Cattle Medicine – Responsible Use Course

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Module 1 Health and Proper Care of Cattle

Objectives

After you have completed this introductory module, you will understand the importance of:

- Disease prevention through herd health programs
- Treatment and control of disease including accurate diagnosis
- Food safety in order to ensure consumer confidence
- Protection of the environment through proper use and disposal of animal health products and sharps.

Much of this introductory module provides you with the terminology needed to understand the proper use of animal health products.

Disease Prevention — Herd Health Programs

A herd health program is a management system based on periodic visits to the dairy or beef herd by a veterinarian to check on the occurrence of disease (calf sickness and death, mastitis prevalence) and production efficiency (average daily gain, feed efficiency, average milk production, average days in milk). A herd health program relies on a good working relationship between you, the producer, and your veterinarian to ensure optimum production management in areas such as genetics, nutrition, housing, disease control, animal care, animal-environment management and financial management (see Figure 1).

Disease prevention and control are important components of a herd health program. Your veterinarian can help you design management, vaccination, housing and nutritional programs to reduce the occurrence of disease and decrease the requirement for medications. A herd health program should include basic recording of health and production data.

Figure 1 Vet Examining Calf

More Info

For more detailed information on disease prevention and management, see the Animal Health Course for Cattle, available from the Home Study program of Alberta Agriculture, Food and Rural Development.

Example

Activities Performed During Herd Visits

Monitoring and analysis of production and health/disease data, monitoring of nutritional status, clinical and post mortem examination of animals, animal care management (e.g., vaccination, castrating, pregnancy examination, bull testing) and animal-environment management (e.g., proper disposal of used animal health products, rotation of recently calved cows on pasture to prevent scour outbreaks) are activities performed during herd visits.

Exercise

List those activities for which you have used your veterinarian.

_____

_____

_____

For what additional activities should you enlist the help of your veterinarian?

_____

_____

Disease Terminology

This section provides some terminology with which you should be familiar. You will see these terms used throughout the manual.

Figure 2 Septic Calf

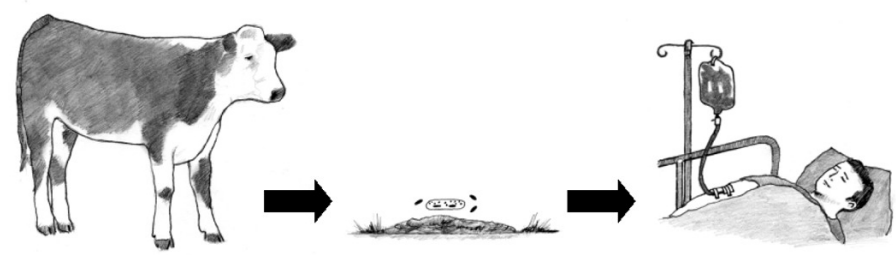
Disease

Disease is characterized by a departure from the normal state of health, such as an abnormality of body structure or function that results in symptoms. Disease may be localized to a part of the body (e.g., a foot abscess), or be generalized throughout the entire body (e.g., hemophilosis, milk fever). Disease may be clinical, where the abnormal signs resulting from the illness are very obvious as with a severe pneumonia or severe footrot. Disease also can be subclinical, where there are no obvious observable clinical signs of illness. Examples are when an animal grows slower than normal or its immune system is compromised by some nutritional or environmental stresses or pre-existing infections, making it more susceptible to other disease agents.

Diseases may be infectious, where they are caused by living organisms, including bacteria, viruses, fungi, parasites or prions (abnormal protein). Zoonotic diseases are those caused by microorganisms capable of causing disease in humans as well as animals (see Figure 3).

Example ***Zoonotic Diseases***

Salmonella, *E. coli* O157:H7 and Cryptosporidia are examples of zoonotic diseases.



Contagious and Non-contagious Disease

Diseases may be contagious or non-contagious. Contagious diseases are easily spread among animals, either directly, such as through nose to nose contact (e.g., IBR) or sexual contact (e.g., vibrosis), or indirectly, such as through contaminated feed equipment or housing (e.g., Salmonella). Non-contagious diseases do not spread from animal to animal (e.g., hardware disease).

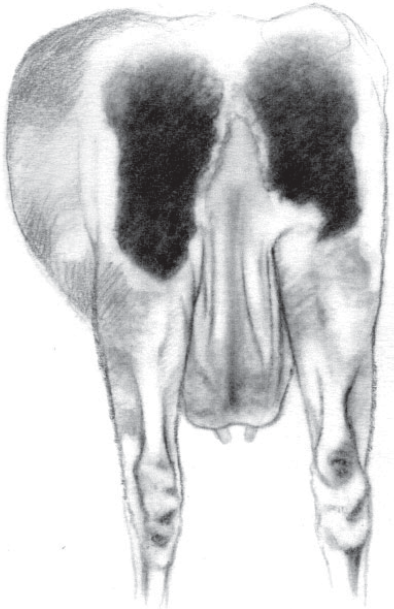
Non-infectious Disease

Diseases can be non-infectious and caused by something other than living organisms (see Table 1 Non-infectious Disease).

Table 1 Non-Infectious Disease

	Example	Treatment
Nutritional	Vitamin A deficiency	Focused on supplementing any deficiencies and treating symptoms of any excesses (e.g., bloat medication)
Poisonings	Lead or toxic plants	Includes removal from sources of poisoning and treatment of clinical symptoms
Metabolic	Grain overload (see Figure 4), ketosis, milk fever	Focused on correcting biochemical abnormalities such as treatment of milk fever with calcium solutions
Physical agents	Hardware disease, broken leg, cuts	Varies depending on cause of problem; may involve surgery
Genetic	Bovine leukocyte adhesion deficiency (BLAD), complex vertebral malformation (CVM), mule foot	Rarely any specific treatment available
Endocrine (hormonal)	Cystic ovaries	Based on correcting production or imbalances in body hormones
Allergies	Adverse reaction to a drug	Epinephrine (adrenaline)

Figure 4 Cow with Bloat



Bacteria

Bacteria are single cell microorganisms that do not require living cells to multiply. They can reproduce and persist in the environment or an animal's body. Not all bacteria cause disease and some are important for normal bodily functions such as the bacteria in the rumen (forestomach) responsible for feed digestion in cattle. Pathogenic bacteria are capable of causing disease, often by producing toxins or poisons.

Example

Pathogenic Bacteria

Mannheima haemolytica causes pneumonia (see Figure 5).
Histophilus somnus causes hemophilosis.
Staphlococcus aureus causes infectious mastitis.

Figure 5 Cow with Pneumonia

Most pathogenic bacteria are susceptible to the effects of antimicrobials when the right product and dosage is chosen and treatment is started early in the course of the disease.

Antimicrobials

Antimicrobials are agents that kill microorganisms or suppress their growth. Antimicrobials are a necessary tool to manage infectious diseases in both beef and dairy herds (see Figure 6).

Figure 6 Antimicrobials

Viruses

Viruses are microscopic infectious agents that are smaller than bacteria and only reproduce inside a cell. Some are capable of surviving in the environment outside of the animal's body, for example, bovine virus diarrhea virus (BVD). As viruses reproduce, they destroy cells causing the symptoms of disease. Unlike bacteria, viruses do not produce toxins.

Antimicrobials do not destroy viruses. Antimicrobials will not prevent or eliminate viruses once they have infected cells.

Example

Antimicrobials and Viruses

In the case of viral diseases such as infectious bovine rhinotracheitis (IBR), treatment with antimicrobials is sometimes done to prevent secondary bacterial infections in the lung, but the antimicrobial will not kill the IBR virus. Mixed viral and bacterial infections are common in diseases such as bovine respiratory disease (shipping fever). As a result, antimicrobials are often recommended in these cases by the veterinarian following clinical diagnosis.

Ensuring an animal has a strong immunity helps prevent viral infections. Immunization is the process of rendering an animal immune. This immunity can occur passively, through the transfer of protective antibodies (proteins in the blood or tissues that protect an animal from a virus or bacteria) from the cow's colostrum (first milk) to the calf (see Figure 7), or by administering animal health products that contain antibodies (for example, Colostrx, Head Start) (see Figure 8). This immunity can also occur actively through vaccination.

Figure 7 First Milk

Figure 8 Administering Antibodies

Vaccination

Vaccination is the introduction of vaccine into an animal to produce immunity. Vaccines are a suspension of modified live or killed microorganisms (viruses, bacteria), administered for the prevention of infectious diseases. Vaccination is the only way to prevent viral infections and some bacterial infections (see Figure 9).

More Info

For further information on vaccination guidelines, refer to VIDO's Vaccination Guidelines in Appendix 5, Part I, and at www.vido.org.

Figure 9 Vaccinating

Fungi

Fungi are microscopic plants, some of which are capable of causing disease.

Example ***Fungi***

Ringworm is a fungal disease in cattle (see Figure 10).

Figure 10 Cow with Ringworm

Parasites

Parasites are plants or animals that live within or upon another living organism at whose expense they obtain some advantage.

Parasites

Intestinal and lung worms, ticks, warbles, mange mites, lice and coccidia are parasites.

Prions

Prions are aberrant misfolded proteins that appear to cause bovine spongiform encephalopathy (BSE) and other brain abnormalities. There is no treatment in live animals at this time for prions.

Understanding the previous terms will help you work with your veterinarian to determine which diseases present the greatest risk to your herd and then develop herd specific vaccination protocols (see Figure 11) to reduce disease risks.

Document vaccination protocols and herd health records following the national dairy (Canadian Quality Milk) and beef (Quality Starts Here – Verified Beef Production) on-farm food safety program requirements.

Figure 11 Feedlot Treatment Protocol

Feedlot Treatment Protocol

Record all treatments in treatment records
Annually review protocol with vet and update
Give all IM and SC injections in the neck
Give no more than 10 cc per site.
Use 16 x 1" needles for IM injections; use 16 g x 1/2" needles for SC injections.

Disease Diagnosis	Treatment (Drug, Dose, Route, Frequency, Duration) – include how to handle relapses	Withdrawal Period	Comments
BRD	Drug XX - 3 cc / 100 lb. - subcutaneous - single treatment	28 days	Send to sick pen

For any disease condition not listed above, contact the veterinarian for diagnosis and treatment.

Date November 13, 2005 Veterinarian's Signature John Smith

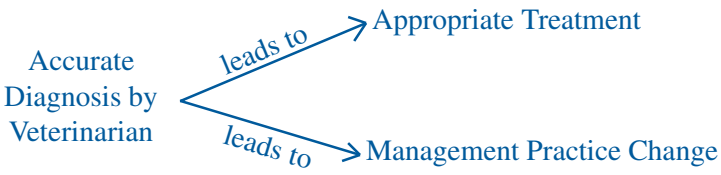
Print Name of Veterinarian and Clinic: John Smith, Anywhere, Alberta

Treatment and Control of Disease

Even with the best herd health and disease prevention programs, there will be a need to treat and control disease in your herd.

An accurate diagnosis is essential in picking the right treatment.

Treatment is the management and care of an animal with a disease or disorder. Prior to treatment of cattle, your veterinarian should diagnose the disease and determine the appropriate treatment and management practice changes.



Work with your veterinarian to determine common diseases in your herd and the clinical signs that identify specific diseases. Then, design a written treatment protocol for specific diseases. Standardized treatment protocols:

- Reduce guess work
- Ensure that treatment is consistent by everyone involved
- Ensure that appropriate drugs and only those that are necessary are used.

Your veterinarian can analyze treatment results and determine if changes are needed in the treatment protocols. When you are unsure of the diagnosis or treatment of a disease, particularly those conditions that rarely occur in your herd and are not documented in the herd's treatment protocol, contact your veterinarian before treatment (see Figure 12).

Figure 12 Veterinarian Examining Calf

A medicine is any drug or remedy. A drug is any substance or mixture of substances manufactured, sold or represented for use in:

- The diagnosis, treatment, mitigation or prevention of a disease, disorder, abnormal physical state or symptoms (for example, antimicrobials)
- Restoring, correcting or modifying organic functions (for example, probiotics)
- Disinfection of premises in which food is manufactured, prepared or kept (for example, disinfectants).

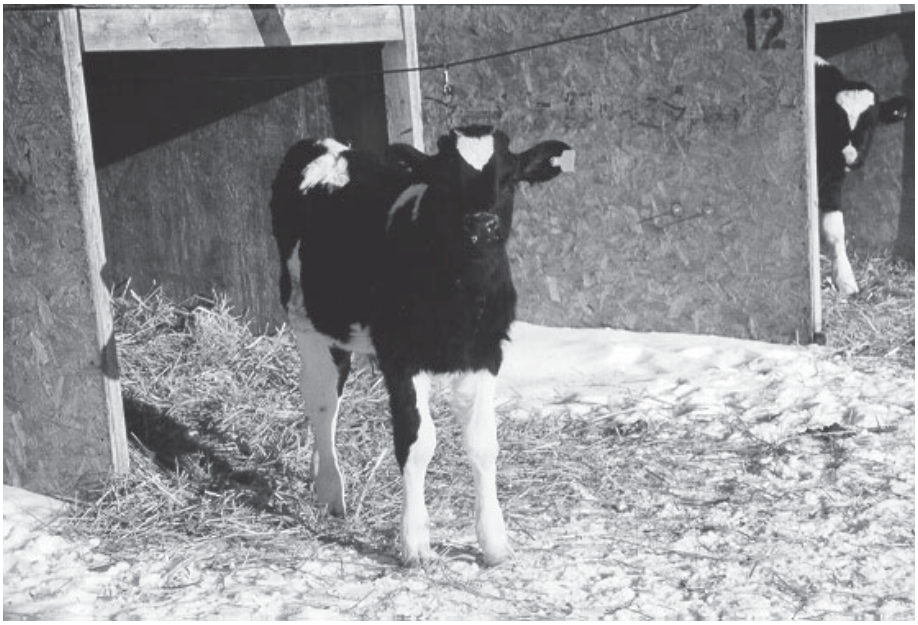
Depending on the diagnosis, your veterinarian will recommend specific treatment. Follow the treatment advice of your veterinarian to increase the the chance of animal recovery and to reduce unnecessary treatment costs related to excessive or inappropriate drug use.

RecordingTreatments

In any treatment, it is important to identify the treated animal with a unique eartag number (see Figure 13) and record the treatments, either on paper form, such as a calendar, or in a computerized health program. Recording treatments is a key step in showing prudent drug use. As well, recording treatments allows your veterinarian the opportunity to analyze herd treatment results to determine whether changes are needed in the treatment protocol or other areas of the herd health program to improve health outcomes.

Recording treatments is a key step in showing prudent drug use.

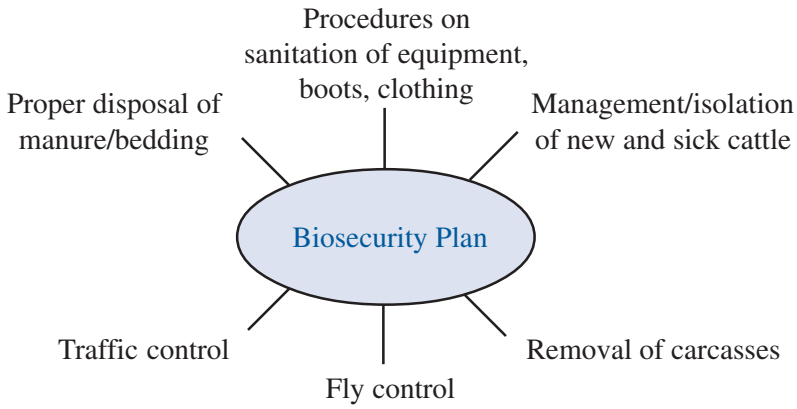
Figure 13 Cows with Eartags



Biosecurity and Biocontainment

Preventing and controlling disease includes biosecurity and biocontainment. Biosecurity refers to management practices used to prevent and reduce the risk of the entry of infectious diseases onto your farm. Biocontainment refers to management practices to prevent and reduce the risk of the movement of infectious diseases within or on your farm. Preventing and controlling infectious diseases on your farm helps ensure reduced disease costs and market access, both domestically and internationally. Work with your veterinarian to develop a biosecurity plan specific to your herd operation. The biosecurity plan should focus on identifying disease risks to your herd and then determining how to prevent infectious diseases from entering your herd through management of new cattle and traffic. Biocontainment should focus on determining methods to prevent disease from spreading within your herd through proper vaccination protocols and good nutrition programs to increase the ability of animals to fend off infectious agents.

Components of a Biosecurity Plan



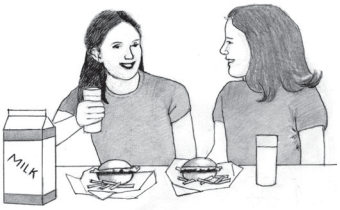
An effective biosecurity and biocontainment plan reduces the risk of disease and thus the need for antimicrobials (see Figure 14).

Figure 14 Biosecurity Sign and Foot Dip

Food Safety

Any treatment or control protocol should recognize the need for food safety. When it comes to beef or milk, food safety is the primary concern of consumers. Consumers are concerned about BSE, drug residues, antimicrobial resistant bacteria, bacterial contamination of beef or milk, and broken needles in beef. Any threat to food safety may result in reduced consumption which may affect domestic and international markets and the economic viability of beef and dairy cattle producers.

Figure 15 Food Safety is Critical



Hazard Analysis Critical Control Points (HACCP)

The Canadian beef and dairy industries are reassuring consumers of the safety of Canadian beef and milk by implementing national on-farm food safety programs. The national beef on-farm food safety program is called "Quality Starts Here - Verified Beef Production" (see Figure 16) and the national dairy on-farm food safety program is called "Canadian Quality Milk" (see Figure 17). Both of these industry programs have been recognized as technically sound by the Canadian Food Inspection Agency. These programs are based on Hazard Analysis Critical Control Points (HACCP). HACCP is an internationally recognized food safety system for:

- Preventing food safety hazards before they occur
- If they do occur, putting in place corrective actions to prevent the problem from moving up the food chain to the consumer
- Preventing reccurrences of problems.

Figure 16 ABOFFS Logo

ALBERTA BEEF ON-FARM FOOD SAFETY

Figure 17 CQM Logo

ALBERTA milk

Seven Principles of HACCP

- Identifying food safety hazards on an operation
- Identifying good production practices on the operation that control the food safety hazards
- Defining target levels or critical limits for the food safety hazards
- Developing active monitoring procedures to ensure good production practices are being effectively implemented
- Determining corrective actions should problems occur
- Developing methods to verify that management practices are working
- Record keeping to document good production practices.

More Info

To learn more about the national beef on-farm food safety program, contact Alberta Beef Quality Starts Here at www.beefsafety.ab.ca *and Canadian Quality Milk Program, contact Alberta Milk at* www.albertamilk.com.

Categories of Food Safety Hazards

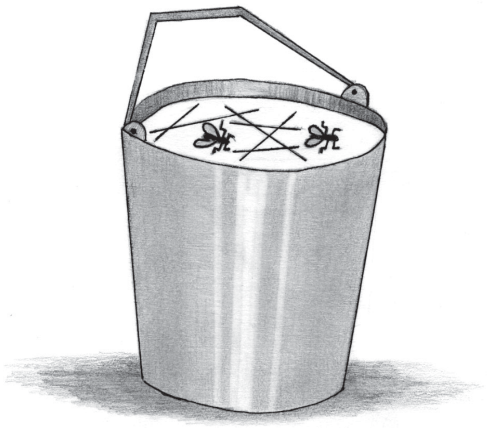
The three main categories of food safety hazards are:

- Biological
- Chemical
- Physical.

Biological hazards include pathogenic bacteria, viruses or parasites in beef and milk. Chemical hazards include drug and pesticide residues in beef and milk. Physical hazards include broken needles in beef and flies and straw in milk (see Figure 18).

Further details on prudent drug use are described in Module 6 Prudent Drug Use.

Figure 18 Contaminated Milk



Antimicrobial Resistance

In recent years, antimicrobial resistance has become a concern to consumers. Antimicrobial resistant bacteria in beef and milk are bacteria that have become difficult to inhibit or kill with various antimicrobials. Resistance is developed either spontaneously or through transfer of genetic material. The concern is that people may become infected with these antimicrobial resistant bacteria, and treatment for disease may be more difficult. Overuse and misuse of antimicrobial drugs contributes to the development of antimicrobial resistant bacteria. To reduce the risk of antimicrobial resistance, veterinarians and producers must use antimicrobials prudently.

Protection from Drug Residues

When animals are treated with animal health products, some of the product or breakdown components of the product (metabolites) may be excreted in cattle manure and urine. These drug residues or metabolites can contaminate the soil or water directly. This may impact the health of animals or humans and potentially increase the risk of development of antimicrobial resistance. To reduce this potential risk, use animal health products only when necessary, according to directions of a licensed veterinarian. The products used should be approved by Health Canada for use in food producing animals. Products licensed in Canada have passed environmental impact assessments to ensure their safety. Handle cattle manure/urine in accordance with the *Agriculture Operation Practices Act* so that it doesn't contaminate surface waters either directly or through manure runoff. Design manure storage areas according to the regulations of the same Act to prevent leaching and contamination of groundwater.

Protection from Sharps

Sharps include veterinary supplies such as needles, syringes, scalpel blades or broken glass. There are risks of needle stick injuries or cuts when these materials are not handled or disposed of properly (see Figure 19). Empty drug or pesticides containers, as well as expired drugs or vaccines, pose a risk to the environment through residues directly contaminating water ways, contaminating soil, or leading to the development of resistant bacteria.

Figure 19 Sharps Disposal Containers

More Info

See Module 13 Disposal of Biomedical Waste and Carcasses for proper disposal of biomedical waste and pesticides.

Summary

This module introduced you to some very important concepts in terms of using cattle health products properly. You learned that disease prevention is key, and treatment and control are measures to be used when disease occurs. With any treatment, you must consider food safety and protection of the environment.

Module 2 General Drug Information

Objectives

After you complete this second introductory module, you will be able to:

- Distinguish between over-the-counter and prescription drugs
- Describe and give examples of six broad classifications of drugs: biologicals, pharmaceuticals, parasiticides, fungicides, tranquilizers and anesthetics, and disinfectants.

It is important to have a complete understanding of any drugs you administer.

Drug Classification

Drugs available to beef and dairy producers fall within two general classes.

Over-the-Counter (OTC) Drugs

Over-the-counter drugs do not require a prescription and are available to producers on demand from many sources such as feed stores (see Figure 1). They can only be used according to the manufacturer's label unless direction for extra-label use is given by a veterinarian within a valid veterinary-client-patient relationship.

Figure 1 Over-the-Counter Drug

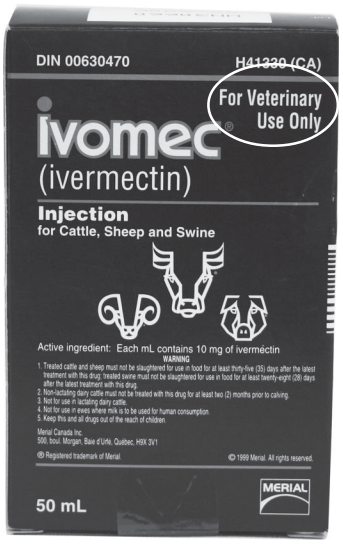


Figure 2 Prescription Drug

Figure 3 Purchasing Prescription Drugs

Prescription (Pr) Drugs

Prescription drugs are restricted to sale and use by, or on the order of, a licensed veterinarian to protect the drug's therapeutic usefulness (see Figure 2). Drugs in this classification often have extensive label requirements requiring professional guidance to maximize effectiveness and minimize the risk of residues. There are several characteristics unique to prescription drugs.

- The use of these drugs is dependent on a proper diagnosis of the animal and full and recent knowledge of the health of the particular animals
- These drugs are not available on demand and cannot be sold over-the-counter by non-professional staff
- These drugs can only be purchased and used under the guidance of a licensed veterinarian in a valid veterinary-client-patient relationship with the producer (see Figure 3)
- The producer can use these drugs only according to the manufacturer's label on the drug container, unless directed otherwise by the veterinarian's prescription.

Exercise — *Drug Classification Checklist*

Using Appendix 3, check the following drugs as either over-the-counter or prescription.

Drug	Prescription	Over-the-Counter
Dry Clox		
Cefa - Lak		
Tetrabol		
Flucort		
Excenel RTU		
Salix		
Borgal		
Estrumate		
Tasvax 8		
Pyramid MLV 4		
Ivomec		
Lysoff		
Rumensin		

See page 2-7 for the answers.

General Categories of Drugs

Within the two broad drug classifications, the drugs commonly used in livestock formulations fall into six general categories.

Biological

A biological is a medicinal preparation made from living animal or plant tissue. An example is a vaccine which is a suspension of weakened or killed microorganisms administered to elicit an immune response for protection, amelioration or treatment of infectious diseases. The vaccine is administered by subcutaneous (i.e., under the skin), intramuscular (i.e., in the muscle), oral (i.e., in the mouth) or intranasal (i.e., in the nose) route. Vaccines are most commonly administered by injection in the neck, either intramuscularly or subcutaneously. Table 1 describes the types of vaccines available.

Table 1 Types of Vaccines

Vaccine	Definition	Example
Modified Live Vaccines	Vaccines prepared from live microorganisms that have lost their virulence (ability to cause disease) but remain alive and have retained their ability to induce protective immunity	Bovi-Shield 3
Killed Vaccines	Vaccines prepared from killed microorganisms in combination with a carrier (adjuvant) to stimulate protective immunity	Triangle 4
Bacterins	Killed bacterial vaccines such as clostridial bacterins	Tasvax 7
Subunit Vaccines	Vaccines containing only the specific proteins of the infectious agent that induce protective immunity	Pneumo-Star
Autogenous Vaccines	Vaccines prepared from cultures of material derived from a specific lesion of the animal being vaccinated	wart vaccine

Other examples of biologicals are antibodies and immunoglobulins which are specialized serum proteins produced by white blood cells (B lymphocytes) in response to an immense number of different antigens to which an animal has been exposed. Some immunoglobulins such as those present in "Head Start" are administered orally within the first few hours of life to achieve optimum absorption and produce a protective passive immunity.

See the Glossary for definitions of antibodies, immunoglobulins and antigens.

Probiotics are live microbial feed supplements (e.g., lactobacillus) that beneficially affect the animal by improving its intestinal microflora. Probiotics are generally administered orally.

Pharmaceutical

A pharmaceutical is a drug obtained by creating, mixing or compounding chemicals. Most pharmaceuticals are administered by subcutaneous, intramuscular or intravenous (i.e., in the vein) injection. Drugs can also be given by oral, topical (i.e., skin) , intramammary (i.e., in the udder), intrauterine (i.e., in the uterus) and intravaginal (i.e., in the vagina) routes in cattle. Table 2 describes the types of pharmaceuticals available.

Table 2 Types of Pharmaceuticals

Pharmaceutical	Definition	Example
Antimicrobial	A broad term for any natural or synthetic compound that kills microorganisms or suppresses their growth	antibiotics, sulfonamides and iodine
Antibiotic	A substance produced by a microorganism that kills other microorganisms or suppresses their growth	penicillin
Corticosteroids	Hormones that have strong anti-inflammatory actions and are produced by the adrenal glands	Dexamethasone Pred
Non-steroidal Anti-inflammatory	Non-steroid chemicals with anti-inflammatory properties similar to corticosteroids	Aspirin, Banamine
Hormone	A chemical transmitter transported by the bloodstream to specific cells and organs where it regulates functions such as growth, reproduction, metabolic processes, sexual attributes and behavior	ear implants made of estrogen, progesterone and testosterone combinations
Diuretic	A drug that causes the kidney to produce more urine	Salix
Vitamins and Minerals	Essential nutrients for normal metabolism	vitamin E, selenium

Parasiticide

A parasiticide is a drug or chemical that kills parasites (e.g., cocci, worms).

Parasiticides

Anthelmintics for worm treatment (Safe-Guard premix), endectocides, such as the ivermectin products that kill internal worms and external parasiticides, and insecticides, such as fly ear tags, Spotton and Lysoff.

While injectable parasiticides continue to be used, oral and topical routes of administration are most common.

Fungicide

A fungicide (antifungal) is an agent, such as griseofulvin, that destroys fungi.

Tranquilizers and Anesthetics

A tranquilizer is an agent that calms or quiets an anxious or agitated animal without affecting its clarity of consiousness.

Tranquilizer

Atravet = acepromazine is a tranquilizer.

An anesthetic is an agent capable of producing anesthesia which is the loss of feeling or sensation induced to permit the performance of surgery and other painful procedures.

Anesthetic

Halothane is an anesthetic.

Almost all of these products are prescription drugs administered by veterinarians.

Disinfectant

A disinfectant is an agent that destroys infection-producing organisms (e.g., heat, steam, chlorine, hibitane, iodine). Generally, disinfectants are applied to inanimate objects such as floors and equipment since they are usually too strong to be used on living tissue. A formalin foot bath for dairy cattle is one exception to this; however, care must be taken with formalin foot baths as the fumes are carcinogenic (capable of causing cancer).

Drug Categories

Using Appendix 3, identify the following drugs as biological, pharmaceutical, parasiticide, fungicide, tranquilizer/anesthetic or disinfectant.

Drug	**Category**
Borgal	_____
Tetrabol	_____
Salix	_____
Estrumate	_____
Ivomec	_____
Tasvax 8	_____
Pyramid MLV 4	_____
Rumensin Premix	_____

See page 2-7 for the answers.

Summary

This module introduced you to over-the-counter and prescription drugs. You learned about some general categories of drugs and examples of each. You need to understand the characteristics of each category before you administer drugs to cattle.

Answers to Exercise on Page 2 – 2.

Drug Classification Checklist

Drug	Prescription	Over-the-Counter
Dry Clox	✔	
Cefa - Lak	✔	
Tetrabol		✔
Flucort	✔	
Excenel RTU	✔	
Salix	✔	
Borgal	✔	
Estrumate	✔	
Tasvax 8		✔
Pyramid MLV 4	✔	
Ivomec		✔
Lysoff		✔
Rumensin		✔

Answers to Exercise on Page 2 – 6

Drug	Category
Borgal	pharmaceutical antimicrobial
Tetrabol	pharmaceutical antimicrobial
Salix	pharmaceutical nutritional
Estrumate	pharmaceutical hormone
Ivomec	parasiticide
Tasvax 8	biologic
Pyramid MLV 4	biologic
Rumensin Premix	pharmaceutical antimicrobial

Module 3 Federal and Provincial Legislation

Objectives

After you complete this module, you will be able to:

- Describe the federal and provincial legislation that relates to the sale, purchase, use and disposal of animal health products
- Explain the federal and provincial legislation related to the management of reportable diseases, animal identification and use of feed medications.

See Appendix 1 for more information on the legislation.

The following regulations are of importance to beef and dairy producers because they include provisions related to the sale, purchase, use and disposal of animal health products, as well as the management of reportable diseases, animal identification requirements, and the use of feed medications on farm. Producers are responsible to ensure that they are aware of and compliant with their legal responsibilities under these Acts.

Federal Legislation

Several pieces of federal legislation affect beef and dairy producers.

Pest Control Products Act

The *Pest Control Products Act* regulates products used for the control of pests and the organic functions of plants and animals. The Act and Regulations prescribe standards for registration, manufacturing, storing, displaying and use of pesticides to ensure their efficacy and safety.

Food and Drugs Act

The *Food and Drugs Act* provides the conditions and standards under which drugs are manufactured and offered for sale. The Act ensures drugs on the Canadian market are safe and effective and that labels contain all necessary warnings such as toxicity, contraindications and withdrawal periods.

Banned Veterinary Drugs

Never use banned veterinary drugs in cattle. Use only animal health products approved by Health Canada for food producing animals and follow label directions or a veterinary prescription for drugs used extra-label. Approved pharmaceuticals and premixes will have a drug identification number (DIN), licensed pesticides will have a Pest Control Product (PCP) number, and licensed vaccines will have a Canadian Food Inspection Agency (CFIA) establishment license number and/or US veterinary license number.

Banned Veterinary Drugs in Cattle

- Chloramphenicol and its salts and derivatives
- 5-nitrofuran compounds
- Clenbuterol and its salts and derivatives
- Diethylstilbestrol
- 5-nitroimidazole compound

Health of Animals Act

The *Health of Animals Act* regulates the health of animals. The regulation contains parts and schedules related to eradication of diseases (Part IX), animal identification (Part XV), prohibited materials in ruminant feed (Part XIV) and veterinary biologics (Part XI).

Meat Inspection Act

The *Meat Inspection Act* covers the import and export of and inter-provincial trade in meat products. It also covers the registration of establishments, the inspection of animals and meat products in registered establishments and the standards for those establishments and for animals slaughtered and meat products prepared in those establishments.

Feeds Act

Under the authority of the federal *Feeds Act*, CFIA administers a national livestock feed program to verify that livestock feeds manufactured and sold in Canada or imported into Canada are safe, effective and labeled appropriately. Within this Act are responsibilities for livestock producers using and mixing medicated feeds on farm.

Provincial Legislation

Several pieces of provincial legislation affect beef and dairy producers.

Pharmaceutical Profession Act

The *Pharmaceutical Profession Act* is the primary provincial legislation regulating the sale of all drugs in the Province of Alberta. The Act states that only a pharmacist can engage in the exclusive scope areas of the practice of pharmacy. Exceptions in this provision include "registered veterinarians" and the sale of livestock medicine pursuant to the Production Animal Medicine Regulation.

Veterinary Profession Act

The *Veterinary Profession Act* defines the requirements of a "registered" veterinarian and states that only such a veterinarian can engage in the practice of veterinary medicine which includes, but is not restricted to, prescribing and dispensing of drugs.

Livestock Diseases Act

Under the *Livestock Diseases Act*, certain provisions exist where persons other than those under the *Pharmaceutical Profession Act* and *Veterinary Profession Act*, may sell medicine. The Production Animal Medicine (PAM) Regulations provide for the licensing of a person to sell medicine specifying which medicine may be sold and prescribing any other conditions concerning the sale and handling of medicine.

The *Livestock Diseases Act* also contains the regulations for proper disposal of dead animals under the Destruction and Disposal of Dead Animals Regulations.

Environmental Protection and Enhancement Act

The *Environmental Protection and Enhancement Act* of Alberta contains the Environmental Code of Practice for Pesticides which regulates the use, application, handling and disposal of pesticides.

Agricultural Operation Practices Act

The *Agricultural Operation Practices Act* (AOPA) ensures the safe and sustainable handling of manure through regulation of the expansion and construction of confined feeding operations (CFOs) and the storage, application and incorporation or injection of manure.

Summary

You should now have an understanding of the federal and provincial pieces of legislation that affect your use of animal health products and feed medications.

See Appendix 1 for more information on the legislation.

Module 4 Roles and Responsibilities

Objectives

After you complete this module, you will be able to:

- Outline the role of producers, veterinarians, feed manufacturers, nutritionists and pharmaceutical manufacturers in the proper use of animal health products for cattle
- Describe the goals of two on-farm food safety programs.

Each role is critical in ensuring the proper use of animal health products for cattle.

Producers

Dairy and beef producers are responsible for implementing good animal husbandry practices (see Figure 1), including the following:

- On-farm food safety programs
- Biosecurity plans
- Proper nutrition to prevent disease, reduce the need for antimicrobials and reduce the risk of drug residues and broken needles in beef.

Work with your veterinarian to establish a valid veterinary-client-patient relationship so that you are knowledgeable about the prevention, treatment and control of common diseases in your herd, including how to prudently and properly use animal health products and keep good records and animal identification. This knowledge is essential to ensure the health and productivity of the herd and to ensure consumer confidence in meat and milk.

Figure 1 Good Husbandry

Treatment Protocols

You and your employees should follow veterinary approved processing and treatment protocols. Use only government approved animal health products for food producing animals and administer these products according to label directions unless prescribed otherwise by a licensed veterinarian and accompanied by a signed veterinary prescription. This includes the use of feed and water medications as well. Strictly observe withdrawal periods for meat and milk. Should a violative drug residue occur in meat or milk from non-prescriptive extra-label use of a drug outside the confines of a valid veterinary-client-patient relationship (VCPR), you may be subject to regulatory action. Producers may not resell prescription drugs.

Figure 2 Good Feeding Practices

Feeding Procedures

Ensure good feed receiving, storage, mixing and feeding procedures are implemented on the farm to prevent cross contamination of drug residues from medicated to non-medicated or high risk feeds (finishing rations) (see Figure 2). On mixed livestock operations, you need good feeding procedures to prevent prohibited materials (ruminant bone/meat meal) potentially in hog or poultry feed from contaminating dairy or beef cattle feed, increasing the risk of BSE transmission.

Herd Health Program

You are encouraged to work with a licensed veterinarian to develop and maintain a herd health program.This program should include staff training on identification of common diseases, appropriate prevention, treatment and control regimes, and adequate record keeping.

Contact your herd veterinarian if you are aware of any misuse or illegal sale of veterinary drugs and biologics which have the potential to damage the credibility of the entire industry in the eyes of the consumer.

On-Farm Food Safety Program

As a producer, you should implement national on-farm food safety programs. You are responsible for understanding food safety risks, implementing good production practices on farm to reduce those risks, and formulating an appropriate strategy should something go wrong. You are responsible for ensuring that employees also understand their responsibilities to ensure a healthy animal is raised humanely to provide a safe food product. Keep current on new herd management practices.

Veterinarians

Your veterinarian is responsible for working with you to establish herd health programs and implement good animal husbandry practices. Veterinarians have the right to prescribe drugs and biologics (vaccines) which is a privilege reserved by law for the protection of the public. As such, veterinarians have a professional responsibility to ensure that the use of drugs and biologicals does not cause livestock or public health hazards. Practitioners should establish and maintain a valid veterinary-client-patient relationship with their producers when prescribing and dispensing drugs.

Key Responsibilities of Veterinarians

- Advise clients on the safe and responsible use of animal health products
- Write prescriptions for all extra-label drug use (see Figure 3)
- Develop standard processing and treatment schedules that include drug withdrawal periods
- Develop a record keeping system for all events
- Verify that these activities are implemented
- Correct any problems that may occur
- Ensure that only drugs known to be compatible are used in combination for treatment by any method of administration.

Figure 3 Writing a Prescription

Extra-Label Use of Drugs

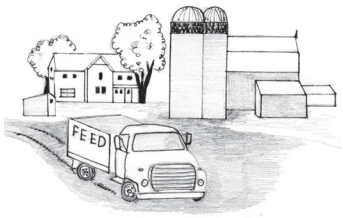
Your veterinarian must write prescriptions for drugs when they are used differently than specified on the label insert (e.g., differences in the animal species, drug dosage, treatment frequencies, treatment duration or disease conditions). Veterinarians are responsible and accountable for all extra-label use of drugs, including injectable, oral (feed water) and topical medications, and resulting adverse reactions and residues.

Additional Veterinarian Responsibilities

- Report adverse reactions from drug and biologicals as well as the illegal sale and misuse of veterinary products
- Keep current on veterinary medicine, animal health and feed regulatory matters, and on-farm food safety programs.

Feed Manufacturers

Figure 4 Delivering Feed



Feed manufacturers are involved in the sale of non-prescription drugs and the preparation and sale of medicated feeds. They should consistently deliver quality feed and be implementing a Hazard Analysis Critical Control Points (HACCP) program (see Figure 4). Feed suppliers should ensure that the correct concentration of the proper ingredients are adequately mixed in feeds. They are responsible to ensure the feed tag label includes the directions for use and pertinent caution and warning statements to be observed by the cattle producers. Feed suppliers must provide the producer with a copy of the feed tag label (see Figure 5), and if delivering the feed on farm, a copy of the feed delivery sheet.

The Compendium of Medicating Ingredient Brochures (CMIB) from Agriculture and Agri-Food Canada contains information on the use of drugs in feed, including permitted drug and drug combinations for use in animal feeds. When a medicating ingredient is at a level or for a purpose not listed in the CMIB, a written prescription by a licensed veterinarian is required. Feed medications must only be used extra-label for a limited period in the treatment of specific, diagnosed conditions and general standards must be met and withdrawals stated on the veterinary feed prescription. Feed manufacturers must ensure the following:

- The drug is prescribed for prophylactic or therapeutic purposes and not as a growth promotant
- The drug has an identification number (DIN) under the *Food and Drugs Act*
- The animals are under the direct supervision of the veterinarian.

The feed manufacturer must have a copy of the prescription prior to delivering the feed.

Figure 5 Feed Bag with Tag

Labels for Veterinary Prescription Feeds

Labels for veterinary prescription feeds must contain the standard labeling requirements as prescribed in the feed regulations, as well as:

- Name and address of the manufacturer
- Name of the person for whom the feed is manufactured
- Name of the veterinarian who issued the prescription
- Name of the feed, including the name and amount of medicating ingredients
- Directions for use, including duration of feeding
- Warning and caution statements
- Weight of the feed.

Nutritionists

Nutritionists work with producers to provide the following:

- Advice on proper nutritional management of the cattle (see Figure 6)
- Advice and training on good feed production practices to ensure the economic production of high quality and safe beef and milk
- Feed protocols, including ration formulations, batch mixing instructions, equipment clean-out procedures and feed delivery procedures
- Feed record forms for use by the producer
- Review of herd and feed production data and feed test results to identify areas for improvement.

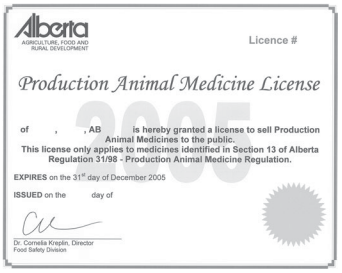
Nutritionists stay current on the on-farm food safety programs and feed/ nutrition management.

Figure 6 Nutritionist with Producer

Licensed Livestock Medicine Outlet

All outlets that sell production animal medicine must have a production animal medicine (PAM) license for each retail outlet (see Figure 7). They must have a thorough knowledge and understanding of the PAM Regulations from the Meat Inspection and Regulatory Services Division – Prevention/ Investigation Unit, Alberta Agriculture, Food & Rural Development, and they must abide by all sections of the PAM Regulations. At least one PAM Qualification Certificate Holder (someone who has taken and passed the PAM Course and exam) must be on duty at all times during regular business hours. The Certificate holder must explain to the producer withdrawal times, toxicity warnings and other precautions on the label and ensure no expired medicines are offered for sale.

Figure 7 PAM License


Alberta
AGRICULTURE, FOOD AND RURAL DEVELOPMENT

Licence #

Production Animal Medicine License

of , , AB is hereby granted a license to sell Production Animal Medicines to the public.
This license only applies to medicines identified in Section 13 of Alberta Regulation 31/98 - Production Animal Medicine Regulation.

EXPIRES on the 31st day of December 2005

ISSUED on the day of

Dr. Cornelia Kreplin, Director
Food Safety Division

Prohibited Sales

PAM outlets are allowed to sell most, but not all, of the drugs listed in Part II of Schedule F (over-the-counter).

Prohibited Sales of Drugs

- Injectable hormones such as dexamethasone are prohibited from sale by PAM outlets
- All drugs under Schedule F Part 1of the *Food and Drugs Act* (prescription drugs) are prohibited drugs for PAM outlets.

PAM outlets must ensure that all over-the-counter (OTC) medicines are clearly labeled and stored according to label directions. Accurate records of all medicines bought and sold must be kept for a minimum of two years.

PAM licensed outlets can not sell medicine to the public from unlicensed premises, such as livestock sales/shows or sell medicine from door to door or by mail order or advertise drug prices. Qualification Certificate Holders can not repackage or alter the contents of any medicine or diagnose, prescribe or contravene the *Veterinary Professions Act* in any manner.

Permitted Sales

Only drugs listed in Section 13 of the PAM Regulation are allowed for possession or sale through PAM outlets.

Drugs Licensed for Sale Through PAM Outlets

- Biologicals (except for Brucella, Rabies, Anthrax and modified live viral vaccines)
- Non-prescription antimicrobials
- Parasiticides
- Oral preparations
- Wound preparations
- Vitamins
- Minerals
- Hormones
- Solutions for metabolic disease (e.g., calcium and dextrose preparations).

Pharmaceutical Manufacturers

In order to market drugs in Canada, drug manufacturers must submit data to the federal government that demonstrates the safety and efficacy of the drug. Information submitted to license a drug includes the drug substance, manufacturing process, safety and efficacy for the intended use, detailed protocol and results of in-house studies and field trials, and toxicity and residue data to assign appropriate withdrawal periods. If the information submitted complies with the requirements of the *Food and Drugs Act* and Regulations, a Notice of Compliance is issued, allowing the manufacturer to sell the product in Canada for use under the conditions specified on the drug label.

Responsibilities of Each Group

Review some of the responsibilities of each group by checking whose role each activity is.

Activity	Producer	Veterinarian	Feed Manufacturer	Nutritionist	Licenced Outlet	Pharmaceutical Manufacturer
Implementing on-farm food safety program						
Drug has DIN number						
Develop standard processing and treatment protocols						
Advice on nutritional management						
Notice of Compliance in order to sell a drug						
Must have a PAM licence						

See page 4-10 for the answers.

Visit the website for CQM Program: www.albertamilk.com
See Appendix 4 for example record forms.

Visit the website for ABOFFS Program: www.beefsafety.ab.ca

You are encouraged to attend a producer training workshop to learn about the ABOFFSP and how to become a certified beef operation.

On-Farm Food Safety Programs

There are two on-farm food safety programs of importance to beef and dairy producers.

Canadian Quality Milk (CQM) Program

The role of CQM is to help dairy producers identify areas in the handling and administration of medicines used on-farm that pose a risk to the safety of the milk or meat that is produced on-farm. CQM serves dairy producers in the following ways:

- Helps put monitoring systems and controls in place to minimize food safety risks by keeping records and implementing check points and appropriate treatment protocols
- Aids producers in developing corrective action plans to deal with situations that develop which pose a risk to the safety of milk or meat such as inappropriate administration of a medication and administration of the wrong medication.

Overall, CQM provides excellent guidelines for storing, handling, administering, recording and managing medicines used on dairy cattle.

Alberta Beef On-Farm Food Safety Program (ABOFFSP)

The national beef on-farm food safety program, called *Quality Starts Here Verified Beef Production*, is delivered in Alberta by the Alberta Beef On-Farm Food Safety Program (ABOFFSP). The beef on-farm food safety program focuses on increasing producer awareness of beef safety risks on farm and providing information on good production practices that can reduce risks and improve safety.

Good production practice information is provided in five areas:

- Animal health management
- Cattle feeding
- Cattle receiving and shipping
- Pesticide control and yard maintenance
- Biosecurity, personnel hygiene and training.

The program is HACCP based and focuses on prevention, but it also includes information on corrective actions, should something go wrong.

Beef Industry Requirement Checklist

Use the following checklist to determine how close you, as a producer, are to meeting industry requirements for managing medicine used in cattle.

- ❒ I have established a valid veterinary-client-patient relationship
- ❒ I work with my veterinarian to develop processing and treatment protocols, identify treated animals and keep records
- ❒ I use only government approved animal health products in food producing animals
- ❒ I ensure all medicines, including feed and water medications and pesticides, are clearly labeled
- ❒ I store medicines according to label directions and dispose of them according to provincial environmental regulations
- ❒ I use drugs according to label directions or according to a veterinary prescription for extra-label use, a copy of which I keep on file
- ❒ I ensure medical equipment is working (e.g., syringes, implant guns)
- ❒ I clean medical equipment, like syringes, according to a sanitation plan
- ❒ I use proper injection techniques to prevent broken needles, and should a broken needle occur, know what to do (see Module 8 Injection Techniques)
- ❒ I have feed management procedures in place and supportive records to prevent feed medication cross contamination during receiving, storage, processing, mixing and feeding
- ❒ I ensure proper disposal of flush materials used to clean out medicated feed equipment
- ❒ I ensure feed medication scales are suitable for the range and weights of medicated ingredients/ premixes/supplements to be quantified
- ❒ I ensure medicated feed scales are accurate
- ❒ I ensure mixers of medicated feeds mix the drug evenly throughout the load
- ❒ I ensure the correct group of cattle get the right amount of medicated feed by labeling feeding pens and keeping feed delivery sheets
- ❒ I keep ration formulas, batch mix sheets and feed delivery sheets for all medicated feeds
- ❒ I request animal health records from previous owners of cattle
- ❒ I ensure cattle are not shipped to slaughter until they have passed their meat withdrawal period and, if any broken needles occurred, inform the next owner
- ❒ If cattle are shipped other than direct to slaughter (e.g., feeder calves), and they are not free of drug residues (e.g., pre-immunized two weeks previously), I inform the next owner of the hazard
- ❒ I use pesticides according to label directions
- ❒ I store and dispose of pesticides to ensure they pose no risk to chemical contamination of cattle directly or through the feed and water
- ❒ I keep all documented procedures and records for a minimum of two years

Summary

You should now be able to describe your role in the proper handling and use of animal health products for cattle. You should understand how others, such as veterinarians, feed manufacturers and suppliers, also play a role. If you filled in the checklist, you have some idea of how well you manage cattle medicines according to industry standards.

Answers to Exercise on Page 4 – 7

Activity	Producer	Veterinarian	Feed Manufacturer	Nutritionist	Licenced Outlet	Pharmaceutical Manufacturer
Implementing on-farm food safety program	✔	✔		✔		
Drug has DIN number						✔
Develop standard processing and treatment protocols	✔	✔				
Advice on nutritional management		✔	✔	✔		
Notice of Compliance in order to sell a drug					✔	✔
Must have a PAM licence					✔	

Module 5 Pharmaceutical Activities

Objectives

After you complete this module, you will be able to:

- Describe how drugs are absorbed, distributed and eliminated from an animal's body
- Take steps to avoid drug residues by observing withdrawal times.

Producers giving medications to food producing animals should be aware of drug withdrawal times–the set amount of time after the last treatment before the milk or meat of the animal is safe for human consumption. To understand how withdrawal times are created, you must first understand how long a drug "stays" in the body. This process is known as pharmacokinetics.

Drug Pharmacokinetics

Although different drugs can have many different effects, all drugs follow certain principles of pharmacokinetics. Whether a medication is administered by mouth, by injection, applied to the skin or infused into the uterus, it must be:

- Absorbed from the site of administration into the bloodstream
- Distributed via the blood to different organs and tissues
- Eliminated from the body, mostly in urine or feces, but also in milk, saliva and tears.

Absorption

A drug must be absorbed before its pharmacological effect can be produced. Sometimes a drug is administered exactly where you want it to act (e.g., intramammary infusion for mastitis). Most of the time, the drug needs to be absorbed from its site of administration and carried to the site of action by the bloodstream. The absorption of a drug varies greatly, depending on method of administration, health of the animal, drug formulation and other factors as described below.

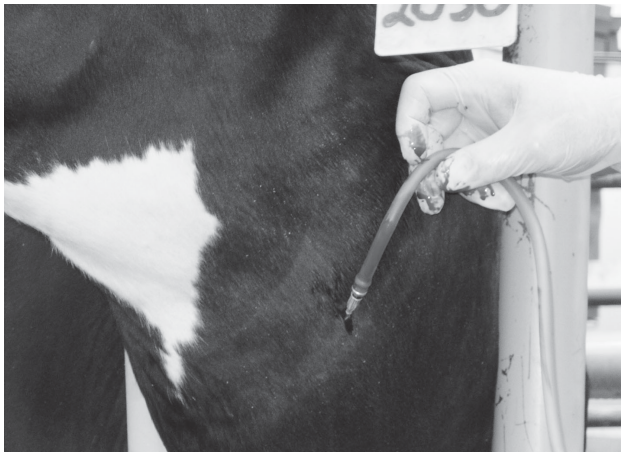
Method of Administration

Many factors affect drug absorption by an animal.

Method of administration affects aborption.

- Drugs given intravenously are "absorbed" immediately and are quickly distributed to the rest of the body via blood circulation (see Figure 1).

Figure 1 Intravenous Administration



- Drugs given by intramuscular (see Figure 2) or subcutaneous injections (see Figure 3) are absorbed into the bloodstream more slowly and can be affected by the location of the injection. For example, a drug injected intramuscularly in the neck will be absorbed faster and more completely than the same drug injected into the hindquarter.

Figure 2 Intramuscular Injection

Figure 3 Subcutaneous Injection

See the Glossary for definitions of intramuscular, subcutaneous, intravenous, intramammary, oral and intrauterine.

- Oral drugs are slowly absorbed in cattle due to the large size of the rumen and the slow passage of feed material. The acidic nature of rumen fluid can also interfere with drug absorption (see Figure 4).

Figure 4 Oral Bolus

- Intramammary, intrauterine and topical drugs are absorbed at varying rates depending on the type of medication and condition of the cow.

Health of the Animal

Health of the animal affects absorption. Subcutaneous medications are slowly absorbed in dehydrated cows. Dehydration reduces blood flow to the skin, so less drug is absorbed into the bloodstream from the injection site.

Dehydration reduces the rate of drug absorption of subcutaneous medications.

Example

Impact of Dehydration on Drug Absorption

A recently freshened cow has milk fever and won't stand up. You want to treat her with calcium borogluconate, either under the skin or in the vein. She is dehydrated because she can't get up and walk to the water bowl. This means a subcutaneous injection will be absorbed very slowly into the bloodstream. In this case intravenous administration of the medication will work much faster.

Sick cows with little rumen movement won't absorb oral drugs as quickly as normal cows. Most oral drugs are absorbed from the small intestine, not the rumen. If the rumen isn't contracting normally, the medicine will be stuck there and won't be absorbed efficiently.

Example

Impact of Animal Health on Drug Absorption

Cows with hardware disease often have sore bellies and little rumen movement. Oral medication does not leave the rumen and cannot reach the intestine where it is normally absorbed. Drugs given by intramammary infusion are absorbed at different rates depending on the stage of lactation or udder status.

Dry cow treatment stays in the udder during the dry period and is not washed out by milking as is the case with lactating cow treatment.

Cows with acute mastitis may have increased blood flow to the udder, which can increase the absorption of drugs into the body. With chronic mastitis, scar tissue in the udder reduces drug absorption.

Drug Formulation

Drug formulation affects absorption. "Long-acting" drugs (such as Liquamycin™ LA-200, Bio-Mycin™ 200, or Longisil) are formulated with carriers that are slowly absorbed from the injection site. Therefore, one dose "lasts longer" because the active drug stays at the injection site and is slowly absorbed into the bloodstream.

Figure 5 Topical Medication

Other Factors Affecting Drug Absorption

Topical medications (such as the common endectocides Ivomec Pour-on, Dectomax Pour-on, Cydectin Pour-on, etc.) are absorbed through the cow's skin into the bloodstream (see Figure 5). These products are liquids that are applied onto the cow's back. However, if the hide is covered with mud or feces, the drug cannot reach the skin to be absorbed. Similarly, if given when raining or snowing, some of the medication may be washed off before it can be absorbed.

The greater the surface area of an injection site, the quicker the drug will be absorbed. To reduce carcass lesions, administer no more than 10 ml of medication at any one injection site. Inject smaller volumes in more locations to speed up drug absorption as there is a much greater surface area than with one large injection. It is especially important to use more locations when using long-acting drugs because of their already slow rate of absorption.

Impact of Injection Volume

Numerous drug residue violations occur each year even though the producer followed the withdrawal period on the drug label. Often this happens because the whole dose was injected entirely in one spot rather than divided into multiple 10 ml injections. The withdrawal time is only accurate if exact label instructions are followed, including the injection volume. The decreased surface area of one large injection slows down the absorption rate, and the label withdrawal time no longer applies.

Distribution

Drug properties and health of an animal influence drug distribution.

Distribution of a drug is required to get the medication to where it needs to work. The drug also needs to reach a certain concentration at the desired tissue to be effective. How a drug is distributed throughout a cow's body is influenced by drug properties and health of the animal.

Physical and Chemical Properties of the Drug

Use the physical and chemical properties of a drug to optimize the choice and dosage of a particular drug.

The physical and chemical properties of the drug affect distribution. Drugs can be classified as water-soluble (dissolves in water) or fat-soluble (dissolves in fat). Water-soluble drugs tend to stay in the bloodstream. They are usually eliminated from the body quickly and require frequent dosing. Fat-soluble drugs tend to accumulate in body tissues. These medications usually have a slower onset of action and stay in the body for longer periods of time.

Health of the Animal

Health of the animal affects distribution.

- Dehydrated cows have less blood flow to the skin and muscle, so less medication is distributed to these organs.
- Sites of active inflammation (red, swollen, warm) receive more blood flow so more drug may be distributed to these areas.
- Sites of chronic inflammation (such as abscesses and scar tissue) often receive little or no blood supply.

Example

Impact of Scars and Abscesses on Drug Effectiveness

Cows with chronic mastitis or pneumonia often have scar tissue or abscesses in their udders and lungs. This abnormal tissue may cause antibiotic therapy to fail. Medication in the bloodstream can't reach the site of infection because it is unable to penetrate the surrounding scar tissue and abscesses.

Elimination

Elimination of a drug from a cow's body is affected by the health of an animal and interaction with other drugs.

Elimination of a drug from the body occurs through metabolism and excretion. Most drugs are excreted into the urine via the kidney. Some drugs are also excreted into bile, saliva or milk. Drug metabolism occurs when the cow's liver changes a fat soluble drug into a more water soluble form for elimination in the urine. Several factors such as health status of the animal and interaction with other drugs affect drug elimination.

Health Status of the Animal

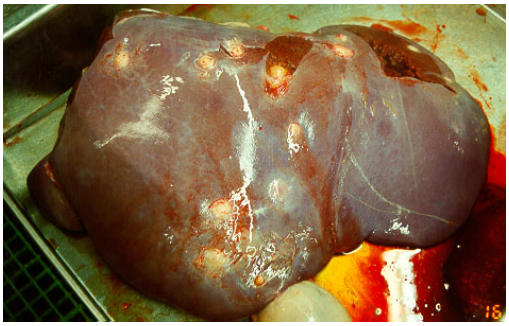
Health of the animal affects elimination. Older cows may have underlying liver disease. This reduces drug metabolism and prolongs the time a drug persists in the body. This can lead to problems with drug toxicity or lead to residue violations.

Example

Effect of Liver Disease

Fatty livers in dairy cattle and liver abscesses (see Figure 6) in feedlot steers reduce liver function.

Figure 6 Liver Abscess



Dehydration and kidney disease reduce drug excretion. The drug accumulates in body tissues because it cannot be eliminated. The buildup of drug may be toxic to the animal and may result in violative drug residues.

Example

Effect of Dehydration and Kidney Disease

Calves with scours and cows with coliform mastitis may be as much as 10 percent dehydrated. Kidney function is reduced and drug excretion slowed in these animals.

Young calves do not have the same liver and kidney function as older animals. Therefore, it may take longer for medication to be metabolized and excreted. This means withdrawal times that have been determined for adult cattle may not be appropriate for calves. This is especially important for veal producers, as the young calves may not have time to eliminate drugs from their body before slaughter.

Talk to your veterinarian whenever you are treating an animal with multiple drugs simultaneously to ensure the best therapy with the fewest side effects.

Interaction With Other Drugs

If you administer more than one drug at a time, each drug may interfere with the pharmacokinetics of the other, changing absorption, distribution and elimination. When these characteristics are changed, the drug's effects on the animal may change, giving you unexpected treatment results.

Exercise

Drug Treatment Failure

Treating a medical problem with more medication is not always better! The drug must be absorbed from the administration site, distributed to the tissue where it is needed, and finally eliminated. If the animal's disease is affecting absorption, distribution or elimination, the drug treatment may fail. Giving an increased dosage or frequency of the drug isn't likely to solve the problem.

Figure 7 Sick Calf

A few cows in your barn have been coughing and breathing heavily for the past few weeks (see Figure7). Your veterinarian diagnoses bacterial pneumonia and treats the cows with a long-acting oxytetracycline (e.g., Liquamycin™ LA-200, Bio-Mycin™ 200) at 5 cc/100 lb., or 60 cc per cow subcutaneously. Three days later they are still coughing and breathing heavily. Your neighbor has had a similar problem, and he said giving them 100 cc of the same drug fixed them right away. You have the leftover bottle on the shelf and decide to try this dose. Why isn't this likely to work any better than your original treatment? Try to write down several reasons before you look at the possible answers that follow.

_____

_____

_____

_____

_____

Possible Answers

- The drug is slowly absorbed from under the skin at a constant rate determined by the physical properties of the medication. Giving more medication isn't going to speed up the absorption! It will just increase the amount of time the drug stays in the body and increase the likelihood of a residue violation.
- The drug may not be distributed at the proper level to the lungs. You can give all the medication you like, but if the drug can't penetrate the lung tissue because of inflammation and/or scar tissue, the therapy won't work. Giving more medication won't change how the drug is distributed.
- The "bugs" causing the pneumonia may not be susceptible to this drug. Even if the drug is absorbed properly and distributed to the lungs at the desired level, the treatment won't work if the bacteria you are trying to kill aren't affected by this antibiotic.
- The pneumonia may be caused by a virus (e.g., IBR, BRSV) which doesn't respond to antibiotics.
- Even if the cause of the pneumonia is successfully treated, the inflammation in the lungs may not resolve immediately. This means the clinical signs (coughing, heavy breathing) will continue. These are not signs of treatment failure.

Other Reasons Not to Increase Drug Dosages

- This is extra-label drug usage, which should only be done under direct veterinary prescription.
- It increases the chance of side effects. Overdoses of oxytetracycline can cause kidney failure.
- It increases the risk of drug residues in meat or milk.
- The drugs aren't cheap…using more costs you more money (see Figure 8)!

Figure 8 Drugs are Expensive

Figure 9 CFIA Inspection

Drug Residues and Withdrawal Times

Consumers are increasingly worried about food safety and drug residues. If the consumer believes animal products are "tainted," it affects the bottom line of every producer.

A drug residue violation occurs when the level of a drug in tissue or milk exceeds a certain amount known as the maximum residue limit (MRL). Once the level of the drug falls below the MRL, the meat or milk is considered safe for human consumption. The Canadian Food Inspection Agency (CFIA) is responsible for ensuring that drug residues are not present in meat and milk (see Figure 9). This is accomplished by visual inspections and random chemical tests at the milk processing and meat slaughter facilities. If a screening test indicates drug residues, samples are sent to CFIA labs for more specific testing. If the animal tests positive for drug residues, it is condemned and an investigation occurs to determine the problem and corrective actions.

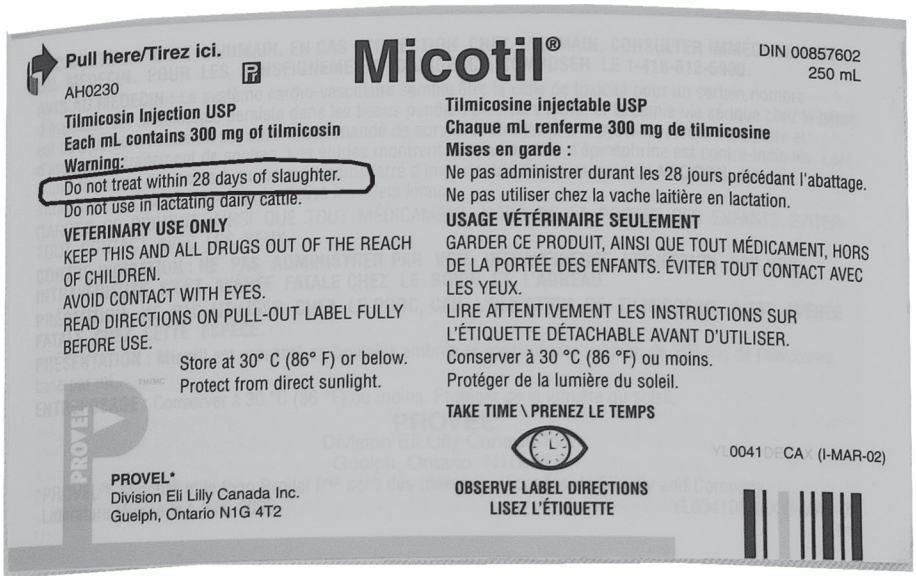
Determining Drug Withdrawal Times

The withdrawal time for a drug is the time required after the drug has been administered according to the label for the drug concentration to fall below the MRL in the meat or milk. The withdrawal time can be found on the drug bottle or insert pamphlet (see Figure 10). As a producer, it is your responsibility to follow the withdrawal time listed. Other factors may extend the amount of time needed to withhold meat or milk. These include:

Health of an animal and extra-label drug use can extend drug withdrawal times.

- Extra-label drug use. Occasionally, your veterinarian may recommend extra-label drug usage (ELDU). This often occurs when there isn't a product labelled for the specific condition you are treating. **ELDU is defined as using a medication in a manner different from the instructions on the drug label.** It could be a change in the drug dosage, frequency of treatment, route of administration, species or age of animal treated or disease condition. ELDU must only occur under veterinary prescription. ELDU may change the amount of time you need to withhold the meat or milk. Ask your veterinarian for written withdrawal times whenever you are directed to use a product in a different manner than what is on the label.
- Health status of the animal. Label withdrawal times are determined by studies using relatively healthy animals. As discussed earlier, old or extremely sick animals do not absorb, distribute and eliminate drugs the same as healthy animals.
- Some medications do not state a meat or milk withdrawal time on the label. This does not mean there is no withdrawal time for that product! If residues of that drug are found in meat or milk samples, it will be considered a violation.

Figure 10 Withdrawal Period



Example

No Withdrawal Time on Label

The common drug dexamethasone (Dexamethasone 2, Dexamethasone 5) does not state a meat or milk withdrawal time on the label. There is no MRL for dexamethasone in meat and milk so any residue detected is considered a violation.

Note: If you are not sure about a medication's withdrawal time, contact your veterinarian for the necessary information.

Detecting Drug Residues

Routine testing of meat and milk samples occurs at slaughter and milk processing facilities. Random normal samples are tested, as well as all non-ambulatory cattle, injection sites and abnormal tissues. There are a number of rapid preliminary tests used at the plant. If more specialized testing is required, the samples are sent to Canadian Food Inspection Agency (CFIA) labs. Their state-of-the-art equipment determines the identity and quantity of drug residues in food products. However, it is better to prevent meat and milk products from being marketed with drug residues than it is to deal with a violation.

For Dairy Producers

A number of simple test kits (see Figure 11) are available to determine if residues for specific drugs are present in your milk samples. These include:

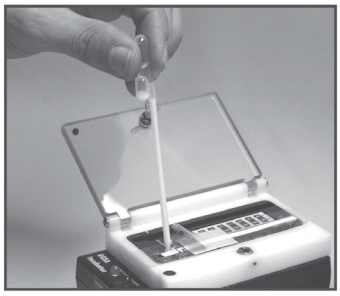
- Charm Farm Cowside test
- CHARM FARM ROSA Test Kit for testing bulk tank raw milk
- IDEXX Snap tests
- Delvotest P/SP.

These tests are all simple to operate, inexpensive and relatively accurate. Send samples of questionable milk to the processing plant for further testing.

For Beef Producers

On-farm testing of meat samples is more difficult. Meatsafe™ is an on-farm test that uses a cow's urine to determine if violative residues of penicillins are present.

Figure 11
Test Kits for Dairy



More Info

For further information about on-farm drug residue tests, visit:
www.idexx.com/dairy–HYPE
www.charm.com/pdf/100-9911-662-300-02_Cowside.pdf

Charm is distributed in Alberta by Alta Genetics:
www.altagenetics.com/english/newproducts/homedcdn.htm
www.dsm.com/en_US/html/dfs/dairy-products-tests-delvotest.htm
www.meatsafetestkits.com

How to Avoid Drug Residue Violations

- Use all drugs strictly as the label indicates. Only use a drug in an extra-label manner if directed by veterinary prescription.
- Clearly identify all treated animals. Most violations occur because treated animals are not identified properly and milk or animals with drug residues are accidentally shipped.
- Keep accurate treatment records.
- Whenever possible, use drugs with short or zero withdrawal times.
- Use rapid tests on milk or urine samples to prevent violations.
- Communicate with other workers, your veterinarian and milk/meat processors (see Figure 12).

Figure 12
Communication is Key

Summary

You should now understand the process of how drugs are absorbed, distributed and eliminated from an animal's body. This will help you take the steps necessary to avoid drug residues by observing withdrawal times.

Module 6 Prudent Drug Use

Objectives

After you complete this module, you will be able to:

- Describe the conditions required to meet a valid veterinary-client-patient relationship
- Select medicines based on established criteria and establish a treatment protocol
- List possible reasons for treatment failure
- Read and understand medicine labels
- Calculate correct dosages
- Avoid adverse drug reactions.

As a producer, it is your responsibility to use drugs under veterinary direction, only when necessary, and according to label directions or veterinary prescriptions for extra-label drug use in order to ensure food safety and consumer confidence in meat and milk products.

Figure 1 Producer with Sick Calf

Valid Veterinary-Client-Patient Relationship (VCPR)

A veterinarian must have a valid VCPR to sell prescription drugs or recommend extra-label use of drugs. A valid VCPR (see Figure 2) exists when the following conditions have been met:

Figure 2 VCPR

- A veterinarian has assumed responsibility for making clinical judgments regarding the health of the animals and the need for medical treatment and the client has agreed to follow the veterinarian's instructions.
- A veterinarian has sufficient knowledge of the animals to initiate at least a general or preliminary diagnosis of the medical condition of the animals. This means that the veterinarian has recently seen and is personally acquainted with the keeping and care of the animals by virtue of an examination of the animals or by medically appropriate and timely visits to the premises where the animals are kept.
- A veterinarian is readily available for follow-up evaluation, or has arranged for emergency coverage, in the event of adverse reactions or failure of the treatment.

Read, Understand and Follow the Label

It is important to read and understand the labels of all animal health products used in cattle and to follow label directions and veterinary prescriptions for extra-label drug use (see Figure 3). If you do not use drugs correctly, you increase the risk of drug residues in meat and milk and the development of antimicrobial resistant bacteria. Additionally, if products are not used correctly, they will not be effective, and this is simply a waste of money.

Figure 3 Read the Label

Results of Improper Drug Use

- Increased treatment failures
- Chronically ill animals
- Use of more drugs and higher drug costs to treat the condition
- Increased risk of drug residues and antimicrobial resistant bacteria
- Increased death rates.

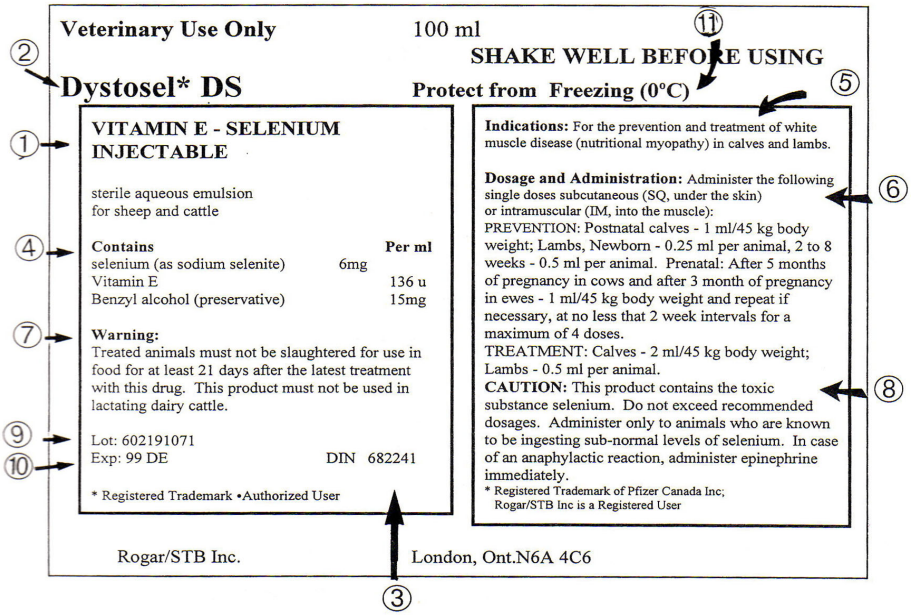
How to Read the Label and Package Insert

All medicine legally sold in Canada must be labeled according to federal regulations. Often there is not enough room on the label, so the manufacturer includes this information on the package insert. Labels and package inserts contain all the necessary information on how to use the product properly and contain the following:

- Trade name or brand name of medicine
- Active ingredients—generic name of ingredients that perform the action claimed on the label and the concentration of each ingredient (the drug concentration is important in determining correct dosage)
- Prescription—whether a prescription drug (Pr next to product name on label)
- Registration number—tells you the product is safe for use
- Drug identification number (DIN Number)—means drug approved by Health Canada
- Pesticide control product number (PCP Number) or a CFIA establishment number for biologics (vaccines)
- Indications for use—on what animal species and diseases the medicine works
- Pharmacology—how the medicine works
- Dosage and administration—amount of medicine to use with each administration, route of administration (in the muscle (IM), under the skin (SQ), in the vein (IV), orally, pour-on, intramammary or other routes of administration), frequency and duration of administration (e.g., once daily for 3 days, once only). May also indicate how to mix it if it needs reconstitution or dilution.
- Contraindications—when not to use the medicine (e.g., pregnant cows)
- Precautions—storage conditions
- Cautions—side effects (e.g., injection site reactions, anaphylactic reactions)
- Warnings—alerts you to human health and safety issues and often contains withdrawal information
- Presentations—size of bottles or containers
- Expiry dates—generally on the bottle label. Indicates shelf life of the product. Products past the expiry date should be disposed of or returned to supplier.
- Lot number/serial number—generally on the bottle. This manufacturing information is important so that adverse reactions can be reported and an investigation undertaken.
- Manufacturer's name—company that produces the product or the distributor of the product

Exercise *Reading a Label*

Using the information on page 6 - 3, identify each of the numbered parts on the label below.



1. _____

2. _____

3. _____

4. _____

5. _____

6. _____

7. _____

8. _____

9. _____

10. _____

11. _____

See page 6 – 13 for the answers.

Keep one copy of each label and package insert on file for every animal health product you use and have this handy at the location where cattle are processed or treated. If there is a question on the product, it can be reviewed quickly. If the information is not on the label or you are in doubt, contact your veterinarian before using the product.

Selecting a Medicine

Exercise

Checklist for Selecting a Medicine

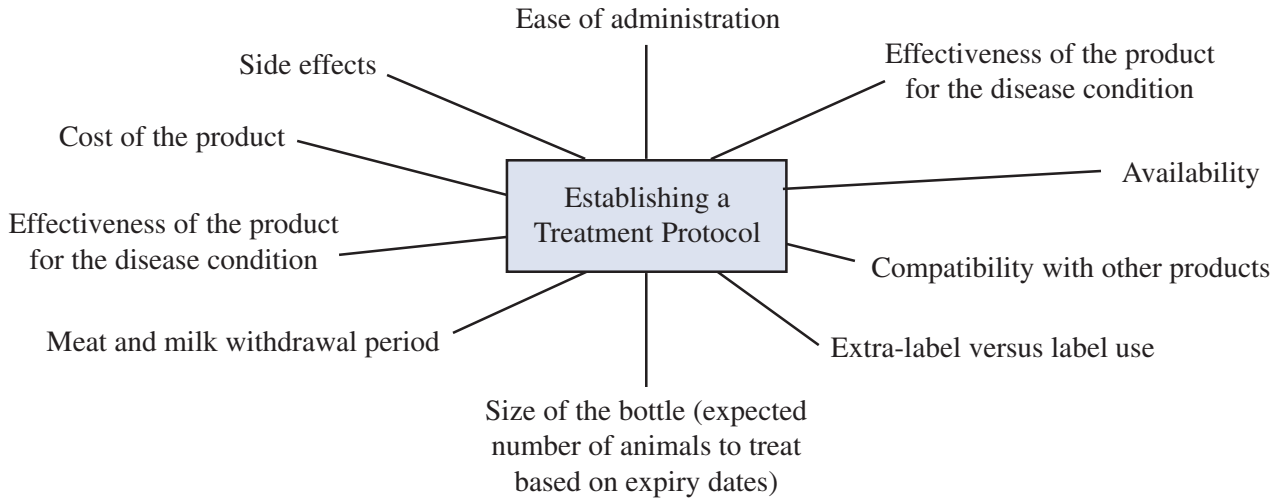
When selecting a medicine, use the following checklist.

- ❒ I have the correct disease diagnosis. If unsure, I contact my veterinarian.
- ❒ The medicine indicated for treatment of this disease is listed in my veterinary treatment protocol. If not, I contact my veterinarian to see if its use is appropriate and update my treatment protocol accordingly. If the veterinarian doesn't agree that it is an appropriate medicine for the disease condition, I do not use it (see Figure 4).
- ❒ The medicine is being used according to label directions. If not, I have a written veterinary prescription for its use extra-label and this extra-label use is consistent with my treatment protocol. If not, I do not use it.

Figure 4
Check With Your Vet

Establishing a Treatment Protocol

When establishing a treatment protocol with your veterinarian for common diseases in your herd, consider the following:



Use drugs extra-label only when there is no approved drug for the disease condition available and the scientific evidence suggests such extra-label drug use is effective and does not have serious harmful side effects.

Harmful Side Effects

- Anaphylactic reactions
- Long drug withdrawal periods
- Harmful to humans.

Your veterinarian must determine the appropriateness of the extra-label drug use.

The treatment protocol developed with your veterinarian should list common diseases, clinical signs of disease, what medicine to use, the dose, route, frequency and duration of treatment, and drug withdrawal period.

Treatment Failure

If you are experiencing treatment failure, for example, repulls/relapses of the same animal with the same disease condition shortly after initial treatment, contact your veterinarian for advice.

Possible Causes of Treatment Failure

- Wrong disease diagnosis
- Late pull (disease advanced prior to initiation of treatment)
- Very virulent (ability to cause severe disease) pathogen
- Pathogen located in a part of the body where the drug has difficulty reaching (e.g., brain, joints)
- Concurrent infection with other viruses or bacteria, such as concurrent BVD infection or animal with a poor immune system due to inadequate nutrition
- Infected tissue is walled off with scar tissue and the antibiotic can not gain access to the bacteria (e.g., *Staphylococcus aureus mastitis*)
- Viral infection which is not responsive to antimicrobials
- Ineffective medicine
  - Doesn't work for disease because not tested for such use (extra-label)
  - Dosage or duration of treatment not adequate
  - Bacteria has developed resistance to antimicrobial
  - Other concurrent medication is interfering with drug.

See the Glossary for a definition of "pathogen".

Work with your veterinarian to identify potential causes of treatment failure to help improve treatment success.

How to Calculate the Correct Dose

To calculate the correct dose, you need to know the:

- Required dosage rate for the drug (e.g., 1 mL/10 kg of the animal's body weight)
- The weight of the animal (in kg or lb.) as accurately as possible
- The concentration of the drug (200 mg of drug per mL of solution).

Sometimes the concentration of the drug is provided on the label as X mg per mL, and you have to administer Y mL.

It is important that the weight of the animal and the dosage rate are in the same units of measure, that is, both are in metric (liter, kilogram) or both are in imperial (fluid, ounce, pounds). You may need to convert fluid ounce to mL and/or lb. to kg.

Converting Units of Measure

In the metric system, "milli" means thousandth part (1 mL = 1/1000 L) and "kilo" means one thousand (1 kg = 1000 grams)

Volume (liquid)

1 mL (milliliter) = 1 cc (cubic centimeter) = 1/1000 litre
1000 mL = 1 litre (L)

Conversions:

1 imperial quart = 1.137 L	1 litre = 0.88 imperial quart
1 imperial gallon = 4.546 L	1 litre = 0.22 imperial gallon

Weight

1 mg (milligram) = 1/1000 gram
1000 mg = 1 gram (g)
1000 g = 1 kilogram (kg)
1000 kg = 1 tonne

Conversions:

1 kg = 2.2 lb.	1 lb. = 454 grams or 0.454 kg	100 lb. = 45 kg

Quick Conversion from lb. to kg

Divide by 2, then subtract 10%

20 lb. divided by 2 = 10 minus 1 (10% of 10) = 9 kg.

Sample Calculation

Here is an example using long-acting oxytetracycline for the treatment of pinkeye.

Calculation for Oxytetracycline

The label says to use 1 mL per 10 kg body weight. This provides 20 mg oxytetracycline per kg body weight. The bottle contains 200 mg oxtetracycline per mL. The animal weighs 1100 lb.

Step 1: Convert animal weight to kg:
1100 lb./2 = 550 lb. minus 55 (10% of 550) = 495 kg

Step 2: Read the dosage provided on label
1 mL per 10 kg

Step 3: Calculate dose
(weight of animal) x mL per dose = 495 kg/10 kg x 1 mL = 49.5 mL
weight per dose

Alternate Calculation

Step 1: Read concentration of active ingredient in bottle: 200 mg/mL

Step 2: Determine weight of animal (as above): 495 kg

Step 3: Read dose per kg of body weight: 20 mg/kg

Step 4: Calculate dose
(weight x dose/kg) = 495 x 20/200 = 49.5 mL
concentration

Parts Per Million Calculation

Mg/kg = g/tonne = ppm (parts per million)

1000 g in 1 kg and 1000 mg in 1 g

In 1 kg there are (1000 x 1000) mg, or 1,000,000 mg

Therefore, 1 mg in 1 kg is the same as 1 mg in a million mg, or 1 ppm

Calculating Amount of Product to Buy for Group Treatment

Calculate the amount of product and dose required for each animal in the following situation.

You have 10 cows (average weight 1350 lb.).

You need to treat them with Excenel Sterile Powder to reduce the effects of pneumonia in the group.

See the Excenel Sterile Powder insert in Appendix 3.

How much product do you give each cow (dosage per animal)?

Label dosage _____

Weight of animal _____

Dose required per animal _____

Total amount of product required _____

How many times should you administer the product? _____

See page 6-13 for the answer.

Calculating the Correct Dose for a Pour-On

Based on the information provided on the product insert for Lysoff (see Appendix 3), calculate the product required to treat 120 animals.

You have 120 animals on average weighing 450 lb.

Step 1: Convert lb. to kg _____

Step 2: Calculate the dose per animal _____

Step 3: Find the number of animals to treat and the size of animals on the chart on the Lysoff label _____

Step 4: Determine the amount of final mixture required (product mixed with water) _____

Step 5: Find the amount of product required (number of cans) _____

See page 6 – 13 for the answer.

Drug Interactions and Adverse Reactions

Unexpected results can result when various animal health products are mixed or used together. Some occurrences are beneficial, others have no effect and some are detrimental.

Drug Incompatibilities / Compatibilities

Drug incompatibilities generally refer to detrimental chemical interactions that occur when drugs are mixed together prior to administration. Some of these incompatibilities are immediately obvious such as when precipitates occur.

> Note: Under no circumstances should drugs be mixed together in a bottle or syringe prior to administration unless indicated on the label.

Various other effects occur when drugs are given separately but at the same time. These effects are known as additive, synergistic and antagonistic. These effects are most commonly associated with the use of antimicrobials.

Additive Effect

An additive effect is when the activity of two or more drugs is equal to the sum of their parts. For example, when treating a mixed bacterial infection, two antimicrobials may be administered simultaneously to treat all the bacteria involved.

Synergistic Effect

A synergistic effect occurs when the activity of two or more drugs is greater than the sum of their individual activities. For example, Trivetrin, Borgal and Tribissen are all combinations of trimethoprim and a sulphonamide antimicrobial. They block sequential steps in the bacteria's protein production, with a resulting synergistic antimicrobial effect.

Example

Antagonistic Effect

An antagonistic effect occurs when the activity is less than the sum of the activity of the individual drugs. For example, penicillin products (Procillin, Depocillin) and oxytetracycline drugs (Liquamycin, Biomycin) do not work well together.

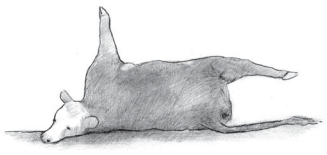
It is your veterinarian's responsibility to ensure that the treatment protocol developed for your herd includes only compatible uses of drugs. This also includes compatible uses of two or more feed medications in a ration. Compatible feed medication mixes are specified in the Compendium of Medicating Ingredients Brochures (CMIB). Any use of two or more feed medications in a feed that are not listed as compatible in the CMIB requires a written veterinary feed prescription for such combined use. When in doubt, contact your veterinarian.

Adverse Drug Reactions

Adverse reactions are unexpected side effects, such as allergic reactions, swellings at the injection site, death of the animal, or failure of the drug to cure the disease (see Figure 5). Report any adverse reactions to your veterinarian who should notify the manufacturer of the drug and the government agency responsible for regulating the drug.

Allergic reactions may show up as skin rashes but more likely as rapid swellings of the eyelids, nose, head, vulva and rectum. The animal may go down immediately following injection in the chute and can die rapidly. Discuss adverse reactions with your veterinarian and include the proper treatment in your treatment protocol so that you are prepared to diagnose and treat such conditions if they occur.

Figure 5
Adverse Drug Reaction



Injection site swellings may occur because of unsanitary injection techniques.

Example

Effect of Dirty Injection Site

Injecting through a dirty hide or using a dirty needle or improper restraint of the animal prior to injection causes significant tissue damage.

Review injection techniques to identify ways to reduce swellings, such as more frequent changing of needles and injecting in clean areas of the neck. Some drug formulations cause more injection site irritation than others. Check the label to see if the product causes transient injection swellings. If you experience a large number of injection site swellings in cattle after using a particular product, contact your veterinarian for advice.

Withdrawal Times

You must always follow the withdrawal time on the label if using the product according to label directions. If using the product extra-label, you must follow the written veterinary prescription. When in doubt, contact your veterinarian.

Identifying Information on the Label

See the following labels in Appendix 3.

- Mastitis preparation (Dry Clox)
- Injectable antimicrobial (Borgal)
- Water medication (Sulfa)
- Feed additive (Rumensin)
- Disinfectant (Hibitane)
- Pesticide (Ivomec)
- Vaccine (Tasvax)

Using the labels above, fill in the chart below. The answers for Dry Clox are given on page 6-14.

	Dry Clox	Borgal	Sulfa	Rumensin	Hibitane	Ivomec	Tasvax
Indications							
Species and Size of Animals							
Amount to Administer							
Route of Administration							
Warnings (withdrawal)							
Restrictions							
Safety Issues							
Type of Product (antibiotic, vaccine, etc.)							
Storage							
Quantity							
Approval #							
Prescription Product?							
Ingredients							
Manufacturer							

Summary

You should now be able to understand drug labels and use them to avoid adverse drug reactions. You should be able to calculate correct dosages and provide reasons for treatment failure.

Answers to Exercise on Page 6 – 4

1 generic name

2 trade name

3 DIN number

4 active ingredients

5 indications for use

6 dosage and administration

7 warnings

8 cautions

9 lot number

10 expiry date

11 precautions/storage conditions

Answers to Exercise on Page 6 – 9 (top)

Label dosage: 50 mg/mL

Weight of animal: 1350 lb. (614 kg)

Dose required per animal: 1.1 mg/kg

Total amount of product required: 13.5 mL

Frequency: daily for 3 days

Answers to Exercise on Page 6 – 9 (bottom)

Step 1: 450 lb./2.2 = 205 kg

Step 2: 62.5 mL/100 kg = 128 mL

Step 3: 120 animals @ 205 kg (chart = 122 animals at 200 kg)

Step 4: 120 animals x 128 mL = 15.3 L

Step 5: 1 can (1.70 L)

Answers to Exercise on Page 6 – 12

	Dry Clox	Borgal	Sulfa	Rumensin	Hibitane	Ivomec	Tasvax
Indications	mastiths						
Species and Size of Animals	*dairy cows (dry period)*						
Amount to Administer	*10 mL*						
Route of Administration	*into each quarter*						
Warnings (withdrawal)	*30*						
Restrictions	*not in lact. cows*						
Safety Issues	*potential allergic reation*						
Type of Product (anibiotic, vaccine, etc.)	*antibiotic*						
Storage	*15 - 30° C*						
Quantity	*12 x 10 mL syringe*						
Approval #	*DIN*						
Prescription Product?	*Yes*						
Ingredients	*cloxacillin*						
Manufacturer	*Wyethe*						

Module 7 Antimicrobials

Objectives

After you complete this module, you will be able to:

- Explain how antimicrobial resistance happens
- Describe your role in the prudent use of antimicrobials
- Describe your veterinarian's role in the prudent use of antimicrobials.

Antimicrobial Resistance

Antimicrobial resistance is the ability of microorganisms, such as bacteria, to evade the inhibiting or killing action of an antimicrobial. Microorganisms can be naturally resistant to particular antimicrobials or they can acquire antimicrobial resistance. Overuse and misuse of antimicrobial drugs contributes to the development of antimicrobial resistance.

As a producer, you can do your part to ensure prudent drug use (see Figure 1).

Prudent Drug Use by Producers

- Implement good animal husbandry practices, such as herd health, nutritional, biosecurity and on-farm food safety programs. These programs focus on disease prevention, accurate disease diagnosis, animal identification, and proper disease treatment and control.
- Follow veterinary recommended processing/vaccination schedules and treatment protocols and prescriptions, based on a valid veterinary-client-patient relationship. When in doubt or experiencing treatment failures, contact your veterinarian for advice.
- Keep accurate processing, treatment, feed and shipping records.

Figure 1 Cattle Producer

- Stay current on the use of alternatives to antimicrobials to improve production or growth, such as alternate feeds and feeding strategies and probiotics.

As a producer, you can expect the following prudent drug use by your veterinarian (see Figure 2).

Figure 2 Veterinarian

Prudent Drug Use by Veterinarians

From: Canadian Veterinary Medical Association

GUIDELINES ON THE PRUDENT USE OF ANTIMICROBIAL DRUGS IN CATTLE, November 2001

Following are general guidelines for the prudent therapeutic use of antimicrobials in beef and dairy cattle:

1. Veterinarians should concentrate their efforts on assisting clients with the design of management, immunization, housing, and nutritional programs that will reduce the incidence of disease, and decrease the requirement for antimicrobial use.
2. Veterinarians should dispense and prescribe antimicrobials only within the confines of a valid veterinarian-client-patient relationship.
3. Veterinarians should properly select and use antimicrobial drugs.
   a. Veterinarians should participate in continuing education programs that deal with antimicrobial use and antimicrobial resistance issues.
   b. Veterinarians should have strong clinical evidence (based upon clinical signs, history, necropsy examination, laboratory data, and past experience) that the disease they are treating is being caused by a bacterial pathogen, as well as some idea as to the identity of the target organism.
   c. Veterinarians should select antimicrobial drugs appropriate for the target organism and administer them at a dosage and route likely to achieve effective concentrations in the target organ.
   d. Veterinarians should base antimicrobial drug selection and treatment regimens on available laboratory and package insert information, on additional published data, and with consideration of the pharmacokinetic and pharmacodynamic properties of the drug.
   e. Veterinarians should use antimicrobial drugs labeled for the condition diagnosed whenever possible. The label dose and the route, frequency and duration of treatment should be followed, whenever possible.
   f. Veterinarians should use antimicrobial drugs for as short a period of time as reasonable; that is, therapy should be discontinued when it is apparent that the immune system can manage the disease, reduce pathogen shedding, and minimize recurrence of clinical disease or development of the carrier state.

g. Veterinarians should select antimicrobial drugs that have the narrowest spectrum of activity and known efficacy in vivo against the pathogen causing the disease problem.

h. Veterinarians should avoid use of combination antimicrobial therapy, unless there is evidence that the combination increases efficacy or suppresses the development of resistance in the target organism.

i. Veterinarians should use local over systemic therapy, when appropriate.

j. Veterinarians should use antimicrobial drugs of lesser importance in human medicine in preference to newer generation drugs that may be in the same class as drugs currently used in humans, provided that this can be achieved while still protecting the health and safety of animals under their care.

k. Veterinarians should avoid use of compounded antimicrobial formulations.

l. Veterinarians should use antimicrobial drugs with specific clinical outcome(s) in mind, such as fever reduction, return of mastitic milk to normal, or to reduce shedding, contagion and recurrence of disease.

m. Veterinarians should periodically monitor herd pathogen susceptibility and therapeutic response, especially for routinely employed treatments (e.g., dry cow intramammary antibiotics), in order to detect changes in microbial susceptibility patterns and to reevaluate antimicrobial selections.

n. Veterinarians should counsel against treatment of chronic cases or animals with a poor chance of recovery. Chronic cases should be removed or isolated from the remainder of the herd.

o. Veterinarians should employ prophylactic or metaphylactic use of antimicrobial drugs, based on a group, source or production unit evaluation, rather than utilizing them as standard practice.

p. Veterinarians should protect drug integrity through proper handling, storage and observation of the expiration date.

4. Veterinarians should endeavor to ensure proper on-farm drug use.

a. Veterinarians should prescribe or dispense drug quantities appropriate to the production-unit size and expected need, so that stockpiling of antimicrobial drugs on the farm is avoided.

b. Veterinarians should train farm personnel who use antimicrobials on indications, dosages, withdrawal times, route of administration, injection site precautions, storage, handling, record keeping and accurate diagnosis of common diseases (see Figure 3). The veterinarian should ensure that labels are accurate to instruct farm personnel on the correct use of antimicrobial drugs.

c. Veterinarians should be encouraged to provide written guidelines to clients, whenever possible, to describe conditions and instructions for antimicrobial use on the farm or unit.

Figure 3
Vet Giving an Injection

Summary

This brief module has provided you with an understanding of how antimicrobial resistance occurs and your role and your veterinarian's role in the prudent use of antimicrobials.

Module 8 Injection techniques

Objectives

After you complete this module, you will be able to:

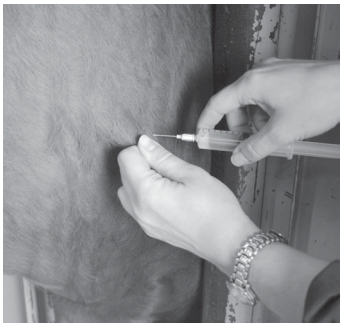
- Use proper injection techniques to prevent broken needles and to improve beef quality by reducing injection site scars that cause tough beef and trim losses
- Deal with broken needles in an appropriate manner to prevent food safety problems.

Broken needles pose a food safety hazard in beef. Beef processors report more than a dozen complaints annually. Often these broken needles aren't found until they reach the consumer's plate causing the consumer to lose confidence in beef. Producers can prevent broken needles with good injection practices.

Proper Injection Techniques

Good injection practices include proper restraint of animals, proper selection of injection sites and proper use and disposal of needles (see Figure 1).

Figure 1 Proper Subcutaneous Injection



General Practices

- Train personnel in good injection techniques before you let them vaccinate or treat cattle.
- Properly restrain cattle before injection (see Figure 2). This means in a chute or by rope.
- Buy chutes that have better access to give neck injections or add neck extensions on existing chutes.

Figure 2
Proper Cattle Restraint

Injection Sites and Methods of Product Administration

- Give all intramuscular and subcutaneous injections in the neck (see Figure 3).
- Do not give injections in the rump (sirloin steaks) or the thigh (round steaks and roasts) since these are expensive cuts of meat and injection site lesions create significant muscle damage, scarring and tough beef. The industry loses millions of dollars annually because of injection site damage (see Figures 6, 7, 9, 10 and 11).
- If products indicate that they can be given subcutaneously (SC) or intramuscularly (IM), give them SC to reduce the risk of tissue damage (see Figure 3 for proper techniques).

Figure 3 Proper SC Injection Technique

- Use products that can be given by routes other than by injection (e.g., pour-on).
- Do not inject more than the recommended dose per injection site on the label. Generally that means not to inject more than 10 cc (mL) per injection site.
- Space multiple injections in the neck a few inches apart.
- For IM injections, inject needle perpendicular into the muscle at right angles to the body for a deep IM injection (see Figure 4).
- Inject into a clean site on the animal.
- Use the tented method to give subcutaneous injections, other than for Micotil. For Micotil, follow label directions on injection techniques.

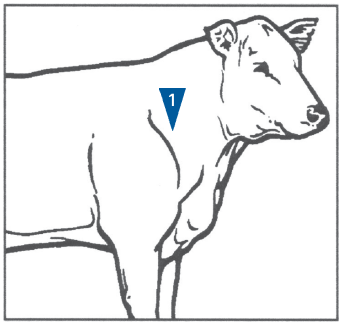
Figure 4 Proper IM Injection Technique

Micotil

Proper Micotil Administration Procedures

- Properly restrain animals prior to administering Micotil.
- With a single hand on the syringe, insert the needle subcutaneously, at a top-down angle, while avoiding penetration of underlying muscle.
- Administer a single subcutaneous dose of 1.5 mL of Micotil per 100 lb. of body weight.
- For beef cattle, injection site 1 (see Figure 5) is recommended, unless this site is inaccessible or places the operator in a potentially dangerous situation.
- For sheep, injection in a skin fold behind the shoulder and over the ribs is suggested.
- Ensure proper disposal of sharp needles and syringes.

Figure 5 Micotil Site



Needle Use

- Use clean needles (see Figure 6 for damage caused by dirty needle)
- Do not leave needles in the bottle after use
- Use the right size of needle:
  - For intramuscular injections, use a 16 or 18 gauge needle from ¾ to 1½ in. long.
  - For subcutaneous injections, use a 16 or 18 gauge needle from ½ to ¾ in. long.
  - For intravenous injections, use a 14 or 16 gauge needle, 1 to 2 in. long.
- Change needles if bent, burred or dull. Normally needles should be changed at least after every 10 to 15 head.
- Don't straighten or re-use bent needles.
- Consider the use of needle-eze extensions or slapshot tubes
- Do not use projectile guns, such as dart guns (see Figure 7) since the risk of broken needles increases, they cause significant tissue damage because of the pressure and volume of drug administered, and they can result in violative drug residues because large volumes of drug are given in one injection site (e.g., 35 to 50 cc in one site). Use of these apparatuses to give long-acting oxytetracycline is extra-label since more than 10 cc (mL) of product would be injected in one site and label directions for long acting oxytetracycline require that no more than 10 cc (mL) be injected per site.
- Use luer slip rather than luer lock syringes

Projectile guns cause significant tissue damage and increase the risk of broken needles.

- Discard used needles in a sharps container (see Figure 8). A sharps container is a separate pail or empty bottle (e.g., bleach bottle) where needles, scalpel blades, etc. can be discarded so that they are not mixed with other garbage. You can purchase these containers from your veterinarian. Label the sharps container. Keeping sharps separate from other garbage reduces the risk of worker injuries and ensures proper environmental disposal. Contact your local municipal dump to see if they take sharps containers.

Figure 6 Abscess Caused By Dirty Needle or Injecting Through Dirty Hide

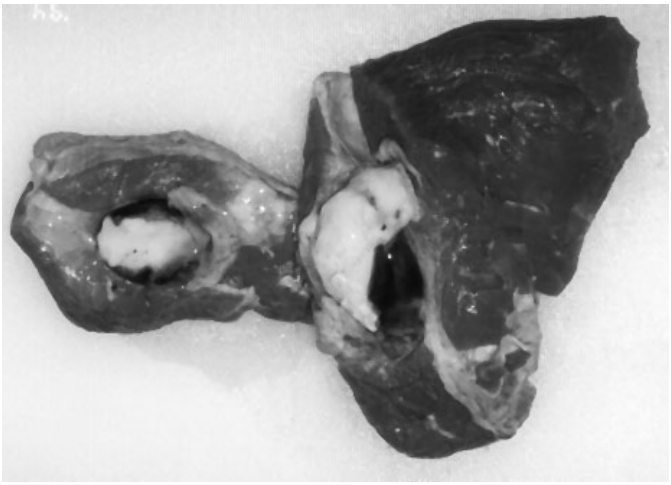
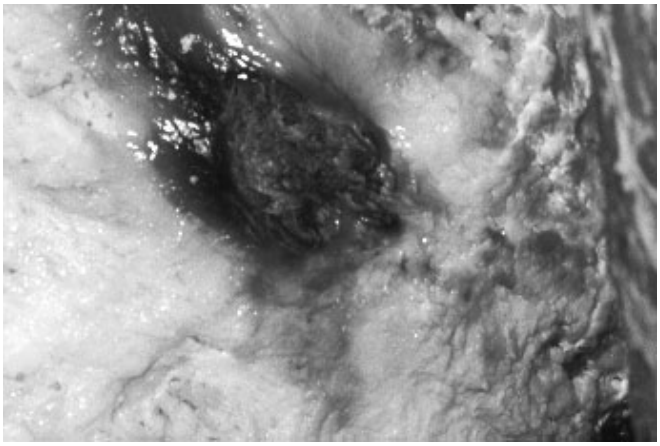


Figure 7 Damage Caused by Medi Dart Gun 28 Days After Injection



Note the damage caused by a dart gun.

- Consider the use of "Ideal needles" or "D3 needles". They contain a metal alloy that is more readably detectable by a metal detector, in the case of a broken needle.

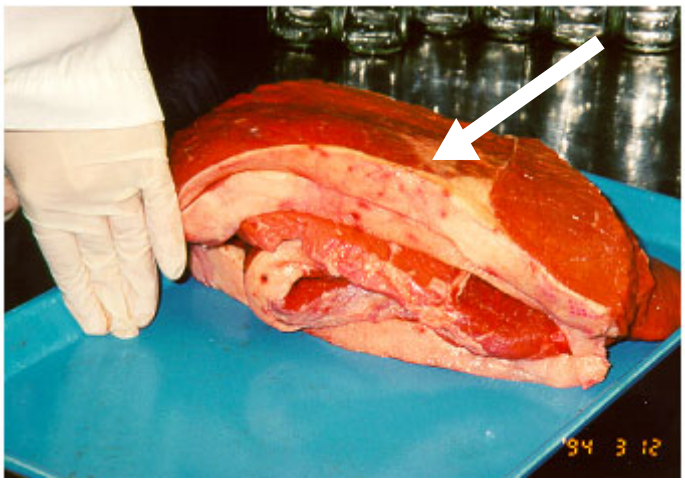
Figure 8 Sharps Container

Discard all used needles in a sharps container.

No matter what age an animal is injected, even at birth, injections will create scar tissue that will persist for the life of the animal. Up to 3 inches away from the scar tissue, the meat is tough (see Figures 9 to 11).

Figure 9 Injection Site Lesions in Round Steaks (thigh muscle)

Figure 11 Damage to Several Steaks From One Injection (arrow shows injection scar)



Dealing With Broken Needles

If a broken needle occurs:

- Try to find the needle to remove it and mark the site.
- If you can't find the needle, contact your veterinarian to see if they can find and remove it.
- If your veterinarian can not remove the needle, identify the suspect animal, record in your processing or treatment or broken needle records the affected animal and where the broken needle may be, and inform the next owner or processor in writing of the potential risk of a broken needle and mark the site (see Figure 12).
- Alternatively, keep this animal at home for freezer beef or euthanize it.
- Review injection techniques and retrain staff.

Broken needles pose a food safety hazard.

Figure 12 Site of Broken Needle

Summary

Broken needles and damage from poor injection techniques pose a food safety and meat quality hazard. You should now be able to prevent damage caused by incorrect injection practices and prevent broken needles.

Module 9 Drug Sites, Feed Medications, Implanting

Objectives

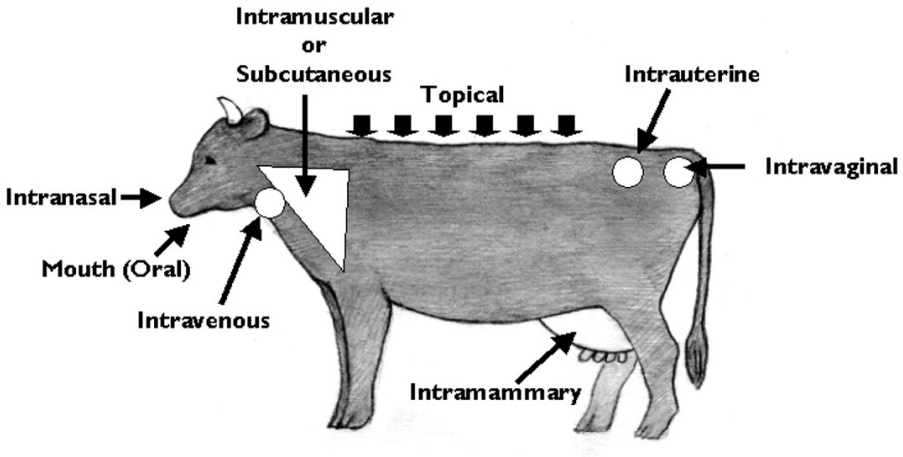
After you complete this module, you will be able to:

- Describe the common routes of administration of drugs
- Select the most appropriate drug administration site for a particular drug
- Handle feed medications properly
- Use proper implanting techniques.

Routes of Administration

The common routes of drug administration are illustrated in Figure 1.

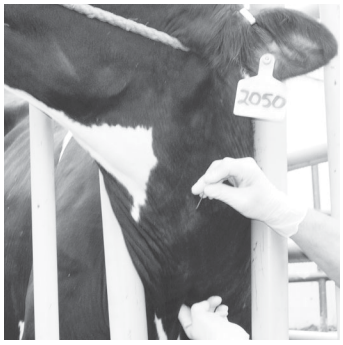
Figure 1 Drug Administration Routes

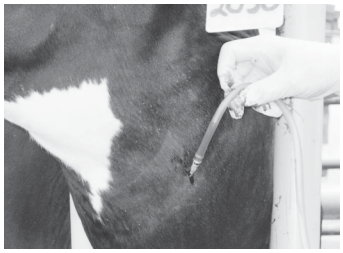


Refer to Module 8 Injection Techniques for good IM and SC injection techniques.

Intravenous Injection (IV)

Figure 2
Intravenous Injection





Although it is not addressed in the Canadian Quality Milk Reference Manual, intravenous injection is an important route of administration in the lactating dairy cow (see Figure 2). This is the route of choice for the administration of large volume pharmaceuticals to avoid muscle damage and ensure consistent withdrawal times. Read and follow label directions to determine proper dosage and ensure that the product is labeled for intravenous use. The jugular vein in the neck is used most commonly; however, the milk vein, tail vein and ear vein are also used. The same concerns regarding a clean injection site, proper size of clean sharp needles and proper restraint are even more important for IV injections.

Good Management Practices for Intravenous Injection

- Clean and disinfect the injection site with 70 percent alcohol prior to injection
- When using the jugular vein, insert a 1–2 in. 14 gauge needle perpendicular to an occluded, engorged jugular vein and then thread down the vein.
- Use the same technique for the milk vein, a vein easily accessible from the milking parlour.
- Do tail vein injections with 1 in. 20 gauge needle. This route is suitable for collecting blood or injection of small volume pharmaceuticals such as tranquilizers and oxytocin.

Intramammary Infusion (IM)

For intramammary infusion, use only products approved for treatment by this route. When treating with intramammary infusions, there is a risk that microbes could be carried past the normal teat defenses and into the udder. Proper hygiene and proper infusion procedures will reduce the risk of contaminating the udder.

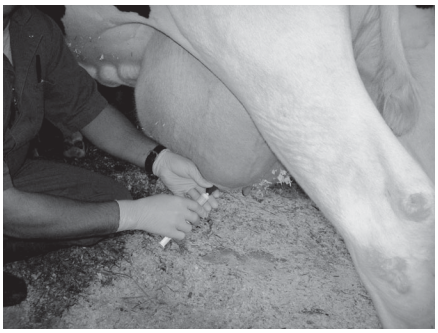
Good Management Practices for Intramammary Infusion

- After milking, dip teats with an approved dip (30 seconds contact time), and clean and disinfect with 70 percent alcohol (a new swab for each teat starting on the far side first), and then treat with an approved intramammary infusion starting with teats on the near side.
- When you administer intramammary products, use a short infusion cannula (3 mm) using the partial insertion technique (see Figure 3). This reduces the chance of forcing microorganisms into the teat cistern.
- After treatment, dip the teats again with an approved dip.
- Ensure milking personnel know which animals have been treated and when milk from each animal is safe to be placed in the bulk tank.

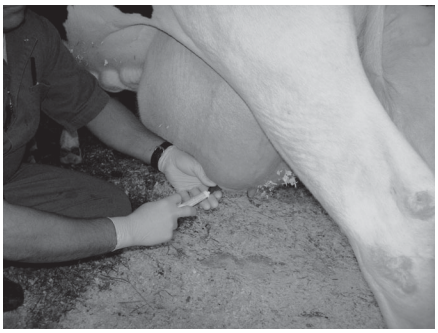
A new non-antimicrobial intramammary infusion is now available for dry cow treatment. The product (Orbeseal®) stays in the teat cistern to form a protective barrier preventing bacteria from entering the udder during the dry period. It is milked out after calving and has no residues requiring milk withdrawal times.

Figure 3 Proper Insertion for Intramammary Infusion

A. Partial Insertion



B. Complete Insertion



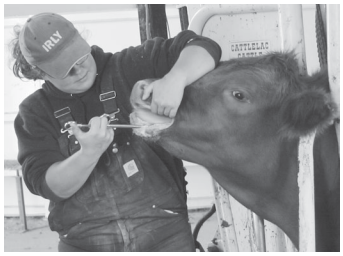
Intranasal

The intranasal route has been used as a delivery method for some vaccines such as IBR. Securely restrain the animal, ideally with a head bar extension from the front of the chute, or with a halter, or by the handler holding the head to the side of the chute with his hip (see Figure 5). Insert the cannula into the nostril and spray the intranasal vaccine into one or both nostrils. The intranasal route has the advantage of being non-invasive; however, currently only a single bovine respiratory disease, infectious bovine rhinotracheitis (IBR) can be vaccinated against. Use the intranasal route only for those products approved on the label to be given this route.

Figure 5 Intranasal Route

Oral (liquid, bolus)

Figure 6 Oral Bolus



When mass medicating a group of cattle, occasionally your veterinarian will recommend administration of liquid medication, such as sulfonamides, amprolium or tetracycline. Medicate the drinking water only with products that are approved for such use. Closely follow the label directions for adding medications to the water to ensure the correct concentration of drug is provided. Remove the medicated water from the cattle as per the label instructions or veterinary prescription regarding the duration of treatment. Ensure that only the cattle that were supposed to get the medication receive the medicated water. Hold cattle for the appropriate medication withdrawal before shipping either milk or cattle to slaughter.

Boluses may be given with a balling gun (see Figure 6), insoluble drugs or liquids may be administered by drench, or larger volumes may be given through a stomach tube (see Figures 7 and 8).

Good Management Practices for Oral Medications

- Properly restrain the animal's head before giving the bolus or drench.
- For mature cattle, insert a Frick speculum into the mouth first, followed by the stomach tube.
- When tubing baby calves, carefully insert the stomach tube. Ensure the stomach tube is in the food pipe (esophagus) before passing liquids, such as colostrum. There should be two tubes felt in the calf's neck (i.e., the windpipe (trachea) and the stomach tube). If you can not feel two tubes, then you may have placed the tube in the windpipe. Remove the tube and try again. If in doubt, contact your veterinarian.

Figure 7 Stomach Tube

Many of the oral medicines given to cattle are directed at improving the rumen environment or improving the metabolic profile (e.g., magnesium and calcium). As a result, the goal is not to bypass the rumen. Drugs given by mouth that must be absorbed in the small intestine must survive passage through the rumen; therefore, their action is relatively slow.

Figure 8 Oral Administration

Intrauterine and Intravaginal

These two routes have been used to administer antibiotics and hormones to resolve reproductive tract infections and to enhance reproductive performance. The infusion of the uterus with antibiotics has been a common method of treating endometritis and pyometra in cattle for many years; however, it has been used less regularly with the introduction of prostaglandins and other therapeutic agents effective in emptying the uterus. The delivery of antibiotics to the uterus is accomplished using an infusion pipette passed through the cervix and the administration of a liquid antibiotic through a syringe and IV tube. Intrauterine boluses can also be used in the early post partum uterus. Tetracycline and penicillin products have been used most commonly, but since these antibiotics are absorbed systemically, proper milk and beef withholding times must be respected.

Although antibiotics can also be administered intravaginally, the most common intravaginal product used is the CIDR® intravaginal progesterone release device. This device is inserted into the vagina and releases progesterone that is in turn absorbed systemically. The product is labeled for synchronization of estrus in beef cattle. Although it is now approved for use in lactating dairy cattle in the United States, there is not approval in Canada and this would clearly be an extra-label use in Canada.

Topical

Topical medications (such as the common pour-on endectocides Ivomec pour-on, Dectomax pour-on, Cydectin pour-on, etc.) are absorbed through the cow's skin into the bloodstream. These products are liquids that are applied onto the cow's back (see Figure 9). Their efficiency of absorption is determined by the lipid solubility, the characteristics of the drug vehicle, the molecule size, the state of skin hydration, the skin cleanliness and the weather conditions. One of the disadvantages of topical medications is that they may be washed off before they are absorbed if the cattle are exposed to rain or snow. Normal animal grooming may also remove the drug before it is absorbed. Other topical medications including creams, ointments, sprays, wound dressings and some antimicrobials such as foot products and teat dips are not absorbed systemically and exert their effect on the local area where they are applied.

Figure 9 Topical Application

Read and follow label directions to determine which products can be used on lactating cows and withdrawal times for marketing cattle or shipping milk. In addition, be aware that nitrofurazone is a common ingredient in many ointments; however, it is now a banned substance in food producing animals.

Ophthalmic (eye) medications are also a form of topical treatment and since most contain antimicrobials, you need to read and follow label directions to determine any withdrawal times for beef or milk.

Intraperitonal and Intra-articular

Intraperitonal injections (administration of medicines directly into the abdominal cavity) and intra-articular injections (those given directly in the joint) are generally only given by a veterinarian because of the expertise required and the risk of infection if improperly given.

Feed Medications

Medications are used in rations to improve animal performance and health. As with any form of medication, improper handling of feed additives can contribute to drug residue problems. Thus, you must monitor the handling of feed medication additives closely to prevent residue violations. Medicated feeds must be put on your list of medicines for the CQM and ABOFFS programs. A production area that has a higher incoming feed residue risk is large single sourced feed ingredients from brokers of non-standard supplies. Non-standard supplies include byproduct feed ingredients.

Benefits of Good Feed Medication Practices

- Reduces risk of drug residues and associated condemnations of carcass and liability issues
- Ensures efficacy of products
- Reduces risk of negative side effects from toxicity
- Reduces risk of product contamination
- Reduces waste of product and associated dollar losses
- Reduces environmental contamination and protects other animals from toxicity
- Reduces pest problems.

Compendium of Medicating Ingredients Brochures (CMIB)

The Compendium of Medicating Ingredient Brochures (CMIB) is the document that lists those medicating ingredients permitted by Canadian regulation to be added to livestock feed. This document specifies the species of livestock, the level of medication, the directions for feeding and the purpose for which each medicating ingredient may legally be used. As well, it includes the brand of each medicating ingredient that is approved for use in Canada and what combinations of medications in the same feed are permitted. All medicated feed manufactured, used or sold in Canada must be prepared in such a way as to adhere to the specifications of the Compendium of Medicating Ingredient Brochures, in order to comply with the Feed Regulations. The sole exception is feeds prepared according to a veterinarian's prescription.

A "medicating ingredient" is defined as:

- a substance intended for use in the prevention or treatment of disease in livestock or
- a substance, other than a feed, intended to affect the structure or any function of the body of the livestock,
- and that has assigned to it a drug identification number (DIN) pursuant to the *Food and Drugs Act*.

For a list of medicating ingredients permitted in cattle feed, see the CMIB brochure in Appendix 1 and at:
http://www.inspection.gc.ca/english/anima/feebet/mib/drguse1e.shtml

Information Provided in CMIB

- Name of the active ingredient
- Brands that are approved for use
- Species and class of livestock (e.g., beef cattle, lactating dairy cows, beef heifers for slaughter)
- Type of feed (e.g., meal, pelleted, complete feed)
- The claim that can be made (e.g., prevention of coccidiosis, improved feed efficiency)
- The level of the drug allowed
- Withdrawal times
- Compatibilities with other drugs
- Caution statement (a statement relating to animal health hazards or to safe product handling or storage)
- Warning statement (a statement relating to human health hazards).

Receiving Medicating Ingredients

Use the following checklist to assess how well you receive and handle ingredients to avoid residue violations.

Checklist for Receiving and Handling Ingredients

- ❒ I purchase only approved feed medications for use in cattle and follow the *Canadian Feed Act* and Regulations.
- ❒ I use feed medications according to the Compendium of Medicating Ingredient Brochures (CMIB) or a written veterinary feed prescription.
- ❒ I have developed procedures for receiving ingredients, including the minimum required specification of incoming feed ingredients. I purchase feed additives from reputable suppliers that follow good manufacturing practices and have a quality assurance program. All feed ingredients are monitored for color, smell and texture on arrival. I consult a nutritionist for guidelines on assessing ingredients for freshness and moisture.
- ❒ I have ongoing training of personnel on the requirements of incoming ingredients. I ensure personnel verify the quality of incoming ingredients. If incoming ingredients do not meet specifications, I return them to the supplier and discuss the problem with the supplier. If the problem continues, I find another supplier who meets my quality needs.
- ❒ I retain samples of incoming ingredients and randomly test their quality.

- ❒ I ensure that all incoming feed medication ingredients are properly labeled and contain a feed tag with label instructions, including the name of the drug and how to use it. (For concentrates, the tag should also show the lot number and expiry date.) I keep feed tags on file for two years, unless specified differently by federal feed regulations.
- ❒ I clearly label all supplement bins to ensure that products are stored in the right bins and to avoid cross contamination between medicated and nonmedicated feeds or between pig/poultry and ruminant feed.
- ❒ I regularly clean bins to prevent molds, bacteria and rodent problems.
- ❒ I store bags of feed medication in a clean and dry, well lit, adequately sized area, free of rodents, birds and insects.
- ❒ I keep feed additives in original packages, and store them in labeled, closed containers such as plastic garbage cans.
- ❒ I ensure that pesticides, fertilizers, herbicides and other poisons are not mixed with the same equipment or stored on the same premises as feed ingredients. I clean up all spills immediately.
- ❒ I dispose of outdated feed medications through the manufacturer or supplier.
- ❒ I keep an up-to-date running inventory of feed ingredients and cross check with the actual inventory on hand.

If you are unable to check each box, you may need to change some practices to avoid residue violations in your meat or milk.

Mixer Validation

Make sure you take the following precautions with your feed mixing equipment (see Figure 10).

Annually, conduct a mixer efficiency test and check scale for accuracy.

- Conduct a mixer efficiency test at least once annually to ensure that medicated ingredients are being mixed evenly throughout the load. Keep written records of the test results. Consult with your equipment dealer or nutritionist for specific recommendations on how to conduct a mixer efficiency test.
- At least once annually, check the scales on the mixer and feed wagon for accuracy to ensure proper doses of medications are added. Contact your scale manufacturer on the recommended procedures for testing the accuracy of scales and what to do if they require calibration. Ensure scales are accurate and sensitive to small weights.
- Regularly maintain the mixer and augers. Check for wear of equipment and replace as needed. Ensure that the equipment used is suitable for the purpose for which it is intended.
- Clean mixer, microhopper and augers after making a medicated feed, whether manually or by flushing with another feed ingredient (i.e., calcium or barley or silage to clean out residual medications or by sequencing production and feeding). Only use flush materials in compatible rations.
- Consider using a separate auger system to deliver medicated supplements or else clean it between medicated and non-medicated feeds to prevent drug carryover.

Figure 10 Feed Mixing Equipment

Mixing

Use the following checklist to assess your current feed mixing practices

Exercise

Checklist for Mixing Ingredients

- ❒ I document each load of feed made (i.e., batch mix sheets), including the date, time, type and amount of each ingredient added.
- ❒ I ensure that correct amounts of medicated feed ingredients are added to each load so that cattle receive the recommended medication levels. I have developed corrective procedures on what to do if too much or too little of an ingredient is added in a load (this is particularly important for medicated ingredients/premixes/supplements).
- ❒ I monitor the mixing process regularly.
- ❒ I document the feed mixing sequence to reduce the potential of drug carry-over between loads.
- ❒ I train personnel on how to properly mix feed additives. I ensure that mixers are not overfilled which may result in inadequate mixing.
- ❒ I closely follow the manufacturer's recommendations for mixing times and validate by the mixer efficiency test. I monitor mixing times (too short or too long mixing times can result in uneven medication levels within the load).
- ❒ I conduct a regular feed analysis to ensure mixing accuracy.
- ❒ I frequently calibrate equipment that measures feed on a volume basis to account for changes in bulk density (test weight), moisture content of feed and flow characteristics of feedstuffs.
- ❒ I mix down low inclusion level medication with some type of carrier such as barley chop or ground oat hulls to achieve better mixing and more consistency in total mixed rations.

If you are unable to check each box, you may need to change some practices to avoid residue violations in your meat or milk.

Feeding

To ensure that you avoid any residue violations for meat or milk, follow the good production practices for feeding described below.

Good Management Practices for Feeding Medications

- Clearly document feeding procedures.
- Use feed sequencing of medicated and non-medicated rations to flush out the equipment to prevent drug carry-over.
- Regularly clean out feed trucks and check the scale weights for accuracy.
- When feasible, use a separate auger system and feed truck to feed medicated starter rations.
- Train personnel on how to read cattle and feed bunk characteristics. Ensure that there is a verification system in place to double check that the right rations are called for the right pens. CQM requires a label on the storage facility or area and distribution containers specifying feed as a medicated feed, group to be fed and a warning defining the caution (i.e., "Not for Lactating Animals" or "Meat Withdrawal").
- Based on your nutritionist's recommendations, retain samples of the mixed ration and test to monitor the process and verify that the system is working correctly.
- Regularly clean feed bunks to prevent moldy feed and residue buildup and cross contamination of drug residues.
- Number feed bunks or pens to reduce feeding mix-ups.

Feed Record Keeping and Review

Record keeping is a critical step in avoiding residue violations. Take the following steps.

To avoid residue violations, you need to keep records on all aspects of feeding.

- Document all critical feeding procedures, including maintenance and cleaning.
- Develop a written training manual and train personnel on recording procedures.
- Ensure that ration sheets are clear, legible and verified before use.
- Store ration formulations, the sequences of feed production and distribution records for one year (CQM) and two years (ABOFFSP).
- Keep up to date on pending regulatory changes regarding feed medication procedures and record keeping requirements.
- Closely monitor all withdrawal times for feed medications and cross check records before shipment of milk or live cattle to slaughter.
- Develop a checklist to be used by management on a regular basis to verify the process. This helps keep management knowledgeable and verifies any procedures.

Implanting

Implanting is used to maximize performance of growing beef cattle. In consultation with an industry specialist (veterinarian, nutritionist or pharmaceutical representative), develop an implant program that works for the outcome or end product you wish the cattle to accomplish (that is, percentage of leanness, marbling and tenderness). If you custom feed cattle, ensure the customer wants implants as part of the processing routine.

Benefits of Good Implanting Techniques

- Properly placed implants may improve performance by 14-17 percent.
- Average daily gain may be improved by10-30 percent and feed efficiency by 6-14 percent.
- May increase value of animal $25-$75 per head.

Good Implanting Techniques

- Follow implant instructions on manufacturer's label or package insert.
- Train staff on the proper use of the implant gun and, most importantly, proper placement of the implant in the ear (see Figure 11). Improperly inserted, broken or crushed implants are not effective and may cause infections, abscessing, bullers and vaginal prolapses.
- Take the time to do a good job. Implanting is one of the slower tasks. The implanter is the "speed regulator," with this action the rate-limiting step.
- Assign only one person to implant a group of cattle. Have the person sign the processing order. Monitor the technique used by staff.
- Avoid overcrowding in the tub while processing. In the chute, restrain the animal properly to minimize head movement. Catch the head short and close behind the ears. Ensure there is enough ear to implant.
- Ensure that implants are properly handled and stored in a dry place or airtight container so that pellets do not absorb moisture from the air. Refrigerate if stated on the label. Ensure implants are not exposed to sunlight.
- During implanting, leave implants in their sterile packaging until ready to put in the gun. Cut the cover and do not twist as this may cause pellets to fall out of the cartridge.
- Keep implant gun clean and store in a clean, dry place between uses.
- If re-implanting is part of the program, ensure the above procedures.
- Conduct random, regular implant checks on cattle post implanting to monitor technique. As part of this check, conduct an implant ear palpation.
- Ask the implant pharmaceutical companies to assist with training and monitoring programs.
- To save time, do an implant check when running animals through the chute for any other reason, such as treating sick animals.

Figure 11 Ear Implant

Steps in Implanting

Follow the steps below to ensure proper implanting technique.

Implanting Steps

Step 1: Ensure that ears are clean and dry.
- Scrape mud and manure off with a knife
- Brush clean with a brush dipped in disinfectant
- Dry with disposable paper towels
- Make scraping and brushing movements all in one direction towards outer tip of ear to avoid re-contaminating area being cleaned.

Step 2: Plan for the last implant. Right-handed people have an easier time implanting in the left ear so this ear should be left for the terminal implant. In this case, the position of the implant may also be considered (i.e., may be placed lower in the ear).

Step 3: Stay at least one finger width away from ear tags when implanting–tag first, then implant. Avoid previous implant spots or any abnormal tissue.

Step 4: Fully insert needle, bevel down, beneath skin, and at the middle third of the ear, between skin and underlying cartilage. Use caution for the outside third of the ear, as the absorption rate will be lowered in cold winter months. Insert the needle a needle length away from intended deposition site. Place implant parallel to the length of the ear, between skin and cartilage. Avoid major blood vessels.

Step 5: If using a fixed needle gun, fully insert implant needle, then withdraw 1/2 in. before beginning to deposit pellets. Carefully withdraw needle at the same speed as the pellets are being deposited.

Step 6: Clean the implant needle between each implant, or if needle slides or skips over skin. Change disinfectant solution and clean tray and sponge regularly. Disinfectants that can be used include chlorhexidene and virkon. Keep hands as clean as possible between each animal.

Step 7: Ensure implant gun is maintained and the implant needle is sharp. Have a spare implant gun available.

Step 8: Pinch the incision site shut after an implant has been placed. Be careful not to bunch the pellet.

Step 9: Check the ear to see if the implant has been properly placed (the implant can be seen and felt under the skin). Check to see if the proper number of pellets remain.

Summary

To avoid drug residue violations, you must handle medications appropriately. You should now be able to use the correct route of drug administration and use proper implanting techniques.

Module 10 Prescriptions

Objectives

After you complete this short module, you will be able to:

- Describe the type of drugs that require a prescription and the parts of a veterinary prescription
- Explain the use of, standards for and parts of the feed prescription.

Drug Prescriptions

A prescription is a written or verbal order for a medication from a licensed veterinarian. Veterinarians are only licensed to prescribe medications for animals if they have a proper veterinary-client-patient relationship (VCPR). Medications requiring prescriptions include:

- Schedule F, Part I drugs
- G (controlled substances)
- N (narcotics).

Veterinarians must have a VCPR before prescribing medications for animals.

Schedule G and N drugs should never be sold over the counter. They may be dispensed by a veterinarian under a valid VCPR and prescription.

Schedule F, Part I drugs require a prescription for sale and are provided to a producer by the veterinarian following a diagnosis. Their sale is controlled in a regulated environment as defined by provincial pharmacy legislation. Schedule F, Part II drugs are less strictly regulated and do not require a prescription.

A veterinarian prescription is required to use drugs in an extra-label manner.

If drugs are given in a manner that is extra-label, a veterinary prescription is required from a licensed veterinarian under a valid veterinary-client-patient relationship. It is the veterinarian's responsibility to ensure there are scientific grounds to use the medication in an extra-label fashion and it is the veterinarian's responsibility to ensure that the prescription contains an appropriate meat and milk withdrawal that will not result in drug residues.

Veterinary prescriptions should be written clearly and completely. Abbreviations should not be used when writing drug names. When writing prescriptions, veterinarians should avoid the following:

- Writing scripts for large quantities of drugs
- More than one order on the same prescription.

Veterinarians should:

- Include their name printed under the signature
- Write prescriptions in ink.

Parts of a Veterinary Prescription

- Name and address of client/owner and name and species of patient – required by law
- Date prescribed
- Inscription – includes the drug name, strength or concentration
- Subscription – number of doses supplied
- Signa – directions for use, including withdrawal period. This should be written as completely and clearly as possible and include all the necessary information the producer needs to administer the drug to the animal.
- Renewal instructions – authorizes producer to obtain additional supplies of medication without going back to see the veterinarian.
- Signature of veterinarian – required by law and written in ink.

Feed Prescriptions

Refer to Appendix 2 for details on feed prescriptions.

Prescription feeds are medicated feeds that are manufactured according to a written prescription by a licensed veterinarian. Veterinarians may prescribe levels or combinations of medications different from those approved in the CMIB. Veterinarians are only permitted to prescribe (feed) medications for therapeutic purposes (i.e., for the treatment or prevention of disease). Prescribing for other reasons (e.g., improvement of performance or feed efficiency) is not permitted (Food and Drugs Regulations C.08.012.1). The general standards in the feed regulations must be met, and the withdrawal period must be stated on the feed prescription to prevent harmful drug residues. The veterinarian must provide the feed mill, prior to preparation of the feed, a copy of the signed feed prescription. The feed manufacturer, veterinarian and producer are responsible to follow the Feed Regulations.

Labeling Requirements for Veterinary Prescription Feeds

- Name and address of the manufacturer
- Name of the client for whom the feed is manufactured and used
- Name of the veterinarian who issued the prescription (keep veterinary feed prescriptions on file for two years)
- Name of the feed including the amount of medicating ingredients
- Directions for use, including duration of feeding
- Warning and caution statements
- Weight of the feed.

A copy of a veterinary feed prescription form is given in Appendix 2, along with what information should be included in the feed prescription. Your veterinarian should provide you with a copy of the signed veterinary feed prescription and ensure that you understand it, including how to mix and feed the prescription medicated feed and appropriate withdrawal periods.

Summary

This short module provides you with the requirements for drug and feed prescriptions and the role of your veterinarian in dealing with both of these.

Module 11 Handling of Drugs

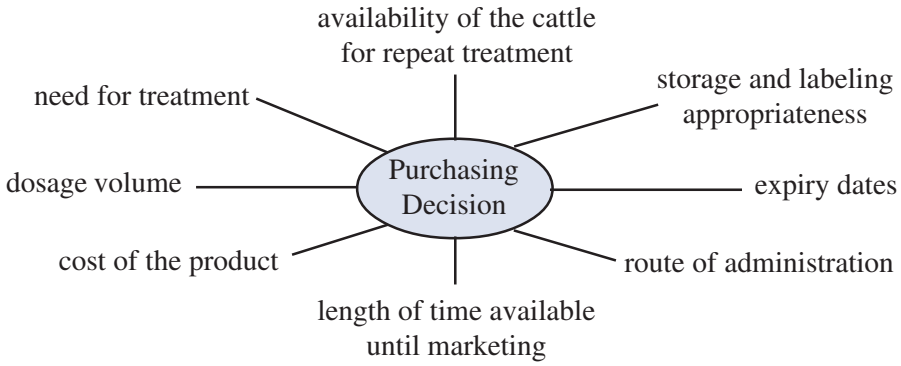
Objectives

After you complete this module, you will be able to:

- Purchase drugs that meet your needs
- Store, mix and transport drugs in a manner that ensures their potency, safety and shelf life
- Handle modified live vaccines to ensure their effectiveness
- Handle and dispose of pesticides to avoid residues in food and the environment
- Provide worker safety during handling of pesticides.

Purchasing Drugs

When you purchase drugs for use in either beef or dairy production, you must exercise due diligence to achieve desired results. Discuss the effectiveness and use of the product with your herd veterinarian. The purchase and use of drugs must be under a valid veterinary-client-patient relationship. In order to select the best product, consider the following.



Avoid compounded or home-made drug combinations since their safety and efficacy are often uncertain.

Storing Drugs

Proper storage of livestock medicines helps maintain their potency, safety and shelf life.

Livestock medicines will maintain their potency, safety and shelf life only if they are stored properly. This is equally true for storage before and after purchase as well as during transportation. Livestock medicines can be sensitive to temperature, light and humidity. There may be special storage instructions for opened or partially used products. Live vaccines, for example, must be entirely used soon after the liquid and powder components have been mixed. Implants, once the package is opened, often must be stored in the refrigerator.

Drug Storage Requirements

- Store drugs in the farm office or utility room away from feeding areas, milking areas and milking equipment.
- Have separate storage facilities for drugs intended for use in lactating versus non-lactating cows or short acting versus long acting products for cattle.
- Protect drugs from temperature fluctuations and seal against dust, insects and light.
- Provide drug storage that is clean, organized and locked.
- Ensure all drugs are stored according to label directions for temperature, humidity and light.
- Check expiry date and discard expired product.
- Keep a drug inventory and reconcile actual amounts with theoretical amounts at least once annually.

Mixing Drugs

Cattle drugs are marketed in a variety of forms including solutions, suspensions, powder and diluent, boluses and ointments. After standing in storage, the suspensions and many of the solutions settle out and require adequate mixing to ensure the dosage drawn into a syringe is a homogeneous mixture as assumed on the label dosage. Pay special attention to the drugs that are packaged as powders and diluents. You must follow the label directions for mixing and storage. The reconstituted product usually has a very limited shelf life and, in the case of modified live vaccines, may be as short as one hour. Other reconstituted products may be frozen to extend the duration of their therapeutic activity, if label directions indicate.

For the drugs that must be reconstituted, transfer needles are often provided to maintain the sterility and activity of the final product.

If you combine different antimicrobials together in contradiction to label directions, you will destroy the effectiveness of each product and, possibly, cause side-effects such as anaphylactic reactions and injection site abscesses.

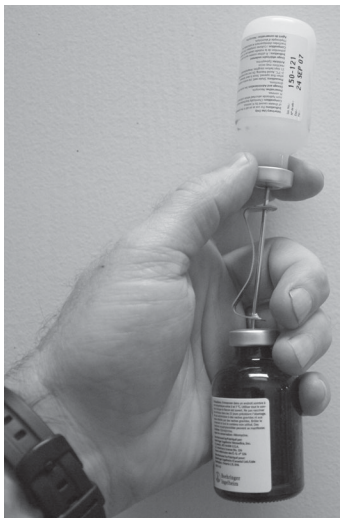
Transporting Drugs

The same temperature, humidity and light considerations for drug storage apply to drug handling during transportation. If shipment is over long distances, consider the duration of transportation and potential exposure to large temperature fluctuations and their impact on quality. Ensure you have proper documentation of dates and times of shipping in case shipments become lost.

Handling Modified Live Vaccines

Modified live vaccines are suspensions of live viruses that have been genetically or chemically modified to prevent them from causing disease. They do, however, continue to multiply at the injection site, and the valuable immunity they produce is dependent on their viability at the time of vaccination. These vaccines are used primarily to control viral diseases and since they contain live organisms, extra care must be given to storage and transportation temperature, proper mixing technique, timely administration after mixing and proper administration. During transport and storage, ensure the vaccines are kept cool but are not frozen (see label directions).

Figure 1 Vaccine Being Reconstituted



For further details, refer to the VIDO Beef Vaccination Guidelines in Appendix 5, Section I.

Good Management Practices When Administering Live Vaccines

- Use a clean, sterile transfer needle when reconstituting the vaccine to avoid contamination from an injection needle with bacteria or other debris that may denature the live vaccine (see Figure 1).
- Ensure that mixed vaccines are administered within a short period of time after mixing (e.g., 1 hour). If heat lamps or heaters are being used at chute side, avoid exposing the vaccine to excessive heat.
- Store vaccines in a cooler with ice while vaccinating cattle. If cattle are being processed and branded at the same time as vaccination, do not choose a vaccine injection site close to a hot brand which will destroy the live vaccine.
- Avoid contact between a live vaccine and a disinfectant. Do not use disinfectant to clean barrels of syringes used to give live vaccines.
- Avoid swabbing bottle tops or needles with disinfectants such as alcohol as contact can denature the live virus vaccine.

Injection Technique

The injection technique for vaccines is similar to other medicines. Use clean, sharp needles of appropriate size for the animal and viscosity of the vaccine. Restrain the animal properly and use the appropriate route of administration identified on the label. Almost all vaccines are to be given subcutaneously or intramuscularly and no vaccines are to be administered intravenously. Give all injections in the neck, never in the rump or hip.

Using Multi-dose Bottles

Multi-dose bottles of drugs are particularly convenient when large numbers of cattle are being treated; however, they can pose a risk if not handled properly. Often the entire bottle will not be used and the remainder will be stored for another occasion. Because the rubber stopper has been punctured, store the bottle in a clean area with the proper temperature, humidity and light to maintain the sterility and the integrity of the product.

Note: Do not use the injection needle to withdraw product from the bottle as it introduces bacteria and debris into the bottle. This contamination may multiply before the next injection use and either denature the product or infect the next animal. For the same reasons, do not store multi-dose bottles with a needle in the stopper.

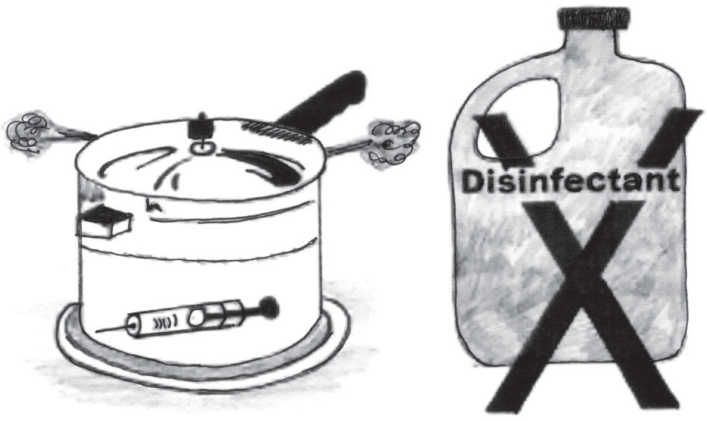
Cleaning Medical Equipment

Proper sanitation of medical equipment is a key component of responsible drug use. Use clean equipment to reduce the incidence of infections at the injection site and ensure the integrity of the product given. Rinse inside components of syringes and transfer lines with distilled or deionized water that is near the boiling point. To accomplish this, repeatedly draw water that is greater than 82°C (180°F) into the syringe and squirt it out. Three to five rinses should be adequate (see Figure 2). Do not use soap or disinfectant (see Figure 3) on internal components since the residues from these products may kill modified live vaccines. Sterilize equipment constructed of glass, stainless steel or some plastics by boiling. Dispose of equipment incapable of proper sterilization to avoid contamination. After a vaccine syringe has been cleaned and is dry, store it in a new zip-lock bag and place in the freezer.

Figure 2 Cleaning Syringes with Hot Water

Proper sanitation of medical equipment reduces the incidence of infections at the injection site.

Figure 3 Disinfectants Leave Residues



Fill in the following checklist to assess your current drug handling practices.

Drug Handling Checklist

Drug Storage Unit

- ❒ I have located the drug storage unit in the farm office or utility room that can be locked.
- ❒ I protect drugs from temperature fluctuations and use a refrigerator.
- ❒ I clean, organize and seal against dust, insects and light.
- ❒ I use separate, labeled shelves for lactating and dry cow products, as well as products for other species (e.g., horse, dog).

Drug Labeling

- ❒ I read and understand all drug labels.
- ❒ I follow all label directions.

Inventory Control

- ❒ I purchase products as needed.
- ❒ I record the date the product was opened.
- ❒ I return expired, unopened products.
- ❒ I discard expired, partially used products.

Mixing and Multi-dose

- ❒ I use transfer needles to reconstitute products or download from larger containers.
- ❒ I do not use the same needle to inject and withdraw more drugs from the bottle.
- ❒ I refrigerate the bottle after opening unless otherwise directed by the label.
- ❒ I attempt to minimize the time a bottle is open.
- ❒ I do not use alcohol for cleaning bottle tops of vials containing live vaccines.
- ❒ I do not store a bottle with a needle in the rubber stopper.
- ❒ I do not combine multiple drugs together in the same syringe.

If you are unable to check each box, you may need to change some practices.

Handling and Disposing of Pesticides

Pesticides are used to destroy pests of any sort and deserve special attention with regard to safe and effective handling and disposal (see Figures 4 and 5). The common pesticides used in dairy and beef facilities are organophosphorus compounds and pyrethroids. Several of the products are used for topical application and readily absorbed through the skin. As a result, they must be handled with gloves and care taken to avoid inhalation or ingestion. Storage of pesticides is extremely important to avoid unsafe residues in meat or milk. Always follow label directions. Under the *Pest Control Products Act*, it is forbidden to use pesticides in an extra-label manner.

Good Management Practices for Handling Pesticides

- Ensure pesticides are clearly labeled.
- Handle and store pesticides according to label directions.
- Store pesticides in a cool, dry place in the original containers. Keep pesticides from freezing and protect from excessive heat.
- Ensure a pesticide storage area has an impervious floor with curbs and no floor drains, and is supplied with an overpack container and a supply of absorbent material, such as sand or kitty litter.
- Do not store pesticides near feed, food, milking facilities or fertilizers, in well houses or feed mixing and milling rooms or around the home and within reach of animals and children.
- Never store or mix pesticides within 30 metres of an open body of water.
- Store pesticides which are highly toxic to animals, such as certain rodenticides and parasiticides, under lock and key.
- Do not reuse pesticide containers.
- Dispose of pesticides as indicated in Module 13 Disposal of Biomedical Waste and Carcasses.

Figure 4 Pesticide Label

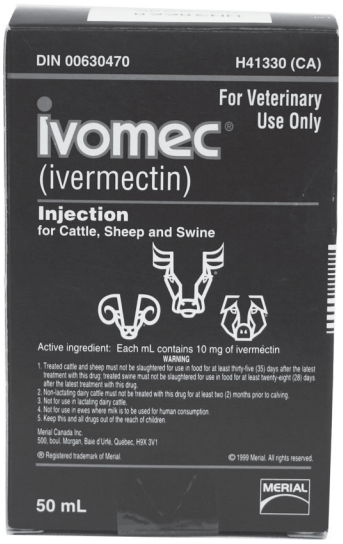
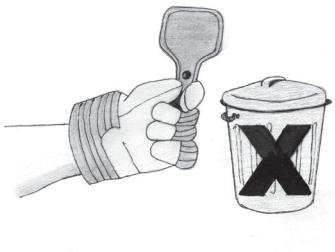


Figure 5
Disposal of Fly tags



Ensuring Worker Safety During Handling of Drugs

Accidental exposure to drugs, pesticides, vaccines and blood can cause serious reactions and infections. Always read the product label or package insert. Label warnings on a product package or insert are meant to alert you to human health and safety concerns and restrictions on use.

Label Warnings

"Women of childbearing age and persons with respiratory problems should exercise extreme caution when handling this product."

"Milk taken from animals during treatment and for 36 hours after the last treatment must not be used for food."

It is good practice to maintain a file folder with product packaging or inserts for quick reference. Ensure that everyone knows where to find this file. Some of the vaccines, drugs and pesticides can cause serious health problems.

Serious Health Problems from Drugs

- Allergic reactions
- Anaphylactic shock
- Breathing problems
- Loss of pregnancy
- Irritation and/or infection at injection sites
- Disease
- Others as described under "Warnings" or "Cautions" on the label.

Accidental Exposure

Minimize accidental exposure by following safe handling practices. Always check the label warnings for adverse effects and remedial action to be taken in case of accidental exposure. See Table 1 Routes of Exposure, Precautions and Remedies.

People who may be particularly susceptible to exposure to the drug being used should avoid handling it altogether or should take extra precautions against self-contamination.

Susceptible Individuals

Some of the hormones used in reproductive management may be hazardous to women who are pregnant. Some drugs present a special hazard to those with asthma or other breathing problems or have had adverse reactions to the drug in the past.

Table 1 Routes of Exposure, Precautions and Remedies

Routes of Accidental Exposure	Precautions Against Accidental Exposure	Remedial Action
Skin contact—some medications are absorbed through the skin or transferred to the mouth, eyes or nose by hands	• Wear latex or nitrile gloves and protective clothing	• Remove contaminated clothing • Immediately wash the affected area with soap and water • Check label warnings for further required action
Self injection—can result in adverse reaction including infections and even death	• Never place your hand or fingers in the path of a needle • Keep the needle shielded • Use safe injection technique • Take care when reinstalling a shield on a needle	• Wash the affected area with soap and water • Disinfect the injection site • Check label warnings for required action
Eye contact—splash or aerosol	• Wear safety glasses or a face shield	• Wash eyes under running water • Check label warnings for further required action
Inhalation—dust or aerosol	• Wear a respirator	• Check label warnings for further required action
Ingestion—splash, hand to mouth transfer through eating, drinking or smoking	• Do not eat, drink or smoke while handling medications • Always wash hands with soap and water after handling medications	• Check label warnings for required action

Note: If in doubt, call your doctor, local hospital or the Provincial Poison Control Centre. Have the package or insert ready so you can answer any questions.

Alberta Poison Control Centre
1-800-332-1414
670-1414 (local call in Calgary)

Other Safety Precautions

- Never drink milk or slaughter an animal for meat or sell an animal until the withdrawal period for the medication used is past.
- Never use a bent needle or try to straighten one.
- Use a dedicated, clearly labeled, container for disposal of sharps. The container should be metal or plastic that cannot be punctured by needles, broken glass or other sharp material. The container should have a tight fitting lid with an opening large enough to easily put sharps into it but not large enough to allow entry of the hand (see Figure 6).
- Clean up spills immediately.
  - When provided, follow manufacturer's directions.
  - Always use a hands free method for cleanup (broom, dust pan or vacuum cleaner).
  - Use absorbent material such as sand, saw dust or kitty litter to soak up liquids.
  - Where appropriate wash the area with soap and water.

Figure 6
Sharps and Biohazard Container

Summary

A critical aspect of avoiding drug residues is the proper handling of drugs. This involves appropriate purchasing, storing, mixing and transporting practices, and special handling of modified live vaccines. Worker safety is critical at all stages of handling.

Module 12 On-Farm Food Safety Programs

Objectives

After you complete this module, you will be able to:

- Describe some of the records required by Canadian Quality Milk Programs and how to use them
- Describe some of the records required by Alberta Beef On-Farm Food Safety Program.

Record keeping is an important part of any management system. The old saying that *We can't manage what we can't measure*, applies.

Canadian Quality Milk (CQM) Program

Examples of the Canadian Quality Milk Programs records related to livestock medicine use are included in Appendix 4. These records, which must be retained for one year, include:

- Standard operating procedures for milking cattle with abnormal milk or treated milk
- Standard operating procedures for treating cattle
- Sample veterinary prescription
- List of medicines and chemicals used in livestock
- Livestock treatment record
- Broken needle record
- Corrective action plans.

More Info

For further details on how to use these documents from CQM, refer to the CQM Reference Manual or contact CQM at:
cqm@albertamilk.com

Alberta Milk
1303 91 Street, SW
Edmonton, AB T6X 1H1
Tel: (780) 453-5942
Cell: (780) 902-9442
Office: (780) 577-3317
Toll Free: 1 877 361-1231
Fax: (780) 455-2196
Email: cqm@albertamilk.com
Website: www.amp.ab.ca

Alberta Beef On-Farm Food Safety Program (ABOFFSP)

Documents in the national beef on-farm food safety program that relate to the proper use of livestock medicines include the following:

- Processing protocol
- Treatment protocol
- Veterinary prescription
- Drug purchase forms or sales slips
- Drug labels
- Processing records
- Treatment records
- Sanitation plan
- Veterinary feed prescriptions
- Medicated feed purchase orders
- Feed mill truck delivery slips and feed tags
- Ration formulations
- Scales and mixers equipment manuals
- Scale calibration procedures and records
- Mixer efficiency testing procedures and records
- Medicated feed equipment cleaning procedures and records
- Feed delivery records
- Livestock medicated water sanitation plan
- Shipping records
- Training records
- Packer reports of carcass violative drug residues.

Alberta Beef Quality Starts Here
Box 74
Stirling, AB T0K 2E0
Phone: (403) 329-6939
Fax: (403) 327-1434
Email: abqsh@theboss.net
Web: www.beefsafety.ab.ca

Written protocols should be dated to help keep track of the current protocol, since they may change over time (e.g., vaccination protocol). Livestock medicine use records can be in paper format, such as on a calving calendar, in a notebook, on recipe cards or on a computer program. Records for ABOFFSP should be legible and stored for at least two years.

Summary

You should now have a basic understanding of the record requirements for Alberta Beef On-Farm Food Safety Program and the Canadian Quality Milk Programs.

Examples of some of these forms are provided in Appendix 5.

Module 13 Disposal of Biomedical Waste and Carcasses

Objectives

After you complete this module, you will be able to:

- Dispose of biomedical waste in a manner that ensures the safety of people and the environment
- Dispose of carcasses to reduce the risk of disease spread.

Biomedical Waste Disposal

Outdated and unwanted drugs, vaccines and pesticides or empty containers should not be disposed of in the garbage. Use Table 1 as a guide to their disposal, but first check the package insert for instructions on disposal. Many municipalities have arrangements for collecting and disposing of sharps, pesticides, vaccines, drugs and other hazardous materials. If necessary, discuss disposal options with your veterinarian. Disposal through the clinic may be possible. In some areas, hospitals may accept drugs for disposal.

Table 1 Disposal of Biomedical Waste

Waste Product	Disposal Method
Unused expired vaccine	Return to the point-of-purchase. Many manufacturers will accept them for disposal.
Modified live vaccines	Should be rendered non-infectious before disposal by: • Freezing • Burning • Adding bleach to the bottle
Sharps	Use a dedicated, clearly labeled, container for disposal of sharps (see Figure 1). The container should be metal or plastic that cannot be punctured by needles, broken glass or other sharp material. The container should have a tight fitting lid with an opening large enough to easily put sharps into, but not large enough to allow entry of the hand.
Unwanted or expired pesticides	Dispose of carefully. Pesticides are hazardous wastes and cannot be disposed of in sanitary landfills or by burning. Empty, non-refillable and damaged refillable plastic or metal pesticide containers can be disposed of only at approved container collection sites. Offer unused pesticide supplies to neighbors. Pesticides that have no further use must be disposed of as hazardous waste. Names of companies that are licensed to handle hazardous waste can be obtained from Alberta Environment's Recycle information line at 1-800-463-6326. Unused products can also be returned to the dealer.
Ivermectin products, like Ivomec and Dectomax, have a drug identification number (DIN) and are considered drugs.	Read their label on proper disposal. Some of the empty Ivermectin containers can be returned to the manufacturer or your veterinarian for a rebate. Contact your veterinarian or the manufacturer for details.

Figure 1 Sharps Containers

Carcass Disposal

Some death loss will occur on every beef and dairy operation, no matter how well they are managed. Disposing of dead animals quickly and effectively is important to reduce the risk of disease. It is also important in maintaining good neighbor relations. Carcasses can be a source of disease if scavenged by wildlife and pets. Some of these diseases can then be passed back to livestock or even humans. Carcasses are also an eyesore, a source of odor and a contributor to fly problems.

The current Destruction and Disposal of Dead Animals Regulations requires that all dead animals must be disposed of within 48 hours by incineration, burying, rendering, composting or natural disposal (scavenging) (see Figure 2). Incineration and natural disposal (scavenging) may be used under very restricted circumstances described in the regulations.

If you are the owner of a dead animal that has been euthanised with drugs or other chemical substances, it must not be disposed of by natural disposal. You must immediately take steps to prevent scavengers from gaining access to the dead animal between the time the animal is euthanised and the final disposal of the animal. For more information, contact your local veterinarian.

More Info

For regulations pertaining to the disposal of dead animals, refer to AAFRD website at: www.agric.gov.ab.ca and search for "disposal of dead animals".

Figure 2 Disposal of Dead Carcasses

Summary

Proper and safe disposal of biomedical waste and carcasses helps reduce contamination of the environment and spread of disease.

Glossary

ABOFFSP	Alberta Beef On-Farm Food Safety Program
abscess	a localized collection of pus surrounded by inflamed tissue; infected tissue walled off with scar tissue
active ingredient	generic name of ingredients that perform the action claimed on the label
acute	sudden onset, sharp rise and short duration
additive	interaction of drugs or conditions such that the total effect is the sum of the individual effects
allergy	hypersensitivity to substances, situations or physical conditions that normally do not produce a reaction in the average individual
anaphylactic	hypersensitivity to foreign proteins or drugs resulting from sensitization following prior contact with the foreign protein or drug
anesthetic	an agent capable of producing anesthesia, which is the loss of feeling or sensation, especially the loss of pain sensation (e.g., lidocaine).
antagonistic	interaction between two or more drugs or other substances in such a way that the action of any one of them is reduced or negated
anthelmintic	drug for worm treatment
antibiotic	a substance produced by a microorganism that kills other microorganisms or suppresses their growth (e.g., penicillin)
antibody	specialized serum protein produced by white blood cells in response to an immense number of different antigens to which an animal has been exposed
antifungal	an agent that destroys fungi such as griseofulvin
antigen	a foreign protein (often an infectious agent) which, if introduced into the animal body, stimulates the production of antibodies
antimicrobial	a broad term for any natural or synthetic compound that kills microorganisms or suppresses their growth (e.g., antibiotics and iodine)
antimicrobial resistance	the ability of microorganisms, such as bacteria, to evade the inhibiting or killing action of an antimicrobial
AOPA	*Agricultural Operation Practices Act*

approved drug	a drug receiving approval from Health Canada (HC) that has undergone extensive evaluation for efficacy/safety and provision of a manufacturing license whose retention is predicated on quality assurance defined through a mandated/ audited GMP protocol. The drugs and their labels receive approval by HC and are given a drug identification number (DIN #). Trade and generic drugs are approved drugs. Licensed pharmaceuticals and premixes have a DIN #. Licensed pesticides have a pest control product (PCP) number. Licensed biologics have a Canadian Food Inspection Agency (CFIA) establishment # and/ or US vet license #
autogenous vaccine	vaccines prepared from cultures of material derived from a specific lesion of the animal being vaccinated in an attempt to elicit a specific immune response (e.g., wart vaccine)
bacteria	single cell microorganisms that do not require living cells to multiply
bacterin	killed bacterial vaccines
balling gun	a tube for delivering a pill to the back of the throat so it is swallowed
biocontainment	management practices to prevent and reduce the risk of the movement of infectious diseases within the farm
biologic	a medicinal preparation made from living animal or plant tissue (e.g., a vaccine)
biological hazard	includes pathogenic bacteria, viruses or parasites in beef and milk
biomedical baste	animal tissue and blood, animal remains, bandages, cultures, drugs, pesticides, vaccines and sharps. Gloves, empty containers or medical devices contaminated with animal tissue/blood, drugs can be disposed of as biomedical waste.
biosecurity	management practices used to prevent and reduce the risk of the entry of infectious diseases onto the farm
bolus	a dose of a drug or large pill that is administered so that the desired therapeutic concentration in the blood is reached rapidly
BSE	bovine spongiform encephalopathy or “mad cow disease”
bullers	animals that ride others as if in heat
Canadian Quality Milk (CQM)	Dairy Farmers of Canada on-farm food safety program
cannula	a small tube for insertion into a body cavity or into a duct or vessel
caution	a statement relating to animal health hazards or to safe product handling or storage
cervix	the lower portion of the uterus which forms the neck of the uterus that opens into the vagina
CFIA	The Canadian Food Inspection Agency

CFIA establishment license number	identifies licensed vaccines
CFO	confined feeding operation as defined in the *Agricultural Operation Practices Act*
chemical hazards	include drug and pesticide residues in beef and milk
chronic	long lasting or frequently recurring
clinical	the abnormal signs resulting from the illness are very obvious
colostrum	milk produced by the cow in the first few milkings. It contains antibodies and is much higher in fat, protein and minerals than normal milk.
Compendium of Medicating Ingredient Brochures (CMIB)	information from CFIA on the proper use of drugs delivered in feed.
concurrent	happening at the same time
contagious	easily spread among animals, through direct contact with a diseased animal or indirectly through contaminated feed equipment or environment
contraindicated	when not to use the medicine, ill-advised
corticosteroid	hormone that has strong anti-inflammatory actions and are produced by the adrenal glands (e.g., Dexamethasone, Predef)
CQM	Canadian Quality Milk Program
deionized water	water in which minerals have been removed
diluent	a diluting agent as the vehicle in a medicinal preparation
DIN	(drug identification number)–pharmaceuticals and premixes approved by Health Canada will have a DIN
disease	a departure from the normal state of health, such as an abnormality of body structure or function that results in symptoms
disinfectant	an agent that destroys infection-producing organisms (e.g., heat, steam, chlorine, chlorhexidine, iodine)
diuretic	a drug that causes the kidney to produce more urine (e.g., Salix Lasix)
drench	a large dose of medicine mixed with liquid and administered by mouth using a bottle or other applicator
drug	any substance or mixture of substances for use in: diagnosis, treatment, mitigation or prevention of a disease, disorder, abnormal physical state or symptoms (e.g., antimicrobials), restoring, correcting or modifying organic functions (e.g., probiotics), disinfectant

drug incompatibilities	generally refer to detrimental chemical interactions that occur when drugs are mixed together prior to administration
ectoparasite	a parasite that lives on the exterior of its host (e.g., lice)
efficacy	effectiveness for the stated purpose
endectocide	a parasiticide with action against internal nematodes (e.g., worms) and external parasites (e.g., lice, grubs)
endocrine	secretions produced in the body that are distributed by way of the bloodstream (e.g., body hormones)
endometritis	inflammation of the mucous membrane lining the uterus
esophagus	food pipe or swallowing tube connecting the mouth to the stomach
estrus	heat; the period in the reproductive cycle during which the cow will accept the male and is capable of conceiving
euthanize	killing or permitting the death of sick or injured animals in a relatively painless way for reasons of mercy
extra label use (ELDU)	use of a drug or product in a manner that is not consistent with what is indicated on the label, package insert or product monograph of any drug approved by Health Canada.
fat-soluble	dissolves in fat
fungi	microscopic plants, some of which are capable of causing disease (e.g., ringworm is a fungal disease in cattle)
fungicide (antifungal)	an agent that destroys fungi (e.g., griseofulvin)
HACCP	Hazard Analysis Critical Control Points, an internationally recognized food safety system
homogenous	uniform structure or composition throughout
hormone	a chemical transmitter transported by the bloodstream to specific cells and organs where it regulates functions such as growth, reproduction, metabolic processes, sexual attributes and behaviour (e.g., ear implants made of estrogen, progesterone and testosterone combinations)
Ideal or D3 needles	needles that contain a metal alloy that is more readily detectable by a metal detector
immunization	the process of rendering an animal immune
immunoglobulin	specialized serum proteins produced by white blood cells in response to an immense number of different antigens to which an animal has been exposed
infectious	caused by small living organisms, including bacteria, viruses, fungi, parasites or prions (abnormal protein)

infusion	continuous slow introduction of a solution into the body
inscription	part of a veterinary prescription which provides the information on the drug name, strength or concentration
intra-articular	administration of medicines directly into a joint
intradermal	into the skin
intramammary	into the mammary gland (udder)
intramuscular (IM)	in the muscle
intranasal	into the nostril (nose)
intraperitonal	administration of medicines directly into the abdominal cavity
intrauterine	into the uterus
intravaginal	into the vagina
intravenous (IV)	into a vein
killed vaccine	prepared from killed microorganisms in combination with a carrier (adjuvant) to stimulate protective immunity
lesion	an abnormal change in structure of an organ or part due to injury or disease (a sore)
mastitis	inflammation of the mammary gland (udder)
maximum residue limit (MRL)	the maximum drug residue in tissue and milk allowed by regulation
medicating ingredient	• a substance intended for use in the prevention or treatment of disease in livestock • a substance, other than a feed, intended to affect the structure or any function of the body of the livestock, and that has assigned to it a drug identification number pursuant to the *Food and Drugs Act*
medicine	any drug or remedy
metabolic disease	disease caused by disturbance of normal chemical reactions in the body of a living organism (e.g., grain overload, ketosis, milk fever)
metaphylactic	mass medication of high-risk cattle upon arrival at the feedlot, pre-conditioner yard or stocker operation. The cattle are treated as a group rather than as individuals, and all are treated before they show clinical signs of disease.
MIB	Compendium of Medicating Ingredient Brochures. Information on the proper use of drugs delivered in feed.
mitigate	to make less severe or painful

modified live vaccine	prepared from live microorganisms that have lost their ability to cause disease but remain alive and have retained their ability to induce protective immunity
non-contagious	not spread from animal to animal or contamination (e.g., hardware disease)
non-steroidal anti- inflammatory	non-steroid chemicals with anti-inflammatory properties similar to corticosteroids (e.g., Aspirin, Banamine)
OFFSP	on-farm food safety program
ophthalmic	the eye and structures in the region of the eye
oral	administered by mouth
organophosphate	a class of compounds (active ingredient) in common pesticides
OTC	over-the-counter
PAM	production animal medicine regulations
parasite	a plant or animal that lives within or upon another living organism at whose expense it obtains some advantage (e.g., intestinal and lung worms, ticks, warbles, mange mites, lice and coccidian)
parasiticide	a drug or chemical that kills parasites (e.g., anthelmintics for worm treatment—Safe-Guard premix; endectocides, such as the ivermectin products, kill internal worms and external parasites; and external parasitides and insecticides, such as fly ear tags, Spotton and Lysoff)
pathogen	an organism capable of causing disease
pathogenic	capable of causing disease
pest control product (PCP) no.	identifies licensed pesticides
pharmaceutical	a drug obtained by creating, mixing or compounding chemicals
pharmacodynamic	dealing with the reactions between drugs and living systems
pharmacokinetics	the study of absorption, distribution, metabolism and excretion of drugs in the body
pharmacology	how the medicine works
physical hazards	hazards in food, such as broken needles in beef and flies and straw in milk
post partum	after calving
ppm	parts per million (e.g., 4 ppm = 4 grams in one million grams or 4 mg/kg)
precautions	a label provides information on handling and storage conditions

prescription	a written or verbal order for a medication from a licensed veterinarian
prion	aberrant, misfolded proteins that appear to cause BSE (bovine spongiform encephalopathy) and other brain abnormalities
probiotics	live microbial feed supplements that beneficially affect the animal by improving its intestinal micro flora; probiotics are generally administered orally (e.g., lactobacillus)
progesterone	the hormone that prepares the lining of the uterus for implantation of a fertilized egg and then helps to maintain it during pregnancy
prolapse	• uterine; the uterus slips from its normal position, reaching into the vagina or being expelled from the body through the vulva • vaginal; the vagina slips from its normal position and is expelled from the body through the vulva • rectal; the rectum slips from its normal position and is expelled in part from the body
prophylactic	guarding from or preventing disease
prostaglandins	compounds made by the body to act as messengers involved in reproduction and in the inflammatory response to infection
protocol	a standardized, detailed, written plan of a treatment or procedure
pyometra	severe bacterial infection with accumulation of pus within the uterus
pyrethroids	a class of compounds (active ingredient) in common pesticides
reconstituted	to restore to a former condition by adding water or other solvent
rodenticide	rodent poison
sharps	needles, scalpel blade and other cutting or piercing instruments
signa	part of a veterinary prescription that provides directions for use, including withdrawal period
solution	a drug dissolved in a liquid
speculum	an instrument inserted into a body passage for inspection or medication
standard operating procedures (SOP)	detailed written instructions for procedures and processes on the farm
sub-clinical	no obvious, observable signs of illness
subcutaneous (SC)	under the skin
subscription	part of a veterinary prescription that provides the number of doses supplied
subunit vaccine	vaccine containing only the specific proteins of the infectious agent that induces protective immunity

suspension	a drug whose particles are mixed with, but not dissolved in, a liquid
synergistic	interaction of drugs or conditions such that the total effect is greater than the sum of the individual effects
systemic	absorbed into the bloodstream
therapeutic	treatment of disease or disorders by remedial agents or methods
topical	applied externally on the body
trachea	wind-pipe
tranquilizer	an agent that calms or quiets an anxious or agitated animal without affecting its clarity of consciousness (e.g., Atravet = acepromazine)
transfer needle	a needle used exclusively for withdrawing product from the original container for transfer to another container
treatment	the management and care of an animal with a disease or disorder
unapproved drug	a drug that does not have a valid DIN and whose sale has not been authorized. Unapproved drugs should not be used in cattle because their safety has not been determined and they pose a risk to animal and human health.
US vet license	identifies licensed vaccines
uterus	womb
vaccination	the introduction of a vaccine into an animal to produce immunity
vaccine	a suspension of modified live or killed microorganisms (viruses, bacteria) administered for the prevention or treatment of infectious diseases
VCPR	veterinary-client-patient relationship • A veterinarian has assumed responsibility for making clinical judgments regarding the health of the animals and the need for medical treatment and the client has agreed to follow the veterinarian's instructions. • A veterinarian has sufficient knowledge of the animals to initiate at least a general or preliminary diagnosis of the medical condition of the animals. This means that the veterinarian has recently seen and is personally acquainted with the keeping and care of the animals by virtue of an examination of the animals or by medically appropriate and timely visits to the premises where the animals are kept. • A veterinarian is readily available for follow-up evaluation, or has arranged for emergency coverage, in the event of adverse reactions or failure of the treatment.
virulent	ability to cause severe disease
virus	microscopic infectious agents that are smaller than bacteria and only reproduce inside a living cell

warning	on a label, a statement relating to human health hazards and safety issues and often containing drug residue withdrawal information
water-soluble	dissolves in water
withdrawal time	the time needed between administering a drug and the elimination of the drug from the animal's tissues in order to ensure no residues remain in the animal's system (e.g., milk or meat)
zoonotic diseases	caused by microorganisms in animals that are capable of causing disease in humans (e.g., Salmonella, *E. coli* O157:H7 and Cryptosporidia)

Appendix 1 Regulations

A. Federal Legislation

The federal and provincial governments are both committed to the production of safe food. Health Canada is the federal department responsible for helping Canadians maintain and improve their health. In partnership with provincial and territorial governments, Health Canada provides national leadership to develop health policy, enforce health regulations, promote disease prevention and enhance healthy living for all Canadians (www.hc-sc.gc.ca). The Minister of Health has total or partial responsibility for the administration of the following acts related to beef safety.

- *Canadian Food Inspection Agency Act*
- *Food and Drugs Act*
- *Pest Control Products Act*
- *Feeds Act*

The Canadian Food Inspection Agency (CFIA) provides inspection and related services to four federal government departments, including Health Canada and Agriculture and Agri-Food Canada. The CFIA (www.inspection.gc.ca) administer and enforce the following Acts related to beef safety:

- *Feeds Act*
- *Food and Drugs Act (as it relates to food)*
- *Health of Animals Act*
- *Meat Inspection Act*

The Veterinary Biologic Section (VBS) is a division of CFIA which is responsible for the licensing of veterinary biologics (vaccines) in Canada. The VBS licenses biologics to ensure they are safe and efficacious in animals, and pose no threat to humans and the environment. The regulations for licensing veterinary biologics are part of the Health of Animals Act.

The Pest Management Regulatory Agency (PMRA) administers the *Pest Control Products Act* (PCPA) for the federal Minister of Health (www.hc-sc.gc.ca/pmra-arla). The *Pest Control Products Act* regulates products used for the control of pests and the organic functions of plants and animals. The Act and Regulations prescribe standards for registration, manufacturing, storing, displaying and use of pesticides to ensure their efficacy and safety. A copy of the Act and Regulations can be found on the Department of Justice Canada web site (laws.justice.gc.ca/en/p-9/90918.html). Provincial governments may require pesticide training and licensing requirements for producers. Contact Alberta Agriculture, Food & Rural Development and Alberta Environment to find out what provincial regulations are in place for producer use of pesticides and disposal requirements for empty containers, unwanted or expired pesticides.

The Veterinary Drugs Directorate (VDD) is part of the Health Products and Food Branch of Health Canada. (www.hc-sc.gc.ca/vetdrugs-medsvet). The VDD ensures safety of food from animals treated with veterinary drugs. As well, VDD ensures that veterinary drugs sold in Canada are safe and effective for animals.

The *Food and Drugs Act* provides the conditions and standards under which drugs are manufactured and offered for sale. The Act ensures drugs on the Canadian market are safe and effective and that labels contain all necessary warnings, such as toxicity, contraindications and withdrawal periods.

Different types of drugs are classified in various Schedules of the *Food and Drugs Act*. Schedule G drugs are controlled drugs, such as barbiturates. Schedule N drugs are narcotics and these drugs can not be sold over the counter, under any circumstances.

Schedule F drugs are of primary interest to cattle producers. Schedule F, Part I veterinary drugs are prescription drugs for animals. These drugs are restricted to sale and use on the order of a licensed veterinarian and can only be sold under the confines of a valid veterinary-client-patient relationship (VCPR).

Prescription drugs can be differentiated from nonprescription drugs by the Pr symbol which is on the label of the drug. Prescription drugs are not available on demand from producers, can not be sold over the counter by non-professional staff and must be adequately labeled with specific instructions for use. Examples of prescription drugs are Micotil, Nuflor, Excenel, and oxytocin.

Schedule F, Part II veterinary drugs are not prescription drugs. These drugs can be sold "over the counter" (OTC) provided the label indicates "For Veterinary or Agricultural Use Only" or the product is in a dosage form unsuitable for humans. The producer must understand what the product is for and how to use it. This includes understanding label directions (including correct calculation of label dosages), contraindications and withdrawal periods. Examples of some nonprescription drugs are penicillin and tetracycline.

In the national beef on-farm food safety program, producers are required to have an annually signed processing protocol and treatment protocol from a licensed veterinarian to ensure that all drug use is under a valid VCPR and the veterinarian has provided adequate information for the safe and prudent use of these products.

Any extra-label drug use (i.e., used other than as stated on the manufacturer's label, such as increasing the dosage, different route or frequency, different animal species) can only be done through the written order of a licensed veterinarian and a copy of the signed, written veterinary prescription should be provided by the veterinarian to the producer for his records.

Within the *Food and Drugs Act*, Part C Drugs, regulations (C.08.012) exist for the sale of medicated feeds. Any medications used in feeds other than as described on the manufacturer's label (reference: Compendium of Medicating Ingredients Brochure) require a written medicated feed prescription from a licensed veterinarian. A copy of the written medicated feed prescription must be given to the producer by the veterinarian and the veterinarian is responsible for ensuring that the producer understands how to feed the medicated feed to his cattle.

The *Health of Animals Act* includes regulations respecting the health of animals. A copy of it can be found at the Department of Justice Canada web site laws.justice.gc.ca/en/H-3.3/C.R.C.-c.2961/129597.html. The regulation contains parts and schedules related to eradication of diseases (Part IX), animal identification (Part XV), prohibited materials in ruminant feed (Part XIV), and veterinary biologics (Part XI).

It is within the *Health of Animals Act* where the proposed Regulations Respecting the Making of Medicated Feed is described. These regulations are currently being revised with stakeholder input. The regulations include standards that cattle producers will have to follow when making medicated feed on farm. The regulations will include licensing requirements of operations, standards on-farm for making medicated feeds e.g., mixer and scale verification, procedures to prevent drug cross-contamination and carry-over, procedures in case of discrepancy or contamination, and records.

The Canadian Cattle Identification Agency (CCIA) (www.canadaid.com/) follows the legislation for animal identification under the *Health of Animals Act*. These regulations describe identification requirements, prohibitions, tagging sites, losses of an approved tag, animal death or slaughter, export and import requirements. Animal identification is an important tool in an animal health and food safety programs.

Under the Health of Animals Regulations, prohibited material is defined as "anything that is, or that contains any, protein that originated from a mammal, other than a porcine or an equine. It does not include milk, blood, gelatin, rendered animal fat or their products." The regulations define importation and rendering requirements of animal protein products to ensure that they do not contain prohibited material which could potentially include agents that cause transmissible spongiform encephalopathies i.e. bovine spongiform encephalopathy. The regulations specify in section 164 "that no person shall feed prohibited material to a ruminant." Producers who have pigs and poultry on the same farm as cattle must have storage and equipment clean-out procedures to prevent feed cross contamination, since pig and poultry feed currently can contain ruminant bone and meat meal. CFIA has recently proposed new regulations that would remove all SRMs from animal feed to reduce the potential on-farm cross contamination of prohibited materials between ruminant and pig/poultry feed.

The CFIA is responsible for the administration of the meat hygiene program to ensure that meat and poultry products leaving federally-inspected establishments are safe and wholesome. The CFIA enforces the *Meat Inspection Act* and Regulations. The *Meat Inspection Act* covers the import and export of and inter-provincial trade in meat products, the registration of establishments, the inspection of animals and meat products in registered establishments and the standards for those establishments and for animals slaughtered and meat products prepared in those establishments. The standards under the regulations discuss some issues as ante and post mortem inspections, how to handle meat products with Cysticercus bovis (beef measles), and allowable food additives, e.g.,, maximum drug residue limits (authorized by these Regulations or the Food and Drug Regulations). The CFIA monitors on a regular basis carcasses for drug residues. Any carcasses found with residues above tolerance levels are condemned and the producer contacted to investigate the problem and prevent reoccurrences. Currently, drug residues in beef carcasses are <1%.

CFIA activities also include HACCP. All federal packing plants in Canada must have HACCP implementation and their HACCP programs are regularly inspected by CFIA for compliance. Information on the Food Safety Enhancement Program (FSEP) and HACCP can be found at CFIA's web site (www.inspection.gc.ca). As well, CFIA is responsible for the administrative and technical recognition of the commodity specific on-farm food safety programs (www.inspection.gc.ca/english/fssa/polstrat/reco/conte.shtml), such as Canadian Quality Milk and Quality Starts Here Verified Beef Production.

Under the authority of the federal *Feeds Act*, CFIA administers a national livestock feed program to verify that livestock feeds manufactured and sold in Canada or imported into Canada are safe, effective and labeled appropriately. A copy of the *Feeds Act* and Regulations can be found at (laws.justice.gc.ca/en/F-9/57123.html).

CFIA conducts such activities as

- Evaluating and approving ingredients for use in livestock feeds
- Monitoring feeds via random sampling and analysis for the presence of residues of chemicals, pesticides, contamination by heavy metals, mycotoxins, and salmonella and verifying drug guarantees in feeds
- Undertaking investigations in response to detections of contamination of meat and producer complaints related to feed, conducted at both commercial feed mills and on farm
- Reviewing labels of medicated feeds for accuracy to verify that the proper level of medication is provided and that all applicable cautions and warnings are provided to enable safe use of the feed as directed. (www.inspection.gc.ca/english/anima/feebet/feebete.shtml)

Under the Feed Regulations, a "medicated feed" is defined as a mixed feed that contains a medicating ingredient. A "medicating ingredient" is defined as:

- a substance that is intended for use in the prevention or treatment of disease in livestock or
- a substance, other than a feed, that is intended to affect the structure or any function of the body of the livestock,
- and that has assigned to it a drug identification number pursuant to the *Food and Drugs Act*.

Medicating Ingredients Permitted in Cattle Feed – When used according to the label. Compounding of drugs may alter withdrawal times.
www.inspection.gc.ca/english/anima/feebet/mib/drguse1e.shtml

Review the CFIA website regularly for changes below in CMIB.

2005 Medicating Ingredient List

Cattle-Calves Nutritional Uses	Withdrawal (days)	Medicating Ingredient Brochure (MIB)
Growth Promotion and Improved Feed Efficiency		
1) chlortetracycline hydrochloride	0	10.1
2) lasalocid sodium	0	66
3) melengestrol acetate	2	46
4) monensin sodium	0	57
Improved Feed Efficiency		
1) salinomycin sodium	0	69
MEDICINAL USES		
Calf diarrhea		
1) chlortetracycline hydrochloride	5	34
2) oxytetracycline hydrochloride	5	35
Stress		
1) chlortetracycline hydrochloride/sulfamethazine	10	49
2) oxytetracycline hydrochloride/neomycin sulfate	7	55
Coccidiosis		
1) amprolium	7	27
2) decoquinate	0	50
3) lasalocid sodium	0	66
*4) monensin sodium	0	57
Foot rot		
1) chlortetracycline hydrochloride	5	34
Bloat		
*1) oxytetracycline hydrochloride	5	35
*2) poloxalene	0	56
Suppression of Estrus		
1) melengestrol acetate	2	46
Liver Abscesses		
1) tylosin phosphate	0	43
Worms		
*1) fenbendazole	13	72
*2) levamisole	10 (meat) 2.5 (milk)	54
*3) morantel tartrate	30	61

***includes lactating dairy cattle**

B. Provincial Legislation

Alberta legislation consists of the *Pharmaceutical Profession Act*, the *Veterinary Professions Act*, the *Livestock Diseases Act*, and the *Environmental Protection and Enhancement Act*. Copies of the Acts can be found at www.gov.ab.ca/qp.

The *Pharmaceutical Profession Act* is the primary provincial legislation regulating the sale of all drugs in the Province of Alberta. This Act is administered by the Alberta College of Pharmacists. This Act lists a number of activities which are defined as "exclusive scope areas of the practice of pharmacy". The Act states that only a pharmacist can engage in the exclusive scope areas of the practice of pharmacy. Exceptions in this provision include "registered veterinarians" and the sale of livestock medicine pursuant to the Production Animal Medicine Regulation.

The *Veterinary Profession Act* is administered by the Alberta Veterinary Medical Association. The Act defines the requirements of a "registered" veterinarian and states that only such a veterinarian can engage in the practice of veterinary medicine which includes but is not restricted to prescribing and dispensing of drugs. Specific exemptions regarding who can engage in the practice of veterinary medicine are listed in the Act (Part 1 (2)) under exclusive scope of practice. January 2004, the AVMA implemented a new policy requiring veterinarians to treat all antimicrobials, including OTC, as prescription drugs in terms of prescribing and dispensing.

Under the *Livestock Diseases Act*, certain provisions exist, where persons other than those under the *Pharmaceutical Profession Act* and *Veterinary Profession Act*, may sell medicine. The Production Animal Medicine (PAM) Regulations provide for the licensing of a person to sell medicine, specifying which medicine may be sold and prescribing any other conditions concerning the sale and handling of medicine. www1.agric.gov.ab.ca/$department/deptdocs.nsf/all/acts301

The Animal Industry Division of Alberta Agriculture, Food & Rural Development is responsible for administering PAM regulations. Section 13 of PAM regulations lists the drugs that are allowed for sale through PAM outlets and these would be referred to as "over the counter" drugs. Schedule F of the Food and Drug Act is the main guide as to which drugs will or will not be allowed for sale through a PAM outlet. All drugs under Schedule F Part I of the F*ood and Drugs Act* are prohibited drugs for PAM outlets. Producers take possession of the drug at a licensed PAM outlet.

The *Livestock Diseases Act* also contains the regulations for disposal of dead animals under the Destruction and Disposal of Dead Animals Regulations www1.agric.gov.ab.ca/$department/deptdocs.nsf/all/acts299?opendocument. The regulations require that all dead animals be disposed of within 48 hours by incineration, burying, rendering, composting or natural disposal (scavenging). See Section IX for further details.

The *Environmental Protection and Enhancement Act* of Alberta contains the Environmental Code of Practice for Pesticides which regulates the use, application, handling and disposal of pesticides. Some animal health products we use in cattle are pesticides, e.g., Lysoff, Spotton, fly tags. If unsure of whether the product is a pesticide, look for a Pest Control Product number on the container and read the label for indications that the product is regulated under the *Pest Control Act*. Pesticide concentrate must be disposed of in accordance with the Waste Control Regulation. See Section IX and contact Alberta Environment for further information www3.gov.ab.ca/env/ on proper pesticide disposal.

The *Agricultural Operation Practices Act* (AOPA) of Alberta came into effect January 1, 2002 to provide the industry with a framework for socially and environmentally sustainable livestock production in Alberta. The Act ensures the safe and sustainable handling of manure through regulation of the expansion and construction of confined feeding operations (CFOs) and the storage, application and incorporation or injection of manure. Alberta Agriculture, Food and Rural Development is responsible for the Act, and it takes the lead role in delivery of extension services and technology transfer to the livestock industry. The Natural Resources Conservation Board (NRCB) is responsible for administering the Act. More information can be obtained at www.agric.gov.ab.ca/$department/deptdocs.nsf/all.

Appendix 2 Feed Prescriptions

Clinic Name Here - Feed Prescription

A. Blank Form

OWNER: _____ ADDRESS: _____

VETERINARIAN: _____ ADDRESS: _____

SPECIES & CLASS: _____ AGE: _____ WEIGHT: _____

SEX: _____ NUMBER: _____ FEED TYPE: _____

PRODUCT: _____ AMOUNT: _____

MEDICATING INGREDIENTS			LEVEL OF DRUG IN FEED		
Proper name(s) of active ingredient(s)	**OR**	Trade name(s) of medicating product	Grams of active ingredient/tonne	**OR**	Grams of product/tonne

PRODUCT/RATION MIXING INSTRUCTIONS: _____

PRODUCT/RATION FEEDING INSTRUCTIONS: _____

CAUTIONS: _____

WARNINGS: _____

MANUFACTURING INSTRUCTIONS: _____

REPEAT: ❒ ONCE, ❒ TWICE, ____ TIMES; ❒ DO NOT REPEAT.

DATE: _____ SIGNED: _____ D.V.M.

The cautions, medicating ingredients and warning statements on this prescription have been discussed with the owner by the above signed veterinarian.

Feed to be Manufactured by: _____

B. Veterinary Feed Medication Prescription

SUMMARY OF INFORMATION REQUIRED:

OWNER: Name of actual customer (person purchasing feed), and name of person actually using (feeding) medicated feed.

OWNER ADDRESS: Business address where the feed will be used.

VETERINARIAN: Name of actual veterinarian (not Clinic name).

VETERINARIAN ADDRESS: Business (Clinic) address.

SPECIES & CLASS: Give actual species, as well as class of animal (e.g.,, starting broilers, laying hens, turkey breeders, swine starters, weaner pigs, growing beef cattle, beef cows, lactating dairy cows).

AGE: Actual age or range of ages of group to be fed (optional if weight of animals is given).

WEIGHT: Actual weight or range of weights of group to be fed (optional if age of animals is given).

SEX: Sex of animals (male, female layer, sow, gilt, heifer, steer, bull, cow, etc.)

NUMBER: Total number of animals to be fed as part of the prescription.

FEED TYPE: Class and/or form of feed, as applicable (complete feed, supplement, premix, pellet, krumble, mash, etc).

PRODUCT: Actual name (ideally including product number) of feed product into which medication is to be added.

AMOUNT: Total amount of feed to be manufactured for the indicated animals in one delivery.

MEDICATING INGREDIENTS: Give name of active ingredient (proper name of medicating ingredient) to be added (e.g.,, monensin sodium, oxytetracycline, melengestrol acetate) or, if the active ingredient is not known, the “Trade name” (common name).

If a specific medicating product is to be used, give both the proper name and the Trade name. The Trade name ideally should also include the product strength (e.g.,, Rumensin 200, Tylan 40 etc.).

LEVEL OF DRUG IN FEED: Give the target level of active ingredient that is to be in the medicated product (i.e., the actual product that is to be manufactured and supplied by the feed company, as given in “PRODUCT” above).

If the MEDICATING INGREDIENT is given as the Trade Name, the LEVEL OF DRUG IN FEED should be given as the weight of actual medicating product. If both sections under MEDICATING INGREDIENTS are completed, both sections under LEVEL OF DRUG IN FEED should be completed.

PRODUCT/RATION MIXING INSTRUCTIONS: Instructions for the “OWNER” on how to mix the medicated “PRODUCT” into other ingredients to make the final ration that will be fed on farm (normally not required for complete feeds). This information must be added to the feed tag by the feed manufacturer.

PRODUCT/RATION FEEDING INSTRUCTIONS: Instructions for the “OWNER” on how to feed the medicated product, or the ration prepared under PRODUCT/RATION MIXING INSTRUCTIONS. This information must be added to the feed tag by the feed manufacturer.

CAUTIONS: Precautionary statements relevant to risks regarding animal heath and safety, and health and safety of persons mixing feed. Acceptable to add “As given in MIB”, if desired and applicable.

WARNING: Precautionary statements relevant to risks regarding human (consumer) heath and safety (e.g., medicated feed withdrawal periods). Acceptable to add “As given in MIB”, if desired and applicable.

MANUFACTURING INSTRUCTIONS: Instructions to feed manufacturer regarding the making of the “PRODUCT” (e.g., Mix medicating ingredient with “x” kg of wheat shorts or other appropriate carrier before adding medicating ingredient to mixer; Flush system following manufacturing of this feed to prevent cross contamination; Do not follow this feed with feeds intended for horses.).

REPEAT: The number of times (if any) that the batch of medicated feed can be supplied to the “OWNER”. The maximum duration for a given prescription is one (1) year.

DATE: Date on which prescription was written, and is in force.

SIGNED: Prescription must be signed by veterinarian.

Feed to be Manufactured by: (Optional) Identifies the intended manufacturer, if desired.

C. Guidelines for Writing Veterinary Feed Prescriptions

July 16, 2003

LIMITATIONS: Veterinarians are only permitted to prescribe (feed) medications for therapeutic purposes (i.e., for the treatment or prevention of disease). Prescribing for other reasons (e.g., improvement of performance or feed efficiency) is not permitted. (Food and Drugs Regulations C.08.012.1)

THE REGULATIONS:

Food and Drugs Act Regulations:

C.08.012.

(1) Notwithstanding anything in this Division, a person may sell, pursuant to a written prescription of a veterinary practitioner, a medicated feed if:

(a) as regards the drug or drugs used as the medicating ingredient of the medicated feed,

(i) the Director has assigned a drug identification number pursuant to section C.01.014.2, or

(ii) the sale is permitted by section C.08.005, C.08.011 or C.08.013;

(b) the medicated feed is for the treatment of animals under the direct care of the veterinary practitioner who signed the prescription;

(c) the medicated feed is for therapeutic purposes only; and

(d) the written prescription contains the following information:

(i) the name and address of the person named on the prescription as the person for whom the medicated feed is to be mixed,

(ii) the species, production type and age or weight of the animals to be treated with the medicated feed,

(iii) the type and amount of medicated feed to be mixed,

(iv) the proper name, or the common name if there is no proper name, of the drug or each of the drugs as the case may be, to be used as medicating ingredients in the preparation of the medicated feed, and the dosage levels of those medicating ingredients,

(v) any special mixing instructions, and

(vi) labeling instructions including

(A) feeding instructions,

(B) a warning statement respecting the withdrawal period to be observed following the use of the medicated feed, and

(C) where applicable, cautions with respect to animal health or to the handling or storage of the medicated feed.

(2) For the purpose of this section, “medicated feed” has the same meaning as in the Feeds Regulations.

Feeds Act Regulations:

5. (1) Subject to subsection (2), all feeds shall be registered.

(2) The following feeds are not required to be registered: …

(g) any veterinary prescription feed manufactured in Canada if

(i) the sale of such feed is authorized under section C.08.012 of the Food and Drug Regulations,

(ii) the amount of feed manufactured does not exceed the amount that would be normally consumed by the number of animals prescribed to receive the feed during the prescribed period of medication,

(iii) the veterinary prescription pursuant to which the feed is manufactured is signed by the veterinarian who issued it and the prescription contains the following information:

(A) the date on which the prescription is written,

(B) the name and address of the person for whom the feed is to be manufactured and by whom it is intended to be used,

(C) the name and level of inclusion in the feed of the medicating ingredient prescribed by the veterinarian,

(D) the type and amount of feed to be manufactured,

(E) the number, kind, class and age or weight of the livestock intended to be fed the feed,

(F) special manufacturing instructions including necessary mill clean-up warnings, if any,

(G) feeding instructions or directions for use of the feed including the period of medication during which the feed is to be fed to the livestock, and

(H) warning statements and caution statements, where applicable,

(iv) the veterinary prescription pursuant to which the feed is manufactured contains a statement, signed by the person for whom the prescription was issued, indicating that he has read and understands the feeding instructions or directions for use and the warning statements and caution statements set out on the prescription, except that no such statement is necessary in those cases where, for practical reasons, the veterinarian who issued the prescription issued it directly to the manufacturer of the feed and is satisfied that the person for whom the prescription was issued was adequately aware of the information set out on the prescription,

(v) a copy of the veterinary prescription is in the possession of the manufacturer of the feed prior to the delivery of the feed, and

(vi) [Repealed, SOR/97-292, s. 22]

(vii) the feed is labeled in accordance with subsection 26(7).

(3) A feed that is exempt from registration pursuant to paragraph (2)(a), (b), (d), (e), (f) or (g) shall conform to the standards prescribed in these Regulations for that feed and shall be packaged and labeled as prescribed in these Regulations. SOR/88-473, s. 2, SOR/90-73, s. 2; SOR/90-92, s. 1; SOR/90-730, s. 2; SOR/93-232, s. 2; SOR/97-292, s. 22.

14. A mixed feed shall not contain

(a) ingredients other than those listed in Schedule IV or V;

(b) medicating ingredients of a brand, at a level or for a purpose or species other than as set out in the Compendium of Medicating Ingredient Brochures unless the feed is a veterinary prescription feed. SOR/88-473, s. 3; SOR/90-73, s. 5.

15. (1) Every person who manufactures or sells a customer formula feed, a consultant formula feed, a feed described in paragraph 5(2)(d) or a veterinary prescription feed shall keep a copy of each mixing formula used in the manufacture of that feed and retain it

(a) in the case of a customer formula feed, a consultant formula feed or a feed described in paragraph 5(2)(d), for a period of six months from the last date of manufacture of that feed; or

(b) in the case of a veterinary prescription feed, for a period of one year from the last date of manufacture of that feed.

(4) Every manufacturer of a customer formula feed or a veterinary prescription feed shall keep a copy of the customer formula or the veterinary prescription under which the feed is manufactured in the manufacturer's possession during the manufacture of that feed and shall keep that copy, together with a list of each date on which the feed was manufactured,

(a) in the case of a customer formula feed, for a period of at least six months from the last date of manufacture of that feed; or

(b) in the case of a veterinary prescription feed, for a period of at least one year from the last date of manufacture of that feed. SOR/97-292, s. 23.

26. (1) Subject to subsections (2) to (6), every feed that is manufactured, sold or imported shall have attached to it or to a package containing it or, if the feed is shipped in bulk, to or on the invoice, shipping bill or statement delivered to the purchaser with the shipment, a label containing the following information:

(a) in the case of a feed not required to be registered, the name and address of the person who manufactured the feed or caused it to be manufactured;

(b) in the case of a feed required to be registered, the name and address of the registrant;

(c) the name of the feed in accordance with section 32;

(d) the brand of the feed, if any;

(e) the registration number, where applicable;

(f) the net amount

(i) expressed as the number of units in a package, in the case of a package of feed containing individual feeding forms, or

(ii) expressed as the mass or volume in the package or shipment, in the case of any other package or bulk shipment of feed;

(g) an accurate statement of the guaranteed analysis in respect of the feed;

(h) subject to subsection 27(3), directions for use in sufficient detail to permit the safe and effective use of the feed for its intended purpose by users with no special knowledge of the purpose and use of the feed;

(i) subject to paragraph (j), the name of each ingredient in the feed or the statement "a list of the ingredients used in this feed may be obtained from the manufacturer or registrant" or "la liste des ingrédients de cet aliment peut être obtenue du fabricant ou du titulaire de l'enregistrement";

(j) the name of each ingredient in the feed if the feed is required to comply with the guarantees stipulated in item 7 of Table 3 of Schedule I;

(k) if the feed contains a medicating ingredient and is in a form other than a mash, the particular form of the feed;

(l) an identification code, in the case of a micro-premix feed or a feed designed to replace whole milk in the ration of the livestock;

(m) if the feed is a medicated feed, other than a veterinary prescription feed,

(i) the name and actual amount of the medicating ingredient present in the feed, in accordance with the Compendium of Medicating Ingredient Brochures, in direct association with the feed name,

(ii) the claim or claims applicable to the kind of medicating ingredient present in the feed, the level of medicating ingredient present in the feed and the type of livestock for which the feed is intended, as set out in the Compendium of Medicating Ingredient Brochures,

(iii) every caution statement in respect of the medicating ingredient present in the feed that is set out in the Compendium of Medicating Ingredient Brochures under or next to the heading, in bold print, “Caution” or “Précaution”, and

(iv) every warning statement in respect of the medicating ingredient present in the feed that is set out in the Compendium of Medicating Ingredient Brochures under or next to the heading, in bold print, “Warning” or “Mise en garde”;

(n) [Repealed, SOR/93-157, s. 1]

(o) in the case of a consultant formula feed, the name and address of the specific purchaser for whom the feed was manufactured; and

(p) any other information, notes, caution statements or warning statements necessary to convey useful information to the purchaser of the feed.

(7) In addition to the labeling requirements prescribed in subsection (1), a veterinary prescription feed shall have on each package or, if the feed is shipped in bulk, on the shipping bill, or on a statement accompanying the shipment

(a) the name and address of the manufacturer;

(b) the name of the person for whom the feed was manufactured;

(c) the name of the veterinarian who issued the veterinary prescription;

(d) the name of the feed including the name and amount of the medicating ingredient present in the feed;

(e) the directions for use including the duration of feeding, as indicated on the veterinary prescription;

(f) any caution statement or warning statement indicated on the veterinary prescription and in the format indicated in subsections (2) and (3); and

(g) the net mass of the feed.

Appendix 3 Sample Drug Labels

A. Dry Cow Treatment – Dry Clox

B. Lactating Cow Treatment – Cefa-Lak

Ayerst

Pr Cefa-Lak®

CEPHAPIRIN SODIUM
FOR INTRAMAMMARY INFUSION
FOR VETERINARY USE ONLY

DESCRIPTION

CEFA-LAK (cephapirin sodium) is a cephalosporin which possesses a wide range of antimicrobial activity against gram-positive and gram-negative organisms. It is derived biosynthetically from 7-aminocephalosporanic acid.

Each 10 mL disposable syringe contains 200 mg of cephapirin activity in a stable peanut oil gel.

Store at controlled room temperature 15° to 30°C; avoid excessive heat.

ACTION

Cephapirin is bactericidal to susceptible organisms; it is known to be highly active against *Streptococcus agalactiae* and *Staphylococcus aureus* including strains resistant to penicillin.

To determine the susceptibility of bacteria to cephapirin in the laboratory, the class disc, Cephalothin Susceptibility Test Discs, 30 mcg, should be used.

INDICATIONS

FOR LACTATING COWS ONLY

For the Treatment of Bovine Mastitis

CEFA-LAK for Intramammary Infusion has been shown to be efficacious in the treatment of mastitis in lactating cows caused by susceptible strains of *Streptococcus agalactiae* and *Staphylococcus aureus* including strains resistant to penicillin.

CEFA-LAK for Intramammary Infusion should be used at the first signs of inflammation or at the first indication of any alteration in the milk. Treatment is indicated immediately upon determining, by C.M.T. or other tests, that the leucocyte count is elevated, or that a susceptible pathogen has been cultured from the milk.

DOSAGE AND DIRECTIONS FOR USE

Infuse the entire contents of one syringe (10 mL) into each infected quarter immediately after the quarter has been completely milked out. Repeat once only in 12 hours. If definite improvement is not noted within 48 hours after treatment, the causal organism should be further investigated. Consult your veterinarian.

Milk out udder completely. Wash the udder and teats thoroughly with warm water containing a suitable dairy antiseptic and dry, preferably using individual paper towels. Carefully scrub the teat end and orifice with 70% alcohol, using a separate swab for each teat. **Allow to dry.**

CEFA-LAK (cephapirin sodium) is packaged with the Opti-Sert® Protective Cap.

For partial insertion: Twist off upper portion of the Opti-Sert Protective Cap to expose 3–4 mm of the syringe tip.

For full insertion: Remove protective cap to expose the full length of the syringe tip.

Insert syringe tip into the teat canal and expel the entire contents of one syringe into each infected quarter. Withdraw the syringe and gently massage the quarter to distribute the suspension into the milk cistern. Do not milk out for 12 hours after last treatment.

Do not infuse contents of the mastitis syringe into the teat canal if the Opti-Sert Protective Cap is broken or damaged.

Reinfection — The use of antibiotics, however effective, for the treatment of mastitis will not significantly reduce the incidence of this disease in the herd unless their use is fortified by good herd management, and sanitary and mechanical safety measures are practiced to prevent reinfection.

CAUTION

CEFA-LAK should be administered with caution to subjects which have demonstrated some form of allergy, particularly to penicillin. Such reactions are rare; however, should they occur, discontinue treatment and consult your veterinarian.

WARNING

1. Milk that has been taken from animals during treatment and for 96 hours after the last treatment must not be used as food.
2. Treated animals must not be slaughtered for food until 4 days after the last treatment.
3. Administration of more than the prescribed dose may lead to residue of antibiotic in milk for more than 96 hours.

SUPPLY

CEFA-LAK (cephapirin sodium) for Intramammary Infusion. Cephapirin sodium equivalent to 200 mg of cephapirin activity per 10 mL syringe.
Carton containing 12 x 10 mL syringes

Opti-Sert® Protective Cap — U.S. Patent No. 4,850,970

Ayerst Veterinary Laboratories
Division of Wyeth-Ayerst Canada Inc.
Guelph, Ontario N1K 1E4

01131 C4200F

C. Systemic Antimicrobial Treatment – Borgal

INTERVET CANADA LTD.
250 WATER STREET, WHITBY, ON, L1N 9T5

Telephone: 905-430-9099
Order Desk: 800-268-4257
Technical Assistance: 877-464-7616 or 905-430-4433
Fax: 905-430-3709
Toll-Free Fax: 888-498-4444
Website: www.intervet.com

Every effort has been made to ensure the accuracy of the information published. However, it remains the responsibility of the readers to familiarize themselves with the product information contained on the product label or package insert.

BORGAL®

Pr

Intervet

Injection
DIN 00555657
Antibacterial Agent
VETERINARY USE ONLY

CHEMISTRY

The active ingredients of BORGAL are a combination trimethoprim and sulfadoxine which have been established in a ratio of 1:5.

ACTION

BORGAL Injection contains trimethoprim, a synthetic antibacterial, and sulfadoxine, a sulfonamide. The two components of BORGAL produce a sequential double blockade of bacterial metabolism, giving a level of activity many times greater than that obtained from either drug alone.

BORGAL provides effective antibacterial activity against a wide range of infections caused by gram-positive and gram-negative bacteria.

BORGAL has shown activity in vitro against the following organisms:

Very Sensitive Organisms

- Escherichia coli
- Clostridium spp
- Shigella spp.
- Salmonella spp.
- Proteus mirabilis
- Bacillus anthracis
- Pasteurella spp.
- Haemophilus influenzae
- Streptococcus zooepidemicus
- Vibrio spp.

Sensitive Organisms

- Streptococcus viridans
- Brucella spp.
- Enterococci spp.
- Staphylococcus aureus including penicillinase-producing organisms
- Proteus spp.
- Actinomyces
- Corynebacterium spp.
- Bordetella spp.
- Neisseria spp.
- Klebsiella spp.

Moderately Sensitive Organisms

- Enterobacter aerogenes
- Nocardia spp.

Non-sensitive Organisms

- Pseudomonas aeruginosa*
- Mycobacterium tuberculosis
- Leptospira spp.
- Erysipelothrix rhusiopathiae

*usually non-sensitive

INDICATIONS AND CLINICAL USES

BORGAL Injection may be used in cattle and swine where potent systematic antibacterial action against a wide range of infections caused by sensitive organisms is required.

BORGAL Injection is indicated in cattle for the treatment of:

RESPIRATORY TRACT INFECTIONS - bacterial pneumonias including bovine pneumonic pasteurellosis (shipping fever).

ALIMENTARY TRACT INFECTIONS - primary enteric and septicaemic colibacillosis and salmonellosis.

OTHER INFECTIONS - infectious pododermatitis (foot rot, foul in the foot) and septicaemias.

BORGAL Injection is indicated in swine for the treatment of:

RESPIRATORY TRACT INFECTIONS - bacterial pneumonias.

ALIMENTARY TRACT INFECTIONS - colibacillosis and post-weaning scours.

OTHER INFECTIONS - mastitis-metritis-agalactia syndrome of sows (MMA) and bacterial arthritis.

CONTRAINDICATIONS

BORGAL Injection should not be used in cattle or swine showing marked liver parenchymal damage or blood dyscrasias, nor in those with a history of sulfonamide sensitivity.

ADVERSE REACTIONS

No significant adverse reactions have been reported.

PRECAUTIONS

With intravenous therapy generally, and sulfonamides in particular, hypersensitivity reactions can occur and should be appropriately treated with corticosteroids or epinephrine.

Temporary, local, irritating swellings are encountered occasionally after intramuscular injection of BORGAL.

WARNING

MILK TAKEN FROM TREATED ANIMALS DURING TREATMENT AND WITHIN 96 HOURS AFTER THE LATEST TREATMENT MUST NOT BE USED IN FOOD. TREATED ANIMALS MUST NOT BE SLAUGHTERED FOR USE IN FOOD FOR AT LEAST 10 DAYS AFTER THE LATEST TREATMENT WITH THIS DRUG.

DOSAGE AND ADMINISTRATION

BORGAL Injection should be administered at a dose rate of 16 mg/kg body weight (3 mL per 45 kg [100 lb]) daily. In piglets weighing less than 4.5 kg (10 lb) do not exceed a dose of 0.5 mL.

Intramuscular injection is recommended for cattle and swine, but if a particularly rapid response is required in acute infections, BORGAL can be administered by slow intravenous injection.

Treatment should continue for 2-3 days after symptoms have subsided. The usual course of treatment is for not longer than 5 consecutive days.

DOSAGE FORM

BORGAL Injection is a solution containing 4% w/v trimethoprim and 20% w/v sulfadoxine in an organic solvent. Each mL contains 40 mg trimethoprim and 200 mg sulfadoxine.

STORAGE

Store at room temperature, below 25°C. Protect from light. Keep from freezing and contamination to prevent crystal formation.

SUPPLY

Amber bottles of 100 mL, 250 mL and 500 mL.

BORGAL, Reg. Trademark of Intervet Canada Ltd.

Disclaimer: Every effort has been made to ensure the accuracy of the information published. However, it remains the responsibility of the readers to familiarize themselves with the product information contained on the product label or package insert. NAC No.: 12180041

D. Intra-Uterine Antimicrobial Treatment – Tetrabol

VÉTOQUINOL N.-A. INC.
2000, CHEMIN GEORGES, LAVALTRIE, QC, J5T 3S5
Telephone: 450-586-2252
Order Desk: 800-363-1700
Fax: 450-586-4649
Website: www.vetoquinol.ca
Email: info@vetoquinol.ca

Every effort has been made to ensure the accuracy of the information published. However, it remains the responsibility of the readers to familiarize themselves with the product information contained on the product label or package insert.

TETRABOL
Vétoquinol
Tetracycline HCl boluses
DIN 00702587
Veterinary use only
Active ingredient:
Each bolus contains:
Tetracycline HCl 4 g

INDICATIONS

- Treatment of infections caused by tetracycline-sensitive bacteria in calves.
- Treatment of post-parturient uterine infections in cows and mares.

DOSAGE and ADMINISTRATION

Calves: Respiratory and enteric infections¼ bolus orally per 50 kg of body weight per day for 3 to 5 days.

Cows and mares: Post-parturient uterine infectionsInsert 1 bolus into the uterine cavity. Repeat after 2 days if needed.

WARNING

Treated animals must not be slaughtered for use in food for at least: calves - 5 days, cows - 18 days after the last treatment with this drug. Milk taken from animals during treatment and within 72 hours after the latest treatment with this drug must not be used in food.

STORAGE CONDITIONS

Protect from excessive heat and moisture.

Made in Canada

Contents

40 boluses 650017D

Disclaimer: Every effort has been made to ensure the accuracy of the information published. However, it remains the responsibility of the readers to familiarize themselves with the product information contained on the product label or package insert. NAC No.: 12341480

E. Systemic Steroidal Anti-inflammatory Treatment – Flucort

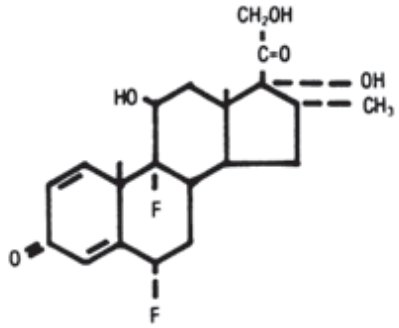
WYETH ANIMAL HEALTH
Division of Wyeth Canada
400 MICHENER ROAD, GUELPH, ON, N1K 1E4
Telephone: 519-837-2040
Order Desk: 800-265-7200
Fax: 519-837-9342
Website: www.wyethah.ca

Every effort has been made to ensure the accuracy of the information published. However, it remains the responsibility of the readers to familiarize themselves with the product information contained on the product label or package insert.

FLUCORT® INJECTION
Wyeth Animal Health
FLUMETHASONE
STERILE
DIN 02228327
VETERINARY USE ONLY
Active ingredient:
Flumethasone 0.5 mg/mL
Preservative:
Benzyl alcohol 9 mg/mL

GENERAL

FLUCORT (flumethasone) is a chemical modification of prednisolone, which possesses greater anti-inflammatory and gluconeogenic properties than the parent compound when compared on an equivalent basis. Due to the potency of FLUCORT (flumethasone) Injection, dosage recommendations should be consulted prior to drug administration. Chemically it is 6a - 9a-difluoro-16a methylprednisolone. The structural formula is as follows:



DESCRIPTION

The active ingredient of FLUCORT Injection is flumethasone which occurs as a white to creamy white, odourless, crystalline powder. The appearance of FLUCORT Injection is a clear, colourless to slightly yellowish, mobile liquid.

EXPERIMENTAL STUDIES

The acetate of flumethasone has been reported to have approximately 700 times the activity of hydrocortisone in the rat liver glycogen disposition assay1,2.

Veterinary experimental studies, utilizing eosinophil depression in normal dogs and blood glucose levels and eosinophil depression in normal cattle as parameters of drug activity in comparison tests involving prednisone and dexamethasone, suggest anti-inflammatory and gluconeogenic potencies for flumethasone of the following approximate order:

Four times that of dexamethasone.

Sixty to eighty times that of prednisone.

Clinical evidence of drug potency obtained during evaluation of the compound further substantiates the above experimental findings.

INDICATIONS

FLUCORT Injection is recommended for various rheumatic, allergic, dermatologic and other disease states which are known to be responsive to the anti-inflammatory corticoids.

Bovine Indications

1. Ketosis.
2. Musculoskeletal conditions due to the inflammation of muscles or joints and accessory structures where permanent structural changes do not exist such as arthritis, myositis, sprains or muscular soreness.

*3. Supportive therapy in milk fever, acute mastitis, metritis, shipping fever, pneumonia and founder.

Equine Indications

1. Musculoskeletal conditions due to inflammation where permanent structural defects do not exist such as bursitis, carpitis, osselets, tendinitis, myositis, sprains and muscular soreness.

*2. Supportive therapy in laminitis, fatigue, heat exhaustion and distemper (strangles).

Canine Indications

1. Musculoskeletal conditions due to inflammation of muscles or joints and accessory structures where permanent structural changes do not exist, such as, arthritis, osteoarthritis, disc syndrome, sprains and muscular soreness.
2. Acute and chronic dermatoses of varying etiology to help control the pruritus, irritation, and inflammation associated with these conditions. The drug has been proven useful in otitis externa in conjunction with topical medication for similar reasons.
3. In allergic states such as hives, urticaria, insect bites and asthmatic conditions.
4. Shock and shock-like states due to trauma, hemorrhage or endotoxins.3

*5. Supportive therapy prior to or following surgical procedures.

*6. Supportive therapy in various disease conditions such as distemper, hepatitis, cystitis, tracheobronchitis and tonsillitis.

Feline Indications

1. Musculoskeletal conditions due to inflammation of muscles or joints and accessory structures where permanent structural changes do not exist, such as, arthritis, sprains and muscular soreness.
2. Acute and chronic dermatoses of varying etiology to help control the pruritus, irritation and inflammation associated with these conditions.
3. For appetite stimulation in combination with the B-complex vitamins.

In human medicine, various corticosteroids have been used for their remissive or palliative effect in a number of disease entities. These diseases include acute and chronic leukemia; various auto-immune disorders such as hemolytic anemia, idiopathic thrombocytopenic purpura, and systemic lupus erythrematosis; ulcerative colitis, nephrosis, asthmatic conditions and pulmonary emphysema.4 The use of corticosteroids as therapy in these human disease states suggests that they may prove of value in their counterparts in animals when encountered.

*When FLUCORT Injection is used as supportive therapy, it does not replace the need for standard, primary therapy.

DOSAGE AND ADMINISTRATION

FLUCORT Injection is recommended for parenteral administration using various routes depending upon the animal species under treatment. Injection should be accomplished slowly with the drug at or near body temperature.

Intravenous injection of the compound may be indicated when a rapid method of administration is desired such as in toxemias or shock or shock-like states.

The following recommended dosages should be used as therapeutic guides. Each animal should be treated on an individual basis and the dosage adjusted according to the response noted.

Dosage of FLUCORT Injection:

Bovine: 1.25 to 5.0 mg daily by intravenous or intramuscular injection. If necessary, the dose may be repeated.

Equine: 1.25 to 2.5 mg daily by intravenous or intramuscular injection. If necessary, the dose may be repeated.

Canine: 0.0625 to 0.25 mg daily by intravenous, intramuscular or subcutaneous injection. If necessary, the dose may be repeated. Intralesional dosages in the dog have ranged from 0.125 to 1.0 mg, depending upon the size and location of the lesion under treatment.

Feline: 0.03125 to 0.125 mg by intravenous, intramuscular or subcutaneous injection. If necessary, the dose may be repeated.

If desired, therapy with FLUCORT Injection may be substituted for other corticoids by the appropriate adjustment of dose levels.

CAUTIONS

The usual cautions and contraindications for adrenocorticoid hormones are applicable with this compound. The close observation of animals under treatment with the drug is necessary since the usual signs of adrenocorticoid overdosage which include sodium retention, potassium loss, fluid retention, weight gain, etc., may not be readily observed. Under clinical and experimental trials, few side effects have been noted but, if they occur, the veterinarian should be prepared to take the necessary steps to correct them.

Continuous therapy with FLUCORT Injection especially at high dose levels, may result in the suppression of adrenal cortical function. In such cases, a temporary suspension of the therapy and stimulation of the adrenal cortex by the use of A.C.T.H. may be advisable. Following prolonged therapy with the drug, it is recommended that the drug be withdrawn gradually. If such animals are later subjected to stressful situations (trauma, surgery, etc.), it is advisable to institute a temporary course of therapy with FLUCORT Injection.

FLUCORT Injection may be administered to animals with bacterial diseases provided that specific and appropriate antibacterial therapy with antibiotic or chemotherapeutic drugs is administered simultaneously. It should be borne in mind that FLUCORT Injection like cortisone, through its anti-inflammatory action, may mask the usual signs of an infection such as pyrexia, inappetence, lassitude, etc. In the course of therapy with FLUCORT Injection should the question of determining the presence of an infectious disease arise, the drug should be withheld temporarily until a diagnosis or rediagnosis establishes the facts.

WARNING

Treated animals must not be slaughtered for use in food for at least 4 days after the latest treatment with this drug.

STORAGE

Store at room temperature.

REFERENCES

1. Stafford, R.O.; Barnes, I.E.; Bowman, B.J.; and Meinziger, M.M. PROC. SOC. EXP. BIOL. MED., 89, 371-374, 1955.
2. Ringler, I.; West, D.; Dulin, W.E.; and Boland, E.W. METABOLISM, 13, 37-44, 1964.
3. Lillehei, R.C.; Longerbeam, J.K.; Bloch, J.H.; and Mannox, W.G. CLIN. PARMACOL. THER. 5, 63-101, 1964.
4. "A Decade of Anti-Inflammatory Steroids, from Cortisone to Dexamethasone." ANN. N.Y. ACAD. SCIENCE, 82, 797-1014., 1959.

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Disclaimer: Every effort has been made to ensure the accuracy of the information published. However, it remains the responsibility of the readers to familiarize themselves with the product information contained on the product label or package insert. NAC No.: 11570652

F. Systemic Diuretic Treatment – Salix

INTERVET CANADA LTD.
250 WATER STREET, WHITBY, ON, L1N 9T5
Telephone: 905-430-9099
Order Desk: 800-268-4257
Technical Assistance: 877-464-7616 or 905-430-4433
Fax: 905-430-3709
Toll-Free Fax: 888-498-4444
Website: www.intervet.com

Every effort has been made to ensure the accuracy of the information published. ”However, it remains the responsibility of the readers to familiarize themselves with the product information contained on the product label or package insert.

SALIX™
Intervet
Furosemide Injection
DIN 00116238
Diuretic-Saluretic Sterile
VETERINARY USE ONLY

SALIX (furosemide) is a chemically distinct diuretic and saluretic pharmacodynamically characterized by:

-A high degree of efficiency

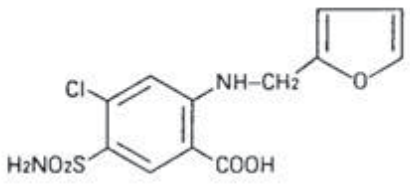
-A rapid onset of action of comparatively short duration

-Low toxicity with excellent patient tolerance

-Action at the proximal tubule, the ascending limb of the loop of Henle, and the distal tubule.

CHEMISTRY

SALIX is an anthranilic acid derivative. Chemically, it is 4-chloro-N-furfuryl-5-sylfamoyl-anthranilic acid.



INDICATIONS

SALIX is indicated in those conditions where a diuretic effect is desired. It is effective in edema and ascites of cardiac or renal origin in dogs, in udder edema of cattle and in stocking of dependent edema of horses. In dogs, cats and horses, it is effective in reducing localized, non-inflammatory edema such as that caused by trauma. The rationale for diuretic therapy is dictated by clinical pathology causing the condition.

CONTRAINDICATIONS AND ADVERSE REACTIONS

SALIX is a highly effective diuretic-saluretic which, if given in excessive amounts or for prolonged periods, may result in dehydration and electrolyte imbalance. Therefore, the dosage and schedule may have to be adjusted to the patient's needs. The animal should be observed for early signs of electrolyte imbalance and corrective measures administered. Early signs of electrolyte imbalance are increased thirst, lethargy, drowsiness or restlessness, fatigue, oliguria, gastrointestinal disturbances and tachycardia. Special attention should be given to potassium levels. SALIX may lower serum calcium levels and cause tetany in rare cases of animals having an existing hypocalcaemic tendency.

Electrolyte balance should be monitored prior to surgery in patients receiving SALIX. Imbalances must be corrected by the administration of suitable fluid therapy.

Sulfonamide diuretics have been reported to decrease arterial responsiveness to pressor amines and to enhance the effect of tubocurarine. Great caution should be exercised in administering curare or its derivatives to patients on SALIX therapy due to the possibility of additive hypotensive effects. For this reason, it is advisable to discontinue SALIX one week prior to any elective surgery where curare might be used.

It is advisable to discontinue SALIX therapy one week prior to the use of a general anaesthetic.

Excessive loss of potassium in patients receiving digitalis or its glycosides may precipitate digitalis toxicity. Caution should be exercised in animals administered potassium-depleting steroids.

Potassium supplements should be administered where high doses of SALIX are used over prolonged periods.

SALIX given intravenously should be administered slowly to avoid vomiting and/or ataxia.

SALIX is not an antibacterial; udder swelling due to bacterial infections should receive other appropriate therapy.

WARNINGS

MILK TAKEN FROM TREATED ANIMALS DURING TREATMENT AND WITHIN 48 HOURS AFTER THE LATEST TREATMENT WITH THIS DRUG MUST NOT BE USED IN FOOD.

TREATED ANIMALS MUST NOT BE SLAUGHTERED FOR USE IN FOOD FOR AT LEAST 48 HOURS AFTER THE LATEST TREATMENT WITH THIS DRUG.

THIS DRUG IS NOT TO BE ADMINISTERED TO HORSES THAT ARE TO BE SLAUGHTERED FOR USE IN FOOD.

PRECAUTIONS

Due to a lack of data, the use of SALIX is contraindicated in pregnant queens and bitches and all intravenous use is contraindicated in cats.

PHARMACOLOGY

Investigations into the mode of action of SALIX have utilized the most recent methods in nephrology: micropuncture, stop-flow experiments and various clearance studies in dogs and humans. It has been demonstrated that SALIX inhibits primarily the reabsorption of sodium not only in the proximal and distal tubule but more importantly in the ascending limb of the loop of Henle. The action on the distal tubule is independent of an inhibitory effect on carbonic anhydrase and aldosterone. The prompt onset of action is due to rapid absorption and poor lipid solubility. The low lipid solubility and rapid renal excretion minimize the possibility of tissue accumulation or crystalluria. Evidence indicates that SALIX is often effective in humans with markedly reduced glomerular filtration rates, in which other diuretics usually fail. SALIX does not reduce the G.F.R. in man. As a result of its action on the ascending limb, it generally produces a urine which is isotonic or hypotonic, in which the concentration of sodium is equal to or less than in body fluids. The onset of diuresis following oral administration is usually less than one hour with a duration of 6 to 8 hours. With intravenous injection of SALIX Parenteral diuresis usually begins within a few minutes and lasts up to 3 hours.

DOSAGE AND ADMINISTRATION

Dog and Cat: SALIX Parenteral (5% Solution) - 5 mg/kg body weight (2 mg per pound) given once or twice daily at a 6 to 8 hour intervals. May be given by either the intramuscular or intravenous route in dogs, but only by the intramuscular route in cats.

Cattle: SALIX Parenteral (5% Solution) - 0.5 to 1 mg/kg body weight (0.25 to 0.5 mg/lb) administered intramuscularly or intravenously or 500 mg (10 mL) once daily or 250 mg (5 mL) twice daily per 454 kg (1000 lb) animal at 12 hour intervals. Treatment not to exceed three days.

Horses: SALIX Parenteral (5% Solution) - 0.5 to 1 mg/kg body weight (0.25 to 0.5 mg/lb) administered intramuscularly or intravenously or 500 mg (10 mL) once daily or 250 mg (5 mL) twice daily per 454 kg (1000 lb) animal at 12 hour intervals.

DOSAGE DISCUSSION

Dog and Cat: A prompt diuresis usually follows the initial treatment. In severe or refractory cases the dose may be doubled or increased by increments of 2.2 mg/kg (1 mg/lb) body weight. Re-examination of the patient and close liaison with the client are necessary to establish an optimum dosage schedule.

In acute conditions in dogs, where an emergency exists, slow intravenous administration of the calculated dose may be repeated in 1 to 2 hours.

Mobilization of edema may best be accomplished by a combination of parenteral and oral administration.

For the sake of safety and efficiency, a treatment schedule of every second day or 2 to 4 consecutive days per week may be most desirable.

Diuretic therapy should be discontinued after the reduction of edema and maintained only after programming a dosage schedule sufficient to prevent recurrence.

Due to rapid onset and relatively short duration of action, administration may be timed to control the diuretic period for the convenience of the client or veterinarian.

Cattle: A prompt diuresis usually ensues from the initial treatment. A reduction of the edema and softening of the teats and udder usually occurs within 24 to 48 hours after the start of treatment. If an effect is not noticed within 72 hours, the animal should be re-examined.

SUPPLY

50 mL vials containing 50 mg SALIX per mL.

STORAGE

Store at room temperature, below 25°C. If crystallized, shake at room temperature until crystals dissolve. Protect from light. Yellow discolouration means decreased potency.

Active Ingredient: Each mL contains 50 mg of furosemide.

Preservatives: Quatresin® (myristyl gamma picolinium chloride) 0.02% and Sodium Sulfite 0.2% in each mL.

Intervet Canada Ltd.
250 Water Street
Whitby, ON L1N 9T5
1-800-268-4257

Net

50mL 205 300-4

Disclaimer: Every effort has been made to ensure the accuracy of the information published. However, it remains the responsibility of the readers to familiarize themselves with the product information contained on the product label or package insert. NAC No.: 12180442

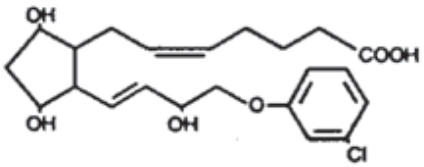
G. Reproductive Hormone Treatment – Estrumate

SCHERING-PLOUGH ANIMAL HEALTH
Division of Schering Canada Inc.
3535 TRANS CANADA HWY., POINTE CLAIRE, QC, H9R 1B4
Telephone: 800-605-2584
Telephone Orders:
Quebec: FRENCH: 800-361-2431 or 514-426-7340
ENGLISH: 800-361-6550 or 514-426-7344
Atlantic Provinces & Ontario: 800-361-6550
Fax Orders: 888-428-7400 or 514-428-7400
Telephone Orders: Manitoba/Saskatchewan/Alberta/British Columbia: 800-661-3134 or 403-236-7363
Fax Orders: 403-236-5196

Every effort has been made to ensure the accuracy of the information published. However, it remains the responsibility of the readers to familiarize themselves with the product information contained on the product label or package insert.

ESTRUMATE®
Pr
Schering-Plough
cloprostenol
Injectable Prostaglandin Analogue for Cattle

ESTRUMATE cloprostenol is a synthetic prostaglandin analogue, structurally related to prostaglandin F2a (PGF2a). Each 2 mL contains 500 µg of cloprostenol (as cloprostenol sodium), in an isotonic citrate buffer containing 0.1% w/v chlorocresol B.P. as bactericide.



ACTION

ESTRUMATE causes functional and morphological regression of the corpus luteum in cattle. This effect on the life span of the C.L. usually results in estrus within two to five days after treatment, followed by ovulation with normal fertility. ESTRUMATE alone will not increase fertility.

USES

By its ability to shorten the life span of the corpus luteum, ESTRUMATE can be used to treat certain clinical conditions which delay breeding, to manipulate the estrous cycle to better fit certain management practices, and to induce abortion.

THERAPEUTIC INDICATIONS

Subestrus (silent heat or nondetected estrus)

Cows which fail to exhibit normal estrous behaviour although ovarian cyclicity continues can be treated with ESTRUMATE while in the luteal phase of the estrous cycle. They may then either be closely observed for estrus over a scheduled time period and bred on detection of estrus or bred at 72 and 96 hours after injection without estrous detection.

Pyometra or chronic endometritis

Damage to the reproductive tract at calving or post-partum retention of the placenta frequently leads to infection and inflammation of the uterus which is usually referred to as endometritis. Under certain circumstances, this may progress into chronic endometritis with the uterus becoming distended with purulent matter. This condition, frequently referred to as pyometra, is characterized by a lack of cyclical estrous behaviour and presence of a persistent corpus luteum. This condition can be successfully treated by causing regression of the C.L. by treatment with ESTRUMATE. Where necessary, treatment may be repeated after 10-14 days.

Pregnancies from mismating

Unwanted pregnancies can be safely and efficiently terminated from one week after mating until about 4½ months of gestation. The induced abortion is uncomplicated, the fetus and placenta are usually expelled at about four and five days after the injection and the reproductive tract returns to normal soon after the abortion. Trial results have demonstrated that an abortion rate of approximately 95% can be expected for up to 4½ months of gestation. The ability of ESTRUMATE to induce abortion decreases beyond 4½ months while the risk of dystocia and its consequences increases.

Mummified Fetus

Death of the conceptus during gestation may be followed by its degeneration and dehydration. Induction of luteolysis with ESTRUMATE usually results in the expulsion of the mummified fetus from the uterus. (Manual assistance may be necessary to remove the fetus from the vagina. Normal cyclical activity should then follow.)

CONTROLLED BREEDING

The luteolytic action of ESTRUMATE can be used to schedule estrus and ovulation for an individual animal or a group of animals. This allows control of the time at which cycling cows or heifers can be bred.

ABORTION IN FEEDLOT HEIFERS

Unwanted pregnancies can be safely and efficiently terminated from one week after mating until about 4½ months of gestation. The induced abortion is uncomplicated, the fetus and placenta are usually expelled at about four and five days after the injection and the reproductive tract returns to normal soon after the abortion. Trial results have demonstrated that an abortion rate of approximately 95% can be expected for up to 4½ months of gestation. The ability of ESTRUMATE to induce abortion decreases beyond 4½ months while the risk of dystocia and its consequences increases.

ADMINISTRATION

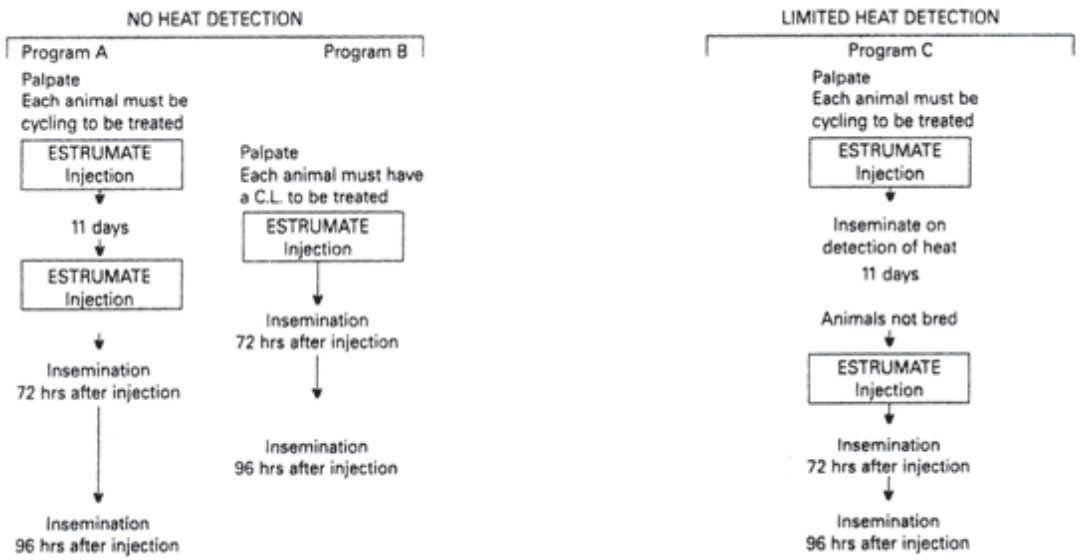
ESTRUMATE should be administered by intramuscular injection. Only cattle with a functional C.L. can respond to the luteolytic action of ESTRUMATE. In the cycling animal, there are refractory periods of 4 to 5 days before and after ovulation when cattle are not responsive to prostaglandins.

DOSAGE

For Therapeutic Indications - 2 mL For Controlled Breeding - 2 mL For Abortion - 1.5 mL (2 mL for animals over 455 kg)

INJECTION REGIMENS

For abortion and for therapeutic indications; one injection. For controlled breeding; Veterinarians and their dairy and beef producer clients should select the controlled breeding program which is appropriate for the existing circumstances and management practices.



First service conception rates in Canada using existing artificial insemination practices are generally agreed to be between 40% and 60% for beef cattle and 50% to 60% for dairy cattle. The spread of calf crops indicates similar levels are attained using natural service. Field trial results have demonstrated that producers can achieve similar conception rates using ESTRUMATE. If existing management breeding practices are resulting in higher or lower conception rates, similar levels can be expected using ESTRUMATE.

Following the controlled breeding program, those animals not conceiving should be rebred. This may be done by:

- observing animals for a return to estrus (especially during the third week after injection) and inseminating or hand mating animals returning to estrus
- turning in clean-up bull(s) 7 to 8 days after the last injection to cover any animal returning to estrus.

Many factors affect conception rates. Before a controlled breeding program is planned, the producer and his consulting veterinarian should review the operation's breeding history, herd health and nutritional status, and agree that a controlled breeding program is practical in the producer's specific situation. For a successful controlled breeding program:

- Cows and heifers must be cycling. Cattle should be palpated.
- Cattle should be in good condition for breeding. Animals in poor or medium condition should be fed to ensure a positive nutritional balance for 4 to 6 weeks before ESTRUMATE treatment and for 4 weeks after treatment.

- Proper program planning and record keeping are essential.
- Artificial insemination must be performed by competent inseminators using high quality semen. Inseminator fatigue must be avoided.

CONTRAINDICATIONS

Since ESTRUMATE results in an abortion rate of approximately 95% in cattle for up to 4½ months of gestation and causes some cattle in later pregnancy to abort, it should not to be given to pregnant animals unless induced abortion is desired.

Adverse reactions have not been seen at the recommended dose of 500 µg. At 50 and 100 times the recommended dose, mild side effects may be detected. These include increased uneasiness, mild transient diarrhea, slight frothing and milk let-down.

ESTRUMATE has a good margin of safety and deleterious effects have not been reported on the progeny conceived at the estrus following treatment.

WARNINGS

Treated animals must not be slaughtered for use in food for at least 48 hours after the last treatment with this drug.

ESTRUMATE can be absorbed through the skin. Therefore, care should be taken when handling the product, especially by women of child bearing age and by asthmatics.

Accidental spillage on the skin should be washed off immediately with water. Prostaglandins of the F2a type may cause bronchospasm in man although the possible incidence of this effect with ESTRUMATE is not known. Should respiratory embarrassment result from accidental inhalation or injection, the inhalation of a rapid-acting bronchodilator is indicated.

PRECAUTION

A low incidence of clostridial and other infections at the injection site has been reported following prostaglandin administration. Treated animals should be closely observed post-injection and appropriate antibiotic therapy initiated at the first sign(s) of infection.

PACK

5 x 2 mL single dose vials
10 mL, 20 mL and 50 mL multi-dose vials
PHARMACEUTICAL PRECAUTIONS
Protect from light.
DIN 02137658
Imported by
SCHERING CANADA INC.
POINTE-CLAIRE, QUÉBEC
H9R 1B4
® Registered Trademark of Schering Canada Inc.

1742019C R1197
Disclaimer: Every effort has been made to ensure the accuracy of the information published. However, it remains the responsibility of the readers to familiarize themselves with the product information contained on the product label or package insert. NAC No.: 12080342

H. Disinfectant – Hibitane

WYETH ANIMAL HEALTH
Division of Wyeth Canada
400 MICHENER ROAD, GUELPH, ON, N1K 1E4
Telephone: 519-837-2040
Order Desk: 800-265-7200
Fax: 519-837-9342
Website: www.wyethah.ca

Every effort has been made to ensure the accuracy of the information published. However, it remains the responsibility of the readers to familiarize themselves with the product information contained on the product label or package insert.

HIBITANE®
Wyeth Animal Health
DISINFECTANT
DIN 00053236
FOR VETERINARY USE ONLY
Active Ingredient: Chlorhexidine acetate (Hibitane) 2% w/v

DIRECTIONS

For disinfection of inanimate objects to aid in the control of canine distemper virus, equine influenza virus, transmissible gastroenteritis virus, hog cholera virus, parainfluenza-3 virus (PI3), bovine rhinotracheitis virus (IBR), bovine virus diarrhea virus (BVD), infectious bronchitis virus and Newcastle virus.

Ensure inanimate objects are thoroughly cleaned and all organic material is removed. Add 120 mL of Hibitane Disinfectant to each 3.8 L of clean water and mix well. Wash or rinse walls, cages or utensils with the prepared solution.

Hibitane Disinfectant has been shown to be virucidal in vitro against rabies virus (CVA strain) in laboratory tests when used as directed.

For general disinfection - clean walls, cages and utensils thoroughly ensuring all organic matter is removed. Add 30 mL of Hibitane Disinfectant to each 3.8 L of clean water and mix well. Wash or rinse walls, cages or utensils with the prepared solution.

CAUTION: Use only as directed.

STORAGE: Store under normal conditions at room temperature 15-30°C (59-86°F).

WARNING: Keep out of reach of children
Made in Canada by arrangement with
AstraZeneca Canada Inc.
®Licensed user of Hibitane
Net
3.8 L 342554315701
A2475C

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I. Pour-on Endectocide – Ivomec

MERIAL CANADA INC.
20000 CLARK GRAHAM, BAIE D'URFÉ, QC, H9X 3R8
Telephone: 514-457-1555
Order Desk: 888-637-4251 (888-MERIAL1)
Fax: 514-457-1175
Website: www.merial.com
Email: webmaster@merial.com

Every effort has been made to ensure the accuracy of the information published. However, it remains the responsibility of the readers to familiarize themselves with the product information contained on the product label or package insert.

IVOMEC®
Merial
(ivermectin)
Pour-On for Cattle
VETERINARY USE ONLY

INTRODUCTION

Discovered and developed by scientists from the Merck Research Laboratories, IVOMEC Pour-On contains ivermectin, a unique new chemical entity. Its convenience, broad-spectrum efficacy and wide safety margin make it an excellent antiparasitic product for cattle.

One dose effectively controls a wide range of internal and external parasites that can impair the health and productivity of cattle.

PRODUCT DESCRIPTION

IVOMEC Pour-On for Cattle is a clear, blue coloured liquid containing 5 mg of ivermectin per mL (0.5% w/v).

IVOMEC Pour-On is formulated to deliver the recommended dose level of 500 mg of ivermectin per kg of body weight in cattle when applied along the top line from the withers to the tail head at the rate of 1 mL per 10 kg.

ACTIVE INGREDIENT

Ivermectin is an antiparasitic agent derived from the avermectin family of compounds. The avermectins are highly active, broad-spectrum antiparasitic agents isolated from fermentation of the soil organism Streptomyces avermitilis.

INDICATIONS

For the treatment of parasitic infections and infestations due to gastrointestinal roundworms, eyeworms, lungworms, grubs, biting and sucking lice, mites and hornflies in cattle. In addition, due to its persistent effect, this product also controls certain parasitic infections and infestations as outlined under PERSISTENT EFFECT.

GASTROINTESTINAL ROUNDWORMS

Ostertagia ostertagi (adults and fourth stage larvae including inhibited O. ostertagi)

Haemonchus placei (adults and fourth stage larvae)

Trichostrongylus axei (adults and fourth stage larvae)

T. colubriformis (adults and fourth stage larvae)

Cooperia surnabada (syn mcmasteri) (adults)

C. oncophora (adults)

C. punctata (adults)

Nematodirus helvetianus (fourth stage larvae)

Oesophagostomum radiatum (adults and fourth stage larvae)

O. venulosum (adults)

Strongyloides papillosus (adults)

Trichuris ovis (adults)

EYEWORMS

Thelazia gulosa (adults)

T. skrjabini (adults)

LUNGWORMS

Dictyocaulus viviparus (adults and fourth stage larvae)

CATTLE GRUBS (MIGRATING STAGES)

Hypoderma bovis

H. lineatum

LICE

Linognathus vituli

Haematopinus eurysternus

Damalinia bovis

MITES

Chorioptes bovis

Sarcoptes scabiei var bovis

If psoroptic mange is to be treated, IVOMEC Injection for Cattle, Sheep and Swine is recommended.

HORNFLIES

Haematobia irritans

PERSISTENT EFFECT

Endoparasites

IVOMEC Pour-On given at the recommended dosage of 500 µg of ivermectin per kg of body weight effectively controls infections of Dictyocaulus viviparus and Oesophagostomum radiatum acquired up to 28 days after treatment; Trichostrongylus axei and Cooperia punctata acquired up to 21 days after treatment; and Haemonchus placei, Ostertagi ostertagi, Cooperia oncophora and Cooperia surnabada (syn mcmasteri) acquired up to 14 days after treatment.

Ectoparasites

IVOMEC Pour-On given at the recommended dosage of 500µg of ivermectin per kg of body weight effectively controls infestations of Haematobia irritans acquired up to 35 days after treatment; and Damalinia (Bovicola) bovis and Linognathus vituli acquired up to 49 days after treatment.

For best results, IVOMEC Pour-On should be part of a total parasite control program including internal and external parasites based on the epidemiology of these parasites. Consult your local veterinarian or entomologist for the most effective timing of applications.

ADMINISTRATION

IVOMEC Pour-On is formulated for external use only in cattle; it should not be used in other species. The formulation should be applied along the top-line in a narrow strip extending from the withers to the tail head at a dose rate of 1 mL per 10 kg of body weight.

Squeeze-Measure-Pour System (250 mL)

Attach the metering cup to the bottle. Set the dose by turning the top section of the cup aligning the correct body weight with the pointer on the knurled cap. When body weight is between the markings, use the higher setting. Hold the bottle upright and squeeze it to deliver a slight excess of the required dose as indicated by the calibration lines. By releasing the pressure the dose automatically adjusts to the correct level. Tilt the bottle to dispense the dose. An off (stop) position is provided to close the system between dosing. Bottles should remain upright during storage.

Squeeze-Measure-Pour System (1 L oval bottle with 50 mL metering cup)

Attach the metering cup to the bottle. Set the dose by turning the top section of the cup, aligning the correct body weight with the pointer on the knurled cap. When body weight is between the markings, use the higher setting. Hold the bottle upright and squeeze it to deliver a slight excess of the required dose as indicated by the calibration lines. By releasing the pressure the dose automatically adjusts to the correct level. Tilt the bottle to dispense the dose. When 100 kg (10 mL) or 150 kg (15 mL) dose is required, turn the pointer to “stop” before dispensing the dose. The off (stop) position will close the system. Bottles should remain upright during storage.

Collapsible Packs (2.5 L and 5 L)

Use dosing equipment compatible with IVOMEC Pour-On. Follow manufacturer’s directions for use and care of the equipment. Other dosing equipment may be incompatible, resulting in locking, incorrect dosage and leakage. Connect the dosing gun to the collapsible pack as follows: (1) Attach the open end of the draw-off tubing to the dosing gun and attach draw-off tubing to the self-venting cap with the stem. (2) Replace the shipping cap with the self-venting draw-off cap which has the stem and tighten this cap. (3) Invert the pack and gently prime the dosing gun, checking for leaks.

20 Liter Pack

Use dosing equipment compatible with IVOMEC Pour-On. Follow manufacturer’s directions for use and care of the equipment. Other dosing equipment may be incompatible, resulting in locking, incorrect dosage and leakage. Connect the dosing gun to the drum as follows: (1) Attach the open end of the draw-off tubing to the

dosing gun and attach draw-off tubing to the self-venting cap with the stem. (2) Replace the shipping cap with the self-venting draw-off cap which has the stem and tighten this cap. (3) Gently prime the dosing gun, checking for leaks.

MODE OF ACTION

Ivermectin is a member of the macrocyclic lactone class of endectocides which have a unique mode of action. Compounds of the class bind selectively and with high affinity to glutamate-gated chloride ion channels which occur in invertebrate nerve and muscle cells. This leads to an increase in the permeability of the cell membrane to chloride ions with hyperpolarization of the nerve or muscle cell, resulting in paralysis and death of the parasite. Compounds of this class may also interact with other ligand-gated chloride channels, such as those gated by the neurotransmitter gamma-aminobutyric acid (GABA).

The margin of safety for compounds of this class is attributable to the fact that mammals do not have glutamate-gated chloride channels, the macrocyclic lactones have a low affinity for other mammalian ligand-gated chloride channels and they do not readily cross the blood-brain barrier.

NOTE TO USER

The colour of IVOMEC Pour-On for Cattle fades when exposed to light and, depending on the light intensity, fading may occur in less than 30 minutes. This rapid loss of colour does not reflect a loss of potency of ivermectin. However, prolonged exposure (i.e., weeks) to light can result in a gradual decline of ivermectin potency in the formulation.

SAFETY

Studies have demonstrated a wide safety margin. Based on plasma levels, the topically applied formulation is expected to be at least as well tolerated by breeding animals as is the subcutaneous formulation, which has demonstrated an adequate safety margin in breeding animals.

ENVIRONMENTAL SAFETY

Studies indicate that when ivermectin comes in contact with the soil, it readily and tightly binds to the soil and becomes inactive over time. Drug containers and any residual contents should be disposed of safely (e.g.,,, by burying or incinerating) as free ivermectin may adversely affect fish or certain water-borne organisms.

WARNING

1. Treated animals must not be slaughtered for use in food for at least forty-nine (49) days after the last treatment with this drug.
2. Because a withdrawal time for milk has not been established, non-lactating dairy cows must not be treated within two months of calving.
3. This product may be irritating to human skin and eyes. If accidental skin contact occurs, wash the affected area immediately with soap and water. If accidental eye exposure occurs, flush eyes immediately with water and contact a physician.
4. Use only in well-ventilated areas or outdoors. Close container when not in use.
5. Keep this and all drugs out of the reach of children.

CAUTION

1. For topical application only. Do not administer orally or parenterally.
2. This product is not for use in species other than cattle.
3. Cattle should not be treated when hair or hide is wet since reduced efficacy will be experienced. Rain falling on cattle in less than two hours after dosing may result in reduced efficacy.
4. The antiparasitic activity of ivermectin will be impaired if the formulation is applied to areas of skin with mange scabs or lesions, or with dermatoses or adherent materials, e.g.,, caked mud or manure.
5. To prevent potential secondary reactions when treating infections with cattle grubs, consult your veterinarian on the correct timing of treatment.

STORAGE

IVOMEC Pour-On stored at temperatures below 0°C may become cloudy. Warming at room temperature will restore the normal appearance without affecting efficacy.

Store bottle in carton to protect from light.

Flammable - keep away from heat, sparks, open flame or other sources of ignition.

PACKAGING

IVOMEC Pour-On for Cattle is available in five ready to use sizes: 250 mL, 1 L, 2.5 L, 5 L and 20 L.

250 mL H41309 CA DIN 00761842 is supplied in a multiple-dose bottle with metering cup. Each bottle contains enough solution to treat 10 x 250 kg of body weight (one mL per 10 kg).

1 L H41310 CA DIN 00761842 is supplied in a multiple-dose bottle with metering cup. Each pack contains enough solution to treat 40 x 250 kg of body weight.

2.5 L H41311 CA DIN 00761842 is supplied in a soft, collapsible pack including a self-venting draw-off assembly designed for use with automatic dosing equipment. Each pack contains enough solution to treat 100 x 250 kg of body weight.

5 L H41350 CA DIN 00761842 is supplied in a soft, collapsible pack including a self-venting draw-off assembly designed for use with automatic dosing equipment. Each pack contains enough solution to treat 200 x 250 kg of body weight.

20 L H41364 CA DIN 00761842 is supplied in a drum and includes a self-venting draw-off assembly designed for use with automatic dosing equipment. Each pack contains enough solution to treat 800 x 250 kg of body weight.

Merial Canada, Inc.
500 Boulevard Morgan
Baie d'Urfé QC H9X 3V1

Merial Limited: Registered in England and Wales [Reg. No. 3332751] with registered offices at 27 Knightsbridge, London, SW1X7QT, England and domesticated in Delaware, USA as Merial LLC

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J. Vaccines

Clostridial Bacterin –Tasvax 8

SCHERING-PLOUGH ANIMAL HEALTH
Division of Schering Canada Inc.
3535 TRANS CANADA HWY., POINTE CLAIRE, QC, H9R 1B4
Telephone: 800-605-2584
Telephone Orders: Quebec: FRENCH: 800-361-2431 or 514-426-7340
ENGLISH: 800-361-6550 or 514-426-7344
Atlantic Provinces & Ontario: 800-361-6550
Fax Orders: 888-428-7400 or 514-428-7400
Telephone Orders: Manitoba/Saskatchewan/Alberta/British Columbia: 800-661-3134 or 403-236-7363
Fax Orders: 403-236-5196

Every effort has been made to ensure the accuracy of the information published. However, it remains the responsibility of the readers to familiarize themselves with the product information contained on the product label or package insert.

TASVAX® 8
Schering-Plough
Bacterin-Toxoid
Clostridium Chauvoei-Haemolyticum-Novyi Type B-Perfringens Type B, C and D-Septicum-Tetani Bacterin-Toxoid
ARB Lic. No.: 32

Description: One dose of TASVAX® 8 contains the immunizing antigens of Cl. chauvoei, Cl. haemolyticum, Cl. novyi Type B, Cl. perfringens Types B, C and D, Cl. septicum and Cl. tetani, with potassium alum adjuvant.

Indications: For the vaccination of cattle and sheep against diseases caused by Cl. chauvoei (blackleg), Cl. haemolyticum (bacillary hemoglobinuria), Cl. novyi (black disease or infectious necrotic hepatitis), Cl. perfringens Type B (lamb dysentery), Type C (hemorrhagic enterotoxemia), type D (pulpy kidney), Cl. septicum (malignant edema) and Cl. tetani (tetanus).

Dosage and Administration:

Cattle: Initial dose - 4 mL; Subsequent dose - 4 mL; Subcutaneous injection.

Sheep: Initial dose - 4 mL; Subsequent dose - 2 mL; Subcutaneous injection.

Cattle: In order that a balanced response to vaccination is obtained, a primary course of two injections of 4 mL each should be given with an interval of 6 weeks between injections. To maintain a constant high level of immunity, booster injections should be administered at intervals of 6 months, or when outbreaks are seasonal, at least 2 weeks before the anticipated outbreak. Calves vaccinated under 3 months of age should be revaccinated at 4-6 months of age. Calves vaccinated at 3 months of age or older should be revaccinated 6 weeks later. Inject subcutaneously with strict aseptic precautions.

Sheep: On being vaccinated for the first time, all classes of sheep must be given a 4 mL dose followed by a further 2 mL dose 6 weeks later. This primary course should be completed at least 2 weeks before maximum immunity is required. This may be either a period of risk or, in pregnant ewes, during lambing. Revaccination with 2 mL is required at six-month intervals for continuous protection, but where there is not a period of risk in the winter annual revaccination is all that is necessary. In lambing flocks, pregnant ewes should be injected 2 weeks before lambing is due to commence. They will then be able to pass on enough antibodies in the colostrum to enable their lambs to be passively protected for the first 12-16 weeks of life, provided the lambs suck normally within the first 12 hours of birth. Replacements born of vaccinated ewes should receive the first dose of the primary course at 10-12 weeks of age. Administration is by subcutaneous injection. Injections should be made through an area of clean, dry skin, over the chest wall, behind the shoulder, observing strict aseptic precautions.

Precaution(s): Shake well before using.

Partly used Flexipacks should be discarded at the end of the day's vaccination.

Protect from freezing.

Refrigerate at 2°C-8°C.

To facilitate reference it is important that the serial numbers given on the label of each container should be recorded.

Caution(s): After subcutaneous administration a small nodule may appear at the injection site but generally disappears within a few weeks.

As with all biologics, anaphylactoid reactions may occur.

Antidote(s): Epinephrine.

Warning(s): Do not vaccinate within 21 days of slaughter.

For veterinary use only.

Presentation: TASVAX® 8 is supplied in Flexipacks of 40 mL, 100 mL, 240 mL, 500 mL and 1 liter.

® Registered Trademark of Schering Canada Inc.

Disclaimer: Every effort has been made to ensure the accuracy of the information published. However, it remains the responsibility of the readers to familiarize themselves with the product information contained on the product label or package insert. Compendium Code No.: 12080830

WYETH ANIMAL HEALTH
Division of Wyeth Canada
400 MICHENER ROAD, GUELPH, ON, N1K 1E4
Telephone: 519-837-2040
Order Desk: 800-265-7200
Fax: 519-837-9342
Website: www.wyethah.ca

Every effort has been made to ensure the accuracy of the information published. However, it remains the responsibility of the readers to familiarize themselves with the product information contained on the product label or package insert.

Respiratory Vaccine–PYRAMID® MLV 4

Wyeth Animal Health

Bovine Rhinotracheitis-Virus Diarrhea-Parainfluenza-3-Respiratory Syncytial Virus Vaccine

Modified Live Virus

For the vaccination of healthy cattle as an aid in the prevention of disease caused by bovine rhinotracheitis, bovine virus diarrhea, bovine parainfluenza-3 and bovine respiratory syncytial virus.

DOSE: Aseptically rehydrate with the accompanying diluent. Cattle, inject one 2 mL dose subcutaneously or intramuscularly using aseptic technique. Annual revaccination is recommended. Protect animals from exposure for at least 14 days after vaccination. Calves vaccinated under 6 months of age should be revaccinated at 6 months of age.

CAUTION: Store in the dark at 2° to 7°C (35° to 45°F). Avoid freezing. Shake well. Use entire contents when first opened. Do not use in pregnant cows or in calves nursing pregnant cows. A small percentage of animals may show transient mild injection site swelling. Do not vaccinate within 21 days before slaughter. Burn container and all unused contents. In case of anaphylactoid reaction, administer epinephrine.

Thimerosal, neomycin and polymyxin B added as preservatives.

U.S. Patent No. 5,733,555

For Veterinary Use Only

Manufactured by

Fort Dodge Laboratories, Inc.

Fort Dodge, Iowa 50501 U.S.A.

U.S. Vet. License No. 112

One vial vaccineOne vial diluent 10 DosesRehydrate to 20 mL 852590769A1915C

50 DosesRehydrate to 50 mL A1917A

Disclaimer: Every effort has been made to ensure the accuracy of the information published. However, it remains the responsibility of the readers to familiarize themselves with the product information contained on the product label or package insert. NAC No.: 11571193

K. Medicated Feed Additive – Rumensin

ELANCO ANIMAL HEALTH
Division Eli Lilly Canada Inc.
RESEARCH PARK CENTRE, 150 RESEARCH LANE, SUITE 120, GUELPH, ON, N1G 4T2
Telephone: 519-821-0277
Order Desk: 800-773-7603
Fax: 519-821-7831
Website: www.elanco.com

Every effort has been made to ensure the accuracy of the information published. However, it remains the responsibility of the readers to familiarize themselves with the product information contained on the product label or package insert.

RUMENSIN® PREMIX
Elanco
Monensin with Microtracers®
DIN 02231173
PREMIX
FOR USE IN CATTLE FEEDS ONLY

INDICATIONS:

1. For improved feed efficiency in beef cattle (steers and heifers) fed in confinement for slaughter.
2. As an aid in the prevention of coccidiosis caused by Eimeria bovis and Eimeria zuernii in cattle. Note to user: Coccidiosis occurs sporadically in first lactation dairy heifers, but is not considered a significant disease in mature dairy cows.
3. For increased rate of weight gain in growing cattle on pasture (slaughter, stocker and feeder cattle,and beef and dairy replacement heifers) of greater than 180 kg (400 lb) body weight.

IMPORTANT: Must be thoroughly mixed in feeds before use.

WARNINGS:

1. Do not supplement monensin from other sources (eg. other feedstuffs containing monensin or the Rumensin Controlled Release Capsule).
2. When mixing and handling Rumensin, use protective clothing, impervious gloves and dust mask. Operators should wash thoroughly with soap and water after handling.

ACTIVE DRUG INGREDIENT:

Monensin (as monensin sodium) 200.0 g per kilogram

FEEDING DIRECTIONS: (Complete Diet: which includes complete feed plus roughage)

Claim 1: Choose one of the feeding programs provided below:

Option 1: Feed continuously at a rate of 33 g monensin activity per tonne (1,000 kg) until animals reach market weight. No withdrawal required.

Option 2: Feed at 11 g monensin activity per tonne (1,000 kg) for an introductory period of 28 days, followed by 33 g monensin activity per tonne (1,000 kg) until animals reach market weight. No withdrawal required.

Claim 2: Feed continuously at a rate of 22 g monensin activity per tonne (1,000 kg) during periods of exposure to coccidiosis or when coccidiosis is likely to be a hazard. No withdrawal required.

FEEDING DIRECTIONS: (Medicated Supplement)

Claim 3: Hand feed at 200 mg of monensin activity per head per day in medicated supplement. No withdrawal required.

MIXING DIRECTIONS: (Complete Diet)

For claims 1, 2 and 3: Rumensin Premix can be mixed in dry supplements prior to final mixing.

For claims 1 and 2: Rumensin Premix can be used in the following thixotrope liquid supplements: HCS, Nutrena Feeds, Cargill Limited, Promolas Liquid Supplement Suspension, United Molasses Company, Div. of Tate & Lyle.

Claim 1:

Option 1: Mix 165 g Rumensin Premix per tonne (1,000 kg) (to provide 33 g monensin activity) to market weight.

Option 2: Mix 55 g Rumensin Premix per tonne (1,000 kg) (to provide 11 g monensin activity) for the first 28 days followed by 165 g Rumensin Premix per tonne (1,000 kg) (to provide 33 g monensin activity) to market weight.

Claim 2: Mix 110 g Rumensin Premix per tonne (1,000 kg) (to provide 22 g monensin activity).

Medicated supplement/premix fed as a % of total diet dry matter:

Including the medicated supplement/premix as a % of total diet dry matter is ideal. If the supplement/premix is to be fed as a % of total diet dry matter, to meet the approved drug level in the complete feed, the amount of monensin sodium required per kg of supplement/premix dry matter is calculated by dividing the approved drug level by the desired % inclusion of supplement/premix into the diet on a 100% dry matter basis:

$$\text{mg monensin/kg supplement/premix} = \frac{\text{Approved drug level (mg/kg total diet) x 100}}{\text{\% supplement/premix of total diet dry matter}}$$

Medicated supplement/premix fed as a fixed amount per head per day:

If the medicated supplement/premix is to be fed as a fixed amount per head in the total diet, the approved levels of monensin sodium must be converted to mg per head per day to accommodate this type of feeding. To do this, the following calculation is used:

mg monensin/head/day = weight of animal (kg) x dry matter intake as a % of body weight (%) x approved drug level (mg/kg total diet).

This calculation has been made for a wide range of body weights, using six different dry matter intake levels and is presented in “Daily Intake of Monensin Activity” tables found in the Rumensin Technical Reference Guide Addendum. These calculations represent the correct levels of monensin sodium required per head per day for a given body weight.

NOTE:

1. All rations should be corrected to a 100% DRY MATTER BASIS.
2. For intermediate blending of secondary premixes and/or supplements, and the use of dry or thixotrope liquid supplements, to provide the required dosages, see the Rumensin Technical Reference Guide Addendum.
3. All secondary premixes and supplements must be thoroughly mixed in the total daily diet or in complete feed (grain portion of the ration) before use. Do not feed undiluted.
4. Consult your veterinarian and/or nutritionist for additional information regarding the use of monensin in lactating dairy cattle.

MIXING DIRECTIONS: (Medicated Supplement)

Claim 3: The medicated supplement must be prepared so that when it is hand fed as directed, at a minimum of 0.5 kg/head/day, it provides 200 mg of monensin activity per head per day. For example, if the medicated supplement is to be hand fed at 0.5 kg per head per day, it must have 2 kg of Rumensin premix added to it per 1000 kg of supplement. The medicated supplement must be hand fed from the beginning to the end of the pasture season.NOTE: Thixotrope liquid medicated supplements should not be used for hand feeding of cattle on pasture.

CAUTION:

1. Do not exceed recommended levels as reduced average daily gains may result.
2. Do not allow dogs, horses, other equines or guinea fowl access to formulations containing monensin. Ingestion of monensin by these species has been fatal.
3. Do not use Rumensin medicated feed for the treatment of outbreaks of coccidiosis.
4. May be used in feeds containing the pellet-binding agents, Bentonite (2%), Attapulgite (2%), Kaolin (2.5%), Lignin Sulfonate (4%), Carboxymethylcellulose (0.1%) or Agri- Colloid.
5. NOT TO BE USED AFTER EXPIRATION DATE. Do not use thixotropic supplements after four weeks storage (Cargill) or eight weeks (United Molasses Company, Div. of Tate & Lyle).

STORE IN A COOL DRY PLACE

ELANCO · Division Eli Lilly Canada Inc.
Guelph, Ontario N1G 4T2

Net Weight
25 kg bag AF 1406 04/19/02
500 kg tote 04/19/02

Disclaimer: Every effort has been made to ensure the accuracy of the information published. However, it remains the responsibility of the readers to familiarize themselves with the product information contained on the product label or package insert. NAC No.: 11840103

L. Water Medication - Sulfa

BIMEDA-MTC ANIMAL HEALTH INC.
Distributed by V<130>toquinol N.-A. Inc.
Distributed by VÉTOQUINOL N.-A. INC.
2000, CHEMIN GEORGES, LAVALTRIE, QC, J5T 3S5
Telephone: 450-586-2252
Order Desk: 800-363-1700
Fax: 450-586-4649
Website: www.vetoquinol.ca
Email: info@vetoquinol.ca

Every effort has been made to ensure the accuracy of the information published. However, it remains the responsibility of the readers to familiarize themselves with the product information contained on the product label or package insert.

SULFA 25% SOLUTION
Bimeda-MTC
Sodium Sulfamethazine 25% Solution
Apple Flavoured
DIN 00601837
Veterinary Use Only

WARNING: Milk taken from treated animals during treatment and within 96 hours after the latest treatment must not be used as food. Treated animals must not be slaughtered for use in food for at least 12 days after the latest treatment with this drug. The product must not be added to swine feeds.

DESCRIPTION:

A non-sterile solution containing 25 grams of sodium sulfamethazine in each 100 mL.

INDICATIONS:

Cattle & Sheep: For the treatment of foot rot, shipping fever, bacillary enteritis, metritis, bacterial scours, mastitis, bacterial respiratory diseases and coccidiosis in sheep.

Calves: For the treatment of secondary infections in white scours, septicaemia and prevention of coccidiosis. As an aid in the treatment of bacterial respiratory diseases.

Swine: For the treatment of bacterial enteritis, mastitis, metritis, and bacterial respiratory diseases.

Horses: For the treatment of strangles, navel ill, joint ill, bacterial enteritis and many secondary bacterial infections associated with respiratory virus infections.

Poultry: For the treatment of caecal coccidiosis in chickens.

DOSAGE:

Livestock: First day: 45 mL of 25% sodium sulfamethazine for each 50 kg of body weight. Second and following days: one half of the above dosage. Do not treat for more than 5 days.

Beef Cattle: Add 80 mL to each 9 litres of drinking water for the first day. Second and following days: one half of the above dosage. Do not treat for more than 5 days.

Poultry: Mix 35 mL of product per 9 litres of drinking water for 2 days - then reduce dosage to 17.5 mL of product per 9 litres of drinking water for 5 additional days. Only allow access to medicated water.

CONTRAINDICATION:

This product must not be used in laying birds.

Distributed by: Vétoquinol N.-A. Inc.

Net

4 Litres 4242B

Disclaimer: Every effort has been made to ensure the accuracy of the information published. However, it remains the responsibility of the readers to familiarize themselves with the product information contained on the product label or package insert. NAC No.: 11940772

M. Parenteral Drug–Excenel RTU Sterile Suspension

PFIZER ANIMAL HEALTH
Pfizer Canada Inc.
17300 TRANS-CANADA HIGHWAY, KIRKLAND, QC, H9J 2M5
Order Desk: 800-663-8888
Toll-Free: 877-633-2001
Technical Services Canada: 800-461-0917
Technical Services USA: 800-366-5288
Website: www.pfizerah-canada.com

Every effort has been made to ensure the accuracy of the information published. However, it remains the responsibility of the readers to familiarize themselves with the product information contained on the product label or package insert.

EXCENEL® RTU STERILE SUSPENSION
Pr
Pfizer
(ceftiofur hydrochloride sterile suspension - mfr. std.)

For Veterinary Use Only
IN-01

For Intramuscular use in swine for the treatment of bacterial respiratory disease (swine bacterial pneumonia) associated with Actinobacillus (Haemophilus) pleuropneumoniae and Pasteurella multocida.

For intramuscular and subcutaneous use in cattle (including lactating dairy cattle). For the treatment of bovine respiratory disease (BRD, shipping fever, pneumonia) associated with Mannheimia spp . (formerly known as Pasteurella haemolytica), P. multocida and Haemophilus somnus. Also indicated for the treatment of acute bovine interdigital necrobacillosis (footrot, pododermatitis) associated with Fusobacterium necrophorum and Bacteroides melaninogenicus.

DESCRIPTION

EXCENEL RTU Sterile Suspension is a ready to use sterile suspension of the hydrochloride salt of ceftiofur in a cottonseed oil vehicle. Each mL of sterile suspension contains as medicinal ingredient:

Ceftiofur (as hydrochloride) 50 mg

Non-medicinal ingredients:

Phosphilipon 90-H 0.50 mg

Sorbitan monoleate 1.5 mg

Sterile water for injection (USP) 2.25 mg

Cottonseed oil q.s.

ACTIONS

Ceftiofur is a broad spectrum cephalosporin antibiotic active against Gram-positive and Gram-negative bacteria including b-lactamase-producing strains. Like other cephalosporins, ceftiofur is bactericidal in vitro resulting from inhibition of cell wall synthesis.

Swine: Ceftiofur has demonstrated excellent in vitro and in vivo activity against Actinobacillus (Haemophilus) pleuropneumoniae and Pasteurella multocida which are associated, singly or in combination, with swine bacterial respiratory disease (swine bacterial pneumonia).

Bovine: Ceftiofur hydrochloride has demonstrated excellent in vitro and in vivo activity against Mannheimia spp. (formerly known as Pasteurella haemolytica), Pasteurella multocida and Haemophilus somnus the three major pathogenic bacteria associated with bovine respiratory disease (BRD, pneumonia, shipping fever). In vitro activity has been demonstrated against Corynebacterium pyogenes another bacterial pathogen associated with BRD. The clinical significance of this in vitro activity is not known. Studies with ceftiofur have demonstrated in vitro and in vivo activity against Fusobacterium necrophorum and Bacteroides melaninogenicus two of the major pathogenic anaerobic bacteria associated with acute bovine interdigital necrobacillosis (footrot, pododermatitis).

Clinical isolates were obtained in the United States, Canada, and Denmark. Testing followed National Committee for Clinical Laboratory Standards Guidelines. Minimum inhibitory concentrations (MIC) for swine bacterial respiratory disease pathogens are summarized in Table 1.

Table 1Minimum Inhibitory Concentrations for Ceftiofur Against Swine Clinical IsolatesMIC (µg/mL)

Organism (# of strains tested)	Range	MIC90	Mode
Actinobacillus pleuropneumoniae (83)	d”0.03 - 0.06	d”0.03	d”0.03
Pasteurella multocida (74)	d”0.03 - 0.06	d”0.03	d”0.03

Minimum inhibitory concentrations (MIC) for cattle bacterial respiratory disease pathogens are summarized in Table 2.

Table 2Minimum Inhibitory Concentrations for Ceftiofur Against BRD Clinical IsolatesMIC (µg/mL)

Organism (# of strains tested)	Range	MIC90	Mode
Mannheimia spp. (42)	d”0.003-0.03	0.015	0.0078
Pasteurella multocida (48)	d”0.003-0.015	d”0.003	d”0.003
Haemophilus somnus (59)	no range	d”0.0019	d”0.0019

In addition, ceftiofur has excellent in vitro activity against other Gram-negative pathogens, such as Proteus vulgaris, Klebsiella pneumoniae, Escherichia coli and Salmonella typhimurium, and some in vitro action against certain strains of Gram-positive pathogens such as Staphylococcus aureus, Staphylococcus xylosus, Staphylococcus simulans, Staphylococcus epidermidis, Streptococcus suis, Streptococcus uberis and Streptococcus bovis. Ceftiofur was effective when tested in a variety of mouse disease models involving Escherichia coli, Staphylococcus aureus, Streptococcus agalactiae, Mannheimia spp (formerly known as Pasteurella haemolytica), Haemophilus somnus, Pasteurella multocida, and Salmonella typhimurium. The clinical significance of these findings is not known.

All Minimum Inhibitory Concentration information is based on data generated using ceftiofur Na and not ceftiofur HCl.

CLINICAL PHARMACOLOGY

Ceftiofur administered as either ceftiofur sodium or ceftiofur hydrochloride is metabolized rapidly to desfuroylceftiofur, the primary metabolite.

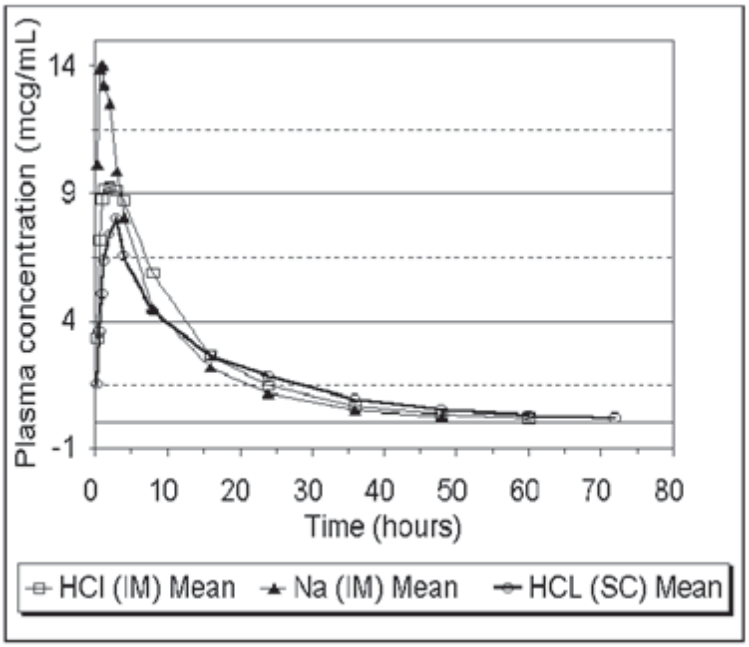
Comparable bioavailability of ceftiofur hydrochloride sterile suspension (EXCENEL RTU sterile suspension) and ceftiofur sodium sterile powder (EXCENEL sterile powder) was demonstrated after intramuscular administration of 3.0 and 5.0 mg ceftiofur equivalents per kg body weight in swine and cattle after intramuscular or subcutaneous administration of ceftiofur hydrochloride and intramuscular administration of ceftiofur sodium at 2.2 mg ceftiofur equivalents per kg of body weight.

Swine: After administration of a single intramuscular dose of ceftiofur hydrochloride at 3.0 mg ceftiofur equivalents per kg of body weight, maximum plasma concentrations in the order of 12 µg/mL were obtained within 1 to 4 hours. The area under the plasma concentration vs. time curve from the time of injection to the limit of quantification of the assay (0.150 µg/mL) was 216 ± 28.0 µg·hr/mL, and the plasma half-life was approximately 17 hours. At 24 hours plasma concentrations of ceftiofur and its primary biologically active metabolite averaged 2.97 ± 0.663 µg/mL. This value represents approximately 30 times the MIC90 for Actinobacillus pleuropneumoniae and Pasteurella multocida (MIC90 d" 0.03 µg/mL). Plasma ceftiofur concentration remained above 0.2 µg/mL for 77.2 ± 10.7 hours, which is approximately seven times greater than the MIC90 for Actinobacillus pleuropneumoniae and Pasteurella multocida. Thus, administration of ceftiofur to swine as either the sodium or hydrochloride salt at a dose of 3 mg/kg provides effective concentrations of ceftiofur and desfuroylceftiofur metabolites in plasma above the MIC90 for the labelled pathogens Actinobacillus pleuropneumoniae and Pasteurella multocida for the 24 hour period between the dosing intervals. Twelve hours after the last of three daily intramuscular injections of radiolabelled ceftiofur hydrochloride at a dose of 3.0 mg ceftiofur equivalents per kg of body weight, concentrations of total ceftiofur in the lungs of pigs averaged 2.08 ± 0.55 µg/g.

Cattle: Administration of ceftiofur to cattle as either the sodium or hydrochloride salt at a single dose rate of 1.1 mg ceftiofur equivalents per kg of body weight daily for 3 days provides effective concentrations of ceftiofur and desfuroylceftiofur metabolites in plasma above the MIC90 for the bovine respiratory disease (BRD) label pathogens Pasteurella multocida, Mannheimia spp. (formerly known as Pasteurella haemolytica) and Haemophilus somnus. Ceftiofur hydrochloride sterile suspension and ceftiofur sodium have comparable bioavailability in plasma when an equivalent dose is administered (see figure 1). The relationship between plasma concentrations of ceftiofur and desfuroylceftiofur metabolites above the MIC90 in plasma and efficacy has not been established for the treatment of bovine interdigital necrobacillosis (footrot) associated with Fusobacterium necrophorum and Bacteroides melaninogenicus.

The graph presented in Figure 1 demonstrates that ceftiofur hydrochloride sterile suspension and ceftiofur sodium have comparable bioavailability in plasma when an equivalent dose is administered. While this data was obtained in a study using a dosage of 2.2 mg/kg BW, other studies have demonstrated that the ceftiofur hydrochloride dosage of 1.1 mg/kg BW is equally efficacious as a 2.2 mg/kg BW dosage for treatment against the labelled bacterial pathogens. Therefore, a comparable bioavailability profile as depicted in Figure 1 would be expected when comparing ceftiofur hydrochloride (intramuscular and subcutaneous) to ceftiofur sodium (intramuscular) at the recommended dosage of 1.0 mg/kg BW.

Figure 1. Bovine plasma concentrations of ceftiofur and desfuroylceftiofur metabolites after administration (2.2 mg ceftiofur equivalent kg of body weight) of EXCENEL RTU sterile suspension (ceftiofur hydrochloride sterile suspension, 50 mg/mL) by intramuscular or subcutaneous injection or EXCENEL sterile powder (ceftiofur sodium sterile powder, 50 mg/mL) by intramuscular injection.



Total residues of ceftiofur were measured in the lungs of cattle administered radiolabeled ceftiofur at 2.2 mg ceftiofur equivalents per kg of body weight at 24 h intervals for five consecutive days. Twelve hours after the fifth injection of ceftiofur hydrochloride, total ceftiofur concentration in the lung averaged 1.15 µg/g, while total ceftiofur concentrations in the lung 8 h after the fifth ceftiofur sodium injection averaged 1.18 µg/g. Treatment of bovine respiratory disease at a dosage of 1.1 mg CE/kg BW has demonstrated equal efficacy to a dosage of 2.2 mg CE/kg BW.

LABORATORY MICROBIOLOGY

Based on the pharmacokinetic studies of ceftiofur in swine and cattle after a single intramuscular injection of either 3.0 or 5.0 mg ceftiofur equivalents per kg of body weight (swine), or 1.1 mg ceftiofur equivalents per kg of body weight (cattle) and the MIC and disk (30 µg) diffusion data, the following breakpoints are recommended for both swine cattle isolates.

Zone Diameter (mm)	MIC (µg/mL)	Interpretation
e”21	d”2.0	(S) Susceptible
18-20	4.0	(I) Intermediate
d”17	>8.0	(R) Resistant

A report of <Susceptible> indicates that the pathogen is likely to be inhibited by generally achievable blood levels. A report of <Intermediate> is a technical buffer zone and isolates falling into this category should be retested. Alternatively the organism may be successfully treated if the infection is in a body site where drug is physiologically concentrated. A report of <Resistant> indicates that the achievable drug concentrations are unlikely to be inhibitory and other therapy should be selected.

Standardized procedures1 require the use of laboratory control organisms for both standardized diffusion techniques and standardized dilution techniques. Ceftiofur sodium discs and reference standards can be used to determine sensitivity of isolates to ceftiofur hydrochloride. The 30 µg ceftiofur sodium disk should give the following zone diameters and the ceftiofur sodium reference standard powder should provide the following MIC values for the reference strains:

OC Strain	MIC (µg/mL)	Disk Zone Diameter (mm)
E. coli ATCC 25922	0.25-1	24-30

ANIMAL SAFETY

Swine: Results from a five-day tolerance study in normal feeder pigs indicated that ceftiofur sodium was well tolerated when administered at 125 mg ceftiofur equivalents per kg of body weight (more than 40 times the recommended daily dosage of 3.0 mg/kg) for five consecutive days. Ceftiofur administered intramuscularly to pigs produced no overt adverse signs of toxicity. To determine the safety margin in swine, a safety-toxicity study was conducted. Ceftiofur sodium was administered intramuscularly at 0, 5, 15 and 25 mg ceftiofur equivalents per kg body weight for 15 days to five barrows and five gilts per group. These doses represent 0, 1.66, 5 and 8.33 times the recommended dose of 3.0 mg/kg of body weight per day, and 5 times the recommended treatment duration of 3 days. No adverse systemic effects were observed, indicating that ceftiofur has a wide margin of safety when injected intramuscularly into feeder pigs at the recommended dose of 3.0 mg ceftiofur equivalents per kg of body weight daily for 3 days, or at levels more than 8 times the recommended dose for 5 times the recommended duration of treatment.

A separate study evaluated the injection site tissue tolerance in swine when EXCENEL RTU (ceftiofur hydrochloride) was administered intramuscularly in the neck at 3.0 and 5.0 mg ceftiofur equivalents per kg of body weight. Each of 12 animals received three injections at each dose. Injection sites were evaluated daily for swelling and other signs of reaction. No swelling or inflammation was observed clinically beyond 12 hours post-injection. Animals were necropsied at intervals of 12 hr, and 3, 5, 7, 9, 11, 15, 20, 25 days after the last injection. Injection sites were evaluated grossly at necropsy. Areas of discoloration and cavitation of the muscle, fat and/or deep fascia associated with the injection site were resolved for the majority of sites (75%) by 11 days after the last injection. In the remaining sites (25%) a small focus of discoloration and cavitation (0.3 x 0.2 x 0.1 cm) in the deep fascia persisted for 20 days. Thus injection sites appeared normal for the majority of animals (75%) by 11 days after the last injection.

Cattle: Results from a five-day tolerance study in feeder calves indicated that ceftiofur sodium was well tolerated when administered intramuscularly at 55 mg ceftiofur equivalents per kg of body weight (55 times the recommended daily dosage of 1.0 mg of ceftiofur equivalents per kg of body weight) for five consecutive days. No adverse systemic effects were observed. In a 15-day safety/toxicity study, five steer and five heifer calves per group were administered ceftiofur sodium intramuscularly at 0 (vehicle control), 1, 3, 5 and 10 times a dose of 2.2 mg of ceftiofur equivalents per kg of body weight to determine the safety factor. This was comparable to 0, 2.2, 6.6, 11 and 22 times the recommended dose of 1.0 mg of ceftiofur equivalents per kg of body weight. There were no adverse systemic effects indicating that ceftiofur sodium has a wide margin of safety when injected intramuscularly into the feeder calves at 22 times (22 mg ceftiofur equivalents per kg of body weight) the recommended dose for three times (15 days) the recommended length of treatment of three to five days. Local tissue tolerance to intramuscular and subcutaneous injection of ceftiofur hydrochloride was evaluated in two additional studies in cattle.

Intramuscular Administration: Results from a tissue tolerance study indicated that ceftiofur hydrochloride was well tolerated and produced no systemic toxicity in cattle when administered intramuscularly in the neck and rear leg at a dose of 2.2 mg ceftiofur equivalents per kg of body weight at each injection site (more than twice the recommended daily dosage). This represents a total dose per animal of 4.4 mg of ceftiofur equivalents per kg of body weight (more than four times the recommended daily dosage). Clinically noted changes (local swelling) at injection sites in the neck were very infrequent (2/48 sites, 4%) whereas noted changes in rear leg sites were more frequent (21/48 sites, 44%). These changes in the rear leg injection sites were generally evident on the day following injection and lasted from 1 to 11 days. At necropsy, injection sites were recognized by discolouration of the subcutaneous tissues and muscle. Areas of subcutaneous discolouration e”4 cm diameter were observed up to 19 days following intramuscular injection in the neck in 25% of injection sites. Significant discolouration e”4 cm diameter) of the fascia was observed through 24 days after intramuscular injection in the neck in 25% of injection sites. Significant muscle discolouration (4 x 3 x 2 cm area) was observed 15 days after intramuscular injection in the neck in 25% of injection sites. Clear oily material (possibly residual oil from the formulation) was observed in the deep fascia up to day 24 after intramuscular injection in 25% of injection sites. Intramuscular neck injection sites were normal by 28 days post injection.

At necropsy, significant discolouration e”4 cm diameter) of the sub-cutis was observed 60 days after intramuscular injection in the rear leg in 25% of injection sites; clear oily material (possibly residual oil from the formulation) was observed at the superficial muscle fascia 60 days after intramuscular injection in the rear leg in 25% of injection sites. Resolution of rear leg injection sites could take 60 or more days.

Subcutaneous Administration: Results from a tissue tolerance study indicated that ceftiofur hydrochloride was well tolerated and produced no systemic toxicity to cattle when administered subcutaneously at 1.1 or 2.2 mg ceftiofur equivalents per kg body weight at 24-hour intervals for 5 days. Mild and usually transient, clinically visible or palpable reactions (local swelling) were localized at the injection site. At necropsy, injection sites were routinely recognized by edema, limited increase in thickness and colour changes of the subcutaneous tissue and/or fascial surface of underlying muscle. The fascial surface of the muscle was visibly affected in most cases through 9.5 days after injection. Underlying muscle mass was not involved. There were no apparent differences in tissue response to administration of ceftiofur hydrochloride at 1.1 or 2.2 mg ceftiofur equivalents per kg body weight.

INDICATIONS

Swine: EXCENEL RTU sterile suspension is indicated for the treatment of swine bacterial respiratory disease (swine bacterial pneumonia) associated with Actinobacillus (Haemophilus) pleuropneumoniae and Pasteurella multocida.

Cattle (including lactating dairy cattle): EXCENEL RTU sterile suspension is indicated for the treatment of bovine respiratory disease (BRD, shipping fever, pneumonia) associated with Mannheimia spp (formerly known as Pasteurella haemolytica) P. multocida and Haemophilus somnus and for the treatment of acute bovine interdigital necrobacillosis (footrot, pododermatitis) associated with Fusobacterium necrophorum and Bacteroides melaninogenicus.

CONTRAINDICATIONS

As with all drugs, the use of EXCENEL RTU sterile suspension is contraindicated in animals previously found to be hypersensitive to the drug. In the event of a hypersensitivity reaction following the administration of this drug, immediate appropriate therapy should be instituted. In the absence of studies on the safety of ceftiofur in pregnant swine or swine intended for breeding, such use is not recommended.

DOSAGE

Swine: Administer to swine at a dosage of 3.0 mg ceftiofur equivalents per kg of body weight (1 mL of sterile suspension per 17 kg body weight). Treatment should be repeated every 24 hours for a total of three treatments.

Cattle: Administer to cattle at a dosage of 1.0 mg ceftiofur equivalents per kg of body weight (1 mL of sterile suspension per 50 kg body weight). Treatment should be repeated every 24 hours for a total of three treatments. Additional treatments may be administered on days four and five for animals which do not show a satisfactory response (not recovered) after the initial three treatments.

DIRECTIONS FOR USE

EXCENEL RTU sterile suspension is to be administered by intramuscular injection only in swine, and by intramuscular or subcutaneous injection in cattle. Injection in the neck region is recommended for both species. Subcutaneous administration in the neck in cattle is the preferred method to minimize edible tissue damage. Sixteen (16) gauge or larger needles, 1 to 1½ inches long, will give the best results. Shake the bottle for a minimum of 10 seconds or until contents are resuspended before using. The concentration of the suspension remains uniform for up to 25 minutes after thorough shaking. Before withdrawing the suspension from the bottle, disinfect the rubber cap of the bottle with a suitable disinfectant such as 70 percent alcohol. The injection site should be similarly cleaned with the disinfectant. Intramuscular injections should be made by directing a needle of suitable gauge and length into the neck region of swine or cattle. Avoid blood vessels and major nerves. Before injecting the suspension, pull back gently on the plunger. If blood appears in the syringe, a blood vessel has been entered; withdraw the needle and select a different site. No more than 10 mL should be injected per site.

WARNINGS

NOT FOR HUMAN USE. KEEP OUT OF REACH OF CHILDREN.

Penicillins and cephalosporins, including ceftiofur, as well as other antimicrobial drugs can cause allergic reactions in sensitized individuals. To minimize the possibility of such a reaction, users of such antimicrobial products are advised to avoid direct contact of the product with the skin, eyes and mucous membranes.

Swine: Treated animals must not be slaughtered for use in food for at least 2 days after the latest treatment with this drug.

Cattle: Treated animals (i.m. or s.c.) must not be slaughtered for use in food for at least 3 days after the latest treatment with this drug. Mean residues and the corresponding 99th tolerance limit in liver, non-injection site skeletal muscle and fat were found to be below the Maximum Residue Limit (MRL) by 12 hours. Statistical analysis and estimation of the 99th tolerance with 95% confidence for kidney and injection site residues confirmed safe levels in these tissues at 3 days.

No milk discard time is required when this product is used according to label directions and dosage. Residual drug concentrations in milk at all time intervals after the last treatment (12 and 24 hours) are well below the published safe concentration of 1.0 ppm which has been established on the basis of extensive metabolism and toxicity data. All screening tests were negative except for the Idexx SNAP Test, which was positive for 4/15 samples at 12 hours. Drug residues were not detectable by any other screening assay procedures commonly used by the dairy industry. Assay procedures tested included Bacillus stearothermophilus Disk Assay, Gist brocades Delvotest® P MINI, Charm-II® Tablet Beta-lactam Test (Competitive Assay), Charm Bacillus stearothermophilus Disc Assay, Idetek LacTek™ B-L (beta-lactam), Idetek LacTek™ CEF (ceftiofur), and the BR Star Test (Brilliant Black Reduction Test).

Use of dosages in excess of those indicated or by unapproved routes of administration, such as intramammary, may result in illegal residues in milk and prolongation of the edible tissue withdrawal period beyond 72 hours (3 days).

NOTE

Swine: To avoid the possibility of trimming at the site of injection, do not slaughter swine for at least 11 days after the latest treatment with this drug.

Cattle: To avoid the possibility of trimming at the site of injection in the neck, do not slaughter for at least 11 days after the latest s.c. treatment with this drug and at least 28 days after the latest intramuscular treatment in the neck with this drug.

STORAGE CONDITIONS

Store at controlled room temperature 15°C to 30°C. Protect from freezing.

PRESENTATION

EXCENEL RTU sterile suspension is available in 100 mL (5 gram) vials.

1Performance Standards for Antimicrobial Disk and Dilution Susceptibility Tests for Bacteria Isolated from Animals; Proposed Standard. NCCLS Document M31-P (ISBN 1-56238-258-6). NCCLS, 771 East Lancaster Avenue, Villanova, Pennsylvania 19085, 1994.

1-800-EXCENEL

T-ERG/3

DIN 02239274

Disclaimer: Every effort has been made to ensure the accuracy of the information published. However, it remains the responsibility of the readers to familiarize themselves with the product information contained on the product label or package insert. NAC No.: 11982850

N. Pour-on Parasecticide–Lysoff

BAYER INC.
Animal Health Division
77 BELFIELD ROAD, TORONTO, ON, M9W 1G6
Telephone: 416-248-0771 or 800-268-1331
Toll-Free: 800-62-BAYER
Order Desk: 800-387-9179
Order Desk Fax: 800-361-3306
Fax: 416-240-4918
Website: www.animalhealth.bayer.ca

Every effort has been made to ensure the accuracy of the information published. ”However, it remains the responsibility of the readers to familiarize themselves with the product information contained on the product label or package insert.

LYSOFF™
Bayer
Parasiticide-Topical
Reg. No.: 15360 P.C.P. Act
Active Ingredient(s): Agricultural Guarantee:
Fenthion 7.6%

Indications: Recommended for use in beef and nonlactating dairy cattle for the control of lice.

Dosage and Administration:

Beef Cattle and Nonlactating Dairy Cattle: LYSOFF™ pour-on for lice is diluted with water to form a mixture which is applied as a pour-on to the backline of cattle for the control of lice. A single treatment is effective for the initial control of lice on cattle. A second treatment may be applied 28 days later if re-infestation occurs.

When to Apply for the Control of Lice: For the most effective control of lice, cattle should be treated when lice become a problem or the existence of lice has been confirmed. A repeat application for louse control may be required for animals heavily infested with lice or for those animals which become re-infested. When making a louse control application, be certain to treat every animal in the herd except those animals under three (3) months of age to reduce the sources of re-infestation.

Mixing Directions:

1. Use a clean bucket for each batch of mixture.
2. Water temperature is not critical, but a better mixture is formed if the temperature is below 27°C.
3. A mixing ratio of eight (8) parts water to one (1) part LYSOFF™ is required. The mixture must be prepared in two (2) steps:

A. An equal part of water should be added slowly (while stirring) to an equal amount of LYSOFF™. Caution - Do not add the LYSOFF™ to the water. Continue to stir for one (1) minute.

B. Add the remaining water to the mixture while stirring. Continue to stir for an additional two (2) minutes. The result will be a thick, creamy mixture which is ready to use.

4. Do not store the mixture for more than 30 days.

The following schedule may be used to determine the amount of water and LYSOFF™ required for various batch sizes:

Amount of final mixture desired	Initial Mix (Step A above)		Final Mix (Step B above)
	LYSOFF™ pour-on Required	Amount of water to be added to the LYSOFF™ pour-on	Additional water to be added to make final mixture
15.3 L	1.70 L (1 can)	1.70 L	11.9 L
10.2 L	1.10 L (2/3 can)	1.10 L	8.0 L
5.1 L	0.56 L (1/3 can)	0.56 L	4.0 L
2.6 L	0.28 L (1/6 can)	0.28 L	2.0 L

Amount to Apply: Apply 62.5 mL of the final mixture per 100 kg of body weight. The mixture should be poured uniformly along the centre line of the animal's back using a long-handled dipper. The following table may be used to determine the number of animals that can be treated with various amounts of mixture:

No. of Animals Treated Per Quantity of Final Mixture:

Animal Weight	15.3 L	10.2 L	5.1 L	2.6 L
100 kg	244	163	81	41
200 kg	122	81	40	20
300 kg	81	54	27	13
400 kg	61	40	20	10
500 kg	48	32	16	8

Precaution(s): Do not re-use the empty container. Follow provincial instructions for any required additional cleaning of the container prior to its disposal. Make the empty container unsuitable for further use. Dispose of the container in accordance with provincial requirements. For information on the disposal of unused, unwanted product and the clean up of spills, contact the regional office of Conservation and Protection, Environment Canada.

Caution(s): Keep out of the reach of children.

Harmful or fatal if swallowed, inhaled or absorbed through the skin. Do not get in eyes, or on clothing. Avoid contact with the eyes by wearing protective eyewear. Suitable chemical resistant gloves, long sleeves and trousers must be worn during application. Do not inhale the fumes of spray mist. Use with adequate ventilation. Wash contaminated clothing with soap and hot water before re-use. Do not contaminate feed or food.

Do not use the container in any connection with feed, food or drinking water. The product is toxic to fish, birds and other wildlife. Keep out of lakes, streams or ponds. Do not contaminate water by the cleaning of equipment or the disposal of wastes. Apply the product only as specified on the label. Do not apply where runoff is likely to occur.

First Aid: If poisoning should occur, obtain prompt medical aid.

If swallowed, obtain prompt medical aid. Do not induce vomiting. If spilled on the skin, wash immediately with soap and warm water. If in eyes, rinse immediately with plenty of water and obtain prompt medical aid.

Warning(s): Do not slaughter cattle within 35 days following a single treatment with this drug. If a second application is made for louse control, do not slaughter within 45 days of the second treatment.

Fenthion is a cholinesterase inhibitor. Do not use the product on animals simultaneously or within a few days before or after treatment with or exposure to cholinesterase inhibiting drugs, pesticides or chemicals, including other fenthion products.

Application Restrictions:

Do not treat lactating dairy cattle, calves less than three (3) months old, sick, convalescent or stressed livestock. Consult a veterinarian before using on pregnant animals.

Do not treat nonlactating dairy cattle within 10 days of freshening. If freshening should occur within 10 days after treatment, do not use milk as human food for the remainder of the 10-day interval.

Do not treat cattle for 10 days before or after shipping, weaning, dehorning or after exposure to contagious or infectious diseases.

Notice to User: This control product is to be used only in accordance with the directions on the label. It is an offense under the Pest Control Products Act to use a control product under unsafe conditions.

Notice: Seller's guarantee shall be limited to the terms set out on the label and, subject thereto, the buyer assumes the risk to persons or property arising from the use or handling of this product and accepts the product on that condition.

Toxicology: Fenthion is a cholinesterase inhibitor. Atropine is antidotal. 2-PAM is also antidotal and may be administered in conjunction with atropine.

Side Effects: While LYSOFF™ pour-on is not an effective product for cattle grub control, host-parasite reactions have on rare occasions been reported. In rare instances, animals may (usually 24 to 48 hours after treatment) exhibit symptoms of staggering or more rarely posterior paralysis, salivation or bloat caused by treating when cattle grubs are in the area of the spinal cord or gullet. Although rare, the occurrence of host-parasite reactions is further reduced in animals treated for cattle grubs in the fall. Consult a veterinarian should these symptoms occur.

Notice to Veterinarian: Should one or more of the above reactions occur, treat symptomatically. Anti-inflammatory agents may be helpful. If necessary, relieve bloat by trocarization. Do not administer atropine as it is contraindicated in host-parasite reactions. If toxicity should occur as a result of gross overdosage, atropine is antidotal.

Presentation: 1.7 L containers.

Disclaimer: Every effort has been made to ensure the accuracy of the information published. However, it remains the responsibility of the readers to familiarize themselves with the product information contained on the product label or package insert. Compendium Code No.: 12230210

Appendix 4 Dairy OFFSP Record Forms (www.amp.ab.ca)

A. Standard Operating Procedure (SOP) for Milking Cattle With Abnormal or Treated Milk

In order to prevent shipping abnormal milk and milk containing livestock medicine or chemical residues, describe step-by-step the various actions that must be taken to prevent this milk from entering the food supply. See Chapter 5 in the CQM Reference Manual for a sample SOP.

Please note: If your procedures are different for abnormal and treated milk, you may need two separate SOPs.

Step 1 _____

_____

Step 2 _____

_____

Step 3 _____

_____

Step 4 _____

_____

Step 5 _____

_____

Step 6 _____

_____

Step 7 _____

_____

Step 8 _____

_____

Step 9 _____

_____

Note: If you have a problem or improperly milk a treated animal, see G. Corrective Action Plans, Page xx.

B. Standard Operating Procedure (SOP) for Treating Cattle

In order to prevent livestock medicine or chemical residues in milk and meat, proper administration of livestock medicine is essential. Describe step-by-step the various actions that must be taken when an animal has to be treated. See Chapter 4 of the CQM Reference Manual for a sample SOP..

Step 1 _____

_____

Step 2 _____

_____

Step 3 _____

_____

Step 4 _____

_____

Step 5 _____

_____

Step 6 _____

_____

Step 7 _____

_____

Step 8 _____

_____

Step 9 _____

_____

Step 10 _____

_____

Note: If you have a problem or improperly treat an animal, see Corrective Action Plans, Record 13.

C. Sample Veterinary Prescription

Clinic: _____

Veterinarian: _____

Phone #: (____) _____ Fax: (____) _____

Address: _____

_____

Patient ID: _____

Treatment: _____

DIN: _____

Instructions for use: _____

_____

_____

_____

Prescription expiry date: _____

Withdrawal recommendations: _____

_____

_____

Milk: _____ Meat: _____

Withdrawal Date: _____ Withdrawal Date: _____

Veterinarian's signature: _____

Owner's or agent for owner's signature: _____

D. List of Medicines and Chemicals Used on Livestock

(excluding milking chemicals, e.g., teat dips, detergen)

Product Name	Approved for use in dairy (✔)	Product label, insert or written instructions from vet (✔)	Stored According to Label (✔)

Product Name	Approved for use in dairy (✔)	Product label, insert or written instructions from vet (✔)	Stored According to Label (✔)

E. Livestock Treatment Record

Animal ID	Expiry Date Valid (✓)	Treatment Administered (product, dosage, mode of treatment[a])	Withdrawal Time (Hrs/days)		Date of Treatment (✓ am or pm)	Completed Withdrawal (✓ am or pm)		Residue Testing (+/-)[b]	Broken Needles[c] (✓ & Site[d])	Person Treating (Signature)
			Milk	Meat		Milk	Meat			
					Date: ❑ am ❑ pm	Date: ❑ am ❑ pm	Date: ❑ am ❑ pm			
					Date: ❑ am ❑ pm	Date: ❑ am ❑ pm	Date: ❑ am ❑ pm			
					Date: ❑ am ❑ pm	Date: ❑ am ❑ pm	Date: ❑ am ❑ pm			
					Date: ❑ am ❑ pm	Date: ❑ am ❑ pm	Date: ❑ am ❑ pm			
					Date: ❑ am ❑ pm	Date: ❑ am ❑ pm	Date: ❑ am ❑ pm			
					Date: ❑ am ❑ pm	Date: ❑ am ❑ pm	Date: ❑ am ❑ pm			
					Date: ❑ am ❑ pm	Date: ❑ am ❑ pm	Date: ❑ am ❑ pm			
					Date: ❑ am ❑ pm	Date: ❑ am ❑ pm	Date: ❑ am ❑ pm			
					Date: ❑ am ❑ pm	Date: ❑ am ❑ pm	Date: ❑ am ❑ pm			

a: Mode of Treatment IM = Intramuscular (in the muscle) IMM = intramammary (in the udder) IU = intrauterine (in the uterus) IV = intravenous (in the vein) OR = oral (in the mouth) SC = subcutaneous (under the skin) TP = topical (on the skin)

b: Residue testing only required for new animals or a letter of guarantee from the previous owner.

c: Broken needles can also be recorded on Record 11.

d. Site R = Rump F = Flank N = Neck

F. Broken Needles

Animal ID	Date of Broken Needle	Location	Signature	Information passed on to next buyer (✓)	Signature

Note: This record must be maintained for as long as the cattle listed remain in the herd.

G. Corrective Action Plans (Emergency Plans)

Area of Concern	Specific Incidence	Corrective Action To Be Taken	Contact Person		
			Name	**Phone**	**Cell Phone**
Cooling and Storage of Milk	Milk is not cooled to between 1°C to 4°C within the acceptable cooling period				
Equipment Sanitation	1. Visible milk residue build-up on milk contact surfaces				
	2. Improper water temperature				
Use of Water for Cleaning of Milk Contact Surfaces	Water test result reveals a form of contamination (e.g. high bacteria)				

Record: CORRECTIVE ACTION PLANS (Emergency Plans)

Area of Concern	Specific Incidence	Corrective Action To Be Taken	Contact Person		
			Name	Phone	Cell Phone

Appendix 5 Example of Some ABOFFSP Document Forms

A. Feedlot Processing Protocol

Do not co-mingle new cattle with resident cattle until processed.
Record all activities on processing records. Responsible crew signs off on records.
Return records to office following processing.
Give all injections in the neck area only, with no more than 10 cc (mL) per site.
Use 16 x 1" needles for IM injections; use 16 g x 1/2" or 3/4" or 5/8"needles for SC injections.
Process within 24 hours of arrival.

Type of Cattle_____

Procedure	Products	Dose	Withdrawal Time	Comments
Vaccinations				
Parasecticides				
Prophylactic Medication				
Implants (re-implant)				
Abortion Regime				
Other (e.g., add missing CCIA eartags and feedlot tags)				

Castraction Method: _____

Dehorn Method: _____

Date: _____ Veterinarian's Signature: _____

Print Name of Veterinarian and Clinic: _____

B. Cow-Calf Processing Protocol and Records

Recommended Processing Time (e.g. spring branding)	Type of cattle (cows, bulls, replacement heifers, calves)	Procedure	Product Name	Lot or Serial #	Route (IM, SC, PO)	Dose (units)	Injection Location (RT or LT neck…)	With-drawal Period (days)	Date Processed	Crew Initials	Comments

***include vaccines, antimicrobial treatments, injectable vitamins/minerals, implants, external or internal parasites in chart as well. When possible select SQ or pour-on products. Give all injections in the neck region only.**

Veterinarian's Signature: _____ Date:_____

C. Feedlot Treatment Protocol

Record all treatments in treatment records.
Annually review protocol with vet and update.
Give all IM and SC injections in the neck.
Give no more than 10 cc per site.
Use 16 x 1" needles for IM injections; use 16 g x 1/2" or 3/4" or 5/8" needles for SC injections.

Disease & Diagnosis	**Treatment (Drug, Dose, Route, Frequency, Duration) - include how to handle relapses**	**Withdrawal Period**	**Comments**

For any disease condition not listed above, contact the veterinarian for diagnosis and treatment.

Date: _____ Veterinarian's Signature: _____

Print Name of Veterinarian and Clinic: _____

D. Veterinary Treatment Protocal for Beef Cow-Calf Herds

Insert Name of Veterinary Clinic

Insert Address of Veterinary Clinic

Insert Ranch and Producer Name

NOTE: NEVER GIVE INJECTIONS IN THE RUMP OR ROUND, NEVER EXCEED 10CC/ IM INJECTIONS SITE

Give ALL IM or SC injections in the neck.

Withdrawal times should be calculated from the last day of treatment and use the longest time listed.

[herd veterinarian to complete and edit protocol as necessary]

Calf Scours (Mild to Moderate)

Clinical Signs: calf mild to moderately depressed, mobile, sunken eyes, skin tents on neck, diarrhea, +/- fever

- Oral Fluids (provide name of acceptable products e.g.,, Revibe)
  - Volume
  - Frequency
  - Notes (describe special instructions e.g.,, keep on cow or pull from cow)
- Take temperature and record on treatment records
- Antimicrobials (provide options, include boluses and injectables)
  - Dose
  - Route
  - Frequency
  - Withdrawal period
  - Notes (e.g.,, veterinary prescription required…..)
- Mark sick calf with individual identification (e.g.,, ear tag)
- Segregate sick calf and cow from healthy cows and calves
- Sanitation (Notes: describe biosecurity measures to prevent spread)
- Record individual treatment data on treatment records
- Contact vet if common problem to discuss herd management practices to control outbreak and prevent reoccurrences in future

Calf Scours (Severe)

Clinical Signs: 10-12% dehydrated, eyes really sunken, unable to stand, legs cold, diarrhea, +/- fever

- Contact veterinarian to evaluate and treat
- Take temperature and record on treatment records
- IV fluids
    - Dose
    - Frequency
    - Notes
- Antimicrobials
    - Dose
    - Route
    - Frequency
    - Withdrawal period
    - Notes (e.g.,, veterinary prescription required…..)
- Mark sick calf with individual identification (e.g.,, ear tag)
- Remove calf from cow
    - Notes (describe)
- Segregate sick calf from healthy calves
- Record individual treatment data on treatment records (date, animal ID, disease, drug, dose, route, withdrawal period, crew)
- Biosecurity measures (Notes: describe)
- Contact vet if common problem to discuss herd management practices to control outbreak and prevent reoccurrences in future

Pneumonia

Clinical Signs: off feed, depressed, fever, +/- snotty nose, +/- runny eyes, +/- cough, fast or labored breathing

- Take rectal temperature and record on treatment records
- Antimicrobials (provide options)
    - 1st treatment
    - Drug
    - Dose
    - Route
    - Frequency
    - Withdrawal Date
    - 2nd treatment
    - Drug
    - Dose
    - Route
    - Frequency
    - Withdrawal Date
    - 3rd treatment
    - Drug
    - Dose
    - Route
    - Frequency
    - Withdrawal Date
    - Chronics
    - Drug
    - Dose
    - Route
    - Frequency
    - Withdrawal Date
- Mark sick animal with individual identification (e.g.,, ear tag)
- Record individual treatment data on treatment records (date, animal ID, disease, drug, dose, route, withdrawal period, crew)
- Notes (describe additional points)

Footrot

Clinical Signs: lame, redness and swelling between the toes (coronary band), +/- open wound between toes that drains

- Mark sick animal with individual identification (e.g.,, ear tag)
- Antimicrobials (provide options)
    - 1st treatment
    - Drug
    - Dose
    - Route
    - Frequency
    - Withdrawal Date
    - Relapse (repull)
    - Drug
    - Dose
    - Route
    - Frequency
    - Withdrawal Date
- Record individual treatment data on treatment records (date, animal ID, disease, drug, dose, route, withdrawal period, crew)
- Notes (describe additional points)

Pinkeye

Clinical Signs: runny eye, red/white/bluish spot on the eye (cornea), rapid blinking, +/- ulceration

- Mark sick animal with individual identification (e.g.,, ear tag)
- Antimicrobials (provide options)
    - 1st treatment
    - Drug
    - Dose
    - Route
    - Frequency
    - Withdrawal Date
    - Relapse or Chronic
    - Drug
    - Dose
    - Route
    - Frequency
    - Withdrawal Date
- Eye patch if ulcerated
- Contact veterinarian if herd outbreak
- Record individual treatment data on treatment records (date, animal ID, disease, drug, dose, route, withdrawal period, crew)
- Notes (describe additional points)

Add other diseases or conditions for an operation that may occur commonly e.g.,, Nervous Disease, Cocciodiosis, Dystocia, Vaginal/Rectal Prolapse, Uterine Prolapse, Waterbelly, Bloat, Acidosis, Diarrhea, Mastitis, Cancer Eye, Bullers, Injury. For unknown disease, suggest that you advise them to contact veterinarian.

Disease or Condition (write in name of disease or condition)

Clinical Signs: (describe)

- Mark sick animal with individual identification (e.g.,, ear tag)
- Take rectal temperature and record on treatment records
- Antimicrobials (provide options)
    - 1st treatment
    - Drug
    - Dose
    - Route
    - Frequency
    - Withdrawal Date
    - Relapse or Chronic
    - Drug
    - Dose
    - Route
    - Frequency
    - Withdrawal Date
- Other treatment (describe drug, dose, route, frequency, withdrawal period)
- Contact veterinarian if herd outbreak
- Record individual treatment data on treatment records (date, animal ID, disease, drug, dose, route, withdrawal period, crew)
- Notes (describe additional points)

Date Recommended _____ Print Veterinarian's Name _____

Veterinarian's Signature_____

E. Veterinary Prescriptions

Any extra-label use of oral (feed, water, drench), injectable, or pour-on animal health products requires a written and signed veterinary prescription. Veterinary prescriptions are filed in one secure location _____ (where) and available for review during on-farm audit.

Example: Veterinary Rx

Name and address of beef operation and owner of cattle: _____

Name and species of patient (describe the cattle): _____

Date prescribed: _____

Information about drug, such as name, strength or concentration: _____

Quantity (note: no compounding is allowed): _____

Administration Directions (include information on what disease being treated): _____

_____

Withdrawal Date (meat): _____

Renewal Instructions: _____

Print Name of Veterinarian and Clinic: _____

Signature of Veterinarian: _____

F. Feedlot Processing Records

Lot_____ Home Pen_____

Tag Sequence_____

Tag Location_____ Tag Color_____

Number of Head_____ Sex_____ Weight_____ Type_____

Processing Date(s) _____ Arrival Date(s) _____

Processing Message _____

Lot Messag _____

Procedure	Products	Lot Serial	Expiry Date	Dose	Route	Site	Crew	Withdrawal Date
Vaccination								
Parasite Treatment								
Implant - arrival - reimplant								
Prophylactic Antibiotics								
Other								

All IM injections give in the neck; no more than 10 cc per injection site.

G. Individual Treatment Records for Cattle

Name of Beef Cattle Operation

Date	Animal Identification	Disease or Condition	Rectal Temp	Weight (units)	Product Name	Dose (units)	Route (IM, SC, PO)	Injection Location (RT or LT neck…)	Withdrawal Period (days)	Comments	Crew Initials

When possible select SQ or pour-on products. Give all injections in the neck region only.
Record any broken needles under comments.

H. Mass Treatment Records for Cattle

Name of Beef Cattle Operation

Date	Group/Pen Identification	Disease or Condition	Product Name	Avg Wt (units)	Dose (units)	Route (IM, SC, PO, feed, water)	Injection Location (RT or LT neck...)	Withdrawal Period (days)	Comments	Crew Initials

When possible select SQ or pour-on products. Give all injections in the neck region only.
Record any broken needles.

I. Livestock Sanitation Plan

Beef Operation Name

Syringes

- Clean syringes each day after use
- Wash external syringe surface with soap (list options e.g.,, hibitane, betedine), water and a brush
- Do not use soap or disinfectant on internal components of syringes used to give modified-live virus vaccines.
- Rinse the inside components of the vaccine syringe, including tubes and connectors, in water that is near the boiling point. Repeatedly draw water through the syringe and squirt it out. Three to five rinses is sufficient. Let the syringe cool before using.
    - Metal syringes can be taken apart and boiled in hot water for 5 minutes. Reassemble while hot. Use a small amount of clean vegetable oil spray to lubricate rubbers. After assembled, completely rinse the internal parts three to five times with boiling water (e.g.,, boil 2 cups of water in the microwave). Let syringe cool 5 to 10 minutes before using.
    - Plastic syringes can be rinsed as above and then heat sterilized in the microwave. Completely fill the plastic syringe with water, wrap the syring in 5 to 10 layers of wet paper towels; place the wet paper towels and syringe in a zip lock bag; leave the ziplock bag open and place in the microwave. Microwave the syringe on high for 5 minutes. Do not let paper towels dry out; else there can be a fire. Remove the plastic syringe, squirt out any remaining water in syringe and cool 10 minutes before using.
- Clean vaccine transfer needles in hot tap water (no soap or disinfectant).
    - Place transfer needle in a cup of water (completely cover with water throughout process) and microwave on high and boil for 1 minute. Cool before use.
    - Wrap needle in several wet paper towels, place in open ziplock bag and microwave at high for 2 minutes. Do not let paper towels dry out. Cool before use.
- Store cleaned vaccines and transfer needles in dust free, dry environment e.g.,, ziplock bag
- Other (describe)

Medicated Livestock Water for Confined Cattle

- If a watering line system is used to deliver medication, it is calibrated to ensure accurate dosing, and it is flushed with clean water after use and before next use to avoid contamination and drug carry-over.
- Portable water troughs used to deliver medication are removed from pens once treatment is complete, rinsed out with water, and stored until next use.

Pesticides (includes topical parasiticides)

- Read the product label for specific storage instructions
- Keep pesticides from freezing and protect from excessive heat
- Do not store pesticides near feeds, food or fertilizers, near well houses or feed mixing and milling rooms, within 30 metres of an open body of water
- Keep pesticides out of reach of animals
- Store highly toxic pesticides under lock and key

- Dispose of unwanted or expired pesticides as hazardous waste. Contact provincial environment departments recycle information line for names of companies
- Offer unused pesticides to neighbors or return to dealer
- Do not dispose of pesticides in sanitary landfills or by burning
- Dispose of non-refillable plastics or metal pesticide containers at a pesticide container collection site. Contact municipality for information.
- Triple rinse or pressure rinse and drain dry containers before disposal
- For details on rinsing, contact provincial department of agriculture
- Do not reuse empty containers.
- Outer packaging can be burned or disposed of in a regular landfill.
- Other (describe)

Pen Maintenance to Reduce Tag on Cattle

- Manure is removed from pens at least once annually by
  - Owner or farm personnel
  - Custom pen cleaner
- Corrals and feeding pens are cleaned of manure during
  - Summer
  - Spring
  - Winter
  - Fall
- Manure is removed using a tractor and
  - Bucket
  - Box scrapers with
  - pull or
  - push blade
- Other (describe)
- Between manure removal from pens, excess manure is scrapped to a bedding mound
- Between manure removal from pens, excess manure is scrapped to the back of the pen for in-pen composting
- Pens are bedded as needed with
  - Straw
  - Wood chips
- Fill dirt is placed in holes, pits, wallows in corral surfaces, including around water troughs and feed bunks
- Pen floors are sloped (e.g.,, 2 to 4%) to ensure good drainage and quick drying of pens
- Waterers are maintained to reduce leakage and overflow
- Other (describe)

Worker Bathrooms

- Person responsible for cleaning washrooms is
  - Name
- Soap and water is available in worker washrooms
- Worker washrooms are cleaned
  - Daily
  - Weekly
  - When dirty
  - Other (describe)
- Sinks, toilets, counters, walls, floors and windows are cleaned
- Garbage containers are emptied and cleaned
- Other (describe)

J. Medicated Feed Batch Sheet

Feed Type _____ Farm Name _____

Tonnes _____ Date: _____

MAJOR INGREDIENTS	Kgs / Te	1	2	3	4	5	6	7	8	9	10
BAGS (25kg)											
Hand Adds (kgs)											
Batch Size (kgs)											

Mixer Signature _____

MEDICATED FEED
BATCH SHEET

Feed Type Steer Finisher Farm Name Example

Tonnes 15 Date:

MAJOR INGREDIENTS	Kgs / Te	1	2	3	4	5	6	7	8	9	10
Barley	445	XX	XX	XX	XX	XX	X	X	X	X	X
Oats	250	XX	XX	XX	XX	XX	X	X	X	X	X
Corn	145	XX	XX	XX	XX	XX	X	X	X	X	X
32% Beef Grower Supp	85	XX	XX	XX	XX	XX	X	X	X	X	X
Beet Pulp	72	XX	XX	XX	XX	XX	X	X	X	X	X
BAGS (25kg)											
Mineral Pak	2	XX	XX	XX	XX	XX	X	X	X	X	X
Vitamin Pak	0.5	XX	XX	XX	XX	XX	X	X	X	X	X
Hand Adds (kgs)											
ADE Crumbles	0.5	XX	XX	XX	XX	XX	X	X	X	X	X
Batch Size (kgs)	1000										

Mixer Signature _____

Headings across the top 1,2,3….. are the # of batches. Each time an individual ingredient is added the operator checks that square off. For total batches over 10 (10te), another check mark is added per ingredient.

The list of major ingredients can also include the roughage.

K. Medicated Feed Mixing Procedures

Beef Operation Name

Type of Feed (ration ID)	Drug Trade Name	Feed Mixing Instructions	Feeding Directions	Cautions Warning	Drug Withdrawal Period

Date:_____ Signature:_____

Note: Keep a copy of all medicated feed formulations (e.g. feed tag or master formula from feed mill) and feedmill delivery slips and purchase orders/invoices. Keep a copy of any veterinary medicated feed prescriptions.

L. Feeding Call or Delivery Sheets

Feedlot_____

Trucker_____ Truck ID_____

Date	Delivery Time	Lot	Pen	# Head	Ration ID	Medicated (yes/no)	Assigned Feed (tonnes)	Fed +/- (tonnes)	Notes (weather, clean bunks, ration change...)

M. Feeding Records for Zero-withdrawal Complete Medicated Feeds

Feeding Start Date	Feeding Finish Date	Type of cattle (cows. bulls, heifers calves…)	Number of Cattle	Frequency of Feeding (e.g. every day, every other day…)	Total Amount of Complete Medicated Feed Fed each Feeding (Units) [amount per head per feeding x number head]	Comments	Feeding Crew Initial

Note: Use this record form if you purchase from the feed mill complete medicated feeds (i.e. can be fed "as is" and does not require any further mixing according to the feed tag) and the medication within the feed has a zero withdrawal period e.g.,, Monensin/Rumensin or Tylan. Contact your feed mill if unsure if feed purchased is a "complete" feed. If changing the amount of feed fed per head or the number of cattle fed, start a new row to record changes.

Note: Keep copy of feed tags and any feed delivery slips from the feed mill

N. Shipping Records

Record on shipping records that a cross-check was done for drug residue withdrawals, broken needles and the health of animals. A box for these 2 items could be included on currently used shipping records. Include Initials of responsible personnel and date signed.

If no shipping records available, create shipping records.

Have copies of shipping records available for review by on-farm auditor.

Example of shipping records:

Feedlot: _____

Shipping Date	Lot	Pen	# Head	Destination	Drug WD ✓	Broken Needle ✓	Health ✓	Crew Signature

Note: Describe any animals that have not completed drug residue withdrawal period (animal identification, product given, withdrawal date)

Ranch: _____

Shipping Date	Type of Cattle	Cattle Identification	# Head	Destination	Drug WD ✓	Broken Needle ✓	Health ✓	Crew Signature

Note: Describe any animals that have not completed drug residue withdrawal period (animal identification, product given, withdrawal date)