccine vial and diluent.
- If the vial contains multiple doses and a single injection syringe is to be used, ensure a sterile needle remains in the vial top.
- The type of swab to be used to clean and sterilise the top needs to be determined as some sterilants such as alcohol may denature or kill live antigen.
- Ensure that any syringes are clean and sterile and do not contain any extraneous material such as disinfectants that might kill off or denature the vaccine.
- If having to reconstitute the vaccine always use the correct type of diluent or water.
- If reconstituting is required always use the correct volume of diluent or water.



- If the vaccine to be used is applied via the drinking water or by air as a coarse or fine spray ensure that the water used will not affect the efficacy of the vaccine.
- If reconstituting is required, it probably means that it is a live vaccine and check how long it is viable after reconstitution.
- With live vaccines only make up sufficient volume that can be easily used within the designated time.
- Ensure all vaccines when in use are kept as required i.e. some must not be exposed to high temperatures or to direct sunlight etc.
- When a multidose syringe is used ensure the correct volume is being injected.
- With all types of syringes ensure that the needle is changed at frequent intervals so as to ensure it is not blunt or causing contamination.
- If a vaccine vial is broached but not completely used at the time, check on the SPC (data sheet) the length of its in-use shelf-life and do not use after that period.

4.5.6. Vaccinating an animal

- Ensure that the animal is competently and adequately restrained before vaccination.
- Do not vaccinate animals that are inadequately restrained or when —playing upll as this may lead to injury to people or the animal, or placing the vaccine in the wrong place or missing the animal all together
- Place the vaccine into a clean area as aseptically as possible.
- If the animal is dirty find a clean area or sometimes clipping will allow somewhere cleaner to be used.
- If animals are too dirty do not vaccinate until they are cleaner.
- Where possible do not inject in the rain as this can lead to more contamination at the sites used for injection.
- Check in the manufacturer's literature if any particular parts or areas of the body should be used.
- Give the vaccine by the correct route.
- If more than one route can be used take advice to determine the one best to use, probably it should be based more on the rate at which immunity develops or the type of immunity produced rather than just on the ease of administration.

**Self-Check -4****Written Test**

Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

- _____ is the determination and regulation of the size of the drug, the frequency of the drugs administration and the amount of dose to be administered. **(3points)**
A. Dose
B. Dosage
C. Toxic dose
D. All
- What are the most important and most frequently used parenteral routes? **(7 points)**
- Write commonly used IM injection site in cattle. **(3points)**
- Describe administration methods of vaccines. **(7points)**

Note: Satisfactory rating – 20 points

Unsatisfactory - below 20 points

You can ask you teacher for the copy of the correct answers.

Answer Sheet

Score = _____

Rating: _____

Name: _____

Date: _____

Short Answer Questions



Information Sheet-5

Identify and minimize environmental impacts

5.1. Veterinary medicines in the environment

The impact of veterinary medicines on the environment will depend on a number of factors including physicochemical properties, amount used and method of administration, treatment type and dose, animal husbandry practices, manure storage and handling practices, metabolism within the animal, and degradation rates in manure and slurry. Once released to the environment, other factors such as soil type, climate, and ecotoxicity also determine the environmental impact of the compound. The importance of individual routes into the environment for different types of veterinary medicines varies according to the type of treatment and livestock category.

The main routes of entry to the terrestrial environment are:-

- use of veterinary medicines in intensively reared livestock
- the application of slurry and manure to land
- use of veterinary medicines in pasture-reared animals
- Excreted pharmaceutical residues directly into the environment.

Veterinary medicines applied to land via spreading of slurry may also enter the aquatic environment indirectly via surface runoff or leaching to groundwater. It is likely that topical treatments have greater potential to be released to the environment than treatments administered orally or by injection. Inputs from the manufacturing process, companion animal treatments, and disposal are likely to be minimal in comparison.

Veterinary medicines do enter the environment, with sheep dip chemicals, antibiotics, sealice treatments, and anthelmintics being measured in soils, groundwater, surface waters, sediment, or biota. Maximum concentrations vary across chemical classes, with very high concentrations being reported for the sheep dip chemicals.

The degree to which veterinary medicines may adsorb to particulates varies widely.

Veterinary medicines can persist in soils for days to years, and half-lives are influenced by a range of factors including temperature, pH, and the presence of manure. The persistence of major groups of veterinary medicines in soil, manure, slurry, and water varies across and within classes. The acute and chronic effects of Ivermectin and sheep dip chemicals substances are known to be toxic to many organisms at low concentrations.



5.2. Antimicrobials

Antibiotics and related antimicrobial compounds are widely administered for animal health and management and are used to treat diseases, promote growth, and improve feed efficiency. Many antimicrobials used in the animal food-producing industry are provided in the feed throughout the lifetime. Much of this intake, between 30 and 90% of the initial dose, is being excreted. Therefore, antimicrobials applied in farming operations can and do find their way into the receiving environment, where they can be present either as the parent compound or as a metabolite.

Once in the environment, their efficacy and persistence depends on their:-

- physio-chemical properties
- prevailing climatic conditions, and soil types and variety
- as well as other environmental factors.

Veterinary antibiotics can enter terrestrial and aquatic environments through spilled or excreted feed additives, overland flow runoff, unsaturated zone transport from fields to which agricultural waste has been applied, and leaky waste-storage structures.

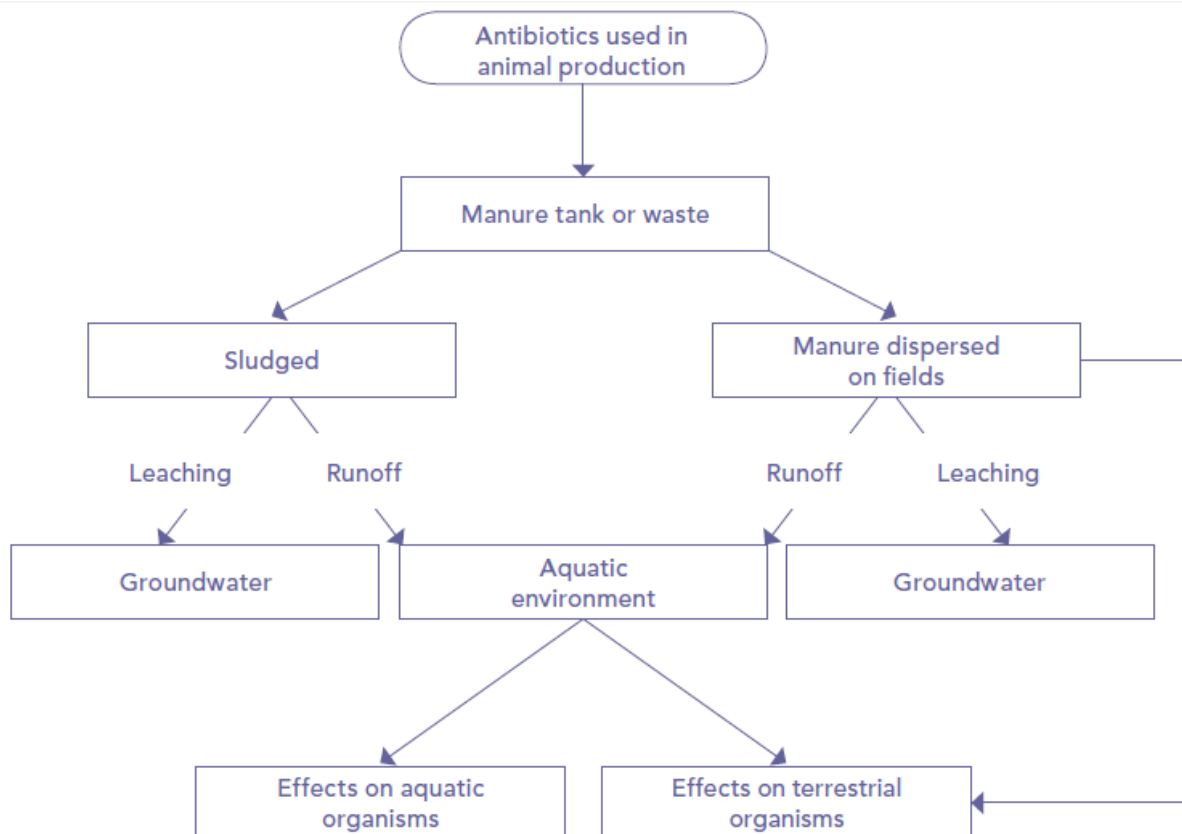


Figure 11: Anticipated exposure pathways for veterinary antibiotics in the environment

**Self-Check -5****Written Test**

Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

1. What are factors which determine the impact of veterinary medicines on the environment? **(3 points)**
2. How veterinary antibiotics can enter terrestrial and aquatic environments?**(4 points)**
3. Write the main routes of veterinary chemicals entry to the terrestrial environment. **(3 points)**

Note: Satisfactory rating – 10 points

Unsatisfactory - below 10 points

You can ask you teacher for the copy of the correct answers.

Answer Sheet

Score = _____

Rating: _____

Name: _____

Date: _____

Short Answer Questions



Operation Sheet- 1	Administer treatment
---------------------------	-----------------------------

1.1. Drawing medication into the syringe

Step 1-Take a syringe and cap it with a needle

Step 2-Remove the needle cap

Step 3-Take a new bottle and remove the aluminum cap

Step 4-Poke the needle through the rubber cap

Step 5-Draw the medication into the syringe

Step 6- Lower the bottle and slowly remove the needle

Step 7-Place the bottle upright in a safe place for future use

Step 8-Point the needle upwards to allow any air bubbles present to float to the top

1.2. Giving an intravenous injection

Step 1- Restrain the animal properly

Step 2- The holder should elevate the animal's head up and to the side.

Step 3-Feel for the trachea on the neck.

Step 4-Put pressure at the bottom of the groove and you will see the groove swell from your finger up to the jaw of the animal.

Step 5-Using an 18 to 20 gauge needle, direct it at a 45 degree angle then stab through the skin.

Step 6- Pull back on your syringe and see if there is blood present

Step 7- Administer drugs slowly

1.3. Subcutaneous injection

Step 1-Pull up a pinch of skin making a tent.

Step 2- Insert the needle into the tent taking care not to pierce through the other side.

Step 3- Depress the plunger slowly.

Step 4- Injecting with the needle pointing towards the ground will lessen the likelihood of the drug leaking out of the hole left by the needle.

Step 5- Massage the injected area.



LAP Test	Practical Demonstration
----------	-------------------------

Name: _____ Date: _____

Time started: _____ Time finished: _____

Instructions: Given necessary templates, tools and materials you are required to perform the following tasks within 5-7 hours.

Task 1. Drawing medication into the syringe

Task 2. Giving an intravenous injection

Task 3. Performing subcutaneous injection



List of Reference Materials

1. Ethiopia Sheep and Goat Productivity Improvement Program (ESGPIP). Technical bulletin no.10 giving injections to sheep and goats.
2. <https://www.farmersweekly.co.za/farm-basics/how-to-livestock/injecting-cattle-part-2/>.
3. <https://www.thebrooke.org/sites/default/files/professionals/working%20equid%20veterinary%20manual/wevm-chapter-4.pdf>.
4. Livestock vaccination available on <https://www.daf.qld.gov.au/businesspriorities/biosecurity/animal-biosecurity-welfare/animal-health-pests-diseases/protectyour-animals/livestock-vaccination>.
5. Mccurnin, D M. And Bassert, J. M. (2006): Clinical Textbook for Veterinary Technicians. Sixth Edition, Elsevier Sunder, USA.
6. Pew Commission on Industrial Farm Animal Production (2007): Environmental Impact of Industrial Farm Animal Production.
7. Responsible Use of Medicines in Agriculture Alliance (RUMA)(2006): Responsible use of vaccines and vaccinations in farm animal production. National Office of Animal Health (NOAH), UK.



ANIMAL HEALTH CARE SERVICE

NTQF Level II

Learning Guide-3

**Unit of Competence: Administer Medications to
Livestock**

**Module Title: Administering Medications to
Livestock**

LG Code: AGR AHC2 M10 LO3-LG-03

TTLM Code: AGR AHC2 M10 TTLM 1019v1

LO3. Complete treatment process



Instruction Sheet	Learning Guide # 3
--------------------------	---------------------------

This learning guide is developed to provide you the necessary information regarding the following **content coverage** and topics:

- Move livestock along planned route
- Clean, maintain and store equipment, materials and facilities
- Dispose livestock residues and waste

This guide will also assist you to attain the learning outcome stated in the cover page.

Specifically, **upon completion of this Learning Guide, you will be able to:**

- Prepare and move livestock along planned route without damage to person, property or environment.
- Clean, maintain and store equipment, materials and facilities used for treatments in line with manufacturer's specifications, OHS and enterprise requirements.
- Dispose livestock residues and waste of in line with enterprise requirements for OHS and environmental management.

Learning Instructions:

1. Read the specific objectives of this Learning Guide.
2. Follow the instructions described below 3 to 6.
3. Read the information written in the information "Sheet 1, Sheet 2 and Sheet 3".
4. Accomplish the "Self-check 1, Self-check t 2 and Self-check 3" in **page 80, 83, and 86** respectively.
5. If you earned a satisfactory evaluation from the "Self-check" proceed to "LO4" in **page - 88.**



Information Sheet-1	Move livestock along planned route
----------------------------	---

1.1. Animal behavior patterns

No matter if you are moving animals to different pastures, providing veterinary care, or conducting research, safety should be a priority when handling livestock. Animal behavior can be unpredictable at times and livestock can revert to instinctual reactions when they feel threatened or stressed. Individuals can be injured due to preoccupation, haste, impatience, or even anger. Injuries that are common when moving and working with livestock include bites, kicks, being stepped on, pinned against a solid surface, or overcome by a single animal or the whole herd.

An understanding of fear motivated behavior in cattle and horses helps prevent accidents. The first principle is that herd animals such as cattle and horses often become agitated and fearful when a lone animal is separated from the herd. A single animal that is frantically attempting to rejoin its herdmates can be very dangerous. Lone bovines left behind in crowd pens or alleys cause several serious accidents by jumping fences or running over people. A person should never get into a confined space with a single, agitated, large animal. Either the animal should be released, or more animals should be put in with it. Plan ahead and consider your safety and the animal's safety when moving and handling livestock during post treatment. Some general safety guidelines should include:

- Understand and study the typical behaviors of the specific livestock you are working with.
- Understand aggressive warning signs such as showing of teeth, ears laid back, raised hair, snorting, or stomping of feet.
- Avoid startling an animal by making it aware of your approach before getting too close. Approach from an angle that you can be seen.
- Move calmly, deliberately, and patiently. Avoid quick movements or loud noises that may startle animals.
- Avoid being in travel paths during the feeding of a herd or large group of livestock.
- Be aware of your surroundings and always leave an escape route when working in close quarters with livestock.
- Use the proper personal protective equipment to prevent injuries and exposure to potential zoonotic illnesses.



- Utilize good housekeeping practices in barns and livestock facilities to prevent slips, trips, or falls.

1.2. Movement patterns

Handling is safer when animals are moved quietly. Handlers should not yell or flap their arms, because this may agitate the animals. Excessive use of electric prods increases animal agitation, as well as hazards to handlers. When cattle become agitated and fearful, up to 20 minutes is required for their heart rate to return to normal. Agitated large animals are easier and safer to move if they are given an opportunity to calm down.

Both veterinarians and handlers also need to understand the point of balance. The point of balance is an imaginary line at the animal's shoulders. To induce the animal to move forward, the handler must be behind the point of balance. To make the animal move backward, the handler must be in front of the point of balance.

Don't try to move a dangerous bull on foot or alone. Use a Ute or tractor, get someone to help, use a well-trained dog, or bring the bull along with a group of steers or cows to help keep it calm.

- Move confidently, but carefully. You must show dominance.
- Keep bulls moving at a trot until they're well into the paddock and clear of the gate. Keep them a good distance apart.
- Stay clear of a fighting pair.
- Always have a waddy and be ready to use it.
- If cornered by a bull, don't move too fast. Slowly move out of the bull's 'flight zone'. Turning and running from the bull invites being chased and they are usually faster. If there is no escape route, step sideways out of his best vision. This will confuse him.



Self-Check -1	Written Test
----------------------	---------------------

Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

1. What is the reason a single animal can be very dangerous? **(2points)**
2. Why handlers should not yell or flap their arms?**(2points)**
3. What are common injuries when moving and working with livestock?**(4points)**

Note: Satisfactory rating – 8 points

Unsatisfactory - below 8 points

You can ask you teacher for the copy of the correct answers.

Answer Sheet

Score = _____

Rating: _____

Name: _____

Date: _____

Short Answer Questions



Information Sheet-2	Clean, maintain and store equipment, materials and facilities
----------------------------	--

2.1. 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.

Clean

Cleanliness and organization are good business standards, especially in a health care facility. Always clean up spills as soon as they happen. You should always clean and return equipment to the proper storage place immediately after use. At least daily, remove all trash from your work area. Organize drawers, cabinets, and counters so that items can be found easily and clutter is reduced.

Biostatics or biocidal agents require complete access to all surfaces of the instruments or equipment we are processing.

The presence of blood, pus, serum or faecal matter interferes with this process, effectively protecting potential pathogenic material and acts as a physical barrier to the disinfectant or biocide.

Drying of instruments

- Instruments should be dried thoroughly within a drying cabinet or manually dried individually with a lint free cloth prior to assembling and packaging. Drying cabinets are rare in veterinary hospitals, hence manual drying is commonly performed.
- Drying is an important step in reducing the potential of re-contamination during inspection and assembly as well as avoiding rusting, staining or steam quality problems.
- Instruments that have any residual moisture may contribute to some common problems such as, wet loads, wet steam and perforation of paper packaging material.

2.2. Storage

Requirements for storage

- If sterile goods are incorrectly stored, there is a potential for contamination, rendering the instruments or equipment non-sterile.
- An ideal storage room/area would have controlled air conditioning with low turbulence, minimal traffic and separate from other activities.



- The area must be dry, with humidity in the range of no less than 35% and no more than 70%. Temperature should be no higher than 23 degrees celsius.
- Sterile stock should be free from direct sunlight, dust, dampness, insects, vermin and constant handling.
- Closed cupboards or shelving systems should be designed with shelving 50mm - 75mm away from the wall, 20cm - 25cm sitting above the floor and 45cm - 50cm away from the ceiling.
- Smooth washable surfaces are recommended for ease of cleaning. Routine cleaning of all surfaces should be undertaken.
- Sterile items must be kept away from water pipes, and not stored under sinks.
- Cardboard boxes are not recommended as storage containers for sterile goods as they are porous, cannot be cleaned and potentially harbor contaminants.
- Always store food, drinks, condiments, and snacks in a separate refrigerator from the one used to store biological or chemical hazards such as vaccines, drugs, and laboratory samples.

**Self-Check -2****Written Test**

Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

1. _____ is an important step in reducing the potential of re-contamination during inspection and assembly as well as avoiding rusting, staining or steam quality problems.
(1point)
2. What will be done after use the syringe and partly-used bottles of medicine? **(4points)**
3. What will happen if sterile goods are incorrectly stored? **(3points)**

Note: Satisfactory rating - 8 points

Unsatisfactory - below 8 points

You can ask you teacher for the copy of the correct answers.

Answer Sheet

Score = _____

Rating: _____

Name: _____

Date: _____

Short Answer Questions



Information Sheet-3	Dispose livestock residues and waste
----------------------------	---

3.1. Waste Cleaning and Disposal

Veterinary biomedical waste is a potential source of both zoonotic and non-zoonotic infectious pathogens. Precautions should be taken to minimize contamination of the clinic environment and the risks to people and animals from potentially infectious waste.

- PPE should be worn during waste cleanup and disposal procedures, and footwear should not be worn outside the facility.
- Dispose of all hazardous drug waste according to Federal, State, and local regulations (separately from regular waste).
- Double-bag all chemotherapy waste including partially filled vials, undispensed products, unused IVs, needles and syringes, gloves, gowns, mats, and contaminated materials from spill cleanups or animal bodily fluids/waste.
- Place materials with trace wastes (those that contain less than 3% by weight of the original quantity of hazardous drugs) such as needles, empty vials and syringes, gloves, gowns, and tubing in chemotherapy waste containers. Assure that such containers protect from sharps injuries. Do not use red sharps containers for drug disposal.
- „Consider disposing of other bulk hazardous drugs (expired or unused vials, ampoules, syringes, bags, and bottles of hazardous drugs or solutions of any other items with more than trace contamination) in a manner similar to that required for RCRA-defined hazardous wastes.
- Avoid using sprayers or pressure washers to clean the cages, kennels or stalls of treated animals to minimize the aerosolization of hazardous wastes.
- Clean the cages and kennels of treated animals with disposable towels if possible and use disposable towels to clean bodily waste from treated animals.

3.2. Sharps and medical waste

The most serious hazard from needles or sharp objects in a veterinary medical environment is from the physical trauma (and possible bacterial infection) that is caused by a puncture or laceration. To prevent these types of accidents, always keep sharps, needles, scalpel blades, and other sharp instruments capped or sheathed until ready for use.



- Do not attempt to recap the needle after use unless the physical danger from sticks or lacerations cannot be avoided by any other means. Although some practice is needed before the one-handed method becomes second nature, it is the safest and most practical approach for most veterinary situations.
- Do not remove the needle from the syringe for disposal because this unnecessary handling often results in injuries. Whenever possible, the entire needle and syringe should be disposed of in the designated sharps containers immediately after use.
- Do not try to overfill a sharps container when it's full, it's full! When the sharps container is full, seal it and replace it with a new one. Never open a sharps container that has already been sealed or stick your fingers into one for any reason.
- Destroying the needle prior to disposal is not recommended because it may aerosolize the contents of the needle and increase your exposure.

**Self-Check -3****Written Test**

Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

1. Veterinary biomedical waste is a potential source of _____? **(1 points)**
 - A. Both zoonotic and non-zoonotic infectious pathogens
 - B. Non-zoonotic infectious pathogens
 - C. Zoonotic infectious pathogens
 - D. None
2. List out double-bag wastes. **(5 points)**
3. What will be done to prevent physical trauma from needles or sharp objects caused by puncture or laceration? **(4 points)**

Note: Satisfactory rating – 10 points

Unsatisfactory - below 10 points

You can ask you teacher for the copy of the correct answers.

Answer Sheet

Score = _____

Rating: _____

Name: _____

Date: _____

Short Answer Questions



List of Reference Materials

1. Collage of Food, Agriculture (2019): Livestock Handling Safety. Ohio State University.
<http://www.fao.org/3/X2096E/X2096E06.htm>. Early reaction contingency planning principles and strategies.
2. NIOSH (2010): Safe Handling of Hazardous Drugs for Veterinary Healthcare Workers.
3. The New Zealand Veterinary Nurse (2015): Sterilizing practice for veterinary nurses.



ANIMAL HEALTH CARE SERVICE

NTQF Level II

Learning Guide-4

**Unit of Competence: Administer Medications to
Livestock**

**Module Title: Administering Medications to
Livestock**

LG Code: AGR AHC2 M10 LO4-LG-04

TTLM Code: AGR AHC2 M10 TTLM 1019v1

**LO4: Monitor effectiveness of
treatment**



Instruction Sheet	Learning Guide # 4
--------------------------	---------------------------

This learning guide is developed to provide you the necessary information regarding the following **content coverage** and topics:

- Monitor livestock post-treatments
- Recognize and treat abnormalities of livestock
- Record livestock treatment process

This guide will also assist you to attain the learning outcome stated in the cover page.

Specifically, **upon completion of this Learning Guide, you will be able to:**

- Monitor livestock post-treatments for signs of treatment effectiveness.
- Recognize and treat abnormalities in livestock health and condition appropriately.
- Detail and record livestock treatment process and outcomes including withholding periods in line with enterprise requirements.

Learning Instructions:

1. Read the specific objectives of this Learning Guide.
2. Follow the instructions described below 3 to 6.
3. Read the information written in the information “Sheet 1, Sheet 2, and Sheet 3”.
4. Accomplish the “Self-check 1, Self-check 2, and Self-check 3” in **page 91, 93, and 97** respectively.
5. If you earned a satisfactory evaluation from the “Self-check” proceed to “Module”



Information Sheet-1	Monitor livestock post-treatments
----------------------------	--

1.1. Patient monitoring

For veterinary technicians, the majority of time in the clinic is spent providing patient care of which a large portion, especially in critical care, is devoted to monitoring. The primary objectives of critical care monitoring include:-

- 1) evaluation of current status
- 2) evaluating the response to therapy and
- 3) Detecting new problems.

Continuous 24-hour monitoring should be provided to patients who are very critical or unstable, whereas 8-hour monitoring intervals may be acceptable in improved or stable patients.

Both subjective parameters and objective parameters are combined to provide the most complete evaluation of patient progress so that sound treatment decisions can be made.

- Subjective parameters include **hydration status** and **mentation** (attitude, alertness, appetite).
- Objective parameters include **body weight**, **urine production**, **vital signs** (i.e., temperature, pulse, respirations), and lab results. Special techniques are often utilized to enhance our ability to monitor, diagnose, and treat critically ill veterinary patients.

The most important tool in monitoring any patient is **serial physical exams** and **assessment** by a trained and attentive caregiver. A rational approach to patient monitoring can be loosely organized around the principles of **triage** and **body system anatomy**.

Animals under treatment or being monitored should not be confined alone, as sheep and cattle separated from their herd and flock may become severely distressed. Treated animals should be penned, yarded and managed in the company of a small group of quiet, easily handled animals.

Eating, rumination and activity behavior are important indicators of recovery from health issues. Animals with abnormal behavior during recovery might need additional clinical examination to stay one step ahead of serious problems. Animals should be in a clean, dry, and comfortable area where they can be observed frequently by trained personnel.

**Self-Check -1****Written Test**

Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

1. What are the primary objectives of critical care monitoring?(**3 points**)
2. List out objective parameters. (**4 points**)

Note: Satisfactory rating - 10 points

Unsatisfactory - below 10 points

You can ask you teacher for the copy of the correct answers.

Answer Sheet

Score = _____

Rating: _____

Name: _____

Date: _____

Short Answer Questions



Information Sheet-2	Recognize and treat abnormalities of livestock
----------------------------	---

2.1. Medical treatments in the Post arrest period

- Many variables affect the outcome and management of an arrested patient.
- These variables include the animal's underlying diseases and reason for arrest, in addition to the experience and equipment available to the resuscitation team.
- There is a general consensus regarding the difficulties facing the team and the syndromes associated with the post arrest period, but disagreement exists regarding treatment methods, treatment priorities, and which therapies result in the best outcome.
- All therapies of post arrest patients are somewhat controversial due to an inability to create a standardized model.
- Many drugs may be useful in the post resuscitation patient and the list continues to grow.
- Abnormalities in livestock health and condition are recognized and treated appropriately.

2.2. Abnormalities after treatment in livestock

Inspection should be carried out in adequate lighting where the animals can be observed both collectively and individually at rest and motion. The general behaviour of animals should be observed, as well as their nutritional status, cleanliness, signs of diseases and abnormalities.

Some of the abnormalities which are checked on inspection include:

- Abnormalities in respiration
- Abnormalities in behaviour
- Abnormalities in gait
- Abnormalities in posture
- Abnormalities in structure and conformation
- Abnormal discharges or protrusions from body openings
- Abnormal colour
- Abnormal odour



Self-Check -2	Written Test
----------------------	---------------------

Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

1. What are variables which affect the outcome and management of an arrested patient? **(5points)**
2. Write abnormalities which are checked on inspection after treatment. **(5 points)**

Note: Satisfactory rating - 10 points

Unsatisfactory - below 10 points

You can ask you teacher for the copy of the correct answers.

Answer Sheet

Score = _____

Rating: _____

Name: _____

Date: _____

Short Answer Questions



Information Sheet-3	Record livestock treatment process
----------------------------	---

3.1. Recordkeeping

Veterinary medical records include a wide range of forms and logs that document the treatment and care of animal patients. The results of physical examinations, laboratory tests, and diagnostic procedures, such as radiographic imaging, ultrasound, electrocardiograms, and endoscopy, are examples of information that is included in the record. In addition, medical records document treatment protocols, such as the administration of medication and intravenous fluids, surgery, wound care, and radiation or physical therapy. Medical records also describe the progress of patients, list daily observations, and chart vital signs and other monitoring data. Finally, medical records document euthanasia and postmortem examinations and include important authorization and consent forms. The number and types of forms and logs that comprise medical records vary from practice to practice. Medical records are a key element of the veterinary care program and are considered critical for documenting animal well-being as well as tracking animal care and use at a facility. A veterinarian should be involved in establishing, reviewing, and overseeing medical and animal use records. All those involved in animal care and use must comply with federal laws and regulations regarding human and veterinary drugs and treatments. Drug records and storage procedures should be reviewed during facility inspections.

3.2. Functions of the medical record

The Institute of Medicine has organized the functions of the medical record into two broad categories: primary purposes and secondary purposes.

- **Primary purposes** support the patient's medical care such as the documentation of diagnostic procedures, diagnoses, prognoses, and treatment.
- **Secondary purposes** are not clinically based but rather include evaluations of medical information for business, legal, and research purposes.

A comprehensive medical record supports excellent medical care, research, and good business practices. It also helps to protect practices during malpractice litigation.



I. Primary purposes

Supports excellent medical care

- A. Identifies correct patient and owner
- B. Supports generation of diagnostic and treatment plans
- C. Supports continuity of care
- D. Supports communication
 - 1. Among health care team members
 - 2. With the owner
 - 3. Personalizes veterinarian-client relationship

II. Secondary purposes

Supports business and legal activities

- A. Verifies billing.
- B. Supports actuarial calculations.
 - 1. Income analysis
 - 2. Budgetary plans
 - 3. Staff workloads
- C. Supports inventory maintenance.
- D. Supports formulation of marketing strategy.
- E. Supports hospital accreditation.
- F. Acts as a legal document.

Supports research

- A. Case studies and presentations
- B. Registries and databases
- C. Education of veterinarians and veterinary technicians



Table 1: Routine livestock treatment record

Date commenced	Date ceased	Animals	Identification of animals	Product	Dosage	Time of use	Withdrawal period	Responsible person	Reason for treatment



Self-Check -3	Written Test
----------------------	---------------------

Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

1. _____ are a key element of the veterinary care program. **(2 points)**
2. One of the following is the primary purposes support the patient's medical care. **(2 points)**
 - A. Treatment
 - B. Business
 - C. Legal
 - D. Research purposes
3. List out at least 4 examples of information that is included in the veterinary medical record. **(4 points)**
4. Identify the steps of motivating clients in relation of taking referral services. **(4 points)**

Note: Satisfactory rating – 12 points

Unsatisfactory - below 12 points

You can ask you teacher for the copy of the correct answers.

Answer Sheet

Score = _____
Rating: _____

Name: _____

Date: _____

Short Answer Questions



List of Reference Materials

1. Mccurnin, D M. And Bassert, J. M. (2006): Clinical Textbook for Veterinary Technicians. Sixth Edition, Elsevier Sunder, USA.
2. Farm Animal Welfare Committee (FAWC) (2012): Farm Animal Welfare: Health and Disease.