21. Developing a Vaccination Plan

For a vaccination plan to be effective the following points should be considered:

1. Is the disease likely to occur in your area?
2. If the disease occurs, is it significant?
3. Is the vaccine effective?
4. Is the vaccine readily available?
5. Is the vaccine safe?
6. Is use of the vaccine cost effective?

It is, therefore, worthwhile discussing the needs of your flock/herd with your local veterinarian. There are very few vaccines available for use in Canada that are approved for either sheep and/or goats.

Clostridial Vaccines

Most clostridial vaccines come in combination, commonly referred to as multi-valent. No matter which one you choose it should contain *Cl. tetani* (tetanus) and *Cl. perfringens* type D (pulpy kidney). These two diseases are common killers of lambs/kids. The vaccine is cost effective to use and is effective in controlling the disease. Remember that if the vaccine is given to the ewe/doe then passive immunity is given to the lamb/kid in the colostrum. Passive immunity should protect the lamb or kid until 60 days of age, at which time the lamb/kid will need to undergo a vaccination series of a primary vaccination followed by a booster three to four weeks later. Annual vaccination is required to maintain adequate protection.

Important Note:
Some of the 7-way and 8-way vaccines have recently been reformulated with Cl. soredellii instead of tetanus (Cl. tetani); ensure that the vaccine that you use contains tetanus.

Caseous Lymphadenitis

This disease is common in many sheep and goat flocks. The vaccine is cost effective and safe. The real role of the vaccine is to reduce the number of abscesses seen in the herd. The vaccine is available alone or in combination with tetanus and pulpy kidney. Research has shown that lamb/kid vaccination series that are delayed until the lamb/kid is at least 11 weeks of age are more effective in protecting the vaccinated animals than those given at a younger age.

Rabies

There are several rabies vaccines licensed for use in sheep in Canada; none are approved for use in goats. Clinical cases of rabies in small ruminants are uncommon. If a sheep/goat did get rabies the risk of transmission to humans would be extremely low, but nonetheless a risk.

Anthrax

Sheep and goats are at a relative low risk of acquiring anthrax compared to other species. Generally speaking, unless you are in a higher risk area, the vaccine would not be routinely administered.

Note: There have been reports of adverse reactions to the vaccine in Pygmy goats.

Enzootic Abortion Vaccine (*Chlamydia psittaci* Bacterin)

Given how common this form of abortion is in small ruminant flocks in western Canada, any protection afforded by this vaccine is worthwhile. If your flock has had previous problems, consider vaccination for any replacements. Producers who purchase animals from unproven sources should also consider vaccination. The vaccine is not 100 percent effective but can help reduce abortion rates in the flock/herd. For goats use of this vaccine is an ELDU. The vaccine is made by the Colorado Serum Company and distributed in Canada by the Canadian Cooperative Wool Growers (CCWG) and CDMV Inc.

ELDU
Extra-label drug use, also referred to as "off-label use" refers to the actual use or intended use of any drug, whether it is a prescription drug or over-the-counter (OTC) drug, in an animal in a manner that is not in accordance with the approved label or the package insert of the drug licensed by Health Canada.

Vibriosis Vaccine (*Campylobacter fetus,* Bacterin-ovine)

This form of abortion is also very common in western Canada and once again any protection afforded by this vaccine would be worthwhile. This is especially true since even with the very best management it is not possible to completely exclude this disease from your flock. The vaccine actually contains the two most common strains of the bacteria responsible for abortions. The first dose is given just before breeding and the second dose two to three months later. Annual boosters are required. The vaccine is made by the Colorado Serum Company and distributed in Canada by the Canadian Cooperative Wool Growers (CCWG) and CDMV Inc.

Other Vaccines

In other parts of the world where there is a larger industry there are other vaccines available, notably a foot rot vaccine, an orf vaccine, and a foot and mouth vaccine.

Foot rot is less prevalent in western Canada as there is less moisture and the disease is best controlled by good biosecurity measures. The vaccine is available in Canada with an EDR completed by your veterinarian.

The orf vaccine, although widely discussed, is not very helpful as the vaccine is simply orf virus which is administered by scratching the skin in the armpit of the ewe/doe. The immunity is not long-lived and the ewes/does shed virus into the environment. It is only of value in flocks/herds which have a severe problem with clinical disease.

Because foot and mouth disease has been eradicated from Canada, vaccination is not available. In a worse-case scenario in which the disease were to appear the government may use vaccination as a disease control measure.

EDR
Emergency Drug Release permits the manufacturer of a new drug to sell a limited quantity of the new drug to a veterinary practitioner. The new drug is one which is not marketed in Canada and is requested by the practitioner for the purpose of diagnosing or treating a medical emergency.

22. Biosecurity

Biosecurity is the term used to describe procedures put in place to prevent new diseases being brought onto your farm. Many of the important diseases of sheep and goats are best controlled by avoidance or eradication. If a herd is free of a disease it is vitally important that the disease be kept out. Once the disease has been eradicated, none of the remaining animals will have immunity; if the disease were to return it would commonly have dire consequences since in the absence of immunity it would spread unchecked.

Disease may enter a farm in a number of ways:

- Purchased animals
- People
- Rodents
- Feed
- Equipment (objects, such as feed trucks, water buckets, etc.)

Preventative Procedures

Purchased Animals

Many important diseases of sheep and goats (Johne's disease, maedi-visna, CAE, abortion) are carried by animals that appear completely normal. There is no way to determine if they are carrying disease by examining them. A blood test can be used to detect some diseases, such as maedi-visna or CAE; however, some diseases do not have a diagnostic test available.

The only way to know if the disease may be present is by asking the vendor and trusting the answer. The purchase of any animal will always

involve some measure of risk, but if you know the vendor or know their reputation the risk can be minimized. Avoid purchasing animals at auctions and never buy newborn animals. Newborns that are sold are either orphans or "extras" and may not have not received sufficient colostrum. As a result, they may be incubating a wide variety of diseases.

Regardless of where purchased animals come from, it is important that all new animals are placed in some form of quarantine. The quarantine area should be separate from the rest of the herd. The animals should be dewormed and monitored for any signs of illness for two to six weeks. The animals can then be introduced to the herd after the quarantine period is over.

People

Any visitors to your farm can carry disease on their clothing or footwear. The highest risk visitors are those who routinely come in contact with other small ruminants. It is important that routine procedures be put in place to ensure that visitors do not bring disease with them.

All visitors should be provided with footwear and coveralls to avoid any risk of carrying disease. At the very least, these visitors should not wear clothing that has been in contact with other animals and they should thoroughly clean their footwear before entering the pastures or corrals, or wear disposable plastic boots over their own shoes. Clean footwear by scrubbing with a detergent solution until clean and then soaking with an appropriate disinfectant for five minutes. Other visitors should clean their footwear before visiting the animals.

Note: Simple foot baths are ineffective.

Rodents

All wild animals can carry disease that may be transmitted to your herd. It is important to protect your herd from contact with wildlife as much as possible. Suitable fencing provides some protection. Introducing a rodent control program is important. Minimizing the number of cats on the farm is also beneficial.

Feed

Feed may be contaminated with infectious material in any number of ways. The only protection that you have is to buy good quality feed from a reputable source. Once you have the feed it should be stored in such a way as to minimize further contamination, for example, it should be well-protected from vermin and birds.

Equipment

Any equipment that has been in contact with sheep and goats can harbour disease. This is especially true of veterinary equipment and shearing equipment. All equipment that has been in contact with sheep and goats on other premises should be thoroughly cleaned with soap and then disinfected with an appropriate disinfectant at the labelled concentration for at least five minutes.

If any visitor to your farm refuses to abide by the biosecurity arrangements, ask them why they have a problem with it. The choice is yours; assume the risk of whatever the visitor may bring with them or ask them to leave. It is your farm and your finances that are at risk. You do not want visitors who do not care about the well-being of your farm.

Biosecurity in Alberta[1, 2]

The Office of the Provincial Veterinarian (OCPV) has commenced a biosecurity initiative, which is designed to increase the awareness and the use of biosecurity practices among Alberta's livestock producers and livestock service industries.

The implementation of the Alberta's Biosecurity Initiative is designed to:

- Protect livestock from disease.
- Decrease production losses arising from preventable disease.
- Improve the health status of livestock.
- Maintain market access by preventing the occurrence of any Foreign Animal Disease (FAD) in Alberta and demonstrating that Alberta's livestock producers and livestock service industries do in fact follow best practices in biosecurity.

What is Biosecurity?

The term "biosecurity" refers to the protection of the health of livestock by preventing the transmission of disease. Whatever the situation, biosecurity precautions should be a part of the management practices followed by all agricultural operations.

Examples of biosecurity practices include:

Quarantining new stock
Maintaining a vaccination program
Controlling rodents
Cleaning footwear
Changing coveralls
Controlling access of visitors and service people

FAD
Foreign Animal Disease - any disease of animals which is not normally present in Canada.

Limiting exposure to wild birds and other wildlife

A complete farm biosecurity program will minimize risks from:

Incoming stock
Feed and water
Pets
Pests
Farm visitors

Why is Biosecurity Important?

Biosecurity can:

- Help prevent the introduction of diseases from other countries, for example foot and mouth disease. FMD can spread quickly, devastate export markets and cause severe economic consequences for the entire livestock industry.
- Help prevent the spread of certain diseases already found in Alberta, such as Johne's disease and infectious foot rot in sheep. These diseases can have a significant financial impact on a farm operation.
- Protect the operator and his/her family from disease causing organisms that are transmissible from animals to humans, such as *Salmonella*, *E. coli* 0157:H7 and *Campylobacter*.
- How well a farming operation implements biosecurity will attest to their commitment to the health of the livestock industry.

How are Livestock Diseases Spread?

Some diseases require direct contact between infected and healthy animals, while others can be easily carried on boots or clothing contaminated by infected manure or other bodily discharges. People can carry and transmit some diseases to livestock, for example salmonellosis, while some other diseases cannot be transmitted by humans at all.

By understanding how diseases are spread, you will be better able to design an effective biosecurity control program for your farm or service industry.

Who Should Practise Biosecurity?

Biosecurity should be practised by anyone who:

- Owns livestock
- Works with livestock

- Visits farms, abattoirs or premises where livestock, poultry or their products are handled, including stockyards, auction markets and livestock shows.

Knowing the Risk

Everyone should know, manage and keep accurate records on the disease status of their own animals. There is little point in being totally focused on others when your own flock/herd is sick.

The Introduction of New Livestock

In order to lessen the chance of introducing disease, new livestock should be bought from sources that also practise good health management, as infected stock carries the highest risk of introducing a disease into an operation.

- New stock should be isolated in a clean area.
- Care of the resident animals should precede the care of quarantined animals.
- Those working with the isolated animals should change their outer clothing and wash their hands when they leave the isolated area.
- Farm equipment used in the quarantine area should be disinfected before being used in other areas of the farm.

Quarantine *– isolate animals from all other animals for a period of thirty days. The distance between the quarantined animals and other stock must be at least 30 metres (100 feet.)*

Sick Animals

Isolation of all new animals is critical. Follow the same quarantine procedure you would use for the introduction of new livestock.

For Feed and Water

- Ensure that feed and water sources are not accessible to visitors.
- Ensure that feed and water are not contaminated with manure, either directly or through runoff.
- Do not use the feed hauling equipment to transport manure.

Farm Visitors

Farm visitors generally represent a lower risk. However, visitors have been known to introduce disease-causing organisms on soiled footwear, clothing or equipment. Farm visitors can be classified by the risk they represent:

1. Low risk visitors come from urban areas, from within the same country of origin, and for the most part do not have contact with livestock or poultry. They present almost no risk of introducing disease, even if few precautions are taken. Ag tourism guests usually fall into this category, as they are primarily from urban

locations. However, it is common courtesy to greet each guest and to:

Make them aware of the operation's biosecurity program. Enquire about their proximity to livestock and poultry in the past two weeks.

2. Moderate risk visitors are those who travel from farm to farm, but have no direct contact with livestock or manure. This would include such visitors as oil and gas workers visiting wells on your property, for example.

3. High risk visitors are those who travel from farm to farm and have direct contact with livestock or manure. Therefore, when you visit other farms yourself, be sure to practise good biosecurity measures and ask that others also extend the same courtesy to you and your farm.

The following are suggested procedures for agricultural operations concerned with practising biosecurity.

For Visitors

- Establish a visitor protocol to prevent random access to an operation.
- Greet every visitor in a predetermined location away from the livestock; for example, ensure that all visitors come to the house first to be greeted and do not allow them wander about the farm at will.
- Find out where they have been in the past two weeks. Ensure that foreign visitors, especially those from countries with foot and mouth disease, have taken the appropriate precautions against the risk of their carrying disease agents. Keep accurate and current records of these visits.
- Provide alternative footwear or plastic disposable booties as a cover for visitors' footwear.
- Provide a clean-up area, including hand washing facilities, for all visitors.
- Do not allow animals access to any human food or packaging material that visitors may have brought onto the premises. Disease outbreaks have occurred via this route.
- Educate all visitors about the biosecurity plan and its universal benefit.
- Enforce the biosecurity plan.

For Vehicles

- Establish a traffic pattern to prevent random access to the operation and to avoid contact with manure.
- If applicable, provide facilities for washing and disinfecting tires, mud flaps, etc.

Will All Premises Have the Same Biosecurity Requirements?

There can be no single biosecurity plan to meet the needs of all farms or agricultural businesses. The diseases and potential risks vary between livestock species, and also depend on the activities occurring on the premises.

Each business must assess all potential risks and develop a flexible and practical biosecurity plan tailored to its circumstances. For more information on developing a biosecurity plan, contact the Office of the Chief Provincial Veterinarian -
Website: *www1.agric.gov.ab.ca/$Department/deptdocs.nsf/all/cpv4264*
Phone: 780-427-3448

References

1. *Biosecurity in Alberta, Apr 09. http://www1.agric.gov.ab.ca/$department/deptdocs.nsf/all/cpv10708#order*
2. *Biosecurity Considerations for Ag Tourism Ventures, Apr 09. http://www1.agric.gov.ab.ca/$department/deptdocs.nsf/all/agdex10345*

23. Treatment Protocols for Disease

The following protocols are not meant to take the place of good advice from your own veterinarian, but are here to help you work with your veterinarian to develop treatment plans which will work for your flock.

Abortion

If a ewe/doe aborts during late pregnancy immediately:

1. Separate the animal from the remainder of the flock.
2. Remove the fetus and afterbirth – wearing disposable gloves, place it in a strong garbage bag and tie the top. Refrigerate, do not freeze.
3. If you are pregnant, may be pregnant or are in ill health avoid all contact with the flock.
4. Keep the aborted material somewhere cool and out of reach of animals.
5. Monitor the rest of the flock closely for signs of other abortions.
6. If there are other abortions manage as above.
7. You should already have worked with your veterinarian to develop an intervention level (for example, three abortions or two percent of the flock). If the intervention level has been reached, submit the aborted material to the laboratory for analysis.
8. Work with your veterinarian to determine if it is appropriate to treat the flock with oxytetracycline by injection or in the feed.

Pneumonia in Growing Lambs/Kids

1. Growing lambs/kids that separate from the group or go off feed may be showing early signs of pneumonia.
2. Signs of overt pneumonia include coughing, nasal discharge, depression and death.
3. If you suspect pneumonia, take the animal's rectal temperature using a regular medical thermometer. If the temperature is greater than 40.5°C (104.5°F), the animal likely has infectious pneumonia.
4. Treatment options for pneumonia in lambs include an oxytetracycline LP injection daily for three to five days. Another medication licensed for use in lambs but requiring a prescription is Micotil; a veterinarian may also prescribe long acting oxytetracycline, which is an extra-label use.
5. There are not any injectable antibiotics licensed for use in goats; you will require a prescription for all treatments.
6. **Note**: Most treatments used in lambs will work in goats but **never** use Micotil in goats, as it can be toxic.
7. If animals start to die from pneumonia, ensure that a post-mortem is performed to determine the cause in order to ensure that the correct treatment is being used.

Sick Ewes/Does in Late Pregnancy

1. If an animal goes off its feed and goes down in the last few weeks of pregnancy the two most common disorders are ketosis (twin lamb disease) or hypocalcaemia (milk fever).
2. First assess the animal's body condition score. Animals in very good or poor body condition are more prone to ketosis.
3. Collect a urine sample and test it for ketones (to collect a urine sample cover the animal's nose and mouth so that it starts to suffocate; within approximately 30 seconds it will start to struggle and will then urinate).
4. If there are ketones in the urine, the animal has ketosis (twin lamb disease).
5. If there are no ketones, check the response of the eyes to light (normally the pupils will shrink when a flashlight is shone into them); also see if the rumen is moving. If the rumen is not moving and the eye response to light is poor, the animal likely has hypocalcaemia (milk fever).
6. Animals with ketosis should be treated with a ketosis drench and receive approximately 100 mL of 50% dextrose iv. Make

every effort to get the animal eating. In severe cases, talk to your veterinarian about terminating the pregnancy with steroids or performing a C-section. Remember that other animals in the flock will be at risk of developing the same condition.

7. Animals with hypocalcaemia should be treated with 100 mL of 23 percent calcium borogluconate under the skin. Remember that other animals in the flock will be at risk of developing the same condition.

Scours in Young Lambs/Kids

1. Scours is common in young animals and is caused by a variety of organisms.
2. Is the animal a single and also bright and happy?
   - This animal probably has nutritional scours; monitor, no further treatment required.
3. Is the animal scouring but active and looking to nurse?
   - Treat the animal twice daily with oral electrolytes.
4. Is the animal scouring and depressed?
   - Check body temperature; if the animal is hypothermic, treat appropriately (Refer to *Hypothermic Lambs/Kids* in this chapter).
   - Administer oral electrolytes four times daily.
5. If you are experiencing a major outbreak, contact your veterinarian. If animals are dying, get a post-mortem exam to determine the cause.

Scours in Older Lambs/Kids

1. Scours in animals over one month of age is more commonly due to worms or coccidiosis.
2. Fecal samples may be used to determine the cause.
   Note: Due to the life cycle of the parasites worms may not always be excreted.
3. If the diagnosis is worms, deworm all sheep/goats.
   Note: Dewormers are not labelled for use in goats.
4. If it is coccidiosis, treat severely affected animals with an injectable sulfa drug for example, Borgal or Trivetrin (ELDU). Consider treating the whole group with a coccidiostat in the feed.

ELDU
Extra-label drug use, also referred to as "off-label use" refers to the actual use or intended use of any drug, whether it is a prescription drug or over-the-counter (OTC) drug, in an animal in a manner that is not in accordance with the approved label or the package insert of the drug licensed by Health Canada.

Old Thin Ewes/Does

There are many possible reasons why an older animal may be in poor body condition. When dealing with such an animal always consider the following:

1. What is the condition of the teeth? Poor teeth are a common cause of weight loss; such animal should be culled.
2. Is the animal competing for feed and failing to get enough to eat? This is also a very common cause of weight loss. Try putting the animal in a smaller group with good quality feed.
3. Is there any evidence of abscesses due to caseous lymphadenitis (CL), or is there a herd history of CL? Affected animals should be culled.
4. Do the feces look normal? If they are softer than normal consider either parasites or Johne's disease; either deworm or cull.
5. Is there a history of maedi-visna or CAE in the flock? Consider blood testing the animal or cull if there are clinical signs of disease.

Hypothermic Lambs/Kids

Any lamb or kid in the first few days of life that is failing to thrive should be considered hypothermic.

1. Take the rectal temperature. If the temperature is between 37 and 39°C, go to step 2. If the temperature is less than 37°C go to step 3.
2. Dry the lamb/kid and give it a feed of warm milk by stomach tube. If the lamb/kid is active and temperature is close to normal, return it to its mother. Otherwise keep it in the nursery area.
3. First assess the age. If the animal is less than six hours old go to step 4. If the animal is older go to step 5.
4. Young animals should be dried and warmed. When they become active they should immediately be fed good quality warm colostrum by stomach tube. Attempt to return the animal to its mother as soon as the temperature is normal, and monitor for signs of rejection.
5. If the animal can lift its head go to step 6. If the animal cannot lift its head go to step 7.
6. Feed the animal by stomach tube with warm milk. Ensure that it is dry and place it in the warmer. When it is dry and the body temperature is normal return it to its mother and monitor.

7. Severely affected animals should first be treated with an intra-peritoneal injection of dextrose. Then dry and warm the animal. When it can lift its head it should be fed milk via stomach tube. When the temperature has returned to normal and the animal is active, return it to its mother and monitor.

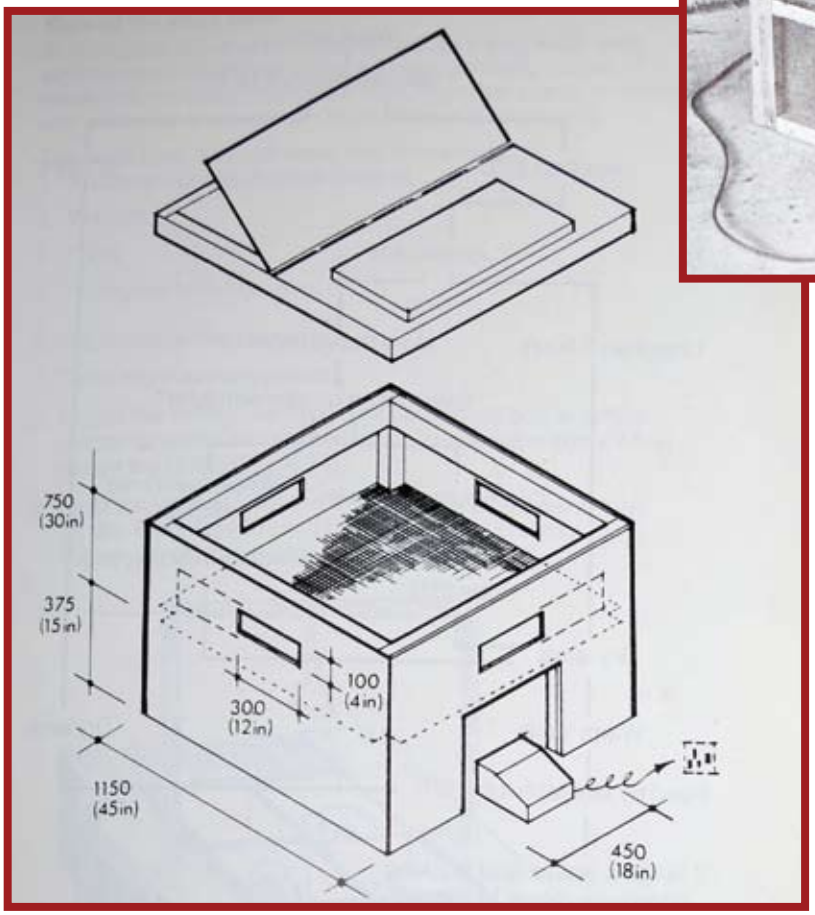

Figure 1 and 2 - Lamb/kid warming box