

Animal Health

Level-I

**Based on August 2022, Version4 Occupational
standard**



**Module Title: - Providing Basic Health Care for
Animal**

LG Code: AGR ANH1 M06 LO(1-4) LG (20-23)

TTLM Code: AGR ANH1TTLM)0922v1

September 2022
Addis Ababa, Ethiopia

Table of Contents

Introduction to the Module	1
LO #1-Provide Basic Health Care for	2
Instruction sheet.....	2
Information Sheet1	3
Self-Check 1	10
LO #2- Provide care for pregnant Animal	11
Instruction Sheet	11
Information Sheet 2	13
Self-Check 2	36
Operation Sheet 2.....	37
LAP TEST 2	38
LO#3-Provide care for lactating animals	39
Instruction sheet.....	39
Information Sheet 3	40
Self-check 3	53
Operation Sheet 3.....	54
LAP TEST 3	55
LO #4- Provide Care for New-born Animals.....	56
Instruction sheet.....	56
Information Sheet 4	58
Self-Check 4	76
Operation Sheet 4.....	77
LAP TEST 4	78
Reference Materials	79

Introduction to the Module

This module covers the knowledge, skills and attitude required to provide care service for sick, pregnant, lactating and new-born animals. It requires a regular follow up and identify sign of ill health, sign of approaching parturition, assess the condition of new-born and perform resuscitation activity, disinfection of navel, feeding of colostrum and care for new-born animals.

Page 1 of 83	Ministry of Labor and Skills Author/Copyright	Animal Health Level -I	Version -1
			September, 2022

LG #20

LO #1-Provide Basic Health Care for Sick Animals

Instruction sheet

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

- Providing Basic and Suitable accommodation
- Accessing essential feed and water
- Maintaining hygiene of sick animals

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

- Provide basic and suitable accommodation for sick animals
- Access essential feed and water for sick animals based on the recommendation duty of veterinarian.
- Maintain sick animals and their accommodations hygienic to prevent aggravation of injury/health problem

Learning Instructions:

1. Read the specific objectives of this Learning Guide.
2. Follow the instructions described below.
3. Read the information written in the information Sheets
4. Accomplish the Self-checks

Information Sheet1

1.1 Providing Basic and Suitable accommodation

Definition: Any kind of shelter, refuge affording protection to animals

Housing: it is a place where livestock are living the whole day in intensive care or half a day in semi- intensive care.

A. Type of Accommodation /House

- **Primary Enclosures**

The primary enclosure (usually a cage, pen, or stall) provides the limits of an animal's immediate environment. Acceptable primary enclosures

- ✓ Allow for the normal physiologic and behavioural needs of the animals, including urination and defecation, maintenance of body temperature, normal movement and postural adjustments, and, where indicated, reproduction.
- ✓ Allow conspecific social interaction and development of hierarchies within or between enclosures.
- ✓ Make it possible for the animals to remain clean and dry
- ✓ Allow adequate ventilation.
- ✓ Allow the animal's access to food and water and permit easy filling, refilling, changing, servicing, and cleaning of food and water utensils.
- ✓ Provide a secure environment that does not allow escape of or accidental entrapment of animals or their appendages between opposing surfaces or by structural openings.
- ✓ Are free of sharp edges or projections that could cause injury to the animals.
- ✓ Allow observation of the animals with minimal disturbance of them.

- **Sheltered or Outdoor Housing**

Sheltered or outdoor housing such as barns, corrals, pastures, and islands-is a common primary housing method for some species and is acceptable for many situations. In most cases, outdoor housing entails maintaining animals in groups.

When animals are maintained in outdoor runs, pens, or other large enclosures, there must be protection from extremes in temperature or other harsh weather conditions and adequate protective and escape mechanisms for submissive animals. These goals can be achieved by such features as windbreaks, shelters, and shaded areas, areas with forced ventilation, heat-radiating structures, or means of retreat to conditioned spaces, such as an indoor portion of a run. Shelters should be accessible to all animals, have sufficient ventilation, and be designed to prevent build-up of waste materials and excessive moisture. Houses, dens, boxes, shelves, perches, and other furnishings should be constructed in a manner and made of materials that allow cleaning or replacement in accord with generally accepted husbandry practices when the furnishings are excessively soiled or worn.

Whether cows are housed in cubicles, straw yards or cow sheds, in order to maximize performance and to ensure satisfactory standards of welfare, the accommodation must at least provide for the animal’s most basic needs.

As an absolute minimum, the housing must provide a comfortable, clean, well-drained and dry lying area together with shelter from adverse weather, space to allow the animal to move, lie down and rise freely as well as access to adequate food and water. All housing for cattle should include an adequate provision of calving pens and sick pens for isolation of sick or injured animals.

If the housing system does not provide for these basic needs, then not only will both production and welfare be compromised, but it is likely that you are also failing to comply with the welfare codes and the law relating to animal welfare in your area Housing should be comfortable, clean and well ventilated shelter for cattle.

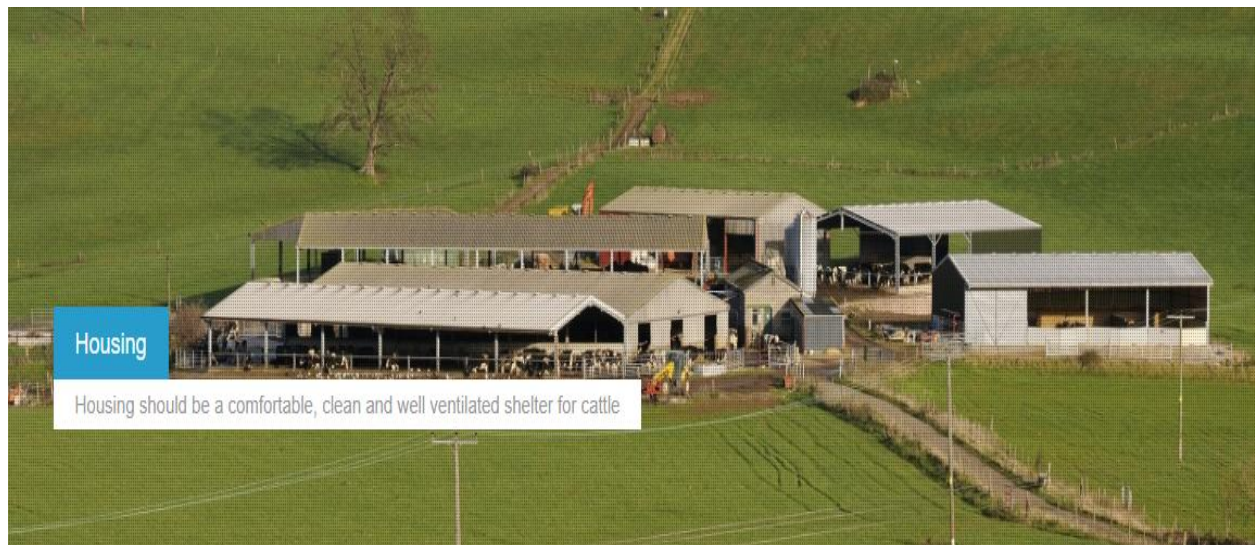


Figure. 2.1 cattle housing

(<https://www.farmhealthonline.com/health-welfare/cattle/housing/>
access date, 27 August 2022)

B. Conditions required in to handle sick animal in animal house

- **Bedding**

Bedding is used to absorb moisture, minimize the growth of microorganisms, and dilute and limit animals' contact with excreta. Animal bedding is a controllable environmental factor that can influence experimental data and animal well-being. The veterinarian or facility manager, in consultation with investigators, should select the most appropriate bedding material. No bedding is ideal for any given species under all management and experimental conditions, and none is ideal for all species.

- **Feeding and Watering Through**

Feeding through: is equipment used for provision of feed for animal.

Watering through: is equipment used for watering of animals

- **Light**

Light can affect the physiology, morphology, and behavior of various animals. In general, lighting should be diffused throughout an animal holding area and provide sufficient illumination

for the well-being of the animals and to allow good housekeeping practices, adequate inspection of animals.

- **Ventilation**

The primary purpose of ventilation is to provide appropriate air quality and a stable environment. Specifically, ventilation

- ✓ Provides an adequate oxygen supply;
- ✓ Removes thermal loads caused by the animals, personnel, lights, and equipment;
- ✓ Dilutes gaseous and particulate contaminants including allergens and airborne pathogens;
- ✓ Adjusts the moisture content and temperature of room air; and,
- ✓ Where appropriate, creates air pressure differentials (directional air flow) between adjoining spaces

When designing new buildings, ventilation should be carefully considered as poor ventilation can cause health and welfare issues. Air circulation, dust levels, temperature and relative humidity must be kept within limits that are safe for both animals and humans.

1.4.1. Accessing essential feed and water

- **Feed: Assessment of Nutritional Status**

Before initiation of dietary therapy, the large animal patient must be examined to determine its nutritional needs. Animals may be anorectic owing to systemic disease, or they may be dysphagic owing to a mechanical (foreign body, abscess, poor dentition) or neurologic (botulism, tetanus, viral encephalitis) disease. Assessment of the nutritional status of the patient should include a measurement of the body weight (BW) and body condition score (BCS) of the animal and biochemical tests.

Although nutrition was once regarded as a supportive measure of low priority, it is increasingly being recognized as an important therapeutic intervention in the care of critically ill patients.

- ✓ **Rumen bypass protein or protected amino acids required for sick.**

Proteins are the major building blocks in the repair process and are important in maintaining the immune system. Protein requirements of the diseased and convalescing animals are usually higher than for the normal maintenance. An increased protein level promotes restoration of lean

body mass and increases palatability during the post-operative period. Feeding of higher levels of good quality protein promotes wound healing.

✓ **Fats and carbohydrates:**

These are excellent sources of energy, which is needed in larger amounts than normal for repairing the tissues affected by illness, injury or surgery and to fight infection. Increasing the fat level of the diet provides a more ‘concentrated’ food (calorie-dense) so that the animal can receive the higher levels of energy and other nutrients needed in a smaller amount of food. In most circumstances the amount of energy required per day is greater than the basal or maintenance energy requirement by the species. Fats and omega-3 fatty acids help to manage inflammation. Omega-3 long chain fatty acids help maintain joint mobility, skin health and digestion. In addition to protein and energy, certain minerals and vitamins have important roles to play in the healing process.

✓ **Micro nutrients:**

Diets designed for diseased animals must have the correct balance of minerals and vitamins to avoid the depletion of body stores and provide those needed for the period of recovery. Zinc and potassium improve wound healing. Vitamin B complex improves digestive (microbial) efficiency.

There are several feed additives that can be administered including vitamin B-complex boluses, dried brewer’s yeast, or live cell yeast *Aspergillus oryzae*, or feeding sodium bicarbonate.

Besides, herbal metabolic modifiers, antioxidant blends, prebiotics, and probiotics, etc. are also commercially available which could also be used as supplements/additives to augment the digestive capability and thereby invigorating the animal. The synergistic antioxidant complex (vitamin E, vitamin C, taurine and lutein) helps neutralize free radicals produced during body metabolism and promotes good health.

For calves, the resting energy requirement is approximated as DE (Mcal) = 0.07 BW (kg) and digestible protein as DP (g) = 3.5 BW (kg), which would equate to 3.50 Mcal (3500 kcal) and 175 g of protein for a 50-kg calf. These calculated values represent starting points for

formulating dietary therapy, and adjustment based on clinical response or specific medical conditions may be necessary.

Vitamin and mineral requirements, also available from NRC tables, can usually be met if an enteral diet is formulated with commercial complete feed pellets or pelleted hay. Although B-vitamin deficiencies do not occur naturally in cattle, supplementation may be beneficial in large animals with gastrointestinal diseases that result in the disruption of the normal tract flora that produce B vitamins.

✓ **Oral Supplementation**

Ruminants in particular may consume small quantities of fresh feed if it is offered frequently, whereas if the same quantity is offered in one feeding, it may be ignored after a few bites. Many dairy cows can be coaxed into eating hay if it is placed in the back of the pharynx by the clinician, and oropharyngeal stimulation may result in increased voluntary feed consumption. Fresh silage and dried brewer's grain frequently appeal to the hypophagic cow. Many sick ruminants benefit from grazing if grass is available.

- **Water**

Ordinarily, animals should have access to potable, uncontaminated drinking water according to their particular requirements. Periodic monitoring for pH, hardness, and microbial or chemical contamination might be necessary to ensure that water quality is acceptable Water Troughs; Water troughs are a good way to ensure clean drinking water for animals and to prevent pollution in streams and ponds. Watering devices, such as drinking tubes and automatic waterers, should be checked daily to ensure their proper maintenance, cleanliness, and operation.

1.4.2. Maintaining hygiene of sick animals

- **Sanitation**

Good sanitation is an integral part of humane animal housing. Proper cleaning and disinfection practices help reduce the transmission of infectious diseases to both animals and people, and result in a cleaner and healthier environment. A clean shelter also has the added benefits of

increasing the comfort level of the animals and presenting a positive image of the shelter to the public. Protocols for proper sanitation are essential for any sheltering program. Providing education and training as well as ensuring compliance with those protocols is also essential. The goal of any sanitation program is to maintain sufficiently clean and dry bedding, adequate air quality, and clean cage surfaces and accessories.

- **Cleaning and Disinfection**

Physical cleaning is defined as the removal of urine, fecal matter, and other organic material from the environment. Cleaning should result in a visibly clean surface, but may not remove all of the harmful pathogens. Disinfection is the process that will kill most of the contaminants in a given area . Sanitation is defined as the combination of cleaning and disinfection, and is a requirement for all shelters and rescue homes. Sterilization is the destruction of all microbes, including spores, and is generally reserved for surgical instruments, surgical gloves, and other equipment necessary for sterile procedures. .

Page 9 of 83	Ministry of Labor and Skills Author/Copyright	Animal Health Level -I	Version -1
			September, 2022

Self-Check 1

Name..... ID..... Date.....

Directions: Answer all the questions listed below.

Test I: Choose the best answer (4 point)

1. Which one of the following categorised under basic accommodation for sick animals
 - A. House
 - B. Bedding
 - C. Ventilation and light
 - D. All

2. An equipment which used to ensure clean drinking water for animals and to prevent pollution in streams and ponds.
 - A. Feed trough
 - B. Water trough
 - C. Bedding
 - D. Disinfection

3. The process of removing gross dirt or debris
 - A. Cleaning
 - B. Disinfection
 - C. Sterilization
 - D. drying

Test II: Short Answer Questions(3 point each)

1. Mention the importance of ventilation in relation to animals welfare and behaviour
2. Discuss the advantages of using bedding
3. Justify the goal of maintaining hygiene conditions

Note: Satisfactory rating – 6 points

Unsatisfactory - below 6 points

LG #21

LO #2- Provide care for pregnant Animal

Instruction Sheet

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

- Hazards associated with antenatal care
- Maintaining clean and safe environment
- Providing nutrition and supplementary feed
- Observing the condition and health status of pregnant animals
- Identifying Signs of approaching birth
- Preparing delivery equipment, resources and materials
- Use breeding records

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

- identified and report hazards associated with antenatal care provision to supervisors.
- Maintain a clean, safe and secure environment/ separate shelter for pregnant animals to give birth in severe weather conditions according to organizational guideline and as directed by the supervisor
- Check animal records and confirm stage of gestation where possible.
- Provided a dequate nutrition and supplementary feed to pregnant animals as instructed, and record accordingly
- Observe the condition and health status of pregnant animals and record and report animals experiencing any parturition abnormality to the supervisor
- Identifysigns of approaching birth in animals.
- Check and prepare birthing equipment, resources and materials for use.

Learning Instructions:

1. Read the specific objectives of this Learning Guide.
2. Follow the instructions described below.
3. Read the information written in the information Sheets
4. Accomplish the Self-checks
5. Perform Operation Sheets
6. Do the “LAP test”

Information Sheet 2

Introduction

The guiding objective for good dairy farming practice is that safe, quality milk should be produced from healthy animals using management practices that are sustainable from an animal welfare, social, economic and environmental perspective. To achieve this objective, dairy farmers should apply good practice in the following areas:

- animal health;
- milking hygiene;
- nutrition (feed and water);
- animal welfare;
- environment; and
- socio-economic management.

For each of these categories this Guide lists good dairy farming practices, and suggests measures that can be implemented to achieve the desired outcome.

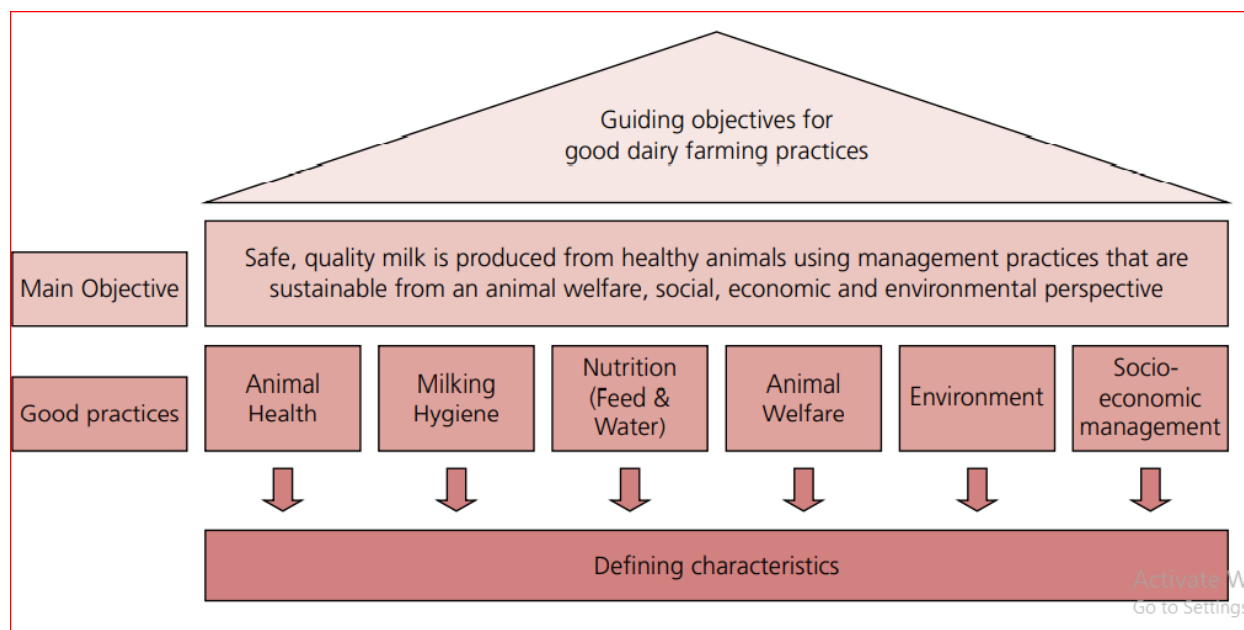


Diagram 2.1 Good dairy farming practices

2.1. Hazards associated with antenatal care

- **Hazard:** is the inherent danger involved in working with a particular animal, material, equipment, process, procedure or system.
 - ✓ Exposure Infectious agents: micro-organisms,
 - ✓ Slippery surfaces, obstacles, tripping hazards,
 - ✓ Fumes and cleaning chemicals and agents,
 - ✓ Physical hazards from animals,
 - ✓ Natural poisonous gases and allergens.
 - ✓ The sanitation, the comfort and defence from predators
 - ✓ Burn or bury
 - ✓ Exposure to dust, noise, airborne
 - ✓ Allergens
 - ✓ Zoonotic diseases like brucellosis

NB. Zoonoses- are diseases communicable from animals to humans.

2.2. Maintaining Clean and Safe Environment

2.2.1 Personal protective equipments (PPE)

Introduction

Personal protective equipments (PPE): materials which are used to protect the stock person from different injuries which can happen in the work place. PPE provides a physical barrier to hazardous materials that may otherwise come into contact with employees' skin, eyes, mucous membranes, and clothing

Whenever appropriate, use PPE such as:

- coveralls,
- Gloves, surgical (latex, vinyl, or nitrile), long heavy duty rubber, leather, lid etc., specific to the materials being handled,
- Face shields when applying disinfectants, and goggles when handling concentrate powders or solutions.
- Non slip waterproof and rubber boot.
- Aprons and hat

2.2.2 Cleaning and Disinfection

- **Cleaning:** - Cleaning is the removal of all foreign material (dirt and organic matter) from the object being reprocessed. Two key components of cleaning are friction to remove foreign matter and fluids to remove or rinse away contamination.

- **Disinfection** physical or chemical means of killing microorganisms, but not necessarily spores. **Disinfectant** a disinfectant is a physical agent or chemical agent that destroys vegetative forms of harmful micro-organisms, usually on inanimate objects but sometimes on the coat or hooves of animals.. It is important to note that not all agents work against all microorganisms and that most disinfectants are likely to be less effective against spores.

Disinfectants help to stop spread of disease and the following are the guide lines for disinfection.

- ✓ Pens and equipments should be disinfected after use to kill the germs.
- ✓ Dirty bedding and diving must be removed
- ✓ Use detergent to loose dirt and organs matter sticking to all surfaces.
- ✓ Use warm or hot water to increase the cleaning performance
- ✓ Remove drinkers and feeders if possible
- ✓ If possible, use gloves when handling undiluted disinfectants.
- ✓ Do not expose disinfectants to sun light

Close the bottles tightly, otherwise the antiseptic will little value

- **Sterilization:** - A process that kills and/or removes all classes of microorganisms and spores. Sterilization of instruments

To carry out sterilization of instruments the following should be done

- ✓ First wash the instruments thoroughly in clean water and detergent and then sterilize them.
- ✓ This is done by boiling for 20 minutes then placing on sterilized container.
- ✓ If this is not possible, wash the instruments clean water and soap.
- ✓ Soak instruments overnight in alcohol and dry them in air before use
- ✓ Syringe, needles, scissors, forceps, knives should be sterilized after use.

- **Lubricating:-**Lubrication refers to the action of rendering something smooth or slippery.

Basic Steps in Cleaning and Disinfection Protocol

There are proper procedures to follow in order to increase the efficiency of the cleaning and disinfection process. If surfaces are not properly cleaned, the disinfection process is ineffective.

The basic steps of cleaning and disinfection include:

- Remove all visible gross contaminants from people, vehicles, and all equipment.
- Apply detergent solution onto the surface and allow sufficient time for the detergent to disperse. This allows for the breakdown of the different components of accumulated grime such as fat, protein, and manure.
- Thoroughly rinse the surface using a hose or pressure washer while preventing cross contamination of clean surfaces. Residual detergent may interact unfavorably with the applied disinfectant.
- Apply a standard-registered disinfectant to inactivate disease agents. Follow all safety precautions and use directions specified on the product label. The disinfectant must be left on surfaces for the required contact time per the label instructions.

Cleaning is the most important step in the disinfection process. If an item or material is not adequately cleaned, the application of disinfectant is a waste of time and money because soil (manure, dirt, secretions, and excretions) cannot be disinfected. The cleaning process can be broken down into four basic steps:

- Dry clean
 - Wet wash
 - Rinse and
 - Dry
- a) **Dry Clean**— the area to be disinfected should be dry cleaned with a shovel and broom. This step will remove all gross contamination with manure, debris, loose straw, and feed. Any material that cannot be burned should be buried. Scrap wood, wooden gates, wooden feed bunks, and items that are of limited financial value compared to the time and effort required to clean them should be gathered together to be appraised and burned. Ropes, halters, and other items of minimal value that are difficult to clean and disinfect should be appraised and burned.

Begin the process by hauling the manure to a predetermined site for disposal. This may involve moving a number of tons of manure and require considerable time. Stalls, barns, and stanchions that cannot be cleaned out with tractors must be cleaned with manure fork, shovel and broom.

When the dry cleaning step is finished, there will be no loose dirt, dust, feed, bedding, manure, hay, straw or any other loose organic material left within the structure. The surfaces will not necessarily be visibly clean when this step is complete because of organic matter which is tightly adhered to the surface.

- b) **Wet Wash:** all exposed surfaces, cracks, junctions, joints and mechanical items should be wet washed with a soap solution or detergent. During the wet wash it is necessary to scrub, scrape, or wire brush all surfaces vigorously to break down any biofilm which may be present. Scrubbing can be done with rags on smooth surfaces although commercially available plastic or metal scrub pads are much more efficient. Rough surfaces should be scrubbed with a wire brush to ensure that they are cleaned as completely as possible. Deep cracks, crevices, pits, pores, or other surface irregularities should be given special attention to dislodge accumulated grime. When the wet wash step is completed, the surfaces will be visibly clean. The moisture on surfaces will spread evenly, wetting the surface completely. There will be no beading of moisture which would indicate the presence of oil or grease.
- c) **Rinse:** Rinse washed surfaces thoroughly to remove all traces of soap or detergent. Residue of soap or detergent should not be left on the surface because it may react in an unfavorable manner with the disinfectant. When this step is complete, the water film will still “wet” the surfaces in the absence of soap or detergent, and there will be no beading
- d) **Dry:** The rinsed surfaces should be dried to remove all of the moisture. Removing the moisture promptly will protect equipment and surfaces from deterioration. If left in place, excess moisture will dilute the disinfectant which is to be applied to the surfaces and there is no practical way to compensate for the dilution when mixing the disinfectant. In cool or cold weather, drying can be accomplished by heating the building and circulating the air with auxiliary blowers. In hot weather, drying can be accomplished with blowers or fans alone. In confined areas or on equipment where air circulation from fans is not enough, the use of high pressure air from a compressor or high volume “leaf blowers” will remove excess moisture so drying can take place.

- e) **Inspect:** All surfaces, junctions, cracks, and mechanical devices in the building should be carefully inspected to assure that the cleaning process has removed all of the organic matter. Rewash any areas *that* may require further attention in order to pass inspection.

2.3. Providing Nutrition and Supplementary Feed

Introduction

Adequate health care and nutrition can ensure rapid growth of female calf as well as attaining puberty at an early age. Timely insemination of such animals can help them to calve at 2 to 2 ½ years of age. As foetus develops rapidly during last 3 months of pregnancy, adequate care needs to be taken during this time.

The aim of feeding the pregnant cow is to:

- Get the cow into good condition at calving
- Produce a good and healthy calf
- Achieve a high peak yield early in lactation and a high total lactation yield
- Prevent too much weight loss

If pregnant animals are underfed, they will be in poor body condition when they give birth and begin lactating. Milk production will be significantly reduced. They will also be slow to start cycling again. Underfed animals may also give birth to light weight and/ or weak offspring.

Nutrients for dairy cows

The nutrients required by dairy cows are water, energy, protein, fibre, vitamins and minerals. These requirements largely determine how we think about the composition of their feed. Feed contains both water and dry matter. The dry matter component of the diet is the part which contains the necessary energy, protein, fibre, minerals and vitamins

i. Water

The body of a dairy cow is composed of 70–75 per cent water. Milk is about 87 per cent water. Water is also essential to regulate body temperature. As well, water is involved in digestion, nutrient transfer, metabolism and waste removal.

Water has structural and functional roles in all cells and all body fluids. An abundant, continuous, and clean source of drinking water is vital for dairy cows.

ii. Energy

A dairy cow uses energy to function (walk, graze, breathe, lactate, and maintain a pregnancy). Energy is the key requirement of dairy cows for milk production. It determines milk yield, milk composition (fat and protein content) and body weight.

iii. Protein

Protein is the material that builds and repairs the body's enzymes, hormones, and all the tissues (e.g. muscle, skin, organs, foetus) except fat and bone. Protein is needed for the body's basic metabolic processes, growth and pregnancy.

Protein is also vital for milk production. Proteins are made up of various amino acid molecules. Amino acids are the building blocks for the production of protein for milk, tissue growth and the development of the foetus during pregnancy.

Cows require 25 different amino acids for normal metabolic functioning. Fifteen of these can be produced by the cow's own metabolism. The remaining ten are termed essential amino acids because they must either be supplied in the diet (as dietary protein) or as a product of the digestion of the microbes in the rumen (microbial protein). Protein is usually measured as crude protein.

iv. Fibre

Cows need a certain amount of fibre for efficient rumen function. The fibre is required to ensure that the cow chews its cud (ruminates) enough and therefore salivates. The saliva helps to buffer the rumen pH and prevent the degree of acidity varying too much.

The length and the structure of the fibre are both important. They determine how much chewing a feed requires. Feeds which need extra chewing increase the flow of saliva. Fibre in the cow's diet also slows down the flow of material through the rumen and thus gives the microbes more chance to digest feed. Products of fibre digestion are important for the production of milk fat.

v. Vitamins and minerals

Vitamins are organic compounds that all animals require in very small amounts. At least fifteen vitamins are essential for animals. Vitamins are needed for many metabolic processes in the

body; e.g. for production of enzymes, bone formation, milk production, reproduction and disease resistance. Minerals are inorganic elements. They are needed for (among other things) teeth and bone formation; enzyme, nerve, cartilage and muscle function or formation; milkproduction; blood coagulation; energy transfer; carbohydrate metabolism; and protein production.

Recommendation

- Animals in the last trimester of pregnancy should not be taken far away for grazing, uneven paths should also be avoided.
- A lactating animal should be dried within a period of 15 days after the 7th month of gestation.
- Pregnant animals should have enough space for standing and sitting comfortably.
- Pregnant animals need suitable ration to reduce the possibility of diseases like milk fever and ketosis at the time of calving and also to ensure adequate milk production.
- Water should be provided round the clock to pregnant animals with a minimum of 75-80 litres of fresh and clean drinking water daily.
- A heifer after 6-7 months of gestation should be tied with milking animals; and its body, back and udder should be massaged.
- 4-5 days before calving, the animal should be tied in a separate clean and airy area having sunlight. Bedding materials like paddy straw should be spread on the ground

Tabl 2.1 Daily Feed Requirements of a Pregnant Animals

Green Fodder	15-20 kg
Dry Fodder	4-5 kg
Compound Cattle Feed	2-3 kg
Oil Cake	1 kg
Mineral Mixture	50 gm
Salt	30 gm

2.4. Observing the condition and health status of pregnant animal

2.4.1. Body condition scoring

Body Condition Scoring (BCS) is a technique for assessing the condition of livestock at regular intervals. The purpose of condition scoring is to achieve a balance between economic feeding, good production and good welfare. The body condition score (BCS) of a dairy cow is an assessment of the proportion of body fat that it possesses, and it is recognized by animal scientists and producers as being an important factor in dairy cattle management.

A common dairy practice used to determine the nutritional status of an individual heifer or cow, or to evaluate the average condition for a group. Animals are evaluated on a 5-point scale, with 1 being extremely thin and 5 being extremely fat.

There is a similar scoring system for dairy cattle, with “1” being thin and “5” being obese. Dairy cattle usually should be between 2.5 and 4. Judging a dairy cow’s score under this system depends more on the appearance of the flesh around the pin and hook bones and tailhead, which are visible on the back of the cow. Hook bones are at the corner of the top of the rump, and pin bones are at the bottom of the pelvic area, near the midway point of the tail. The tailhead is the base of the tail. Body condition affects productivity, reproduction, health and longevity of dairy cows.

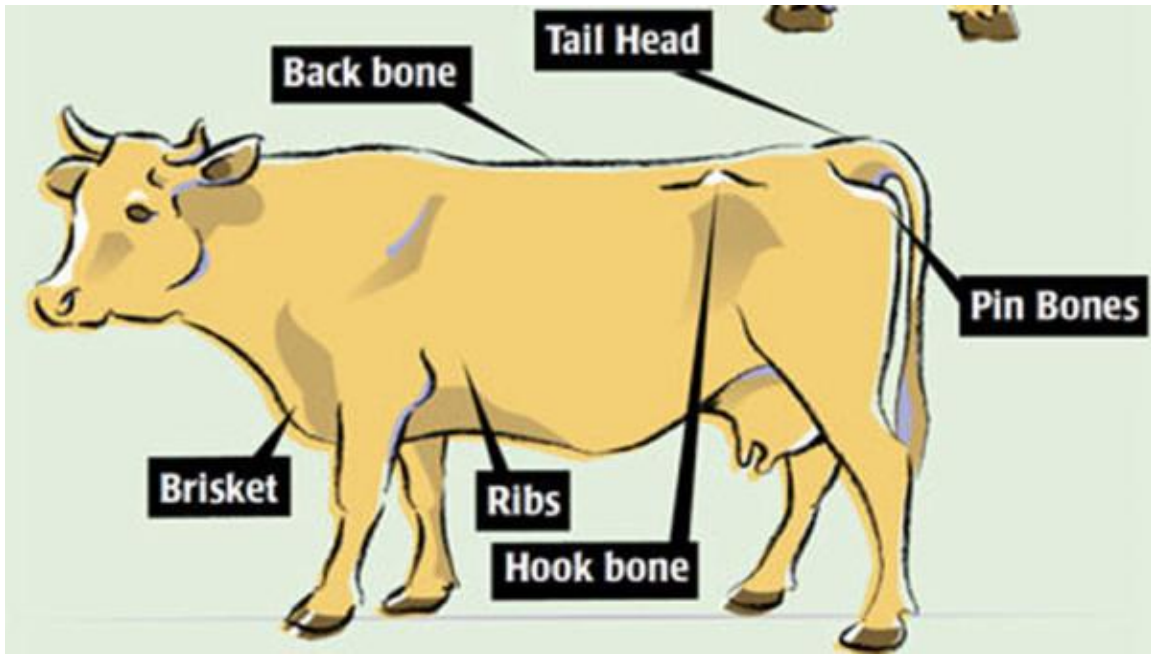


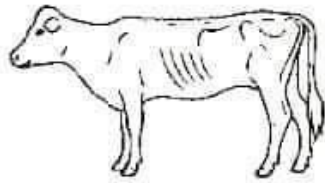
Figure 2.2 A visual and tactile assessment of six different areas on the cow's body: brisket, ribs, back, hook bone, pin bones and tail head.

(<https://www.hobbyfarms.com/why-body-condition-score-your-cows-5/> access date, 03 september 2022)



C. BODY SCORING

- Body scoring is very important in assessing the health status of an animal.
- A low score may indicate diseases or improper feeding while a high score may indicate a high probability of breeding and metabolic problems.



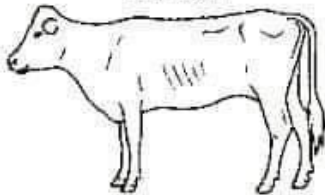
Body score 1

BODY SCORE-1

- Extremely thin. No fat in brisket or tail docks.
- All skeletal structures are visible.
- Dull hair
- May be diseased and survival during stress is doubtful



Cattle with body score 1



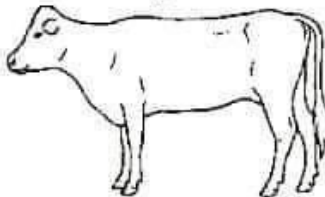
Body score 2

BODY SCORE-2

- Thin. Vertebrae, hips and pin bone prominent.
- Some tissue cover around tail dock, hip bones and the flank.
- Muscle tissue evident but not abundant, health may be OK.



Cattle with body score 2



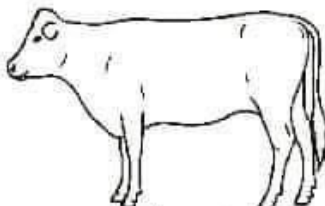
Body score 3

BODY SCORE-3

- Ribcage only slightly visible.
- Fat deposit behind shoulder obvious, ideal condition for calving.
- Fat deposit in brisket area.
- Hook and pin bone visible, but not prominent.



Cattle with body score 3



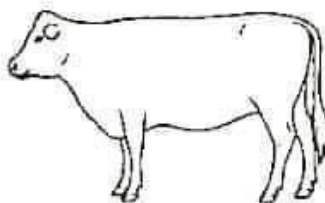
Body score 4

BODY SCORE-4

- Skeletal structure difficult to identify.
- Obvious fat deposits behind shoulder and tail head.
- Flat appearance to the top line.
- Folds of fat starting to develop over ribs and thighs.



Cattle with body score 4 may have metabolic problems at calving.



Body score 5

BODY SCORE-5

- Animal is obese, flat appearance dominates.
- Brisket is heavy and bone structure not noticeable.
- Tail head and hip bones completely buried in folds of fat.
- Back is flat and completely covered by fat.
- Mobility impaired by large fat deposits.



Cattle with body score 5 and above have high probability of metabolic and breeding problems.



Body scoring would be a helpful yardstick to monitor health

Figure2.3 Body condition scoring in dairy farms

(<https://www.pashudhanpraharee.com/body-condition-scoring-bcs-in-farm-animals/> access date: 03/09/ 2022)

Page 23 of 83	Ministry of Labor and Skills Author/Copyright	Animal Health Level -I	Version -1
			September, 2022

2.4.2 General Demeanour (Animal Behaviors)

General demeanour of animals is a useful indication of nature of disease and it is the response of the animal to external stimuli. In the case of animal in a herd or flock, separation of an individual may be an indication of disease.

Classification Of Demeanour

a. Normal (bright) demeanour

b. Abnormal demeanours

a. Normal (bright): when, on being approached, an animal make a normal response to external stimuli, such as movement and sound, the demeanour is said to be normal (bright). Normal reaction under these circumstances may consist of elevating the head and ears, turning towards and directing the attention at the source of stimuli, walking away and evincing signs of attack or flight.

b. Abnormal demeanour

- Decreased response (depression): this has three stages.
 - ✓ dull (apathetic)
 - ✓ dummy state
 - ✓ Comma
- Excitation or increased response
 - ✓ Apprehension (mildly anxious)
 - ✓ Restlessness
 - ✓ Mania
 - ✓ Frenzy

2.4.3 Gait

It indicates the locomotors process of an animal. Locomotors disturbances are seen when the animal moves about voluntarily, or is led or driven at various paces, towards or away from the clinician

2.4.4 Posture

It denotes the anatomical configuration when the animals remain in stationary situation. How does it stand? How does it sit? How does it lie?

Examples that indicate abnormalities of posture

Kyphosis – it is dorsal bending of the spinal column.

Lordosis – it is ventral bending of the spinal column.

Dog-sitting-position in acute gastro-distention in the horse, pain and pressure on the diaphragm cause the animal to adopt the “dog-sitting-position”.

2.4.5 Confirming stages of gestation (pregnancy)

Pregnancy also named gestation is formation of embryo from joining of sperm with the egg, embryo attached to the wall of the womb by a navel cord and grows within a bag. If male and female animals have been allowed to run together in a large herd it will be difficult to determine the expected time for birth (parturition) in natural mating and extensive farming. However, in intensive farming, you do know when a female was mated or given artificial insemination provided enabling to determine stage of gestation and when she animal give birth.

stage of gestation can be determined

- Using AI records (Insemination date)
- Performing pregnancy diagnosis

Signs of pregnancy

Signs of pregnancy include

- sign of heat/estrus/ heat stops when pregnancy begins
- the animal becomes quieter
- the belly grows bigger and
- dropping of the production of milk gradually in lactating animals.

The length of pregnancy differs in different animals. There can be a few days difference either way depending on the type, climate, feed and other factors.

Table 2.2 gestation period in different species

Animal	Length of pregnancy	Average length of gestation	
		Species	Avg. in Months*
Cow	280 days	Cattle	9
Buffalo	320 days	Goats	5
Sheep	150 days	Sheep	5
Goat	150 days	Swine	3 mo. 3 wks. 3 days
		Horse	11

2.5. Identifying Signs of approaching birth

Introduction

As a cow nears her delivery date,; It is a good idea to place a cow ready to give birth into a clean, dry pen deeply bedded with straw so the calf is born into a clean environment. If the weather is warm and your cattle are on pasture, she also can be moved to a clean pasture.

2.5.1 Signs of a birth approach

The duration of stage one of calving is highly variable among animals, and the onset and changes occurring, such as myometrial contractions, cervical dilation, and fetal repositioning, are largely not detectable. Hence, 6 to 12 hours of restlessness, box walking, and tail raising, and increased frequency of rising and lying down may occur. If, after approximately 6 to 12 hours (cows and heifers, respectively) of this behavior without undue disturbance, abdominal contractions have not commenced, an exploratory examination should be conducted. If cervical dilation has commenced and no abnormalities are detectable, monitoring should continue approximately hourly.

2.5.2 Stages of parturition

Stage 1: The first stage of parturition is dilation of the cervix. The normal cervix is tightly closed right up until the cervical plug is completely dissolved. In stage 1, cervical dilation begins some four to 24 hours before the actual birth. During this time the progesterone block is no longer present and the uterine muscles are becoming more sensitive to all factors that increase the rate and strength of contractions. At the beginning, the contractile forces primarily influence the relaxation of the cervix but uterine muscular activity is still rather quiet.

Stage 1 is likely to go completely unnoticed, but there may be some behavioral differences such as isolation or discomfort. Near the end of stage 1 ranchers may observe elevation of the tail, switching of the tail, and increased mucous discharge.

Stage 2: The second stage of parturition is defined as the delivery of the newborn. It begins with the entrance of the membranes and fetus into the pelvic canal and ends with the completed birth of the calf. The second stage is the one producers are really interested in because this is where all the action is. Clinically the onset of stage 2 is marked by the appearance of membranes or

water bag at the vulva. The traditional texts, fact sheets, magazines, and other publications state that stage 2 in cattle lasts from two to four hours but the recent studies reported that much shorter being approximately one hour for heifers and one-half hour for adult cows.

Stage 3: The third stage of parturition is the shedding of the placenta or fetal membranes. In cattle this normally occurs in less than eight to 12 hours. The membranes are considered retained if after 12 hours they have not been shed. Years ago it was considered necessary to remove the membranes by manually unbuttoning the attachments. Research has shown that manual removal is detrimental to uterine health and future conception rates. Administration of antibiotics usually will guard against infection and the placenta will slough in four to seven days. Contact your veterinarian for the proper management of retained placenta.

Stage 4: is the passing of the placenta. Many cows will consume the placenta, and it usually does not cause any problems. One of the important last points to do in a birth is to check the uterus for a second calf by slipping a clean, gloved hand into the birth canal. Many times, twins can cause birthing difficulties a cow may be having. If the labor was difficult, the uterus and vagina should be checked for tears or excessive bleeding. If there are tears in the wall of the uterus or large amounts of blood coming out of the vagina, call your veterinarian for treatment. Check the calf after delivery. Make sure all mucus is removed from the mouth and nostrils. The calf should be blinking and attempting to lift its head immediately after delivery. If the calf is not breathing, use a piece of straw to tickle its nose. If that fails to stimulate a breath, you can try chest compressions or even mouth-to-snout breathing. When the calf takes a breath, stop rescue breathing. If a calf is gurgling fluid, drape the lower half of the body over the side of a pen or two bales of hay or straw so the head hangs down below the upper body. This will let fluid escape from the respiratory tract. Chest compressions while the calf is draped can also help with breathing. Get the cow up or gently drag the calf to the cow's head, so she can begin cleaning and drying the calf off. You should dip the calf's umbilical cord stump in a tincture of two point five (2.5) percent iodine.

2.5.3 Normal birth in Presentation, Position and posture of the fetus

These terms enable orientation of the fetus to be accurately described in cases of normal and abnormal birth. They are defined as follows:

Page 27 of 83	Ministry of Labor and Skills Author/Copyright	Animal Health Level -I	Version -1
			September, 2022

- **presentation**

the relationship between the long is of the fetus and the long axis of the maternal birth. canal. Mostly longitudinal (anterior or posterior) but can occasionally be transverse or vertical.

- ✓ **anterior presentation:**

forefeet first, head resting on the limbs, and the eyes level with the knees (Figure 1). As stated above, in this presentation the cow does not usually require assistance, unless it is a heifer at first calving, the calf is dead, or the calf is too big for the cow.

- ✓ **aposterior presentation:**

both the hindfeet are presented with the calf's spine upward toward the cow's spine (Figure 3), and the sole or bottom of the hooves will face upward. In a normal anterior presentation (head and forelimbs first) the hooves are downward. If the calf is on its back, however, the position of the hooves is reversed in each of these presentations.

- **Position**

that surface of the maternal birth canal to which the fetal vertebral column is applied. Mostly dorsal but may be ventral (fetus 'upside down') or lateral (right or left).

- **Posture**

the disposition of the head and limbs of the fetus.

- **Classification of Birth /Delivery can can be :**

- ✓ **Normal birth (normal presentation)**

Thus a calf during normal birth would be in anterior longitudinal presentation, dorsal position, and with a posture in which the extended head and neck were resting on the extended forelimbs. A puppy during normal birth would be in anterior longitudinal presentation and dorsal position. It has a posture in which the head and neck are extended, the forelimbs, with shoulders flexed, are held by the side. The hindlimbs are extended behind. Examples of presentation, position and posture are shown in the following figures.

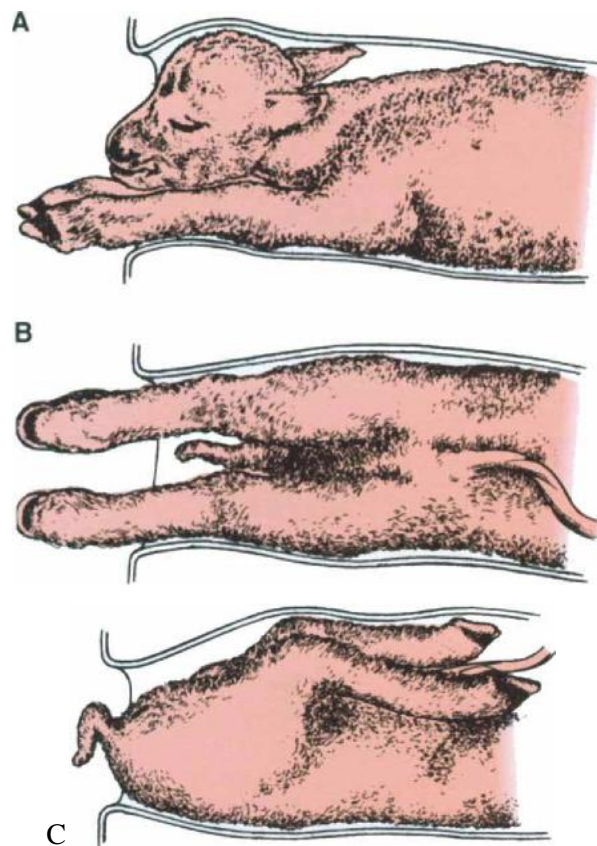


Figure 2.3: Examples of presentation, position and posture. (A) calf in anterior presentation, dorsal position, head resting on extended forelimbs. (B) Posterior presentation, left lateral position, hindlimbs extended. (C) Posterior presentation, ventral position, bilateral hip flexion (breech presentation).

✓ **Difficulty of Giving Birth (Dystocia)**

Dystocia is difficult to give birth in animals. It arises from different causes like myometrial defects, metabolic abnormalities like hypocalcaemia, fetal over size, physical and anatomical immaturity of the dam, abnormal presentation of the fetus, lack of labor due to nutrition deficiency, insufficient dilation of the birth canal, fetal hormone deficiency, fetal death and other miscellaneous causes. intervention is recommended in cases of fetopelvic incompatibility, maldisposition, twinning, uterine inertia, and vulval or cervical stenosis. Emergency veterinary assist is needed when the case happens

Signs

- ✚ Force full straining without fetal presentation
- ✚ Presentation of only single leg

✚ Lying down by stretching legs away Management

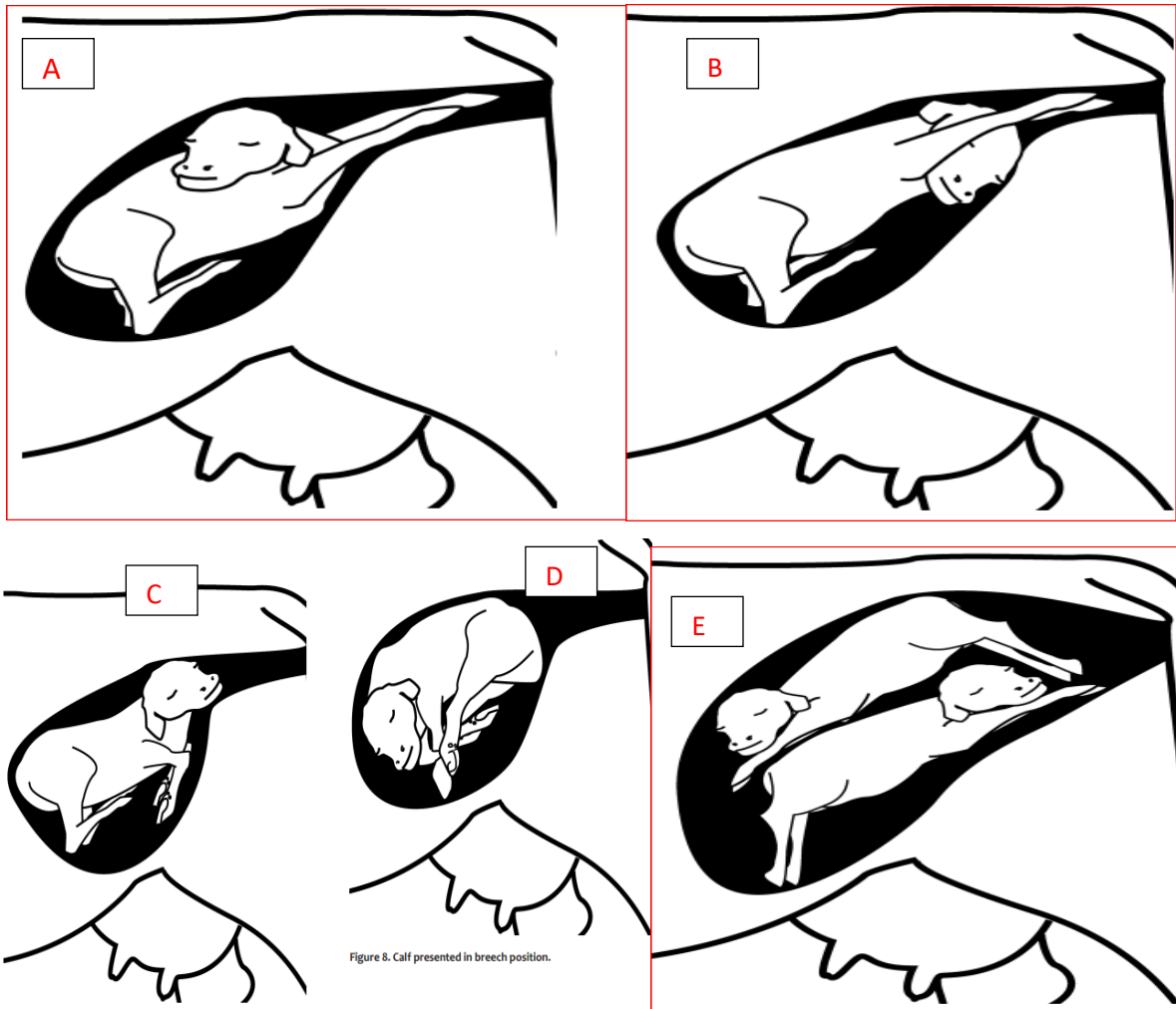


Figure.2.4: Two Front Legs Presented: Head Retained (A) and Two front legs presented with head back between legs (B); Calf presented with its head in the birth canal but one or both forelegs retained (C), and Calf presented in breech position (D) Twin calves entering the birth canal (E) (Selk and Sparks, 2018).

Causes of Dystocia

The causes of dystocia are divided into maternal or fetal causes, depending on whether the mother or her offspring were 'responsible' for the problem. In many cases both maternal and fetal factors are involved and the classification of causes becomes less exact. Our greater knowledge of the endocrine control of the birth process has shown that although in many species the fetus initiates the process, a cascade of hormone changes follows in the

mother.

The maternal components of birth are the provision of expulsive forces and a bony and soft tissue birth canal through which the fetus can pass.

The fetal components of birth include initiation of the birth process; the assumption of correct presentation, position, and posture; and being sufficiently small to pass through the birth canal.

- **Maternal causes**

- ✓ Failure of expulsive forces
- ✓ Uterine inertia
- ✓ Biochemical deficiencies: estrogen/progesterone ratio, oxytocin, prostaglandin Fl_a, relaxin, calcium, glucose
- ✓ Hysteria/environmental disturbance
- ✓ Oligoamnion (deficiency of amniotic fluid)
- ✓ Premature birth
- ✓ Secondary uterine inertia (the consequence of another cause of dystocia)
- ✓ Uterine damage including rupture
- ✓ Uterine torsion (may also cause obstruction of birth canal)
- ✓ Abdominal inability to strain (because of age, pain, debility, diaphragmatic rupture, tracheal/laryngeal damage)
- ✓ Obstruction of the birth canal
- ✓ Bony pelvis: fracture, breed, diet, immaturity, neoplasia, disease
- ✓ Soft tissue:
 - ✓ Vulva congenital defect, fibrosis, immaturity
 - ✓ Vagina congenital defect, fibrosis, prolapse, neoplasia, perivaginal abscess, hymen
 - ✓ Cervix congenital defect, fibrosis, failure to dilate
- ✓ Uterus torsion, deviation, herniation, adhesion, stenosis

- **Fetal causes**

- ✓ Hormone deficiency ACTH/cortisol: initiation of birth
- ✓ Fetopelvic disproportion fetal oversize ±
- ✓ defect fetal monsters

2.5.4. Diagnosis and treatment plan to assist and handle distokiya

As a result of the general clinical examination, the detailed obstetric examination, and any useful back-ground information provided by the patient's history, the obstetrician will normally be able to arrive at a diagnosis of the cause of dystocia and formulate a plan for the resolution of the case. Such a plan should initially be tentative because, if the first attempt at treatment is unsuccessful, alternative treatments may have to be employed and must always be kept in mind.

The welfare of the patient must be paramount when planning and carrying out treatment. The wishes of the owner sometimes quite forcibly expressed - must be carefully considered but the final course of action is decided by the obstetrician. In practice, economic considerations have to be taken into account to ensure that the cost of the proposed treatment can be met and is realistic.

- **Preparation** (prepare before helping)
 - ✓ **Equipment:** Before calving season starts do a walk through of pens, chutes, and calving stalls. Make sure that all are clean, dry, strong, safe, and functioning correctly. This is a lot easier to do on a sunny afternoon than on a cold dark night when you need them.
 - ✓ **Protocol:** Before calving season starts, develop a plan of
 - ✚ what to do
 - ✚ when to do it
 - ✚ who to call for help (along with phone numbers), and
 - ✚ how to know when you need help.

Make sure all family members or helpers are familiar with the plan. It may help to write it out and post copies in convenient places. Talk to the local veterinarian about the protocol and incorporate his/ her suggestions. Your veterinarian will be a lot more helpful when you have an emergency during the kids' school program if you have talked a few times during regular hours.

- ✓ **Lubrication:** Many lubricants have been used and one of the best lubricants is probably the simplest – non-detergent soap and warm water.

- ✓ **Supplies:** The stockman should always have in his medicine chest the following:
 - ✚ disposable obstetrical sleeves,
 - ✚ non-irritant antiseptic,
 - ✚ lubricant,
 - ✚ obstetrical chains (60 inch and/or two 30 inch chains),
 - ✚ two obstetrical handles, mechanical calf pullers, and
 - ✚ injectable antibiotics.
 - ✚ a good flashlight with extra batteries and towels or a roll of paper towels.
- ✓ Assisting (Intervention)
- **Possible treatments** used to assist delivery and dystocia
 - ✓ Conservative treatment: the obstetrician may consider the case to be not quite ready for assistance and decide to allow the patient a finite period of time before taking further action.
 - ✓ Manipulative treatment: assisted vaginal delivery after correction of any fetal maldisposition.
 - ✓ Drug therapy to increase myometrial activity: the use of specific ecbolic drugs such as oxytocin. Calcium or glucose therapy may be required in cases where a deficiency is suspected.
 - ✓ Surgical treatment: at cesarean section the uterus is opened surgically to allow removal of the offspring via laparotomy. On occasion the uterus may be found to be so damaged at surgery that hysterectomy is necessary.
 - ✓ Fetotomy (sometimes termed 'embryotomy') is the division - by the obstetrician working per vaginam - of the fetus into small portions that can more easily be delivered through the birth canal.
 - ✓ Regrettably, and fortunately very occasionally, the mother may be in such a poor state or its economic value is so low when presented for treatment that euthanasia is necessary

2.6. Preparing delivery equipment, resources and materials.

Equipments or instruments required can be categorized as obstetrical, fetotomy, clinical or hoof and restraining materials.

- **PPE** There must be full PPEs including arm length glove, overall, apron, boot, hat, etc
- **Obstetrical kits** include calf puller, vaginal speculum, forceps, scissors, blade and handlers (hooks) as observed in picture below
- **Fetotomy equipment:** Tubular embryotome, fetotomy wire, handles for wire,) handle for embryotome, screw to tighten handle, introducer, threader, cleaning brush
- **Consumable materials and other resources**
 - ✚ Scissor, , forceps, suture material, gauze, cotton, towel,
 - ✚ Tincture of iodine, savlone, saline water
 - ✚ Navel dip (iodine based)
 - ✚ Towels
 - ✚ Calf coat
 - ✚ Ear tags
 - ✚ First Defense and applicator
 - ✚ Treatment book
 - ✚ Weigh scale or weight tape
 - ✚ Colostrum
 - ✚ Gloves
 - ✚ MuSe® or equivalent (e.g. Dystocel, Selon-E

2.6.1. Use Breeding Records

introduction

Breeding records are needed to evaluate breeding efficiency of the animal and determine number of services per conception,, , none return rate, insemination date, stage of pregnancy, calving date and calving interval. The service or insemination date must record including the code and breed of bull to avoid problems of inbreeding and know the percentage of cross breeds that is the base for improvement of fertility in future. It should be known that, breeding efficiency of the animal also determined by , the efficiency and ability of the inseminator, and the fertility and quality of the semen.

Information needed to be recorded also include: the history of previous births and present birth including duration of gestation, history of illness or abnormal discharge in the last few days, duration and signs of labor, number of offspring born - live and dead, interval between births, intensity and pattern of straining, and removal of placenta within normal range or not

Vaccination of pregnant animals for the prevention of some infectious diseases has been mentioned previously, however, these vaccinations depend on whether or not, the disease is prevalent and the species-specific requirement. Pregnant mares however, need to be essentially given tetanus antitoxin or tetanus toxoid during gestation and immediately after foaling. Special attention need to be attached to the hygiene at the time of parturition and as such, animals must be shifted to hygienic parturition stalls and this would also prevent overcrowding.

- **Reason for Keeping Records**

Farm records are kept for all or some of the following reasons:-

- ✓ **To satisfy the Receiver of Revenue**

This is an essential requirement of record keeping but should not be the sole reason, and a record system can be designed which satisfies the Receiver and is also useful for other purposes.

- ✓ **To assist in financial planning decisions**

Financial records, in more detail than those required for the Receiver, can be used for cash flow planning, enterprise analysis and other purposes.

- ✓ **To control labor**

This is usually a wages book recording days worked, wages paid, money owed, leave *etc.*

- ✓ **To assist in land management decisions**

These include farm maps and grazing, irrigation, fertilizer use, crop yield, areas and management operations records.

- ✓ **To assist in livestock management decisions**

These are the records of individual animals and groups of animals, their production, health, feed use *etc.*

- ✓ **No logical reason**

A lot of useless information is often kept which is never, or can never, be converted into useful information.



Self-Check 2

Name..... ID..... Date.....

Directions: Answer all the questions listed below.

Test I: Multiple choice (each has 1 point)

A

1. Anterior presentation
2. Posterior presentation
3. Sterilization
4. Dystocia
5. Disinfection

B

- A. Difficult to give birth
- B. forefeet first, head resting on the limbs
- C.both the hindfeet are presented with the calf's spine upward
- D. kills all classes of microorganisms and spores.
- E. killing microorganisms but notnecessarily spores

Test I: Short Answer Questions (each has 3 point)

6. Discuss the causes and possible treatments for dystocia
7. Mention the reasons for keeping records?
8. List signs for a birth approach?
9. Discuss hazards associated with antenatal care
10. explain the aim of feeding the pregnant cow

Note: Satisfactory rating – 10 points

Unsatisfactory - below 10 points

Page 36 of 83	Ministry of Labor and Skills Author/Copyright	Animal Health Level -I	Version -1
			September, 2022

Operation Sheet 2

2.1. Procedures to prepare delivery equipments

A. Tools and equipments

- i. PPE (arm length glove, overall, apron, boot, hat etc)
- ii. calf puller, vaginal speculum, forceps, scissors, blade and handlers
- iii. Tubular embryotome, fetotomy wire, handles for wire
- iv. handle for embryotome, screw to tighten handle, introducer, threader,
- v. Scissor, , forceps, suture material, gauze, cotton, towel,
- vi. Tincture of iodine, savlone, saline water
- vii. Towels
- viii. Animal
- ix. Ear tags
- x. First Defense and applicator
- xi. Treatment book
- xii. Weigh scale or weight tape
- xiii. Colostrum
- xiv. Alcohol
- xv. cleaning brush
- xvi. Flashlight
- xvii. Antibiotics

B. Procedures or techniques to prepare tools to handle dystocia case

- Wear PPE
- Select equipments and tools
- Clean and disinfect equipments and tools based on standard guide lines
- Follow the protocols (develop a plan what, when and how to do)

LAP TEST 2

Name..... ID.....

Date.....

Time started: _____ Time finished: _____

Instructions: Given necessary templates, tools and materials you are required to perform the following tasks within **1:30**hour. The project is expected from each student to do it.

Task-1 Prepare delivery equipments and tools based on the standard operating procedures



LG #22

LO#3-Provide care for lactating animals

Instruction sheet

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

- Monitoring post-delivery health, bonding of dam and new-born
- Providing clean and comfortable area for lactating animals
- Providing appropriate food and clean water
- Carrying out hygienic milking
- Observing, recording and reporting health status of lactating animals

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

Specifically, upon completion of this learning guide, you will be able to:

- Monitor Post-birthing health and bonding of dam and new-born and report any abnormality to the supervisor
- Provide clean and comfortable area for lactating animals as directed by the supervisor.
- Provided appropriate and sufficient food and clean water for lactating animal as instructed
- Carry out milking in a clean manner following the organizational procedure to minimize contamination and reduce incidence of mastitis
- Observed the condition and health status of lactating animals and record and report any abnormalities are to the supervisor

1. Read the specific objectives of this Learning Guide.
2. Follow the instructions described below.
3. Read the information written in the information Sheets
4. Accomplish the Self-checks
5. Perform Operation Sheets
6. Do the “LAP test”

Information Sheet 3

3.1 Monitoring post-delivery health, bonding of dam and new-born

Immediately after calving, the cow has a low appetite and will not eat as much feed as the body may require. Cow undergoes a lot of stress while calving, therefore, the animal should be given light, palatable, mild laxative ration containing warm rice gruel, boiled rice/ wheat bran, boiled millet or wheat mixed with edible oil, bypass fat, Jaggery, Soya, Asafoetida, Methi, Black Cumin, ginger etc. for 2 to 3 days after calving. This kind of diet is also helpful in early expulsion of placenta.

In addition, the animal should be given tender green fodder and fresh water as much as it wants to drink, but do not give hot water. Ensure the milking cow has constant access to clean drinking water and receives required quantity of Area Specific Mineral Mixture daily.



Figure 3.1: New born calf with mother

3.2 Providing clean and comfortable area for lactating animals

Pregnant cows near delivery date and young calves should be provided with a shed or a barn to escape bad weather. The barn should be ventilated to eliminate ammonia fume buildup and to provide fresh air. Bedding material, such as straw or corn stalks, should be maintained so there is always a dry layer on top. It can be allowed to build up until you are able to clean the pen more thoroughly, provided there are no wet areas. Broken fence panels, bent steel posts, and

rusted feeders should be removed from pens, corrals, and pastures. Cows can become impaled or entangled in these items. Fences should be maintained in good repair to prevent a curious cow from walking through a down fence line

- Regularly sanitized animal barn,
- Comfortable bedding
- Non-slippery floor
- Well ventilated room and secured from predators

3.3 Providing Appropriate Feed and Clean Water

Introduction

Dietary composition, feed intake, and milk yield collectively determine severity and duration of body weight loss and condition loss in early lactation. The lactating female has the highest nutrient requirements and should be fed the highest-quality forage and may still require additional energy and protein supplementation to minimize body weight and condition loss. Higher-quality forage is necessary to increase feed intake, otherwise excessive supplement amounts would be required. The current National Research Council (NRC) recommendations for SAC lactation diets assume a low intake capacity, which results in an excessive dietary energy density (80% TDN) being required.

3.3.1 Feeding of milking cows in different stages of lactation.

Feeding guidelines for dairy crossbred cows.

A. After 7 months of lactation.

Objectives : to bring cows in proper condition for drying off.

Extra ration demands:

- Feed for body condition score 3.0 – 3.5
- Ideal dry period is 40 – 60 days (cows shorter, heifers at least 60 days)
- 2 weeks before drying off aim for a milk production of max 10 kg milk by reducing concentrate supplementation to 0 and/or by feeding low energy forage

and reducing protein level in the ration (14% CP). BCS should not go down though! Enough water!

B. Dry cows (60 – 14 days before calving).

Aim : to train rumen muscles and maintain rumen papillae as much as possible.

Extra ration demands:

- Voluminous and structure rich, 9 – 11 kg DM, feeding value of 575 gTDN/ kg DM
- Supply small amount of starch (e.g. 1 kg Barley)
- Supply enough protein in the ration (+ 12 % CP)
- K, Na and Ca poor to reduce incidence of milk fever
- Enough mg

C. Dry cows (14 – 0 days before calving).

Aim : to smooth transfer from “dry” to “high milk production”.

Extra ration demands:

- DM intake drops dramatically
- Energy and protein requirements go up very quickly (calf + colostrum production)
- Rumen flora must adjust to the feeds provided after calving : provide gradually the same basic ration as other high producing cows (650 gTDN/kg DM)
- Provide roughages ad lib (10% left over), every day cleaning of feeding trough
- Last week provide 2-3 kg concentrates in at least 2 portions (mixing concentrates and roughages by hand avoids fermentation problems), heifers 1-2 kg
- Total ration : CP level 14 %
- More starch
- Provide enough Mg, Se and Cu
- Water should not be too cold

D. Early lactation cows (0 – 20 days after calving).

Aim : Careful start of the lactation, making sure that cows have a healthy start.

Extra ration demands:

- Around calving no ration changes

- Top quality roughage (minimum of 10 – 15% of the ration dry matter should comprise of highly digestible forage like young grass and/or legume)
- Enough effective fibre to ensure optimum rumen fermentation
- Slowly increase concentrate supplementation (increase with 200 grams per day). Make sure animals eat plenty of roughage ! Cows that show healthy rumen function and good dry matter intake can have a faster increase in concentrate supplementation.
- CP level in ration 14%, this makes sure that cows slowly increase milk production (they are not “pushed” too much)
- Provide minerals/ vitamins according requirements 27

E. High production cows, 30 – 120/150 days in lactation.

Aim : feed cows for maximum milk production and reproduction.

Extra ration demands:

- Record milk production daily; for every 1.5 kg milk produced more provide 1 kg concentrate more
- Top quality roughage (minimum of 10 – 15% of the ration dry matter should comprise of highly digestible forage like young grass and/or legume)
- Never give more than 45% of total ration dry matter in the form of concentrates; generally 8 kg dry concentrates is maximum for crossbred cows weighing 500 kg.
- Provide a source of bypass protein (oil seed meal, fish meal, cereal bran, lignin containing legume) at a level of 10% of the dry matter intake
- Provide concentrate in portions of max. 2-3 kg
- CP level ration 16 %.

F. Low Production cows, > 150 days in lactation.

Aim : produce cheap milk based on as much roughage as possible.

Extra ration demands :

- Good quality roughage if available; DM intake from roughage can be high during this lactation stage.
- Limited concentrates
- Supplementation of concentrates above basic ration level : 1 kg concentrates/2 kg milk more.

- Later in lactation adjust concentrates in accordance to body condition
- CP level of ration around 15%
- End of lactation : body condition score of 3 – 3.5

3.3.2 Mineral and vitamin requirements.

Two categories of minerals are needed, Micro/trace minerals and Macro minerals. There are seven macro minerals that need to be analyzed and balanced within a cow's diet. These are calcium (Ca), phosphorus (P), magnesium (Mg), sulfur (S), sodium (Na), chlorine (Cl) and potassium (K). Some of these minerals work together, while others work independently.

trace or micro minerals include cobalt, copper, iodine, iron, manganese, selenium and zinc.

3.3.3 Water requirements

Several changes occur in cows as they progress through different stages of lactation. As well as variations in milk production, there are changes in feed intake and body condition, and stage of pregnancy

Other factors which will influence the water intake are climatic conditions (hot and dry versus cold and wet) and the DM content of the supplied feedstuffs (hay versus fresh grass). Also the physiological status of the cow (lactating, pregnant or dry) & mineral content of the ration influences the intake.

In general the water requirement, including the water in the feedstuffs, of dairy cattle is as follows:

- Calves 5 – 15 litres per day
- Young stock (1 – 2 years of age) 15 – 35 litres per day
- Dry cows 30 – 60 litres per day
- Lactating cows

up to 10 kg milk 30 – 60 litres per day

up to 20 kg milk 70 – 100 litres per day

up to 30 kg milk 90 – 150 litres per day

Water intake depends to a large extent on the ambient temperature and the body weight. Under hot conditions the intake will be higher.

3.4 Carrying out hygienic milking

Carrying out milking in a clean manner

- Standard milking procedures Important to

Page 44 of 83	Ministry of Labor and Skills Author/Copyright	Animal Health Level -I	Version -1
			September, 2022

- ✓ Produced quality milk
- ✓ Finish milk from the udder in required amount

- Important equipment's are
 - ✓ Milk strainer
 - ✓ Pair of towel
 - ✓ Waste basket
 - ✓ Dipping cup glove
 - ✓ Milking can
 - ✓ Strip bowel
 - ✓ Weighing

- Important Material are:-
 - ✓ Rope
 - ✓ Disinfectant
 - ✓ Milker sitting
 - ✓ PPE
 - ✓ Feed

Procedures of milking

- Put on PPE
- Assemble all the necessary clean and sanitized milking equipment's and materials
- Restrain (move in to the parlor and restrain leg by rope
Avoid shouting and new things)
- Supply feed to the animal
- Teat pre dip (dip the teat to remove microorganism)
- Wash the udder ,teats especially teats ends should be thoroughly washed with warm (110 °F) sanitizer solution
- Massage the udder thoroughly and dried with an individual towel
- Use strip cup and identify milk before direct milking
 - ✓ This is to check whether the milk is normal or not
 - ✓ If the milk read cow may be suspected of mastitis disease and lastly discarded it
- Place the chair and have milking bucket under the cow's udder
- Start milking and complete it at least with 5 or 6 minute
Complete milking and increasing milking frequency is important
- Record the milk and disinfect the teat
- Take away leg restrain from animal and release
- Continue this step to animals

3.5 Observing, recording and reporting health status of lactating animals

Introduction

Health management is one of the most important factors influencing the development of dairy cattle industry Ethiopia. It is one of the critical factors in maintaining optimum milk yield, keeping normal calving intervals and ensuring the generation to continue through caring and reducing mortality in calves and other young dairy stocks.

Good dairy health management practices is based on good nutritional supply, housing, genetic improvement and close follow up which discussed in dairy cattle feed management and dairy cattle fertility management manuals. To avoid health problems in dairy cattle routine health care procedures should be followed. It is important to recognize the dairy cattle herd in general and then the individual cows in particular for any health issues. This can be done through attentive observation, touching individual cows, smelling and even by hearing sounds from cows. These are important points to identify health problems in the herd and to take appropriate action on time. The most common dairy cattle diseases discussed in this manual are Infectious Diseases, Diseases of the Reproductive system, Diseases of Digestive system, metabolic diseases, and parasitic diseases.

Body condition score should be closely monitored throughout lactation to ensure that the diet adequately meets nutritional needs. Depending on an individual's milk production curve, body weight and condition gain to replace reserves may occur in mid- to late lactation or following weaning. It is important to make sure that females regain lost weight but do not gain excessive additional weight.

3.5.1 Diseases of Post-Partum

i. major reproductive health problems of dairy cattle

Dystocia, vaginal prolapse, uterine prolapse, endometritis, anoestrus, repeat breeder, abortion, retained placenta, stillbirth and metritis are the most common reproductive disorders that have direct impact on reproductive performance of dairy cattle. These diverse disorders are similar in that they all can result in impaired reproductive function.

Page 46 of 83	Ministry of Labor and Skills Author/Copyright	Animal Health Level -I	Version -1
			September, 2022

a) Abortion and stillbirth

Abortion is the termination of pregnancy and it represents one important aspect of infertility in farm animals. In dairy cattle, it is commonly defined as a loss of the fetus between the age of 42 days and approximately 260 days.

Pregnancies lost before 42 days are usually referred to as early embryonic deaths, whereas a calf that is born dead between 260 days and full term is defined as a stillbirth. A low rate of abortion is usually observed on farms and 3 to 5 abortions per 100 pregnancies per year are often considered as normal. However, the loss of any pregnancy can represent a significant loss of (potential) income to the producer.

Factors that cause proportion of pregnancies to terminate with an abortion.

Non-infectious cause includes

- trauma
- Hormonal abnormalities
- genetic abnormalities,
- toxic agents and Ergot alkaloids (Clavicepspurpure),
- stress, and malnutrition.

The infectious causes include

- viruses,
- bacteria,
- rickettsia,
- fungi,
- protozoa and
- Chlamydia

b) Prolapse of genital organs

Genital prolapse is a major but not very common reproductive disorder in cattle. It is regarded as an emergency condition and should be managed before excessive edema, mucosal trauma, contamination and fatal hemorrhage lead to a grave prognosis.

c) Uterine prolapse

Uterine prolapse is one of the most potentially dangerous complications associated with third stage of labour during calving of cow. It is partial or complete turning inside- out of the organ, in which the inside comes to the outside through the lips of the vulva and hangs down, sometimes as far as the hocks.

A uterine prolapse is usually seen immediately following or within a few hours of calving. It is considered as medical emergency. This condition is life threatening. If the affected cow not treated quickly, she could go into shock or die from blood loss. If the uterine prolapse repaired properly

The cause of prolapse of the uterus is not clear, but there is no doubt that it occurs during the third stage of labour.

Predisposing factors which includes

- hypocalcaemia,
- prolonged dystocia,
- fetal traction,
- fetal oversize,
- retained fetal membranes and
- chronic disease.

NB. Uterine prolapse may be avoided by reducing the predisposing factors

d) Vaginal prolapse

Vaginal prolapse refers to a condition in which part or the entire vaginal wall protrudes from the vulva. It tends to occur during mid to late gestation period, sometimes after delivery. Vaginal prolapse is more common than uterine prolapse, and typically looks like a pink bulge of tissue ranging in size from a large grapefruit to a soccer ball.

Precipitation of prolapse of genital organs suggested multiple etiologies but placental estrogen during second half of gestation in cattle causing relaxation of pelvic ligament; vulva and vulval sphincter muscle are mostfeasible proposition although hereditary predisposition

may not be undermined.

A vaginal prolapse occurs due to increased pressure in the abdominal cavity during the latter stages of pregnancy. Older cows, cows carrying twins and cows with Bosindicus ancestry are more prone to have

e) **Retention of the fetal membrane**

Retention of the fetal membrane comprises of failure of dehiscence and a lack of expulsion of fetal membranes within the duration of physiological third stage of labour. Primary retention of fetal membranes results from a lack of detachment from the maternal caruncles whereas secondary retention is related to a mechanical difficulty in expelling already detached fetal membranes e.g. uterine atony.

Retention of the fetal membranes or retention of placenta in the cow is defined as the condition in which the fetal membranes are not expelled within a period of 12 to 24 hours after expulsion of the fetus. Retention of fetal membranes is one of the most common conditions occurring in dairy cows following parturition.

There are a number of risk factors associated with retention of fetal membranes,

- Mechanical risk of RFM
 - ✓ Dystocia,
 - ✓ caesarean section,
 - ✓ uterine torsion,
 - ✓ abortion,
 - ✓ stillbirth,
 - ✓ induced parturition and
 - ✓ twin.
- Nutritional causes may be due to deficiency of
 - ✓ proteins,
 - ✓ selenium,
 - ✓ iodine,

- ✓ vitamin A and E
- ✓ calcium deficiency during pregnancy.
- Mangemental causes include
 - ✓ stress,
 - ✓ hereditary,
 - ✓ inbreeding and
 - ✓ obesity.
- Infectious diseases like
 - ✓ brucellosis,
 - ✓ leptosprosis,
 - ✓ salmonellosis,
 - ✓ listeriosis,
 - ✓ IBR virus and
 - ✓ BVD virus.

f) Uterine infection

Uterine diseases are highly prevalent in high producing dairy cows. The bacterial infection of uterus may occur, during or immediately after parturition, coitus or while carrying out artificial insemination. The severity and persistence of infection in the uterus depends on the degree of contamination, uterine defense mechanism and presence of substrates for the growth of the microbes such as devitalized tissues.

Postpartum uterine disease is the leading cause of reproductive inefficiency in dairy cattle. Metritis, endometritis, pyometra, Retention of fetal membranes and some non specific infections

ii. Metabolic Diseases

Metabolic diseases are caused by physiological disturbances of the cow due to imbalanced feed supply. They are common in dairy cattle with poor feeding management system.

a. Milk fever

Hypocalcemia or milk fever is a metabolic disease of mature high lactating cows and caused by calcium deficiency in the body of the animal which is important for contraction of muscles. The

disease occurs just before 12 hours, during calving or even 24-48 hours after calving. The disease is associated with hypocalcaemia and characterized by general muscle weakness, circulatory collapse and depression. The disease contributes to dystocia, retained placenta and uterine prolapse. Deficiency of calcium is associated with excess secretion of calcium in colostrums, decreased absorption and mobilization of calcium from intestine and bones, respectively.

- Clinical Signs

Depression, loss of consciousness, dry muzzle, cold ear, pupil might be dilated, muscle tremor, grinding of teeth, subnormal body temperature, loss of muscle tone, circulatory collapse, sterna recumbency with curvature of the neck, drowsy appearance and flaccid paralysis.

- Prevention and control

- ✓ Supply more phosphorus and low calcium during late stage of pregnancy (1:3 ratio).
- ✓ Administration of calcium chloride 120-150 ml orally 24 hours before calving.
- ✓ Supply the cow with balanced diet during pregnancy. (refer nutrition manual).
- ✓ Treatment: Calcium borogluconate 25-30 % solution = 100-200gm calcium borogluconate in 400-800 ml solution respectively

b. Ketosis

Hypoglycemia or Ketosis is a metabolic disease of heavy lactating cows. It is characterized by weight loss, pica, inappetance, decreased milk production, neurological abnormalities that usually occurs during the first 6 weeks of lactation. It occurs during peak milk production when more energy is needed. High milk production low glycogen level resulting in negative energy balance called ketosis.

- Clinical Signs

Weight loss, constipation, loss of skin elasticity, head pressing, walking in circle, abnormal gait, deviation of neck and champing of jaw, the breath has acetone odor.

- Prevention and control

- ✓ Cows at calving should not be too fat or in very poor condition
- ✓ Avoid sudden change of feed
- ✓ Add sufficient protein to the ration

- Treatment of sick animals
 - ✓ Glucose 50% solution; 500ml intravenous followed by 20% solution subcutaneous.
 - ✓ Propylene glycol 125-250gm mixed with equal volume of water

Self-check 3

Name..... ID..... Date.....

Directions: Answer all the questions listed below.

Test I: Choose the best answer (each has 1 point)

1. A disease characterized by weight loss, pica, inappetance, decreased milk production, neurological abnormalities
A. Ketosis B. milk fever C. Q fever D. All
2. It is one of the most important factors influencing the development of dairy cattle industry Ethiopia.
A. Health management C. Milking hygiene
B. Body condition scoring D. Feeding
3. A mangmental factor which cause retention of placenta in recently calved cows
A. Stress B. brucellosis C. abortion D. defiency of protein
4. The expulsion of fetuse before termination of gestation period
A. Abortion B. embryonic mortality C. still birth D. infertility

Test II: Short Answer Questions(each has 3 point)

1. Write the guide lines for feeding dry cows (14 – 0 days before calving)?
2. Write at least two matablic diseases and list their causes and treatments recommended
3. Discusse risk factors that increase the occurrence of retention of placenta?

Note: Satisfactory rating – 7 points

Unsatisfactory - below 7 points



Operation Sheet 3

1.1 Procedures for standard milking for lactating cow

A. Tools and equipments

- | | |
|--------------------|-------------------------|
| i. PPE | vii. Waste basket |
| ii. Rope | viii. Dipping cup glove |
| iii. Disinfectant | ix. Milking can |
| iv. Milker setting | x. Strip bowel |
| v. Milk strainer | xi. Weighing balance |
| vi. Pair of towel | |

B. Procedures

- Put on PPE
- Assemble all the necessary clean and sanitized milking equipment's and materials
- Restrain animal
- Supply feed to the animal
- Teat pre dip (dip the teat to remove microorganism)
- Wash the udder with warm (110 °F) sanitizer solution
- Massage the udder thoroughly and dried with an individual towel
- Use strip cup and identify milk before direct milking
- check whether the milk is normal or not
- discard mastitis suspected milk
- Place the chair and have milking bucket under the cow's udder
- Start milking and complete it at least with 5 or 6 minute
- Record the milk and disinfect the teat
- Take away leg restrain from animal and release
- Continue this step to other animals



LAP TEST 3

Name..... ID.....

Date.....

Time started: _____ Time finished: _____

Instructions: Given necessary templates, tools and materials you are required to perform the following tasks within **1: 30**hour. The project is expected from each student to do it.

Task-1 perform standard milking procedures

LG #23

LO #4- Provide Care for New-born Animals

Instruction sheet

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

- OHS procedures during postnatal care
- Resuscitation of new-born animals
- Performing disinfection of navel
- Collecting Colostrum and fed for new born
- Regular checking of new-born on colostrum feeding
- Providing clean, safe and secure housing environment
- Preventing hypothermia
- Monitoring relationship between mother and young
- Maintaining and monitoring feeding, watering and shelter area
- Identifying, recording and reporting health and feeding problems

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

Specifically, upon completion of this learning guide, you will be able to:

- follow OHS procedures associated with postnatal care provision.
- Carry out new-born resuscitation as required and according to the organizational guideline under direct supervision.
- perform disinfection of navel using appropriate disinfectants
- collect and feed colostrum to the new born within the appropriate time period
- check new-born animals regularly after administration of colostrum and colostrum feeds repeated as required
- provide clean, safe and secure housing environment according to the enterprise guideline.
- carry out prevention from hypothermia by maintaining an appropriately warm environmental temperature in new born care areas

- monitor relationship between mother and young where appropriate and strategies are consulted with supervisor to address any problems.
- maintain and monitor feeding, water and shelter areas for correct operation, cleanliness and hygiene
- identify, record and report routine health and feeding problems, including digestive upsets and infections to the vet

Learning Instructions:

1. Read the specific objectives of this Learning Guide.
2. Follow the instructions described below.
3. Read the information written in the information Sheets
4. Accomplish the Self-checks
5. Perform Operation Sheets
6. Do the “LAP test”

Information Sheet 4

Introduction

Calf management in a dairy herd is very critical and a vital one because; today's calves are going to be the replacement stock in the future. Any lacunae in the calf management will have serious repercussions in the production of the dairy farm in the long run. Extra care and attention is warranted to the calves especially below 3 months of age as they are vulnerable to many infectious diseases especially the respiratory and enteric infections. As per the standards laid, for any given dairy herd at any given point of time the calf mortality rate should be less than 5%.

Calves are the future of dairy herd. It is said that “good animals are raised, not purchased”

Purpose: To provide proper health care to a newborn calf. This will give the calf the best start at a long, healthy, productive life.

The first hour after birth, known as the 'Golden Hour,' is the most crucial time in a calf's life. Proper calf management and feeding habits at this time affect the calf's long-term health and development, as well as its overall lifetime productivity. During the 'Golden Hour,' what must take place

- Assessment of newborn calf vitality.
- Calf resuscitation.
- Removing the calf from the cow.
- Successful umbilical care

The following steps must be done during this vital one-hour period:

Page 58 of 83	Ministry of Labor and Skills Author/Copyright	Animal Health Level -I	Version -1
			September, 2022



Figure 4.1 Actions must taken just after calving (hateshwaret *al.*, 2022)

4.1. OHS procedures during postnatalcare

It is essential that all personnel maintain a high standard of personal cleanliness.

- Clothing suitable for use in the animal facility and laboratories in which animals are used should be supplied and laundered by the institution.
- A commercial laundering service is acceptable in many situations; however, appropriate arrangements should be made to decontaminate clothing exposed to potential hazards.
- Disposable gloves, masks, head covers, coats, coveralls, and shoe covers might be desirable in some circumstances.
- Personnel should wash their hands and change clothing as often as necessary to maintain personal hygiene.
- Outer garments worn in the animal rooms should not be worn outside the animal facility. Personnel should not be permitted to eat, drink, use tobacco products, or apply cosmetics in animal rooms.

4.2 Resuscitation of new-born animals

The first thing to notice, therefore following the birth of a calf, buffalo calf, kid or lamb is the normal respiration. If sufficient delay occurred in the delivery of the fetus it should be held by its hind legs and lifted upwards to remove mucus in the air passages by gravitation. Gentle massage

of the chest area is suggested during the lifting. Air must be blown in the ear and this stimulates the young one to shake his head. Gentle rubbing of the body with hand or soft towels would also help in increasing the circulation in the calf, lamb or kid. Once the calf is respiring. The “ABC” of resuscitation (airway patency, breathing stimulation, circulation support) indicates the sequence of priorities for herd staff in dealing with at-risk calves. Resuscitation can commence while the calf is still in the birth canal and continues until the vital signs have normalized (eg, posture, activity, respiratory function, rectal temperature) or until a heart beat is undetectable with a stethoscope.

Resuscitative first-aid procedures can be implemented by all herd staff using physical techniques requiring little equipment. Once the calf’s thorax has emerged from the cow, the calf can breathe even if it remains in situ because of hip lock. Thus, resuscitation can begin during a problem calving by stimulation of the calf’s nasal receptors with straw or a finger (or an intranasal tube if oxygen therapy is available).

Immediately after birth, the calf should be briefly suspended upside down. This procedure facilitates postural drainage of pulmonary fluids and has a positive impact on pulmonary gas exchange, correction of mixed acidosis, and subsequent absorption of colostral immunoglobulins . Clearance of the airways can begin with pharyngeal and nasal suctioning using an aspirator pump [52]. Although only a small volume of fluid (!10 mL) is generally removed, the procedure significantly benefits pulmonary gas exchange and acid-base balance

How To Perform successful calf resuscitation

- Remove the mucus from the nose and mouth and clean it.
- If the calf does not start breathing, artificial respiration should be used by pressing and relaxing alternatively, the chest walls with hands.
- Another method gently pull the calf up by the hind legs to allow the fluid to drain from mouth and nose . This may be repeated several times and helps in restoring respiration
- Clean the afterbirth from nose and mouth

Be present at calving



Monitor calving progress and assist, as necessary

(for intervention decision tree)



Calf in birth canal, but thorax emerged

Establish patent airway

(aspirate pharyngeal and nasal fluid)



Stimulate breathing and circulation

(physical cardio–pulmonary resuscitation, positive pressure ventilation, pharmacological stimulants, oxygen therapy)

Calf is born



Assess vital signs immediately

(head-righting reflex, activity, breathing, heart rate, mucus membranes)



Establish patent airway

(suspend calf upside-down)



Stimulate breathing and circulation

(physical cardio–pulmonary resuscitation, positive pressure ventilation, pharmacological stimulants, oxygen therapy)



Place calf in sternal ‘dog sitting’ posture

Monitor vital signs

(reflexes, activity, demeanour, breathing, heart rate, mucus membranes, rectal temperature)



Correct mixed respiratory metabolic acidosis

(sodium bicarbonate therapy, as necessary)



Umbilical antiseptics

(chlorhexidine, repeated, as necessary)



Feed colostrum



Prevent hypothermia

(dry off and heat up)

Diagram 4.2 showing Standard operating procedure for intensive care of at-risk newborn calves.

4.3. Performing disinfection of navel

As soon as the calf starts breathing, observe as to whether the navel cord is still attached. The navel cord should be disinfected. The navel cord of the calf is tied about 2.5 cm away from the body and cut about one centimetre below the ligature. Apply tincture of iodine to the cut end and repeat it 2-3 days. This will prevent infection. Then, if the cow does not lick the calf dry, or if the weather is cold, the herdsman should wipe the calf to clean and dry.

Procedures to cut umbilical cord

- Handling of the new-born
- Use of appropriate chemical for disinfection (Iodine Tincture)
- Tying of navel about 2 cm away from the body and cutting 1 cm below ligature
- Apply tincture of iodine to the cut end and repeat it 2-3 days

Successful umbilical care

The navel or joint ills are caused by the transfer of infection from the environment into the calf through the navel cord. A wide range of farm hygiene and calf care/immunity principles must be optimized at and immediately after delivery to prevent navel sickness. The navel should be examined for excessive bleeding, discomfort, abnormal swelling, smell, or pus during the first

week of life, and treated as directed by your local veterinarian. If a farm has a recurring navel ill and uses navel cord dressing, adjusting the process (e.g., switching from iodine to chlorhexidine, switching from a teat dip to a navel dip solution, dipping instead of spraying) may help avoid navel ill. If navel problems persist, halt cord dressing and concentrate instead on improving calf immunity and calving cleanliness.

How to Prevent Navel ill?

- Good maternity pen hygiene. Ensure calves are born in a clean, freshly bedded calving unit.
- Minimise the length of time a calf spends in calving pens.
- Ensure adequate early intake of good quality colostrum
- Practice navel hygiene.
- Practice antisepsis (chlorhexidine or iodine) if navel ill is a problem on the farm and hygiene is already optimal.
- Check the calf regularly for signs of navel ill.

4.4. Collecting Colostrum and fed for new born

For the first two weeks of life, calves receive most of their nutrition from milk. From four days of age, calves can be fed either whole milk, waste milk, reconstituted milk replacer, or fermented or fresh colostrum. The type of milk fed is determined by price, availability, and convenience. Calves are generally fed milk twice daily from a nipple bottle or bucket, or they can drink from an open bucket. When milk or reconstituted milk replacer is fed to calves from either a nipple or open bucket, the esophageal groove closes and milk bypasses the rumen and is shunted from the esophagus into the abomasum or true stomach. The groove closes in response to nervous stimulation and is active in calves until about 12 weeks of age. The next important step to follow is to feed the Colostrum within 15 minutes of calving, the calf should be fed with colostrum at the rate- 1/10th of body weight and buffalo calves at the rate -1/15th of body weight

Importance of Colostrum feeding

- it provides warmth and energy to the new born and help increase the body temperature
- It also provides many antibodies (passive immunity) which builds up the newborns immunity
- Laxative effect
- Antitrypsin action(which allows the immune globulins to reach the intestines without destruction trypsin).
- rich in proteins, fat and excellent source of Vit A,D, & E
- Excellent economic diet for both the neonates & older calves
- Contain antibacterial substances- lactoferrin, lactoperoxidase & lysozyme

4.4.1 Milking Hygiene

Milking is the defining activity of dairy farming. Consumers demand high standards of milk quality, so milking management aims to minimize (microbial, chemical and and physical contamination.)

- Milking management covers all aspects of the process of obtaining milk from Animals quickly and effectively, while assuring the health of the animals and the quality of the milk.
- Consistency in the day-to-day implementation of milking procedures is an important part of good dairy farming practice for milking.
- Milk animals regularly using consistent milking techniques institute regular milking times and routines.
- Ensure good milking technique is consistently applied. Incorrect or variable milking techniques can result in a higher mastitis risk and injury to the animal.

The correct technique for machine milking is to:

- prepare animals properly before milking;
- attach the cups to clean, dry teats;
- avoid unnecessary air ingress at cup attachment;
- avoid overmilking; • remove cups gently; and
- when necessary, apply teat disinfectant to each teat after milking according to national recommendations and regulations.

The correct technique for hand-milking is to:

- restrain the animal to be milked using a method that does not cause pain or injury; • ensure the milker’s hands are clean and dry;
- prepare the teats for milking, ensuring they are clean and dry;
- only use appropriate teat lubricants according to national recommendations and regulations;
- handle the teats gently, ideally using the ‘fist-grip’ method, avoiding any discomfort, pain or injury to the animal;
- use buckets that are non-corrosive, easy to clean and disinfect, and do not taint the milk;
- avoid contaminating the collected milk with foreign material such as dust, dirt, soil, urine, manure (faeces) and protect it from flies; and
- when necessary, apply teat disinfectant to each teat after milking according to national recommendations and regulations.

4.4.2 Collection and Storing of colostrum

Fresh colostrum should be fed to calves within 1 hour of collection, or pasteurised and stored appropriately. There are three ways to help reduce the rate of microbe multiplication:

- refrigeration,
- freezing and
- pasteurisation

Table 4.1 colostrum storage condtions

Storage method	Refrigeration	Freezing
Length of storage	24 hours	Up to 1 year
Quantity of Milk	1–2 litre containers	1–2 litre zip bags/purpose made flat
Storage Temperature	4°C	18 o 20°C

NB. Colostrum should always be tested, bagged and labelled if stored. Ensure all stored colostrum is labelled with the collection date and cow identity. This is particularly important if

the cow later tests positive for Johne’s disease. Remember to use a thermometer to regularly check the temperature of fridges and freezers.

4.4.3 Feeding of colostrum

The Three Qs of Feeding Colostrum (Quickly, Quantity And Quality)

Colostrum is vital to the newborn calf because it contains antibodies (also known as immunoglobulins, or IgG), which provide immunity. It is also rich in energy and nutrients that are essential for growth.

Quality

- Feed high quality colostrum that has been measured using a Brix refractometer or colostrometer.
- Good quality colostrum contains at least 50 g/L of IgG. Any colostrum containing < 20 g/L of IgG should not be used.
- Colostrum quality declines the longer it is held in the udder
- It is not possible to determine the quality of colostrum by looking at it: it must be tested.
- Test colostrum from all cows. Ensure cows are milked as soon as possible after calving so that the best possible colostrum is collected and fed to newborn calves.
- Quality will decline if the colostrum becomes contaminated with bacteria, so collect and store it hygienically

Quantity and Quickly

The recommendation is to give a first feed of 3 litres within the first 2 hours. This can be split into two feeds if necessary, particularly for smaller breeds, and should be followed up by another similarly sized feed within 12 hours of birth.

- The colostrum should be fed at body temperature of 38°C.
- Optimal feeding time for colostrum is within the first 2 hours of birth, but the legal requirement is within the first 6 hours of birth
- Feeding colostrum to calves over several days is beneficial for building immunity and fighting infections
- To optimise immunity, it is very important that calves receive their first colostrum feed as soon as possible after birth, ideally within 2 hours.

- Optimal feeding time for colostrum is within the first 2 hours of birth, but the legal requirement is within the first 6 hours of birth
- Feeding colostrum to calves over several days is beneficial for building immunity and fighting infections.

Methods of feeding of colostrum

- natural (suckling directly from the dam)
- artificial
 - ✚ bottle feeding
 - ✚ bucket feeding
 - ✚ oesophageal tube feeding

Calf starter feeds should be dust-free, highly palatable feeds containing 75 to 80 percent total digestible nutrients (TDN), 15 to 20 percent crude protein, and adequate minerals and vitamins. They should be coarsely ground, rolled, or pelleted to facilitate feed intake and rumen development.



Figure 4.2 A multi-teat calf feeder, suitable for feeding group housed calves
(Amaral-Phillips *et al*; 2006).

4.5. Regular checking of new-born on colostrum feeding

Body weight of the calf is recorded on a balance along with length, breadth and height for the computation of milk allowance. Well fed cross bred calves on an average should gain 400 grams a day or 2.5 to 3 kilograms per week.

4.6. Providing clean, safe and secure housing environment

Introduction

The new borns need to be protected from the extremes of the weather including heat, cold and rains yet allowing them ample space, sufficient ventilation and sunlight. Saw dust is a good bedding material for new borns housed in permanently built buildings as it keeps them clean and dry and can be removed easily from time to time. Some commercially made calf homes are also marketed at some places. In situations where dairy cows, buffaloes and goats are kept in open thatched houses their new borns need care. However, sheep at many places are migratory and the lamb mortality is still low although they are kept in the open during the winter lambing. Probably these lambs have a higher immunity.

Calves being raised without a mother can be bedded with shavings, sawdust, ground corncobs, or straw. Maintain the bedding on a regular basis so the calf always stays dry. The calf will suck on any exposed surface, so make sure there are no sharp edges in the pen.

As the calf moves off the bottle and when he or she is eating grain and drinking independently, you can start to group the calves in small pens, or better yet, introduce them to an outside corral for fresh air and exercise. If you use an electric fence as an outside pen, the calves will need to be trained to the fence; otherwise, they may just run right through it when they are frolicking or playing a game with the other calves.

Tie bright strips of cloth or plastic to the wire between the supporting posts. This will let the calves see where the wire is located. They may investigate and get a shock, but it is doubtful they will try to cross the fence again.

Precautions to be taken :

- The calves are kept in the calf pen for minimum of 5 days after their birth. The calf paddock should be kept neat & clean without any debris, sharp objects & stones. The paddock should be located in a elevated area without any water logging, well aerated and with good shade.
- The calf pen and calf shed are to be cleaned with good quality disinfectant in correct dilution. The calf pen and calf shed are to be dried well before the calves are housed inside them.
- The calf pen, calf shed and water troughs are to be white washed with lime at regular intervals.
- The calf pen, calf shed are to sprayed with ectoparasiticide or organophosphorus reagents to avoid tick/lice infestation in calves.
- Immediately after the birth, clean the nostril and mouth from the mucus.
- Clean the whole body of the calf massages/ press the chest for the onset of respiration

4.7. Preventing hypothermia

In cold weather, calves require more energy to keep warm. Calves must be fed with enough milk and concentrate to provide them with extra energy to maintain their body temperature, grow and remain healthy.

- **Housing**
 - ✓ Monitor and record daily temperature in the calf shed using a min–max thermometer located at calf height
 - ✓ Dry newborn calves to reduce heat loss
 - ✓ Watch out for calves shivering or with raised hair
 - ✓ Supply plenty of dry bedding material to allow the calf to nest
 - ✓ Even in cold weather, calves need plenty of fresh air, but avoid draughts at calf level
 - ✓ Reduce damp by providing adequate drainage
 - ✓ In the presence of draughts or damp, calves will use more energy to keep warm
- **Feed and water**
 - ✓ Increase volume of milk or milk solids
 - ✓ Use a milk replacer with a fat content of at least 18%

- ✓ Do not mix over 160 g of milk replacer made up to 1 litre with water because this will result in
- ✓ excessive mineral intake
- ✓ Provide fresh water at all times

- **Environment**

The temperature the calf feels is a combination of temperature, airspeed and humidity.

- **Timing of feeds**

Consider feeding milk to calves three times a day. The interval between milk feeds should not exceed 12 hours.

- **Calf jackets**

coats or blankets can be used to help keep calves warm, dry and healthy when temperatures fall below 15°C. Before investing in these products, ensure your calves are receiving sufficient energy and have dry bedding to keep warm.

Important: Newborn calves must be kept warm to conserve energy

- ✓ immediately drying the neonate, and then swaddling full-term neonates
- ✓ placing premature infants in a polyethylene bag
- ✓ covering the new-born with blanket
- ✓ apply bedding to the floor of new-born house



Figur4.3 blanket cloths for new born
(Sreedhar and Sreenivas, 2015;Purohit, G. N. 2011).

4.8. Monitoring relationship between mother and young

The mother usually licks the young one continuously immediately after birth and this removes any mucus adherent to the nostrils and also stimulates the blood circulation in the young ones body. normally it should be kept in front of her mother who starts licking her. Some mothers may not lick their young ones and they must be dried with soft towels and massaged for some time.

Grooming

- Allow the mother to clean off (licking) her calf.
- If the cow does not get up, drag the calf in front of her to clean her calf.
- If the cow is no longer interested in cleaning her calf and the calf is still wet, use clean towels to dry the calf. This is especially important on cold days

4.9. Maintaining and monitoring feeding, watering and shelter area

Feeding Management:

Utensils in which whole milk or milk replacer is fed to calves, must be clean and should be cleaned after each feeding. Severe digestive upsets can results from such contamination of the feeding parts. Either the nipple pail or the open type bucket are satisfactory for feeding milk or milk replacer. It may take less effort to teach a calf to nurse from a nipple pail than to drink from an open pail. Also, a rapid consumption of milk from an open pail may at times cause digestive upsets.

Calf starter and water important for rumen development for the first part of life, the calf functions as a simplestomached or monogastric animal. At birth, the first three components of the stomach the rumen, reticulum, and omasum are undeveloped and do not aid in digesting feeds for the very young calf. When the calf starts to eat calf starter (mixture of grains, protein source, minerals, and vitamins) and to drink water, the rumen starts to develop.

Calf starter should be fed to calves starting at four days of age. Calf starter should be formulated to include very palatable ingredients and to contain adequate protein, minerals, and vitamins. Hay should not be fed until calves are weaned and/or they are eight weeks of age.

Page 71 of 83	Ministry of Labor and Skills Author/Copyright	Animal Health Level -I	Version -1
			September, 2022

4.10. Identifying, recording and reporting health and feeding problems

Identification and Recording

Good records maintain and transmit accurate information about the animal collection so that the information:

- documents a complete history of each animal owned by or kept at your facility.
- provides meaningful archival material for the future.
- provides legal documentation, including proofs of title and reports for permits.
- provides genetic history (pedigree) and basic demographic information used in local and global species management.

4.10.1 Management Practices

- **Identification** : This is essential for good management, especially in breeding farms. The best method of permanent identification is by tattooing the inside of the ear with indelible ink. Metal ear tags or button with letters and numbers may be inserted in the ear as a means of identification. Branding, ear-notching, Neck strap or neck-chain (with a number plate attached) and radio frequency identification devices (RFID) are other methods of identification. Records should be kept to identify the birth date and at least the sire and dam of each heifer..
- **Body weight**: of the calf is recorded on a balance along with length, breadth and height for the
- computation of milk allowance. Well fed cross bred calves on an average should gain 400 grams
- a day or 2.5 to 3 kilograms per week.
- **Removal of supernumerary teats** is also important and this has to be carried out before
- development begins. This is usually done in the first month of age with the help of a short pair
- of sterile scissors. If the extra teat is at the base of the normal teat, veterinary help may be
- resorted to remove it.

- **Dehorning or disbudding:** New born calves and kids are dehorned by destroying the horn bud at about 7-10 days of age by using caustic potash sticks or using an electric horn debudder. Care should be taken not to burn the horn bud excessively and antiseptics must be applied after debudding is completed.
- **Tail docking:** tail docking of lambs can be done during the first week of life using rubber ring or an electric docker.
- **Castration:** Castration means removal of essential organs of reproduction in males. Castration of bucks and lambs using rubber rings should also be done within the first 2 weeks of life
- **Vaccination:** At birth, calves can be given an oral vaccine to prevent scours. At two to three months of age, calves should be vaccinated for blackleg with a seven-way Clostridial vaccine.
- Tincture of iodine is swabbed on the area where the teat was removed, and the area needs to be checked daily for infection and to see that it is healing properly.
- **Weaning of new borns** Weaning means removal of new borns from the mother's milk and shifting them to solid feed and fodder. The aim of weaning is many folds; it lowers the cost of rearing, helps in development of the rumen and also triggers the reproductive cyclicity in the mother which was inhibited or prolonged by the suckling calf. Calves can be fed commercially available early starter feeds by the third or fourth week and offered hay as early as the second week.. Ideally new born calves/buffalo calves should be weaned at 5-8 weeks of age

4.10.2 Common diseases of new borns

The most frequent problems of the new born calves, lambs and kids are navel ill, septicemia, diarrhea, pneumonia and cooccidiosis. Dairy calves can suffer from vitamin A deficiency, ringworm and theleriosis

- **Septicemia**

When a new born has septicemia it has disease producing organisms or toxins in its blood. These can spread to multiple organs and can result into meningitis, multiple organ dysfunction, shock and death. Septicemia in calves is usually the result of bacterial infection (E.Coli, Salmonella) that occurs while the calf is in the uterus, during, at, or immediately after birth.

- ✓ The route of infection can be

- ✚ the blood of a sick dam,
- ✚ an infected placenta,
- ✚ the calves umbilical stump, mouth, inhalation or wound.

Septicemia is the most severe medical problem that a calf can develop. Septicemia is difficult to treat, and the survival rate is low.

✓ **Clinical signs**

The affected calves are usually depressed, weak, and reluctant to stand and suckle poorly within 5 days of birth. Swollen joints, diarrhea, pneumonia, meningitis, cloudy eyes and or a large tender navel may develop.

Treatment- antibiotic and Fluid therapy

- **Diarrhea (Neonatal Calf Scours)**

Diarrhea is the most common cause of death in young calves, less frequent in buffalo calves and is almost entirely avoidable by good management. The highest risk period for diarrhea is from birth until about 1 month of age. Many bacteria, viruses and/or parasites cause diarrhea in calves, kids and lambs. Usually, the calf is infected with more than one agent. The virus, bacteria or parasite is generally identified from a fecal sample or from the intestines of a dead calf. A useful guide to the cause of diarrhea could be the age of onset of diarrhea. E. Coli affects mostly within first 3 days of life and Salmonella affects 5-14 day old calves, bovine virus diarrhea occurs in calves between 4 to 10 weeks of age and coccidia affects calves between 7 days to 6 months age.

✓ **Clinical signs**

symptoms can vary from profuse watery diarrhea to hemorrhagic diarrhea sometimes with colic and nervous signs. Dehydration may develop fast along with hypoglycemia; coma and death appear fast in unattended patients.

- ✓ **The treatment** : depends upon early identification and prompt fluid and electrolyte replacement. The identification of extent of dehydration (percent) can be done by using the below mentioned criterion as the calf usually dies of dehydration

- **Pneumonia**

Pneumonia is an inflammation of the lungs and is usually caused because of lack of colostrum feeding, cold weather, diurnal temperature variations and a wet housing.

✓ **Clinical signs:** of pneumonia include a nasal discharge, dry cough, body temperature of greater than 41 degree C, respiratory distress and decreased appetite. Frequently more than one agent are involved in an outbreak and include Pasteurellahaemolytica, Pasteurellamultocida, Mycoplasma bovis, Haemophilussomnus, Actinomyces pyogenes, IBR and Salmonella dublin. Problems that occur within 5 days of birth usually have their source as the dam or the calving environment.

✓ **therapy**

- ✚ Antibiotic therapy is necessary along with non-steroidal anti-inflammatory drugs like aspirin, banamine or ketoprofen.
- ✚ Supplementation of probiotics and improvement of the environment and keeping the calves in a clean and dry place is helpful in improving the calves' health.
- ✚ Rubbing the chest of the calf with liniments is helpful. When the calf is seriously ill it must be monitored more closely and appropriate therapy instituted at an early time. Calf mortality because of respiratory disease is high in young calves below 1 month of age.

• **Coccidiosis**

A disease in calves that is also very common in poultry and is characterized by chronic diarrhea.

- ✓ **Signs:** watery scours with flakes of blood, dull listlessness, mucus in the feces, dehydration, and weight loss
- ✓ **Control methods:** accurate diagnosis and monitoring, maintain sanitation, limit stress, and medicate

Self-Check 4

Name..... ID..... Date.....

Directions: Answer all the questions listed below

Test I: Multiple choice(each has 1 point)

1. The removal of new borns from the mother's milk and shifting them to solid feed and fodder.
 - A. Weaning
 - B. Identification
 - C. castration
 - D. calving
2. Activities to be done during the golden hours
 - A. Assessment of newborn calf vitality
 - B. Removing the calf from the cow
 - C. Calf resuscitation and Successful umbilical care
 - D. All
3. Successful umbilical care **doesnot** include
 - A. Good maternity pen hygiene
 - B. Ensure adequate early intake of good quality colostrum
 - C. Practice navel hygiene and Practice antisepsis
 - D. Weaning

Test I: Short Answer Questions(each has 3 points)

1. What is the golden hour in care of new born and write what activities to be done during this period?
2. What are practices to be done in new born management?
3. What amounts of colostrum is given to newborn within the 1st two hours
4. Mention the most common new born disease and treatments given
5. Discuss the importance of colostrum feeding

Note: Satisfactory rating - 9 points Unsatisfactory - below 9 points



Operation Sheet 4

Procedures to cut the umbilical cord

A. Tools and equipments

- | | |
|--------------------------------|----------------------|
| i. Animals (calve) | vi. Suture materials |
| ii. Scissors | vii. Saline water |
| iii. Forceps | viii. Disinfectants |
| iv. Surgical blades | ix. Gauze and cotton |
| v. Restraining material (rope) | |

B. Procedures to cut umbilical cord

- Handling the new-born
- Use of appropriate chemical for disinfection (Iodine Tincture)
- Tye the navel about 2 cm away from the body
- cuttthe navel or umbilical cord 1 cm below ligature
- Apply tincture of iodine to the cut end
- repeat it 2-3 days

C. Standard operating procedure for intensive care of at-risk newborn calves

- Strict Supervise the cow at calving
- Monitor calving progress and assist, as necessary
- aspirate pharyngeal and nasal fluids
- Stimulate breathing and circulation (resuscitation)
- Assess vital signs immediately (measure vital parameters)
- Apply Umbilical antisepsis
- Feed colostrum
- Prevent hypothermia((dry off and heat up)
- Weigh body
- Assess the conditions

LAP TEST 4

Name..... ID.....

Date.....

Time started: _____ Time finished: _____

Instructions: Given necessary templates, tools and materials you are required to perform the following tasks within **1:30**hour. The project is expected from each student to do it.

Task-1 Perform the standard operating procedure for intensive care of at risk newborn calves

Task-2 perform the pocedures to cut umblical cord successfully

Reference Materials

Books:

Amaral-Phillips, D. M., Scharko, P. B., Johns, J. T., & Franklin, S. (2006). Feeding and managing baby calves from birth to 3 months of age. *UK Cooperative Extension Service, University of Kentucky, ASC-161*.

hateshwar, Vinod & Muwal, Hitesh & Magazine, The. (2022). Care of the New Born Calf. 1. 41-43

Mee, J. F. (2008). Newborn dairy calf management. *Veterinary Clinics of North America: Food Animal Practice*, 24(1), 1-17.

National Academies of Sciences, Engineering, and Medicine. 1996. Guide for the Care and Use of Laboratory Animals. Washington, DC: The National Academies Press. <https://doi.org/10.17226/5140>.

National Research Council. (2001). *Nutrient requirements of dairy cattle: 2001*. National Academies Press.

Purohit, G. N. (2011). Care of the New Born Domestic Animals.

Singh, H.P., Kansal, S.K. and Singh, J. (2018). Study on calf care and management practices followed by dairy farmer's in Punjab, India. *International Journal of Current Microbiology and Applied Science*, 7(7): 1217-1228.

Sreedhar, S., & Sreenivas, D. (2015). A study on calf mortality and managemental practices in commercial dairy farms. *Livest. Res. Intern*, 3, 94-98.

Web addresses

<https://www.pashudhanpraharee.com/body-condition-scoring-bcs-in-farm-animals/>

<https://www.hobbyfarms.com/why-body-condition-score-your-cows-5/>

ACKNOWLEDGEMENT

Ministry of Labor and Skills wish to extend thanks and appreciation to the many representatives of TVET instructors and respective industry experts who donated their time and expertise to the development of this Teaching, Training and Learning Materials (TTLM).

Page 80 of 83	Ministry of Labor and Skills Author/Copyright	Animal Health Level -I	Version -1
			September, 2022

The experts who developed the learning guide

No	Name	Qualification	Educational background	Region	Phone number	E-mail
1	Dr. SileshiAregahagn	DVM, MSc	Veterinary Medicine	Kombolcha/Amhara	0920480599	kochasile@gmail.com
2	Dr. ChemereAyenew	DVM, MSc Candidate	Veterinary Medicine	Alage Federal	0913628734	chemereaz@gmail.com
3	Dr. AddisuBedashu	DVM, MSc	Veterinary Medicine	Holeta/Oromia	0910281160	addisubedashu@gmail.com
4	Dr. Degu Fitehanegest	DVM, MSc	Veterinary Medicine	Alage/Federal	0910525106	degufe@gmail.com
5	Dr. DirshayeKebede	DVM, MSc Candidate	Veterinary Medicine	Alage/Federal	0916497739	dirshaye.kebede@yahoo.com
6	Mr. Amsalu Bedasso	MSc	RDAE	Alage/Federal	0911353949	amsalub5@gmail.com
7	Mr. Derebe Tesema	BVSc, MSc Candidate	Animal health	Alage/Federal	0982253307	derebetesema08@gmail.com