TRAINING MANUAL ON TRAINING OF CAHWs

Vaccines

Samples collection vials

CAHW Training

Training Guide to Trainers

IFAD
Investing in rural people

Regional Livestock Development Centre, Kanglung

Department of Livestock

Published by:
Regional Livestock Development Centre, Department of Livestock. MoAF
Kanglung Trashigang: Bhutan

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ROYAL GOVERNMENT OF BHUTAN
Ministry of Agriculture and Forests
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FOREWORD

While livestock professionals, as technocrats, made plans and strive to make Bhutan self-sufficient in livestock and poultry products, it is not so much in our hands, to make it happen. Ultimately, it depends on our farmers, whether they will produce or not. However, it is our responsibility to set conducive policy environments and teach our farmers to farm efficiently. As they transit from subsistence farming system to more semi/commercially oriented farming, farmers will need to acquire new knowledge and skills to adopt modern farming methods. It is the responsibility of our experts and extension colleagues to transfer this knowledge and skills to our farmers.

Until today farmers' trainings in livestock production has been conducted mostly by our extension colleagues based on their expertise and convenience. While they did excellent job in doing what they felt was important, there was lack of standard and uniformity in contents, methodology, and the process. As a result, farmers' trainings varied in content, depth of subject covered, and methodology followed. It is important we have certain uniformity in these trainings, therefore every farmer that attended certain module are at a similar level of understanding.

I am happy to inform that RLDC Kanglung is coming out with a farmers' training manual for livestock production. This publication is one of a kind that has been due a long time. This publication will go a long way in establishing a standard and uniformity in conducting farmers' training. I would like to thank the management at RLDC, Kanglung for bringing out this important publication.

The Project Steering Committee under the chairmanship of Dasho Secretary, MoAF has provided valuable guidance and advice. Let me also thank IFAD and CARLEP management for supporting with fund and making it possible for RLDC Kanglung to bring forth this publication.

Allow me to congratulate the Regional Director, RLDC, Kanglung and his team of livestock professionals working in eastern Bhutan who contributed to this important publication. I urge all experts and our colleagues working in the field to use this manual extensively while conducting farmers' trainings on various aspects of livestock development.

Tashi Delek!

21 August 2019

Dr. Tashi Samdup
Director General
Department of Livestock

ROYAL GOVERNMENT OF BHUTAN
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Acknowledgements

This training manual has been made possible through support and contributions from the Dzongkhag Livestock Sector and Central Agencies under Department of Livestock in the Eastern Region.

I would like to sincerely thank Hon'ble Director General, Department of Livestock, Ministry of Agriculture & Forests, for his guidance, support and encouragement in facilitating the development of "Farmers' Training Manuals" for the benefit of livestock farmers in enhancing productivity and improving effective farming system. We would also like to acknowledge the support and input of experts from Department of Livestock Head office and Program Centre agencies under DoL who contributed in various ways towards the development of this manual.

The management of RLDC Kanglung would like to acknowledge the OPM CARLEP for providing funds for development of training manuals.

My personal thanks go to all contributors for their time, commitment and contribution to this first-of –its-kind effort.

TashiDelek

Regional Director

August, 2019

ACRONYMS

CAHW	Community Animal Health Worker
FMD	Foot and Mouth Disease
BQ	Black Quarter
AI	Avian Influenza
NCD	New Castle Disease
CSF	Classical Swine Fever
SOPs	Standard Operating Procedures

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	30 min	Roles of CAHWs	Group work
		TEA BREAK	
	30 min	Group findings presentation	Group leader
	1 hour	Presentation roles of CAHWs	Theory
Session 2	1 hour	Animal body anatomy, organs and its functions	Theory
		LUNCH BREAK	
	1hour & 30 min	Body systems and its functions	Theory
		TEA BREAK	
	1hour & 30 min	Practical on identification of external anatomy	Field visit/Practical
	30 min	Assessment	Q & A
		Day Two	
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	30 min	Listing of physical features and conditions associated with them when animals are sick	Group work
	30 min	Presentation on group findings	Group presenter
		TEA BREAK	
	2 hours	Identification of healthy and sick animals based external features observations	
		LUNCH BREAK	
Session 4	1 hour	Physical features for clinical examination of individual animal	Theory
	1hour & 30 min	Field visit on session 1 & session 2	Practical
		TEA BREAK	
	30 min	Assessment	Picture spotting and Q & A
		Day Three	
Session 5	1 hour	Briefed introduction to diseases/clinical cases occurrence	Theory
	30 min	Group work on common clinical cases frequently encountered in the field	Participants
	30 min	Presentation on group findings	Group presenter
		TEA BREAK	
	1hour & 30 min	Common clinical cases, causes and line of treatments	Theory
		LUNCH BREAK	
	1 hour	Continuation……	Theory
		TEA BREAK	
	1 hour 30 min	Field visit	Practical
	30 min	Assessment	Practical and Q & A

Session	Time in hours	Topic	Remarks
		Day Four	
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	1 hour	Practical demonstration on different restraining techniques	Resource person
	1 hour	Assessment on different restraining techniques	Participants
		LUNCH BREAK	
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		TEA BREAK	
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		TEA BREAK	
	1 hour 15 min	BQ: Mode of transmission, clinical signs, line of treatments and prevention and control measures	Theory & video clips
		Day Six	
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		TEA BREAK	
	1 hour	AI: Mode of transmission, clinical signs, line of treatments and prevention and control measures	Theory & clips
	1 hour	NCD: Mode of transmission, clinical signs, line of treatments and prevention and control measures	Theory & clips
		LUNCH BREAK	
	1 hour	CSF: Mode of transmission, clinical signs, line of treatments and prevention and control measures	Theory & clips
		TEA BREAK	
	1 hour	Anthrax: Mode of transmission, clinical signs, line of treatments and prevention and control measures	Theory & clips
	30 min	Assessment	Q & A

Session	Time in hours	Topic	Remarks
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	1 hour	Fecal sample and SOPs	Theory
		TEA BREAK	
	1 hour	Field visit	Practical
	30 min	Assessment: Practical demonstration	Practical
		LUNCH BREAK	
Session 11	1hour	Importance of vaccination	Theory
	1 hour	Types, schedule, site and doses of vaccines	Theory
		TEA BREAK	
	1 hour	SOPs to be followed during vaccination of animals	Theory
	30 min	Field visit (Practical demonstration)	
		Day Eight	
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		LUNCH BREAK	
Session 12	1 hour	Importance of maintaining cool chain	
		TEA BREAK	
	30 min	Equipments required to maintain cool chain	Theory
	30 min	Assessment (practical and Q & A)	All participants
		Day Nine	
Session 13	1 hour	Introduction to surgical instruments	Theory
	1 hour	Uses of different surgical instruments	Theory and practical
		TEA BREAK	
Session 14	1 hour	Importance of record keeping	
	30 min	Types of recording	
		LUNCH BREAK	
	1 hour	Practical on recording	All participants
		Closing	

Session 1: Introduction and roles of CAHWs

Duration: 2 hours 30 min

Target Group: CAHWs

Learning objective	To learn importance of CAHWs being introduced in the rural communities and its roles to be executed
Learning outcome	CAHWs' should be able to understand the inception of CAHW and to render the roles of CAHWs
Content	Lecture notes on why CAHW has to be instituted in rural communities and its roles
Methodology	Lecture, ppt presentation and pre-assessment
Materials/ tools	Projector, markers , white board and chart paper
Assessment criteria	Q & A

1. Introduction

The concept of Community Animal Health Worker (henceforth referred to as CoAHW) is almost a decade and half old in Bhutan and this underscores the need to carry out well-planned preparation and meticulous handling in order to derive the maximum benefit from its implementation. It was accepted, at the very inception, of the danger that this concept might get diluted and eventually not being accepted by the community if it is not handled properly since its launch.

Different Dzongkhags have already implemented the concept in different ways and have adopted different approaches, there is a real danger for the concept of CoAHW becoming understood and implemented in different ways. There is a felt need for a broad but standard guidelines/framework in order to maintain some uniformity and consensus across Dzongkhags and Gewogs. However, location specific adaptations are acceptable within the broad framework. It is important that all Dzongkhags should have same understanding and perception of the concept and the ways and means to translate it into actions. So basically, the following sections are an attempt to establish broad conceptual and operational frameworks for Dzongkhags' reference while conducting such training in future.

The free public services are provided by the government on livestock extension related aspects regarding the supply of veterinary medicines, vaccines, treatment and vaccinations including technical advices to the population whose subsistence livelihood are dependent on livestock farming. These services are delivered to the farmers through the geog extension agents in each of the dzongkhags, many of which are located in the rugged terrain with scattered settlements. As either the number of households is more or very scattered, it is impossible for one extension agent (current norm) to provide efficient services at all times. In this scenario, the concept of Community Animal Health Worker (**CoAHW**) took birth as a novel approach to accelerate livestock development programmes and to deliver prompt veterinary services in the community.

1.1. The Roles of Community Animal Health Workers

Session 2: Anatomy, body organs, body systems and its functions

Duration: 3 hours 30 min

Learning objective	To have basic knowledge of normal body anatomy, vital body organs, different body systems and its functions and interaction, and size and appearance in normal animals
Learning outcome	CAHWs' should be able to visualize and draw the different organs of the body and list at least one or two important functions
Content	Lecture notes, pictures of different body organs and its functions
Methodology	Lecture, ppt presentation and practical demonstration, video clips
Materials/ tools	Projector, markers , white board, chart papers and animal
Assessment criteria	Picture spotting and Q & A

2. Body Anatomy

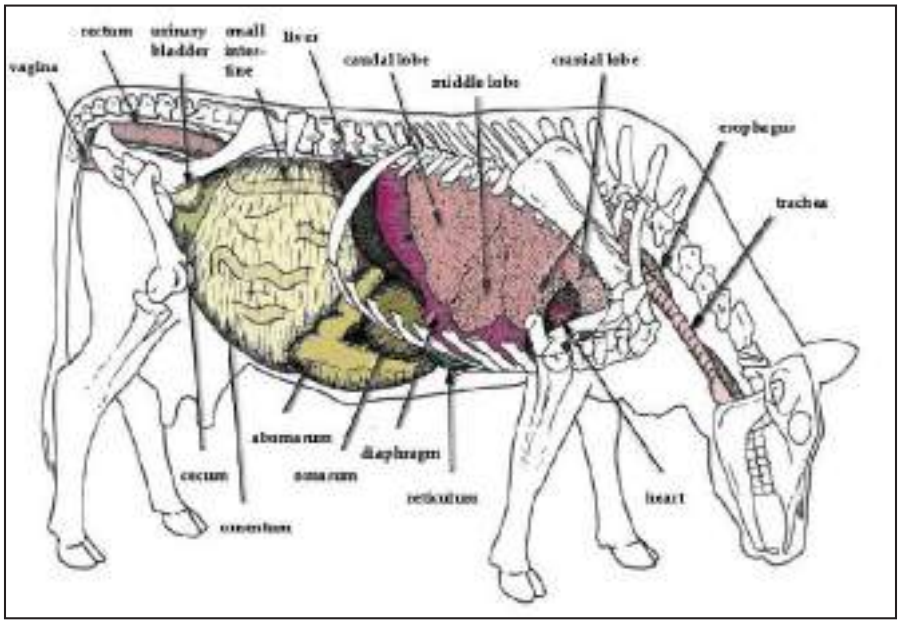


Figure 1. Body anatomy

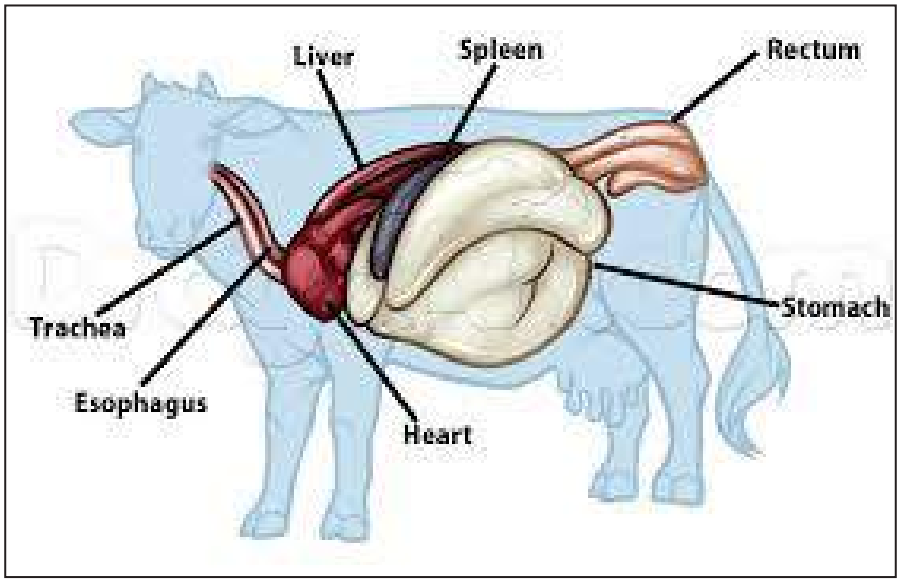


Figure 2. Location of organs

2.1. Body organs and functions

An organ is a complex structure with a special function or number of functions to perform daily to sustain the life of organism. Among the organs, below mention organs are vital for sustaining of normal life:

Liver

- Removes toxic byproducts of certain medications
- Prevents shortages of nutrients by storing vitamins, minerals and sugar
- Produces most proteins needed by the body
- Helps body fight infection by removing bacteria from the blood
- Produces most of the substances that regulate blood clotting

Lungs

- To bring oxygen into the body when we inhale
- To remove carbon dioxide from body when we exhale

Heart

- Generating blood pressure
- Ensuring one-way blood flow
- Regulating blood supply

Spleen

Produce lymphocytes that aid our immune system

Remove old and damaged red blood cells

Acts as a reservoir of blood in times of shock or heamorrhage

Preserves iron during filtration, important for synthesizing heamoglobin

Kidney

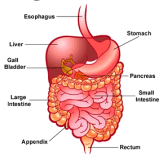
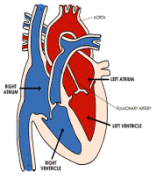
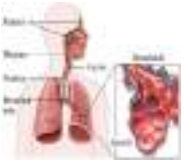
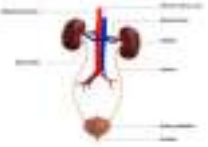
Filtration of waste products from the blood

Tubular reabsorption of useful substances from the filtrate

Tubular secretion of unwanted substances back into the collecting ducts

Maintaining normal blood presusure by balancing electrolytes in the blood

2.2. Body systems and its functions

Sl/ No	System	Organs in the body	Functions
1	Musculo-skeletal 	Muscle and bones	Support and movement
2	Digestive 	Mouth, esophagus, stomach, intestine, liver and pancreas	Digestion and absorption of nutrients
3	Circulatory 	Heart and blood vessels	– Transport of O2 and CO2 – Distribution of nutrients and transport of waste – Maintenance of body temperature – Circulation of hormones
4	Respiratory 	Muzzle, windpipe and lungs	– Breathing – gas exchange
5	Urinary 	Kidney and bladder	Get rid of poisons and waste (urine)
6	Nervous 	Brain, nerves and spinal cord	Pass messages around the body and control the body

7	Sensory 	Eyes, ears, nose and skin	Sense and detect things outside the body
8	Reproductive 	Testes, penis ovaries, uterus, vagina, vulva, udder	To produce young
9	Lymphoreticular 	Lymph nodes and spleen	Protect against infectious diseases, produce blood

Session 3: Identification of healthy and sick animals

Duration: 4 hours

Learning objective	To impart knowledge to differentiate between signs of sick animals from healthy animals.
Learning outcome	At the end of session, CAHWs' should be able to differentiate sick from healthy animals and list the features of a healthy animal and those of sick animal
Content	Lecture notes with pictures on different physical body condition parameters of sick and healthy animals
Methodology	Lecture, ppt presentation and field demonstration (practical), group work, video clips
Materials/ tools	Projector, markers , white board, chart papers and live healthy and sick animals
Assessment criteria	Q and A

3. Identification of healthy and sick animals

The healthy and sick animals can be differentiated by physical anatomical observation as follow:

3.1. General appearance:

It refers to the general conformation or stature of the animal and relates to the symmetry, shape and the relative size of the body regions.

The healthy animal is alert and aware of its surroundings. It is active and holds its head up watching what is happening around it. It should stand on all of its feet.

Figure 3. General appearance of sick and health animals

3.2. Behaviour:

It is the response to normal stimuli. Usually normal animal is bright and alert and while sick animal's reaction is dull, with intense to normal stimuli e.g acid indigestion, anxious look e.g in initial stage of milk fever and uncontrolled animal's action eg. Rabies, nervous form of ketosis and hypomagnesemic tetany.

3.3. Expression:

It denotes the facial appearance of the animal. It is peaceful and placid of the face in normal animals while abnormal expression includes anxious, dozed, sleepy, fixed etc.

3.4. Ears

Most animals have erect ears which move in the direction of any sound. Ear movements will also be quick to get rid of flies or any disturbances

Figure 4. Position of ears

3.5. Nose and muzzle

Figure 5. Condition of nose and muzzle

The nose should be clean with no discharge. In healthy animal the muzzle should be moist not dry. Healthy animals frequently lick their noses with their tongues.

3.6. Coat appearance

The deviation from normal coat appearance indicates the condition of health. Usually coat of healthy animal will be smooth and shiny. The abnormalities of skin can be seen from distance such as changes in the hair, presence of diffuse lesions, evidence of discharges and itching.

Figure 6. Coat appearance of sick and healthy animals

3.7. Movement (gait):

Figure 7. Gait behavior

It denotes the limb movements which are usually described according to the rate, range, force and direction.The healthy animal will walk easily and steadily with all of its feet taking its weight. Steps should be regular. Irregular movement results from pain in the feet or limbs.

3.8. Body condition:

Normal animal is well-conditioned with all prominent parts of skeleton is covered with flesh giving round appearance. Sick animal will be thin or lean, emaciated, cachectic, obese etc.

Figure 8. Body condition scoring range

Session 4: Clinical examination of individual animal

Duration: 2 hours

Learning objective	To learn about basic parameters to be adopted during process of clinical examination of individual animal
Learning outcome	At the end of session, CAHWs' should be able identify the locations (site for examination) and to conduct the basic clinical examination professionally
Content	Lecture notes and pictures
Methodology	Lecture, ppt presentation and practical demonstration
Materials/ tools	Projector, markers , white board, chart paper and animal
Assessment criteria	Practical assessment and Q & A

4. Clinical examination of individual animal

4.1. Temperature

Temperature of the skin is best judged by pressing the hand over neck and trunk and to the extremities. Skin temperature depends on initial body temperature and partly on degree of dilatation of the capillaries.

Normal body temperature: Normal temperature is taken when the animal is at rest, moderate atmospheric temperature and good ventilation.

Table 1. Normal temperature range of cattle

Species	Rectal temperature	
	Centigrade	Fahrenheit
Cattle	37.8- 39.2	100.04-102.56

4.2. Rumen movement

The rumen moves regularly and contracts about once every minute. By putting your fist on the left flank (in the hollow behind the ribs) you will be able to detect the contractions. Regular contractions are a sign of good health.

Figure 9. Location of rumen to see rumen movement

4.3. Respiration

Respiratory organs are comprised of nasal passage, nasopharynx, trachea, Bronchi, lung and thoracic cavity. The respiration rate is usually taken when the animal is at rest. Normally cattle will have 10 to 13 numbers of respirations per minute.

Methods of determination:

1. Observing the movement of ribs and flank
2. By placing the dorsum of the hand over the nostrils.

Figure 10. Physical detection of respiration

Session 5: Common clinical cases and line of treatments

Duration: 7 hours

Learning objective	To impart knowledge on identification of common clinical cases, make assessment of the case and intervene directly or seek help from a livestock extension officer.
Learning outcome	CAHWs' should be able to: Identify the clinical symptoms of common diseases and render basic line of treatments
Content	Lecture notes on common clinical cases, line of treatments with photos
Methodology	Lecture, ppt presentation and field visit (if cases are available)
Materials/ tools	Projector, markers , white board and chart papers, required medicines
Assessment criteria	Picture spotting

5. Common clinical cases and line of treatments

Disease can be classified as acute or chronic. An acute disease starts quickly and lasts for a short period. The chronic disease lasts for a long time and weakens the animal. Diseases are said to be infectious (will spread from one animal to another) or noninfectious (will not spread from one animal to another).

5.1. Diarrhea

Among the various disorders of dairy cattle, the infection of GIT leading to diarrhea is the common clinical manifestations ever encountered in most of the clinical cases. Diarrhea is a condition in which animals pass watery droppings (faeces) very frequently. The droppings are loose, runny and smelly and in different colour from normal.

Figure 11. Diarrhea case

Causes

- Germs (viral bacterial)
- Internal parasites
- Change/wrong feeding practices

Treatments

- Infusion of intra venous fluids to correct electrolyte imbalance due to excessive lost through diarrhea.
- Antacid to coat the intestinal mucosa which will prevent irritation.
- Antimicrobials to prevent infection.
- Supportive treatment like antipyretics, anti-inflammatory and vitamins.
- Deworm if there is no history of deworming.
- Feacal sample must to be collected.

5.2. Worms infestation

The farmers in field usually do not follow any recommended schedule for deworming. Most of them resort to deworming only when the calf is off-feed or when worms are observed in the faeces. The farmers are required to understand the importance of deworming the animals periodically. The animals showing following sign are the indication of worms infestation:

Figure 12. Condition of emaciated cow

- Diarrhea
- Cough
- Emaciation

Table 2. Symptoms and treatments of common worm infestation

Disease	Symptoms	Treatment
Ascariasis	The calves with ascariasis remain unthrifty and pass large load of worms in the faeces at periodic intervals. The calves may show convulsions and indigestion as main symptoms and normally pass foul smelling clay colored or watery feces. A characteristic butyric odour may also be detectable in their breath.	Piperazine compounds provide prophylaxis towards all the round worms effectively including Neoascaris. Piperazine hydrate (56.3% w/v) is administered right from day 3 @ 3-6 ml per 10 kg body weight. Micronised albendazole powder 5-10 mg/kg bw per oral may also be given. Second dose is to be given after 21 days. For the first year repeat doses every two months but rotate drug every 2^{nd} or 3^{rd} dose. Thereafter, dosage is to be given thrice a year. Levamisole (7.5 mg/kg per oral) is another drug of choice. The treatment is repeated every month for first three months and thereafter every two months.
Strongyloidosis	Intermittent diarrhoea with blood and mucus is a common feature. Build-up of warm and moist areas should be prevented inside shed.	Thiabendazole, levamisole and other broad-spectrum anthelmintics are effective.
Coccidiosis	There may be sudden onset of severe diarhoea with foul smelling, fluid feces containing mucus and blood. Blood may appear as dark tarry staining of feces or as streaks of clots, or the evacuation may consist entirely of large clots of fresh red blood. Perineum and tail are commonly smeared with blood stained feces. There is a characteristic severe straining and sometimes rectal prolapse may occur.	Amprolium and sulphamethazine@ 10 mg kg^{-1} and 140 mg kg^{-1}respectively orally daily for 3-5 days are useful. Same drugs @ 5mg kg^{-1} and 35 mg kg^{-1} in feed for 15-20 days are good for prophylaxis. Coccidiosis treatment with sulpha drugs and other coccidiostats is required only when the fecal examination reveals presence of coccidia.

Disease	Symptoms	Treatment
Ectoparasites	Excitement, itching, irritation, abscesses on skin	Cypermethrin (100mg/lit) need to be sprayed on calves and in the paddock. The dosage for ticks, mites and lice is 1 ml/lit of water; for flies is 5 ml/lit of water and for animal housing is 20 ml/lit of water (5 lit of emulsion per 100 sq met surface). This should be sprayed thrice in a year.

5.3. Cough

A cough is a strong forceful expiration. Treatment appears to be the main corrective measure specific to etiological agent, but measures for bio security and improvement of housing and management are not to be forgotten.

Causes

- Infectious diseases of lungs or windpipe
- Parasites in lungs
- Fluid/feed in lungs

Treatment

If possible, the treatment will be specific of the disorder, such as

- Tetracycline for ehrlichiosis,
- Anthelmintic drug for lungworm,
- Corticosteroids for allergies.

5.4. Wound

It is a break of continuity of tissue in any part the body caused by traum.

Causes

- injured by the horns and bites of other animals,
- thorns and sharp objects such as glass, wire and nails
- Surgical interventions

Figure 13. Cut wound

Treatments

- Clip the hairs around the wound and shave it.
- Clean the wound with antiseptic solutions.
- Apply antibiotic ointment.
- Dress the wound with bandage to avoid contamination of wound.
- Suture it by using appropriate suture material if it's a large wound.
- If the wound was contaminated give antibiotic

5.5. Tick infestation

- Application of ectoparasitics like cypermethrine or deltamethrine.
- Injection of ivermectin which will take care both ecto and endoparasites.

5.6. Bloat

It is the accumulation of gases in the rumen which is due to overfeeding, sample indigestion and obstruction of esophagus by foreign bodies.

Figure 14. Location and treatment of bloat

Causes

- over feeding of succulent fodder and clover grass
- obstruction of esophagus

Clinical Signs

- Distended left abdomen is the most obvious sign
- Usually associated with pain, discomfort, and bellowing.
- Death can occur within 15 minutes after the development of bloat

Diagnosis

- On the clinical signs described above
- History of access to lush pasture
- Passing a stomach tube will distinguish between gassy and frothy bloat. If it's gassy bloat a stomach tube passed into the rumen will allow the gas build-up to escape through the tube. No such gas is seen in frothy bloat.

Treatment

- In a few cases a trochar and cannula punched through the side into the rumen will relieve gassy bloat when a stomach tube has not worked. But such cases are rare, and as the trochar provides a tremendous opportunity for introduction of infection, it should only be used as a last resort.

- For frothy bloat, antifoaming agents that disperse the foam should be given by stomach tube. Old-fashioned remedies such as mustered oil, linseed oil and turpentine are effective but newer treatments such as dimethicone or polaxolene are easier to give as the effective dose is much smaller.
- If an outbreak of frothy bloat occurs all cattle on that pasture should be removed immediately and put onto a high fibre diet (hay or straw), and any cows showing bloating signs treated with an anti-foaming agent. The pasture should not be grazed for at least ten days.

Session 6: Restraining of farm animals

Duration: 3 hours 30 min

Learning objective	To restrain different species of livestock in humane manner to avoid injury to the attendant or the animal during clinical interventions
Learning outcome	CAHWs' should be able to restrain various farm animals in a proper way CAHWs should be able to use restraining tools in a proper way
Content	Lecture notes , photos on restraining techniques available
Methodology	Lecture, ppt presentation and practical demonstration
Materials/ tools	Projector, markers , white board, chart paper and live animals, restraining tools
Assessment criteria	Demonstration of restraining techniques by trainees

6. Restraining of farm animals

Restraining is the process of preventing an animal from movement for various purposes for examination, treatment, sterilization, etc to avoid injury to the handler and animal and for smooth functioning of interventions. Restraint can be achieved simple by physical force or by chemical means. The types of restraining techniques for different animals are shown as below:

6.1. Heads Restraint technique

Manually grasp the bridge between the nostrils with the thumb and forefinger of one hand and hold it firmly.

Figure 15. Head restraining

6.2. Milking Hopples technique

Apply the figure "8" just above the hock to prevent a cow from raising the rear legs and thus prevents kicking. It is simple and effective. Get a rope made of heavy cotton between 18-22 inches around the hind legs just above the hock joint in figure of "8" pattern crossing between the two legs. Thus it prevents the animal raising its legs and make intervention possible.

Figure 16. Leg restraining

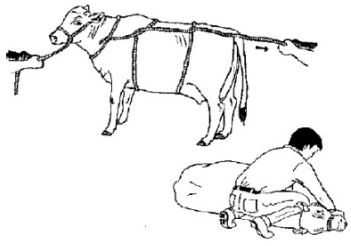
6.3. Tail restraining technique

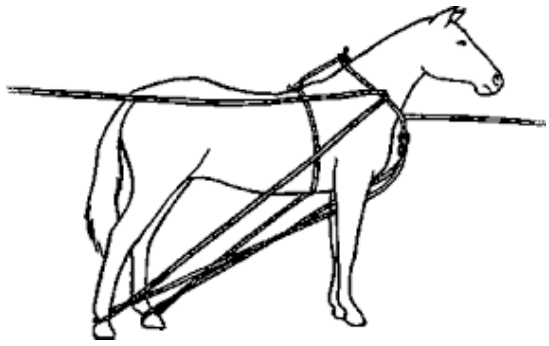
Your assistant may apply the tail restraint whenever it is necessary to distract cow's attention. It may be used when giving udder injections to a nervous cow. Keep both hands close to the base of the tail as much as possible. Stand to the side of the cow to avoid being kicked and apply a lifting force on the tail. It should be gentle but firm.

Figure 17. Tail restraining

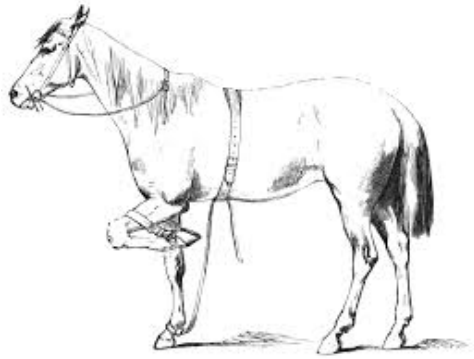
6.4. Casting

Casting or throwing cattle and buffalo





6.5. Other methods



Session 7: Rational use of drugs (non-patent and ayurvedic drugs)

Duration: 2 hours 30 min

Learning objective	To impart the skills and ethics on prudent use of veterinary drugs
Learning outcome	CoAHW should be able identify the drugs, CAHW should be able to know the compounding procedures CAHW should be know the indications
Content	Lecture notes , photos
Methodology	Lecture, ppt presentation and practical demonstration
Materials/ tools	Projector, markers , white board, chart paper and drugs
Assessment criteria	Q & A

7. RATIONAL USE OF DRUGS

7.1. Rational drug use

"Rational use of drugs requires that patients receive medications appropriate to their clinical needs, in doses that meet their own individual requirements for an adequate period of time, and the lowest cost to them and their community"

These requirements will be fulfilled if the process of prescribing is appropriately followed.

This includes:

- Steps in defining patients problems (or diagnosis).
- In defining effective and safe treatments (drugs and non drugs)
- In selecting appropriate drugs, dosage and duration.
- In writing a prescription.
- In giving patients adequate information.
- In planning to evaluate treatment responses.

The rational prescribing should meet the following criteria:

7.1.1. Appropriate indications:

- The decision to prescribe drug(s) is entirely based on medical rationale and that drug therapy is an effective and safe treatment.

7.1.2. Appropriate Drug:

- The selection of drugs is based on efficacy, safety, suitability and cost considerations.

7.1.3. Appropriate Patient:

- No contraindications exist and the likelihood of adverse reaction is minimal, and the drug is acceptable to the patient.

7.1.4. Appropriate Information:

- Patients should be provided with relevant, accurate, important and clear information regarding his or her conditions and the medication(s) that are prescribed.

7.1.5. Appropriate Monitoring:

- The anticipated and unexpected effects of medications should be appropriately monitored.

Unfortunately, in real practice, prescribing patterns do not always conform to these criteria and can be classified as "inappropriate" or "irrational" prescribing. Irrational Prescribing can be regarded as "pathological" prescribing, where the above mentioned criteria are not fulfilled.

7.2. Irrational prescribing

Common patterns of irrational prescribing may be manifested in the following forms:

- The use of drugs, when no drug therapy is indicated.
- The use of a wrong drug for a specific condition requiring drug therapy.
- The use of drugs with doubtful / unproven efficacy.
- The use of drugs of uncertain safety status
- Failure to provide available, safe and effective drugs
- The use of correct drug with incorrect administration, dosage and duration.
- The use of unnecessary expensive drugs

7.3. Factors underlying the irrational use of drugs

There are many different factors which affect the irrational use of drugs, which can be categorized as those deriving from the following factors:

Patients:

- Drug misinformation
- Misleading beliefs
- Patient demands / expectations.

Prescribers

- Lack of education and training
- Inappropriate role models
- Lack of objective drug information
- Generalization of limited experiences
- Misleading beliefs about drugs efficiency

Work place

- Heavy patient load.
- Pressure to prescribe.
- Lack of adequate lab capacity
- Insufficient staffing.

Drug supply

- Unreliable suppliers system
- Drug shortages
- Expired drugs supplied

Drug Regulation

- Non-essential drugs available.
- Non-formal prescribers.
- Lack of regulation enforcement.

Industry

- Promotional activities
- Misleading claims.

All these factors are affected by various attitudes that are prevailing among the prescribers and consumers. In some areas the use of injections remains high due to the false assumption of the prescribers that injections will improve patients satisfaction and

that they are always expected by the patients. In some countries, the frequent use of injections is declining because of the fear of AIDS.

7.4. Impact of Irrational use of Drugs

This can be seen in many ways:

- Reduction in the quality of drug therapy leading to increased morbidity and mortality.
- Waste of resources leading to reduced availability of other vital drugs and increased costs.
- Increased risk of unwanted effects such as adverse drug reactions and the emergence of drug resistance.
- Psychosocial impact, such as when patients come to believe that there is “a pill for every ill”, which may cause an apparent increased demand for drugs.

Session 8: Handling of drugs (non-patent and ayruvedic)

Duration: 2 hours

Learning objective	To impart knowledge and skills on storage and handling of drugs to maintain its efficacy
Learning outcome	CoAHW should be able to : Segregate and store drugs in store properly Handling of drugs while treating sick animals with strict bio-security
Content	Lecture notes , photos
Methodology	Lecture, ppt presentation and practical demonstration
Materials/ tools	Projector, markers , white board and chart paper, drugs
Assessment criteria	Practical assessment and Q & A

8. Handling of drugs

8.1. Drug handling

All medicines should be stored in accordance with manufacturers' recommendations whether in the practice or in a vehicle. Medicines should be packed well to avoid exposure to direct sunlight and drugs should be received with proper goods issue note.

Figure 18. Proper arrangement of drugs

There should be no direct access by members of the public (including family and friends) practice should be allowed access only as appropriate.

Should keep a record of premises and other places where they store or keep medicinal products and drugs nearing expiry should be arranged such that it can be utilized before others.

8.2. Proper measure of storage and transportation

- Noting expiry date of drugs while receiving and before use.
- Observe manufacturers storage instructions
- Proper packaging while transporting
- Keep in cool dark and dry place(s)
- Aseptic withdrawal of drugs from bottles.
- Expired drugs must be discarded
- Spillages should be cleaned immediately
- Never use bottles intended for human food
- Keep out of reach of children e.g cupboards or high shelves.
- Adhere to good ethics and conducts on use of drugs.

Figure 19. Proper packaging of medicines

8.3. Consequences of poor handling

It will lead to drug expiry, breakages, spillages, accidental ingestion by children, contamination and deterioration by heat or sunlight.

8.4. 8.4. Disposal of expired and damage drugs

Since drugs are biologically hazardous it should not be disposed in the environment carelessly. The expired and damaged drugs should be properly collected, packed and send to the extension center for further sending it to relevant authorities for disposal.

Empty vaccine vials and drug bottles should be disposed by deep burring while cartoons and plastics should be burnt to ensure minimal environmental contamination.

Session 9: Notifiable diseases

Duration: 10 hours

Learning objective	To impart basic knowledge on how to identity or suspect the notifiable diseases and report such outbreaks to gewog livestock officer
Learning outcome	Should be able to identify list of notofiable disease conditions in their respective areas and notify to EA or dzongkhag head quarter
Content	Lecture notes , pictures with exhibiting sysmptoms
Methodology	Lecture and ppt presentation
Materials/ tools	Projector, markers , white board and chart paper, video clips
Assessment criteria	Pictures spotting and Q & A

9. Notifiable diseases

9.1. Foot and mouth disease

- It is viral disease
- Hoofed animals are susceptible
- Mortality generally occur to young animals

Mode of transmission

- Direct contact
  - Vesicular fluid
  - Ingestion of infected animal's product
- Indirect contact
  - Boots, hands, clothing, dairy products

Clinical signs Lameness

- Oral lesions
- Fever
- Excess salivation
- Abortion
- Hoof lesions
- Death in young animals

Figure 20. Signs of FMD

Line of treatment

- No specific treatment as such for the disease
- Need to carry out symptomatic treatments
- Antibiotic course to prevent secondary bacterial infection.

Prevention and control measures

- Immediate report to the concerned authority
- Isolation of infected animals
- Restrict movement of products and animals
- Burning of infected materials
- Ring vaccination
- Annual vaccination to the susceptible animals

Figure 21. Burning of infected materials

9.2. Black Quarter

- It is bacterial disease
- Young healthy cattle, sheep and goat are susceptible
- Mostly occurs in summer when environment is hot and humid

Mode of transmission

- Transmitted through ingestion of contaminated feed
- Contamination of wounds
- Consumption of infected products

Clinical signs

- Palpation of affected area crepitates due to accumulation of gas
- Fever
- Loss of appetite
- Depression and dullness
- Difficult breathing
- Lameness in affected leg
- Swelling affected parts

Figure 22. Loss of appetite

Line of treatment

- Incise the swelling parts and drain off
- Penicillin and oxytetracycline injection
- Supportive treatment like antipyretics, anti-inflammatory, B-complex, etc

Prevention and control measures

- Isolation of infected and in contact animals
- Disposal of carcass either by deep burial or burning
- Proper disinfection of contaminated materials
- Annual vaccination before rainy season

Figure 23. Disposal of carcass and burning of infected materials

9.3. Rabies

- It is viral disease
- All warm-blooded animals are susceptible
- Mortality 100%

Mode of transmission

- Direct contact
  - Gets bitten by rabid dog
  - Gets in contact with infected salivation
- Indirect contact
  - Consumption of infected products

Clinical signs

- Change their normal behaviour and behave very strangely
- Run around and bite anything
- Eyes become red and saliva drips from the mouth
- Fear of water (hydrophobia)
- Paralysis
- Seizures

Figure 24. Signs of rabies

Line of treatment

- No treatment

Prevention and control measures

- Keep suspected animal in enclosure/isolation
- Annual vaccination of dog population

9.4. Avian Influenza

- It is viral disease
- Susceptible to all breeds of birds

Mode of transmission

- Influenza virus shed in feces, saliva, nasal secretions
- Fecal-oral
  - Predominant mode of transmission
- Other possible modes
  - Fecal-cloacal
  - Respiratory
  - Mechanical vectors

- Virus introduction
  - Migratory birds
  - Infected poultry, pet birds

Figure 25. Signs of AI

Clinical signs

- Sudden death
- Systemic disease
- Drop in egg production
- Neurological signs
- Depression, anorexia, ruffled feathers
- Combs swollen, cyanotic
- Conjunctivitis and respiratory signs
- Most birds in an affected flock die

Line of treatment

- No specific treatment
- HPAI in poultry usually not treated

Prevention and control measures

- All-in/all-out flock management
- Prevent contact with wild birds or their water sources
- Do not allow birds to return to the farm from live markets
- Practice strict hygiene and biosecurity measures
- Depopulation of infected flocks
- Proper carcass disposal
  - Burying
- Strict biosecurity measures
- Cleaning and disinfection
- Vaccination

Figure 26. Cleaning and disinfection

9.5. New Castle disease

- It is viral disease
- Morbidity up to 100%
- Mortality up to 90%

Mode of transmission

- Direct contact with feces, respiratory secretions
- Indirect contact
  - Feed, water
  - Equipment
  - Human clothing
- Contaminated or incompletely inactivated vaccines

Clinical signs

- Drop in egg production
- Numerous deaths within 24 to 48 hours
- Deaths continue for 7 to 10 days
- Edema of head, especially around eyes
- Greenish, dark watery diarrhea
- Respiratory and neurological signs
- Signs vary with species and virulence

Figure 27. Signs of NCD

Line of treatment

- No specific treatment

Prevention and control measures

- Depopulation may be necessary
- Destruction
  - Exposed carcasses
  - Litter
  - Animal products
- Disinfection of premises
- Control insects and mice
- Limit human traffic

9.6. Classical Swine Fever

- CSF is a highly contagious viral disease of swine.
- Mortality varies from almost zero to 100%.
- Only the domestic pig and wild boar are susceptible naturally.

Mode of transmission

- Direct Transmission
  - Contact between sick and healthy animals
- Indirect Transmission
  - Feeding uncooked garbage with infected meat.
  - Fomites: vehicles, equipment, boots, clothes.

Clinical signs

- High Fever: 106-108oF (>41oC)
- Depression and conjunctivitis
- Constipation, then Diarrhea
- Skin hemorrhages/Cyanosis
- Anorexic and gaunt
- Staggering gait and convulsions
- Abortion
- Death 10-20 days post infection

Figure 28. Signs of CSF

Line of treatment

- No treatment should be attempted

Prevention and control measures

- Isolate ill animals immediately
- Minimize visitors on the farm
- Clean and disinfect
  - Vehicles
  - Equipments
  - Boots and clothing
- Annual vaccination
- Area restrictions on pig movements

9.7. Anthrax

- It is very contagious disease
- Communicable to all warm-blooded animals and man

Mode of transmission

- Bacteria present in hemorrhagic exudate from mouth, nose, anus
- Spores viable for decades

Figure 29. Signs of anthrax

Clinical signs

- Per-acute
  - Sudden death
- Acute
  - Tremors, dyspnea
  - Bloody discharge from body orifices
- Loss of appetite and grinding of teeth

Line of treatment

- Antibiotics injection with penicillin and tetracycline

Prevention and control measures

- Isolation of affected animals
- Do not open carcass
- Deep burial
- Decontaminate soil
- Remove organic material and disinfect structures
- Annual vaccination

Session 10: Sample collection

Duration: 3 hours 30 min

Learning objective	To know the SoPs of fecal sample collection.
Learning outcome	Should be able to collect fecal sample according to SoPs.
Content	Lecture notes
Methodology	Lecture, ppt presentation and practical demonstration
Materials/ tools	Projector, markers , fecal vial, preservative reagent, animal, video clips, apron, gloves, gum boot
Assessment criteria	Demonstration by trainees and Q & A

10. Sample Collection

Sample is the in-vivo or in-vitro specimens collected from the animal surrounding or from live animal or from carcass to diagnosis of specific disease.

10.1. Faecal sample

It is collected for diagnosis of any GIT disorder caused by etiological agents like parasites, bacteria, virus and etc. 5 gm of Freshly voided feces should be collected in fecal vial using 10% formalin as preservative.

Figure 30. Vials for sample collection

10.1.1. Sample packaging instructions

- Samples should be placed in a water proof liner and sealed tightly.
- Do not use frozen water-filled plastic bags as ice packs, use gel packs.
- Protect the submission form from moisture by enclosing in water proof bags.
- Each specimen should be placed in a separate, clearly labeled container.
- Label tubes numerically and reference the numbers to animal's IDs on submitted form
- Animal detail such as breed, sex, age, symptoms, for what laboratory analysis for and treatment regiment carried out should be mention clearly in the submission form

10.2. Standard operating procedures for fecal sample collection

10.2.1. Objective

- To collect fecal samples suitable for laboratory analysis.
- Alternatives to animal use
- No practical alternatives

10.2.2. Details of Procedure

- Small calves - restrain manually. Gently pass a gloved, lubricated finger through the anus and massage the rectal wall to stimulate rectal evacuation.
- Larger cattle - restrain in a race, crush or bail. Gently pass a gloved, lubricated hand through the anus and withdraw any faecal material present. To stimulate rectal evacuation, massage the rectal wall.

10.2.3. Drugs, chemicals, or biological agents

- Nil

10.2.4. Impact of procedure on the wellbeing of animal(s)

- Minimal, if animal handled quietly.

10.2.5. Reuse and repeated use

- Collect one sample per beast per day. For research purposes, animals may be sampled twice daily, as long as the animal does not become distressed.

10.2.6. Care of animal(s) during/after procedure

- Firm gentle restraint should be applied to reduce the chance of traumatic injury.

10.2.7. Pain relief measures

- Nil

10.2.8. Qualifications, experience or training necessary to perform this procedure

- Demonstrator: Should have performed this procedure before.
- Students: Should be competent in the handling and restraint of cattle.

Session 11: Vaccination

Duration: 8 hours 30 min

Learning objective	To know the importance of vaccination for prevention of diseases, to impart skills of administering vaccines to familiarize the CAHWS with vaccination schedule and prescribe dosages
Learning outcome	Should be able to list out the tools required for vaccination should be able to handle and administer vaccine should be able to know site, route and dose of vaccine
Content	Lecture notes
Methodology	Lecture, ppt presentation and practical demonstration
Materials/ tools	Projector, markers , white board, chart paper, vaccine and animals
Assessment criteria	Practical assessment

11. Vaccination

Vaccination is the injection of killed or attenuated microbes in order to stimulate the immune system against the microbe, thereby preventing disease.

The purpose of vaccination is to produce immunity or produce substances known as antibodies that can produce protective immune response to disease.

11.1. Types of vaccine

- Inactivated or killed vaccine- prepared from killed organisms incapable of causing disease. Provide short term immunity. Eg. BQ & HS vaccine and FMD vaccine.
- Attenuated or live vaccine- prepared from live organisms which has been developed to stimulate the production of antibodies without casing the disease. Provide long term protection. Eg Flu vaccine.

Figure 31. Types of vaccines

11.2. Vaccination schedule of common diseases

Disease	Vaccine	Image	Dosage and route	Vaccination (Primary)	Re-vaccination	Remarks Appropriate time
Foot & mouth disease	Quadrivalent (O,A,C & 22 Asia 1)		3ml IM	6 month	annually	Biannual in endemic areas
Black quarter & haemorrhagic septicemia	Alum ppt Vaccine		5-10 ml S/C	6 month	annually	Before monsoon
Rabies	Anti-rabies vaccine		1 ml S/C	3 month	annually	

Table 3. Vaccination schedule for poultry

Vaccination Schedule for the Farm

Age	Name of vaccine	Name of diseases	Type of vaccine	Route of administration
1-3 days	CEVAC BIL	Ranikhet + Bronchitis	live	Eye drop
7-10 days	CEVAC ND IBD k	Gumboro + Ranikhet	killed	Breast mussel (0.25ml)/bird
14-16 days	CEVAC GUMBO L	Gumboro	live	Drinking water
21-22 days	CEVAC GUMBO L	"	"	"
21-27 days	CEVAC NEW L	Ranikhet + Bronchitis	Live	Eye drop
6-7 weeks	CEVAC FPL	Fowl pox	Live	Wing web stab
8-10 weeks	CEVAC KORIMUN 8 K	Coryza + Salmonellosis	killed	Breast mussel (0.5 ml)/bird
11-12 weeks	CEVAC FPL	Fowl pox	Live	Wing web stab
16-18 weeks	CEVAC KORIMUN 8 K+CEVAC ND IB EDS K	ND+IB+EDS	Killed	Breast mussel (0.5 ml)/bird

11.3. Site of vaccination

Figure 32. Different sites and methods vaccination

11.4. Standard operation procedures for cattle vaccination

11.4.1. Objective

- To administer the appropriate vaccine to prevent the occurrence of disease in a manner which will cause minimal pain to the animal.

11.4.2. Alternatives to animal use for teaching

- Practice on wetsuit material or cowhide prior to use of live specimens.

11.4.3. Details of procedure

- Stock may be restrained in a crush/headbail or race.
- Vaccination of stock should be avoided if they are wet from rain.
- Appropriate needle length and gauge should be used. Needles should be disinfected between injections and replaced as required.
- Product label instructions should be followed.
- Subcutaneous injections should be given on either side of the neck, just below and behind the ear, in keeping with Cattle care Quality Assurance guidelines.
- To avoid injection site residues intramuscular injections should be administered into the neck or thigh. No more than 10mL should be administered intramuscularly into any one site.

11.4.4. Drugs, chemicals, or biological agents

- Specific vaccine used. Use only vaccines recommended for cattle.

11.4.5. Impact of procedure on the wellbeing of animal(s)

- Vaccination, carried out according to label directions, will prevent occurrence of disease.

11.4.6. Reuse and repeated use

- Vaccination should only be carried out at the frequency specified on the label. If a ‘skills’ mob is used for student training purposes, stock should only be vaccinated once per week, and then only with sterile saline water.

11.4.7. Care of animal(s) during/after procedure

- Normally not required.

11.4.8. Pain relief measures

- Minimal pain is apparent if carried out as recommended.

11.4.9. Qualifications, experience or training necessary to perform this procedure

- Demonstrator: Veterinarian or experienced cattleman. S4 drugs may only be administered under the direction of a registered veterinarian.
- Students: Basic understanding of anatomy, familiarity with the technique using non-living material, familiarity with handling cattle.

Session 12: Cold chain

Duration: 2 hours

Learning objective	To know the importance of cold chain to maintain the efficacy of vaccines.
Learning outcome	Should be aware of cool chain mechanism
Content	Lecture notes on importance of cold chain
Methodology	Lecture and ppt presentation
Materials/ tools	Projector, markers , white board, chart paper, cool box and refrigerator
Assessment criteria	Q & A

12. Cold chain

A cold chain is a temperature controlled supply chain. An unbroken cold chain is an uninterrupted series of storage and distribution activities which maintain a given temperature range from the production to till the vaccine is being administered to the patient. One common temperature range for cold chain in pharmaceutical industries is 2 to 8 degree Celsius.

12.1. Purpose of cold chain

- Extend and ensure the potency of vaccine as it is biological product.
- Ensuring maximum benefit from immunization.
- Assurance in potent product and vaccine programs.

Figure 33. Equipment for storage of vaccines

12.2. Equipments used in cold chain

- Refrigerator- used to store vaccine, no more than 50% full, safeguard electricity supply, group vaccines by type, place vaccines in clearly labeled plastic mesh baskets.
- Deep freezers - used to keep ice packets for transporting vaccine in cool boxes.
- Cool boxes- used to carry small quantity vaccines, transport vaccines, fully frozen ice packs are kept at bottom and sides, should not keep vaccine more than 48 hours.
- Ice packs- used in cool boxes for vaccine transport.

Figure 34. Items required for transportation of vaccines

12.3. Cold chain system

Production unit

Cold chain maintained vehicles

DVH

Stored in refrigerators

Transported in cool box

Extension centers

Stored in refrigerators

Transported in cool box

Patients

Session 13: Introduction to surgical equipments

Duration: 3 hours

Learning objective	To indentify and learn the use of basic surgical instruments required at field level to intervene minor surgeries.
Learning outcome	CAHW is able to identify basic surgical instruments and its uses in minor surgeries
Content	Lecture notes on identification of surgical instruments
Methodology	Lecture, ppt presentation and practical
Materials/ tools	Projector, markers , white board, chart paper and instruments
Assessment criteria	

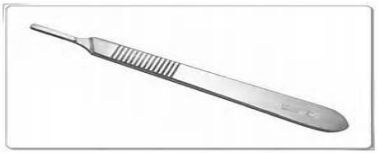
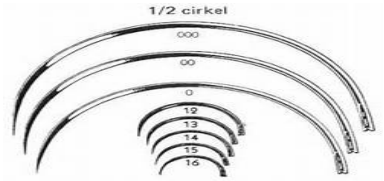
13. Introduction to surgical equipments

Surgical equipments are tools or devices that perform such functions as cutting, dissecting, grasping, holding, retracting, or suturing. Most of it is made of stainless steel.

As CAHWs one must help extension agents during sterilization program, they must know certain basic equipments and there functions.

13.1. List of surgical equipments and their use.

Name of equipment	**Uses**
Artery forceps 	Use for grasping, compressing, and holding the end of an artery during ligation
Thumb forceps 	A two-bladed instrument with a handle, used for compressing or grasping tissues in surgical operations, handling sterile dressings, and other purposes.
Scissors 	Usually used for cutting
Needle holder 	Use to hold a suturing needle for closing wounds during suturing and surgical procedures.
Towel clamp 	hand-held locking device with sharp prong, used to hold surgical drapes in place

Surgical blade 	Make surgical incision and tissue debriment
Scalpel 	used for surgery, anatomical dissection for holding blade.
Suture needle 	Closing the edges of wounds
Suture thread 	Holding the edges of wounds till recovery
Dehorning iron 	Dehorning calves. Should be done at the age of 10 days
Hove cutter 	Cutting hooves of cattle
Burdizzo castrator 	For closed method of castration

Ear tag applicator 	For application of ear tag of animal
Automatic syringe 	Use for vaccination of cattle of poultry
Injection needle 	Large animal I/V, I/M and S/C injection
Drencher 	Drenching of powder and bolus form of medicines animal

13.2. Handling of surgical equipments

Surgical equipments should be handle carefully and sterilized or disinfect before and after used. The main purpose of sterilizing equipments is to perform aseptic surgery which will enhance wound healing, reduce contamination and transmission of various infectious agents through surgical equipments.

Bigger equipments like dehorner, castrator and hoof cutter should be disinfected and kept safely to prevent from rusting.

All the stainless steel equipments should be washed, dry, packed well for next use and sterilized in autoclave machine or if not possible at least disinfect with surgical sprit in field level. Blade, needles and other disposable equipments should be deep buried in safe place.

Session 14: Record keeping

Duration: 3 hours

Learning objective	To learn on importance of recording and types of recording by the CAHWs
Learning outcome	Able to keep simple records
Content	Lecture notes on why recording
Methodology	Lecture, ppt presentation on types of format and practical
Materials/ tools	Projector, markers , white board and chart papers
Assessment criteria	

14. Record keeping

14.1. Importance of recording

- To understand the overview of clinical cases prevalence
- To understand the status of vaccination coverage
- To get first hand information while following up the clinical cases
- To verify and evaluate the drugs and vaccines usage by CAHW
- To understand the endemicity of certain clinical cases
- To ease the choice of drugs to be supplied

14.2. Types of recording

14.2.1. Clinical cases recording format

S/N.	Name of Owner	Address	Species	Breed	Age	Sex	Cases	Treatment

14.2.2. Vaccination recording format

S/N.	Name of Owner	Address	Species	Breed	No. of animals vaccinated		Vaccinated against		
					Male	Female	FMD	ARV	BQ/HS

14.2.3. Dewormng recording format

S/n.	Name of owner	Address	Species	Round worm	Liver fluke	Tape worm	Coccidiosis

14.2.4. Parasite disease control recording format

S/n.	Name of owner	Address	Species	No. of animals	Qty	Tick control

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