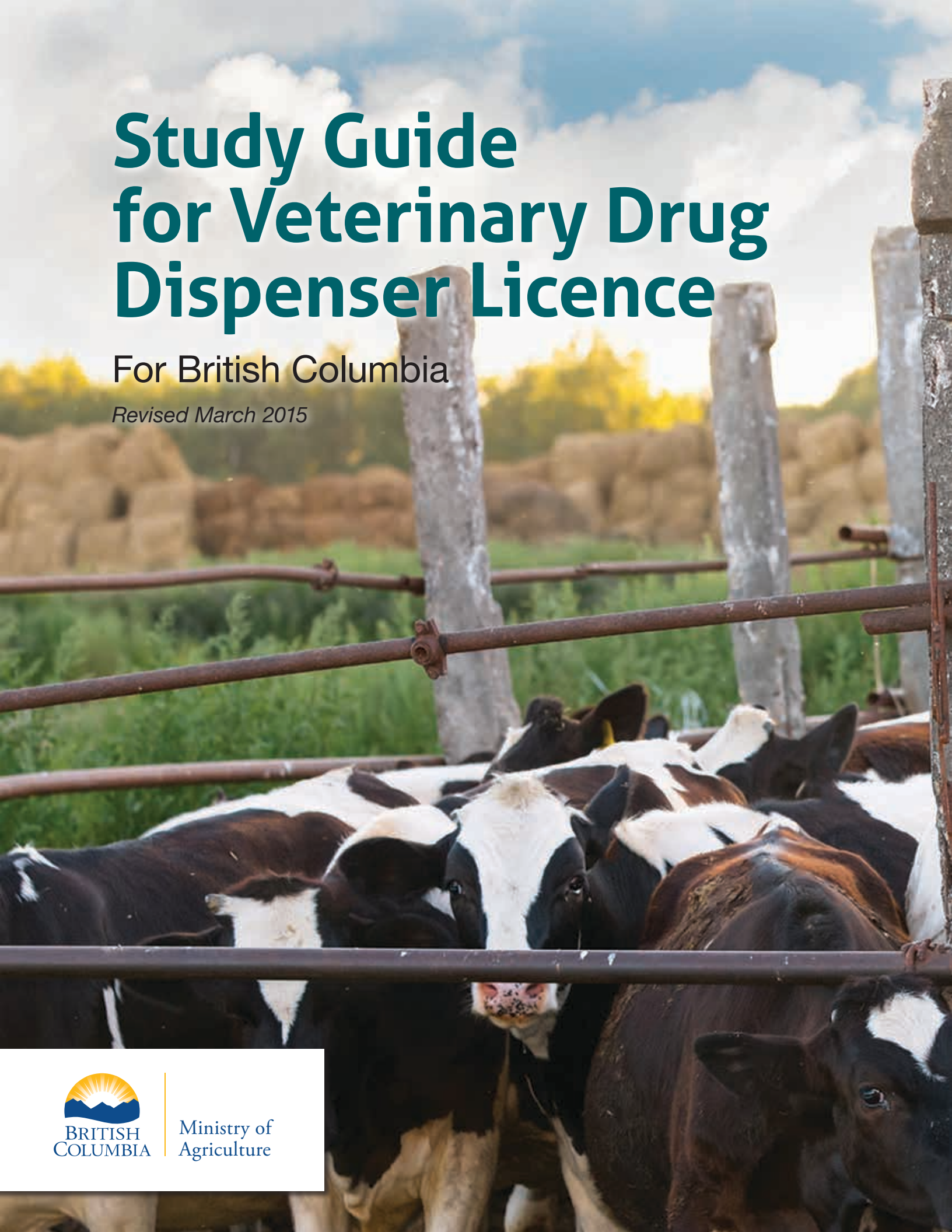
# Study Guide for Veterinary Drug Dispenser Licence

## For British Columbia

*Revised March 2015*



BRITISH COLUMBIA | Ministry of Agriculture

# Foreword

This handbook has been compiled to provide applicants for the Veterinary Drug Dispenser Licence with information about how veterinary drugs and biologicals (vaccines and bacterins) should be handled, stored and used.

Pharmaceuticals have brought enormous benefits to mankind. Some of the most deadly diseases such as Small Pox have been eradicated while others have been effectively controlled through vaccines. The same benefits have been achieved through the development of veterinary drugs and vaccines which helped to improve the quality and quantity of animal production systems in agriculture.

The use of drugs also comes with consequences. Readily available drugs at affordable prices have caused some producers to use these drugs as their primary disease control strategy while abandoning good animal husbandry practices. Some producers use veterinary drugs as a standard management practice, whether needed or not, in an attempt to lower production costs. Persistent prophylactic use is not only uneconomical, it has also led to the development of drug resistance among an increasing number of disease-causing organisms.

As a Licensed Veterinary Drug Dispenser, it is important to ensure that drugs are handled appropriately and only applied when needed and according to label instruction. It is equally important to ensure that the producer who purchases the drug knows what animal it can be used on, the precautions of use and the required withdrawal time.

The sale of veterinary drugs is permitted and regulated by two pieces of legislation and administered by different ministries:

- *Veterinary Drugs Act* – administered by the Ministry of Agriculture
- *Pharmacy Operations and Drug Scheduling Act* – administered by the College of Pharmacists on behalf of the Ministry of Health

**Ministry of Agriculture**
**Veterinary Drug Dispenser Licence**
**Study Guide**

## The Exam

The exam consists of four sections. Sections 1-3 pertain to selling veterinary drugs and medicated feeds. This exam is open book and 1.5 hours is allowed to write; 75% is a pass. If your business is selling drugs specific to bee diseases you must also study Section 4. An additional half hour is allowed to write the exam with this section included – also open book and 75% pass.

## Handbook Sections for Study

| | |
|---|---|
| Section 1 | Legislation Concerning Veterinary Drugs and Medicated Feeds |
| Section 2 | Use of Veterinary Drugs Listed in Table |
| Section 3 | Some Consequences of Misuse of Veterinary Drugs |
| Section 4 | Specific Directives for the Sale of Veterinary Drugs for the Control of Bee Diseases |

# Contents

# Section 1
# Legislation Concerning Veterinary Drugs and Medicated Feeds

For our purposes, there are three Acts that control the sale of veterinary drugs and medicated feeds in BC. These are:

1. The ***Feeds Act*** – administered by the Canadian Food Inspection Agency
2. The ***Food and Drugs Act*** – administered by Health Canada
3. The ***Veterinary Drugs Act*** – administered by the Ministry of Agriculture of British Columbia

The ***Feeds Act*** provides standards that permit the inclusion of medicines or drugs in feeds for farm animals, birds and fish used for human consumption.

The standards state:

- which drugs can be included in animal, fish or poultry feed;
- specifies the animal, fish or bird for which the medicated feed can be prepared;
- lists the maximum permissible level of drug permitted in the final ration;
- directions for use of the medicated feed;
- cautions in the use of the medicated feed and lists necessary warnings;
- the maximum amount of drug permitted may be at a treatment, preventative of growth stimulating level.

The pharmaceuticals which can be added to feed, at the levels and under the conditions set out in the Compendium of Medicating Ingredient Brochures (CMIB) are listed in the BC Ministry of Agriculture's Policy Document Schedule A, Table 1. The CMIB, produced by the Canadian Food Inspection Agency, contains information on the manufacture and use of medicated feeds. Appendix A of this Handbook provides an example of MIB 37A as it appears in the CMIB, September 2014. It can be seen that directions for use are specific.

The ***Food and Drugs Act*** authorizes which drugs may be sold in Canada and, through the regulations, provides the conditions and standards under which they may be prepared for sale. For instance, all drugs listed in the Prescription Drug List of the Food and Drug Regulations may be sold only on a prescription. Because drugs like Micotil (tilmicosin) are included in the list, it is necessary that its sale adhere to the requirement of a prescription for all purposes.

The ***Pharmacy Operations and Drug Scheduling Act*** permits the use of drugs in this province through its power to regulate who may be licensed to sell them. The Act may be more restrictive than the federal *Food and Drugs Act* but it cannot be less restrictive. A non-prescription drug under the *Food and Drugs Act* could be made a prescription under the *Pharmacists*, *Pharmacy Operations and Drug Scheduling Act* but as a rule an attempt is made to be consistent with the *Food and Drugs Act*.

The ***Veterinary Drugs Act*** *of British Columbia* gives the British Columbia Ministry of Agriculture the authority to control the sale of veterinary drugs by persons other than a pharmacist or a registered veterinarian. It gives the Minister of Agriculture the authorization to develop regulations for the sale of veterinary drugs and medicated feeds and the manufacture of medicated feeds.

The Veterinary Drug and Medicated Feed Regulation is administered by the Chief (Provincial) Veterinarian. The Regulations specify the different classes of licences, list the requirements that have to be met for each class of licence and regulates those who may be licensed. The Regulations are included with this Handbook.

A Veterinary Drug Licence **may** be issued to holders of Medicated or Limited Medicated Feed Licence, the operator of a registered hatchery, a person in areas of limited service, and to persons whom the Minister of Agriculture considers appropriate.

Products exempt from the Regulations under the *Pharmacy Operations and Drug Scheduling Act* include some deworming preparations for cats and dogs. Other preparations for pets are **not** exempt.

Four classes of licences may be issued:

1. **Limited Medicated Feed Licence** for a business where medicated feeds are sold but **not** manufactured, i.e., purchased as bagged medicated feed. The annual fee is $12.00 (at the time of writing – subject to change) and expires on March 31 each year. The licensee is required to record all purchases of medicated feed that have been imported for sale from another province or another country in the Veterinary Drug Purchase Register.

   The original copy of the Veterinary Drug Purchase Register must be forwarded to the Chief (Provincial) Veterinarian **before February 28** each year to cover all out-of-Province purchases for the **previous calendar year**.

2. **Medicated Feed Licence** authorizes the licensee to manufacture and to sell feeds medicated with veterinary drugs listed in Schedule A, Table 1 to the limit shown in the CMIB. Upon written order (prescription) of a registered veterinarian, the licensee may manufacture medicated feeds with veterinary drugs in levels above those listed in the CMIB and with veterinary drugs not listed in Schedule A, Table 1.

   The annual fee is $55.00 (at the time of writing – subject to change) and expires on March 31 each year. The licensee is required to record all drug purchases in the Veterinary Drug Purchase Register. This must be kept up-to-date as each batch of drugs are purchased. The original copy and a copy of all prescriptions filled shall be forwarded to the Chief (Provincial) Veterinarian **before February 28** each year to cover all out-of-Province purchases for the **previous calendar year**.

3. **Veterinary Drug Licence** authorizes the licensee to sell the veterinary drugs listed in Schedule A, Table II. The annual fee is $55.00 (at the time of writing – subject to change) and expires on March 31 each year. The licensee is required to record all drug and biological purchases in the Veterinary Drug Purchase Register as they are received. The original copy shall be forwarded to the Chief (Provincial) Veterinarian **before February 28** each year to cover all purchases for the **previous calendar year**.
4. **Veterinary Drug Dispenser Licence** is issued to a person who passes an examination. The exam covers the properties, use and abuse of veterinary drugs and related information. Every Medicated Feed Licensee or Veterinary Drug Licensee must have a Veterinary Drug Dispenser present at all times at the premises where business is carried on
    - when and where medicated feeds are being manufactured, or
    - when open for business for the sale of veterinary drugs.

The Veterinary Drug Dispenser Licence is normally valid for five (5) years. The fee is $12.00 (at the time of writing – subject to change) and must then be renewed by re-examination. Re-examination may be required for any licensee at any time at the request of the Chief (Provincial) Veterinarian.

**Businesses that have a Medicated Feed Licence or a Veterinary Drug Licence MUST HAVE A PERSON HOLDING A CURRENT VETERINARY DRUG DISPENSER LICENCE ON THE PREMISES DURING THE MANUFACTURE OF MEDICATED FEEDS OR FOR THE SALE OF VETERINARY DRUGS ON THE PREMISES DURING WORKING HOURS.**

Under the *Veterinary Drugs Act* and Regulation of B.C. it is illegal for a drug wholesaler to sell directly to a farmer. It is also illegal for drugs to be transported in British Columbia except by a wholesaler to a properly licensed outlet, veterinarian or pharmacist. Farmers may transport or have delivered, drugs purchased by them from a B.C. licensed veterinary drug retail outlet, veterinarian or pharmacist to their farm for their own use.

These regulations do not affect the sale of veterinary drugs by pharmacists or registered veterinarians.

## Significant Terms in Pharmacy and Veterinary Medicine

The sale of veterinary drugs carries with it certain responsibilities, and implies that the sellers have some knowledge of the products. In order to add to this knowledge, one must understand some of the terms that are used in regard to these products. All drugs and biological products are used to treat or prevent diseases.

### 1) Diseases may be classified as:

#### a. Non-Infectious

**Sporadic:** These are diseases that appear from time to time and usually only affect one animal in the herd. Such diseases as bloat, founder, urinary calculi, and broken bones are examples of this.

**Metabolic and nutritional:** These are diseases caused by an upset in the body function of the animal and nutritional imbalances. Milk fever, pregnancy disease of ewes, white muscle disease and hypomagnesemia are diseases of this category.

**Poisonous:** Almost any chemical eaten in excess may cause poisoning and varying types of disorders. Poisonous plants, such as Timber Milk Vetch, Ragwort and Water Hemlock, among others, are of concern in British Columbia. Animals receiving excess doses of drugs or medicinal chemicals can also show toxic reactions.

#### b. Infectious:

These include diseases caused by an infectious agent. The disease is not spread directly from one animal to another. In this classification are such diseases as blackleg, lump jaw, pulpy kidney disease, foot rot and edema disease of swine.

#### c. Contagious:

These are diseases caused by an infectious agent and will spread from one animal to another. Included in this group are most of the viral diseases, shipping fever, pinkeye, ringworm, and scours of newborn animals.

#### d. Parasitic:

Parasites (worms and insects) may be regarded as a form of animal life that has become adapted to live on or in animals larger than themselves. The parasite nourishes itself at the expense of the host and causes disease by robbing the host of its nourishment or by causing tissue damage.

The majority of livestock losses are caused by infectious, contagious and parasitic diseases. **These are caused by agents known as bacteria, viruses and parasites.** There are other disease-causing agents such as chlamydia, rickettsia and mycoplasma. In this Handbook we will concentrate on bacteria, viruses and parasites.

## 2) Other Terms (Definitions):

### a. Antigen:

A protein introduced into the body that is recognized as foreign. The body reacts to this foreign protein by producing antibodies that assist in the removal of the foreign protein. Infectious agents (antigens) introduced into the body stimulate an antibody response that assists in the control and removal of the infectious agents from the body.

### b. Antibody:

A protein produced by the body in response to a foreign protein (antigen). Antibodies that are developed in response to infectious agents control and remove these agents. Immunity or resistance to disease is dependent on the presence of antibodies against a particular infectious agent.

### c. Viruses:

Viruses are infectious agents that require DNA or RNA from a host's cell to multiply. During this process they disrupt the function of the cell and often destroy it. The damage caused by the virus may cause the animal to be ill or die, or it may only reduce the resistance of the animal and make it more susceptible to bacterial disease. **At the present time, we do not have drugs that will significantly overcome viruses in the living host.**

### d. Bacteria:

Bacteria are living microscopic organisms that do not require a living cell to multiply as viruses do. A healthy animal has bacteria in its gut; these are known as normal gut flora and are necessary for the animal's digestive process. However, other bacteria called pathogens, if present, may cause disease**.**

The invasion of the animal body by pathogenic bacteria and viruses results in a constant battle between the host and invading organisms. If the organisms are able to overcome the resistance of the host, disease ensues. **Factors such as the nutritional status of the animal, the stress it is subjected to and sanitary conditions will also affect the ability of the animal to overcome the pathogen.**

The host is able to build up immunity or resistance to bacteria and viruses by the production of antibodies. When exposed to bacteria, referred to in this context as an antigen, the animal's body produces antibodies. These antibodies are able to neutralize or destroy antigens. However, these antibodies are specific for that particular antigen. The animal's body must produce antibodies for each antigen it encounters.

When an animal is vaccinated, antibody production is stimulated for that particular antigen (bacteria or virus). Later, when the animal is exposed to that bacteria or virus, enough antibodies are often present to overcome the infection. Similarly, when an animal recovers from an infection it will build up antibodies to that infection. **Animals under stress, poor nutrition, have just been through saleyards and transported, castrated, dehorned, branded, or are just weaned, usually respond poorly to vaccination and may not produce enough antibody to overcome the invading pathogen.**

### e. Immunity:

Having enough antibodies to overcome exposure to any particular disease-causing organism is known as **immunity**.

**Active immunity**: When an animal is vaccinated with antigens that have been altered so as not to cause disease, the body is stimulated to produce its own antibodies. Recovery from an infection has the same effect.

**Passive immunity**: When an animal receives **antibodies** produced in another animal, those antibodies help to protect the animal against a specific disease. In this case the animal is not stimulated to produce its own antibodies. A good example of this is mother's colostrum (first milk), which contains antibodies that protect the newborn.

Active immunity takes ten days to two weeks to develop, however, it lasts a long time – sometimes a lifetime. Passive immunity protects immediately but lasts only a few weeks.

### f. Anaphylactic Reaction:

This occurs when an animal becomes oversensitive to a protein and reacts violently to reject the protein when it is administered. Many pharmaceuticals contain proteins that are foreign to the host and they may cause an anaphylactic reaction in oversensitized animals.

### g. Gram Positive/Gram Negative Bacteria:

Bacteria can be seen under the microscope and can be grown on various media such as agar. They can be stained with different dyes, which aid in their identification. One common staining method is known as Gram's stain. Depending on the colour imparted to the bacteria, they are referred to as being Gram positive or Gram negative. Staphylococci and streptococci are examples of Gram positive organisms; coliforms, pasteurella and brucella are examples of Gram negative organisms.

### h. Narrow Spectrum/Broad Spectrum Antibiotics:

Some drugs are effective mainly against Gram positive organisms and others against Gram negative. For example, penicillin is effective against Gram positive organisms and streptomycin is effective only against Gram negative organisms. These are referred to as narrow spectrum antibiotics. Tetracyclines, tylosin and erythromycin will destroy certain Gram positive and Gram negatives and are referred to as broad spectrum antibiotics. However, because an antibiotic has a narrow spectrum it does not mean it is less effective against bacteria that are susceptible to it than a broad spectrum antibiotic. In fact, it is often more effective against susceptible bacteria.

### i. Sensitivity Testing:

**Bacteria exposed to certain drugs or antibiotics may develop a resistance to that drug.** Bacteria isolated from a laboratory specimen are grown on agar and small discs impregnated with specific antibiotics are applied to the agar plate. If the bacteria are unable to grow in close apposition to these discs, it indicates that the bacteria are sensitive to the drug. This procedure is known as sensitivity testing and is done to determine the most appropriate antibiotic treatment for a particular disease.

### j. Bacteriostatic/Bacterial Antibiotics:

Some drugs will inhibit bacteria from growing and multiplying, and are known as bacteriostatic. Other drugs that kill the bacteria are known as bactericidal.

### k. Vaccines/Bacterins:

The words vaccines and bacterins are often used interchangeably. When bacteria gain entrance to the body they stimulate antibody production. Not all bacteria stimulate a good strong production of antibodies. Hence we are unable to vaccinate for all diseases, and some vaccines produce a better immunity than others. Some bacterins or vaccines will produce lifelong immunity with one dose. Others may require two or more doses with annual re-vaccination. It is important to follow the instructions on the label.

A good vaccination program is an important part of disease prevention. Bacterins are produced by growing the bacteria, killing it and diluting it to a standard concentration.

Modified-live vaccines are produced by growing the organism in suitable media. The organisms are kept alive, but are altered so that they are much less likely to cause disease. Modified-live vaccines are **not included** on Schedule A, Table 2 and **cannot be sold by** Licensed Veterinary Drug Outlets. Vaccines are also produced by killing the organism and using the whole organism in the vaccine or a portion of the organism. These products can be sold by Licensed Veterinary Drug Outlets. Bacterins and vaccines require 10-15 days or longer, and sometimes multiple administrations, to produce adequate immunity. They are not intended to cure disease, but to prevent it. **Their use is not a substitute for good sanitation and animal husbandry.**

### l. Toxoids/Antitoxins:

Some organisms produce toxins or poisons that cause disease in the animal. Toxoids are produced from these toxins. They have their antigenic factor maintained or enhanced but their poisonous effect is reduced or eliminated. They act like vaccines producing an active immunity.

Antitoxins are products that neutralize the toxins produced by the bacteria. They act immediately but are short-lived. They produce a passive immunity.

# Section 2
# Use of Veterinary Drugs Listed in Table 2

## Biologicals

Section 5 of the Veterinary Drug and Medicated Feed Regulation and Schedule A, Table 2 list the veterinary drugs which may be sold by licensees. The first group listed are biologicals. They include vaccines, bacterins and toxoids as discussed earlier. When given to an animal, vaccines, bacterins and toxoids stimulate the production of antibodies against the specific disease to prevent or minimize illness.

It should be remembered that vaccines, bacterins and toxoids prevent disease, but have little value in treatment. Animals under "stress," including poor nutrition, may not respond to the administration of biologicals adequately to protect them against disease.

Biologicals, to maintain their effectiveness, should be kept under refrigeration (but not frozen) at all times.

Route of administration is on the label of the product and it is important to follow those instructions.

1. Killed virus vaccines in animals that have not been previously vaccinated typically require two doses approximately 21 days apart. Failure to administer the second dose within the time frame stated on the label will result in inadequate protection from the vaccine.
2. Animals that have received two doses in the required time period typically must be vaccinated annually in order to provide continued protection.
3. Beef Quality Assurance Programs promote the administration of bacterins and vaccines subcutaneously. **Do not use vaccines and bacterins subcutaneously unless that route of administration is stated on the label.**

Fridge dedicated to vet products only

## Examples of biologicals

### Avian Encephalomyelitis Vaccine

This vaccine is used to prevent a nervous disease of young poultry. It is not sold by licensees in general, but it is included in Schedule A, Table 2 for the use of hatcheries licensed under the Regulations.

### Bovine Virus Diarrhea Vaccine

Bovine Virus Diarrhea (DVD) is associated with respiratory disease, diarrhea, abortions and brain defects in newborn calves. It has also been shown to reduce the body's defence mechanism, reducing the animal's resistance to other diseases.

### Bovine Respiratory Syncytial Virus Vaccine

Bovine Respiratory Syncytial Virus (BRSV) is associated with respiratory disease in cattle. The vaccine is often included with BVD, IBR, PI3 vaccine.

## Clostridial Bacterins and Toxoids

Diseases caused by the Clostridia family of bacteria include **Blackleg**, **Malignant Edema**, **Enterotoxemia**, and **Tetanus (Lockjaw)**. These biologicals are used widely in cattle and sheep.

Blackleg is common and affects young animals.

Malignant Edema is seen less often; it affects animals of all ages.

Enterotoxemia is an infection of the gut. It is most often seen under feedlot conditions when animals are given an abundance of “heavy” feed. It occurs in sheep and occasionally in young calves and pigs.

Treatment of these preceding diseases is of little use. Frequently, no symptoms are seen and the livestock owner finds a number of dead animals. Prevention is most important.

Tetanus is not a prominent disease in British Columbia. However, most producers have lost a calf or pig from Lockjaw after castration. A tetanus toxoid is injected to prevent infection and should be given at least two weeks before surgery is anticipated. Tetanus antitoxin can be used at the time of surgery but the protection is short lived.

As these diseases are caused by bacteria that are closely related, bacterins are manufactured that combine protection against two or more of the infections. There are 2-way, 7-way and 8-way bacterins.

## Erysipelas Bacterins

Erysipelas is a disease of pigs and turkeys. It is common in British Columbia.

This product comes in an injectable vaccine and as an oral preparation to be given in the drinking water.

## Infectious Bovine Rhinotracheitis Vaccine

This virus disease of cattle is also called IBR or Rednose. It produces respiratory disease and also is a cause of abortion.

Because IBR is enzootic, the vaccine should have widespread use in all cattle.

## Infectious Bronchitis Vaccine

Infectious Bronchitis is a virus disease of poultry. Like Avian Encephalitis vaccine, it is included in Table 2 for the benefit of licensed hatcheries and may not be stocked by other licensed businesses.

## Mink Botulism Toxoid – Mink Distemper Vaccine – Mink Virus Enteritis Vaccine

These veterinary drugs may be classed as specialty items for the mink raising industry. Purchases are made through one licensed outlet in British Columbia. The licensed outlet obtains the required doses from a supplier specializing in the production of these vaccines. Thus there is no interest by other licensees to stock these biologicals.

## Newcastle Disease

Newcastle Disease is a virus disease of poultry. Hatcheries are licensed to supply and use Newcastle vaccine.

## Parainfluenza Vaccine (PI3)

This vaccine is included in the IBR vaccine and is associated with respiratory diseases of cattle.

## Pasteurella Bacterin – Toxoid

Pasteurella infection of cattle is another name for Shipping Fever and may be termed a contagious pneumonia of livestock.

## Staphylococcus Bacterin

Staphylococcus is another class of bacteria which is of major importance to livestock. It can cause a severe mastitis in cattle, Blue Bag in sheep, and is the frequent germ in boils, abscesses and other infections.

The bacterin is not a good antibody producer and its effectiveness is debateable. Staphylococcus is also capable of producing a toxin (poison) that can cause serious symptoms and, upon occasion, death in the infected animal. However, livestock owners may request a Staphylococcus bacterin, having experienced “good luck” with its use.

Staphylococcus bacterin is another that can be combined with other bacterins in a “shotgun” approach to prevent disease.

## Streptococcus Bacterin

Streptococcus bacterin is produced for pigs in which certain strains cause illness and death.

## Streptococcus equi Bacterin

Streptococcus equi is the cause of Strangles, which goes by the more common name of Horse Distemper. This bacterin is not entirely effective in controlling an outbreak of Horse Distemper, but its use may lessen the number of new cases as well as reducing the severity of the symptoms.

## Vibriosis Bacterin (Campylobacter)

Vibriosis is a venereal disease of cattle and sheep.

## Aquaculture Vaccines

There are also vaccines for aquaculture included in Schedule A, Table 2 such as Aeromonas salmonicida bacterin, Vibrio anguillarum bacterin, Vibrio ordalli bacterin, Vibrios almonicida bacterin and Yersinia ruckeri bacterin.

## Antibiotics

Although the term antibiotic means any substance that opposes growth, it is now used in a restricted sense to describe those products of the growth of certain fungi and bacteria that possess the property of inhibiting the growth of disease causing micro-organisms. This phenomenon has been known for over 80 years, but it was not until the isolation of penicillin in a pure form in 1940 and the discovery of its therapeutic activity that research really went ahead. Several hundred antibiotics have since been isolated, but many were either too toxic to animal tissues or not efficient enough to be developed commercially. Some are bactericidal, that is they actively kill certain bacteria (penicillin is an example of this) while others are bacteriostatic, that is they inhibit the multiplication but do not kill bacteria (oxytetracycline is an example).

### Penicillin

Penicillin is produced by the growth of the mold *Penicillin notatum*. At least ten different penicillins have been identified. The penicillin used for treatment is mostly Penicillin G and the sodium salt is preferred because of its stability.

Penicillin is measured in units and is based on the potency of pure crystalline Penicillin G, i.e. one international unit is 0.0006 milligrams of the pure salt. Thus, 5,000 units weigh three one thousandths of a gram (3 milligrams).

Penicillin is rapidly excreted from the body and the difficulty is to maintain adequate blood levels without continuous or frequent injections. Various methods have therefore been devised to retard the absorption of penicillin from the site of injection. At first it was suspended in oil, but now the more insoluble mixture of procaine and penicillin suspended in water, or with aluminum stearate suspended in oil, is used. The effect is to delay the reaching of a maximum blood level which, although lower than with crystalline penicillin, will remain longer.

Penicillin is destroyed by acids and alkalis and by penicillinase, an enzyme produced by many bacteria, some of which may also be found in non-sterile distilled water. Thus, because of gastric acidity, enzyme destruction and absorption on to food, its action, when given by mouth, is unreliable. In addition to injection, it may be used locally in the form of creams or ointments. Some preparations lose their activity even when refrigerated and the recommended methods of storage and handling must be adhered to.

Penicillin is active against a number of Gram-positive bacteria, but within these groups of sensitive organisms may be strains of resistant organisms of the same species. Also the sensitivity of a strain outside the body (in vitro) may not apply to the same organism when inside body tissues (in vivo). If used with other antibiotics, such as tetracycline, an antagonism may occur that destroys the activity of both antibiotics.

## Streptomycin and Dihydrostreptomycin

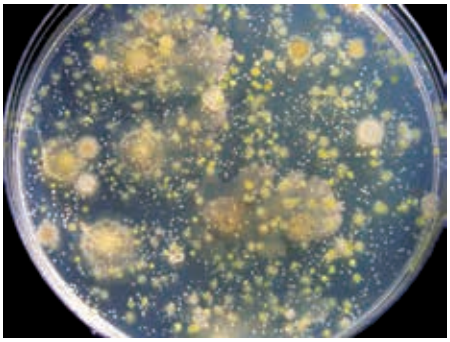
Streptomycin is an antibiotic obtained from the growth of *Streptomyces griseus* and is usually supplied as the hydrochloride, sulphate, or calcium chloride double salt. Serious drawbacks are its toxicity and the tendency to produce resistant strains of organisms, especially when used in chronic conditions requiring a long course of treatment. It is mainly effective against Gram-negative bacteria and is bactericidal at high concentrations, but may cause toxic reactions.

Dihydrostreptomycin sulphate or hydrochloride are about equal therapeutically, but less toxic than streptomycin. Preparations available may be mixtures of streptomycin and dihydrostreptomycin and are often available combined with penicillin.

## Tetracyclines

Those available are chlortetracycline and oxytetracycline. Oxytetracycline is available in both oral and injectable forms. It is important to follow the label instructions in regard to the dosage, the route administered and the volume administered per injection site.

Chlortetracycline is obtained from cultures of *Streptomyces aureofaciens* and is a yellow crystalline substance available as the soluble hydrochloride. It has a fairly wide range of activity against cocci and both Gram-negative and Gram-positive bacteria, but its main area of use is against some chlamydia and rickettsiae. However, as it alters normal intestinal flora if given to cattle, sheep or goats, it will seriously interfere with rumen digestion. It is therefore used mainly in young calves, lambs and goats before rumen development has occurred. Bacterial populations in the gut are in competition with one another. **A normal gut flora (i.e., beneficial bacteria that normally inhabit the gut) tends to inhibit pathogens in the gut from multiplying and causing disease. If the gut flora are knocked out by the use of antibiotics, pathogens, if resistant to that antibiotic, have a much better chance of multiplying and causing disease.**



Oxytetracycline is obtained from cultures of *Streptomyces rimosus*. It too has a wide range of activity, but, unfortunately, has also created similar problems to chlortetracycline if given orally.

The preceding section is a brief account of the more common antibiotics. Much work has been done regarding the emergence of resistance to antibiotics in bacteria that were previously sensitive. It is sufficient to know that certain resistant bacteria have the ability to transfer this resistance to other sensitive bacteria, which then multiply and pass on this resistance genetically. This causes a problem when resistant bacteria come in contact with pathogens – they may pass on their resistant characteristic to the pathogen. A drug that worked before may not work now. This resistance may also be passed from animal bacteria to human bacteria, which could result in a human infection that is non-responsive to treatment.

## Chemotherapeutics

Chemotherapy is the treatment of disease with chemical agents, but it is restricted today to the use of chemical agents that have a specific action on the organism causing disease. For instance, quinine in the treatment of malaria is an early example.

### Sulphonamides

In 1935 the introduction of sulphonamides opened up a whole new field of chemotherapeutics having a wide range of activity against pathogenic organisms. Although a large number have been produced, the number now in regular use is quite small. The choice of any sulphonamide depends on the concentration that is effective in the blood and its rate of absorption and excretion. This influences the frequency of dosage, their individual toxic effects and their antibacterial action. They may interfere with digestion and vitamin production in the animals by destroying the normal gut flora. Some alter the oxygen carrying hemoglobin of blood, and some form insoluble substances that damage the kidneys.

Effectiveness is based on maintaining an adequate concentration in the blood. The most common route of administration is by mouth. Those listed in Schedule A, Table 2 are the ones most commonly used. The correct dosage rate must be adhered to, for once the necessary blood concentration is allowed to fall, the bacteriostatic effect of the drug is lost.

### Antiparasitic Drugs

Amprolium, nithiazide, 2-4-diaminio-5(chlorophenyl)-6-ethylprimidine, and dimetridazole are chemicals used as aids in the prevention and treatment of parasites causing coccidiosis and blackhead in chickens and turkeys. Their use and claims are controlled by the CMIB when mixed in feeds. Where they are added by owner to feed or water, the directions must be adhered to and it must be realized that they are an aid to management – not a substitute.

Phenothiazine, piperazine salts, tetramisole, ivermectin and the benzimidazoles are drugs that kill or inactivate intestinal worms. No one wormer is effective against all species of worms and each has its advantages. While they are the least toxic to healthy mammals when used correctly, it must be remembered that they are poisons and caution is necessary when dosing individuals which may be severely affected by parasitism. Individual reactions, such as anaphylactic shock, occasionally occur in normal animals, even when dosed according to weight and condition. Worms can also build up a resistance to these drugs.

# Injectable Vitamin and Mineral Preparations

## Injectable A and D

Vitamin A promotes good health by stimulating healthy tissues that are more disease resistant in the animal.

Vitamins A and D are essential to good health in the animal. They are readily available in green forage but are often deficient in cured forage fed in winter.

## Vitamin B Preparations

There are many different types of vitamin B (e.g., riboflavin, thiamine, nicotinic acid, pantothenic acid). While they, like vitamin A, are essential for good health, they are seldom found in short supply as most are produced normally in the paunch of ruminants. Thus, you will not find much demand for injectable vitamin B, but there could be some demand by horse owners.

## Selenium – Vitamin E

This is a mixture of the trace mineral selenium and vitamin E. Selenium is deficient in most areas of British Columbia, although there are local pockets where there are toxic levels. Severe deficiencies can cause death in an animal, mild deficiencies will interfere with the animal's ability to fight infections. Selenium and vitamin E are synergistic (they help each other). This product should only be used where it is known that the diet is deficient in selenium. In such cases a reasonable attempt should be made to correct the deficiency in the diet. Whenever possible one should avoid injections as referenced in the previous comments regarding Beef Quality Assurance.

### Injectable Iron

Pigs are born with insufficient iron and sow's milk does not contain enough iron to fulfill the baby pig's needs. Therefore, iron must be supplied, typically by injection.

### Calcium Solutions

Milk Fever is a common problem of dairy cattle and is due to a sudden drop in circulating calcium within the blood system of recently calved cows. This veterinary drug is usually given intravenously (i.e., into the bloodstream through a vein) and requires skill to administer. Purchasers should be advised to use calcium solutions with caution as they can adversely affect the heart and kill when given too quickly.

Calcium solutions may also include phosphorous and magnesium and, therefore, can be used to correct deficiencies of these minerals.

### Sodium Iodide Solution

This antibacterial solution is given intravenously for the treatment of Actinomycosis (Lump Jaw) and Actinobacillosis as well as other chronic diseases. As with calcium solutions, they must be administered with extreme caution as sudden death may result.

## Miscellaneous Veterinary Drugs

The veterinary drugs included in this section are made available primarily for three conditions affecting cattle. Barium chloride, silicones, surfactants and tartar emetics are found in preparations to treat bloat; propylene glycol and sodium proprionate for the prevention or treatment of acetonemia (ketosis); and zeranol, better know as Ralgro, is a growth stimulant and used to increase the efficiency of finishing cattle.

### Chlorhexidine

Chlorhexidine (Hibitane) is an antiseptic and general disinfectant used in a number of preparations. As with all disinfectants, the most efficient and effective dilution is the one recommended on the label. General cleaning and disinfecting/sanitizing agents that do not have a drug identification number (DIN) are not restricted.

# Section 3
# Some Consequences of Misuse of Veterinary Drugs

The rational use of veterinary drugs demands a knowledge not only of the disease to be treated, but also the nature and extent of the infection. Unfortunately, this is not always the case and they are sometimes used in a hit and miss fashion.

Over the years, many bacteria have become resistant, either by mutation or by the transferable resistance syndrome. This phenomena poses many problems, but it is known that where the use of antibiotics and chemotherapeutics is restricted, the resident bacterial population in a herd or flock may regain some of its previous sensitivity. Antibiotics and chemotherapeutics should never be used as a substitute for good husbandry.

Apart from the fact that some diseases do not now respond to treatment because of bacterial resistance, the big concern is a public health one. Animals in general are believed to be the reservoir of those salmonella types that cause human food poisoning and the multiple resistance found in some outbreaks of this disease may have been acquired when the strains were in the animal community. This may eventually lead to the banning of all drugs used for treatment from use as feed additives, and much greater restrictions on their use for treatment. To a greater or lesser extent this is already happening and many countries are considering severe restrictions for all antibiotics however used. Resistant organisms in animals may be transferred to man by direct contact or through contaminated food.

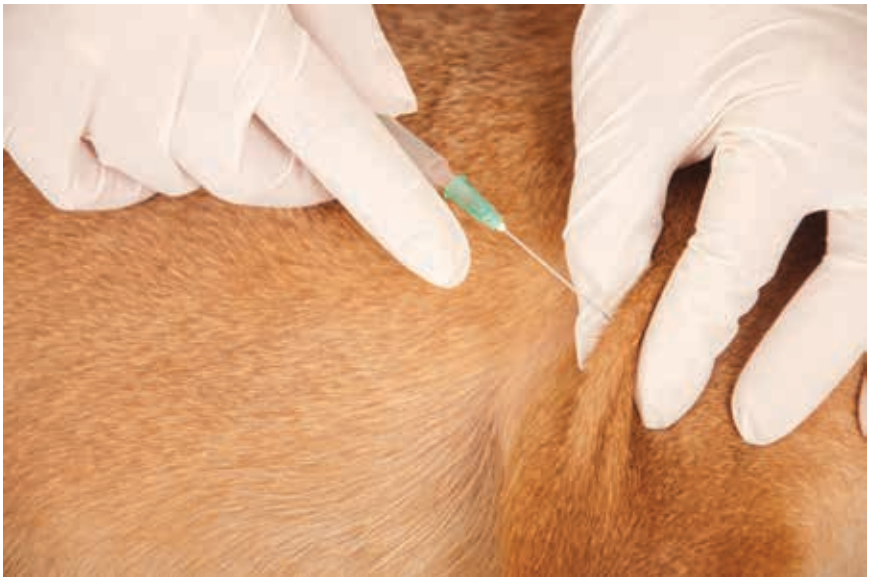
However, this is only one aspect of the effects of misuse. Another potential problem is that of drug residues in food for human consumption if appropriate withdrawal times are not used. Firstly, there may be allergic reactions in hypersensitive people or this hypersensitivity may develop due to exposure. Secondly, toxic reactions, which may be acute or chronic, may occur. Thirdly, some drugs are carcinogenic, i.e., cause the formation of cancers, and there is the danger of acute exposure to these. Fourthly, resistant organisms may develop in people by continued exposure to drug residues in food. Also, any residues above certain tolerances (which may be set at zero) are considered adulterants and it is illegal to sell adulterated food. Consumers are aware of these problems and are concerned about the food they eat. We must make sure that the drugs used in animals are not abused, otherwise the consumer will lose confidence in animal food products.

In considering the dose of any drug, the uninformed often think that if a certain amount of a drug is good, then double the dose should be twice as good. This is not true and an example would be aqueous penicillin where doubling the dose prolongs the effective blood concentration by only one hour each time it is doubled; there is no direct relationship to dosage. Increasing the dose rate increases the withdrawal time but often not in relation to the increased dose. It can be much, much longer (see following page). It is often thought that if a dose is missed in a course of treatment that no harm is done. In the case of sulphonamides, if the effective initial blood concentration is allowed to fall by missing a dose, then the subsequent maintenance dose rate may be unable to raise it to the effective level again. The expected response would, therefore, be lacking.

Dosing at too low a level may allow a predominance of resistant organisms to develop which, when subsequent treatment is required, do not respond. Treatment with one antibiotic can lead to bacteria that are resistant to antibiotics other than that to which they have been exposed. An example of this is neomycin which, when fed to calves for one week, resulted in *Escherichia coli* bacteria which were also resistant to tetracyclines, streptomycin, neomycin, kanamycin and ampicillin. This resistance was capable of being transferred in the laboratory to other *E. coli* and *Salmonella*.

Multidose bottles are commonly used these days for antibiotics, chemotherapeutants, biologicals, vitamins and minerals. These are convenient and cheaper to produce. However, it must be remembered that as soon as the rubber stopper is pierced by a needle there is a strong potential for contamination of the product by organisms. In a matter of hours, under the right conditions these organisms can have multiplied rapidly in the bottle – producing an infectious "soup". This can destroy the product or even cause severe disease, anaphylactic reaction or death in the animal when it is next used.

Thus, it can be seen that the decision to use antibiotics or chemotherapeutics in any given case should not be made lightly and veterinary advice should be obtained whenever possible so that both the correct drug and the correct dosage may be used.



The injection of drugs intramuscular (IM, into the muscle) causes tissue damage. This tissue damage shows up in meat products as scarring or sometimes as an abscess. These injection site lesions cost the meat industry millions of dollars in lost product because these sites have to be cut out. There is the direct loss of meat product and the loss of prime cuts because they have to be sold as lesser quality cuts when injection sites are cut out.

Sound health management programs will reduce the number of animals that require treatment. Beef and Pork Quality Assurance Programs are designed to reduce injection site lesions. Injection sites should be clean, a clean sharp needle should be used and the volume should not exceed 20 ml per injection site (label may state less). Large volumes injected in one site not only cause damage but they also affect the absorption of the drug and make the withdrawal time invalid (see page 24). Injections should not be given in the same area when giving repeated injections.

Finally, every licensee must realize that it is a privilege to handle and use these drugs, it is not a right. Remember, the next child that fails to respond to medicines when desperately needed, may be yours.

## Unlawful Veterinary Drugs Most Frequently Found in Businesses

Occasionally veterinary drug licensees are found selling drugs not listed in Section 5 of the Regulation or in Schedule A, Table 2. The most common culprit veterinary drugs are discussed below. Sale of such drugs is in contravention of the Veterinary Drug legislation and violate the terms of a Veterinary Drug Licence.

### Hormones

**Stilbestrol** (Diethylstilbestrol) is a sex hormone. It favourably influences weight gains in cattle and has been used in livestock rations and as a stimulant for many years. However, it has been proven carcinogenic, that is, cancer producing. The use of stilbestrol in animals was stopped in Canada on January 1, 1973.

**Oxytocin** is a very powerful muscle stimulant. Its chief use is to force the let down of milk in nursing cows. Unfortunately, it stimulates other muscles besides those in the mammary gland. The use of oxytocin, without a careful evaluation of the patient, has brought about the death of an animal on occasion.

**Cortisone** is dangerous because it has the ability to mask symptoms and give a false sense of well-being. When cortisone is used with an inappropriate antibiotic, an overwhelming infection can occur. This is because cortisone interferes with the immune response, one of the basics of body defence against disease.

The unlawful sale of cortisone usually involves its combination with mastitis ointments. Prednisolone follows a similar pattern to cortisone and is usually combined with neomycin in mastitis infusions.

### Acepromazine

Tranquilizers such as acepromazine, may not be sold by licensees because they are mood altering and can disguise symptoms. The sins which have been committed by the use of tranquilizers are many – for example, in the selling of a balky horse or a kicking cow. In the hands of unscrupulous persons tranquilizers are an aid to illegal transactions in the livestock trade.

### Phenylbutazone, Dexamethasone, and DMSO (dimethyl sulfoxide)

These products are powerful anti-inflammatory agents that relieve rheumatic conditions as well as inflamed muscles and tendons. They mask symptoms and give temporary relief from pain. An animal treated with these products may appear and act normal, but in the meantime it could be further damaging already damaged tissues.

### Lidocaine

Lidocaine is a local anesthetic commonly used to anesthetize skin for surgery or suturing. As such, veterinary oversight is required in the use of lidocaine.

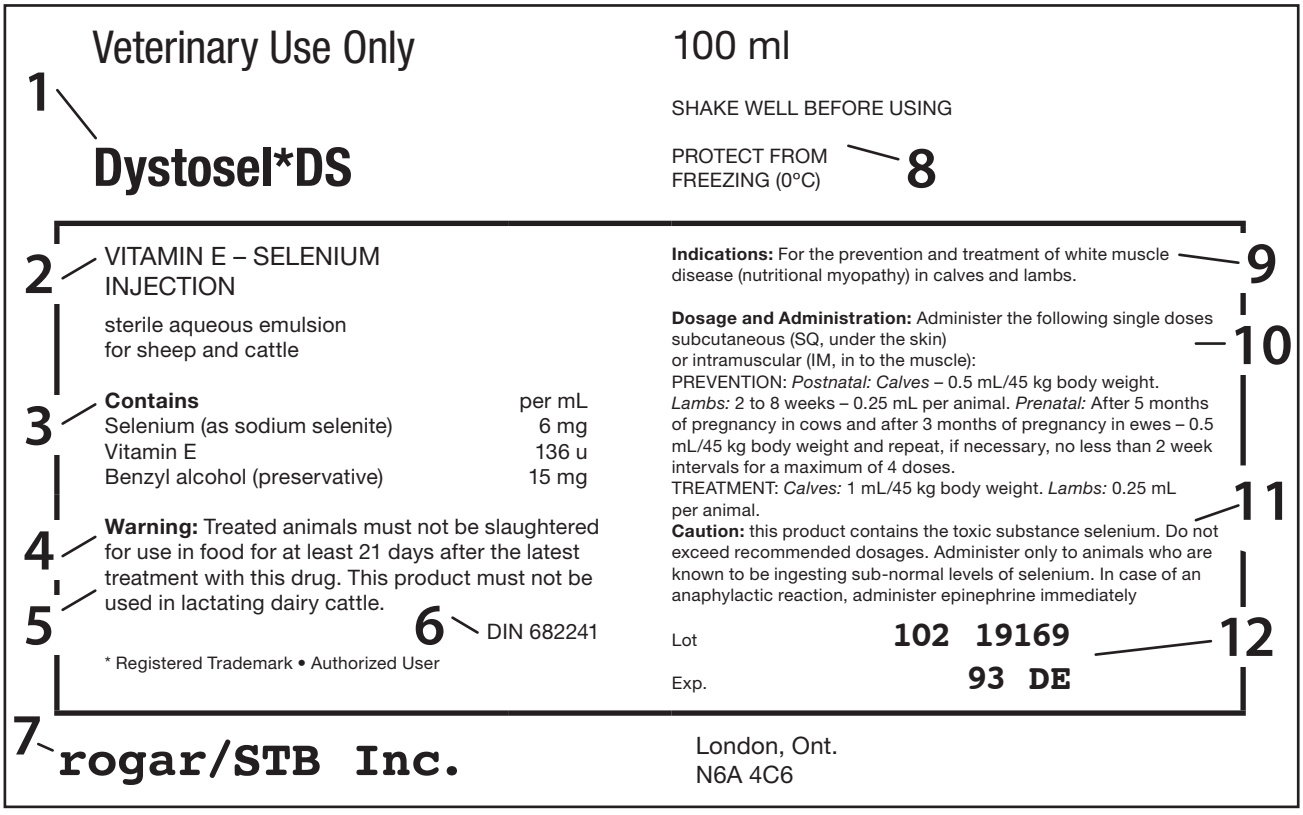
## Labelling

Products are licensed according to the contents and instructions on the label. To use a product in any manner other than stated on the label is a violation. Only licensed veterinarians are allowed by law to deviate from the instructions on the label. When a veterinarian deviates from the label this is described as a prescription use. He is responsible for anything that should go wrong, including residues.

An example of a label on a veterinary drug is included below. It illustrates 12 things usually included in such a label. You should be aware of these as it is your responsibility to point them out to the purchaser.

1. Trade Name
2. Generic Name
3. Content of the bottle or package
4. Withdrawal time
5. Restrictions to its use
6. DIN (Drug Identification Number)
7. Manufacturer
8. Storage Instructions
9. Indications
10. Dosage and method of administration
11. Cautions
12. Expiry date (the date after which the product must not be used)

1. **TRADE NAME:** This is the name that the pharmaceutical company has chosen to call the product. It may contain the name of the drug that is in the product or it may not bear any relation to the drug. Many of the same or similar products that are designed to do the same job have names that are totally dissimilar.



***Example:***

Covexin Plus is a clostridial bacterin containing antigens against eight different clostridial organisms and is sold by Merck Animal Health. This product was originally sold by Burroughs Welcome, which was bought out by Coopers, which was acquired by Merck. Coopers had their own 8-way clostridial bacterin (Tasvax-8) but they continued to sell both trade name products after the merger. This is a good example of the fact that trade names only have implications in marketing and little to do with what the product is used for.

Tasvax-8 is a clostridial bacterin containing the same eight antigens as in Covexin-8, manufactured by the same company.

2. **GENERIC NAME:** This identifies the active ingredient. In the case of the Covexin-8 and the Tasvax-8, the product is a Clostridial Bacterin. The specific clostridial antigens contained in the product will be listed under the **Active Ingredients**.

3. **CONTENT AND CONCENTRATION** (active ingredients): This will tell you what is in the product and the amounts. For the sample label, it lists the antigens that are present.

   The sample label states the amount of vitamin E and selenium present. It also includes the carrier, Benzyl Alcohol (the substance in which the active drug is dissolved or suspended) and the amount present. The concentration is expressed as the amount present in each millilitre (ml) or in the case of powders it is the amount present per gram. (Note that ml and cc (cubic centimetre) are the same volume measurement. It takes 1 000 mls (cc) to make a litre.)

4. **WITHDRAWAL TIME:** This is usually labeled **Warning** and states the amount of time after the last treatment before the animal may be slaughtered, or a product from it (such as milk) can be used for human consumption.

   **The withdrawal time is only applicable if the directions are followed exactly.** If the dosage is changed, if the method of administration (intramuscular/oral, etc.) is changed or it is given to a different species of animal than is recommended on the label, the withdrawal time is no longer applicable. The safe withdrawal time is no longer known. **This is extremely important.**

   If someone treats an animal differently than the label specifications and for some reason sends the animal to slaughter, or its product to market, after the label withdrawal time there is a strong possibility that this animal will have residues and will be unfit for human consumption.

5. **RESTRICTIONS:** These instructions are usually included under **Warning**. It will state what animals or class of animals this product cannot be used on. For the sample label the product is not to be used in lactating dairy cattle. Depending on the product, you may see here “not for use in food producing animals”.

6. **DRUG IDENTIFICATION NUMBER (DIN):** This is a coded number that appears on the label of all products licensed by the Veterinary Drugs Directorate, Health Canada. All veterinary pharmaceutical products in Canada carry this number except for patent medicines, which are not restricted drugs and do not require a licence to sell them. This number is recorded in all poison control centres. In the case of an accidental poisoning, use of the DIN to identify the drug prevents the confusion that could occur with the use of the trade name or generic name. The emergency treatment procedures, etc. are recorded for each DIN number.

   Biologicals (vaccines, bacterins and toxoids) do not carry a DIN number. They are licensed by the Canadian Food Inspection Agency.

7. **MANUFACTURER:** The name and address of the manufacturer of the veterinary drug.

8. **STORAGE INSTRUCTIONS:** These directions are extremely important to ensure that the product maintains its effectiveness.

   These must be followed by the client using the product and storing it at home. It is your responsibility as the retailer to ensure that the product is stored in the manner recommended and to point out the storage recommendations to your customer. It is your responsibility to sell a viable product to your customer.

   If you receive a shipment from your supplier that requires refrigeration and it arrives without cold packs, you are accepting an inferior product. The same can be said for frozen product in the winter. Do not accept shipments from a transport company that does not meet the storage instructions on the product. This is also true in accepting customer returns such as unopened vaccine. You have no idea how this product was stored after it left your premises. This product may be totally useless if it has not been stored properly. When you are selling a product to your customer that requires refrigeration it is in your best interest and the usefulness of the drug to provide some method of keeping that product cool until it can be refrigerated at home.

   The following are storage terms associated temperatures:

   Refrigerate – 2-8 degrees C.
   Cool Place – 8-15 degrees C.
   Protect from excessive heat – store below 40 degrees C.

   If there are no specific instructions, drugs should be protected from moisture, excessive heat and freezing. Drugs should not be stored in direct sunlight. Drugs that have been exposed to excessive heat or freezing in transportation should not be accepted.

9. **INDICATIONS** (Licensed Animal Species and Reasons for Use): The approved reasons for use of the veterinary drug and the approved animal species for use of the drug are listed. Deviation from the approved animal species and reasons for use should only occur as directed by a veterinarian.

10. **DOSAGE:** The dose to be administrated and the route stated (IM, SC, oral, etc.) has been used in the trials to substantiate the label claims. If these instructions are not followed then the label is not valid and instructions such as the withdrawal time are no longer valid. The dosage is usually stated in ml/kg of body weight.

11. **CAUTIONS:** These are designed to draw attention to any potential adverse reactions from the product, to make sure that the user is aware of these potential reactions and is prepared to act in the case of an adverse reaction.

12. **EXPIRY DATE:** Clinical tests have been done to determine the “shelf life” of the product. Remember you are selling a consistent, quality product that has been designed to produce a specific result. If you use an out-dated product the company has said that after this time this product no longer meets the label information and is not suitable for use.

    To sell an out-dated product is to sell someone a product that you have no idea of its quality. Veterinary pharmaceuticals are purchased to do a particular job and it is not a bargain to purchase out-dated drugs.

    It is important to regularly check the expiry dates on your inventory and to rotate stock to avoid having expired stock. It is also important to check the expiry date when unpacking shipments from the wholesaler. If the product does not have a reasonable shelf-life left, you may be left with unsold out-dated product. If you are selling short-dated product, you are not providing your customers with good service as they may not be able to use the product before it becomes out-dated.

IT IS YOUR RESPONSIBILITY TO POINT OUT TO YOUR CUSTOMER THE WARNINGS ASSOCIATED WITH THE PRODUCT.

THE SALE OF PHARMACEUTICALS IS A PRIVILEGE NOT A RIGHT. RESPONSIBLE SALES OF VETERINARY PHARMACEUTICALS WILL RESULT IN YOU MAINTAINING THAT PRIVILEGE, FAILURE TO DO SO WILL RESULT IN A LOSS OF THAT PRIVILEGE.

## The Veterinary Drug Purchase Register

The Veterinary Drug and Medicated Feed Regulation requires that a holder of a Medicated Feed Licence who mixes feeds or a holder of a Veterinary Drug Licence shall keep a register of all purchases made by the licensee. For this purpose, the Ministry of Agriculture supplies a Veterinary Drug Purchase Register in which it is necessary to legibly record, in order of date, all purchases of veterinary drugs showing:

- date of purchase
- name of supplier
- quantity purchased
- the generic name
- trade or brand name
- the name of the manufacturer of veterinary drugs purchased.

It is required that the veterinary drugs purchased to manufacture medicated feed (Schedule A, Table 1) be kept in a separate Veterinary Drug Purchase Register to those veterinary drugs (Schedule A, Table 2) to be sold from a licensed business. The original copy of the Purchase Register is to be sent to the Chief (Provincial) Veterinarian before February 28 each year to cover the purchases in the previous calendar year. Failing to do this may lead to a suspended licence and refusal to renew any Medicated Feed Licence or Veterinary Drug Licence in the next calendar year.

It is also required that holders of Limited Medicated Feed Licenses must submit a Purchase Register of medicated feeds purchased from another province or country and sold in British Columbia. The Chief Veterinarian must receive this Purchase Register before February 28 each year.

Note: The Veterinary Drug Purchase Register must be kept current. Drugs, etc. should be added as they are received.

There are two very important reasons why the Veterinary Drug Purchase Register is necessary:

1. Having available a written register whereby the Ministry of Agriculture can ascertain what veterinary drugs are being purchased and sold by licensees. The veterinary drugs that can be sold legally are those listed in Section 5 of the Regulation and Schedule A, Table 1 and 2. The exception is permitted under section 4 of the Regulations where a holder of a Medicated Feed Licence may sell, only upon the written order of a registered veterinarian, feeds medicated with veterinary drugs in strengths listed above those authorized under the *Feeds Act* (Canada) and feeds medicated with other veterinary drugs not listed in Schedule A, Table 1.

A report on the use of over-the-counter antibiotics in BC livestock and poultry is based on the Veterinary Drug Purchase Register. The report is available at www.agf.gov.bc.ca/lhmr/vetdrug.htm.

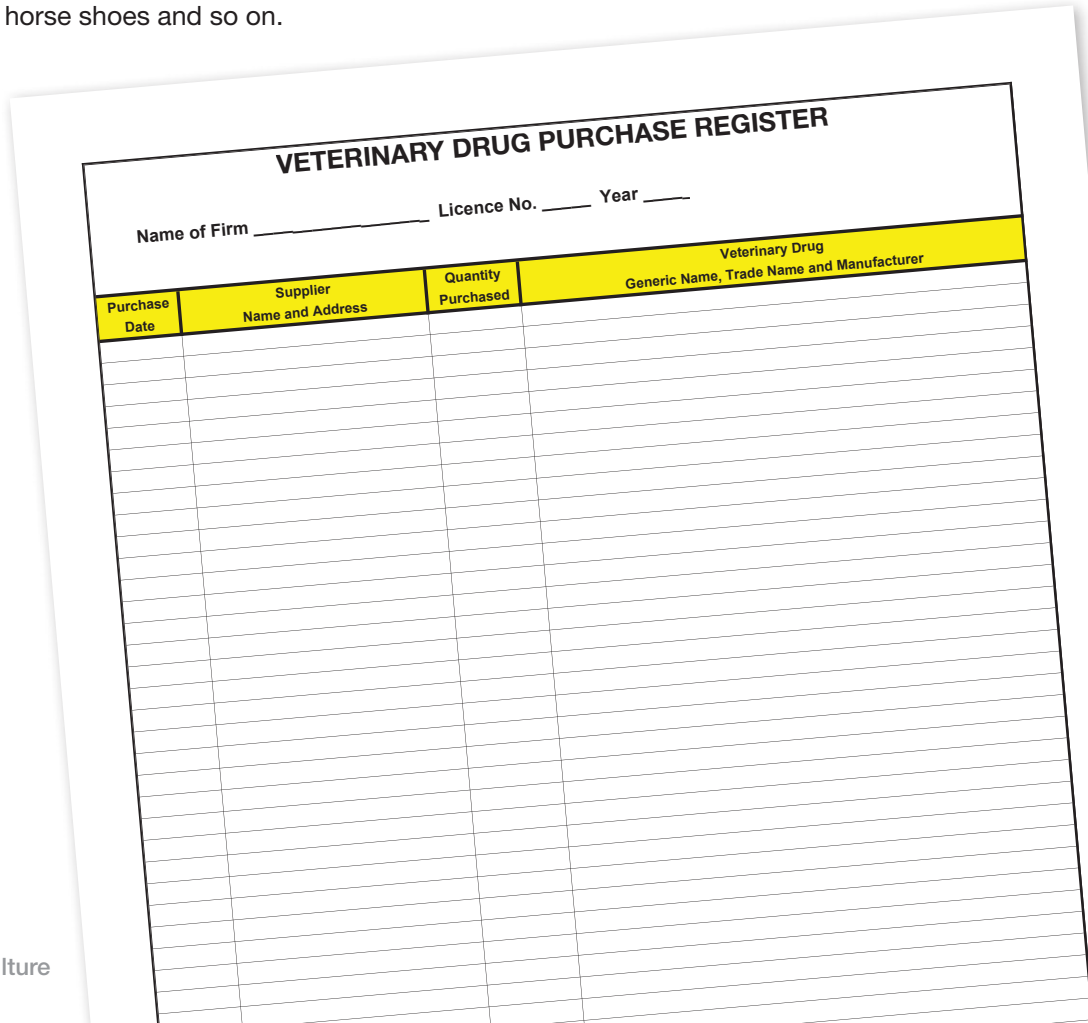
2. Having available the written registers, which can be summed to determine the drug sold in the province during a calendar year. During 1974, for instance, there were 18,746 doses of Newcastle-Bronchitis vaccine used in poultry, 103,900 lbs. of Furazolidone (NF 180) mixed in poultry feeds (now banned for use in food-producing animals) and 20,250 cc's of Erysipelas bacterin sold for use in pigs. These examples indicate the valuable information on veterinary drug sales that is available based on the veterinary drug purchase register.

The main purpose of this section of the Study Guide is to try and standardize the reporting of veterinary drugs in the Veterinary Drug Purchase Register returns. The main problems are in five areas:

1. In the "Quantity Purchased" column, reporting must be standardized to pounds, cc's, ml's, gallons, ounces, grams and doses. There is no way that accurate totals, as to amounts, can be determined when the "Quantity Purchased" column includes designations such as bags, barrels, packages, #, 2's, drums and so on. Appendix B shows a very poor tabulation of amounts when using the designations in the previous sentence. One can see that it is impossible to arrive at a reasonably accurate total of the actual sales due to the many different ways that quantities are shown. In Appendix B, the total doses for poultry vaccines are fine, but the rest is impossible.

   Appendix C shows a Purchase Register completed neatly and correctly.

2. In the "Veterinary Drug" column, it is required that only veterinary drugs be entered in the "Veterinary Drug" column. There is no call to include saddles, halters, horse shoes and so on.



VETERINARY DRUG PURCHASE REGISTER

Name of Firm _____ Licence No. _____ Year _____

| Purchase Date | Supplier Name and Address | Quantity Purchased | Veterinary Drug Generic Name, Trade Name and Manufacturer |
|---|---|---|---|

3. In the “Veterinary Drug” column, the generic name must be included. The generic names are those actually listed in Schedule A, Table 2. Unless this is done, there is considerable difficulty in knowing what the medical ingredients are. Unless the generic name is included it is difficult to determine if any Schedule A, Table 2 veterinary drugs are in products such as water medication, pink eye bomb, dehorning paste, udder rub, teat dilators, pig saver, ringo, and a host of other terms! Products such as horse dewormer and calf scour tablets likely contain Schedule A, Table 2 veterinary drugs, but it can be difficult to know the amounts of the specific ingredients unless the generic name is included.

4. In report “Quantity Purchased”, all of the poultry vaccines are listed according to the “doses” used. This is fine and it must remain this way.

   When it comes to reporting “Quantity Purchased”, for all other vaccines and bacterins used in animals, the amounts must be reported in “cc’s” or “ml’s”. This is essential as Blackleg, Corynebacteria and Pasteurella bacterins and IBR vaccines are being reported in both “cc’s” or “ml’s” and “doses”. In order to standardize, report all bacterins and vaccines in “cc’s” or “ml’s”, except those sold by hatcheries and used for poultry diseases.

5. In order to save time and space, trade names can be used provided that the ingredients are listed at least once on the Purchase Register. For instance, if the term “Triple Bacterin” is used and a statement is made that this product includes C1 chauveii-speticum and pasteurella, then for the entire year the brand name “Triple Bacterin” can be used. The applies to other products such as Coopervac, Two-Way Bacterin and so on.

It is realized that much of the difficulty of properly completing the Veterinary Drug Purchase Register is due to problems of continuity of staff in each licensed business. Sometimes, the task is delegated to a clerk and, in most cases, this person has not been properly apprised of what is required in the recording of veterinary drugs. Booklets (Veterinary Drug Purchase Registers) are available from the Livestock Health Management and Regulation (for address see page 37).

Better continuity and adequate knowledge is the aim of the Ministry of Agriculture, and provides additional impetus for the need to issue Veterinary Drug Licenses to businesses where a qualified person has completed a course of study and has passed an examination.

# Section 4
# Veterinary Drugs to Control Bee Diseases

## Conditions

- A person or business who dispenses veterinary medicines for the control of bee diseases must be familiar with the *Veterinary Drug and Medicated Feed Regulations*.
- Authority to dispense veterinary drugs for the control of bee diseases requires a licence that is limited to Oxytetracycline ("Oxytet"), Tylosin (Tylan), and Fumagillin (Fumadil B).
- Section 11 of the regulations requires that veterinary drugs can only be sold as packaged and labelled by the manufacturer.
- Section 13 of the regulations prohibits veterinary drugs to be repackaged.

## Pathogens

The honeybee *Apis mellifera* is affected by a number of pathogens, most of which are contagious either between individual bees within the hive or between hives and apiaries. Bee diseases may be caused by a range of pathogens including bacteria, microsporidia, fungi, viruses and parasitic mites.

With the exception of the Varroa mite, *Varroa destructor,* infectious agents attack only one stage of the bee, i.e. larval stage or adult stage. Bee diseases are usually classified as brood diseases or adult diseases.

The brood diseases include:

- American Foulbrood (AFB) – *Paenibacillus larvae*
- European Foulbrood (EFB) – *Mellisococcus plutonius* (incl. *Paenibacillus alvei* as secondary invader)
- Chalkbrood – *Ascosphaera apis*
- Stonebrood – *Aspergillus spp.*
- Sacbrood – Sacbrood virus (SBV)

Adult bee diseases include:

- Varroa mite – *Varroa destructor*
- Tracheal mite – *Acarapis woodi*
- Nosema – *Nosema apis, Nosema ceranae*
- Bee viruses

AFB, EFB and Nosema are the only bee diseases treated with veterinary drugs.

## Antibiotics

### Limitations and Precautions

- The application of antibiotics should not be used as the sole disease control agent of bee diseases. Antibiotics should be used in combination with cultural and physical control practices and should only be applied when actual disease signs and symptoms justify their use.
- The spores of the spore-forming bacterium *Paenibacillus larvae*, the causal agent of American Foulbrood, will not be killed when antibiotics are applied. The drug only prevents spore germination and vegetative growth.
- Frequent use of the same antibiotics over many years has led to the development of antibiotic-resistant bacterial strains of AFB and EFB in some areas. While registered antibiotics remain effective in most cases, they should only be applied when inspection results demand their use, and only according to label instruction.
- Care must be taken to ensure that no medications get into honey that will be extracted for human use. All medication must be removed 6 weeks before honey extraction. Any medicated honey still present at extracting time may be fed to bees.
- Proper dosage of antibiotic is essential. Overdosing will not offer better disease protection or efficacy and may harm the bees and bee brood. Underdosing is equally detrimental as it promotes the development of resistance.

***Tetracyclines*** were first introduced to control American and European Foulbrood disease in the early 1950s. These antibiotics were marketed under different trade names including Terramycin Animal Formula, Tetra-Sol, Onycin and others. Since the early 1990s, only Oxytetracycline Hydrochloride has been registered for use in Canada, under the trade name Oxytet.

Oxytet is formulated with a concentration of 55 milligrams per gram of powder (= 25 grams of active intergradient per 450 gram (= 1 lb) of formulation). For formula preparation and application, follow label instructions.

The tetracycline formulation is relatively unstable in water solution and remains effective for about 2 weeks. The powdered form of the antibiotic remains effective until its expiry date when stored properly.

In 1997, antibiotic-resistant strains of *P. larvae* (r-AFB) were diagnosed in BC for the first time. Subsequent surveys and tests have shown that r-AFB prevalence has remained low and that standard treatment with oxytetracycline antibiotics has remained effective in most cases.

***Tylosin*** tartrate is a broad-spectrum antibiotic registered for use to control brood diseases in beehives in Canada since 2013. Its registration was brought about as an alternative to oxytetracycline which showed declining efficacy in Alberta beehives since the early 2000s.

When antibiotic-resistance to oxytetracycline first appeared in Alberta, producers gained access to tylosin through off-label prescription by local veterinarians. In 2013, tylosin was fully registered for use in beehives across the country.

Tylosin has shown high efficacy in the control of AFB and EFB, but its persistence has rendered the product less suitable for use in the spring. It is recommended to be applied as an additive to sugar syrup feed in the fall.

***Fumagillin*** has been used exclusively to control the microsporidian *Nosema apis* which parasitizes the digestive tract of adult honey bees. The antibiotic is produced by the fungus *Aspergillus fumigatus* and marketed in Canada under the trade name Fumagilin-B.

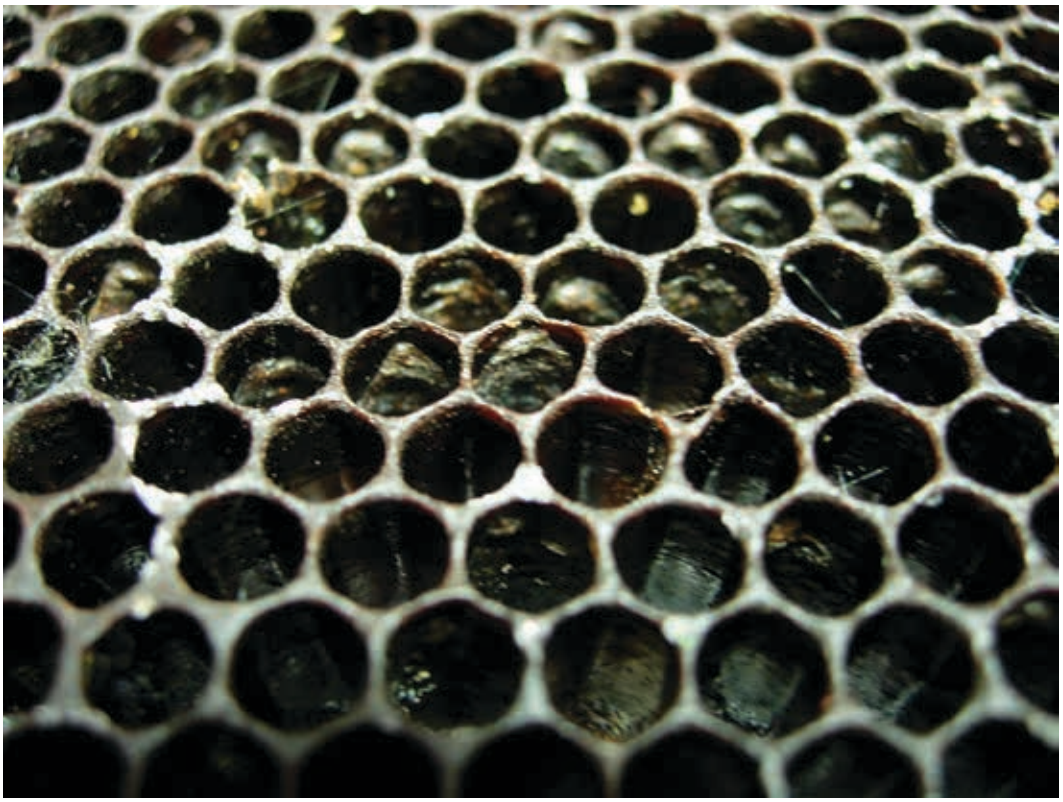
Fumagilin-B is formulated with a concentration of 21 milligrams per gram of powder. To prepare, dissolve 3 gm of powder for each litre of sugar syrup. To improve dissolving the powder, first apply small quantity of water to the powder, stir to form a paste. Add the paste to the sugar syrup while stirring, keeping the temperature at less than 30°C. Fumagilin-B breaks down rapidly in solution and can't be stored for more than 24 hours. The powder remains effective until its expiry date when stored in a cool, dry and dark place.

In the early 2000s, a second species *Nosema ceranae* was diagnosed in North America. Since then, *N. ceranae* has become the predominant species. Treatment with Fumagilin-B may not always be as effective compared to controlling *N. apis*. Increased dosage and frequency of application has been recommended according to label instructions.

# Bee Diseases

## American Foulbrood

American Foulbrood (AFB) is caused by the bacterium *Pseudobacillus larvae* (formerly *Bacillus larvae*). AFB was first diagnosed in British Columbia in the late 1800s, and led to the introduction of the first bee legislation. Similar measures were taken in most other Canadian provinces. AFB is regarded as one of the most serious bee diseases since it is highly contagious and capable of killing colonies. Prior to the introduction of veterinary antibiotics in the 1950s, the disease often wiped out whole apiaries at a rate of 10% in British Columbia.



*American Foulbrood Scales*

*Pseudobacillus larvae* is a Gram-positive spore-forming bacterium that parasitizes the larval stage of the honey bee. Larvae of less than 24 hours old are particularly vulnerable to infection but they can become infected up to 48 hours after which they become resistant. Upon entering the mid-gut, spores will germinate and grow vegetatively. Infected larvae generally don't display symptoms until brood cells have been capped. Death mostly occurs in the pre-pupal stage which coincides with the formation of bacterial spores. The larval remains turn black and eventually deteriorates into a scale-like structure at the bottom side of the cell.

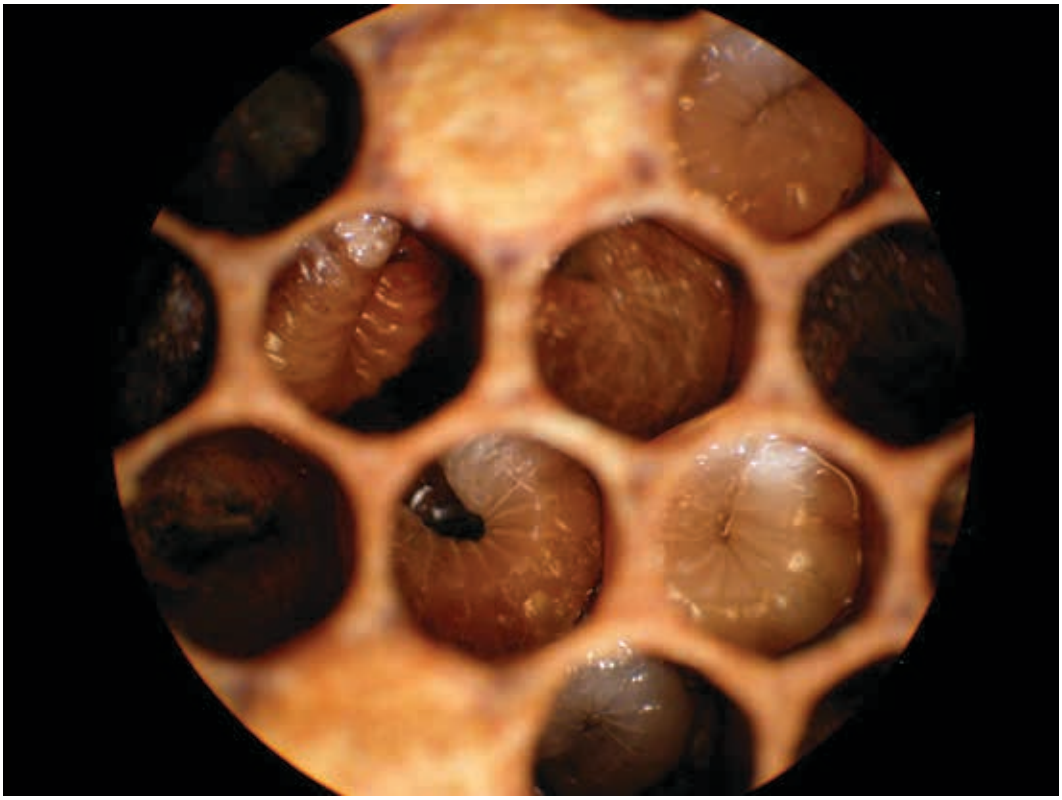
Housecleaning bees will attempt to remove the decayed larva or scale. Spores will be distributed among bees and cause infection of other larvae. The disease can spread rapidly throughout the colony, and spread to other colonies and apiaries.

Antibiotics fed to bees will prevent spore germination and growth in the midgut. However, spores will not be killed and may germinate in the future. Spores can withstand high temperatures, freezing and drought, and have shown to remain infective for decades within scales of infected equipment.

## European Foulbrood

European Foulbrood disease is caused by *Melissococcus plutonius*. The disease resembles American Foulbrood but has distinct symptoms. The disease is generally less destructive than AFB and is often associated with colony nutrition and stress.

*M. plutonius* is ingested by the larva where it enters the midgut and competes for food. Unlike *P. larvae* of AFB, it doesn't infect the larval tissue. When food supplies are abundant, the infected larvae pupate and develop into adults without showing symptoms. When the larva approaches the pupal stage, it will defecate and discharge large numbers of *M. plutonius* bacteria that are subsequently spread by housecleaning bees.



*European Foulbrood*

The death of the larva enables other species of bacteria to feed on the larval remains. A number of species are involved with *Pseudobacillus alvei* being the most common secondary invader. *P. alvei* is most often observed during microscopic examination and is characterized by its spindle-shaped cells.

EFB-infected larvae can be identified by their distorted and twisted position in the cell and discoloration from off-white to brown. The disease mostly disappears with the onset of a steady nectar and pollen flow. A single antibiotic treatment is sufficient to clear severe cases of the disease.

In 2013, antibiotic-resistant EFB was detected in BC for the first time. The resistance was observed in *P. alvei* cultures. No such observations were made involving *M. plutonius*. Since EFB is a disease complex involving different bacterial species, there is not sufficient information at this time to conclude that EFB has become antibiotic resistant.

## Nosema Disease (Nosemosis)

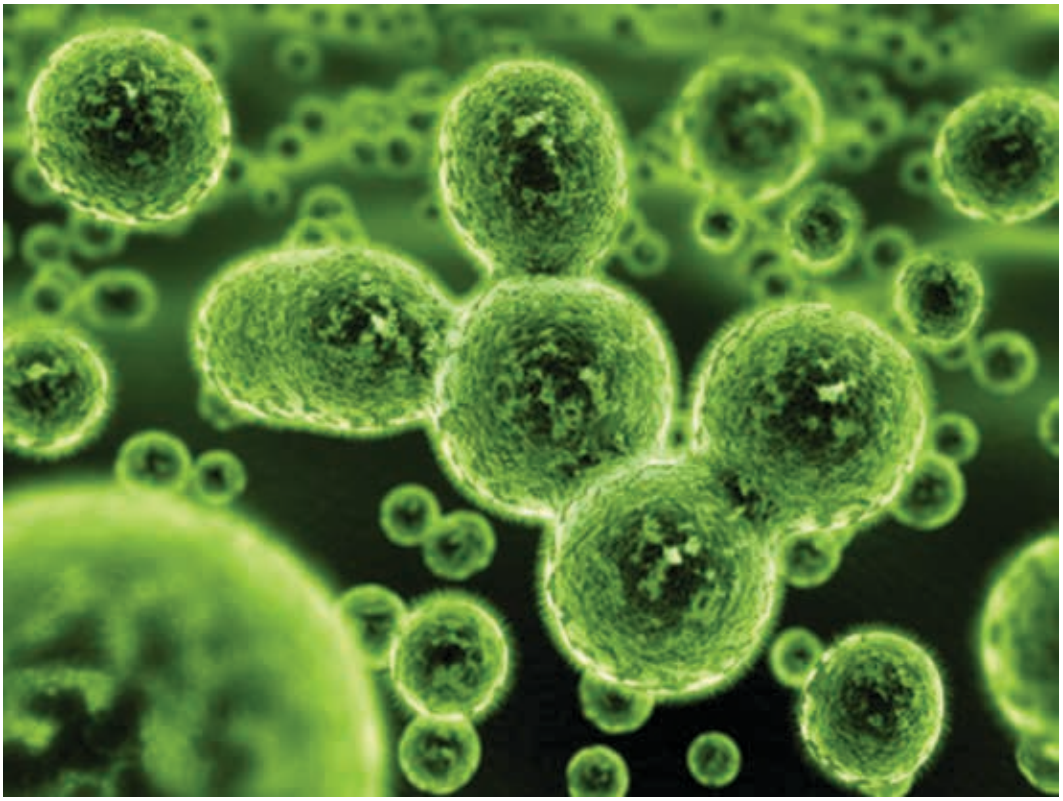
Nosema disease is an adult honey bee disease caused by the microsporidian *Nosema apis* and more recently by *Nosema ceranae*.

Spores of Nosema enter the midgut of adult honey bees and embed themselves into the epithelial cell wall. Upon germination, a harpoon-like filament is discharged to penetrate the cell wall and release its nucleus material for reproduction. The parasite will replicate within 48 hours. Build-up of spores will cause the cells to burst and release spores into the midgut cavity resulting in involuntary defecation by the infected bees. Fecal deposits inside and outside the hive will be sources of new infestations.

Nosema infection is most prevalent during the late winter season after the bees have been confined to the hive for several months. The disease generally clears up when weather conditions allow for bee flight and collection of fresh pollen.

Severe infestation may prevent the colony to regain strength. Nosemosis may be exacerbated by bee viruses, including Black Queen Cell virus and Filamentous virus.

Nosema disease can be confused with dysentery of adult bees, which is the result of accumulated non-digestible winter food materials and may also involve unidentified viral agents. The only reliable diagnosis of Nosema disease is through microscopic examination of the midgut of adult bees.



*Nosema as seen under a microscope*

# BC Ministry of Agriculture Contact

BC Ministry of Agriculture
Livestock Health Management and Regulation
1767 Angus Campbell Road
Abbotsford, BC V3G 2M3

Toll free: 1-877-877-2474
Fax: 604 556-3015

Veterinary Drugs Act

# Veterinary Drug and Medicated Feed Regulation

Note: Check the Cumulative Regulation Bulletin 2014
for any non-consolidated amendments to this regulation that may be in effect.
[includes amendments up to B.C. Reg. 118/2009, April 1, 2009]

**Contents**

**Interpretation**

1 In this regulation:

"**Act**" means the *Veterinary Drugs Act*;

"**CMIB**" means the Compendium of Medicating Ingredient Brochures published by the Canadian Food Inspection Agency;

"**licensee**" means a person who holds a licence issued under this regulation;

"**minister**" means the Minister of Agriculture and Lands;

"**production animal**" means

(a) a species of animal that may be used for human consumption or whose products may be used for human consumption,

(b) fur bearing animals as defined in the *Fur Farm Act*, and

(c) a species of animal used for crop pollination;

"**Provincial veterinarian**" means the Provincial veterinarian appointed under the *Livestock Disease Control Act*;

"**registered veterinarian**" means a person registered under the *Veterinarians Act* or an inspector under the *Livestock Disease Control Act*;

"**registered poultry hatchery**" means a hatchery permitted under the *Livestock and Livestock Products Act* (Canada).

[am. B.C. Regs. 431/95, s. 1; 118/2009, s. 1.]

**Licences to sell**

2 (1) Subject to the Act and this regulation, the minister may issue licences of each class set out in Column 1, upon application and payment of the fee in Column 2 for each class.

| Column 1<br>*Class of Licence* | Column 2<br>*Licence Fee*<br>$ |
|---|---|
| limited medicated feed licence .... | 12.00 |
| medicated feed licence ..... | 55.00 |
| veterinary drug licence ..... | 55.00 |
| veterinary drug dispenser licence | 12.00 for 5 years |

(2) An application for a licence under subsection (1) must be in the form provided by and forwarded to

Provincial Veterinarian
Abbotsford Agricultural Centre
1767 Angus Campbell Road
Abbotsford, B.C., V3G 2M3

(3) Unless sooner terminated in accordance with this regulation,

(a) a limited medicated feed licence, medicated feed licence, or veterinary drug licence expires on March 31 next following the date of issue, and

(b) a veterinary drug dispenser licence expires on March 31 five years after the date of issue.

(4) A licence is not transferable and where a change is made in the ownership of a business licensed under this regulation, the licensee

(a) shall notify the Provincial veterinarian of the change and return the licence to him, and

(b) is not entitled to receive any refund on the licence fee in respect of the unexpired term of the licence.

[am. B.C. Regs. 232/83; 459/87; 19/90; 257/93, ss. 1, 2; 431/95, ss. 2 and 3; 118/2009, s. 2.]

**Limited medicated feed licence**

3 A limited medicated feed licence authorizes the licensee to sell medicated feed, subject to this regulation, but not to manufacture it.

**Medicated feed licence**

4 Subject to this regulation and to the *Feeds Act* (Canada) and the regulations under that Act, a medicated feed licence authorizes the licensee,

(a) without the order of a registered veterinarian, to manufacture and sell medicated feeds containing veterinary drugs listed in the most recent edition of the CMIB, in strengths not exceeding those authorized under the most recent edition of the CMIB, and

(b) only upon the written order of a registered veterinarian, to manufacture and sell medicated feeds containing

(i) veterinary drugs listed in the most recent edition of the CMIB, in strengths exceeding those authorized under the most recent edition of the CMIB, or

(ii) veterinary drugs listed or described in Part II, Schedule F of the Food and Drug Regulations (Canada).

[am. B.C. Reg. 118/2009, s. 3.]

**Veterinary drug licence**

5 (1) A veterinary drug licence authorizes the licensee to sell the following veterinary drugs:

(a) injectable biologicals for the prevention or treatment of disease in production animals, including antiserums, bacterins, toxoids, antitoxins, products containing concentrated or purified antibodies and vaccines, except brucella, rabies, anthrax, modified live virus and live virus vaccines for mammals;

(b) antibiotics for administration to production animals and sulfonamides and their salts and derivatives listed or described in Part II, Schedule F of the Food and Drug Regulations (Canada), including drug preparations listed in the most recent edition of the CMIB;

(c) vitamins for injection into or oral administration to production animals, injectable vitamin A not to exceed 500 000 I.U. per millilitre and injectable vitamin D not to exceed 75 000 I.U. per millilitre;

(d) preparations containing

(i) minerals for oral administration to, and

(ii) selenium and iron for injection into

production animals, for the prevention of deficiencies, including hematinics for horses, if the hematinics contain not more than 1 milligram of copper gluconate or cobalt gluconate or both;

(e) growth promotants in the form of implants and feed additives labeled by the manufacturer for use in production animals;

(f) injectable epinephrine for treatment of anaphylactic reactions in production animals;

(g) dextrose, calcium, phosphorus and magnesium preparations and propylene glycol labeled by the manufacturer for treatment and prevention of acetonemia and hypocalcemia in production animals and preparations intended as an aid in the supportive treatment of nutritional deficiencies in debilitated production animals;

(h) anti-cannibalism compounds for poultry;

(i) topical preparations labeled by the manufacturer as liniments, counter-irritants or poultices for the treatment of joint pain, swollen ligaments, tendons or muscles;

(j) acetylsalicylic acid boluses for horses or cattle;

(k) disinfectants, udder washes and teat dips and sanitizers.

(2) A veterinary drug licence may only be issued to

(a) the holder of a limited medicated feed licence or a medicated feed licence,

(b) the operator of a registered poultry hatchery,

(c) a person in an area where professional veterinary advice or pharmaceutical service is not available, or

(d) a person the minister considers appropriate, upon the advice of the Advisory Committee on Veterinary Drugs.

[am. B.C. Reg. 118/2009, s. 4.]

**Veterinary drug dispenser**

6 (1) A medicated feed licensee shall have a veterinary drug dispenser on the premises when medicated feeds are being manufactured.

(2) A veterinary drug licensee shall have a veterinary drug dispenser present on the premises when those premises are open for business.

(3) A licensee shall notify the Provincial veterinarian, in writing, within 72 hours

(a) of ceasing to have a veterinary drug dispenser present on the premises as required by subsections (1) and (2), or

(b) of having a different or additional veterinary drug dispenser on his premises for the purpose of subsections (1) and (2),

giving the name and licence number of the veterinary drug dispenser.

**Cancellation of licences**

7 The minister may cancel a licence where the person to whom it was issued

(a) made a false statement in his application for licence,

(b) made a false statement in the register of purchases or the record of purchases and sale, or

(c) has contravened

(i) this regulation,

(ii) the Act, or

(iii) the *Veterinarians Act*.

[am. B.C. Regs. 431/95, s. 2; 118/2009, s. 5.]

**Veterinary drugs**

8 (1) A licensee shall maintain a permanent place of business and he shall keep and sell veterinary drugs only at that place of business.

(2) A licensee shall ensure that there is no public access to the area of the place of business, the cabinet, the refrigerator or other storage space where veterinary drugs listed in section 5 (1) are stored and kept for sale.

(3) No person shall store, distribute or mix a veterinary drug except under the personal supervision of a licensed veterinary drug dispenser.

[am. B.C. Reg. 118/2009, s. 6.]

**Storage where refrigeration unnecessary**

9 A licensee who keeps veterinary drugs for sale shall store any drugs he keeps that do not require refrigeration in a clean, sanitary cabinet or other storage space which prevents the drug from coming in contact with any food for human or animal use, or any drug or medicine for human use.

**Storage where refrigeration necessary**

10 (1) A licensee who keeps veterinary drugs for sale shall store any drugs he keeps that require refrigeration in a separate, clean and sanitary refrigerator at the temperature recommended by the manufacturer of the drugs.

(2) A licensee shall ensure that a refrigerator in which he keeps veterinary drugs does not contain any food for human or animal use, or any drug or medicine for human use.

**Manufacturer's packaging and labelling**

11 A holder of a veterinary drug licence shall sell veterinary drugs only as packaged and labelled by the manufacturer.

[am. B.C. Reg. 460/87, s. (a).]

**Duties of licensed dispenser**

12 Every licensed dispenser shall

(a) draw the purchaser's attention to toxicity warnings and precautions to be taken, following the use of any veterinary drug, with respect to animal and poultry products intended for human consumption, and

(b) immediately after the expiration date appearing on any container or package containing a veterinary drug, make a diagonal red mark across the label of the container or package, and shall keep such drugs separate from his other stock until they are destroyed or returned to the manufacturer.

**Prohibitions**

13 No licensed dispenser shall

(a) repackage a veterinary drug,

(b) give away, barter or sell a veterinary drug as an inducement to purchase other merchandise,

(c) sell a veterinary drug after the expiration date appearing on the container or package containing the drug,

(d) sell a veterinary drug other than a veterinary drug listed on the licence held by a licensee, or

(e) refuse a request to provide a receipt to any person who purchases a veterinary drug from him.

[am. B.C. Reg. 460/87, s. (b).]

**Exemptions**

14 This regulation does not apply to a sale by a manufacturer, wholesaler or agent of a manufacturer or wholesaler to

(a) a pharmacist or a registered veterinarian,

(b) another manufacturer or wholesaler or his agent,

(c) a person licensed under this regulation to sell specified drugs, where the drugs sold to that person are among those specified on his licence, or

(d) officials of governments and universities engaged in research and testing, and who provide services involving the use and application of veterinary drugs.

**Sales**

15 No manufacturer, wholesaler or agent of a manufacturer or wholesaler shall sell to a licensee a veterinary drug that is not listed in Table 1 or 2 of Schedule A.

**Certain sales prohibited**

16 Subject to section 14, no manufacturer, wholesaler or agent of a manufacturer or wholesaler shall sell any veterinary drug to a person who is not licensed under this regulation.

**Record of purchases and sales**

17 (1) A holder of a medicated feed licence who mixes medicated feeds or a holder of a veterinary drug licence shall keep a veterinary drug purchase register, supplied by the minister, of all purchases of veterinary drugs made by him and shall honestly, fully and legibly record in the register, in order of date, all purchases of veterinary drugs showing the date of purchases, name of supplier, quantity purchased, the generic name, trade name and name of manufacturer of the drugs.

(2) A holder of both a medicated feed licence and veterinary drug licence must keep separate veterinary drug purchase registers for the drugs referred to in section 4 and the drugs listed in section 5 (1).

(3) A holder of a limited medicated feed licence shall keep a register, supplied by the minister, of all purchases of medicated feed that have been imported for sale from another province or from another country.

[am. B.C. Reg. 118/2009, s. 7.]

**Record keeping and reporting**

18 (1) A licensee shall forward the original copy of his veterinary drug purchase register to the Provincial veterinarian before February 28 each year to cover all of the licensee's purchases for the previous calendar year.

(2) A licensee shall keep copies of his purchase invoices and purchase register for 24 months.

(3) Where a licensee does not comply with this section, the minister may suspend his licence or refuse to renew his licence for the next fiscal year or portion of it.

**Further requirement**

19 Where veterinary drugs are mixed in medicated feeds on the written order of a registered veterinarian, the licensee shall retain the written order and forward it with the original copy of the veterinary drug purchase register as required under section 18 (1).

**Licensees may be required to maintain a drug sales record**

20 (1) The Provincial veterinarian may, for just cause, require any licensee to maintain a veterinary drug sales record, supplied by the minister, of all sales made by the licensee.

(2) A licensee who is required under subsection (1) to maintain a veterinary drug sales record shall

(a) honestly and legibly record in the register, in order of date, all sales of veterinary drugs, the name, form and strength of the veterinary drug sold, and the name and address of the purchaser, and

(b) ensure that the signature of the person actually selling the drug is affixed at the time of sale.

**Transportation**

21 (1) No person shall transport within the Province, or cause to be transported within the Province, any veterinary drug except for delivery to

(a) a veterinary drug licensee or medicated feed licensee under this regulation,

(b) a pharmacist,

(c) a registered veterinarian,

(d) a manufacturer, wholesaler or an agent of a manufacturer or wholesaler, or

(e) officials of governments and universities

but a person who purchases veterinary drugs from a person referred to in paragraphs (a) to (c) may transport the drugs or have them delivered to the place where he requires them.

(2) No licensee other than the operator of a registered poultry hatchery shall deliver any veterinary drugs.

**Safe transport of veterinary drugs**

22 A person who transports veterinary drugs shall do so in a manner that

(a) will prevent the containers of these drugs from coming in contact with human or animal food or other products that might be contaminated by contact, and

(b) will maintain the original potency or efficacy of the drugs.

**Veterinary drug dispensers**

23 (1) The Provincial veterinarian may issue a veterinary drug dispenser licence to a person who qualifies under this section.

(2) No person under the age of 18 years shall apply for or be issued a licence as a veterinary drug dispenser.

(3) No person shall be issued a licence as a veterinary drug dispenser unless he passes an examination set by the Provincial veterinarian respecting the properties, use and abuse of veterinary drugs and related information.

(4) A person who is not successful in passing the examination may, on written request, write an additional examination not sooner than 14 days after the date of the previous examination but may not write the examination more than twice within any 6 month period.

(5) The Provincial veterinarian may require an applicant for a licence as a veterinary drug dispenser to attend a course of instruction on medicated feeds and veterinary drugs at a time and place the Provincial veterinarian designates.

[am. B.C. Reg. 257/93, s. 3.]

**Further examinations**

24 (1) The Provincial veterinarian may require a veterinary drug dispenser to undergo a further examination at any time as to his competency respecting the properties, use and abuse of veterinary drugs and related information.

(2) The Provincial veterinarian may cancel the veterinary drug dispenser licence of any person who fails to pass an examination required under subsection (1).

**Offence**

25 (1) A person who contravenes section 6 (1) and (2), 8, 9 to 11, 13, 15, 16, 21 or 22 commits an offence.

(2) No proceeding, conviction or penalty for an offence under subsection (1) relieves any person from any other liability.

**Schedule A**

Repealed. [B.C. Reg. 118/2009, s. 8.]

**Schedule B**

Repealed. [B.C. Reg. 257/93, s. 6.]

[Provisions of the *Veterinary Drugs Act*, R.S.B.C. 1996, c. 363, relevant to the enactment of this regulation: section 71]

## Veterinary Drugs Act

Veterinary Drug and Medicated Feed Regulation
Policy Document
Revised January 2015

## Schedule A, Table 1
## Veterinary Drug Additives for Medicated Feed

This table is provided as an aid to licensees, who are encouraged to review section 4 of the Regulation. In case of a discrepancy between the table and section 4 of the Regulation, the Regulation is deemed correct. Medicated Feed Licensees can manufacture and sell medicated feed containing:

Amprolium
Arsanilic acid
Bacitracin methylene disalicylate
Bambermycins
Chlortetracycline hydrochloride
Clopidol
Decoquinate
Dichlorvos
Diclazuril
Erythromycin thiocyanate
Fenbendazole
Halofuginone hydrobromide
Hygromycin B
Ivermectin
Lasalocid sodium
Levamisole
Lincomycin
Maduramycin ammonium
Melengestrol acetate
Monesin sodium
Morantel tartrate
Narasin
Neomycin sulphate
Nicarbazin
3-Nitro-4 hydroxyphenylarsonic acid
4-Nitrophenylarsonic acid
Novobiocin
Oxytetracycline hydrochloride
Piperazine
Poloxalene
Procaine Penicillin
Pyrantel tartrate
Ractopamine hydrochloride
Robenidine hydrochloride
Salinomycin sodium
Senduramicin sodium
Spectinomycin
Sulfamethazine
Tiamulin
Tilmicosin
Tylosin phosphate
Virginiamycin
Zilpaterol hydrochloride
Zinc bacitracin
Zoalene

# Veterinary Drugs Act

Veterinary Drug and Medicated Feed Regulation
Policy Document
Revised January 2015

## Schedule A, Table 2

**Live and modified live vaccines cannot be sold**, except poultry vaccines if specifically permitted under licence.

This table is provided as an aid to licensees, who are encouraged to review section 5 of the Regulation. In case of a discrepancy between the table and section 5 of the Regulation, the Regulation is deemed correct. As per section 5 of the Regulation, Veterinary Drug licensees can sell the following injectable biologicals:

*BIOLOGICALS require refrigeration until used

| POULTRY | MINK |
|---|---|
| *(Usually only licensed hatcheries can handle these)* | *(Restricted – handled by special outlets)* |
| Adenovirus vaccine | Mink botulism toxoid |
| Avian encephalomyelitis vaccine | Mink distemper vaccine |
| Bordetella vaccine | Mink virus enteritis vaccine |
| Chicken anemia virus vaccine | Pseudomonas bacterin |
| Clostridial toxoids | |
| Coccidiosis vaccine | |
| Duck virus enteritis vaccine | |
| Duck virus hepatitis vaccine | |
| Encephalomyelitis vaccine | |
| E. coli vaccine | |
| Erysipelas bacterins | |
| Fowlpox vaccine | |
| Infectious bronchitis vaccine | |
| Infectious bursal disease vaccine | |
| Infectious laryngotracheitis vaccine | |
| Marek's disease vaccine | |
| Mycoplasma gallisepticum bacterin | |
| Newcastle disease vaccine | |
| Paramyxovirus vaccine | |
| Pasteurella multocida bacterin | |
| Reimerella anatipestifer vaccine | |
| Salmonella bacterins | |
| Viral arthritis vaccine | |
| **CATTLE, SHEEP AND GOATS** | **PIGS** |
| Bovine respiratory syncytial virus killed vaccine | Actinobacillus (Hemophilus) bacterin |
| Bovine virus diarrhea killed vaccine | Bordetella bacterin |
| Campylobacter (Vibrio) bacterin | Clostridial bacterins and toxoids |
| Coronavirus killed vaccine | E. coli bacterin |
| Clostridial bacterins and toxoids | Erysipelas bacterin |
| Corynebacterium bacterin | Leptospira bacterin |
| E. coli bacterin | Mycoplasma hyopneumonia bacterin |
| Hemophilus somnus bacterin | Parvovirus killed vaccine |
| Infectious bovine rhinotracheitis killed vaccine | Porcine circovirus killed vaccine |
| Leptospira bacterin | Pasteurella bacterin |
| Parainfluenza killed vaccine | Swine influenza killed bacterin |
| Pasteurella bacterin | Streptococcus bacterin |
| Rotavirus killed vaccine | Tetanus antitoxin |
| Salmonella bacterin | Tetanus toxoid |
| Staphylococcus bacterin | |
| Tetanus antitoxin | |
| Tetanus toxoid | |
| **AQUACULTURE – RESTRICTED OUTLETS** | |
| Aeromonas salmonicida bacterin | Vibrio anguillarum bacterin |
| Flavobacterium columnare bacterin | Vibrio ordalli bacterin |
| Infectious hematopoietic necrosis virus DNA vaccine | Vibrio salmonicida bacterin |
| Infectious salmon anemia virus killed vaccine | Yersinia ruckeri bacterin |

# Veterinary Drugs Act

Veterinary Drug and Medicated Feed Regulation
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## Schedule A, Table 2 (cont'd)

| HORSES | MISCELLANEOUS VETERINARY DRUGS |
|---|---|
| Clostridial toxoid<br>Equine encephalomyelitis vaccine<br>Equine influenza killed vaccine<br>Rhinopneumonitis vaccine<br>Rhodococcus equi bacterin<br>Salmonella typhimurium bacterin<br>Streptococcus equi bacterin<br>Tetanus antitoxin<br>Tetanus toxoid<br>West Nile virus killed vaccine | *(Single or combination)*<br>Barium chloride<br>Chlorhexidine<br>Copper salts iodine and preparations thereof<br>Dextrose<br>Disinfectants, udder washes, teat dips and sanitizers<br>Liniments, counter-irritants and poultices<br>Propylene glycol<br>Pregelatinized starch (as a demulcent only)<br>Silicones<br>Sodium propionate<br>Surfactant veterinary drugs for use in prevention and treatment of ruminant bloat<br>Tatar emetic<br>*Estradiol benzoate (growth promotion use only)<br>*Progesterone (growth promotion use only)<br>*Testosterone Propionate (growth promotion only)<br>*Zeranol |
| **ANTIBIOTICS** | ***CHEMOTHERAPEUTICS** |
| *(Single or combination)*<br>Bacitracin (for topical use only)<br>Dihydrostreptomycin<br>Erythromycin<br>Fumigillin<br>Lincomycin hydrochloride (for oral use only)<br>Neomycin<br>Novobiocin (for intramammary use only)<br>Penicillin G<br>Polymyxin B<br>Spectinomycin<br>Succinylsulfathiazole<br>Sulfacetamide<br>Sulfadiazine<br>Sulfaguanidine<br>Sulfamerazine<br>Sulfamethazine<br>Sulfanilimide<br>Sulfaquinoxaline<br>Sulfathiazole<br>Streptomycin<br>Tetracyclines<br>Tyrothricin (for topical use only) | *(Single or combination)*<br>Amprolium<br>Acetylsalicylic acid boluses (for horses or cattle only)<br>Benzimidazole preparations (example fenbendazole)<br>2, 4-diamino-1-p-chlorophenol<br>Dichlorovos anthelmintics<br>Dimetridazole<br>Epinephrine<br>Febantel<br>Ivermectin (Avermectins)<br>Morantel tartrate<br>*Moxidectin*<br>*Moxidectin & Praziquantel*<br>Nithiazide<br>3-nitro-4-hydroxyphenolarsonic acid (maximum strength of tablet 3.5%)<br>Nitrofurans and the analogues (for horses only)<br>Famphur<br>Phenothiazine<br>Piperazine salts<br>Pyrantel<br>dl-tetramisole or its isomers<br>Trichlorofon (as a paste wormer only)<br>Injectable and oral vitamin and mineral preparations (including selenium and iron) |

**Please Note**

* No public access is allowed to the groups and individual drugs shown with an asterisk.

- All products must be approved for sale in Canada. All of the above must be sold in the original, unopened container.
- Prescription products cannot be sold.

### Products Which Cannot Be Sold By Licensees

This is not an inclusive list of all the products that licensees can not sell. The partial list below is provided as an aid to licensees. It includes products that have historically been a source of confusion for licensees.

| | |
|---|---|
| Acepromazine | DMSO (dimethyl sulfoxide) |
| Dexamethasone | Lidocaine |
| Dog or cat vaccines | Rabies vaccine |

# Appendix A

## Example Medicating Ingredient Brochure No. 37A

### Bacitracin from Zinc Bacitracin – MIB #37A

Date Revised: 2014-09

**Approved Brands**

Albac 110 Zinc Bacitracin Premix contains bacitracin (from zinc bacitracin) at 110 g/kg (Zoetis Canada Inc.)

**Approved for Use**

In meal or pellet feed for chickens; swine.

**Approved Claims**

For chickens – Claim 1, 2

For swine – Claim 3, 4

**Claim 1:** For the reduction of early mortality in chicks.

**Level of Drug:** 110 mg/kg (0.011%) of bacitracin in the complete feed.

**Directions:** Feed this medicated feed as the sole ration for 5-15 days.

**Caution:**

1. Do not use in feeds containing bentonite or other pellet binding agents. (Required only on premix and supplement labels.)

**Claim 2:** For the prevention of necrotic enteritis caused by Clostridium perfringens susceptible to bacitracin in broiler chickens.

**Level of Drug:** 55 mg/kg (0.0055%) of bacitracin in the complete feed.

**Directions:** Feed this medicated feed continuously as the sole ration to market weight.

**Caution:**

1. Do not use in feeds containing bentonite or other pellet binding agents. (Required only on premix and supplement labels.)

## Claim 3:

### As an aid in the prevention of Bacterial Enteritis (Scours) (except Coliform Diarrhoea) in swine.

**Level of Drug:** 55 mg/kg (0.0055%) of bacitracin in the complete feed.

**Directions:** Feed this medicated feed as the sole ration.

**Caution:**

1. Do not use in feeds containing bentonite or other pellet binding agents. (Required only on premix and supplement labels.)
2. Pigs refusing to eat should be treated individually.

## Claim 4:

### As an aid in treatment of Bacterial Enteritis (Scours) (except Coliform Diarrhoea) in swine.

**Level of Drug:** 110 mg/kg (0.011%) of bacitracin in the complete feed.

**Directions:** Feed this medicated feed as the sole ration for 5-15 days.

**Caution:**

1. Do not use in feeds containing bentonite or other pellet binding agents. (Required only on premix and supplement labels.)
2. Pigs refusing to eat should be treated individually.

## Accepted Compatibilities

Zinc bacitracin is compatible with the following drug/drug combinations. For details refer to the MIB as indicated.

| Number | Medicated ingredients | For use in feed for |
|---|---|---|
| 1. | Lasalocid sodium (MIB #66) | broiler chickens |

Date modified: 2014-09-19

# Appendix B

## Poor Tabulation of Amount From "Quantity Purchased" Column

**Key to Abbreviations**

**N/B – Newcastle Bronchitis Vaccine**
**N/C – Newcastle Vaccine**
**I/B – Infectious Bronchitis Vaccine**
**M/D – Marek's Disease Vaccine**
**A/E – Avian Encephalomyelitis Vaccine**
**ILT – Infectious Laryngotracheitis Vaccine**

| | |
|---|---|
| N/B | 2,180,000 doses |
| N/C | 340,000 doses |
| I/B | 298,000 doses |
| M/D | 16,000 doses |
| A/E | 89,500 doses |
| ILT | 245,500 doses |
| Erysipelas bacterin | 13,800 cc |
| Aureomycin Bisulphate | 3# |
| ESP | 75# + 80 |
| Electrolytes | 35# + 25 + 50 lbs |
| Emtryl | 300 tablets |
| Germex | 6 gallons |
| Gallimycin Poultry | 14 drums |
| Formula | 1,700 grams |
| Gallimycin Sol | 100 cc |
| Gallimycin Inject | 100# |
| (BSO Bonded TM2) | 100# + 50 bags + 50 lbs |
| (ISO Bonded TM2) | 2 gal |
| Kerol | 25# + 25 |
| Klotogen | 240 ounces |
| Medic Aid | 5# |
| MF 180 | 4# + 5 |
| MDS | 10# + 5 |
| Neo Med | 1,020 grams |
| Neotran | 10# + 65 lbs |
| Div. 5 Special | 275# |
| Western Fedd Special | 31 gal |
| 1 Stroke environ | 32# |
| Sol Nitrofurazine | 352 ounces |
| Superdyne | 1 gal + 60 ounces + 30/4 |
| Sulquin | 230,400 cc |
| Spectam | 1 drum |
| Sulpha plus | 46 gal |
| Sulphamethazine | 50# + 10 bags |
| Tranquillizer | 6# + 48 + 72 1's |
| Tetramix | |

# Appendix C

## Veterinary Drug Purchase Register

**Note:** Please Print

Licence No.: _____

Name of Firm: _____ Year: _____

### Veterinary Drug

| Date of Purchase | Supplier (Company Name and Address) | Quantity Purchased | Veterinary Drug (Generic Name, Trade Name, and Name of Manufacturer) |
|---|---|---|---|
| Jan. 1, 2103 | Kane Vet Supplies<br>11204 – 186th Street<br>Edmonton, AB | 2 x 250 ml | penicillin G, Penpro, Vetoquinol |
| Feb. 7, 2013 | Wecan Sales<br>3686 Mountain Street<br>Beamsville, ON | 4 x 23.6 gm | pyrantel pamoate, Exodus Paste, Bimeda-MTC Animal Health |
| Feb. 7, 2013 | Wecan Sales | 12 x 6.42 gm | ivermectin, Bimectin Paste, Bimeda-MTC Animal Health |
| Feb. 14, 2013 | Kane Vet Supplies | 10 x 100 ml | Clostridial Bacterins, TasVax 8, Schering Plough |
| Feb. 14, 2013 | Kane Vet Supplies | 6 x 30 gm | chlorhexidine acetate, Hibitane, Wyeth |
| March 7, 2013 | Canadian Saddlery & Centurion Supply<br>PO Box 21116<br>10 Humber Street<br>Stratford, ON | 11 x 25 gm | fenbendazole, Safe-Guard Paste, Intervet Canada |
| April 13, 2013 | Vetoquinol<br>2000 Chemin Georges<br>Lavaltrie, QU | 1 x 1L | ivermectin, Bimectin Pour-On, Vetoquinol |
| April 13, 2013 | Vetoquinol | 2 x 400 gm | Oxytetracycline, Oxysol 62.5, Vetoquinol |
| May 24, 2013 | Merial Canada<br>20000 Clark Graham<br>Baie D'Urfe, QU | 1 x 2,000 dose | Newcastle and bronchitis vaccine (MASS & CONN Type), Newcastle-Bronchitis Vaccine, Merial Canada |
| May 24, 2013 | Merial | 1 x 5,000 dose | Bronchitis vaccine, Bronchitis Vaccine (MASS Type), Merial Canada |
| June 2, 2013 | Vetoquinol | 8 x 400 gm | tetracycline, neomycin sulfate, Neo-Chlor, Vetoquinol |
| June 2, 2013 | Vetoquinol | 12 x 500MM IU | penicillin G, Pot-Pen, Vetoquinol |
| June 2, 2013 | Vetoquinol | 25 x 400 gm | piperazine, Piperazine 52, Vetoquinol |
| June 2, 2013 | Vetoquinol | 1 x 10 kg | penicillin G, streptomycin, Super Booster, Vetoquinol |
| June 2, 2013 | Vetoquinol | 24 x 23.6 gm | pyrantel pamoate, Exodus Paste, Bi-Meda Animal Health |

**Ministry of Agriculture**

# Veterinary Drug Regulations in BC Useful Links

The documents listed below are available at the BC Ministry of Agriculture's Veterinary Drug Regulations in BC website (www.agf.gov.bc.ca/lhmr/vetdrug.htm).

Types of Licences and Application Forms

Study Guide for Veterinary Drug Dispenser Licence

Schedule A, Table 1 & 2

Drug Purchasing Record Form

Veterinary Drugs Act

Veterinary Drug and Medicated Feed Regulation

Use of Over-the-Counter Antibiotics in BC Livestock and Poultry, 2002-2012

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