Beef Cattle Medicine Course

Canadian Veterinary Medical Association

Association canadienne des médecins vétérinaires

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Throughout the course, specific drug products are used for example purposes. Some may no longer be on the market. The CVMA does not endorse any one product.

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How to Use This Course

Introduction

There is a need to provide additional training resources to veterinarians for beef cattle producers on how to use all drugs responsibly, including how to complete basic animal health records. The Beef Cattle Medicine Course delivers basic information to beef cattle producers on how to use animal health products responsibly, providing the necessary foundation upon which producers can work with their veterinarian to build their herd health programs and ensure continued access to pharmaceuticals that are effective, to ensure animal health, welfare, and performance, and reduce costs of production.

Who Should Use This Course?

Beef cattle producers can use the course to learn the basic principles on how to use animal health products wisely, as part of their on-farm food safety, herd health, and beef sustainability programs. Cattle veterinarians can use the course as an educational tool to ensure their clients use animal health products wisely. This will help veterinarians meet their legal obligations for a valid veterinary-client-patient relationship.

Course Objectives

The Beef Cattle Medicine Course provides beef cattle producers knowledge of proper use of animal health products which will:

- Improve cattle health and welfare by reducing disease losses and wastage
- Improve beef safety by reducing risks of drug residues and antimicrobial resistant bacteria
- Ensure drugs continue to be available and remain effective over time
- Reduce the need and likelihood for additional government regulation
- Provide a cost benefit in terms of reduced treatment cost when drugs are used only when necessary and according to label directions or veterinary prescriptions.

Contents of the Course

Module 1
Health and Proper Care of Cattle

This first introductory module teaches you the importance of disease prevention through herd health programs. It also introduces you to some important concepts and terminology related to the use of cattle health products. You learn that disease prevention is key and that you must consider food safety and protection of the environment with any treatment you use.

Module 2
General Animal Health Product Information

This second introductory module introduces you to over the counter and prescription drugs and pesticides. You will study the six broad classifications of animal health products, how they work, and some examples of each.

Module 3
Federal and Provincial Legislation

This brief module describes current federal and provincial legislation that applies to the sale, purchase, use and disposal of animal health products and feed medications. You learn which legislation applies to your situation and how to find out more information.

Module 4
Roles and Responsibilities

In this module, you learn your role in the proper handling and use of animal health products as well as the role of veterinarians, feed manufacturers and suppliers, nutritionists, and pharmaceutical manufacturers.

Module 5
How Drugs Work

After completing this module, you will understand how drugs are absorbed, distributed, and eliminated from an animal's body. This knowledge will help you take steps to avoid drug residues by observing proper withdrawal times.

Module 6
Prudent Drug Use

In this module, you learn how to read a drug label, calculate correct drug dosages, and avoid adverse drug reactions. You learn the requirements for a valid veterinary-client-patient relationship. You learn how to select medicines based on established criteria and treatment protocols.

Module 7
Antimicrobials

This brief module gives you 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

This module teaches you proper injection techniques to prevent broken needles and reduce injection site scars that reduce beef quality. You will learn how to deal with broken needles in an appropriate manner to prevent food safety problems.

Module 9
Drug Sites, Feed Medications, Implanting

After you complete this module, you will be able to select the correct route of drug administration and use proper implanting techniques. By handling medication appropriately, the products will work as intended, and you will avoid drug residues.

Module 10
Prescriptions

In this module, you learn the types of drugs that require a prescription and the parts of a veterinary prescription. You will look at the role of your veterinarian in writing a prescription and ensuring you understand it.

Module 11
Handling of Drugs

To ensure drugs are effective and safe, and to avoid drug residues, they must be used and handled properly. This means appropriate purchasing, storing, mixing, and transporting practices, and special handling of vaccines. You learn how to ensure worker safety at all stages of handling.

Module 12
Certification and Surveillance Programs

This module gives you an understanding of the basic requirements to participate in various Canadian certification programs, such as VBP+, CRSB, and PAACO Canadian Feedlot Audit and provides web-site links to their programs. This program also describes both national and regional animal health and AMU/AMR surveillance programs. and provides web-site links to their resources.

Module 13
Disposal of Biomedical Waste and Carcasses

This module outlines how to dispose of biomedical waste and carcasses in a manner that prevents the spread of disease and ensures the safety of people and the environment.

Glossary

At the end of the modules is a comprehensive glossary of terms used throughout the course. Use this when you are unsure of the precise meaning of a term.

Appendix

The appendix provides valuable detail that is not found in the modules such as:

- Some detail on federal and provincial legislation
- Feed prescription examples and guidelines
- Sample labels of various drugs used to treat beef cattle
- Sample On-farm food safety and Canadian Feedlot Audit templates
- Veterinary treatment protocol and prescription forms
- Livestock sanitation plan
- Treatment and feeding records forms.

Symbols

This symbol alerts you to an example that helps illustrate an important concept.

This symbol leads you to more information on a topic. You may be directed to the appendices or to a website.

This symbol indicates an exercise is to be completed. Complete as many of these as possible to help you understand the course material. Try to apply the material to your own situation.

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 to ensure consumer confidence
- Protection of the environment through proper use and disposal of animal health products and

Disease Prevention — Herd Health Programs

A herd health program is a management system based on periodic visits to the beef herd or feedlot by a veterinarian to check on the occurrence of disease (e.g., calf sickness and death, abortion prevalence) and production efficiency (e.g., average daily gain, feed efficiency, pregnancy rate, culling rate). 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, genetic, culling, 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 AN ANIMAL

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 reviewed 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?

_____

_____

_____

_____

_____

MORE INFO

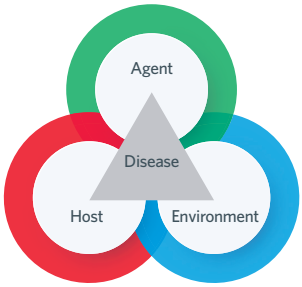
For more detailed information on disease prevention and management, contact your veterinarian.

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

Epidemiological Triangle



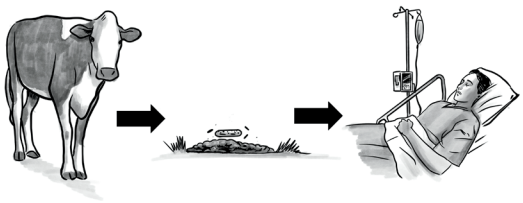


FIGURE 3 ZOONOTIC MICROORGANISMS

MORE INFO

VIEW VIDEO 1

https://www.merckvetmanual.com/management-and-nutrition/health-management-interaction-beef-cattle/health-and-production-management-program

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., histophilosis, milk fever). Disease may be clinical, where the abnormal signs resulting from the illness are 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.

Infectious diseases 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. (see Figure 3)

Contagious Disease

Contagious diseases are easily spread among animals, either directly, such as through nose-to-nose contact (e.g., IBR) or sexual contact (e.g., vibriosis), or indirectly, such as through contaminated feed equipment or housing (e.g., *Salmonella*).

Whether clinical disease occurs depends on a interrelationship amongst the infectious agent, a susceptible animal, which is influenced by the strength of its immune system, and the environment. This is known as the epidemiological triangle.

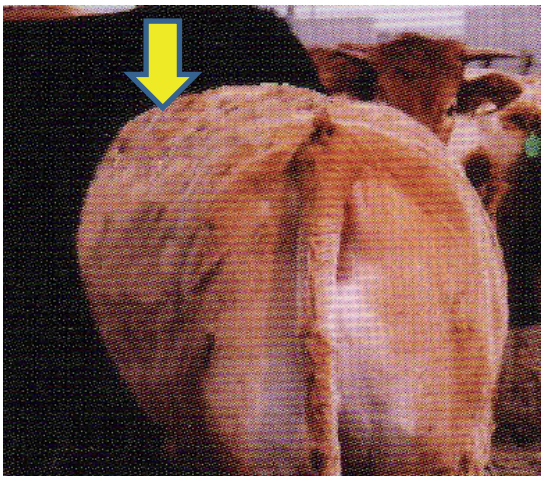


FIGURE 4 STEER WITH BLOAT

Enlarged left side which is higher than the backbone (spine) – rumen over-extended with gas (gas bloat) or frothy bubbles (frothy bloat)

FIGURE 5 HEIFER WITH PNEUMONIA

Non-infectious Disease

Non-infectious diseases do not spread from animal to animal (e.g., hardware disease). They are caused by something other than living organisms (see Table 1 Non-infectious Disease).

TABLE 1 NON-INFECTIOUS DISEASE

	EXAMPLE	TREATMENT
Nutritional	Vitamin A deficiency, Selenium deficiency, Copper deficiency	Focused on supplementing any deficiencies and addressing any oversupplementation issues (e.g., selenium toxicity)
Poisonings	Lead or toxic plants	Includes removal from sources of poisoning and treatment of clinical symptoms
Metabolic	Grain overload and bloat (see Figure 4), ketosis, milk fever	Focused on correcting biochemical abnormalities such as treatment of milk fever with calcium solutions
Physical	Hardware disease, broken leg, cuts	Varies depending on cause of problem; may involve surgery
Genetic	Arthrogryposis, dwarfism, mannosidosis, mule foot	Rarely any specific treatment available
Endocrine (hormonal)	Cystic ovaries	Use drugs to treat cysts on ovaries so heifer/cows will ovulate normally again
Allergies	Adverse reaction to a drug	Epinephrine (adrenaline) or other appropriate therapy pending on cause of allergy e.g., tilmicosin reaction requires treatment with calcium, not epinephrine.

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 can cause disease, often by producing toxins or poisons.

EXAMPLE

PATHOGENIC BACTERIA

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

FIGURE 6 ANTIMICROBIALS

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

Antimicrobials

Antimicrobials are agents that kill microorganisms or suppress their growth. Antimicrobials are a necessary tool to manage infectious diseases in beef cattle operations (see Figure 6). Some people refer to these as antibiotics.

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 (BVD) virus. 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. Vaccination, in addition to good husbandry practices, is the main method to reduce viral infections and diseases caused by viruses.

FIGURE 7 FIRST MILK (COLOSTRUM)

FIGURE 8 ADMINISTERING ANTIBODIES FROM COLOSTRUM

EXAMPLE

ANTIMICROBIALS AND VIRUSES

In the case of viral diseases such as infectious bovine rhinotracheitis (IBR), treatment with antimicrobials is sometimes prescribed by your veterinarian to prevent secondary bacterial infections in the lung, but **antimicrobials will not kill viruses**. 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 bacterial and viral infections. 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 actively, by administering animal health products that contain antibodies (for example, Calf's Choice Total®, Head Start®) (see Figure 8). Vaccination, or immunization, is administering a vaccine to actively assist an animal in generating a specific protective immunity against the infectious agents e.g., bacteria and/or viruses, in the vaccine.

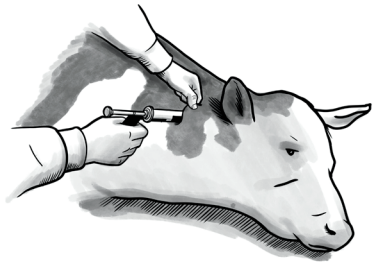


FIGURE 9 VACCINATING

MORE INFO

For further information on vaccination guidelines, contact your veterinarian and refer to BCRC's Vaccination Guidelines at www.beefresearch.ca. For further information on proper vaccine use for beef cow herds and major diseases in beef herds, refer to www.wecahn.ca/wecahn-networks/beef-network/beef-cow-calf-vaccine-project

FIGURE 10 STEER WITH RINGWORM

MORE INFO

Vaccinating Your Beef Herd: youtube.com/playlist?list=PL16s0XbcZVIurNHLqLLB58yc-cwdvush-

Vaccination

Vaccination is the introduction of a 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).

Fungi

Fungi are microscopic plants, some of which cause disease.

EXAMPLE

FUNGI

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

Parasites

Parasites are plants or animals that live within or upon another living organism at whose expense they obtain some advantage. There are internal and external parasites. Examples of internal parasites are those within the rumen or intestines e.g., coccidia, and examples of external parasites are lice or grubs.

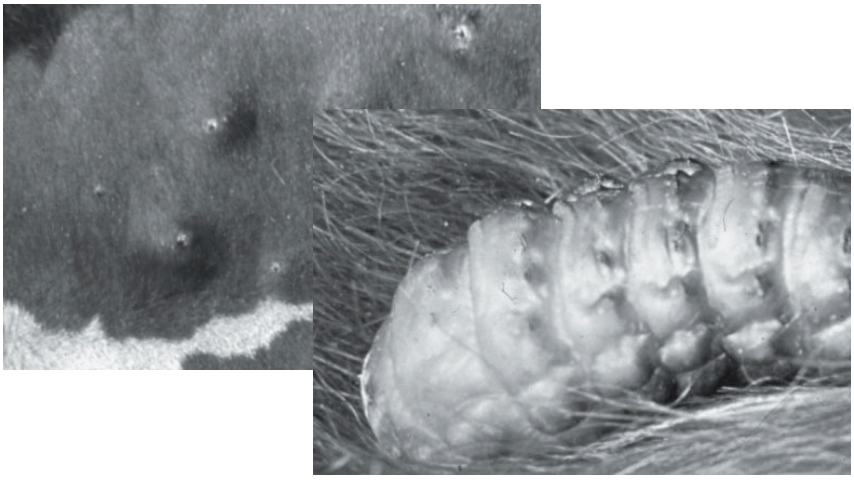


FIGURE 11A/B GRUB OF WARBLE FLY (*HYPODERMA* SP.) AND COW INFESTED WITH WARBLES (SHOWING BREATHING HOLES)

Prions

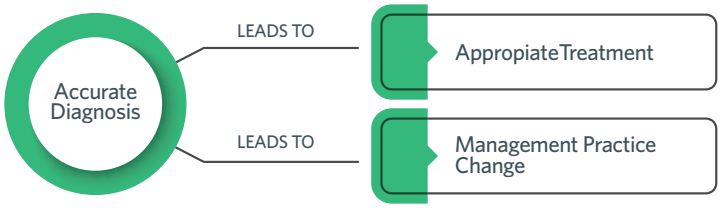
Prions are aberrant misfolded proteins that appear to cause bovine spongiform encephalopathy (BSE) and other brain abnormalities. Currently, there is no treatment in live animals for prions.

Understanding the previous terms will help you work with your veterinarian to determine which diseases present the greatest risk to your herd.

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 beef cow herd and feedlot.

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 or train you and your staff how to diagnose common diseases in beef cattle, to ensure appropriate treatment and management practice changes.



Work with your veterinarian to determine common diseases in your cow herd or feedlot and the clinical signs that identify specific diseases. Then, design customized written or computerized animal health protocols to prevent, treat and control specific diseases in your beef operation. Standardized health protocols, such as processing or vaccination protocols and treatment protocols:

- Reduce guess work
- Ensure that animal health products are correctly and consistently used by everyone involved
- Ensure that appropriate vaccines and drugs, and only those that are necessary, are used to improve health and performance responses, whilst reducing drug and labor costs and the development of antimicrobial or parasiticide resistance.

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

An accurate diagnosis is essential to ensure the right treatment for the right animal.

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 (e.g., antimicrobials)
- Restoring, correcting, or modifying organic functions (e.g., probiotics)
- Disinfection of premises in which food is manufactured, prepared, or kept (e.g., disinfectants).

FIGURE 12 VETERINARIAN EXAMINING STEER

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

Recording Vaccinations and Treatments

It is important to record all vaccinations and treatments to help make informed management decisions. 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, notebook, or in a computerized animal health program. Recording treatments is a key step in showing responsible drug use. As well, recording treatments allows your veterinarian the opportunity to analyze treatment, chronic i.e., animals with prolonged disease that have not responded to treatment, railer i.e., animal that will be shipped to slaughter earlier than normal, and mortality (death) rates to determine whether changes are needed in the treatment protocol or other areas of the herd health program to improve health outcomes.

Recording vaccinations and treatments is a key step in showing responsible drug use.

Biosecurity and Biocontainment

FIGURE 13 STEER WITH 2 UNIQUE CROSSLINKED EARTAG NUMBERS (CCIA, GREEN FEEDLOT TAG)

MORE INFO

Vaccination Protocols and Records:
youtu.be/giOJsaQbEGA

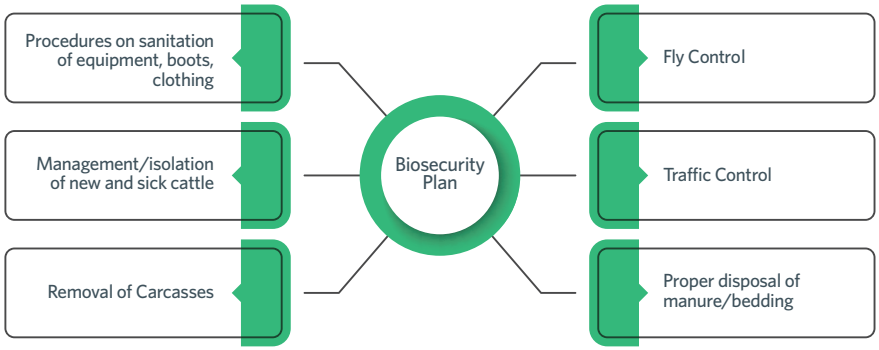
FIGURE 14 BIOSECURITY SIGN AND FOOT DIP

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 beef operation. Biocontainment refers to management practices to prevent and reduce the risk of the movement of infectious diseases within or on your operation. 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 beef operation. The biosecurity plan should focus on identifying disease risks to your herd or feedlot and then determining how to prevent infectious diseases from entering your herd or feedlot through management of new cattle and traffic.

Biocontainment should focus on determining methods to prevent disease from spreading within your herd/feedlot through proper vaccination protocols and good nutrition programs to increase the ability of animals to fight off infectious agents.

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

COMPONENTS OF A BIOSECURITY PLAN



MORE INFO

For more information on Biosecurity Plans for beef operations see
https://inspection.canada.ca/animal-health/terrestrial-animals/biosecurity/standards-and-principles/beef-cattle/eng/1378825897354/1378825940112

Food Safety

FIGURE 15 FOOD SAFETY IS CRITICAL

MORE INFO

To learn more about the national beef on-farm food safety program, contact Verified Beef Production Plus at www.verifiedbeef.ca. To learn more about the Canadian Roundtable of Sustainable Beef (CRSB), check out www.crsb.ca. To learn more about the PAACO certified Canadian Feedlot Audit, nationalcattlefeeders.ca/feedlot. To learn about Ontario Corn Fed Program ontariocornfedbeef.com

FIGURE 16 VBP+ LOGO

FIGURE 17 PAACO AND OCFP LOGOS

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

Hazard Analysis Critical Control Points (HACCP)

The Canadian beef industry is reassuring consumers of the safety of Canadian beef by implementing a national on-farm food safety program (OFFSP) and other certification programs, which include food safety requirements, such as the Canadian Roundtable of Sustainable Beef (CRSB), Ontario Corn Fed Program, and the National Cattle Feeders Association's PAACO certified Canadian. The national beef on-farm food safety program is called "Verified Beef Production Plus" (see Figure 16). This OFFSP program has been recognized as technically sound by the Canadian Food Inspection Agency. This program is 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 recurrences of problems.

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
- Keeping good records to document good production practices.

Categories of Food Safety Hazards

The three main categories of food safety hazards are:

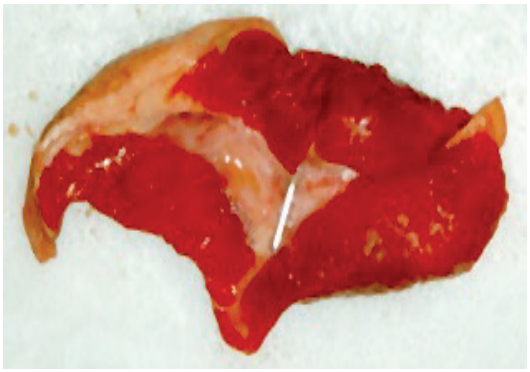


FIGURE 18 BROKEN NEEDLE IN BEEF STEAK

Biological hazards include pathogenic zoonotic bacteria, viruses, or parasites in beef. Chemical hazards include drug and pesticide residues in beef, as well as accidental exposure to hazardous toxins or materials, such as lead, that affect the safety of the beef for human consumption. Physical hazards include broken needles or buckshot in beef (see Figure 18).

Antimicrobial Resistance

In recent years, antimicrobial resistance has become a concern to consumers. Antimicrobial resistant bacteria in beef 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 from eating contaminated beef or through environmental exposure from bacterial contaminated water, soil, or wind. If either humans or cattle are infected with pathogenic resistant bacteria, treatment for disease may be more difficult. Overuse and misuse of antimicrobial drugs in humans and animals promotes selection for and transmission of antimicrobial resistant bacteria. To reduce the risk of antimicrobial resistance, medical doctors, veterinarians, and livestock producers must use antimicrobials responsibly.

MORE INFO

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

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 residue risk from the environment, and to reduce the risk of violative drug residues in beef caused by failing to follow label meat withdrawal periods or using drugs extra-label without a valid veterinary prescription, administer animal health products only when necessary and always according to a valid veterinary prescription from a licensed veterinarian. Follow the meat withdrawal periods on the veterinary prescription. The products used should be approved by Health Canada for use in food producing animals. Products licensed in Canada have passed human and animal safety and

FIGURE 19 SHARPS DISPOSAL CONTAINERS

MORE INFO

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

environmental impact assessments to ensure their safety if they are used according to manufacturer's label directions and veterinary prescriptions. Handle cattle manure/urine in accordance with Provincial Agricultural Environment Regulations and Acts, so that it doesn't contaminate surface or ground waters either directly or through manure runoff. Design manure storage areas according to the regulations of the same Acts 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.

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 use when disease occurs. With any treatment, you must consider food safety and protection of the environment.

Module 2

General Animal Health Product 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 animal health products: biologicals, pharmaceuticals, parasiticides, fungicides, tranquilizers and anesthetics, and disinfectants.

It is important to have a complete understanding of any animal health products that you administer.

Drug Classification

Drugs available to beef cattle 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 directions unless direction for extra-label use is prescribed by a licensed veterinarian within a valid veterinary-client-patient relationship. A written veterinary prescription with an appropriate meat withdrawal period as determined by CgFARAD must be provided prior to ELDU. Animal health products called parasiticides, which are used to prevent, control, or treat parasites, such as lice, grubs, and worms, may be licensed either by Health Canada – Veterinary Drug Directorate, as a "drug" with a DIN (drug identification number), such as ivermectin, or they may be licensed by the Pest Management Regulatory Agency (PMRA) as a pesticide e.g., permethrin. Extra-label use is not permitted with parasecticides licensed by PMRA.

FIGURE 1 OVER THE COUNTER DRUG

MORE INFO

PEST MANAGEMENT REGULATORY AGENCY

www.canada.ca/en/health-canada/services/consumer-product-safety/pesticides-pest-management.html

FIGURE 2 PRESCRIPTION DRUG

FIGURE 3 PURCHASING PRESCRIPTION DRUGS

GLOSSARY

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

If a parasiticide is licensed as a pesticide, they are not considered a drug. It is important to note that veterinarians cannot prescribe pesticides for extra-label use, as per the federal Pest Management Regulations and Acts (PMRA). The most common OTC drugs are parasiticides like ivermectin, anticoccidial products, and medicated feed additives (MFAs), such as ionophores and ractopamine in the feed, when used as per manufacturer’s label directions and in approved combinations with other MFAs in the feed.

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). All classes of antimicrobials, other than Class 4 ionophores, are prescription drugs in Canada. Drugs in this classification often have extensive label directions requiring professional guidance to maximize effectiveness and minimize the risk of drug residues and the development of antimicrobial resistance. 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 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 a written veterinarian’s prescription.
- Producers may not give or sell their prescription drugs to another producer.

EXERCISE

ANIMAL HEALTH PRODUCT CLASSIFICATION CHECKLIST

PRODUCT	PRESCRIPTION	OVER THE COUNTER
Bovatec® 20 Medicated Premix		
Borgal®		
Draxxin®		
Excenel® RTU		
Forcyl®		
Bioestrovet		
Tasvax® 8		
Ivomec® Pour-On		
Component implants		
Rumensin™ Premix		

SEE PAGE 2-7 FOR THE ANSWERS.

Using Appendix 3, check the following animal health products as either over the counter or prescription (assume products are being used as per manufacturer's label directions).

General Categories of Animal Health Products

Animal health products commonly used in livestock formulations fall into six general categories.

Biological (Vaccines)

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 prevention, control, or treatment of infectious diseases. The vaccine is administered by subcutaneous (under the skin), intramuscular (in the muscle), oral (in the mouth) or intranasal (in the nose) route. Table 1 describes the types of vaccines available.

TABLE 1 TYPES OF VACCINES

VACCINE	DEFINITION	EXAMPLES
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 Gold® 5 Inforce® 3 Pyramid® 2 + Type II BVD
Killed Vaccines	Vaccines prepared from killed microorganisms in combination with a carrier (adjuvant) to stimulate protective immunity	Triangle® 5 Vira Shield™ 6+Somnus
Bacterins	Killed bacterial vaccines such as clostridial bacterins	Tasvax® 8
Subunit Vaccines	Vaccines containing only the specific proteins or extracts of the infectious agent that induce protective immunity	One-Shot® Presponse® SQ
Autogenous Vaccines	Vaccines prepared from home-made cultures of material derived from a specific lesion of the animal that is going to be 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 are for sale commercially, such as those present in "HEADSTART®", which are administered orally within the first two hours of life to achieve optimum absorption and produce a protective passive immunity.

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

Pharmaceutical

A pharmaceutical is a drug obtained by creating, mixing, or compounding chemicals. Most pharmaceuticals are administered by subcutaneous (under the skin), intramuscular (in the muscle), or intravenous (in the vein) injection. Drugs can also be given by oral, topical (skin), intramammary (in the udder), intrauterine (in the uterus), intravaginal (in the vagina), intraspinal (in the spinal column) 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 or synthetically made	Dexamethasone Predef® 2X
Non-steroidal Anti-inflammatory	Non-steroid chemicals with anti- inflammatory properties like corticosteroids	Banamine Metacam or Meloxicam
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, testosterone, trenbalone acetate
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).

EXAMPLE

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, Boss® Pour-On, and CyLence™ Pour-On.

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

Fungicide

A fungicide (antifungal) is an agent that destroys fungi.

GLOSSARY

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

TRANQUILIZERS, SEDATIVES, AND ANESTHETICS

A tranquilizer is an agent that calms or quiets an anxious or agitated animal.

EXAMPLE

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. Rompun™, on the other hand, is a sedative and analgesic.

EXAMPLE

Anesthetic

Lidocaine is a local anesthetic; sevoflurane is a general anesthetic.

Most 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, chlorhexidine, iodine). Some disinfectants are applied to inanimate objects such as floors and equipment if they are too strong to be used on living tissue. Chlorhexidine and iodine are used in teat and skin disinfection. Formalin is sometimes used in foot baths or foot sprays for beef cattle with hairy heel warts.

EXERCISE

ANIMAL HEALTH PRODUCT CATEGORIES

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

PRODUCT	CATEGORY
Borgal®	_____
Forcyl®	_____
Salix®	_____
Estrumate®	_____
Ivomec® Pour-On	_____
Vision® 8	_____
Pyramid® FP5	_____
Rumensin™ Premix	_____

SEE PAGE 2-7 FOR THE ANSWERS.

Summary

This module introduced you to over the counter drugs, prescription drugs, pesticides, and biologics. You learned about some general categories of animal health products and examples of each. You need to understand the characteristics of each category before you administer them to cattle.

Answers to Exercise on Page 2 – 2.

ANIMAL HEALTH PRODUCT CLASSIFICATION CHECKLIST

DRUG	PRESCRIPTION	OVER THE COUNTER
Bovatec® 20 Medicated Premix		x
Borgal®	x	
Draxxin®	x	
Excenel® RTU	x	
Forcyl®	x	
Bioestrovet	x	
Tasvax® 8		x
Ivomec® Pour-On		x
Component™ implants		x
Rumensin™ Premix		x

Answers to Exercise on Page 2 – 6

PRODUCT	CATEGORY
Borgal®	*pharmaceutical - antimicrobial*
Forcyl®	*pharmaceutical - antimicrobial*
Salix®	*pharmaceutical - diuretic*
Estrumate®	*pharmaceutical - hormone*
Ivomec® Pour-On	*parasiticide*
Vision® 8	*biological*
Pyramid® FP5	*biological*
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.

MORE INFO

See Appendix 1 for more information on the legislation.

The following regulations are of importance to beef cattle 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 cattle 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 meat withdrawal periods. Federal regulations also determine the prescription status of drugs.

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 and veterinary prescriptions. Only use drugs in an extra-label manner if you have a veterinary prescription and there is scientific evidence to justify such use, and when no other licensed alternatives exist. 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, e.g., nitrofurazone
- Clenbuterol and its salts and derivatives
- Diethylstilbestrol and other stilbene compounds
- 5-nitroimidazole compound, e.g., metronidazole.

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 biologicals (Part XI).

Safe Food for Canadians Act

The *Safe Food for Canadians 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*, the Canadian Food Inspection Agency (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 cattle producers.

Pharmaceutical Acts

The *Pharmaceutical Profession Act* or Pharmacy Act is the primary provincial legislation regulating the sale of all drugs in each Province. 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 other provincial regulations, such as in Alberta, the Production Animal Medicine Regulation and Authorized Medicine Sales Regulation under the *Animal Health Act*, or in Ontario, the *Livestock Medicines Act* and Regulations. Each province has its own provincial regulations regarding the dispensing of drugs in its province, including veterinary drugs.

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. Some provincial regulations allow pharmacists to dispense veterinary drugs upon receipt of a veterinary prescription from a licensed veterinarian in that province.

Animal Health Act

Provincial acts, such as the *Animal Health Act* in various provinces contains the regulations for proper disposal of dead animals under the Destruction and Disposal of Dead Animals Regulations. In Ontario, the Disposal of Dead Farm Animals regulations fall under the *Nutrient Management Act*.

Environmental Protection Act

The *Environmental Protection Acts* in each province contain the Environmental Code of Practice for Pesticides which regulates the use, application, handling, and disposal of pesticides.

Agricultural Operation Practices Act or Nutrient Management Act

The *Agricultural Operation Practices Act* (AOPA) or *Nutrient Management Act* in various provinces ensure 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 understand the federal and provincial pieces of legislation that affect your use of animal health products and feed medications.

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 on-farm food safety and beef quality programs.

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

Producers

Beef cattle producers are responsible for implementing good animal husbandry practices (see Figure 1), including the following:

- Canadian Beef Code of Practice www.nfacc.ca/codes-of-practice/beef-cattle
- On-farm food safety, animal health and welfare, and beef quality assurance programs
- Biosecurity plans
- Proper housing
- Proper transport as per CFIA Transport Regulations
- Proper nutrition to prevent disease, reduce the need for antimicrobials, and reduce the risk of drug residues and broken needles in beef.

FIGURE 1 GOOD HUSBANDRY

MORE INFO

Vaccination Protocols
youtu.be/giOJsaQbEGA

FIGURE 2 GOOD FEEDING PRACTICES

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 beef.

Processing/Vaccination and Treatment Protocols

You and your employees should follow veterinary approved processing/vaccination and treatment protocols. Use only Health Canada 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. Should a violative drug residue occur in beef, the Canadian Food Inspection Agency (CFIA) will contact you to do an investigation, and there may be regulatory action if drugs were not used as per the veterinarian's prescription, and meat withdrawal periods were not followed. **Producers may not resell or give to another producer, their veterinary prescription drugs**.

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). It is illegal to feed prohibited materials (ruminant bone/meat meal) to cattle, to prevent the risk of BSE (Bovine Spongiform Encephalopathy) disease transmission. On mixed livestock operations, you must ensure no cross-contamination of hog or poultry or sheep/goat feed with beef cattle feed, to reduce the risk of drug residues or negative health effects in the cattle.

Herd Health Program

You are encouraged to work with a licensed veterinarian to develop and maintain a herd health program. The program should include staff training on identification of common diseases, appropriate prevention, treatment and control protocols, 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 beef industry in the eyes of the consumer.

Certification Programs

As a producer, you should implement the good production practices in the national on-farm food safety program (Verified Beef Program), which is a core requirement for certification in the Verified Beef Production + Program, Ontario Corn Fed Beef Program, Canadian Roundtable of Sustainable Beef, and the PAACO Feedlot Audit. 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 a herd health program 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 do not cause livestock or public health hazards. Practitioners must establish and maintain a valid veterinary-client-patient relationship with their producers when prescribing and dispensing drugs, which should include training sessions on use of drugs.

Key Responsibilities of Veterinarians

- Advise clients on the safe and responsible use of animal health products
- Write veterinary prescriptions for prescription drugs and any drugs used extra-label (see Figure 3)
- Develop herd specific processing/vaccination and treatment protocols, 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.

Extra-Label Use (ELDU) of Drugs

Your veterinarian must write prescriptions for drugs, prescription or OTC, when they are used differently than specified on the label insert (e.g., differences in the animal species, drug dosage, drug route, method of administration (remote delivery devices) 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 drug residues. Veterinarians must contact the Canadian global Food Animal Residue Avoidance database (CgFARAD) www.cgfarad.usask.ca to request appropriate drug meat withdrawal periods to record on their veterinary prescription for any drug used extra-label, to ensure food safety.

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, feed, and transport regulatory matters, Canadian Beef Code of Practice, and on-farm food safety, animal health and welfare, and beef quality assurance programs.

Feed Manufacturers

FIGURE 3 WRITING A PRESCRIPTION

FIGURE 4 DELIVERING FEED

FIGURE 5 FEED BAG WITH TAG

Feed manufacturers are involved in the sale of non-prescription drugs and the mixing and transport 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 is adequately mixed in feeds. They are responsible to ensure the feed tag label is consistent with the veterinarian's feed prescription, for prescription drugs or those medicated feed additives (MFAs) used in unapproved combinations. The feed tag must include directions for use and pertinent caution and warning statements, including meat drug withdrawal periods, to be observed by beef 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 the Canadian Food Inspection Agency (CFIA) contains information on the use of drugs (medicated feed additives) in feed, including permitted drug and drug combinations for use in animal feeds www.inspection.canada.ca/animal-health/livestock-feeds/medicating-ingredients/eng/1300212600464/1320602461227. When a medicating feed ingredient is used at a level or for a purpose or in a combination with other feed additives that are not listed in the CMIB, a written feed prescription by a licensed veterinarian is required before the mixing and delivery of the medicated feed, whether a premix, supplement, or total mixed ration (TMR)..

Feed medications must only be used extra-label for a limited period in the treatment of specific, diagnosed diseases 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 a licensed veterinarian.

The feed manufacturer must have a copy of the veterinarian's feed prescription prior to mixing and delivering the feed.

Veterinary Prescription Feeds

Veterinary Feed Prescriptions must contain:

- Date of Prescription, Name and address of the manufacturer
- Name of the person and who the feed is manufactured for (number, kind, class, age/wt)
- Generic or active ingredient name, level of inclusion of medicating ingredients
- Manufacturing directions, feeding directions for use, including duration of feeding
- Warning and caution statements, including meat withdrawal period if any
- Type and amount (weight) of the feed to be manufactured
- Name and signature of the veterinarian who issued the prescription

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
- Feed protocols, including ration formulations, batch mixing instructions, mixer testing, scale calibration, equipment clean-out procedures, ration step-ups, and feed delivery procedures
- Feed record forms for use by the producer
- Review of herd and feed production data, growth performance data, lot closeouts (feedlots), and feed test results to identify areas for improvement.

Nutritionists should stay current on the on-farm food safety and beef quality certification programs, export programs e.g., ractopamine-free or no added hormones, and feed/ nutrition management.

Licensed Livestock Medicine Outlets

FIGURE 6 NUTRITIONIST WITH PRODUCER

All outlets that sell production animal medicine must meet provincial regulations for each retail outlet (see Figure 7). For example, in Alberta, this is through the Authorized Medicine Sales Regulations under the *Animal Health Act*, and in Ontario this is through the *Livestock Medicines Act* and Regulations. They must have a thorough knowledge and understanding of the provincial regulations from their responsible provincial departments of agriculture, and they must abide by all sections of the provincial Act and Regulations to ensure animal and human safety.

Prohibited Sales

Provincial livestock medicine outlets are not allowed to sell prescription, narcotic or controlled drugs. Depending on specific provincial regulations, only licensed veterinary clinics and/or pharmacies may dispense prescription veterinary drugs.

Livestock medicine outlets can only sell drugs approved for sale in Canada and they must have a Drug Identification Number (DIN). Biologics offered for sale must have a CFIA registration number.

MORE INFO

www.alberta.ca/alberta-wholesale-and-retail-animal-medicine-sales.aspx

MORE INFO

omafra.gov.on.ca/english/livestock/animalcare/livestockmed.htm

EXAMPLE

PROHIBITED SALES OF DRUGS

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

Livestock medicine outlets must ensure that all over the counter (OTC) drugs are clearly labeled and stored according to label directions, and they are not expired. Accurate records of all medicines bought and sold must be kept for a minimum of two years.

Livestock medicine licensed outlets cannot 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 cannot 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 the respective sections of the provincial livestock medicine outlet regulations may be sold direct to producers.

MORE INFO

See Appendix 4 for example record forms.

Drugs Licensed for Sale Through Livestock Medicine Outlets (may vary by province)

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

Pharmaceutical Manufacturers

To market drugs in Canada, drug manufacturers must submit data to the federal government, Health Canada – Veterinary Drug Directorate, 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.

EXERCISE

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	LIVESTOCK MEDICINE OUTLET	PHARMACEUTICAL MANUFACTURER
Implementing on-farm food safety program						
Drug has DIN number						
Develop standard processing and treatment protocols						
Follow veterinary prescriptions and treatment protocols						
Advice on nutritional management						
Notice of Compliance to sell a drug						
Must have a provincial livestock medicine outlet licence						

SEE PAGE 4-10 FOR THE ANSWERS.

There is a national beef on-farm food safety program of importance to beef producers.

Verified Beef Production Plus (VBP+)

The national beef on-farm food safety program, called *Verified Beef Production Plus*, is delivered provincially by provincial delivery agents. The national 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.

Food safety specific 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.

The VBP+ Program, as well as the Ontario Corn Fed Beef Program, the Canadian Roundtable of Sustainable Beef indicators, and the PAACO Feedlot Audit from the National Cattle Feeders Association also contain similar food safety requirements, in addition to other health, beef quality, and welfare requirements.

EXERCISE

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 good records
- ☐ I use only Health Canada 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 all prescription drugs and those used extra-label, 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 food safety standards.

Answers to Exercise on Page 4 – 7

ACTIVITY	PRODUCER	VETERINARIAN	FEED MANUFACTURER	NUTRITIONIST	LIVESTOCK MEDICINE OUTLET	PHARMACEUTICAL MANUFACTURER
Implementing on-farm food safety program	X	X		X		
Drug has DIN number						X
Develop standard processing and treatment protocols		X				
Follow veterinary prescriptions and treatment protocols	X		X	X		
Advice on nutritional management		X	X	X		
Notice of Compliance to sell a drug					X	X
Must have a provincial livestock medicine outlet licence					X	

Module 5

How Drugs Work

Objectives

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

- Understand how drugs are absorbed, distributed, and eliminated from an animal's body
- Steps to take 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 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.

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Many factors affect drug absorption by an animal.

GLOSSARY

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

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

Method of administration affects absorption.

FIGURE 1 INTRAVENOUS ADMINISTRATION

FIGURE 2 INTRAMUSCULAR INJECTION

FIGURE 3 SUBCUTANEOUS INJECTION

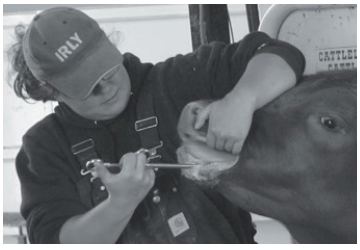


FIGURE 4 ORAL BOLUS

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

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.

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) 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.

Other Factors Affecting Drug Absorption

Topical medications (such as the common pour-on endectocides e.g., Ivomec ® Pour-on for cattle, Bimectin(R) Pour-On ®) are absorbed through the animal's skin into the bloodstream (see Figure 5). These products are liquids that are applied onto the animal's back. However, if the hide is covered with mud or feces, the drug cannot reach the skin to be absorbed. Similarly, if applied when raining or snowing or very cold outside, some of the medication may be washed off or freeze on the hair 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, when administering approved products administer subcutaneously or intramuscularly, inject 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. Administering a large volume in 1 injection location e.g., 40 ml, can result in drug residues at the injection site at the end of the meat withdrawal period due to the slow absorption of the drug. As well, large volumes in 1 site increase the risk of beef quality issues, including scar tissue and abscesses. It is especially important to use more locations when using long-acting drugs

FIGURE 5 TOPICAL MEDICATION

because of their already slow rate of absorption. Only give injections in the neck area to reduce the risk of injection site lesions in expensive cuts of meats e.g., top hip is the top butt where sirloin steaks come from; back hind leg is the inside/outside/eye of round steaks and roasts..

EXAMPLE

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.

Dehydration reduces the rate of drug absorption of subcutaneous medications.

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 an animal's body is influenced by drug properties and health of the animal.

Physical and Chemical Properties of the 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 animals 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 drugs may be distributed to these areas.
- Sites of chronic inflammation (such as abscesses and scar tissue) often receive little or no blood supply, reducing absorption of drugs.

EXAMPLE

IMPACT OF SCARS AND ABSCESSES ON DRUG EFFECTIVENESS

Cows with chronic mastitis or feeder cattle with chronic 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.

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

Elimination

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 animal'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 cattle 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 or liver abscesses (see Figure 6) in feedlot cattle reduce liver function.

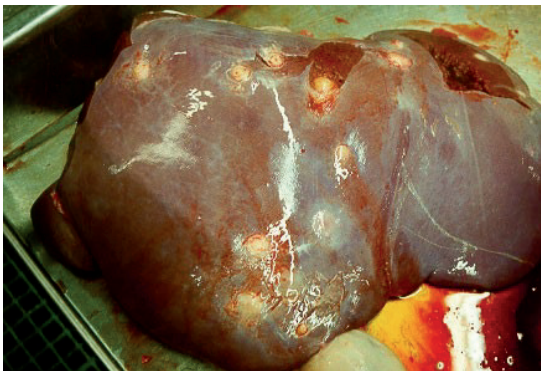


FIGURE 6 LIVER ABSCESS

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.

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

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

FIGURE 7 SICK CALF

DRUG TREATMENT FAILURE

Treating a medical problem with more medication is not always better! It may just be more expensive. 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 and it will affect drug meat withdrawal periods if extra-label (requires a veterinary prescription).

A few cows in your barn have been coughing and breathing heavily for the past few weeks (see Figure 7). Your veterinarian diagnoses bacterial pneumonia and treats the cows with a long-acting oxytetracycline (e.g., Liquamycin™ LA-200, Bio-Mycin™ 200) at 4.5 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.

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.

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

FIGURE 8 DRUGS ARE EXPENSIVE

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 adverse 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)!

Drug Residues and Withdrawal Times

FIGURE 9 CFIA INSPECTION

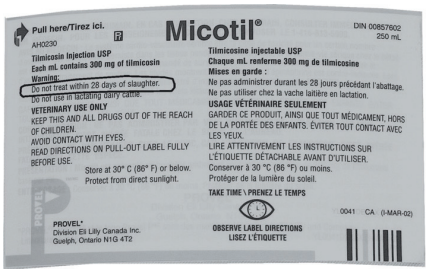


FIGURE 10 DRUG WITHDRAWAL PERIOD

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 exceeds a certain amount known as the maximum residue limit (MRL). Once the level of the drug falls below the MRL, the meat is considered safe for human consumption. The Canadian Food Inspection Agency (CFIA) is responsible for ensuring that drug residues are not present in meat (see Figure 9). This is accomplished by visual inspections and random chemical tests at the 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. 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. These include:

- Extra-label drug use. Occasionally, your veterinarian may recommend extra-label drug usage (ELDU). This often occurs when there isn't a product labeled 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, method of administration e.g., remote delivery device, species or age of animal treated, or disease condition. ELDU must only occur under a written valid veterinary client patient relationship and a veterinary prescription. ELDU may change the amount of time you need to withhold the meat. Ask your veterinarian whether it is appropriate to use the drug extra-label, and if OK, ask for a written veterinary prescription with an meat drug withdrawal period approved by CgFARD.
- Health status of the animal. Label withdrawal times are determined by studies using relatively healthy animals. As discussed earlier, old, or extremely sick animals or very young animals do not absorb, distribute, and eliminate drugs the same as healthy animals.
- Some medications do not state a meat 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, it will be considered a violation.

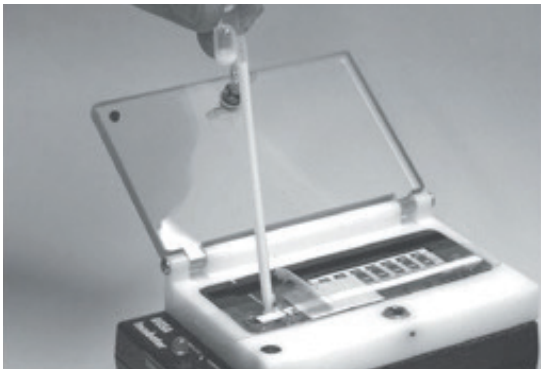


FIGURE 11 TEST KITS FOR ANTIMICROBIAL RESIDUES

FIGURE 12 COMMUNICATION IS KEY

MORE INFO

For further information about on-farm drug residue tests, visit:

www.charm.com

Charm is distributed in Alberta by Alta Genetics:
www.altagenetics.com

https://www.charm.com/products/test-and-kits/antibiotic-tests/

www.meatsafetestkits.com

EXAMPLE

NO WITHDRAWAL TIME ON LABEL

The common drug dexamethasone (e.g., Dexamethasone 2, Dexamethasone 5) does not state a meat withdrawal time on the label. There is no MRL for dexamethasone in meat, so any residue detected is considered a violation. Your veterinarian can contact the CgFARAD for withdrawal advice.

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 samples occurs at slaughter facilities. Random normal samples are tested, as well as all non- ambulatory cattle, injection sites, and abnormal tissues. There are several 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 products from being marketed with drug residues than it is to deal with a violation.

For Beef Producers

On-farm testing of meat samples is more difficult. L.A.S.T™ (Live Animal Swab Test) is an on-farm test that uses an animal's urine to determine if violative residues of antimicrobials are present. However, this test has its own limitations and is not frequently used by veterinarians or producers extension.okstate.edu/fact-sheets/avoiding-antibiotic-residues-in-beef-

How to Avoid Drug Residue Violations

- Use all drugs strictly as the label and veterinary prescriptions indicate. Only use a drug in an extra-label manner if directed by your veterinarian, whom you have a valid VCPR, and request a written veterinary prescription.
- Clearly identify all treated animals. Most violations occur because treated animals are not identified properly and animals with drug residues are accidentally shipped.
- Check all cattle vaccination and treatment records, including feed records, before shipping cattle to slaughter to ensure they have passed all drug meat withdrawal periods.
- Keep accurate treatment records.
- Whenever possible, use drugs with short or zero withdrawal times in cattle close to slaughter.

Summary

You should now understand 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

Responsible 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 with your veterinarian
- 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 and veterinary prescriptions for all drugs , including OTC and prescription drugs used on and extra-label, vaccines, and pesticides to ensure food safety and consumer confidence in beef.

Valid Veterinary-Client-Patient Relationship (VCPR)

FIGURE 1 PRODUCER WITH SICK CALF

FIGURE 2 VCPR

FIGURE 3 READ THE LABEL AND VETERINARY PRESCRIPTION

A veterinarian must be licensed with the provincial veterinary association in the province they are working, and they must have a valid VCPR to prescribe prescription drugs or recommend extra-label use of drugs. A valid VCPR (see Figure 2) exists when the following conditions have been met:

- 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 Manufacturer's Label and/or Veterinary Prescription

It is important to read and understand the labels of all animal health products used in cattle and to follow manufacturer label directions and/or veterinary prescriptions (see Figure 3). If you do not use drugs correctly, you increase the risk of drug residues in meat 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.

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), intranasal (IN), 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 the meat and milk 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.

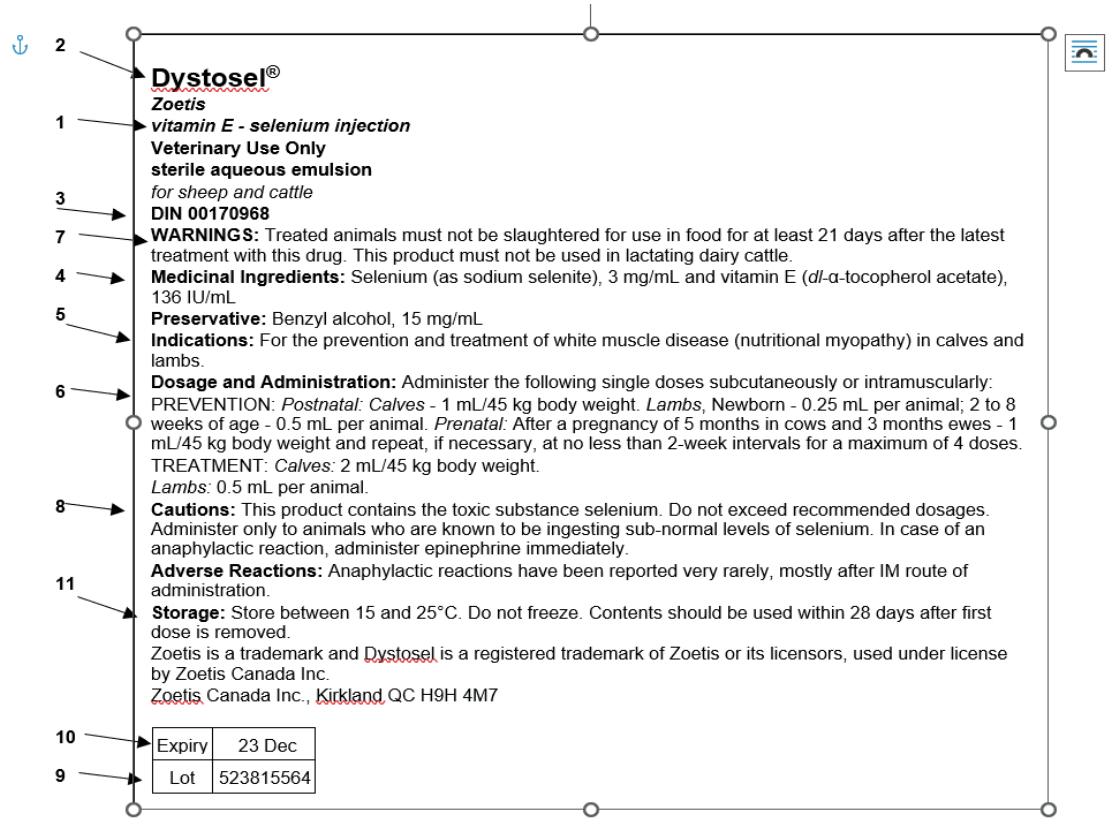
CVP™ Compendium of Veterinary Products

Compendium of Veterinary Products (CVP) contains all drug labels, including medicated feed additives. A free "CVP Vet" app is available from Animalytix LLC. It can be downloaded free onto Iphones and Android phones from your App Store or Google Play Store. As well, the Compendium is available at this weblink cca.cvpservice.com

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.

FIGURE 4 CHECK WITH YOUR VET

GLOSSARY

See the Glossary for a definition of "pathogen".

Selecting a Medicine

EXERCISE

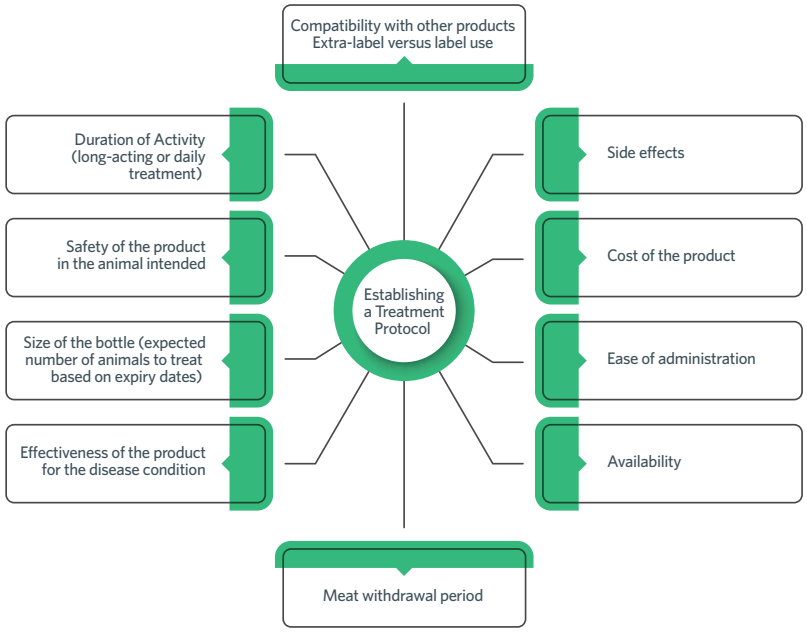
CHECKLIST FOR SELECTING A MEDICINE

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 the vet updates 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 and/or my veterinary prescription, which is consistent with my vet's processing, vaccination, or treatment protocol. I do not use any drug other than as per the label/vet prescription unless I have written permission from my vet in a revised veterinary prescription to use the drug extra-label. Else, I do not use.

Establishing a Treatment Protocol

When working with your veterinarian to establish a specific treatment protocol for common diseases in your herd/feedlot, 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.

EXAMPLE

HARMFUL SIDE EFFECTS

- Anaphylactic reactions
- Long drug meat withdrawal periods
- Increased risk of antimicrobial drug resistance
- Injection site lesions
- Harmful to animals e.g., toxicity
- Harmful to humans.

The treatment protocol developed by your veterinarian for your beef operation should list common diseases, clinical signs of disease, what medicine, if any, to use, the dose, route, frequency and duration of treatment, and drug withdrawal period. It is important to remember that not all diseases need drugs!

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

Treatment Failure

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

Work with your veterinarian to identify potential causes of treatment failure

Possible Causes of Treatment Failure

- Wrong disease diagnosis e.g., grain overload, not BRD; or lameness caused by injury, not arthritis
- 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 or high levels of stress
- Infected tissue is walled off with scar tissue and the antibiotic cannot gain access to the bacteria (e.g., *Staphylococcus aureus* mastitis)
- Viral infection which is not responsive to antimicrobials
- Ineffective medicine
  - Drug not effective for specific pathogenic bacteria e.g., penicillin or cephalosporins don't kill *Mycoplasma* spp.
  - 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.

How to Calculate the Correct Dose

To calculate the correct dose, you need to know from the drug label and/or veterinary prescription 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 must 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 imperial gallon = 4.546 L

1 litre = 0.88 imperial quart
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

EXAMPLE

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.

EXAMPLE

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.

1. Convert animal weight to kg:
   1100 lb/2 = 550 kg minus 55 (10% of 550) = 495 kg
2. Read the dosage provided on label
   1 mL per 10 kg
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

1. Read concentration of active ingredient in bottle: 200 mg/mL
2. Determine weight of animal (as above): 495 kg
3. Read dose per kg of body weight: 20 mg/kg
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 or 1000 grams

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

EXERCISE

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 finishing steers (average weight 1350 lb.) with footrot.

You need to treat each of them with Excenel Sterile Powder.

See the Excenel Sterile Powder insert in Appendix 3.

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

Label dosage _____

Weight of animal _____

Dose required per animal _____

How many times should you administer the product? _____

Total amount of product required _____

See page 6-13 for the answer.

EXERCISE

CALCULATING THE CORRECT DOSE FOR A POUR-ON

Based on the information provided on the product insert for (see Appendix 3),
calculate the product required to treat 120 animals for lice with CyLenceTM Pour-On Label.

You have 120 calves on average weighing 450 lb.

1. Convert lb to kg
2. Find the size of animals on the chart on the CyLence™ Pour-On label
3. Determine the dose (ml) per animal
4. Determine the total amount of product required
(Number of 500 ml containers)

SEE PAGE 6 – 13 FOR THE ANSWER.

Drug Interactions and Adverse Reactions

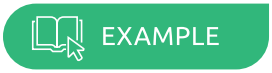
Unexpected results can result when various animal health products are mixed or used together. Some occurrences are beneficial, others have no effect, and some are detrimental.

Drug Incompatibilities/Compatibilities

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

Note: Under no circumstances should drugs be mixed 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 associated with the use of antimicrobials.

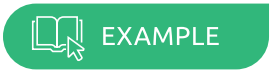


ADDITIVE EFFECT

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, Borgal and Trimidox 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.



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 LA-200®, Bio-Mycin® 200) 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, as it is extra-label. When in doubt, contact your veterinarian.

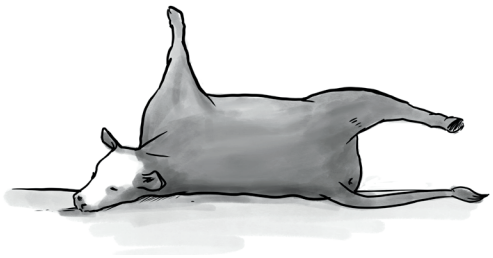
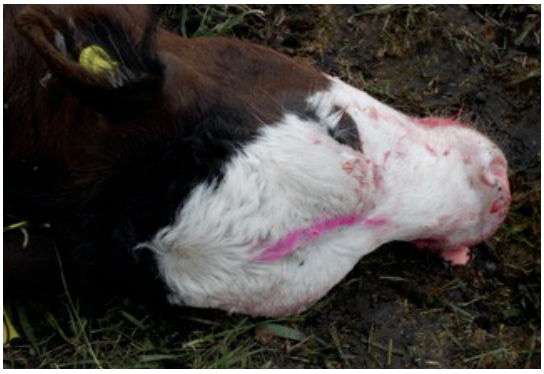
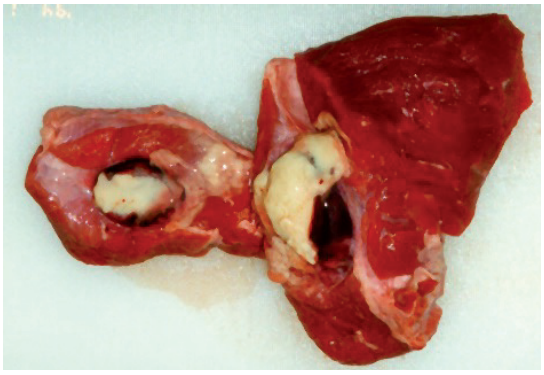


FIGURE 5 ADVERSE DRUG REACTION



ANAPHYLACTIC REACTION



INJECTION SITE ABSCESS

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 (e.g., Health Canada – Veterinary Drug Directoriate).

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, start to mouth breathe and foam at the mouth, 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. These anaphylactic reactions can occur with any drug, including vaccines. It is always important to have epinephrine and dexamethasone on hand if you need to treat a drug reaction.

Injection site swellings may occur because of unsanitary injection techniques, improper restraint prior to injection, irritating drugs, large volumes in a single injection site (> 10 ml per injection site).

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 many injection site swellings in cattle after using a particular product, contact your veterinarian for advice.

Withdrawal Times

You must always follow the drug meat 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 which should contain a meat withdrawal period from CgFARAD. When in doubt, contact your veterinarian.

EXERCISE

IDENTIFYING INFORMATION ON THE LABEL

See the following labels in Appendix 3:

- Mastitis preparation (Cefa-Lak®)
- Injectable antimicrobial (Borgal®)
- Water medication (Sulfa)
- Feed additive (Rumensin™ Premix)
- Disinfectant (Hibitane® Disinfectant)
- Parasiticide (Ivomec® Pour-On)
- Vaccine (Tasvax®)

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

	CEFA-LAK	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 (antimicrobial, 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: 1 mL/50 kg body weight = 0.02 ml/kg

Weight of animal: 1350 lb (614 kg)

Dose required per animal: 0.02 mL x 614 kg = 12.28 mL body weight

Frequency: daily for 3 days

Total amount of product required: 12.28 mL x 3 days x 10 steers = 368.4 mL

Answers to Exercise on Page 6 – 9 (bottom)

Step 1: 450 lb/2.2 = 205 kg

Step 2: 205 kg falls between table weight range of 181-270 kg

Step 3: Chart says to give 6 ml

Step 4: 120 animals x 6 mL = 720 ml, so need 2 x 500 ml containers

Answers to Exercise on Page 6 – 12

	CEFA-LAK	BORGAL	SULFA	RUMENSIN	HIBITANE	IVOMEC	TASVAX
Indications	mastitis						
Species and Size of Animals	Lactating cows						
Amount to Administer	10 mL						
Route of Administration	into each quarter						
Warnings (withdrawal)	4 days						
Restrictions	not in lact. cows						
Safety Issues	Allergic reaction						
Type of Product (antimicrobial, vaccine, etc.)	antimicrobial						
Storage	10-25 C						
Quantity	12 x 10 mL syringe						
Approval #	DIN						
Prescription Product?	Yes						
Ingredients	Cephaprin sodium						
Manufacturer	Boehringer						

Module 7

Antimicrobials

Objectives

After you have completed this introductory module, you will be able to:

- Explain how antimicrobial resistance happens
- Describe your role in the responsible 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 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 responsible drug use to ensure that antimicrobials continue to be available for use and are effective in the treatment of infectious bacterial diseases (see Figure 1).

FIGURE 1 CATTLE PRODUCER

FIGURE 2 VETERINARIAN

FIGURE 3 VET GIVING AN INJECTION

Responsible Drug Use by Producers

- Implement good animal husbandry practices, such as those described in the Canadian Beef Code of Practice, that include herd health, nutritional, biosecurity, are on-farm food safety, welfare, and beef quality assurance programs. These programs focus on disease prevention, accurate disease diagnosis, animal identification, and proper disease treatment and control.
- Follow veterinary recommended processing/vaccination protocols, 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.
- Attend continuing education meetings/workshops to learn about new advances in disease diagnosis, prevention, treatment, and control, as well as about other management practices and technologies that can improve animal health and welfare, growth performance, and economic sustainability.
- Participate in research on animal health, as well as in industry surveillance projects/programs on animal health and antimicrobial use and resistance, to monitor trends of AMU and AMR over time to see if changes in your management, vaccination, diagnostic, or treatment practices are needed, not only for the benefit of your beef operation, but for the good of the entire beef industry.
- Stay current on the use of alternatives to antimicrobials to reduce disease risks and antimicrobial usage, such as vaccines, changes in management practices e.g., low stress weaning, low stress cattle handling and transport, earlier more accurate disease diagnostics, and improvements in production or growth, such as alternate feeds and feeding strategies and pre or probiotics.

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

Prudent Drug Use by Veterinarians

From: Canadian Veterinary Medical Association

Following are some guidelines for the prudent use of antimicrobials in cattle:

1. Veterinarians should concentrate their efforts on assisting clients with management, immunization, housing, nutritional programs, and improved diagnostics 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 research) 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 research 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 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 range of activity and known efficacy against the pathogen(s) 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, if this can be achieved while still protecting the health and safety of animals under their care.

k. Veterinarians should not use compounded antimicrobial formulations as they are not approved drugs and do not meet the manufacturing standards of a Health Canada approved drug.

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

m. Veterinarians should periodically monitor herd pathogen antimicrobial susceptibility and therapeutic responses, especially for routinely employed treatments (e.g., metaphylactic antimicrobials), 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 culled or isolated from the remainder of the herd or humanely euthanized if recovery or salvage slaughter is not feasible.

o. Veterinarians should employ prophylactic or metaphylactic use of antimicrobial drugs, based on a group, source or production unit risk 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.

5. 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.

6. 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.

7. Veterinarians should provide written guidelines to clients, including processing/vaccination and treatment protocols that are herd/feedlot specific, based on disease risks, and describe conditions and instructions for antimicrobial use on the farm.

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

- 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.

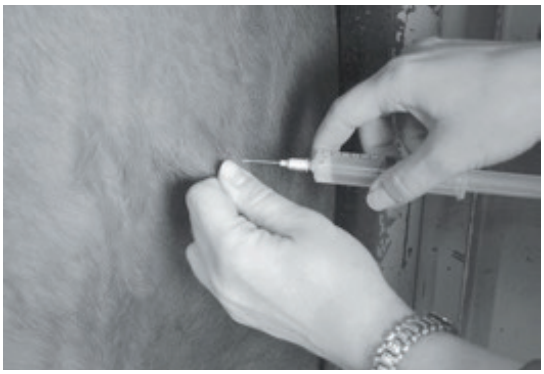


FIGURE 1 PROPER SUBCUTANEOUS INJECTION

FIGURE 2 PROPER CATTLE RESTRAINT

VIDEO

Proper Subcutaneous and Intramuscular Vaccination Techniques:

youtu.be/B4WlOlQffWw

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).

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.
- Good injection techniques reduce injection site lesions, ensure product efficacy, and reduce human safety issues from needle pricks/drug reactions. Contact your medical doctor if concerned.

Injection Sites and Methods of Product Administration

- Give all intramuscular and subcutaneous injections in the neck as per manufacturer's label directions or veterinary prescriptions (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 Figures 3 to 5 for proper SC techniques).

FIGURE 3 PROPER SUBCUTANEOUS INJECTION TECHNIQUE USING THE TENTED METHOD

FIGURE 4A. PROPER SUBCUTANEOUS INJECTION USING THE TENTED OR TWO-HANDED METHOD.

FIGURE 4B. PROPER SUBCUTANEOUS INJECTION TECHNIQUE USING THE SINGLE HANDED METHOD

FIGURE 5 TILMICOSIN SITE

Choose the Right Needle.

- Smaller gauge for smaller animals
- Larger number on needle is smaller gauge i.e., 18-gauge smaller diameter than 16-gauge

- Use products that can be given by routes other than by injection if available (e.g., pour-on ivermectin versus injectable ivermectin (other than when raining or wet snow).
- 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 (Figure 4 is SQ technique).
- Inject into a clean site on the animal.
- Use the tented method to give subcutaneous injections, other than for Micotil™/Tilcomed®/Hymatil™. For these products, follow product label directions on single handed SC injection techniques and ask your veterinarian for syringes with a needle shroud to reduce needle pricks and accidential injections. Never use pressurized or remote delivery devices e.g., Stock Doctor, Medi-Dart gun, to administer tilmicosin or Excede® 200.

Discard all used needles in a sharps container.

Micotil™/Tilcomed®/Hymatil™

Proper Tilmicosin Administration Procedures

- Properly restrain animals prior to administering drug.
- 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 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.
- Ensure proper disposal of sharp needles and syringes.
- Use the shrouded needle Micotil syringe, for added safety, if available
- Never use pressurized or remote Delivery Devices to administer tilmicosin.

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

Needle Use

- Use clean needles (see Figure 6 for damage caused by dirty needle).
- Do not leave needles in the bottle after use.
- Always insert a clean needle in the bottle to prevent contamination of the drug or vaccine.
- 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 5-10 head (research shows get dull after 5 uses).
- Don't straighten or re-use bent needles.
- Avoid the 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 most drugs require that no more than 10 cc (mL) be injected per site. Refer to the fact sheet on Remote Delivery Devices for further information.

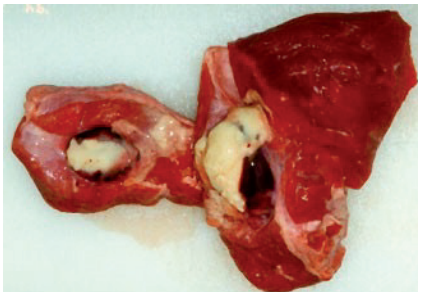


FIGURE 6 ABSCESS CAUSED BY DIRTY NEEDLE OR INJECTING THROUGH DIRTY HIDE

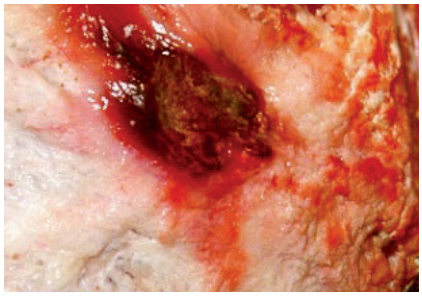


FIGURE 7 DAMAGE CAUSED BY MEDI DART GUN 28 DAYS AFTER INJECTION

- Use luer slip rather than luer lock syringes to reduce risk of broken needles in beef.
- Discard used needles in a sharps container (see Figure 8). A sharps container is a separate pail or empty bottle (e.g., empty 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. Else incinerate on farm.
- 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 in beef.

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).

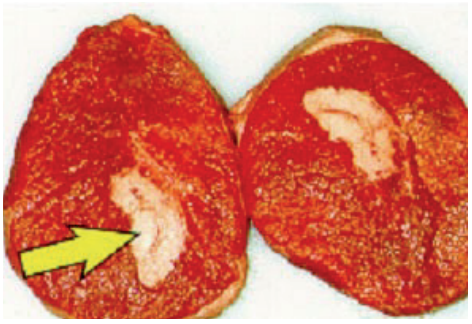


FIGURE 9 INJECTION SITE LESIONS IN ROUND STEAKS (THIGH MUSCLE)

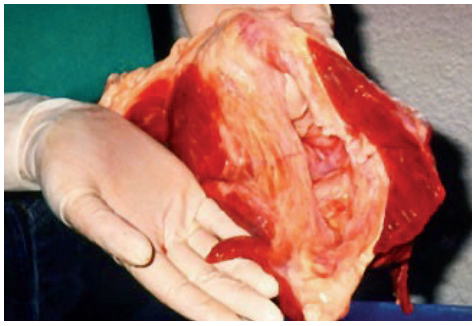


FIGURE 10 INJECTION SITE SCAR TISSUE

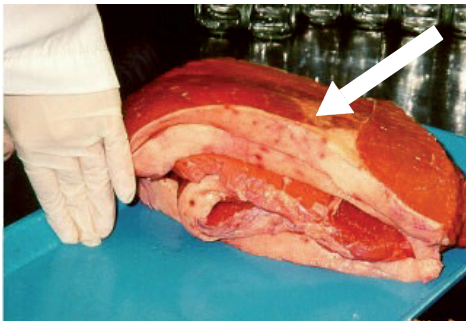


FIGURE 11 DAMAGE TO SEVERAL STEAKS FROM ONE INJECTION (ARROW SHOWS INJECTION SCAR)

Ten Rules of Good Injections.

1. Properly restrain animal prior to injection
2. Follow manufacturer's label directions
3. If choice on label is IM or SC route of injection, inject SC
4. Inject IM/SC only in the neck area
5. Use the right size needle for the size of animal
6. Use sharp clean needles/syringes
7. Change needles every 10 head
8. Inject no more than 10 ml per injection site
9. Space multiple injections a few inches apart
10. Keep good records

Fact Sheet

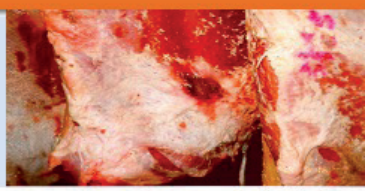
Remote Delivery Devices to Administer Animal Health Products

What are remote delivery devices?

- Devices that deliver animal health products at a distance
- Examples
  - Pneumatic dart gun
  - Stock doctor medicator
  - Medi-dart

There are beef quality, food safety, animal welfare, and human safety concerns with their use.

- Increased risk of injection site lesions and scars creating tough beef.
- Increased risk of violative drug residues at injection site.



- Drugs meant to go SC go IM, reducing drug effectiveness.
- Lower dose or no drug administered to animal; thus, fail to respond to treatment.
- Drug administered in non-approved site e.g., hip, rib, flank.
- Technique more painful and stressful to animal at injection site and if hit head, eyes, spine, or limbs, causing severe permanent injury.
- Increased risk of broken needles or dart imbedded in animal.
- Illegal to use with certain drugs due to human safety risks e.g., tilmicosin (Micotil™, TilcoMed®, Hymatil™).
- Illegal to administer Excede® 200 this way – must administer SC at base of ear.
- Don't weigh animal, so either underdose (drug less effective) or overdose drug ($$ or inaccurate drug withdrawal periods).
- Inaccurately identify animal, so increased risk of drug withdrawal issues.
- Health Canada-Veterinary Drug Directorate approval may be required to administer drug with these devices.

When should these devices be used?

- Remote delivery devices should only be used on pasture when there are no handling facilities available and for human safety issues.
- Do not use in moving animals or if animal further than 20 feet away.
- Never use in feedlot cattle in pens.
- Never use to administer vaccines or drugs other than select antimicrobials that require only 1 treatment (dart).
- Only use to treat clinically sick individual animals.

How best should these remote delivery devices be used to reduce animal health, welfare, beef quality, food safety, and human safety risks?

- Read and follow manufacturer's directions on how to safely use the remote delivery device.
- Select the right size of dart for the drug and animal and the right charges to reduce risk of animal injury, broken needles, and embedded darts in animal.
- Target practice using the device before using on cattle to ensure drug administered in the proper location, which is the neck area for all SC and IM injections.
- Request a prescription from your veterinarian, along with a treatment protocol to determine what antimicrobials are safest and most effective to administer to cattle with various diseases using these remote delivery devices, with the least risk of injection site lesions and drug residues.
- Keep good individual treatment records and indicate when these devices are used to administer drugs.
- Never use tilmicosin (Micotil™, TilcoMed®, Hymatil™) or Excede® 200 with these devices (extra-label, violative drug residues, human safety risk).
- Pick up and maintain remote delivery device darts/guns after use.

Dealing With Broken Needles

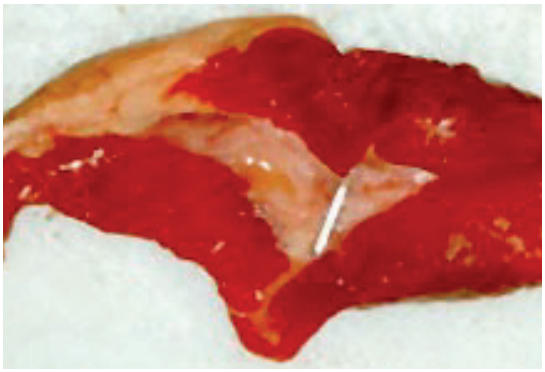


FIGURE 12 SITE OF BROKEN NEEDLE

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 he or she can find and remove it.
- If your veterinarian cannot remove the needle, identify the suspect animal, record in your processing, vaccination, 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.

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 have completed this introductory 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.

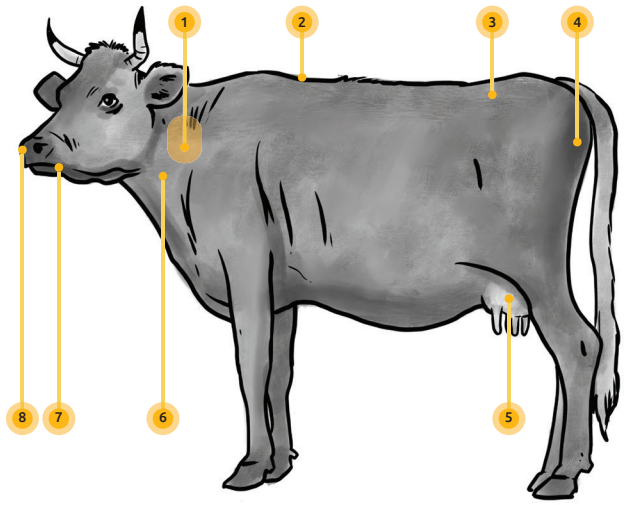


FIGURE 1 DRUG ADMINISTRATION ROUTES

1. Intramuscular or Subcutaneous
2. Topical
3. Epidural
4. Intravaginal or intrauterine
5. Intramammary
6. Intravenous
7. Mouth (Oral)
8. Intranasal

MORE INFO

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

Intravenous Injection (IV)

Intravenous injection is an important route of administration in the lactating dairy cow, but not as common in beef cattle (see Figure 2). This is the route of choice for the administration of large volumes of pharmaceuticals to avoid muscle damage and ensure consistent withdrawal times. It is also the route to get a drug into the animal's system immediately, in the case of severe disease, or the route is required for the administration of certain drugs, such as sodium iodide, and Banamine®. 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 the most common site of injection. The same concerns regarding a clean injection site, proper size of clean sharp needles, and proper restraint are even more important for IV injections.

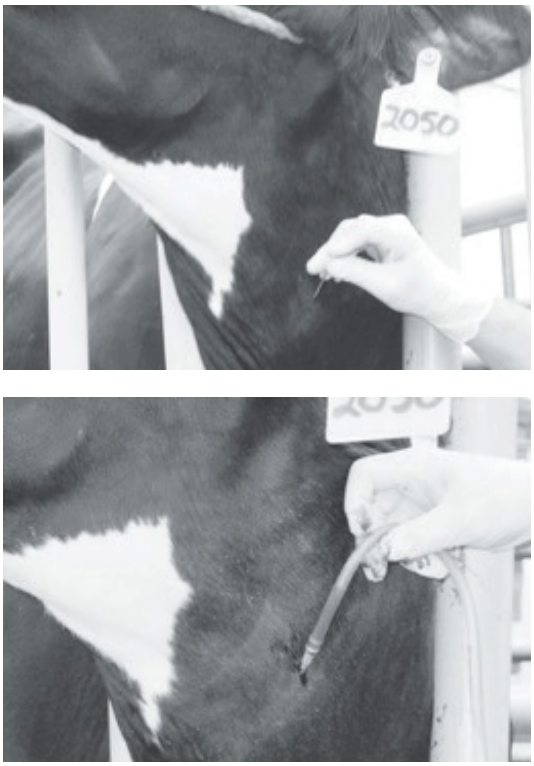


FIGURE 2 INTRAVENOUS INJECTION

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.
- 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 stripping out the milk, 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.
- Record all treatments to ensure cattle are not shipped to slaughter prior to the meat withdrawal period on the drug label or veterinary prescription.

INTRANASAL ADMINISTRATION OF A VACCINE TO A CALF A SPRING PROCESSING.

MORE INFO

Vaccinating Your Beef Herd:
youtube.com/playlist?list=PL16s0XbcZVIurNHLqLLB58yc-cwdvush-

FIGURE 4 INTRANASAL ROUTE

FIGURE 5 ORAL BOLUS

Intranasal

The intranasal route has been used as a delivery method for some vaccines such as IBR and BRSV. 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 or by hand or with a Nordfork device if calf roped (see Figure 4) or if a baby calf on the ground, holding the head firmly. Insert the cannula into the nostril and spray the intranasal vaccine into one or both nostrils as per label directions. The intranasal route has the advantage of being non-invasive and effective in young calves with maternal antibody. Use the intranasal route only for those products approved on the label to be given this route.

Oral (liquid, 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 cattle to slaughter.

Boluses may be given with a balling gun (see Figure 5), insoluble drugs or liquids may be administered by drench, or larger volumes may be given through a stomach tube (see Figures 6 and 7). Check the stomach tube and balling guns to make sure the ends do not get sharp, as they can cut the food pipe (esophagus) of the animal and cause serious issues. Clean the tube and gun after each use with hot water/disinfectant to reduce the spread of infectious diseases, e.g., Salmonella.

FIGURE 6 STOMACH TUBE

Good Management Practices for Oral Medications

- Properly restrain the animal's head before giving the bolus or drench.
- For cattle over 6 months of age, 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 cannot 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.

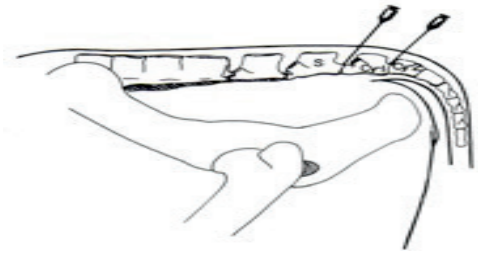
FIGURE 7 ORAL ADMINISTRATION

Intrauterine and Intravaginal

These two routes have been used to administer antimicrobials and hormones to resolve reproductive tract infections and to enhance reproductive performance. The infusion of the uterus with antimicrobials was a common method of treating endometritis and pyometra in cattle for many years; however, it has been used less regularly based on new research suggesting it harms future conceptions, and with the introduction of prostaglandins and other therapeutic agents effective in emptying the uterus. The delivery of antimicrobials to the uterus is accomplished using an infusion pipette passed through the cervix and the administration of a liquid antimicrobial through a syringe and IV tube. Intrauterine boluses may also be used in the early postpartum uterus; however, their efficacy is questionable. Tetracycline and penicillin products have been used most, but since these antimicrobials are absorbed systemically, proper meat drug withdrawal times must be respected.

Although antimicrobials 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.

FIGURE 8 TOPICAL APPLICATION



LOCATIONS FOR EPIDURAL INJECTIONS E.G., LIDOCAINE FOR A TAIL BLOCK. ENSURE PROPERLY TRAINED BY YOUR VETERINARIAN BEFORE ATTEMPTING.

MICRO-MACHINE AND FEED MEDICATION ROOM.

Topical

Topical medications (such as the common pour-on endectocides, eg., Ivomec Pour-on, Bimectin™ Pour-On) are absorbed through the animal's skin into the bloodstream. These products are liquids that are applied onto the animal's back (see Figure 8). 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, or they may not absorb well, if the weather is < 15 C , or the animal's hide is full of mud/manure 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 e.g., Cyclospray® and teat dips are not absorbed systemically and exert their effect on the local area where they are applied.

Read and follow label directions to determine which products can be used on pregnant cows and withdrawal times for marketing cattle. In addition, be aware that nitrofurazone was 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. Do not put products on the eye that are not approved and labeled for such use.

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.

Epidural

Injections (administered into the spinal column) are generally only given by a veterinarian because of the expertise required and the risk of spinal injury if improperly given. They are used in the lumbar area to freeze the rectal and vaginal area most typically.

Feed Medications

Medications are used in rations to improve animal performance and health. As with any form of medication, improper handling of medicated feed additives (MFAs) can contribute to drug residue problems. Thus, you must monitor the handling of feed medication additives closely to prevent residue violations and record all medications administered, including over-the-counter products, like ractopamine, as most MFAs, other than

ionophores, have a meat withdrawal period. A production area that has a higher incoming feed residue risk is large single sourced feed ingredients from brokers of non-standard supplies.

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

MORE INFO

For a list of medicating ingredients permitted in cattle feed, see the CMIB brochure in Appendix 1 and at:

www.inspection. gc.ca/english/anima/ feebet/ mib/drguse1e.shtml

Compendium of Medicating Ingredients Brochures (CMIB)

The Compendium of Medicating Ingredient Brochures (CMIB) is the document that lists those medicating ingredients permitted by Canadian feed regulation to be added to livestock feed. This document specifies the species of livestock, the level of medication, the directions for feeding , warnings and cautions including meat withdrawal periods, and the purpose for which each medicating ingredient may legally be used. As well, it includes the brand names 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, to comply with the Feed Regulations. The sole exception is feeds prepared according to a veterinarian's feed prescription , which is required for all extra-label use of medicated feed additives in the CMIB..

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.*

Receiving Medicating Ingredients

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

EXERCISE

CHECKLIST FOR RECEIVING AND HANDLING INGREDIENTS

- ✓ I purchase only approved feed medications and feed ingredients 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 quality specifications of incoming feed ingredients. I purchase feed additives from reputable suppliers that follow good manufacturing practices and have a HAACP or 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, moisture, and toxin contamination e.g., ergot.
- ✓ 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, or add them into my micro-machine bins as needed.
- ✓ 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 management practices to avoid residue violations in your meat.

FIGURE 9 FEED MIXING EQUIPMENT

Mixer Validation and Scale Calibration

Make sure you take the following precautions with your feed mixing equipment (see Figure 9).

- Conduct a mixer efficiency test at least once annually or after a major repair, 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 and other feed ingredients are added. For feedlots, it is recommended that these checks occur at least weekly. 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 the smallest weights used.
- 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, micro hoppers, 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.

MORE INFO

MIXER TESTING

inspection.canada.ca/animal-health/livestock-feeds/inspection-program/developing-mixer-performance-testing-procedures/eng/1370381600539/1370381604148

MORE INFO

SCALE CALIBRATION

inspection.canada.ca/animal-health/livestock-feeds/inspection-program/scale-and-metering-device/eng/1377727237539/1377727310274.ca

Feed Mixing

Use the following checklist to assess your current feed mixing practices

EXERCISE

CHECKLIST FOR MIXING INGREDIENTS

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

- ✓ I document each load of feed made (i.e., batch mix sheets), including the date, time, type, and amount of each ingredient added, and link to which pens of cattle this batch of feed was fed.
- ✓ 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 a feed 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 micro-machines are used on farm, I have procedures in place, with trained staff, on how to ensure the correct product is added into each bin and each bin is properly labeled.
- ✓ For on-farm micro-machines I ensure these machines are calibrated, kept clean, and maintained regularly.
- ✓ I keep an accurate running inventory which is reconciled frequently of products added into my micro-machine.

Feeding

To ensure that you avoid any drug residue violations for beef, 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; else use separate feed equipment or use flush material e.g., barley or silage to clean feed equipment various medicated feeds as required by CFIA to prevent drug residues.
- 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.
- Label medicated supplement storage bins or areas with the medication. If using a micro-machine, ensure "bins" are labeled and each MFA (Medicated Feed Ingredient) is stored in its original container/bag with the label from the manufacturer.
- Based on your nutritionist's recommendations, retain samples of the mixed medicated rations 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.

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

FIGURE 10. HORIZONTAL LINE IN THE EAR REPRESENTS THE BEST LOCATION ON THE OUTSIDE SIDE OF THE EAR FOR AN IMPLANT I.E., MIDDLE ONE-THIRD.

MORE INFO

IMPLANTING WITH RALGRO

www.youtube.com/watch?v=YcLRo87oR14

MORE INFO

IMPLANTING

www.youtube.com/watch?v=PXxbIKewIBE

www.youtube.com/watch?v=vwy9qTFJrAA

Feed Record Keeping and Review

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

- Document all critical feeding procedures, including maintenance and cleaning.
- Develop a written training manual and train personnel on all feeding procedures, including a feed recall procedure.
- Ensure that ration sheets are clear, legible, and verified before use.
- Store ration formulations, the sequences of feed production and distribution records for at least two years, or longer if required by CFIA Feed Regulations.
- Keep up to date feed medication procedures and record keeping requirements. Review at least once annually with your nutritionist.
- Closely monitor all drug withdrawal times for feed medications and cross check records before shipment of live cattle to slaughter.
- Use a checklist on a regular basis to verify the process. This helps keep management knowledgeable and verifies any feed procedures.

Implanting

Implanting is used to maximize performance of growing beef cattle. In consultation with your veterinarian, develop an implant program that works for the outcome or end product you wish the cattle to accomplish (i.e., performance (ADG, DMC), carcass weight, 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-$140 per head pending implants used.

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 10). Never place implants anywhere other than the ear. 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. Keep implants out of 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 a % of cattle a few weeks post implanting to monitor technique. Set a target to achieve of properly placed implants, typically 95%+.
- Ask implant pharmaceutical companies to assist with training and implant check monitoring programs.
- To save time, do an implant check when running animals through the chute for any other reason, such as treating sick animals.

Steps in Implanting

Follow the steps below to ensure proper implanting technique.

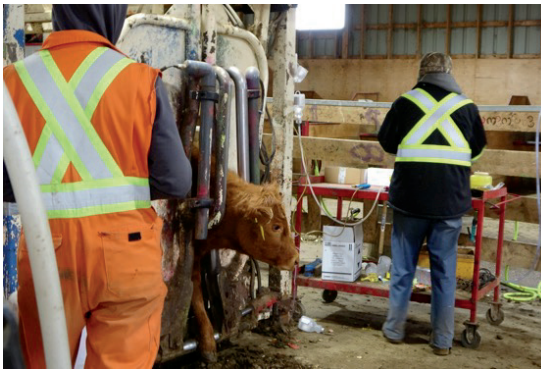
Implanting Steps

1. Ensure that ears are clean and dry.
   - Scrape mud and manure off with a knife
   - Make scraping and brushing movements all in one direction with the hair, towards outer tip of ear to avoid re-contaminating area being cleaned.
   - If ear is dirty, brush clean with a brush dipped in disinfectant e.g., dilute Hibitane, and dry with a disposable paper towel.
2. Plan for the last implant. Right-handed people have an easier time implanting in the left ear; thus, this ear should be left for additional implants. Do not implant in the same ear that a CCIA or management tag is being placed and ensure CCIA or management tag is not placed in the implant site.

MORE INFO

https://www.youtube.com/watch?v=IKD0XW-8uBc

3. Stay at least one finger width away from ear tags and tag first, then implant if you must use the same ear. Avoid previous implant spots or any abnormal tissue.
4. Fully insert needle, 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.
5. If using a fixed needle gun e.g., Ralgro 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.
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, at least every 200 head, and sooner if dirty. Disinfectants that can be used include diluted chlorhexidine. Wear disposable gloves and keep hands as clean as possible between each animal.
7. Ensure implant gun is maintained and the implant needle is sharp. Have a spare implant needle and implant gun available.
8. Pinch the incision site shut after an implant has been placed.
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.



VACCINATING AND IMPLANTING CATTLE.

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 have completed this introductory 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 and standards for a 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).

Schedule G and N drugs are never sold over the counter. They may be dispensed by a veterinarian under a 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.

All antimicrobials used in animals, other than Class 4 antimicrobials, are prescription drugs and require a written veterinary prescription. This is a federal regulatory requirement from Health Canada – Veterinary Drug Directorate. Prescription antimicrobials include" penicillin, sulfa drugs, tetracyclines, macrolides like Draxxin® and its generics, Micotil™ and its generics, Zactran® and Zuprevo®, as well as all florfenicols, like Nuflor® and its generics or Resflor®, all flouoroquinolones, like Baytril, A180®, and Forcyl®, as well as tylosin, virginamycin, or tetracycline in the feed, or tetracycline or sulfa drugs in the water. Other types of pharmaceuticals, which are not antimicrobials, may also require a prescription, such as hormones or diuretics. Class 4 antimicrobials, which do not need a veterinary prescription if used according to label directions, are ionophores which are used in the feed, such as monensin, lasalocid, and salinomycin. Some anticoccidial drugs, if used according to label directions, such as decoquinate and amprolium, do not need a veterinary prescription.

Veterinarians must have a Valid Veterinary-Client-Patient-Relationship (VCPR) before prescribing medications for animals.

A veterinarian prescription is required to use drugs in an extra-label manner. Extra-label is using a drug in any way that is different than the manufacturer's drug label, including for a different species, for a different disease, at a different dose, route of administration, frequency, or duration, as well as using compounded drugs or active pharmaceutical ingredients (APIs).

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 withdrawal period from CgFARAD that will not result in drug residues in beef.

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 longer than a 1-year time period
- Writing scripts for large quantities of drugs
- Including multiple drugs on the same script.

Veterinarians must:

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

A veterinary prescription is required to use drugs in an extra-label manner. **Extra-label** is using a drug in any way that is different than the manufacturer's drug label, including for a different species, for a different disease, at a different dose, route of administration, frequency, or duration, as well as using compounded drugs or active pharmaceutical ingredients (APIs).

MORE INFO

Refer to Appendix 2 for details on feed prescriptions.

Feed Prescriptions

Prescription feeds are medicated feeds that are manufactured according to a written prescription by a licensed veterinarian. Veterinarians must prescribe feed prescriptions for all prescription antimicrobials used in feed and they may prescribe levels or combinations of medications different from those approved in the CMIB (Compendium of Medicating Feed Ingredients). 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 meat 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 species and amount of medicating ingredients
- Directions for use, including duration of feeding
- Warning and caution statements including meat withdrawal period
- 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 meat 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.

Module 11

Handling of Drugs

Objectives

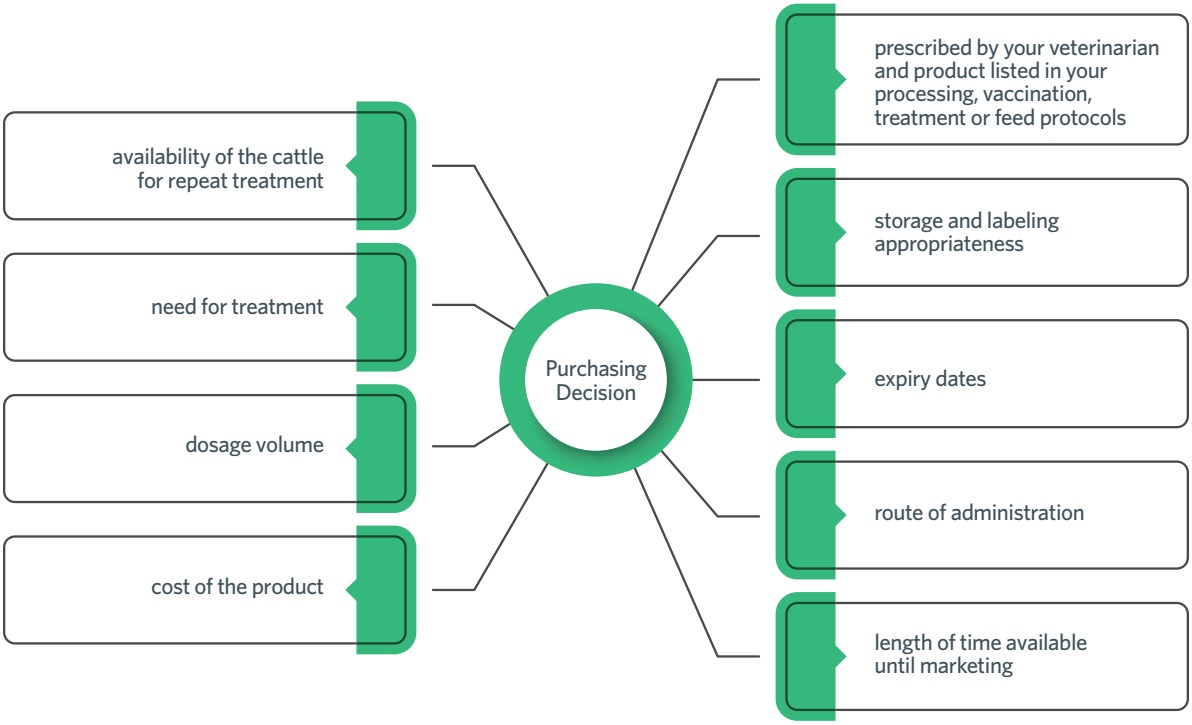
After you have completed this introductory module, you will be able to:

- 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 beef 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.

To select the best product, consider the following.



Do not use compounded or home-made drug combinations since their safety and efficacy are uncertain.

Storing Drugs

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, sunlight, 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, depending on the product, before use, and after the package is opened, may need to be stored in the refrigerator. Once implant packages opened, if you have left-over implants, check how long they are effective. Many not effective after 3 months after the implant package was opened. Check the label.

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

Drug Storage Requirements

- Store drugs in a secured farm office or utility room away from feeding areas.
- Store vaccines and drugs requiring refrigeration temperatures (2 to 8 C) in a fridge, with a thermometer, and monitor temperatures regularly.
- Protect drugs from temperature fluctuations and seal against dust, insects, and sunlight.
- Ensure drug storage area is clean, organized, and locked.
- Ensure all drugs are stored according to label directions for temperature, humidity, and light.
- Check expiry dates and discard expired product, including product reconstituted or opened, as these also have expiry periods. Contact your veterinarian on how to disposed of expired animal health products.
- Keep a drug inventory and reconcile actual amounts with theoretical amounts at least once annually, or more frequently if using a lot of products or there are drug inventory concerns eg., feedlot.
- Do not store vaccines in the door of the fridge as the temperature is not cold enough.
- Do not unthaw frozen vaccine and use or use vaccine if the fridge temperature is over 10 C. Contact your veterinarian on how to dispose of this damaged vaccine.

MORE INFO

TYPES OF VACCINES AND MIXING
youtu.be/oETQ_UMAZ6U

MORE INFO

ADMINISTERING VACCINES
https://youtu.be/B4WlOlQffWw

Mixing Drugs

Cattle drugs are marketed in a variety of forms including solutions, suspensions, powder and diluent, boluses, medicated feed additives, and ointments. After standing in storage, the vaccine or drug 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, are usually no more than two hours. Other reconstituted products may be frozen to extend the duration of their therapeutic activity, if label directions indicate e.g., Excenel® Sterile Powder.

If you combine different antimicrobials together in a bottle or syringe that is 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.

For the drugs that must be reconstituted, such as modified-live vaccines, transfer needles are often provided to maintain the sterility and activity of the final product.

MORE INFO

VACCINE TRANSPORT AND STORAGE:
https://youtu.be/oETQ_UMAZ6U

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. If transporting vaccines, ensure they are stored in a closed cooler with frozen ice packs, and ensure bottles are not directly on the frozen ice packs because this can destroy the vaccine or adjuvant (carrier) in the vaccine. Do not put vaccine coolers on the back of your truck in the summer, as they will get too hot, or freeze in the winter. Vaccine must never be frozen or heated as it will become ineffective.

Some refrigerators can be quite variable in their temperatures. Small electric beer countertop fridges are not suitable for long term storage. It is important to have a thermometer in the fridge and check the temperature daily to ensure it stays between 2 C to 8 C.

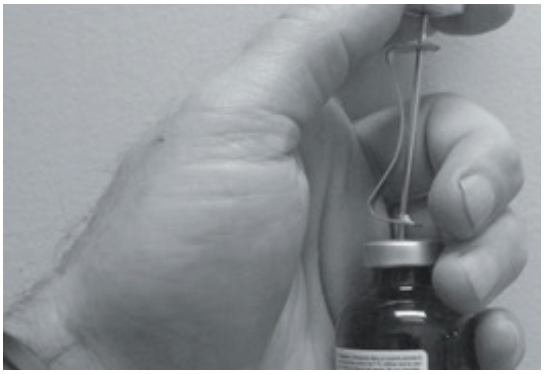


FIGURE 1 VACCINE BEING RECONSTITUTED

MORE INFO

For more information on proper vaccine handling:

https://youtube.com/playlist?list=PL16s0XbcZVIurNHLqLLB58yc-cwdvush-

MORE INFO

For more information on vaccines, including core vaccines to use in beef cow-calf herds, and disease infographics, please go to:

https://www.wecahn.ca/wecahn-networks/beef-network/beef-cow-calf-vaccine-project

Handling Modified-Live Vaccines

Modified-live vaccines are suspensions of live viruses or bacteria 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).

Proper Handling of Modified 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 (i.e., 1-2 hours). 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 inside the 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 like 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 or intranasally, and no vaccines are to be administered intravenously. Give all injections in the neck, never in the rump or hip.

FIGURE 2 CLEANING SYRINGES WITH HOT WATER

FIGURE 3 DISINFECTANTS LEAVE RESIDUES

MORE INFO

CLEANING VACCINE EQUIPMENT
https://youtu.be/HspCXNlpizQ

MORE INFO

VACCINE DISPOSAL
https://youtu.be/GNY0kjMLcOo

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 at 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 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 clean water, ideally 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 fridge or freezer ideally to prevent bacterial and mold growth.

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

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

EXERCISE

DRUG HANDLING CHECKLIST

Drug Storage Unit

- ✓ I have located the drug storage unit and fridge 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 drug containers against dust, insects and light.
- ✓ I use separate, labeled shelves for other species (e.g., horse, dog).

Drug Labeling

- ✓ I read and understand all drug labels.
- ✓ I follow all label directions and veterinary prescriptions.

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, including vaccines, together in the same syringe.
- ✓ I dispose of frozen or hot vaccines
- ✓ I only mix 1 bottle of MLV vaccine at a time and use it up before I mix another bottle.
- ✓ I use MLV vaccines within 1-2 hours after they are reconstituted.

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

Handling and Disposing of Pesticides

FIGURE 4 PESTICIDE

Pesticides are used to destroy pests of any sort and deserve special attention regarding safety and effective handling and disposal (see Figures 4 and 5). The common pesticides used in 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. Always follow label directions. Under the Pest Control Products Act, it is forbidden to use pesticides in an extra-label manner.

FIGURE 5 DISPOSAL OF FLY TAGS

Good Management Practices for Handling Pesticides

- Ensure pesticides are clearly labeled.
- Handle and store pesticides according to label directions.
- Use pesticides according to label directions. It is illegal to use pesticides “extra or off label”. A veterinarian may not prescribe pesticides for extra-label use.
- 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, 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.

EXAMPLE

SAFETY DATA SHEET

Micotil 300

Section 1. Identification

Product identifier : Micotil 300
Product code : Not available.
Other means of identification : AH0230; Tylosin, 4A-O-de(2,6-dideoxy-3-C-methyl-a-L-ribo-hexopyranosyl) -20-deoxo-20-[(3R,5S)-3,5-dimethyl-1-piperidinyl]-, phosphate (1:1) (salt); Tilmicosin Formulation; Tilmicosin Phosphate Formulation; Elanco AH0230 Micotil 300 Injection (Tilmicosin)

Relevant identified uses of the substance or mixture and uses advised against
Identified uses : Veterinary pharmaceutical.
Uses advised against : None known.

Company Name : Elanco Canada Ltd.
150 Research Lane
Suite 120
Guelph, ON CA N1G 4T2
Telephone number : Not Available
Emergency telephone number : CHEMTREC International: 00 1 703-527-3887 (24 hours)
Email : elanco_sds@elancoah.com
Transportation Emergency telephone number : CANUTEC (24 HR) 1-613-996-6666

Section 2. Hazard identification

Classification of the substance or mixture : RESPIRATORY SENSITIZATION - Category 1
SKIN SENSITIZATION - Category 1
SPECIFIC TARGET ORGAN TOXICITY (REPEATED EXPOSURE) (heart, liver) - Category 2

GHS label elements
Hazard pictograms :

Signal word : Danger
Hazard statements : May cause an allergic skin reaction.
May cause allergy or asthma symptoms or breathing difficulties if inhaled.
May cause damage to organs through prolonged or repeated exposure. (heart, liver)

Precautionary statements
Prevention : P280 - Wear protective gloves.
P284 - Wear respiratory protection.
P260 - Do not breathe vapor.
Response : P314 - Get medical advice or attention if you feel unwell.
P304 + P340 - IF INHALED: Remove person to fresh air and keep comfortable for breathing.
P342 + P311 - If experiencing respiratory symptoms: Call a POISON CENTER or doctor.
P362 + P364 - Take off contaminated clothing and wash it before reuse.
P302 + P352 - IF ON SKIN: Wash with plenty of water.
P333 + P313 - If skin irritation or rash occurs: Get medical advice or attention.

Product name : Micotil 300 CA : ENGLISH
Version 10.01 Date of revision: 26 March 2021 Date of previous issue: No previous validation 1/11

FIGURE: EXAMPLE OF MATERIAL SAFETY DATA SHEET (MSDS)

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.
As well, it is useful to have a copy of the Material Safety Data Sheet (MSDS) for each drug you use on farm. Ask your veterinarian or pharmaceutical supplier for a copy. Some of the MSDS can be found on the internet for the pharmaceutical company.

EXAMPLE

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 and MSDS for quick reference. Ensure that everyone knows where to find this file. Some of the vaccines, drugs and pesticides can cause serious health problems.

EXAMPLE

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.

EXAMPLE

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 who 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 (syringes available with shields over the needle e.g., Micotil syringes) • Use safe injection technique • Take care when reinstalling a shield on a needle • Properly restrain cattle prior to injection	• Wash the affected area with soap and water • Disinfect the injection site • Check label warnings for required action • If tilmicosin, have someone take you to Emergency immediately, with a copy of the drug label.
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

FIGURE 6 SHARPS AND BIOHAZARD CONTAINER

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.

EXAMPLE:

Alberta Poison Control Centre 1-800-332-1414
944-1414 (local call in Calgary)

Other Safety Precautions

- Never slaughter an animal for meat or sell an animal until the drug or vaccine meat 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, dustpan 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.

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

Certification and Surveillance Programs

Objectives

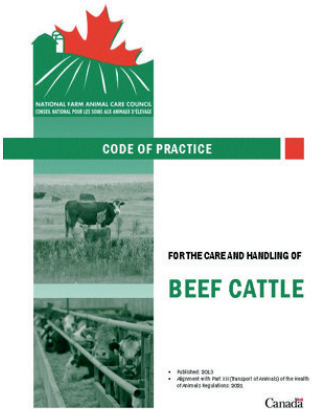
After you have completed this introductory module, you will be able to:

- Describe the core animal health procedures and records related to beef medicine in the Canadian Beef Code of Practice, national beef on-farm food safety program (Verified Beef Production Plus), Ontario Corn Fed Beef Program, Canadian Roundtable of Sustainable Beef, and the National Cattle Feeders' Association PAACO (Professional Animal Auditor Certification Organization) Certified Feedlot Audit.
- Describe how the Canadian Cow-Calf Surveillance Network (C3SN) and the National Feedlot AMU/AMR Surveillance Program relate to beef medicine.
- Describe the roles of AHC (Animal Health Canada), NFACC (National Farm Animal Care Council), and CAHSS (Canadian Animal Health Surveillance System) in relation to beef medicine.

We can't manage what we can't measure. The beef industry has led the development of national, regional, and provincial certification and surveillance programs to measure and monitor production practices, whilst continuing to improve how cattle are raised for beef, to provide reassurances to customers, that Canadian beef is safe, nutritious, and high quality, and cattle are raised with care.

Canadian Beef Code of Practice

MORE INFO



www.nfacc.ca/codes-of-practice/beef-cattle

FIGURE: CANADIAN BEEF CODE OF PRACTICE

The Canadian Beef Code of Practice is a nationally developed guideline for the care and handling of beef cattle. The Beef Code promotes sound acceptable management and welfare practices for housing, health and care, transportation, and other animal husbandry practices. The Codes are based on current science and involve the input of the beef industry and technical experts. Requirements in the Canadian Beef Code that are related to Beef Cattle Medicine include:

- ✓ Valid Veterinary-Patient -Client Relationship
- ✓ Development of a disease prevention and herd health program, to reduce disease risks and need for drugs
- ✓ Monitoring of cattle for disease and prompt treatment or care
- ✓ Consultation with a veterinarian if unusual or high incidence of disease
- ✓ Development of a treatment protocol with veterinarian, including relapses, and when to stop treating, including culling, timely euthanasia
- ✓ Monitoring of treatment responses and reassessment if treatment fails
- ✓ Maintenance of accurate animal health management records

Verified Beef Production Plus

The Verified Beef Production program is the national beef on-farm food safety program based on HAACP (Hazard Analysis Critical Control Points), that is recognized by CFIA (Canadian Food Inspection Agency). The program was expanded (+) to include other indicators in the CRSB program for animal health and welfare, biosecurity, beef quality, environment, and labor. Requirements in the VBP+ program related to Beef Cattle Medicine include:

- ✓ Use all products according to label directions, or in the case of extra-label use, according to a written veterinary prescription.
- ✓ Store animal health products according to label directions.
- ✓ Make sure syringes and other equipment deliver the intended amount of product.
- ✓ Record all individual animal or group treatments on a permanent record, including deaths/euthanasia.
- ✓ Securely restrain cattle to avoid potential bent or broken needles.
- ✓ If a broken needle occurs, identify the suspect animal and record on a permanent record. If the animal is being sold, the next owner must be informed of the broken needle in the specific animal.
- ✓ If treating with the wrong product or dosage, identify the animal, record the incidence, contact a veterinarian, and record actions taken.
- ✓ Records and written veterinary prescriptions are kept for two years.
- ✓ Feed delivery person is informed of unloading requirements for medicated feed or ingredients, including intended storage area or bin.
- ✓ Medicated ingredients and medicated feed have a separate and clearly labeled storage area or storage bins.
- ✓ Delivery of medicated ingredients or medicated feed is cross-checked with ration or prescription.
- ✓ Copies of written and signed veterinary feed prescriptions are available for all extra-label use of feed or water medications.
- ✓ Equipment used for medicated feed or water is cleaned, flushed or a system of sequencing is used to avoid cross-contamination of non-medicated feed.

FIGURE: FEEDING CATTLE.

- ✓ Scales used to mix medicated feed are tested for accuracy at least once per year.
- ✓ Medications are mixed according to label directions and documented ration. Actual amounts mixed are recorded.
- ✓ A system is in place to avoid delivery of medicated feed to unintended cattle.
- ✓ Staff and/or family members understand mixing and feeding procedures for medicated feed and what to do if an error occurs.
- ✓ Medicated feed or water is fed according to label directions or written veterinary prescription.
- ✓ Amount of medicated feed fed per pen or group is recorded.
- ✓ Cattle pens are clearly identified to ensure medicated feed rations are delivered to the right cattle.
- ✓ Reprocessed or flushed feed is used or disposed in a manner to prevent contamination of other feedstuffs.
- ✓ If feed is mixed with the incorrect amount of medication or wrong product, record the incidence, consult a veterinarian, and record actions taken.
- ✓ If medicated rations or water are fed to the wrong cattle, record the incidence and actions taken.
- ✓ A record check for all drug withdrawal requirements and broken needles is completed before cattle are shipped to slaughter. This check is identified in a record including date.
- ✓ If cattle contain a broken needle, next owner is informed including identification of the animal.
- ✓ If cattle are inadvertently shipped without meeting withdrawal times, next owner or slaughter plant is informed and this contact date/ information is recorded.
- ✓ If cattle are being shipped or sold other than directly to slaughter, and they have not met their drug withdrawal times, the next owner is informed.
- ✓ Herbicides, pesticides, solvents, treated seed and petrochemicals are stored, used, and disposed to avoid contamination of cattle feed, soil or water.

COWS AND CALVES ON RANGE.

- ✓ Herbicides and pesticides used on pasture or hay fields within the operation are applied according to label directions and usage is recorded.
- ✓ Records regarding herbicide use on pasture are checked before cattle are allowed access.
- ✓ If a potential cattle exposure has occurred, an expert (e.g., veterinarian or toxicologist) is contacted for recommended procedures or actions. Actions taken are recorded.
- ✓ Persons know how to handle unwanted chemical spills and have material available to clean up or manage as appropriate.
- ✓ Staff are trained.

MORE INFO

ontariocornfedbeef.com

Ontario Corn Fed Beef Program

The Ontario Corn Fed Beef Program is a quality assurance program managed by the Ontario Cattle Feeder's Association, to enhance and maintain sustainable beef production in Ontario. The program focuses on cattle identification, record keeping, and good production practices in food safety and beef quality. Requirements in the program related to Beef Cattle Medicine include:

- ✓ Establish good management practices that prevent disease, reduce the use of medications, and reduce the risk of excessive residues
- ✓ File, sign, and date all OCFB QA Program records
- ✓ Follow label instructions
- ✓ Identify treated animals
- ✓ Ensure proper storage
- ✓ Keep current on herd management practices
- ✓ Report adverse reactions to their veterinarian or supplier of the drug
- ✓ Record all withdrawal times and file for one year after slaughter
- ✓ Must work with veterinarian and have a vet-client-patient relationship
- ✓ Medicines must have Drug Identification Number (DIN)

FEEDING CATTLE IN A BARN IN ONTARIO.

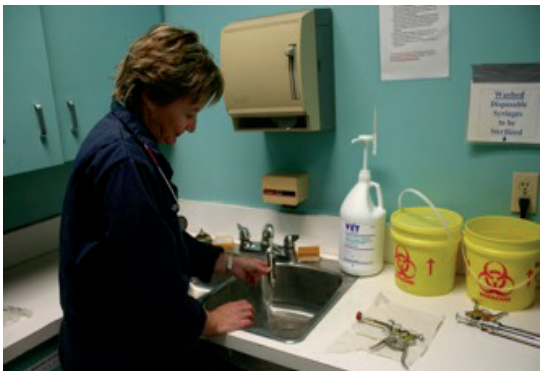
VETERINARIAN AND PRODUCERS REVIEWING DRUG LABEL DIRECTIONS.

ANIMAL HEALTH PRODUCT STORAGE

- ✓ Medicines should only be purchased through a veterinarian
- ✓ Check expiry date and method of storage before purchasing
- ✓ Purchase products recommended by your veterinarian
- ✓ Store and transport medicines according to label directions
- ✓ Purchase only enough product that can be used in a reasonable period
- ✓ Keep only reasonable amounts of medicine on hand based on storage capacity and numbers of incoming cattle
- ✓ Purchase vaccines in dosage/volume sizes to accommodate the size and numbers of groups to be immunized within one hour for live vaccines or within one day for killed vaccines
- ✓ Use SQ or IM route of administration if indicated on label directions
- ✓ Be aware of expiry dates on medicines and discard outdated product
- ✓ All Medically Important Antimicrobials (MIAs) for veterinary use will be sold by prescription only
- ✓ Establish a designated area for storage of all drugs and keep a record
- ✓ Use an operating refrigerator that maintains a temperature of 4° Celsius (locked or in a secure area) or a clean, dust-free, dry, cool, dark cabinet
- ✓ Check product label for instructions on storage
- ✓ Consider light (amber bottle means light sensitive) temperature or humidity
- ✓ Always store opened containers according to label instructions
- ✓ Use transfer needles to download from larger container
- ✓ Do not use the same needle to inject an animal then withdraw more drug from the container
- ✓ Use caution when cleaning bottle tops (alcohol can cause problems with antibiotics and modified live vaccines)
- ✓ Do not store bottles with needle in rubber stopper
- ✓ Ensure that expiry dates are recorded
- ✓ Remember the expiry date refers to shelf life prior to opening product. Discard all expired product (see disposal section)

DO NOT LEAVE INJECTION NEEDLES IN THE TOP OF DRUG OR VACCINE BOTTLES AS THIS CONTAMINATES THE PRODUCT.

SHARPS CONTAINER.



CLEAN SYRINGES AT THE END OF EACH DAY USING HOT POTABLE WATER. STORE CLEANED SYRINGES IN A CLEAN TUBAWARE CONTAINER OR PUT IN A ZIPLOCK BAG AND STORE IN THE FRIDGE, AWAY FROM DUST AND DIRT.

- ✓ Record the date the product was opened (preferably on product)
- ✓ Check the shelf life of reconstituted products (vaccines)
- ✓ Mix only enough vaccine to treat small groups of cattle at a time. The effectiveness of live vaccines mixed beyond one hour is questionable
- ✓ Assign and train one employee to be responsible for following protocol for receiving, inventory control, storage, and handling of medicines
- ✓ Do not expose live vaccines to heat, disinfectants, or sunlight
- ✓ Use caution when handling medicines.
- ✓ Products are often packaged in glass bottles that can break and cause the contents to come in contact with the handler
- ✓ Be knowledgeable of product label instructions. Create a reference binder or file of labels and package inserts for all products used
- ✓ Keep an inventory of all medicines stored on-farm
- ✓ Inventories help determine how much product you have on hand vs. how much you need based on the number of incoming animals
- ✓ Inventories can help determine when products are likely to become outdated and disposal is required
- ✓ Inventories are needed for accurate invoicing information and shrinkage calculations
- ✓ Inventories may be needed as a defense in a legal liability case or as a trace back mechanism if there is a problem (anaphylactic reactions or drug residues)
- ✓ Veterinarians, animal owners, and animal caretakers all share responsibility for minimizing the use of antimicrobial drugs to conserve drug efficacy
- ✓ Antimicrobial treatment procedures should be designed to maximize therapeutic efficacy while minimizing bacterial resistance
- ✓ Antimicrobials used in animals must only be used within the confines of a valid Veterinary-Client-Patient Relationship (VCPR)
- ✓ All users of antimicrobials must be educated in the proper use of antimicrobials including administration, handling, storage, disposal, and record keeping

- ✓ Veterinarians have a responsibility to educate staff, clients, and other animal handlers on the prudent use of antimicrobials and ensure such training occurs
- ✓ All antimicrobials, even those not purchased directly through, but rather on a prescription from a veterinarian, should be used within the confines of a valid (VCPR)
- ✓ Animal owners and caretakers should be instructed in and encouraged to implement management, immunization, housing, and nutritional programs that prevent the incidence of disease and therefore antimicrobial use
- ✓ Antimicrobials should only be used therapeutically if a pathogen is demonstrated or anticipated to be present, based on clinical signs, history, necropsy examinations, laboratory data (including resistance testing), and if the pathogen is expected to respond to treatment
- ✓ The need for antimicrobials provided to prevent an anticipated disease outbreak should be regularly assessed.
- ✓ Antimicrobials should only be used when an animal(s) is determined to be at risk and evidence indicates that such usage reduces morbidity and/or mortality
- ✓ Surgical protocols should emphasize strict aseptic technique instead of prophylactic antibiotics
- ✓ Antimicrobial selection should be based on the known or suspected target organisms, their knowledge of the drug, and other factors such as host immunocompetence. Antimicrobials that specifically target the pathogen should be selected over systemic therapy when appropriate
- ✓ Antimicrobials with unique mechanisms of action or novel resistance profiles in human medicine should not be used in veterinary medicine, particularly food animals, unless the antimicrobials by use or sensitivity testing have been shown to be ineffective and use of the antimicrobial is considered to be lifesaving to the animal
- ✓ Antimicrobials approved for the treatment of the diagnosed condition must be followed whenever possible
- ✓ Antimicrobials should be used for the shortest time period required to reliably achieve a cure. This minimizes exposure of other bacterial populations to the antimicrobial
- ✓ Appropriate withdrawal times for antimicrobials used in animals intended for food must be adhered to

STORE ANIMAL HEALTH PRODUCTS AS PER LABEL DIRECTIONS.

FIGURE: READING DRUG LABELS.

FIGURE: INJECTING CATTLE

- ✓ Animals treated with antimicrobials may shed resistant bacteria into the environment. If possible, steps should be taken to minimize environmental contamination
- ✓ Antimicrobial products should be handled and stored properly. This includes proper disposal to avoid environmental contamination by the antimicrobial drug
- ✓ Always read the product label and follow directions. Always administer in the neck
- ✓ Wash hands before and after handling medications
- ✓ Ensure proper safety procedures are followed (protective clothing, etc.)
- ✓ Use a clean transfer needle (if loading syringe from large container)
- ✓ Do not leave the needle in the bottle after use
- ✓ Sharp needle disposal receptacle to be available and used
- ✓ Clean injection site area on animal
- ✓ Use smallest size to minimize tissue damage and leakage, but large enough to avoid easy breakage.
- ✓ Restrain animal (safer for you and animal)
- ✓ Use sharp, sterile needles and change frequently (ideally, change needle after every animal or after every 10 animals)
- ✓ Remove air from syringe so correct dosage can be given
- ✓ Avoid giving injections through skin or hide that is dirty
- ✓ Choose different sites when giving multiple injections over a period of time or when dividing doses (can impact on product efficacy and food safety)
- ✓ Check that needle is not in a blood vessel when inserting, pull back on plunger and check for blood
- ✓ SQ always be used preferentially where label allows
- ✓ Do not inject more than 20 mm in SQ depth
- ✓ To reduce chance of scar tissue or abscess in valuable cuts of meat, give intramuscular injections in the neck (ahead of the shoulder point)
- ✓ If you break a needle, permanently mark the animal. Mark and record the location on OCFB QA shipping form and notify trucker when shipping

FIGURE: CLEANING SYRINGES

- ✓ Discard any bent needles (do not try to straighten them)
- ✓ Wash and sterilize syringes after use (or discard)
- ✓ Automatic syringes require cleaning, maintenance, and calibration
- ✓ Use boiling water for cleaning equipment (caution: do not use disinfectants for modified-live vaccine products)
- ✓ Always read the label for withdrawal times before administering any medications and be careful not to inadvertently administer two or more products containing the same drug.
- ✓ Remember that injecting medications into sites other than those the label recommends is extra-label and can lead to:
  - ✓ Increased tissue reaction; delayed absorption
  - ✓ Lower than desired drug levels or apparent failure of the drug to cure animal
  - ✓ Drug can stay in animal longer, leading to residues, allergic reactions, shock or death
- ✓ Be sure to always MARK (or identify) the treated animal
- ✓ RECORD the treatment and the withdrawal time on the animal treatment record.
- ✓ Medicines must have Drug Identification Number (DIN)
- ✓ Medicines must only be purchased through a veterinarian
- ✓ Check expiry date and discard outdated products in an approved manner
- ✓ Purchase products recommended by your veterinarian
- ✓ Transport medicines under same conditions required for storage (check label)
- ✓ Only products approved for intravenous use should be given by this route
- ✓ Because absorption is instantaneous, IV injections are used when a drug's immediate effect is required
- ✓ IV injections must be given slowly. Rapid injections can cause fatal shock reactions. The chance of a severe allergic reaction is also higher with IV injections

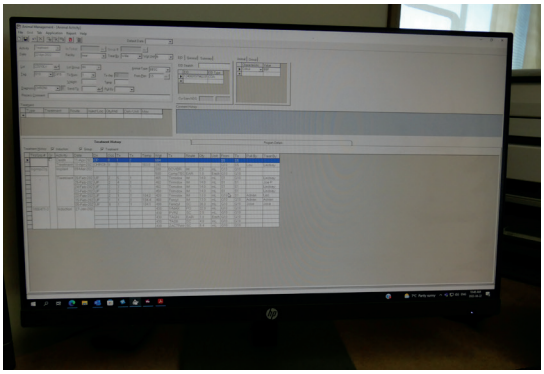


FIGURE: FEEDLOT WITH COMPUTER.

- ✓ Substantial amounts (500 ml or greater) are run in by gravity with the use of IV tubing
- ✓ Smaller amounts are given by syringe
- ✓ All drugs for IV injection must be sterile as the body's natural defense mechanisms against infectious agents are bypassed
- ✓ Only a trained individual should attempt an intravenous injection. (Consult your veterinarian to learn this technique)
- ✓ Any medicine given intravenously has the potential to adversely affect the circulatory system
- ✓ Care must be taken when using drugs capable of penetrating the skin. A drug with the ability to penetrate animal hide, can also penetrate human skin
- ✓ Veterinarian guidance and written instructions for product extra label usage must be filed and kept on-farm until product has expired or been disposed of
- ✓ Monitor proper withdrawal times to ensure appropriate shipping dates (note on Animal or Group Treatment Record)
- ✓ Record all group/individual animal treatment on the appropriate forms – Animal Treatment Record, Group Treatment Record
- ✓ Medications/health products must have a DIN and be purchased through a veterinarian
- ✓ Dispose of outdated products in a safe manner
- ✓ Review product inventory at least twice yearly
- ✓ Maintain records of all veterinary prescriptions (including medicated feed)
- ✓ Record all animal health product purchases on the appropriate forms – Animal Health Product Inventory Record
- ✓ Biomedical waste must be handled and disposed of to prevent contamination
- ✓ Properly dispose of used needles and leftover or expired medication
- ✓ Proper restraint is used to prevent injury when implanting and to allow for proper placement
- ✓ Make sure the ear for implant is clean and that the implanting needle is cleaned between each use

FEEDING CATTLE.

MIXER MACHINE ROOM WITH MICRO MIXER AND MEDICATED FEED ADDITIVES.

- ✓ Dirty conditions and poor technique can cause abscesses, prevent the active ingredient from being absorbed, and can cause loss of the pellet
- ✓ Always read the instructions before implanting. Ensure the implant gun is well maintained and the implant needle is sharp. Carefully pinch the implant site shut after the implant has been placed
- ✓ To ensure the proper use and storage of all medicated feed, producers must work with their feed representative\
- ✓ Veterinarians may prescribe levels or combinations of drugs different from those approved and set out in the CMIB. This is a form of extra-label drug use. The veterinarian assumes full responsibility for the use of medication
- ✓ Mixing feed in a sequence is one method to help ensure antibiotics will not accidentally contaminate finishing feeds
- ✓ Flushing the mixer after mixing medicated feeds is another method to protect finishing feeds and is especially important with stationary mixers. Flushing means preparing non-medicated feed to "flush" through your system, helping to clean out residual medicated feed. Since this feed will contain medication, it should be added to the previously prepared medicated feed
- ✓ Store feed additives in a clean manner and in their original packages if possible
- ✓ Ensure there is proper labeling on all additives, ingredients, and feed bins
- ✓ Check mixer parts for wear. Regularly clean the mill, mixer, mill area, bulk bins, augers, and feeders
- ✓ Always clean feed equipment thoroughly after using medicated feed
- ✓ Equipment used for medicated water is cleaned, flushed or a system of sequencing is used to avoid cross-contamination of nonmedicated feed (this includes portable water troughs, which are to be cleaned or removed when usage is complete)
- ✓ If feed/water is mixed with the incorrect amount of medication or wrong product, record the incidence including the date, specific details of mixing error and pen number if fed to cattle, and consult a veterinarian for advice on next steps

FEED MILL AT FEEDLOT

- ✓ If the incorrectly medicated feed/water is fed to cattle or if properly medicated feed/water is fed to the wrong cattle, ensure the medication error is also recorded in the group treatment and animal treatment records with the withdrawal time and date recorded for shipping reference purposes
- ✓ If the incorrectly mixed feed has not yet been fed to cattle and the veterinarian advises to dispose of the incorrectly mixed medicated feed/water, then it must be disposed of by moving it into a manure storage and covered with manure so it will not be reused or consumed by other animals including birds
- ✓ Record all actions taken and keep on file for one year.

MORE INFO

www.crsbcertified.ca

CHECKING FEEDLOT CATTLE TO FIND SICK ANIMALS.

Canadian Roundtable for Sustainable Beef Program

The CRSB is a community of industry stakeholders, from ranchers and feedlot producers to food service, which has developed a certification program to foster continuous improvement and sustainable practices across the Canadian beef value chain. The certification scheme was developed with the following objectives in mind:

- to provide a tool to recognize sustainable practices in beef production and processing against robust sustainability standards,
- to support the beef supply chain in meeting its sustainable commitments, and
- to build consumer confidence in the sustainability of Canadian beef by providing certified (3rd party-verified) assurances, backed by science, delivered through logos and marketing/label claims.

The Sustainable Beef Production Standard covers indicators in beef production, which covers cow/calf and backgrounding farms and ranches, and feedlot operations. One of the 5 key elements in the Standard is Animal Health and Welfare. Outcome-based indicators have been developed that are based on science and expert opinion. The indicators within this Standard that are related to Beef Medicine include:

- ✓ Animal health and welfare is monitored on an ongoing basis to ensure prompt and appropriate treatment or care as per the relevant National Farm Animal Care Council Code of Practice.
- ✓ Animal health products are responsibly used and through a valid vet/client/patient relationship when required.

RECORDING INDIVIDUAL ANIMAL TREATMENTS IN A CHUTE SIDE COMPUTER.

- ✓ Processes shall be in place to store and use animal health products according to label directions and/or vet prescription.
- ✓ Documented vaccination, parasiticide, and treatment records (group and/or individual).
- ✓ Documented veterinary health protocols for vaccination, parasite control, and treatment of sick cattle.
- ✓ Worker training on accurate disease diagnosis and proper use of animal health products provided by veterinarian.
- ✓ Documented herd health program developed in collaboration with veterinarian.
- ✓ Individual animal health treatment records are kept.
- ✓ Producer and veterinarian work together and regularly monitor disease risks to improve animal health through good animal husbandry practices.
- ✓ Collaborative efforts are made to improve animal health or husbandry through innovative methods, such as participation in research.

✓ Efforts shall be made to appropriately dispose of animal health products and related equipment.

- ✓ Used bottles/containers and expired drugs shall be disposed according to local availability.

✓ Operation contributes to the production of safe food.

- ✓ Operation shall work with licensed bovine veterinarian when unintended product or dosage is given to determine appropriate drug withdrawal period.
- ✓ Suspect broken needles and other physical risks shall be managed appropriately to avoid entry into the food chain.
- ✓ Ruminant and non-ruminant feed shall be stored separately, and separate equipment shall be used for mixing.
- ✓ Withdrawal periods of animal health products shall be followed prior to shipping cattle to slaughter.
- ✓ On-farm food safety training has been completed (e.g., through industry association programs or veterinary clinics).
- ✓ Operation can demonstrate with documented records how it has checked the shipments of animals to slaughter to withdrawal periods have been met.

MORE INFO

CANADIAN FEEDLOT AUDIT GUIDE HAS BEEN REVISED AND CERTIFIED BY PAACO (PROFESSIONAL ANIMAL AUDITOR CERTIFICATION ORGANIZATION) AS MEETING THEIR AUDIT STANDARDS IN ANIMAL WELFARE.

nationalcattlefeeders.ca/feedlot

FEEDLOT CATTLE IN WESTERN CANADA.

PAACO Certified Canadian Feedlot Audit

Following requests from federal processors, the National Cattle Feeders' Association, along with feedlot producers, welfare specialists from Cargill, JBS, and Tyson Foods, and feedlot veterinary and animal science experts, developed a national audit standard in animal health and welfare based on requirements in the Canadian Beef Code of Practice and other food safety and beef quality indicators deemed important in feedlot production. The Audit Program was reviewed by the Professional Animal Auditor Certification Organization and was certified by them in 2015. Since then, the program has been annually reviewed, updated, and recertified by PAACO based on their welfare and audit requirements. The feedlot audit program has been recognized by the National Farm Animal Care Council (NFACC) as meeting the requirements in the Canadian Beef Code of Practice and following their assessment process. CRSB has recognized the standard as fully meeting their indicators in animal health and welfare, beef quality and food safety. Requirements in the feedlot audit that are related to Beef Medicine include:

- ✓ Feedlot has a written feeding program as required by CFIA Feed Regulations, which includes, but is not limited to mixer tests, scale testing, medicated equipment cleanout and/or segregation procedures, management of flush materials, feed recall procedures, prohibition on receiving and feeding prohibited materials i.e., banned ruminant meat/bone meal, segregation procedures for feeds of other species.
- ✓ Feeding records are documented as per CFIA Feed Regulations, including ration formulations, batch mix sheets, feed delivery sheets, veterinary feed prescriptions, medicated feed equipment cleanout procedures, mixer validation tests, scale calibration records
- ✓ Feedlot has a training program for feed staff
- ✓ Feedlot cattle are identified with a CCIA/ATQ RFID ear tag or USDA EID tag, and missing tags are replaced
- ✓ Feedlot has a valid veterinary-client-patient relationship (VCPR) with a licensed provincial practitioner to ensure animal health and care and responsible animal health product use and food safety
- ✓ Feedlot has a documented Antimicrobial Stewardship Protocol/Policy that was developed with their veterinarian to ensure responsible drug use, monitoring, and continual improvement
- ✓ Feedlot has a documented Processing Protocol describing all procedures for new incoming cattle, including animal identification, vaccinations, deworming/lice treatment, implanting (if done),

FEEDLOT CALF SICK WITH PNEUMONIA.

DAILY MONITORING OF CATTLE FOR HEALTH, SICKNESS, AND INJURIES.

metaphylaxic drugs (if used), branding (if done), dehorning (if done), castrating (if done), aborting (if done), weight sorting, and any other procedures

- ✓ Feedlot has documented Treatment Protocol developed by their veterinarian. Treatment Protocol includes:
  - ✓ requirement to monitor cattle on an ongoing basis and provide prompt treatment or care
  - ✓ how to prevent, treat, control, and manage common disease and health problems in feedlot cattle, including but not limited to respiratory disease, lameness including non-ambulatory cattle, injuries, bloats, grain overloads, bullers, pregnant and calving heifers, heat stress, newborn calves, broken horns, castration infections, prolapses
  - ✓ what to do if an animal does not respond to initial treatment, including how to treat relapses (reoccurences), and when to euthanize or cull animals
- ✓ Feedlot has a written Chronic and Railer Protocol on how to manage chronically ill animals and railers
- ✓ Feedlot cattle are observed daily for health, sickness, and injuries by trained competent staff
- ✓ Feedlot has individual animal or group processing records (vaccination, implanting, deworming)
- ✓ Feedlot has individual animal treatment and mortality records, and veterinary prescriptions for all prescription drugs, including those in the feed
- ✓ If performance enhancing technologies (e.g., implants, beta-agonists) are used, they are used as per label directions and/or veterinary prescriptions
- ✓ Feedlot management and/or veterinarian monitor drug usage and disease rates and the veterinarian is notified to investigate any unusual or high disease occurrences (treatment, death) and/or drug use; advising the producer how to reduce losses by examining animals and reviewing existing biosecurity, health (treatment, mortality), and feeding protocols and records
- ✓ Feedlot has a documented Cattle Health Product Management Protocol and records for the receiving, handling, administration (as per BQA guidelines), storage, and inventory management of animal health products

DRUG ROOM IN A FEEDLOT.

SHIPPING FED CATTLE.

- ✓ Feedlot has a Broken Needle Protocol and related records to ensure the next owner of cattle, another producer or processor, is informed of a potential broken needle in an incoming animal to ensure beef safety
- ✓ If feedlot staff replace rectal/vaginal/uterine prolapses, spay heifers, or perform other surgical procedures, pain control is used, and the procedure is performed by trained competent staff
- ✓ Feedlot has written Surgical Protocol with pain control for all surgical procedures performed by feedlot staff, including but not limited to spaying, rectal, vaginal and uterine prolapse repair, claw amputations, rumen fistula
- ✓ If the feedlot feeds heifers and aborts them, it has a written Abortion Protocol
- ✓ If the feedlot castrates' bulls, they use pain control for bulls older than 6 months of age
- ✓ If the feedlot castrates' bulls, they have approved, well maintained equipment for castrating
- ✓ If the feedlot dehorns cattle, they use pain control when dehorning cattle, in consultation with their veterinarian
- ✓ Feedlot has a Shipping Protocol that specifies procedures to ensure that no cattle are shipped to slaughter with violative drug residues
- ✓ Feedlot has shipping records to verify that all shipped cattle, including railers and emergency slaughters, are checked and pass drug withdrawal periods prior to shipment to slaughter, to ensure beef safety
- ✓ Feedlot has documented Biosecurity Procedures, which includes:
  - ✓ policy and management of visitors to the feedlot
  - ✓ segregation and management procedures of sick animals i.e., sick and chronic pen management
  - ✓ cleaning or segregation of machinery and equipment used to move non-ambulatory, diseased or dead animals
  - ✓ cleaning of re-usable veterinary equipment e.g., vaccine syringes, stomach tubes disposal of sharps in a sharp's container
  - ✓ disposal of expired animal health products as per provincial regulations
  - ✓ cleaning of cattle handling facilities

- ✓ how to manage suspected foreign animal diseases (this may be included in the Emergency Response Plan instead)
- ✓ disposal of dead animals as per provincial regulations
- ✓ site security
- ✓ staff biosecurity training
- ✓ Feedlot has a Visitor Log as part of their Biosecurity Program

✓ Feedlot has an animal health and biosecurity training program for staff developed and implemented by their veterinarian

MORE INFO

C3SN

research-groups.usask.ca/c3sn

Canadian Cow-Calf Surveillance Network (C3SN)

The Canadian Cow-Calf Surveillance Network is a network of beef cow-calf herds across Canada that benchmark productivity data and provide prevalence estimates of production limiting diseases in Canada. The network also collects data on antimicrobial use, animal welfare practices, and biosecurity practices. The network provides critical baseline information to the beef industry and researchers to assist with the prevention and management of disease risks, as well as emerging concerns on antimicrobial use and resistance.

MORE INFO

www.canada.ca/en/public-health/services/surveillance/canadian-integrated-program-antimicrobial-resistance-surveillance-cipars.html

Canadian Feedlot AMU/AMR Surveillance Program

The Canadian Feedlot AMU/AMR Surveillance Program is a collaborative research and surveillance project between CIPARS (Canadian Integrated Program for Antimicrobial Resistance Surveillance), national and provincial beef cattle industry associations, feedlot veterinarians, and feedlot producers across Canada. It started as a research project in 2019, funded by federal and provincial government grants and industry groups. In 2022, it became integrated into a long-term surveillance program within CIPARS funded by core federal dollars and additional industry dollars and in-kind support.

The surveillance program is collecting nationally representative antimicrobial use data at feedlots from randomly selected closed lots of cattle during the year and collecting feedlot veterinary antimicrobial dispensing data from the same yards, to measure and monitor

FEEDLOT CATTLE.

CULTURE PLATE WITH BACTERIAL COLONIES.

antimicrobial usage in Canadian feedlot cattle and demonstrate appropriate antimicrobial use.

Pathogenic bacteria of importance in Bovine Respiratory Disease (BRD) are being collected from a sample of cattle at arrival processing and after they have been on feed to determine changes in antimicrobial sensitivity over time in the yard, as well as over years of the program. Enteric bacteria are also being collected from randomly selected pens of cattle 30 days prior to slaughter to measure their antimicrobial sensitivity and monitor changes over time.

AMU/AMR Surveillance in Canadian Feedlot Beef Cattle Project will:

- Provide representative estimates of AMU/AMR in the finishing feedlot sector
- Monitor AMU/AMR trends in feedlots over time
- Investigate associations between AMU and AMR on a targeted basis
- Provide participating feedlot producers and veterinarians with individualized data to support on farm decision making

Findings of the national feedlot AMU/AMR surveillance program will be provided to industry stakeholders in annual CIPARS reports on the Canadian Feedlot AMU/AMR Surveillance program website. As well, additional communication tools will be made available to Canadian feedlot producers and veterinarians. For further information on the program, refer to their website: https:/cfaasp.ca.

MORE INFO

ANIMAL HEALTH CANADA

animalhealthcanada.ca

Animal Health Canada

Animal Health Canada (AHC) provides leadership in building a collaborative, multi—government and animal industry partnership model that clarifies the respective roles, responsibilities, and accountabilities of each partner in implementing an animal health strategy for Canada. The vision of AHC is a sustainable agriculture and agrifood sector strengthened by an inclusive industry partnership protecting the health and wellbeing of farmed animals. Through consultation, gathering, analyzing, and interpreting evidence, and discussion, AHC Working Group participants generate recommendations and develop new partnerships in support of a results driven governance model for emergency response and animal health issues. Their recommendations will focus on:

- alignment of respective organizational accountable, as well as legal and financial systems, for program delivery in areas such as disease surveillance, biosecurity standards and disease prevention, diagnostic capacity building, animal traceability/premises ID systems, emergency response operations, financial recovery framework, human resource capacity building, and animal health scientific infrastructure

MORE INFO

CANADIAN ANIMAL HEALTH SURVEILLANCE SYSTEM

https://cahss.ca/

- leading initiatives to bring industry and government bodies (federal, provincial, and territorial) into partnership(s) regarding resource sharing and actions to be taken to maintain an evergreen animal health strategy for Canada for the management of programs in priority areas as agreed.

Canadian Animal Health Surveillance System (CAHSS)

CAHSS is a network of animal health surveillance networks focused on sharing animal health information. Data is collected and analyzed to stay on top of trends, minimize potential impacts, and gain further insight.

Individual network groups are self-organizing and linked through CAHSS by a shared principles and vision, which is improved animal health outcomes, better response to emerging diseases, heightened consumer and public health confidence, and continued market access. CAHSS is a distinct division of Animal Health Canada. The CAHSS website contains many tools, including but not limited to a resource library, a surveillance initiative library, disease alerts, information on reportable and notifiable diseases, podcasts, and dashboards on disease incidence, laboratory results, AMU/AMR surveillance information, and abattoir data. There is a Beef CAHSS Network that meets regularly to discuss priorities in animal health surveillance, including disease risks and AMU and AMR surveillance in beef cow-calf herds and feedlot operations, as well as research and industry promotion opportunities. Together, industry, government, and

MORE INFO

www.wecahn.ca


CAHSS

BEEF SURVEILLANCE

CONTEXT

The *Beef Network* links the diverse beef community to encourage and support integrated and whole-of-system beef health surveillance. Effective and responsive health surveillance safeguards the prosperity of Canada's beef industry.

The *CAHSS Beef Network* includes members from the National and Provincial beef councils/organizations/networks, Veterinary colleges, Provincial governments, CFIA and AAFC, National and Regional Veterinary organizations/networks.

The *Beef Network* is part of the *Canadian Animal Health Surveillance System* (CAHSS), which connects animal health, public health and wildlife health experts from Canada's animal sectors. In addition to the *Beef Network*, CAHSS member networks include AMU, aquatic, swine and dairy cattle, equine, poultry and wildlife. CAHSS members work on diseases and issues of concern, including reportable and zoonotic diseases, production limiting diseases and antimicrobial use surveillance.

version 20.08.2019

Summary

You should now have a basic understanding of the record requirements for Canadian Animal health certification and surveillance programs for beef cattle that include animal health and medicine requirements.

Module 13

Disposal of Biomedical Waste

Objectives

After you have completed this introductory 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.

FIGURE 1 SHARPS CONTAINERS

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 the provincial government's environmental department. 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. Contact your veterinarian or the manufacturer for details.

MORE INFO

For regulations pertaining to the disposal of dead animals, refer to provincial government websites and search for "disposal of dead animals".

FIGURE 2 DISPOSAL OF DEAD CARCASSES

Carcass Disposal

Some death loss will occur on every beef 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. As well, they attract wolves and coyotes, bears, and cougars.

Each province will have their own regulations for disposal of dead animals. Typically, all dead animals must be disposed of within 48-72 hours by incineration, burying, rendering (including Biogas), composting, or natural disposal (scavenging) (see Figure 2). Incineration and natural disposal (scavenging) may be used under very restricted circumstances described in the provincial regulations.

If you are the owner of a dead animal that has been euthanized 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 euthanized and the final disposal of the animal. For more information, contact your local veterinarian.

Summary

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

Glossary

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

API

Active Pharmaceutical Ingredient. The active ingredient in a pharmaceutical drug is called an active pharmaceutical ingredient (API).

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 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 biocontainmentmanagement 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

CGFARAD

Canadian global Food Animal Residue Avoidance Database

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 license number

CHEMICAL HAZARDS

include drug and pesticide residues in beef and milk chroniclong lasting or frequently recurring clinical the abnormal signs resulting from the illness are obvious

COLOSTRUM

milk produced by the cow in the first few milking's. 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)

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 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 or the use of a compounded product or unapproved active pharmaceutical ingredient (API).

FAT-SOLUBLE

dissolves in fat

FUNGI

microscopic plants, some of which can cause 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 RESIDUES LIMIT

the maximum drug residue in tissue and milk allowed by regulation (MRL)

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 non-steroid chemicals with anti-inflammatory properties like

ANTI- INFLAMMATORY

corticosteroids (e.g., Aspirin, Banamine)

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

identifies licensed pesticides (PCP) no.

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

hazard 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 protein 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; rectum slips from its normal position and is expelled partly from 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

RAILER

animal shipped to slaughter earlier than normal

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

detailed written instructions for procedures and processes on the farm procedures (SOP)

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 specific proteins of infectious agents that induce 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

windpipe

TRANQUILIZER

an agent that calms or quiets an anxious or agitated animal without affecting its 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

Valid Veterinary Client Patient Relationship exists if all 4 conditions below are met:

The client (owner or owner's agent of the animal [s]) has given the responsibility of medical care to the veterinarian and has agreed to follow the instructions of the veterinarian, and;

The veterinarian has assumed the responsibility from the client for making clinical judgment regarding the health of the animal(s), the need for medical treatment, and for ensuring the provision of ongoing medical care for the animal(s), and;

The veterinarian has sufficient knowledge of the health status of the animal(s) and the care received or to be received. The knowledge has been obtained through a recent examination of the animal(s) and the premises where they are (it is) kept or through a history of medically appropriate and timely examinations and interventions, and;

The veterinarian is readily available, or has made the necessary arrangements with another veterinarian, for ongoing medical care in case of adverse reactions or therapy failure.

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 to ensure no residues remain in the animal's system (e.g., milk or meat)

ZOONOTIC DISEASES

caused by microorganisms in animals that can cause 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*
- *Safe Food for Canadian's 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-lois.justice.gc.ca/eng/acts/p-9.01). Provincial governments may require pesticide training and licensing requirements for producers. Contact your provincial agriculture and environment departments 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.canada.ca/en/health-canada/corporate/about-health-canada/branches-agencies/health-products-food-branch/veterinary-drugs-directorate.html). 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 cannot 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 for 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, cannot be sold over the counter by non-professional staff, and must be adequately labeled with specific instructions for use. Most antimicrobials are prescription drugs. Examples of prescription drugs are Draxxin®, 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 Rumensin™ Premix, Safe-Guard® Suspension 10%, and implants without antimicrobial pellets e.g., Component TE-G implants (without Tylan).

Extra-label drug use (ELDU) is using a drug other than as stated on the manufacturer's label, such as increasing the dosage, different route or frequency, different animal species), or using unapproved drugs like compounded drugs or unapproved bulk active pharmaceutical ingredients (APIs) www.canada.ca/en/health-canada/services/drugs-health-products/veterinary-drugs/extra-label-drug-use.html . If drugs are used ELDU, there may be increased risks of drugs residues in beef or the environment and/or an increased risk of antimicrobial resistance. ELDU of approved veterinary drugs can only be done through the written order of a licensed veterinarian, and a copy of the signed, written veterinary prescription must be provided by the veterinarian to the producer for his records www.canada.ca/en/health-canada/services/drugs-health-products/veterinary-drugs/extra-label-drug-use/policy-extra-label-drug-use-eldu-food-producing-animals.html. Veterinarians are required to contact the Canadian global Food Residue Avoidance Database (CgFARAD) to request the appropriate meat withdrawal period for any drug used ELDU in livestock cgfarad.usask.ca. If CgFARAD will not provide a recommended meat withdrawal period for the use of a drug in an extra-label fashion as described by the veterinarian, the veterinarian is liable for any meat residues or other issues that may arise if they still prescribe the drug to be used extra-label. Rules for the use of APIs in veterinary medicine have increased in recent years to ensure food safety www.canada.ca/en/public-health/services/antibiotic-antimicrobial-resistance/animals/oversight-quality-active-pharmaceutical-ingredients-veterinary-use.html#a2.

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-lois.justice.gc.ca/eng/acts/h-3.3. 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). The Safe Food for Canadians Regulations contains the Feeds Act, *Food and Drugs Act*, and *Health of Animals Act* laws-lois.justice.gc.ca/eng/regulations/SOR-2018-108/index.html.

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 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 Safe Food for Canadians Regulations laws-lois.justice.gc.ca/eng/regulations/SOR-2018-108/index.html. The Regulations 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 postmortem 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 recurrences. 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), 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-lois.justice.gc.ca/eng/acts/F-9.

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*.

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 includes drug products that may only be used under a veterinarian prescription as well as products that may be used in the manufacture of livestock feed without veterinarian approval (over the counter products). 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 as the brand of each medicating ingredient that is approved for use in Canada. In addition, it sets out the labelling requirements to ensure compliance to prescribed labelling standards (e.g., medication level, approved claim, directions for use, warnings and cautions). 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 Section 14 of the Feeds Regulations. A copy of the CMIB can be found at inspection.canada.ca/animal-health/livestock-feeds/medicating-ingredients/eng/1300212600464/1320602461227

B. Provincial Legislation

Provinces have their own legislation related to the *Pharmaceutical Act*, the *Veterinary Profession Act*, *Animal Health Act*, and *Environmental Protection Act*. Please check your provincial governments website for copies of these types of regulations and acts and specific details.

The *Pharmaceutical Profession Act* typically is the primary provincial legislation regulating the sale of all drugs in the province. This Act is usually administered by the provincial College of Pharmacists. This Act lists several activities which are defined as "exclusive scope areas of the practice of pharmacy". The Act usually 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.

The *Veterinary Profession Act* is administered by the provincial veterinary 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. Under the different provincial acts, certain provisions may exist, where persons other than those under the *Pharmaceutical*

Profession Act and *Veterinary Profession Act*, may sell medicine.

The provincial *Animal Health Act* usually contains the regulations for disposal of dead animals, which may vary slightly from province to province. The regulations typically require that all dead animals be disposed of within 48-72 hours by incineration, burying, rendering, composting or natural disposal (scavenging).

The *Environmental Protection and Enhancement Act* of a province typically 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., Boss®. 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. Check your government website on rules for proper disposal of pesticide containers and left-over pesticides.

Provinces also have acts and regulations related to 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.

Appendix 2 Feed Prescriptions

A. Blank Form

VETERINARY PRESCRIPTION FOR MEDICATED FEED – RUMINANT				
Is this medication being prescribed in accordance with the CMIB? ☐ Yes ☐ No If YES, indicate the following: CMIB code(s): Claim number(s):				
FEEDMILL INFORMATION				
Feed Mill Name & Address:			Telephone: Fax: Email:	
CLIENT AND VETERINARY CONTACT INFORMATION				
Client Name: Telephone: Manager Name: Telephone: Farm Address: Telephone:			Veterinarian Name: Clinic Name: Clinic Address: Telephone:	
ANIMALS TO BE TREATED				
Species	Production Type	Age or Weight	Number of Animals	Location of Animals to be Treated
TREATMENT DURATION				
# Days:			Feeding Start Date (MM/DD/YYY): Feeding End Date (MM/DD/YYY):	
MEDICATED FEED INFORMATION				
Type of Feed to be Medicated (Complete/Supplement/Macro):				
Name of Feed to be Medicated (if applicable):			Total Quantity of Medicated Feed Product (kg or tonnes):	
Brand Substitution Acceptable? ☐ Yes ☐ No				
DIN product BRAND NAME (Active ingredient, AI;)		g of AI/kg of DIN product	g of AI/tonne complete feed	g of DIN product/ tonne of complete feed
1				
2				
3				
Manufacturing Instructions:			On-Farm Mixing & Feeding Directions:	
Warning(s):			Caution(s):	
Withdrawal:			CgFARAD#:	Refills:
Veterinarian Name (printed):			Signature:	
Date:			License No.:	
Prescription Expiry Date:				

B. Veterinary Feed Medication Prescription

Instructions for Completing the Veterinary Prescription Template for Medicated Feed - RUMINANT

(Note: The use of this template is optional. It has been prepared as an additional prescribing tool for veterinarians.)

Indicate whether the feed is to be medicated in compliance with the Compendium for Medicated Ingredient Brochures (CMIB). If the CMIB is being followed, indicated the CMIB ingredient(s) code(s) and the applicable Claim number(s).

Feed Mill Name and Address where the feed is manufactured (optional).

Name and address of animal owner: provide the name and address of the person for whom the feed is to be manufactured or sold. The Client is the person who owns the animals.

Name of animal manager (if different from above): provide the name of the person responsible for the management of the animals on the premises (Feeds Regs 5.2(g)(iii)(B); Food and Drug Regs C.08.012.2(d)(i)).

Veterinarian's name and contact information: name and contact information for the prescribing veterinarian.

Information on the animals to be medicated: include the species, production type and age or weight of the animals to be treated with the medicated feed (Feeds Regs 5.2(g)(iii)(E); Food and Drug Regs C.08.012.2(d)(ii)).

Location of animals to be medicated: provide the location where the animals to be medicated are housed, including both the address of the premises and the specific location of the animals on the site (e.g. Barn 2, Heifer barn). As the name, ID number or tag number for each animal to be medicated is not indicated on a prescription for a medicated feed, the location of the animals help to distinguish which animals on the farm are intended to be treated.

Indicate Treatment Duration either in the number of days of treatment OR by indicating the start and end dates for feeding the medicated feed.

Type of feed to be medicated (i.e. complete feed, supplement, micro/macro premix) and the total amount of feed to be manufactured under that prescription (Feeds Regs 5.2(g)(iii)(D); Food and Drug Regs C.08.012.2(d)(iii & iv)).

Note: In order to indicate the total amount of feed to be medicated, it may be expressed as total tonnes of feed, or by indicating the number of animals and the treatment duration

Name of the medicating ingredient(s) to be added by indicating 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 (Feeds Regs 5.2(g)(iii)(C); Food and Drug Regs C.08.012.2(d)(iv)).

Amount of the medicating ingredient(s) to be added (Feeds Regs 5.2(g)(iii)(C)), including at minimum:

a) Amount of active in the DIN product in g of active per kg of premix (often included in the Brand Name)
b) Amount of active ingredient in mg per kg (or g per tonne) of medicated feed
c) Amount of DIN product in g per tonne of medicated feed

* Including all three pieces of information will ensure that the calculations have been conducted properly and should reduce potential mixing errors

Any special mixing instructions, including any special manufacturing or mixing instructions (Feeds Regs 5.2(g)(iii)(F); Food and Drug Regs C.08.012.2(d)(v)).

On-Farm Mixing and Feeding Directions provides the directions for use on-farm, including frequency of feeding, any other special feeding instructions and if further mixing is required on-farm (Feeds Regs 5.2(g)(iii)(G); Food and Drug Regs C.08.012.2(d)(vi)(A)).

Warnings and Cautions: If feed is being prescribed as per the CMIB, the prescription can indicate the CMIB code and particular claim for the warnings and cautions to be populated as per the CMIB. If prescribing a medicated feed in a manner that is not consistent with the CMIB (off-label), the prescription must contain all pertinent warnings pertaining to human health, and cautions related to animal health, which are present on the approved drug label, and any additional warnings or cautions that the veterinarian deems necessary (Feeds Regs 5.2(g)(iii)(H); Food and Drug Regs C.08.012.2(d)(vi)(C)).

Withdrawal Period: If prescribing a medicated feed as per CMIB, the labelled withdrawal period will be copied into the Warnings section as it is listed in the CMIB. If prescribing a medicated feed in a manner that is not consistent with the CMIB (off-label), it is the veterinarian's responsibility to indicate the appropriate withdrawal period on the prescription (Feeds Regs 5.2(g)(iii)(H); Food and Drug Regs C.08.012.2(d)(vi)(B)). Indicating a CgFARAD# for a medicated feed being prescribed off-label is optional but highly recommended.

Date: provide the date on which the prescription is written.

Veterinary Signature: The prescription must be physically signed by the prescribing veterinarian or provided electronically following best practices for electronic signatures (Feeds Regs 5.2(g)(iii); Food and Drug Regs C.08.012.2(b)).

Rx No. (prescription number): An optional field that can be populated for tracking purposes.

C. Veterinary Feed Medication Prescription Checklist

- ☐ Date of Prescription (Feeds Regs 5.2(g)(iii)(A))
- ☐ Name and address of the owner (Feeds Regs 5.2(g)(iii)(B); Food and Drug Regs C.08.012.2(d)(i)))
- ☐ Name of person responsible for feeding the animals (if different from owner; Feeds Regs 5.2(g)(iii)(B); Food and Drug Regs C.08.012.2(d)(i))
- ☐ Prescribing Veterinarian's name and contact information
- ☐ Location of animals to be medicated:
  - Address of the farm
  - Identify the location of the animals who will receive the medicated feed, ie. Heifer barn, or Barn #3
- ☐ Information on the animals to be medicated (Feeds Regs 5.2(g)(iii)(E); Food and Drug Regs C.08.012.2(d)(ii)):
  - Species
  - Production type
  - Age or weight of animals
  - Number of animals who will be fed the medicated feed
- ☐ The type of feed to be medicated (Feeds Regs 5.2(g)(iii)(D); Food and Drug Regs C.08.012.2(d)(iii))
  - Identify if it is a complete feed, supplement, macro mix
  - Provide name of the feed to be medicated or its identifying code
- ☐ Amount of medicated feed to be manufactured (Feeds Regs 5.2(g)(iii)(D); Food and Drug Regs C.08.012.2(d)(iv))
- ☐ The name of the medicating ingredient(s) to be added and the concentration (Feeds Regs 5.2(g)(iii)(C); Food and Drug Regs C.08.012.2(d)(iv)
- ☐ The amount of the medicating ingredient(s) to be added (Feeds Regs 5.2(g)(iii)(C))
- ☐ Any special manufacturing or mixing instructions (Feeds Regs 5.2(g)(iii)(F); Food and Drug Regs C.08.012.2(d)(v))
- ☐ Directions for use (Feeds Regs 5.2(g)(iii)(G); Food and Drug Regs C.08.012.2(d)(vi)(A))
- ☐ Duration of use or exact dates for feeding the medicated feed (Feeds Regs 5.2(g)(iii)(G); Food and Drug Regs C.08.012.2(d)(vi)(A))
- ☐ Warnings (Feeds Regs 5.2(g)(iii)(H); Food and Drug Regs C.08.012.2(d)(vi)(C))
- ☐ Cautions(Feeds Regs 5.2(g)(iii)(H))
- ☐ Withdrawal period (Feeds Regs 5.2(g)(iii)(H); Food and Drug Regs C.08.012.2(d)(vi)(B))

- ☐ Signature of the prescribing veterinarian (Feeds Regs 5.2(g)(iii); Food and Drug Regs C.08.012.2(b))
- ☐ Any industry/sector-specific requirements (e.g. quality assurance programs)

Optional Items Checklist – Veterinary Feed Prescription:

- ☐ Feed Mill Name and Address (best practice)
- ☐ CgFARAD number for all extra-label drug use (may be required in some livestock sectors)
- ☐ Compendium of Medicated Ingredient Brochures (CMIB) claim and number, if prescribing a medicated feed according to the CMIB
- ☐ Number of Refills, if deemed acceptable by the veterinarian
- ☐ Prescription expiration date (may be required in some provinces)
- ☐ Statement from the individual for whom the prescription is issued, indicating that he/she has read and understands the feeding instructions or directions for use and the warning statements and caution statements set out on the prescription

Appendix 3 Sample Drug Labels

A. Anaphylactic Shock – Epichlor

EPICLOR

Rafter 8

DIN 00654590

1 : 1000

Contains:

Epinephrine	1 : 1000
Chlorobutanol u.s.p. (preservative)	0.5% w/v
Sodium bisulfite	0.1% w/v

pH control: Hydrochloric acid and/or sodium hydroxide.

Indications:

Treatment of anaphylactic shock, bronchial asthma and related conditions. For acute cardiac failure during surgical anesthesia by intravenous or intracardial injection.

Administration and dosage:

Intramuscular and subcutaneous

Horses and Cattle	3 to 8 ml
Dogs	0.2 to 0.6 ml
Intravenous and intracardial (administer of a 1/10 dilution)	
Horses and Cattle	3 to 8 ml
Dogs	0.13 to 0.5 ml

Intravenous administration should be given slowly- and at room temperature.

Caution:

Not to be used in the administration of cyclopropane or chloroform anesthesia.

Epinephrine may cause auricular fibrillations in horses if it follows chloral hydrate administration.

Veterinary use only.

50 ml

RAFTER 8 PRODUCTS, 87 Skyline Crescent N.E., Calgary, Alberta T2K 5X2

CPN: 1219003.3

B. Lactating Cow Treatment – Cefa-Lak

Cefa-Lak®

Boehringer
Cephapirin Sodium
Intramammary Infusion
Veterinary Use Only
DIN 02173263

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.

Active Ingredient:

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

Storage:

Do not store above 25°C. Do not freeze.

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. (California Mastitis Test) 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 protective cap.

For partial insertion:

Twist off upper portion of the 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 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.

Warnings:

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 4 days after the latest treatment with this drug. Administration of more than the prescribed dose may lead to residue of antibiotic in milk for more than 96 hours. Peanut Allergy Warning: This product contains peanut oil. KEEP OUT OF REACH OF CHILDREN.

Supply:

Cefa-Lak (cephapirin sodium) for Intramammary Infusion. Cephapirin sodium equivalent to 200 mg of cephapirin activity per 10 mL syringe.

Cartons containing 12 x 10 mL syringes or 24 x 10 mL syringes.

Boehringer Ingelheim (Canada) Ltd., 5180 South Service Road, Burlington, Ontario L7L 5H4

471712-01

51724797

CPN: 1230073.3

C. Systemic Antimicrobial Treatment – Borgal

Borgal®

Merck Animal Health

Trimethoprim and sulfadoxine injectable solution

DIN: 00555657

VETERINARY USE ONLY

sterile

DESCRIPTION

Each mL contains:

Active ingredients:

trimethoprime Ph. Eur.	40 mg
sulfadoxine Ph. Eur.	200 mg

Non-medicinal ingredients:

sodium hydroxide Ph. Eur.	25.775 mg
glycerinformal Mfr. Std.	766.50 mg
water for injection Ph. Eur.	203.725 mg

BORGAL 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

Bacillus anthracis

Clostridium spp.

Pasteurella spp.

Shigella spp.

Haemophilus influenzae

Streptococcus zooepidemicus

Salmonella spp.

Proteus mirabilis

Vibrio spp.

SENSITIVE ORGANISMS

Streptococcus viridans

Proteus spp.

Brucella spp.

Actinomyces

Enterococci spp.

Corynebacterium spp.

Staphylococcus aureus including penicillinase-producing organisms

Bordetella spp.

Neisseria spp.

Klebsiella spp.

MODERATELY SENSITIVE ORGANISMS

Enterobacter aerogenes

Nocardia spp.

NON-SENSITIVE ORGANISMS

Pseudomonas aeruginosa*

Leptospira spp.

Mycobacterium tuberculosis

Erysipelothrix rhusiopathiae

*usually non-sensitive

INDICATIONS

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

BORGAL is indicated **in cattle** for the treatment of:

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

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

OTHER INFECTIONS - infectious pododermatitis (foot rot) and septicaemias.

BORGAL 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.

DOSAGE AND ADMINISTRATION

BORGAL 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.

CONTRAINDICATIONS

BORGAL 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.

CAUTIONS

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.

WARNINGS

Milk taken from treated animals during treatment and within 96 hours after the latest treatment with this drug must not be used as food. Treated animals must not be slaughtered for use in food for at least 10 days after the latest treatment with this drug. Keep out of reach of children.

ADVERSE REACTIONS

No significant adverse reactions have been reported.

STORAGE

Store at room temperature, below 25°C.

SUPPLY

Bottles of 100 mL, 250 mL and 500 mL

Intervet Canada Corp., 16750, route Transcanadienne, Kirkland QC, H9H 4M7

1-888-306-0069

Intervet Canada Corp. is a subsidiary of Merck & Co., Inc

Version 02 February 2012

CPN: 1208128.3

D. Intra-Uterine Antimicrobial Treatment – After Calf Bolus

AFTER-CALF BOLUS

Dominion

Veterinary use only

Antibiotic

DIN 00237531

Indications:

For use in retained placenta shreds, metritis and post partum infections in cattle.

Directions for use:

To reduce the development of antimicrobial resistance and maintain effectiveness, use this antibiotic prudently.

Insert one or two boluses deeply into the uterus.

Warnings:

Milk taken from treated animals 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.

Sulfonamides can cause allergic reactions in sensitized individuals. When handling the product, avoid inhalation, oral exposure and direct contact with skin or eyes. Keep out of reach of children.

Each bolus contains:

Urea	13.44 g
Sulfanilamide	1.92 g
Sulfathiazole	320 mg

Storage:

Store at room temperature (15-30°C).

Dominion Veterinary Laboratories Ltd., 1199 Sanford Street, Winnipeg, Manitoba R3E 3A1

1-800-465-7122 - www.domvet.com

Net Contents: 12 Boluses, 20 Boluses

CPN: 1181002.3

E. Systemic Steroidal Anti-inflammatory Treatment – Dexamethasone 2

Dexamethasone 2

Vetoquinol

Dexamethasone Injectable Sterile Solution, USP

Sterile

DIN 00617210

Veterinary Use Only

DESCRIPTION:

Dexamethasone 2 is a synthetic analogue of prednisolone having similar but more potent anti-inflammatory therapeutic action and different hormonal and metabolic effects.

As with any drug, animals receiving Dexamethasone 2 should be kept under close observation and the dosages recommended should not be exceeded. All the precautions and contraindications for adrenocortical hormones apply at this time to the drug.

The dosage of Dexamethasone 2 required is markedly lower than that of prednisolone. The sections on indications, dosage, and precautions should be read before this drug is used.

ACTIVE INGREDIENTS (per mL):

Dexamethasone sodium phosphate	2 mg

PRESERVATIVE:

Benzyl Alcohol	2% W/V

INDICATIONS:

Dexamethasone 2 is indicated as an aid in the treatment of bovine ketosis and as anti-inflammatory agent in dogs, cats, cattle and horses.

Small animals indications include inflammatory conditions involving the joints (where structural changes do not exist, such as peri-articular ankylosis, ruptured ligaments, sheaths, etc.) and non-specific dermatitis.

Equine indications include bursitis, carpitis, osselets, tendinitis, myositis, sprains and as supportive therapy in fatigue, heat exhaustion and acute infectious diseases. If bony changes exist in any of these conditions, responses to Dexamethasone 2 cannot be expected.

DIRECTIONS FOR USE AND DOSAGE:

Dexamethasone 2 must be administered by the intravenous or intramuscular route.

Therapy with Dexamethasone 2 should be individualised according to the severity of the condition being treated, anticipated duration of steroid therapy and the patient's threshold or tolerance for steroid excess. The lowest dose that will offer adequate relief in chronic conditions should be the dose employed. Large doses, however, may be necessary and in such instance, the patient must be closely observed for the occurrence of side effects. Acute conditions sometimes demand the use of larger doses for a short period of time in order to obtain the necessary degree of relief.

Dosage:

Dogs	0.25 to 1.0 mg I.V. or I.M.

The dose may be repeated if necessary.

Cats	0.125 to 0.5 mg I.V. or I.M.

The dose may be repeated if necessary.

Horses	2.0 to 5.0 mg I.V. or I.M.

The dose may be repeated if necessary.

Cattle	5.0 to 20.0 mg I.V. or I.M.

The dose may be repeated if necessary.

When using Dexamethasone 2 as supportive therapy in horses, dogs and cats, the doses suggested above may be used. The use of this product for the above mentioned conditions does not preclude the necessity for using complementary therapy to treat the primary condition.

Treatment may be changed over to dexamethasone from any other glucocorticoid with proper adjustment of dosage.

CAUTION:

All of the precautions and contraindications for hormones must be followed, taking into consideration that the warning signs of cortisone over-dosage such as sodium retention, fluid retention, potassium loss, weight gain, etc. may not be present. Animals receiving the drug should be under close observation to detect these possible untoward effects. When side effects occur, it may be necessary to reduce the dose of the drug or to discontinue therapy.

One should consider the possibility that continuous large doses of dexamethasone will result in some depression of adrenal corticoid function and may produce adrenal atrophy. Then, after long-term therapy, the drug should be withdrawn gradually rather than abruptly.

As all glucocorticoids, Dexamethasone 2 may mask the signs of infection or cause onset of latent infection. For these reasons, it may be advisable to institute proper antibacterial therapy together with Dexamethasone 2. The possible action of dexamethasone in delaying wound healing should be kept in mind.

Doses of dexamethasone above 5 mg, may produce transient drowsiness or lethargy in some horses. The lethargy usually abates in 24 hours.

CONTRAINDICATION:

Clinical and experimental data have corticosteroids administered orally or parenterally to animals may induce the first stage of parturition when administered during the last trimester of pregnancy and may precipitate premature parturition followed by dystocia, fetal death, retained placenta and met.

STORAGE:

Store between 15°C and 25°C.

PRESENTATION:

100 mL vial.

Vetoquinol N.-A. Inc., 2000, ch. Georges, Lavaltrie, QC, CANADA J5T 3S5

Net	Code	
100 mL	040502183	8DEX020C REV 07/16

CPN: 1234020.8

F. Systemic Diuretic Treatment – Salix

SALIX®

Merck Animal Health

Furosemide injection USP

Diuretic-Saluretic Sterile

DIN 00116238

VETERINARY USE ONLY

DESCRIPTION

Furosemide is a loop of Henle diuretic.

Each mL contains:

Active Ingredient: 50 mg of furosemide.

Preservative: 15 mg benzyl alcohol.

Non-medicinal ingredients: Edetate disodium, monoethanolamine, sodium chloride, sodium sulfite and water.

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.

DOSAGE AND ADMINISTRATION

Dogs and Cats: SALIX - 5 mg/kg body weight (2 mg per pound) given once or twice daily. May be given by either intramuscular or intravenous route in dogs, but only by the intramuscular route in cats.

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.

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

Diuretic therapy should be discontinued after resolution of the edema, or maintained to prevent recurrence. Re-examination of the patient and close liaison with the client are necessary to establish an optimum dosage schedule.

Cattle: SALIX - 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.

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 no effect is noticed within 72 hours, the animal should be re-examined.

Treatment not to exceed three days.

Horses: SALIX - 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.

CONTRAINDICATIONS

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

Salix is contraindicated in anuric animals and in animals with a history of hypersensitivity to furosemide.

CAUTIONS

Dehydration and electrolyte abnormalities should be monitored in patients receiving SALIX. Dehydration and electrolyte abnormalities should be corrected by the administration of suitable fluid therapy.

SALIX, 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 hypocalcemic tendency.

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

Furosemide causes a temporary decrease in blood pressure. Caution should be used when administering other drugs that decrease blood pressure because of the possibility of additive hypotensive effects.

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 AS FOOD.

TREATED CATTLE 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.

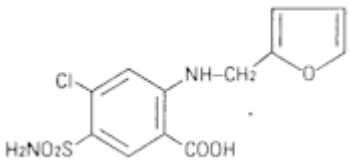
ADVERSE REACTIONS

The following adverse events have been reported: dehydration (pre renal azotemia), electrolyte disorders, vomiting, diarrhea, decreased appetite, weakness, restlessness, ataxia and injection site swelling.

Transient ototoxicity may occur in dogs and cats. Adverse reactions at therapeutic doses are generally the result of a diuretic main effect, e.g., hemoconcentration, reduced pressure in the pulmonary circulation, increased peripheral resistance and increased heart rate.

CHEMISTRY

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



PHARMACOLOGY

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. 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. Following oral administration in dogs maximum blood levels were obtained 1-4 hours post-administration. 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 declined at 60 minutes. Effects last up to 3 hours. Intravenously, 55-69% was excreted within 24 hours of administration.

STORAGE

Store at room temperature, below 25° C. Do not freeze. Store vial in carton to protect from light. If crystallized, shake at room temperature until crystals dissolve.

Discard contents 4 weeks after the first dose is removed.

HOW SUPPLIED

50 mL vials containing 50 mg SALIX per mL.

Intervet Canada Corp., 16750, route Transcanadienne, Kirkland, Qc H9H 4M7

1-866-683-7838

Intervet Canada Corp. is a subsidiary of Merck & Co., Inc.

January 19, 2015

CPN: 1208142.3

G. Reproductive Hormone Treatment – Lutalyze

Lutalyse®

Zoetis

Dinoprost Tromethamine Injection Mfr Std

Sterile solution for injection

Veterinary Use Only

DIN 00813605

DESCRIPTION:

Lutalyse® Sterile Solution is a sterile injectable solution containing the naturally occurring prostaglandin F2α (PGF2α or dinoprost) as the tromethamine salt.

Each mL contains 5 mg dinoprost (as dinoprost tromethamine) and 16.5 mg benzyl alcohol as the preservative.

INDICATIONS:

Horses: Lutalyse Sterile Solution is indicated for its luteolytic effect on corpora lutea in mares to "induce" estrus and may be utilized to stimulate regression of the corpus luteum followed by return to estrus and/or ovulation in mares demonstrating extended diestrus.

Cattle: Lutalyse Sterile Solution is indicated for its luteolytic effect in cattle. This luteolytic action may be utilized to:

1. Effectively control the time of estrus in cycling cattle that have a corpus luteum
2. Treat sub-estrus (no visible estrus)
3. Induce abortion in cattle from 5 to 130 days of gestation
4. Treat chronic metritis and pyometra
5. Induce parturition on or after day 270 of gestation
6. Use with FACTREL® (gonadorelin hydrochloride) sterile solution to synchronize estrous cycles to allow fixed-time artificial insemination (FTAI) in lactating dairy cows

Swine: Lutalyse Sterile Solution may be used to induce parturition in swine when administered within 3 days (72 hours) of normal predicted farrowing dates.

DOSAGE AND ADMINISTRATION:

Horses: To induce estrus, administer 5 mg (1 mL) subcutaneously.

An examination of the genital tract should be conducted before and after administration of Lutalyse Sterile Solution. It should be realized that not all heats are fertile, and that ovulations can accompany silent estrus. Due to the seasonal polyestrus nature of the mare, the efficacy of Lutalyse Sterile Solution may vary with the time of year it is administered. In extended diestrus, there is failure to exhibit regular estrus cycles which should not be confused with true anestrus. Many mares described as anestrual during the breeding season have serum progesterone levels consistent with the presence of a functional corpus luteum. A proportion of "barren", maiden, and lactating mares do not exhibit regular estrus cycles and may be in extended diestrus. Following abortion, early fetal death and resorption, or as a result of "pseudopregnancy", there may be serum progesterone levels consistent with a functional corpus luteum. Treatment of such mares with Lutalyse Sterile Solution usually results in regression of the corpus luteum followed by return of estrus and/or ovulation.

Cattle: To control estrus, to treat subestrus, pyometra, and mummified fetus and to induce abortion or parturition administer 25 mg (5 mL) intramuscularly.

1. Effectively control the time of estrus in cycling cattle that have a corpus luteum: Cows and heifers treated during this time will return to estrus and ovulate within 2 or 4 days after treatment. (Note: administration of Lutalyse Sterile Solution to cattle within 5 days after estrus or 4 days before the onset of the next estrus may not influence the timing of the next estrus.) Rectal palpations and good records of estrus cycles are helpful for the most efficient use of Lutalyse Sterile Solution.
2. Treat sub-estrus (no visible estrus): Individual cattle may have normal cyclical ovarian activity without detectable behavioral estrus; this occurs most frequently in the winter months, at peak lactation in high producing dairy cows, in cows receiving marginal nutrition and in suckled beef cows. If a corpus luteum is present and ovulation has not occurred in the previous 4 days, administration of Lutalyse Sterile Solution may result in corpus luteum regression followed by return to estrus and ovulation. Breeding of cattle treated with PGF2α for the above indication may be by natural service, artificial insemination at the usual time in relation to observed estrus, or by fixed time insemination 78 hours (75-80 hours) post-treatment.
3. Induce abortion in cattle from 5 to 130 days of gestation: Up to day 70, abortion usually occurs in less than 4 days; between days 70 and 130 in less than 7 days, but beyond day 130 less than 60 percent may abort within 3 weeks. Injected heifers should be kept under surveillance and given assistance if necessary.
4. To treat chronic metritis and pyometra: In the cow, chronic metritis frequently occurs as a sequel to an acute or sub-acute endometritis in the first 2 or 3 weeks postpartum; typically, there is an intermittent purulent or muco-purulent discharge. Pyometra is characterized by the retention of purulent fluid within the uterus. Luteal regression through the administration of Lutalyse Sterile Solution is followed by estrus, during which the uterus is evacuated and the uterine environment is relatively unfavorable to the bacteria involved in the infection. Treatment may have to be repeated after 10-12 days where the condition is longstanding.
5. To induce parturition on or after day 270 of gestation: The interval from administration to parturition is 1 to 8 days (average 50-60 hours). Induction of parturition in cattle is indicated where there is risk of oversize calves or where early parturition is desired. In addition, induction is indicated where it is desired to terminate pregnancy complicated by miscellaneous conditions, such as mummified or macerated fetuses, hydrops amnii, hydroallantois, etc. Such fetuses may need manual help to complete their passage through the genital tract.

For use with FACTREL (gonadorelin hydrochloride) sterile solution to synchronize estrous cycles to allow fixed-time artificial insemination (FTAI) in lactating dairy cows: Administer 2 mL FACTREL Injection (100 mcg gonadorelin) per cow as an intramuscular injection in a treatment regimen with the following framework:

- Administer the first dose of FACTREL Injection (2 mL) at Day 0.
- Administer LUTALYSE (25 mg dinoprost, as dinoprost tromethamine) Sterile Solution by intramuscular injection 6-8 days after the first dose of FACTREL Injection.
- Administer a second dose of FACTREL Injection (2 mL) 30 to 72 hours after the LUTALYSE injection.
- Perform FTAI 0 to 24 hours after the second dose of FACTREL Injection, or inseminate cows on detected estrus using standard herd practices.

Below are three examples of treatment regimens for FTAI that fit within the dosage regimen framework described immediately above:

	Example 1	Example 2	Example 3
Day 0 (Monday)	1st FACTREL	1st FACTREL	1st FACTREL
Day 7 (the following Monday)	LUTALYSE	LUTALYSE	LUTALYSE
Day 9 (Wednesday)	2nd FACTREL + FTAI at 48 hours after LUTALYSE	2nd FACTREL 48 hours after LUTALYSE	2nd FACTREL 56 hours after LUTALYSE
Day 10 (Thursday)		FTAI 24 hours after 2nd FACTREL	FTAI 18 hours after 2nd FACTREL

Porcine: To induce parturition administer 10 mg (2 mL) intramuscularly.

Lutalyse Sterile Solution may be used to induce parturition in swine when administered within 3 days (72 hours) of normal predicted farrowing dates. This can be advantageously employed to control the time of farrowing for sows and gilts in late gestation. On average the normal length of gestation for sows is 115 days; therefore, Lutalyse Sterile Solution normally should be administered 112 days or later following breeding. However, gestation periods can vary in length from herd to herd and among different breeds of swine; so the normal predicted farrowing date for the herd in question should be determined before Lutalyse Sterile Solution is administered.

When Lutalyse Sterile Solution is administered 2 to 3 days before normal farrowing dates, 80 percent of the sows injected can be expected to begin farrowing within 40 hours after injection. The mean interval from injection to parturition is approximately 26 hours. (In general, the closer the injection time is to the normal farrowing time, the higher will be the percentage response by sows.) Since piglets from treated sows are born earlier than would normally be the case, it may be necessary to provide assistance at farrowing, especially to any small, weak piglets.

It is recommended that Lutalyse Sterile Solution only be used in a swine facility where adequate records are available on (1) the average length of the gestation period for the animals in that facility, and (2) the breeding date and projected farrowing date for each animal. This information is essential to determine the appropriate time for product administration. Treatment earlier than 3 days prior to normal farrowing dates may produce weak piglets resulting in reduced survival.

As with any multidose vial practise aseptic techniques in withdrawing each dose. Adequately clean and disinfect the vial closure prior to entry with a sterile needle. Injections should be made using appropriate aseptic technique.

CONTRA-INDICATIONS: For subcutaneous use only in the equine and intramuscular use only in the bovine and porcine. Do not administer intravenously.

CAUTIONS:

1. PGF2α may produce abortion in pregnant mares, cows and sows.
2. Since studies have not been conducted in horses suffering from acute and chronic respiratory diseases, PGF2α should be used with caution in such cases.
3. Due to seasonally polyestrus nature of mares the efficacy of this drug will vary with the time of year it is administered.
4. In cattle, PGF2α is ineffective when administered prior to day 5 after ovulation or within 4 days before the on-set of the next estrus.
5. Parturition induction in swine earlier than 72 hours prior to the normal farrowing date may result in piglet mortality

WARNINGS:

Not for human use.

Treated cattle and swine must not be slaughtered for use in food for at least 2 days after the latest treatment with this drug. Treated cattle must not be slaughtered for use in food for at least 7 days after sequential use with FACTREL.

No milk withholding time is required when used according to the label.

This drug is not to be administered to horses that are to be slaughtered for use in food.

This product should be handled carefully to avoid accidental self-injection or contact with the skin or mucous membranes of the user.

Prostaglandins of the F2α type may readily be absorbed through the skin and may cause bronchospasms and/or miscarriage.

Pregnant women, women in childbearing age, asthmatics and people with other respiratory tract diseases should exercise extreme caution when handling this product such as wearing waterproof gloves.

Accidental spillage on the skin should be washed off immediately with water.

In case of accidental self-injection, seek medical advice and show the package insert to the doctor. Should respiratory distress result from accidental inhalation or injection, the inhalation of a rapidly acting bronchodilator is indicated.

Keep out of reach of children

ADVERSE REACTIONS:

Horses: The administration, by the subcutaneous route, of PGF2α to mares may be followed by adverse events commencing within 10 minutes; these may consist of sweating, increase in heart rate and some abdominal discomfort, but they pass within half to one hour, without treatment.

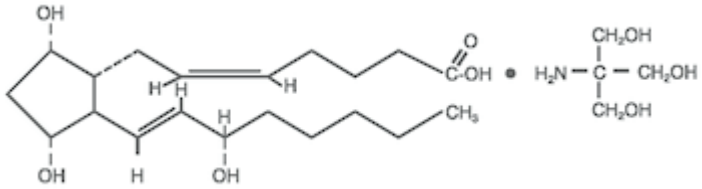
Cattle: A low incidence of clostridial and other infections at the injection site has been reported following prostaglandin administration. Treated animals should be closely observed post injection and appropriate antibiotic therapy initiated at the first sign(s) of infection. Very rarely anaphylactic reactions have occurred after administration of the product. Overdose: The most frequently observed adverse event is increased rectal temperature at a 5X or 10X overdose. However, rectal temperature changes have been transient in all cases observed and have not been detrimental to the animal. Limited salivation has been seen in some instances.

Swine: Adverse events consisting of increased body temperature, increased respiratory rate, increased salivation, stimulation of defecation and urination, flushing of the skin and restlessness (arching of back, pawing and rubbing and gnawing in crate) have been reported following the administration of PGF2α in pregnant sows and gilts. These events tend to parallel the signs exhibited by sows prior to normal parturition, only they appear to be condensed in time. These effects are usually seen within 15 minutes of injection and disappear within one hour.

CLINICAL PHARMACOLOGY

The empirical formula is C20H34O5•C4H11NO3.

The chemical structure of dinoprost tromethamine:



GENERAL BIOLOGIC ACTIONS:

Prostaglandins occur in nearly all mammalian tissues. Prostaglandins, especially PGE's, and PGF's have been shown, in certain species, to (1) increase at time of parturition in amniotic fluid, maternal placenta, myometrium, and blood, (2) stimulate myometrial activity, and (3) to induce either abortion or parturition. Prostaglandins, especially PGF2α, have been shown to (1) normally increase in the uterus and blood to levels similar to that created by the administration of a dose of PGF2α, which was luteolytic, (2) be capable of crossing from the uterine vein to the ovarian artery (sheep), (3) be related to IUD induced luteal regression (sheep), and (4) be capable of regressing the corpus luteum of most mammalian species studied to date. Prostaglandins have been reported to result in release of pituitary tropic hormones. Data suggest prostaglandins, especially PGE's and PGF's, may be involved in the process of ovulation and gamete transport. Also PGF2α, has been reported to cause increase in blood pressure, bronchoconstriction, and smooth muscle stimulation in certain species.

SAFETY AND TOXICITY:

Horses: Overdose studies indicate that mares given 100 mg (20 times the recommended dose) daily for 8 days showed: (1) no change in heart rate, (2) an increase of 1.1°C in rectal temperature 5 hours after injection but had returned to normal by 15 to 24 hours after treatment, (3) no alteration in either 24 hour feed consumption or body weight, (4) decreases in digestive tract activity, sensitivity to pain, and general activity, with evidence of mouth and hind limb incoordination within one hour after injection, (5) laboured breathing and loose stool

within one hour after injection, (6) profuse sweating for about 30 minutes; however, all characteristics, except rectal temperature, had returned to normal by 5 hours after injection.

Mares treated with a 160X overdose daily were recumbent within 10 to 30 minutes of injection but stood up of their own volition during the ensuing one to 4 hours. No mares died following administration of a 160X overdose of PGF2α daily for 8 days.

Cattle: In cattle, evaluation was made of clinical observations, clinical chemistry, hematology, urinalysis, organ weights, and gross plus microscopic measurements following treatment with various doses up to 250 mg PGF2α administered twice intramuscularly at a 10 day interval or doses of 25 mg administered daily for 10 days. There was no effect of PGF2α on the hematology or clinical chemistry parameters measured. A slight transitory increase in heart rate was detected. Rectal temperature was elevated about 0.8° C through the 6th hour after injection with 250 mg PGF2α but had returned to baseline at 24 hours after injection. Increased salivation occurred occasionally. No PGF2α associated gross lesions were detected at necropsy. There was no evidence of toxicological effects. At luteolytic doses, PGF2α did not impair fertility of cattle and had no effect on progeny. If given to a pregnant cow, it may cause abortion; the dose required for abortion varies considerably with the stage of gestation. The half life of PGF2α in bovine blood has been reported to be in the order of minutes. Assay of all muscle samples from treated animals were not significantly different from control tissue at 48 hours after injection in cattle.

Swine: PGF2α was administered intramuscularly to pregnant Yorkshire gilts between 111 and 113 days of gestation, at single doses of 10, 30, 50 and 100 mg of drug equivalent (4 gilts/group). A control group, handled similarly, was injected with vehicle only. The safety of the drug to the pregnant gilts was assessed by the following parameters: clinical observations, food consumption, clinical pathologic determinations and 2 gilts/group were assessed for body weight changes, urinalysis, reproductive performance, organ weights and gross and microscopic observations. The results indicated no treatment related effects from PGF2α treatment that were deleterious to the health of the gilt or offspring.

PGF2α injected gilts had transient (from about 10 minutes to 3 hours) clinical signs that were consistent with previous literature reports which have been attributed to direct acting and/or central nervous system effects. The characteristic signs included: erythema, slight incoordination, nesting behaviour, itching, urination, abdominal muscle spasms, tail movements, hyperpnea, dyspnea, increased vocalization, salivation and at the 100 mg dose only, vomiting. PGF2α treatment did not have any effect on reproductive performance, gross and microscopic observations or the other parameters used to assess toxicosis. PGF2α is a synthetic natural prostaglandin. All systems associated with PGF2α metabolism exist in the body; therefore, no new metabolic, transport, excretory, binding or other systems need be established by the body to metabolize PGF2α.

STORAGE:

Store between 15 and 25°C. Particulate matter, usually identified as silica flakes may appear after periods of storage. These particles have altered neither the potency nor sterility of Lutalyse Sterile Solution.

PRESENTATION:

Lutalyse Sterile Solution is available in 30 mL and 100 mL glass vials.

Zoetis Canada Inc., Kirkland QC H9H 4M7

1633-11-2

40004360

CPN: 1198298.8

H. Disinfectant – Hibitane

Hibitane® DISINFECTANT

Zoetis

DIN 00053236

VETERINARY USE ONLY

Active Ingredient: chlorhexidine acetate	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.

CAUTIONS:

Use only as directed.

STORAGE:

Store between 15 and 30°C.

WARNINGS:

Keep out of reach of children.

Zoetis Canada Inc., Kirkland QC H9H 4M7

Net	
3.8 L	2624-05-0E 30524400
	2624-05-0F 30524500

CPN: 1198374.2

I. Pour-on Endectocide – Ivomec Pour-On

ivomec®

Merial

(ivermectin)

Pour-On for Cattle

DIN 00761842

Veterinary Use Only

PRODUCT DESCRIPTION

IVOMEC Pour-On for Cattle is a clear, blue colored liquid containing 5 mg of ivermectin per mL (0.5% w/v). IVOMEC Pour-On for Cattle is formulated to deliver the recommended dose level of 500 µg 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 in this document 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 (Bovicola) 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

(*) See PERSISTENT EFFECT

PERSISTENT EFFECT

ENDOPARASITES

IVOMEC Pour-On for Cattle 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, Ostertagia ostertagi, Cooperia oncophora and Cooperia surnabada (syn. mcmasteri) acquired up to 14 days after treatment.

ECTOPARASITES

IVOMEC Pour-On for Cattle given at recommended dosage of 500 µg 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 for Cattle 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 for Cattle 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 for Cattle. 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 for Cattle. 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 channels and they do not readily cross the blood-brain barrier.

NOTE TO USER

The color 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 color does not reflect loss of potency of ivermectin. However, prolonged exposure (i.e. weeks) to light can also 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.

WARNINGS

1. Treated animals must not be slaughtered for use in food for at least forty-nine (49) days after the latest 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 out of reach of children.

CAUTIONS

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 for Cattle stored at room 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.

The 250 mL size 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).

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

The 2.5 L size 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.

The 5 L size 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.

The 20 L size 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., 20000 Clark Graham, Baie d'Urfé, Qc H9X 4B6

2050-2498-01
Rev 03/2013
CPN: 1182039.4

J. Vaccines

Clostridial Bacterin –Tasvax 8

TASVAX® 8

Merck Animal Health

Clostridium Chauvoei-Haemolyticum-Novyi Type B-Perfringens Types B, C & D-Septicum-Tetani Bacterin-Toxoid

For animal use only

Cattle: Initial dose - 4 mL

Subsequent dose - 4 mL

Subcutaneous injection

Sheep: Initial dose - 4 mL

Subsequent dose - 2 mL

Subcutaneous injection

DESCRIPTION:

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

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

ADMINISTRATION AND DOSAGE:

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 no 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.

CAUTION:

Shake well before use.

After subcutaneous administration a small nodule may appear at the injection site but generally disappears within a few weeks. Allergic reactions may occur.

Antidote: Epinephrine.

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

Do not freeze. Store at 2°-8°C.

Do not vaccinate within 21 days before slaughter

PRESERVATIVE:

Thimerosal.

WARNING:

Contact a physician immediately if accidental human injection occurs.

Manufactured by: Schering-Plough Animal Health Limited, Upper Hutt, New Zealand

For: Intervet Canada Corp., subsidiary of Merck & Co., Inc., 16750, route Transcanadienne, Kirkland, QC H9H 4M7

1 866 683-7838 (Canada)

® (Schering-Plough Animal Health Corporation), used under license by Intervet Canada Corp. Intervet Canada Corp. is a subsidiary of Merck & Co., Inc.

	Code	
50 mL	086373	192712_R1
100 mL	099554	197084_R1
250 mL	094394	196804_R1
500 mL	094140	189592_R1

CPN: 1208083.7

Respiratory Vaccine–PYRAMID® FP 5

PYRAMID® FP 5

Boehringer

Bovine Rhinotracheitis-Virus Diarrhea-Parainfluenza 3-Respiratory Syncytial Virus Vaccine

Modified Live Virus

Veterinary use only

Indications

For vaccination of healthy cattle as an aid in the prevention of disease caused by bovine rhinotracheitis, bovine viral diarrhea (types 1 and 2), bovine parainfluenza 3, and bovine respiratory syncytial viruses. This product aids in the prevention of persistent BVD Type 1 and Type 2 infection of the fetal calf when it is used subcutaneously in the cow or heifer 30 to 60 days pre-breeding. This vaccine may be used in pregnant cows or calves nursing pregnant cows provided the cows were vaccinated pre-breeding according to label instructions, with any Express® FP Vaccine, Pyramid FP 5, Pyramid FP 10, Pyramid 2 + Type II BVD, or Pyramid FP 5 + Presponse SQ.

Composition

This product contains IBR, BVD Types 1 and 2, PI3, and BRSV modified live viruses. Contains neomycin, polymyxin B, and thimerosal as preservatives.

Dosage and administration

Aseptically rehydrate with the accompanying diluent. Shake well. Inject one 2 mL dose subcutaneously 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.

Summary of pregnant cow safety study

Safety in pregnant cows and heifers was demonstrated in trials conducted in three separate herds of more than 1,400 cows. Prior to breeding, all animals were vaccinated with Pyramid FP 5, a modified live virus (MLV) vaccine containing IBR, BVD Type 1 & 2, PI3, and BRSV. During the first, second or third trimester of pregnancy, the animals were vaccinated again. The pregnant cows received either Pyramid FP 5 or a killed virus (KV) IBR, BVD Type 1 & 2, PI3, and BRSV vaccine (Triangle® 4 + Type II BVD). From pregnancy vaccination through calving, the cows were observed for fetal loss. Fetal loss in both groups was similar with 0.9% in the Pyramid FP 5 vaccinated groups and 1.6% in the KV vaccinated groups. In addition, no abortions due to IBR or BVD were identified in either group. Following birth, each calf's health was monitored for 30 days. The health of calves born to Pyramid FP 5 vaccinated dams was similar to the health of calves born to the KV vaccinated dams. Fetal health risks associated with vaccination of pregnant animals with modified live vaccines cannot be unequivocally determined by clinical trials conducted for licensure. Vaccination of pregnant animals with modified live vaccines should be discussed with a veterinarian.

Precautions

Store in the dark at 2 - 7°C. Do not freeze. Use entire contents when first opened. 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.

Manufactured by: Boehringer Ingelheim Vetmedica, Inc., St. Joseph, Missouri 64506 U.S.A.

US Vet. Lic. No. 124

Manufactured for: Boehringer Ingelheim (Canada) Ltd., Burlington, Ontario L7L 5H4

158613-01

One vial vaccine	10 Doses - Rehydrate to 20 mL
One vial diluent	50 Doses - Rehydrate to 100 mL

CPN: 1230102.2

K. Medicated Feed Additive – Rumensin™ Premix

Rumensin™ Premix

Elanco

AF 1406

Monensin with Microtracer®

DIN 02231173

ACTIVE DRUG INGREDIENT:

Monensin (as monensin sodium)	200.0 g per kilogram

PREMIX FOR USE IN CATTLE

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.
4. For reduction of milk fat percentage in dairy cows.
5. For minimizing loss of body condition during lactation in dairy cows.
6. For improving feed efficiency of milk protein production in dairy cows.

IMPORTANT:

Must be thoroughly mixed in feeds before use.

MIXING DIRECTIONS:

(Complete diet)

For claims 1, 2, 3, 4, 5 and 6: 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 supplement: Promolas Liquid Supplement Suspension, Westway Feed Products.

Claim 1: Mix not less than 165 g and not more than 240 g Rumensin Premix per tonne (1,000 kg) (to provide not less than 33 g and not more than 48 g monensin activity) to market weight.

Claim 2: Mix 110 g Rumensin Premix per tonne (1,000 kg) (to provide 22 g monensin activity).

Claim 4 and 6: Mix not less than 80 g and not more than 120 g Rumensin Premix per tonne (1,000 kg) (to provide not less than 16 g and not more than 24 g monensin activity).

Claim 5: Mix not less than 40 g and not more than 120 g Rumensin Premix per tonne (1,000 kg) (to provide not less than 8 g and not more than 24 g monensin activity).

Medicated supplement/premix fed as a % of total diet dry matter:

Including the medicated supplement/premix as a % of total 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 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:

mg monensin/kg supplement/premix = Approved drug level (mg/kg total diet) % supplement/premix of total diet dry matter x 100

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 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).

NOTE:

1. All rations should be corrected to a 100% DRY MATTER BASIS.

2. 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.

3. 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.

FEEDING DIRECTIONS: (Complete Diet: which includes complete feed plus roughage)

Claim 1: Feed continuously at a rate of not less than 33 g and not more than 48 g monensin activity per tonne (1,000 kg) until animals reach market weight.

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.

Claim 4: Feed continuously at a rate of not less than 16 g and not more than 24 g monensin activity per tonne (1,000 kg).

Claim 5: Feed continuously at a rate of not less than 8 g and not more than 24 g monensin activity per tonne (1,000 kg).

Claim 6: Feed continuously at a rate of not less than 16 g and not more than 24 g monensin activity per tonne (1,000 kg).

FEEDING DIRECTIONS: (Medicated Supplement)

Claim 3: Hand feed at 200 mg of monensin activity per head per day in medicated supplement.

NOTE:

Claim 1: The data used to support a claim for feed efficiency for a dose range of 33 to 48 ppm was derived from a meta-analysis, including 11 studies and more than 11,000 animals. This analysis demonstrated an additional improvement in feed efficiency of 0.05 units on a “deads out” basis in cattle fed 48 ppm when compared with those fed 33 ppm. In some herds, no additional improvement in feed efficiency was shown from feeding Rumensin Premix at levels greater than 33 ppm. Decisions on the appropriate dose of Rumensin Premix should be made in consultation with your veterinarian.

Claim 4: The expected efficacy of this product for reduction of milk fat percentage may be affected by dietary factors. Reduced efficacy may be expected with diets higher in fibre or lower in unsaturated oils.

CAUTIONS:

1. Do not exceed recommended levels as reduced average daily gains may result.
2. Do not allow canines, horses, other equines or guinea fowl access to formulations containing monensin. Ingestion of monensin by these species has been fatal.
3. 3Do 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. 5NOT TO BE USED AFTER EXPIRATION DATE. Do not use thixotropic supplement after eight weeks storage (Westway Feed Products).
6. The 24 g/tonne monensin treatment in primiparous cows may result in increased incidence of udder edema and increased number of inseminations per full term conception.
7. The continuous use of monensin in dairy cows may be associated with increased rates of twinning and stillbirths, and heavier birth weights for heifer calves.

WARNINGS:

1. For claims 1, 2, and 3: Do not supplement monensin from other sources (eg. other feedstuffs containing monensin, the Rumensin™ Controlled Release Capsule or Kexxtone™).
2. For claims 4, 5, and 6: Do not supplement Rumensin Premix above 16 ppm to dairy cows in herds administered the Rumensin Controlled Release Capsule or Kexxtone.
3. No withdrawal period or milk withholding time is required when used according to the label.
4. When mixing and handling Rumensin Premix, avoid inhalation, oral exposure and direct contact with skin or eyes. Use protective clothing, impervious gloves and dust mask. Operators should wash thoroughly with soap and water after handling.
5. Keep out of reach of children.

PREMIX FOR USE IN BROILER CHICKEN AND GROWING TURKEYS

INDICATIONS:

1. As an aid in the prevention of coccidiosis caused by Eimeria necatrix, E. tenella, E. acervulina, E. brunetti, E. mitis, and E. maxima in broiler chickens.

2. As an aid in the prevention of coccidiosis in growing turkeys caused by E. adenoeides, E. meleagrimitis, and E. gallopavonis.

IMPORTANT: Must be thoroughly mixed in feeds before use.

MIXING DIRECTIONS: (Claims 1 and 2)

Thoroughly mix 500 g (0.5 kg) of Rumensin Premix in 1 tonne (1,000 kg) of feed to provide monensin at 100 g monensin activity per tonne of feed.

To ensure adequate mixing, an intermediate blending step may be performed prior to manufacturing a complete feed.

FEEDING DIRECTIONS:

Feed continuously as the sole ration to broiler chickens.

Feed continuously as the sole ration to growing turkeys.

CAUTIONS:

1. 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.
2. Do not allow canines, horses, other equines, or guinea fowl access to formulations containing monensin. Ingestion of monensin by these species has been fatal.
3. This premix contains monensin: avoid simultaneous administration with tiamulin and monitor for possible adverse reactions when used concurrently with other medicinal substances. Avoid simultaneous administration of monensin and sulphonamides to turkeys as instances of possible intoxication have been reported. Animals including birds should not be treated with products containing tiamulin while receiving, or for at least 7 days before or after receiving, feed containing monensin. Severe growth depression or death may occur.
4. Do not use this mixture for treatment of outbreaks of coccidiosis.
5. Some species of turkey coccidia may be monensin tolerant.
6. NOT TO BE USED AFTER EXPIRATION DATE.

WARNINGS:

1. No withdrawal period is required when treated according to the label.
2. Do not feed to replacement and laying chickens and turkeys.
3. When mixing and handling Rumensin Premix, avoid inhalation, oral exposure and direct contact with skin or eyes. Use protective clothing, impervious gloves and dust mask. Operators should wash thoroughly with soap and water after handling.
4. Keep out of reach of children.

PREMIX FOR USE IN SHEEP

INDICATIONS:

For the prevention of coccidiosis associated with pathogenic Eimeria spp. in sheep.

IMPORTANT: Must be thoroughly mixed in feeds before use.

MIXING DIRECTIONS:

Thoroughly mix not less than 55 g (0.055 kg) and not more than 110 g (0.11 kg) of Rumensin Premix in 1 tonne (1,000 kg) of feed (to provide not less than 11 g and not more than 22 g monensin activity).

FEEDING DIRECTIONS:

Feed continuously at a rate of not less than 11 g and not more than 22 g monensin activity per tonne (1,000 kg).

CAUTIONS:

1. Do not exceed recommended levels as reduced average daily gains may result.
2. Do not use in lactating ewes.
3. Do not allow dogs, horses or other equines access to feeds containing monensin. Ingestion of monensin by these species has been fatal.
4. Do not use Rumensin medicated feed for the treatment of outbreaks of coccidiosis.
5. 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.
6. Feeding undiluted or mixing errors resulting in high concentrations of monensin could cause reduced feed intake, poor growth, diarrhoea, and death of sheep.

7. Response to monensin sodium is unlikely if medicated feed intake is insufficient.
8. NOT TO BE USED AFTER EXPIRATION DATE.

WARNINGS:

1. No withdrawal period is required when treated according to the label.
2. Do not use in lactating dairy sheep producing milk for food.
3. When mixing and handling Rumensin Premix, avoid inhalation, oral exposure and direct contact with skin or eyes. Use protective clothing, impervious gloves and dust mask. Operators should wash thoroughly with soap and water after handling.
4. Keep out of reach of children.

PREMIX FOR USE IN GOATS

INDICATIONS:

For the prevention of coccidiosis associated with Eimeria crandallis, E. christenseni, and E. ninakohlyakimovae in goats.

IMPORTANT: Must be thoroughly mixed in feeds before use.

MIXING DIRECTIONS:

Thoroughly mix not less than 55 g (0.055 kg) and not more than 110 g (0.11 kg) of Rumensin Premix in 1 tonne (1,000 kg) of feed (to provide not less than 11 g and not more than 22 g monensin activity).

FEEDING DIRECTIONS:

Feed continuously at a rate of not less than 11 g and not more than 22 g monensin activity per tonne (1,000 kg).

CAUTIONS:

1. Do not exceed recommended levels as reduced average daily gains may result.
2. Do not use in lactating goats.
3. Do not allow dogs, horses or other equines access to feeds containing monensin. Ingestion of monensin by these species has been fatal.
4. Do not use Rumensin medicated feed for the treatment of outbreaks of coccidiosis.
5. 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.
6. Feeding undiluted or mixing errors resulting in high concentrations of monensin could cause reduced feed intake, poor growth, diarrhoea, and death of goats.
7. Response to monensin sodium is unlikely if medicated feed intake is insufficient.
8. NOT TO BE USED AFTER EXPIRATION DATE.

WARNINGS:

1. No withdrawal period is required when treated according to the label.
2. Do not use in lactating dairy goats producing milk for food.
3. When mixing and handling Rumensin Premix, avoid inhalation, oral exposure and direct contact with skin or eyes. Use protective clothing, impervious gloves and dust mask. Operators should wash thoroughly with

soap and water after handling.

4. Keep out of reach of children.

STORE IN A COOL DRY PLACE.

Elanco Canada Limited, 1919 Minnesota Court, Suite 401, Mississauga, Ontario L5N 0C9

Net Weight

25 kg bag 28Apr2022

500 kg tote 10Jan2019

CPN: 1231133.2

L. Water Medication – Sulfamethazine 25% Concentrate Solution

SULFAMETHAZINE 25% CONCENTRATE SOLUTION

Solvet

Sodium Sulfamethazine Concentrate Solution 25%

WARNINGS:

- Milk taken from treated animals during treatment and within 96 hours after the latest treatment with this drug 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.
- Do not use in laying birds.
- Do not add to swine feeds.
- Sulfonamides can cause allergic reactions in sensitized individuals. When handling the product, avoid inhalation, oral exposure and direct contact with skin or eyes. The concentrated product is caustic and may cause severe irritation to the skin. Wear protective gloves and eyewear when handling.
- Keep out of reach of children.

ACTIVE INGREDIENTS:

A non-sterile solution containing 25 grams of sodium sulfamethazine in each 100 mL.

INDICATIONS:

Sulfamethazine 25% Concentrate Solution is an antibacterial drug for use as an aid in the treatment of the following conditions:

Cattle & Sheep: As an aid in the treatment of the following conditions caused by bacteria sensitive to sulfamethazine: foot rot, shipping fever, bacterial enteritis/scours, metritis, mastitis and bacterial respiratory disease. As an aid in the treatment of coccidiosis in sheep.

Calves: As an aid in the treatment of the following conditions caused by bacteria sensitive to sulfamethazine: bacterial respiratory infections and secondary infections in bacterial enteritis/scours. As an aid in the prevention of coccidiosis.

Swine: As an aid in the treatment of bacterial enteritis, mastitis, metritis, and bacterial respiratory diseases caused by bacteria sensitive to sulfamethazine.

Horses: As an aid in the treatment of strangles, navel ill, joint ill (septic arthritis), bacterial enteritis and many secondary bacterial infections, associated with respiratory virus infections, caused by bacteria sensitive to sulfamethazine.

Poultry: As an aid in the treatment of caecal coccidiosis in chickens.

DOSAGE AND ADMINISTRATION:

To reduce the development of antimicrobial resistance and maintain effectiveness, use this antibiotic prudently.

Sulfamethazine 25% Concentrate Solution must be diluted with the amount of drinking water the animal(s) would consume daily. Allow access to medicated water only during treatment.

Dairy Cattle, Calves, Sheep, Swine and Horses: First day: 45 mL of Sulfamethazine 25% Concentrate Solution for each 50 kg of body weight diluted with the amount of drinking water the animal(s) would consume daily. Following days: 22.5 mL of Sulfamethazine 25% Concentrate Solution for each 50 kg body weight diluted in the

amount of drinking water the animal would consume daily. Do not treat for more than 5 days.

Beef Cattle: First day: For each 100 kg of body weight, add 100 mL of Sulfamethazine 25% Concentrate Solution into the amount of drinking water that will be consumed daily by the animal(s). Following days: 50 mL of Sulfamethazine 25% Concentrate Solution for each 100 kg body weight diluted in the amount of drinking water the animal(s) would consume daily. Do not treat for more than 5 days.

Poultry: First 2 days: Mix 35 mL of Sulfamethazine 25% Concentrate Solution in 9 Litres of drinking water. Following 5 additional days: Mix 17.5 mL of Sulfamethazine 25% Concentrate Solution in 9 Litres of drinking water. If animals do not respond within 4 days, stop treatment and recheck the diagnosis.

CAUTIONS:

1. Undiluted product can cause severe burns.
2. Dairy animals drink twice as much water so reduce dosage accordingly.
3. Medicated water should be the only source of water during treatment.

STORAGE:

Store below 25°C. Keep from freezing.

4 Litres

VETERINARY USE ONLY - ANTIBIOTIC

DIN: 02391368

Manufactured by: AVL. 7226-107 Avenue SE, Calgary, Alberta T2C 5N6. 1-877-456-2755

MADE IN CANADA

CPN: 1973019.2

M. Parenteral Drug – Excenel Sterile Powder

EXCENEL®

Zoetis

ceftiofur sodium powder for solution

Veterinary Use Only

broad-spectrum antibiotic

Sterile

DIN 00813567

DESCRIPTION

EXCENEL contains the sodium salt of ceftiofur which is a broad spectrum cephalosporin antibiotic active against Gram-positive and Gram-negative bacteria including β-lactamase-producing strains. Like other cephalosporins, ceftiofur is bactericidal in vitro as a result of inhibition of cell wall synthesis.

Medicinal Ingredient: Each mL of reconstituted solution contains 50 mg ceftiofur (as ceftiofur sodium).

Preservative: Benzyl Alcohol 9 mg per mL (in the sterile diluent)

Non-medicinal ingredients:

Sterile Water for injection, 1 qs per mL

Monobasic Potassium Phosphate, 1.388 mg per mL

Sodium hydroxide, 10% qs to pH

ACTION

Ceftiofur sodium has demonstrated excellent in vitro and in vivo activity against Mannheimia haemolytica and Pasteurella multocida, two of the major pathogenic organisms associated with bovine respiratory disease (pneumonia, shipping fever). This drug has also demonstrated excellent in vitro and in vivo activity against Histophilus somni (Haemophilus somnus) and in vitro activity against Corynebacterium pyogenes, two other bacterial pathogens associated with bovine respiratory disease (BRD). Ceftiofur has demonstrated in vivo and in vitro activity against Fusobacterium necrophorum and Bacteroides melaninogenicus, two of the major pathogenic anaerobic bacteria associated with acute bovine interdigital necrobacillosis (foot rot, pododermatitis). Ceftiofur has excellent in vitro activity against Gram-negative pathogens such as Actinobacillus pleuropneumoniae, Salmonella choleraesuis, Pasteurella multocida and the Gram-positive pathogen Streptococcus suis, all of which singly or in combination can be associated with swine bacterial respiratory disease (swine bacterial pneumonia). Ceftiofur has also demonstrated excellent in vitro and in vivo activity against respiratory pathogens of horses. The drug was very active in vitro against Streptococcus zooepidemicus, S. equi, Streptococcus spp. and Pasteurella spp. isolated from patients with infections. Ceftiofur has demonstrated in vitro and in vivo activity against Mannheimia haemolytica, the major pathogenic bacterium associated with ovine respiratory disease (pneumonia). Ceftiofur has also demonstrated in vivo and in vitro activity against bacterial pathogens from dogs with urinary tract infections. Ceftiofur was more potent (in vitro) than other beta-lactam antibiotics against strains of Escherichia coli and Proteus mirabilis.

In addition, ceftiofur has excellent in vitro activity against other Gram-negative pathogens, such as Proteus vulgaris, Klebsiella pneumoniae, 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 uberis and Streptococcus bovis. The clinical significance of these findings is not known. Clinical efficacy for the treatment of bovine respiratory disease has been demonstrated on the basis of well controlled multi-location clinical trials involving large numbers of cattle.

Ceftiofur sodium has demonstrated in vitro and in vivo activity against E. coli.

INDICATIONS

Cattle and lactating dairy cattle: For treatment of bovine respiratory disease (shipping fever, pneumonia) associated with Mannheimia haemolytica, Pasteurella multocida and Haemophilus somnus. For the treatment of acute bovine interdigital necrobacillosis (foot rot, pododermatitis) associated with Fusobacterium necrophorum and Bacteroides melaninogenicus.

Horses: For treatment of respiratory infections in horses associated with Streptococcus zooepidemicus.

Swine: For treatment of swine bacterial respiratory disease (swine bacterial pneumonia) associated with Actinobacillus pleuropneumoniae and Pasteurella multocida.

Lambs: For treatment of respiratory disease (pneumonia) in lambs associated with Mannheimia haemolytica.

Dogs: For the treatment of canine urinary tract infections associated with Escherichia coli and Proteus mirabilis.

DOSAGE AND ADMINISTRATION

1 g

EXCENEL should be reconstituted by adding 20 mL of sterile diluent for EXCENEL to each 1 g vial. For ease in reconstitution use an 18 gauge needle or larger.

4 g

EXCENEL should be reconstituted by adding 80 mL of sterile diluent for EXCENEL to each 4 g vial.

Directions for Using Transfer Needle for Reconstitution:

1. Remove stopper overseal from diluent and sterile powder vials.
2. Hold transfer needle case by each end and twist slightly to break paper seal.
3. Pull plastic case apart which will expose the short end of the transfer needle. Insert through rubber stopper of diluent vial.
   NOTE: It is imperative that the needle be placed in the diluent vial first. Entry into the sterile powder vial first will result in loss of vacuum and necessitate manual transfer of diluent.
4. Remove other end of plastic case from the transfer needle (needle will remain in the diluent vial).
5. Tipping diluent vial slightly, insert transfer needle through rubber stopper of the sterile powder vial. Quickly invert diluent vial over sterile powder vial. The vacuum should remove all liquid from the diluent vial. Should residual liquid remain in the diluent vial, this must be manually transferred to the sterile powder vial using an appropriate needle and syringe prior to use of the product.
6. Shake solution until complete reconstitution of powder occurs.

Rapid addition of diluent maintained at room temperature will give best results. Normally accepted aseptic technique should be followed during reconstitution to avoid microbial contamination.

A sterile needle and syringe should be used for each injection. Before withdrawing the solution from the bottle, disinfect the rubber cap on the bottle with suitable disinfectant, such as 70 percent alcohol. The injection site should be similarly cleaned with the disinfectant. Needles of 18 gauge and 1 to 1 1/2 inches long are adequate for intramuscular injections.

Administer intramuscular injections by directing the needle of suitable gauge and length into the neck of cattle, horses and swine. Avoid blood vessels and major nerves. Before injecting the solution, 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.

Cattle and Lactating Dairy Cattle: Reconstituted EXCENEL should be administered by intramuscular injection to cattle at the dosage of 1.0 mg ceftiofur per kg of body weight (1.0 mL per 50 kg body weight). Treatment should be repeated every 24 hours for a total of three treatments. Additional treatments may be given on days four and five for animals which do not show a satisfactory response (not recovered) after the initial three treatments.

Horses: Reconstituted EXCENEL should be administered by intramuscular injection to horses at a dosage of 2.0 mg ceftiofur per kg of body weight (2.0 mL per 50 kg body weight) and repeated every 24 hours. Treatments should be continued for 48 hours after symptoms have disappeared. If no response is observed within 4 - 5 days,

the diagnosis should be re-evaluated.

Swine: Reconstituted EXCENEL should be administered by intramuscular injection to swine at the dosage of 3.0 mg ceftiofur per kg of body weight (1 mL per 17 kg body weight). Treatment should be repeated every 24 hours for a total of three treatments.

Lambs: Reconstituted EXCENEL is to be administered by intramuscular injection at the dosage of 2.0 mg/kg body weight. Treatment should be repeated at 24 hour intervals for a total of three treatments. Additional treatments may be given on days four and five for animals which do not show a satisfactory response (not recovered) after the initial three treatments.

Dogs: Reconstituted EXCENEL should be administered by subcutaneous injection at a dosage of 2.0 mg ceftiofur per kg of body weight (0.2 mL per 5 kg body weight). Treatment should be repeated at 24-hour intervals for 5 - 14 days.

Contraindications

As with all drugs, the use of EXCENEL 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.

CAUTIONS

1. The use of ceftiofur sodium in cattle may result in some signs of immediate and transient local pain at the injection site. If no improvement is seen within 3 - 5 days, redetermine the diagnosis.
2. The administration of antibiotics to horses under conditions of stress may be associated with acute diarrhea that could be fatal. If acute diarrhea is observed, discontinue use of this drug and initiate appropriate therapy.
3. Since safety in breeding swine has not been determined, use in animals intended for breeding is not recommended.
4. For horses, safety in breeding animals and suckling foals (under 6 months of age) has not been established.
5. Reversible thrombocytopenia and anemia have occasionally been observed in dogs treated with ceftiofur for prolonged periods. Thus, the use of this drug is contraindicated in animals with pre-existing signs of these conditions. Prolonged therapy (greater than 14 days) should be undertaken only with appropriate evaluation and monitoring of hematologic values.
6. In dogs, safety in breeding, pregnant, lactating and neonatal animals has not been established.

WARNINGS

Treated swine and lambs must not be slaughtered for use in food for at least 24 hours after the latest treatment with this drug. No meat withdrawal period or milk withholding time is required in cattle when treated according to the label. Do not use in calves to be processed for veal. This drug is not to be administered to horses that are to be slaughtered for use in food. Antimicrobial drugs, including penicillins and cephalosporins can cause allergic reactions in sensitized individuals. To minimize the possibility of such a reaction, users of such antimicrobial products, including ceftiofur, are advised to avoid direct contact of the product with the skin and mucous membranes. To limit the development of antimicrobial resistance:

- EXCENEL should not be used as a mass medication for cattle, swine or any other species.
- EXCENEL should only be used to treat individual animals as per the indications.
- •The choice of EXCENEL as the most appropriate treatment should be confirmed by clinical experience supported where possible by pathogen culture and drug susceptibility testing.
- The extra-label drug use of EXCENEL is not recommended.

KEEP OUT OF REACH OF CHILDREN

NOTE

Cattle: Use of dosages in excess of those indicated may result in illegal residues in tissues and/or in milk. Residual drug concentrations in milk at all time intervals after last treatment (e.g., 3, 6, 9, 12, 24, etc. to 120 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. Drug residues were not detectable by any of several screening assay procedures commonly used by the dairy industry. Assay procedures used were Delvotest P*, Bacillus stearothermophilus disk assay (BSDA) and the cylinder/plate (M. luteus) assay. Lower limits of detection for microbiologically active residues for these assays, respectively, were 0.05 ppm, 0.08 ppm and 0.015 ppm.

ANIMAL SAFETY

CATTLE:

Results from a 5-day tolerance study in normal feeder calves indicated that formulated ceftiofur sodium was well tolerated at over 55 times (55.0 mg/kg/day) the recommended dose of 1.0 mg/kg/day for 5 consecutive days. Ceftiofur sodium administered intramuscularly had no adverse systemic effects. Local effects of muscle irritation were detected after the last dose (5 consecutive daily doses) as evidenced by significantly elevated aspartate transaminase and creatine phosphokinase values. However, these transient elevated values returned to baseline values 9 days post-treatment.

In a 15-day safety/toxicity study, 5 steer and 5 heifer calves per group were intramuscularly administered formulated ceftiofur sodium at just over 0 (vehicle control), 2, 6, 10 and 20 times the maximum recommended dose of 1.0 mg/kg/day to determine the safety factor and to measure the muscle irritancy potential in the target species. There were no adverse systemic effects indicating that formulated ceftiofur sodium has a wide margin of safety when injected intramuscularly into feeder calves at over 22 times (22.0 mg/kg/day) the recommended dose for 3 times (15 days) the recommended 3 to 5 days of therapy. The formulation was shown to be a slight muscle irritant based on results of histopathological evaluation of the injection sites at post treatment days 1, 3, 7 and 14.

HORSES:

In a safety study, horses received a daily intramuscular injection of either 0 mg/kg/day (saline control), 2.2 mg/kg/day (50 mg/mL), 6.6 mg/kg/day (100 mg/mL), or 11.0 mg/kg/day (200 mg/mL) of an aqueous solution of ceftiofur sodium for 30 or 31 days. Ceftiofur sodium was well tolerated when administered intramuscularly to male and female horses at doses up to 11.0 mg/kg/day for 30 or 31 days. No clinical evidence of irritation was noted at any dose. The drug-related changes detected in this study were limited to a transient decrease in food consumption in horses receiving 6.6 or 11.0 mg/kg/day ceftiofur, and a general mild skeletal muscle irritation at the injection sites of ceftiofur treated horses evident only on gross and histopathological examination.

In a tolerance study, horses received a single daily intravenous infusion of either 0 (saline), 22.0 or 55.0 mg/kg/day of an aqueous solution (50 mg/mL) of ceftiofur for 10 days. The results indicated that ceftiofur administered intravenously at a dose of 22.0 or 55.0 mg/kg/day apparently can change the bacterial flora of the large intestine leading to inflammation of the large intestine with subsequent diarrhea and other clinical signs (loose feces, eating bedding straw, dehydration, rolling or colic and a dull, inactive demeanor). Decreased food consumption, a loss of body weight, hematologic changes related to acute inflammation and stress, and serum chemistry changes related to decreased food consumption and diarrhea were also associated with treatment at these doses. The adverse effects were most severe a few days after dosing was initiated and tended to become less severe towards the end of the 10-day dosing period.

SWINE:

Results from a 5-day tolerance study in normal feeder pigs indicated that formulated ceftiofur was well tolerated when administered at 125.0 mg/kg (more than 40 times the recommended daily dosage of 3.0 mg/kg of body weight) for 5 consecutive days. Ceftiofur sodium administered intramuscularly to pigs produced no overt adverse signs of toxicity.

To determine the safety factors and to measure the muscle irritancy potential in swine, a safety/toxicity study was conducted. Five barrows and 5 gilts per group were intramuscularly administered formulated ceftiofur sodium at 0, 5.0, 15.0 and 25.0 mg/kg of body weight for 15 days which is 0, 1.66, 5 and 8.33 times

the recommended dose of 3.0 mg/kg of body weight/day and 5 times the recommended treatment length of 3 days. There were no adverse systemic effects indicating that formulated ceftiofur has a wide margin of safety when injected intramuscularly into feeder pigs at the recommended dose of 3.0 mg/kg/day for 3 days or at levels up to 8.33 times the recommended dose for 5 times the recommended length of treatment. The formulation was shown to be a slight muscle irritant based on results of histopathological evaluation of the injection sites at post treatment days 1, 2, 3 and 4. By day 10 post injection the muscle reaction was subsiding and at day 15 post injection there was little evidence of muscle damage in any of the pigs in any of the treatment groups.

LAMBS:

In a 15-day safety/toxicity study in sheep, 3 wether and 3 ewe lambs per group were given formulated ceftiofur sodium by the intramuscular route 0 (sterile water vehicle), 1, 3 or 5 times the recommended dose of 2.0 mg/kg/day for 3 times the recommended maximum duration of 5 days of treatment. There were no adverse systemic effects indicating that formulated ceftiofur is well tolerated and has a wide margin of safety in lambs. Based on examination of injection sites from study days 9, 11, 13 and 15, a low incidence of visual changes and histopathologic findings of a mild, reversible inflammation from all groups including the controls indicated that the formulation is a slight muscle irritant.

DOGS:

Ceftiofur sodium was well tolerated at the therapeutic dose and is safe for the treatment of urinary tract infections in dogs. In clinical studies, ceftiofur was well tolerated by dogs at the recommended level (2.0 mg/kg) for 5 - 14 days. In the acute study, minimal inflammation at the injection site was noted when administered subcutaneously for 42 consecutive days. One of four females also developed thrombocytopenia (15 days) and anemia (36 days). Thrombocytopenia and anemia also occurred at the 3X and 5X dose levels. In the reversibility phase of the study (5X dose), the thrombocytopenia reversed within 8 days, and of the two anemic animals, the male recovered within 6 weeks and the female was sacrificed due to the severity of the anemia.

In the 15-day tolerance study in dogs, exaggerated high subcutaneous doses of 25 and 125 times the recommended therapeutic dose produced a progressive and dose-related thrombocytopenia, with some dogs also exhibiting anemia and bone marrow changes. The hematopoietic changes noted in dogs treated with ceftiofur were similar to those associated with long-term cephalosporin administration in dogs and humans. The hematopoietic effects are not expected to occur as a result of recommended therapy.

STORAGE

1. Store unreconstituted product at a temperature between 15 and 30°C.
2. Store reconstituted product at a temperature between 2 and 8°C for up to 7 days, between 15 and 30°C for up to 12 hours, or frozen for up to 8 weeks. Although some breakage may occur with the frozen product, thaw by immersing the vial in hot, running tap water until a clear, ice-free solution is obtained and then use according to label. Do not freeze and thaw reconstituted product more than once.
3. Colour of cake may vary from off-white to tan and does not affect potency.
4. Protect from light.

PRESENTATION

EXCENEL is available in 1 g and 4 g vials.

Zoetis Canada Inc., Kirkland QC H9H 4M7

1627-11-3

40024482

CPN: 1198286.7

N. Pour-on Parasecticide – BOSS® Pour-On

BOSS® POUR-ON

Merck Animal Health

INSECTICIDE

SOLUTION

GROUP 3 INSECTICIDE

FOR BEEF CATTLE, LACTATING AND NON-LACTATING DAIRY CATTLE AND SHEEP ONLY

DO NOT use on any other animal.

Non-Systemic Pour-On to Control Biting Lice, Sucking Lice, Horn Flies and Rocky Mountain Wood Ticks on Beef, Lactating and Non-Lactating Dairy Cattle and Sheep Keds and Lice on Sheep.

ACTIVE INGREDIENT: Permethrin 5.0% w/w.

AGRICULTURAL

REGISTRATION NO. 25488 PEST CONTROL PRODUCTS ACT.

CAUTION - IRRITATING TO SKIN AND EYES.

READ THE LABEL BEFORE USING.

KEEP OUT OF REACH OF CHILDREN.

BOSS POUR-ON

DIRECTIONS FOR USE

As this product is not registered for the control of pests in aquatic systems, DO NOT use to control aquatic pests. DO NOT contaminate irrigation or drinking water supplies or aquatic habitats by cleaning of equipment or disposal of wastes. BOSS POUR-ON is ready to use. DO NOT dilute.

Cattle: For Dairy Cattle, DO NOT use this product in combination with any other permethrin treatment. For control of biting lice, sucking lice, horn flies and Rocky Mountain Wood Ticks (Dermacentor andersoni) on beef cattle and lactating and non-lactating cattle. Apply 3 mL (1/10 fl. oz) per 45 kg (100 lbs) body weight up to a maximum of 30 mL (1 fl. oz) for one animal. Pour along the back and down the face taking care to avoid the eyes, nose and mouth. Alternatively BOSS POUR-ON may be applied to the face with a cloth that is slightly moistened with the product. For control of Rocky Mountain Wood Ticks apply topically at time of entry into tick infested pastures. DO NOT repeat treatment for at least 14 days. For control of lice, two treatments 14 days apart are recommended. Treatment must only be repeated after 14 days if pest problem persists or reoccurs. DO NOT apply more than 2 applications/animal/year. Leave a one day interval between last application and slaughter.

One 900 mL bottle lasts for 30 treatments or more, depending on the weight of the animal treated.

One 3.785 L bottle lasts for 126 treatments or more, depending on the weight of the animal treated

Sheep: DO NOT use this product in combination with any other permethrin treatment. For the control of sheep keds and lice on sheep. Apply 1.5 mL per 23 kg (50 lbs) body weight up to a maximum of 18 mL for one animal. Part the wool until the skin is visible. Pour onto the sheep's skin along the back and down the face taking care to avoid the eyes and mouth. DO NOT repeat treatment for at least 14 days. Treatment must only be repeated after 14 days if pest problem persists or reoccurs. DO NOT apply more than 2 applications/animal/year. Leave a two day interval between last application and slaughter.

One 900 mL bottle lasts for 50 treatments or more, depending on the weight of the animal treated.

One 3.785 L bottle lasts for 210 treatments or more, depending on the weight of the animal treated.

RESISTANCE MANAGEMENT RECOMMENDATIONS:

BOSS POUR-ON contains the synthetic pyrethroid permethrin (a Group 3 insecticide). Any insect population may contain individuals naturally resistant to permethrin and to other Group 3 Insecticides. Continuous or repeated

exposure to insecticides of this group rapidly selects for resistant insects, eventually leading to the failure of the insecticide to provide satisfactory control. Permethrin resistance has already been recorded in horn fly populations in Canada. The use of this product should therefore conform to current resistance management strategies.

To delay insecticide resistance:

1. When possible, rotate the use of BOSS POUR-ON with insecticides of other groups that control the pests named on the label.
2. Insecticide use should be based on an IPM program that includes scouting, record keeping, and considers cultural, biological and other chemical control practices.
3. Monitor treated pest populations for resistance development.
4. Consult with local provincial authorities and extension specialist for advice on any additional pesticide resistance-management and/or IPM strategies to control cattle or sheep pest populations in your area.
5. For further information or to report suspected resistance contact Intervet Canada Corp. at 1-866-683-7838.

PRECAUTIONS:

KEEP OUT OF REACH OF CHILDREN. HARMFUL IF SWALLOWED. CAUTION: SKIN IRRITANT. Avoid prolonged or repeated contact with skin. Wash skin thoroughly with soap and water after contact. Avoid breathing vapours. Use with adequate ventilation. Wear long pants, long-sleeved shirt, chemical-resistant gloves, shoes, and socks during application and clean-up. Remove contaminated clothing and wash separately from household laundry before reuse. May irritate skin and eyes. Avoid contact with skin, eyes and clothing.

FIRST AID:

If swallowed, call a poison control centre or doctor immediately for treatment advice. Do not induce vomiting unless told to do so by a poison control centre or doctor. Do not give any liquid to the person. Do not give anything by mouth to an unconscious person. If inhaled, move person to fresh air. If person is not breathing, call 911 or an ambulance, then give artificial respiration, preferably by mouth-to-mouth, if possible. Call a poison control centre or doctor for further treatment advice. In case of contact with eyes, hold eye open and rinse slowly and gently with water for 15-20 minutes. Remove contact lenses, if present, after the first 5 minutes, then continue rinsing eye. Call a poison control centre or doctor for treatment advice. In case of contact with skin or clothing, take off contaminated clothing. Rinse skin immediately with plenty of water for 15-20 minutes. Call a poison control centre or doctor for treatment advice. Take container, label or product name and Pest Control Product Registration Number with you when seeking medical attention.

TOXICOLOGICAL INFORMATION:

Inducing vomiting as first aid for this slightly toxic substance may result in increased risk of chemical pneumonia or pulmonary oedema caused by aspiration of the hydrocarbon solvent. Vomiting should be induced only under professional supervision. Skin exposure may cause transient sensations (tingling, burning, itching, numbness). Treat symptomatically.

STORAGE:

Keep container closed when not in use. Do not store near food or feed. In case of spill or leak on floor or paved surfaces, soak up with sand, earth or synthetic absorbent. Do not reuse container. Protect from freezing.

DISPOSAL:

Disposal of container. Do not reuse this container for any purpose. This is a recyclable container, and is to be disposed of at a container collection site. Contact your local distributor/dealer or municipality for the location of the nearest collection site. Before taking the container to the collection site: make the empty container unsuitable for further use. If there is no container collection site in your area, dispose of the container in

accordance with provincial requirements. For information on disposal of unused, unwanted product, contact the manufacturer or the provincial regulatory agency. Contact the manufacturer and the provincial regulatory agency in case of spill, and for clean-up of spills.

PHYSICAL OR CHEMICAL HAZARDS:

Do not use or store near heat or open flames.

NOTICE TO USER:

This pest control product is to be used only in accordance with the directions on the label. It is an offence under the Pest Control Products Act to use this product in a way that is inconsistent with the directions on the label.

NET CONTENTS:

900 mL OR 3.785 L

Intervet Canada Corp., subsidiary of Merck & Co., Inc., 16750 route Transcanadienne, Kirkland, QC H9H 4M7

1 866 683-7838

CPN: 1208011.2

Appendix 4

A. Feedlot Processing Protocol Template - to be completed by vet and producer

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				
Metaphylactic Medication				
Implants (re-implant)				
Abortion Regime				
Other				
(e.g., add missing CCIA eartags and feedlot tags)				

Castration Method: _____

Dehorn Method: _____

Date: _____ Veterinarian's Signature: _____

Print Name of Veterinarian and Clinic: _____

B. Cow-Calf Processing Protocol and Record

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...)	WITHDRAWAL 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 Template - to be completed by vet

Record all treatments in treatment records (paper or computer). 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 (CLINICAL SIGNS)	TREATMENT*	WITHDRAWAL PERIOD	COMMENTS

* (if drug is required, record drug name, dose, route, frequency, duration)
include how to handle all relapses and when to discontinue treatment or call vet if nonresponsive

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. Cow-Calf Treatment Protocol - template with some examples

Insert Name of Veterinary Clinic	
Insert Address of Veterinary Clinic	
Insert Ranch and Producer Name	

NOTE: NEVER GIVE INJECTIONS IN THE HIP (RUMP) OR ROUND (BACK LEGS), NEVER EXCEED 10 CC PER INJECTION SITE

Give ALL IM or SC injections in the neck area only.

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

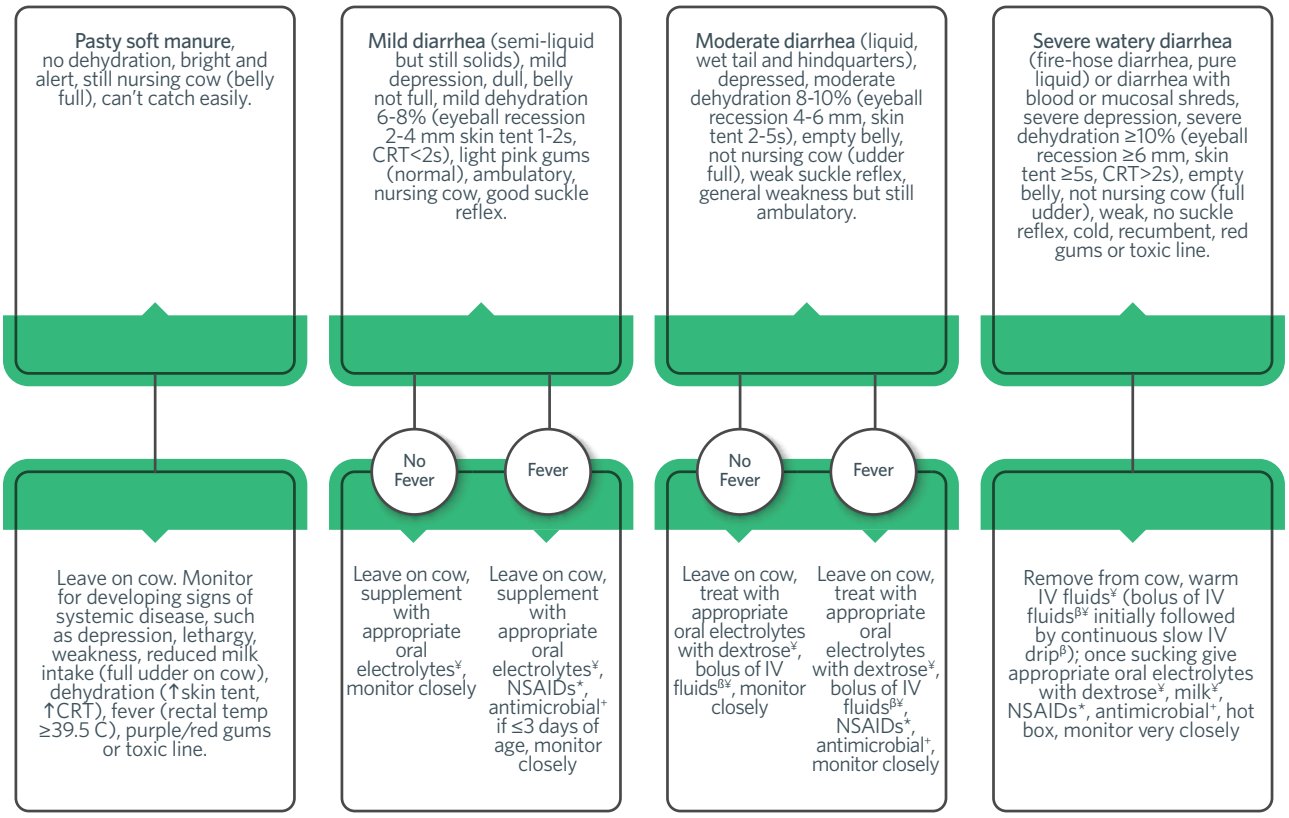
- Oral Fluids (provide name of acceptable products (e.g., Revibe)
  - Volume
  - Frequency
  - Notes (describe special instructions, e.g., keep on cow or pull from cow)
- Take temperature and record on treatment records
- Antimicrobials (if needed, provide options – see CVMA Antimicrobial Diarrhea Decision Tree below)
  - Dose
  - Route
  - Frequency
  - Withdrawal period
  - Notes (e.g., veterinary prescription required….)
- Mark sick calf with individual identification (e.g., ear tag)
- Whether to segregate sick calf from cow or pair from other 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 recurrences in future

Calf Scours (Severe)

Clinical Signs: 10-12% dehydrated, eyes 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 recurrences in future

Diarrheic Beef Calf (<30 days old) – CVMA Antimicrobial Treatment Decision Tree



*NSAID – do not exceed 3 doses or use in dehydrated calves. Meloxicam preferred over flunixin due to COX2 target. Vet Clin North Am Food Anim Pract. 2009 Mar;25(1):101-20. J Anim Sci. 2010 Jun;88(6):2019-28. βChoice of fluids for IV bolus (hypertonic saline or isotonic or hypertonic bicarb) depending on acid-base balance, ¥ IV and Oral Fluid and Milk Recommendations: J Vet Med A Physiol Path Clin Med 2003 Mar;50(2):57-61. J Vet Intern Med 2017 May;31(3):907-921; Vet Clin North Am Food Anim Pract. 2014 Jul;30(2):409-27; J Dairy Sci. 2019 Dec;102(12):11337-11348. J Dairy Sci. 2020 Nov;103(11):10446-10458. Vet Clin Food Anim 25 (2009) 55–72. Vet J. 2017; 226:15-25.

+Only use antimicrobials in diarrheic calves with signs of systemic illness (dehydration, depression, fever, weak or absent suckle reflex, generalized weakness, red gums/toxic line) or diarrhea with blood or mucosal shreds and if disease not coccidiosis (≥3 wk of age): a) TMP-Sulfa (caution in dehydrated calves) - 25 mg/kg IV or IM every 24 hours for maximum of 5 treatments b) ceftiofur – 2.2. mg/kg IM every 12 hours for minimum of 3 days, c) parenteral fluoroquinolones per label dosage and route (ELDU), d) Ampicillin -10 mg/kg IM every 12 hours for minimum of 3 days. J Vet Intern Med 2004; 18:8–17. Res Vet Sci. 2003 Apr;74(2):171-8. Vet Clin North Am Food Anim Pract. 2009 Mar;25(1):101-20. J Dairy Sci. 2014 Dec;97(12):7644-54. Cryptosporidiosis Halocur® or Halagon® and fluids Parasitology. 2020 Dec 2;1-12.

Coccidiosis Baycox® or Amprol® for treatment; ionophores, Deccox® or Amprol® for control/prevention.

Non-antimicrobial alternatives review *J Vet Res 2020.* 64,1 119-126.

Note: Fecal bacterial culture and antimicrobial susceptibility testing is not recommended in calves with diarrhea because fecal bacterial populations do not accurately reflect small intestinal or blood bacterial populations and because the break points for susceptibility test results have not been validated. *J Vet Intern Med* 2004; 18:8–17. If herd problem, may consider fecal sampling to determine if problem *E. coli* (usually ≤3 days of age), cryptosporidia (5-14 days old), rota/corona virus (5-14 days old), bloody scours (DDX: *Clostridial perfringens, Salmonella* spp), coccidiosis ≥ 14 days old. Mixed infections common. If herd problem, investigate risk factors associated with diarrhea and adjust to prevent and control disease e.g. poor colostral immunity (Failure of Passive Transfer) overcrowding, environmental factors including poor hygiene…Vet Clin North Am Food Anim Pract. 2012 Nov; 28(3): 465–481.

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 (if needed, 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 Prescription

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: Group Record

Lot:		Home Pen:	
Tag Sequence:			
Tag Location:		Tag Color	
Number of Head:	Sex:	Average group weight:	Type:
Processing Date(s)		Arrival Date(s)	
Processing Message:			
Lot Message:			

PROCEDURE	LIST PRODUCTS	LOT SERIAL	EXPIRY DATE	DOSE GIVEN	ROUTE (IM, SC, PO, EAR)	INJECTION SITE	CREW	WITHDRAWAL PERIOD
Vaccinations								
Parasite Treatment								
Implant Arrival: Reimplant :								
Metaphylactic Antimicrobials								
Other drugs e.g., abortion drugs, vitamins. . .								
Identification (e.g., management feedlot tag, replace CCIA eartag)								
Other procedures e.g., branding, castrating								
Comments								

* all IM or SC injections in the neck area only

* create a treatment record to record any broken/missing needles

Note: Processing records can be on a group basis or an individual animal basis by CCIA and feedlot mgt tag (important to record on an individual basis if drug volumes are based on individual animal weight – then individual animal weight should also be recorded)

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	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 OM, SC, P0, feed, water)	Injection Location (RT or LT neck,.)	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

CLEANING 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 as will interfere with future 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 are sufficient. Let the syringe cool before using.
- Metal syringes can be taken apart and boiled in hot water for 5 minutes. Reassemble while hot. 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 syringe 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; there can be a fire. Remove the plastic syringe, squirt out any remaining water in syringe and cool 10 minutes before using.
- If repeater syringes, take syringe apart to properly clean.
- 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 scraped to a bedding mound
- Between manure removal from pens, excess manure is scraped 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 are 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:

Feed Type: Steer Finisher	Farm Name: Example
Tonnes: 15	Date: January 15, 2023

MAJOR INGREDIENTS	KGS / TE	1	2	3	4	5	6	7	8	9	10
Barley	445										
Oats	250										
Corn	145										
32% Beef Grower Supp	85										
Beet Pulp	72										
BAGS (25KG)											
Mineral Pak	2										
Vitamin Pak	0.5										
HAND ADDS (KGS)											
ADE Crumbles	0.5										
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:	Trucker 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 *	NUMBER OF CATTLE	FREQUENCY OF FEEDING **	TOTAL AMOUNT OF COMPLETE MEDICATED FEED FED EACH FEEDING ***	COMMENTS	FEEDING CREW INITIAL

* (cows. bulls, heifers calves...)

** (e.g. every day, every other day...)

*** amount per head per feeding x number head

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 IDENTIFI-CATION	# 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)