CANADIAN VERIFIED SHEEP

The Canadian Verified Sheep Program

CSF•FCM
Canadian Sheep Federation
Fédération Canadienne du Mouton

Acknowledgements

The Canadian Sheep Federation would like to thank all those who have been involved in the creation and evolution of the The Canadian Verified Sheep Program. The program has benefited from the many sheep producers, industry experts, provincial government representatives, and the Canadian Food Inspection Agency who have devoted their time and expertise to the program.

We would also like to express our thanks to the producers who have participated in the pilot projects and the Canadian Sheep Federation's On-Farm Food Safety Technical Committee.

Agriculture and Agri-Food Canada | Agriculture et Agroalimentaire Canada

Growing Forward | Cultivons l'avenir

This project was made possible by funding from Agriculture and Agri-Food Canada (AAFC) through its Canadian Integrated Food Safety Initiative (CIFSI). AAFC is pleased to participate in this project and is committed to working with its industry partners to increase public awareness of the importance of the agri-food industry to Canada.

Table of Contents

CHAPTER 1 – ON-FARM FOOD SAFETY

CHAPTER 3 – BIOSECURITY

CANADIAN VERIFIED SHEEP

On-Farm Food Safety Chapter

Canadian Verified Sheep Program

CSF•FCM
Canadian Sheep Federation
Fédération Canadienne du Mouton

Section A – On-Farm Food Safety Practices for Sheep Producers

This section of the manual identifies five major areas of sheep production where food safety hazards may be introduced:

A1. Animal Health Products

A2. Feed, Water and Bedding

A3. Buying, Selling and Shipping Animals

A4. General Farm Management

A5. Training Workers

Within Section A, food safety concerns are emphasized along with the good production practices that can be used to enhance on-farm food safety.

While all **"Must Do"** practices will decrease the risk of a food safety hazard, critical control points are specific practices where the producer can apply controls aimed at preventing, eliminating or reducing a hazard to an acceptable level.

In this manual, a sheep's head  beside the practice signifies a Critical Control Point.

"Must Do" practices are emphasized using bold text.

All record keeping forms referred to can be found in Section B – On-Farm Record Keeping Forms.

RESPONSIBILITY:

A food safety program involves good production practices used to address three areas in preventing a food safety hazard. It is important to be aware of your responsibility as a producer in those three areas to ensure your on-farm food safety program is effective.

- ☐ **Monitoring Procedures:** Regular observation of on-farm practices by the producer or employee.
- ☐ **Deviation Procedures:** Corrective actions taken by the farm when a deviation from a practice is observed.
- ☐ **Verification Procedures:** Procedures need to be verified by someone other than the producer. This is done by the Auditor as part of the audit cycle for the program, which may include review of relevant records and documentation, observation of tasks being performed and interview of the person who performed the task(s).

Producers must also ensure that they follow all Federal, Provincial and Municipal Legislation in relation to agricultural practices, including those related to usage of animal health products, animal feeds, nutrient management, and dead stock handling and disposal. Where Legislation stipulates more stringent practices, the Legislation supersedes the practices required in the Food Safe Farm Practices Program.

A1. Animal Health Products

Animal health products may include, but are not limited to:

- antibiotics;
- animal health products mixed into the feed and water;
- internal parasite control products;
- vaccines;
- reproductive hormones;
- medicated milk replacers;
- wound dressings; and,
- naturopathic/homeopathic products (consult with your veterinarian).

A1.1 Animal Health Product Treatments

Animal health product records are essential to ensure that:

- treated animals are identified;
- withdrawal periods are met; and,
- animal health products are used properly.

Food Safety Concern:

Animal health product treatment records are essential to ensure withdrawal periods are met for the prevention of product residues in the meat and/or other sheep and lamb products.

Good Production Practices for Animal Health Product Treatments:

1.1.1 Use Record 1: Animal Health Product Treatments when treating any animals, including breeding stock, slaughter lambs, feeder lambs, orphan lambs, cull sheep and milking ewes, with an animal health product.

1.1.2 Veterinary prescriptions and package inserts must be kept for all animal health products for a minimum of two (2) years.

1.1.3 Use a reliable method to identify and track sheep, or groups of sheep (pens) that have been treated (i.e. eartags, livestock markers, pen description, and/or identification number). If using markers, ensure markings are visible until the end of the withdrawal period.

1.1.4 Review Record 1: Animal Health Product Treatments to confirm withdrawal times are met prior to shipping.

1.1.5 If an animal health product is incorrectly administered (i.e. to the wrong animal, at the wrong dosage, incorrect route, or for a longer period than prescribed), identify the mistreated animal(s), withhold from slaughter and obtain veterinary advice if necessary to ensure correct withdrawal times are met. Record the incident on Record 7: Problems and Corrective Actions. Retrain employees as necessary and record on Record 8: Worker Training.

1.1.6 Ensure withdrawal times for topical (e.g. pour-on) animal health products are met prior to shearing as they may contaminate lanolin-based products, such as hand creams.

A1.2 Animal Health Product Usage

The approved usage of animal health products appears on product labels or package inserts. When medications are used in a manner not outlined on the label or insert, or for animals not specified on the label or insert, it is called “extra-label” or “off-label”.

All authorized animal health products must have a valid DIN number.

Animal health products are classified as:

- Registered Animal Health Products – tested and approved in Canada for use in sheep.
- Prescription Animal Health Products – can only be purchased with a veterinarian prescription and have the symbol ‘Rx’ on the label.
- Over-the-counter (OTC) Animal Health Products – purchased from a veterinarian or registered outlet such as a feed company or pharmacy.

Extra-Label (or Off-Label) Use

Extra-label (or off-label) use includes, but is not limited to situations when a product is administered:

- To species that are not listed on the label;
- To treat diseases and conditions not listed on the label;
- At a different dosage than stated on the label;
- Using a route, frequency, duration or timing not listed on the label; or,
- To animals shipped for slaughter before the stated withdrawal period.

ANY PERSON USING OR PRESCRIBING ANIMAL HEALTH PRODUCTS IN AN EXTRA-LABEL OR OFF-LABEL MANNER IS SUBJECT TO REGULATORY ACTION IF PRODUCT RESIDUES ARE FOUND IN HUMAN FOOD.

Food Safety Concern:

Product residues may remain in the meat and/or other sheep and lamb products if instructions for usage of animal health products are not followed.

Good Production Practices for Animal Health Products Usage:

1.2.1 Producers are advised to participate in any training available for using animal health products in sheep, lamb and/or livestock.

Prescription and Over-the-counter Registered Animal Health Products

1.2.2 Obtain product inserts for all animal health products used, and follow dosages, treatment duration, withdrawal periods, etc., as specified on the product label or package insert.

1.2.3. Check and calibrate automatic syringes at least once a year to ensure dosage accuracy and record in the comments section of Record 1: Animal Health Product Treatments.

Extra-Label (or Off-label) Use of Prescription Animal Health Products

1.2.4 A valid veterinarian/client/patient relationship must exist prior to extra-label or off-label usage of animal health products.

1.2.5 A prescription from a veterinarian is required and must be followed for all extra-label use of animal health products.

Extra-label Use of Over-the-counter Animal Health Products

1.2.6 Consult a veterinarian on all extra-label use of over-the-counter animal health products.

A1.3 Purchasing and Storing Animal Health Products

Food Safety Concern:

Animal health products that are improperly stored and/or handled may not be fully effective for their intended purpose and may not have predictable withdrawal periods. Sheep may inadvertently consume animal health products that are not stored in a secure place, resulting in unknown withdrawal periods, and animals shipped to slaughter containing animal health product residues.

Good Production Practices for Purchasing and Storing Animal Health Products:

1.3.1 Purchase animal health products from a reputable supplier, and review labels and package inserts to ensure you received the correct product. Store animal health products and syringes in secure locations and maintain storage requirements (e.g. for temperature, light and humidity) as stated on the product label or your veterinarian's instructions.

1.3.2 Use Record 2A: Animal Health Product Inventory; and, Record 2B: Medicated Feed Inventory to maintain up-to-date inventory lists of all animal health products and their storage location on the farm. Dispose of:

- Used, outdated, and/or potentially contaminated products;
- Products that are not properly labeled, received without intact packaging, or are damaged from repeated use; and,
- Products not properly stored (i.e. frozen, exposed to excessive heat, etc.).

Dispose according to the product directions, in a manner to prevent contamination of sheep and sheep products, and follow any applicable regulations. Record the disposal of animal health products on Record 2A or 2B. Review Records 2A and 2B for accuracy at least yearly, sign and date them, and begin new records.

1.3.3 Use marking products that are clearly labeled for use on animals.

1.3.4 If animal health products are found not in the proper storage location, immediately move them to the proper place of storage or dispose of product, as appropriate and record incident on Record 7. Retrain employees if needed, and record on Record 8: Worker Training.

1.3.5 When extracting multiple doses from a vial, use a sterile needle to draw product into the syringe and use a different needle to inject the animal. Needles should be removed from bottles before storage to help prevent contamination of the animal health product.

A1.4 Injecting Animal Health Products

Food Safety Concern:

Broken needles in meat are a significant hazard to consumers.

Good Production Practices for Injecting Animal Health Products:

1.4.1 Whenever possible, use animal health products that can be administered orally or by pour-on applications, or if label instructions allow, use subcutaneous injections to decrease the chances of breaking a needle in the muscle.

1.4.2 Consult a veterinarian for the correct needle length, gauge and injection site according to the product, and weight/age of animal.

1.4.3 Restrain animals to restrict movement during needling to avoid needle breakage. Inspect after each injection to ensure needle is still intact.

1.4.4 Check and replace needles before they are dulled or bent. Do not straighten bent needles as they are more likely to break.

1.4.5 Dispose of all used needles in a puncture resistant sharps container.

1.4.6 Broken needle fragments require filling in the animal's ID and the injection site in the comments section on Record 1: Animal Health Product Treatments. Contact your veterinarian if necessary. Record the incident on Record 7: Problems and Corrective Actions and retrain employees as necessary and record on Record 8: Worker Training.

1.4.7 Consider on-farm euthanasia or slaughter of the animal when needle fragments are not retrievable.

A2. Feed, Water and Bedding

Hazardous materials may contaminate feed and bedding during production, handling and storage. Hazardous chemicals may include, but are not limited to external parasite solutions and powders, footbath chemicals, insect control chemicals, engine fuels, lubricants, crop insecticides and herbicides, paint, rodent poisons, car batteries and antifreeze.

Cats, birds, rodents, dogs and other animals can also contaminate feeds biologically via their feces and should, therefore, be excluded from feed storage areas to prevent contamination by these animals. This will help to prevent the spread of diseases such as toxoplasmosis to sheep and humans.

A2.1 Purchasing, Handling and Storing Feed and Bedding

Being aware of possible contaminants on your farm will help to minimize the risk of feed and bedding materials being contaminated. If you purchase products off-farm, you cannot exercise control over all aspects of their production. However, precautions can still be taken to help decrease the risk of feed or bedding being contaminated.

Food Safety Concern:

Exposing your sheep to contaminated feed or bedding may result in hazardous materials in the meat and/or milk.

Good Production Practices for Purchasing, Handling and Storing Feed and Bedding:

2.1.1 Keep an up-to-date inventory of all bedding materials and non-medicated feeds using Record 3: Incoming Feed and Bedding Inventory, and review the record annually for accuracy.

2.1.2 Purchase processed feeds and feed ingredients from reputable suppliers who follow good management practices, or who are enrolled in a HACCP-based Canadian Feed Safety Program. Communicate with suppliers to ensure that bedding and feed products are produced and stored in a manner that ensures safe animal use.

2.1.3 Purchase and accept only feed that is labeled in accordance with Feed and Health of Animals Regulations and ensure it does not contain any prohibited animal by-products. Feed should be manufactured specifically for ruminants and be labeled with any animal health product ingredients. Refuse to accept any bulk or bagged feed without a proper label.

2.1.4 When receiving feed, bedding and other supplies, obtain a bill of sale, feed tag and/or certificate of verification from your supplier and review to ensure you received the correct feed and/or bedding materials. Acknowledge that you did this by initialing the bill of sale. Keep all records related to feed, including records for any non-ruminant feed, for two (2) years

2.1.5 Do not use bedding materials that may be contaminated with chemicals, such as pressure treated wood chips.

2.1.6 Do not accept or use feed and bedding materials that show signs of possible contaminants such as mould or foreign material. Ensure that the feed transporter has good management practices for cleaning vehicles between loads.

2.1.7 Take a sample from each feed delivery and store in a cool, dark place. If feed related issues arise, the sample can be tested as a possible source of contamination.

2.1.8 Properly maintain farm equipment that may come in contact with feeds or are to be stored in the feed storage areas. Keep receiving areas visibly clean prior to receiving feed and use equipment and vehicles that are visibly clean prior to handling feed and bedding. If handling non-ruminant or medicated feeds, ensure all visible signs of feed are removed from receiving area and equipment immediately after use. Post instructions for cleaning receiving area and equipment in a location accessible to all workers. If cross-utilizing equipment for ruminant and non-ruminant feed, record cleaning of receiving area and equipment on Record 4: Medicated Feed Mixing and Batch Water Mixing under “Lines Flushed/Equipment Cleaned” and initial.

2.1.9 Feed non-ruminant feeds in a secure location to prevent access to sheep.

2.1.10 Do not store hazardous materials such as fertilizers, treated grains, manure, pesticides, fuel, brake fluid or batteries, in or near feed and bedding storage areas.

2.1.11 Design and maintain feed storages to minimize fecal contamination by birds, rodents, cats, dogs and other animals.

2.1.12 Keep feed storage areas visibly clean and dry.

2.1.13 Clearly label all non-ruminant feed storage areas and keep separate from ruminant feed storage. If storage areas are being cross-utilized for ruminant and non-ruminant feeds, keep an inventory of all feeds, the date each storage area is cleaned and initial the record. Store non-ruminant feed in a secure location to prevent access by sheep. Non-ruminant feed includes feed for dogs and other species.

2.1.14 Have procedures posted describing what to do if feed/water is contaminated with medicated feed and/or water, non-ruminant feed, or any other contaminants, or is not properly labeled. Take action immediately to correct the problem, if possible. Do not distribute feed which you are uncertain of the concentration of animal health products and the proper withdrawal date, or has been contaminated with non-ruminant feed. Record the problem and any corrective actions that you take on Record 7: Problems and Corrective Actions. Consult a veterinarian if uncertain on how to handle the situation. Retrain employees as necessary and record training on Record 8: Worker Training.

A.2.2 Purchasing and Storing Medicated Feed

In addition to the good production practices in Sections A1: Animal Health Products; and, A2.1: Purchasing, Handling and Storing Feed and Bedding, there are some additional considerations for purchasing and storing medicated feeds.

Food Safety Concern:

A medicated feed is a mixed feed that contains any animal health product ingredients. Medicated feed that is improperly handled or stored may contaminate non-medicated feed and/or be fed to the wrong animals, resulting in possible residues in the meat.

Good Production Practices for Purchasing and Storing Medicated Feed:

2.2.1 Use Record 2B: Medicated Feed Inventory to maintain an up-to-date inventory of all medicated feeds, including bin storage identification. Dispose of any unused medicated feeds according to the product directions, in a manner to prevent contamination of sheep and sheep products, and follow any applicable regulations. Record the disposal of medicated feeds on Record 2B. Review Record 2B for accuracy at least yearly, sign and date the record, and begin new sheet.

2.2.2 Ensure that all medicated feeds and medicated feed ingredients (animal health products) are identified by labeling the bin, and stored in secure locations to avoid consumption by non-target sheep or contamination of non-medicated feeds.

2.2.3 Always store medicated feeds in a secure location separate from non-medicated feeds to prevent contamination of non-medicated feeds and ingredients.

2.2.4 Inspect all purchased medicated feed for possible contaminants and do not accept feed if there are unexplained differences from previous batches of the same feed (e.g. contains pellets that were not in the last batch of the same feed).

A2.3 On-Farm Mixing of Medications in Feed and Water

In addition to the good production practices in Sections A1: Animal Health Products; and, A2.1: Purchasing, Handling and Storing Feed and Bedding, there are some additional considerations for on-farm mixing of medicated feed and water. Please note if you are mixing feed or water on-farm, you are required to comply with the Federal Feeds Act and Regulations, which when more stringent requirements are specified, supersede the requirements of this manual. When mixing medicated feed and water on-farm including medicated pre-mixes, producers are responsible for ensuring correct concentrations are added.

Food Safety Concern:

If mixing instructions are not accurately followed, the medication may be ineffective or result in unpredictable withdrawal periods.

Good Production Practices for On-Farm Mixing of Medications in Feed and Water:

2.3.1 Do not use any animal health products which have expired or may be contaminated.

2.3.2 Follow detailed directions to ensure even distribution of ingredients, and accurately measure ingredients when mixing medications into feed or water. Adhere to veterinary prescription or product label dosages for mixing. Post detailed mixing instructions in an accessible location for all feed mixes and medicated water that describe how to set up mixing equipment, add premixes, list ingredient amounts added, and sequencing information for medicated feeds.

2.3.3 Record dates and sequence for each batch of both medicated and non-medicated feeds and/or water on Record 4: Medicated Feed Mixing and Batch Water Mixing. Medicated feeds mixed on-farm should also be listed on Record 2B: Medicated Feed Inventory.

A2.3.4 Calibrate water and feed mixing and weighing equipment at least annually and have manufactures' calibration instructions accessible to workers who prepare medicated feed/water. Record the calibration dates on Record 4: Medicated Feed Mixing and Batch Water Mixing and initial.

2.3.5 Post instructions for flushing water lines in a location accessible to all workers. Flush water lines thoroughly after adding a medication.

2.3.6 Clearly identify the contents and store all medicated feeds/water mixed on-farm in secure location(s). Immediately record storage location on Record 4: Medicated Feed Mixing and Batch Water Mixing; and, Record 2B: Medicated Feed Inventory and clean up any spills to avoid accidental consumption by sheep and contamination of non-medicated feeds.

2.3.7 Clean/flush any equipment used to mix and handle medicated feed and water, including feeders, troughs, etc., before using equipment for non-medicated feeds, or use sequencing. Upon cleaning, equipment should be free of all visible signs of feed residues or medicated (e.g. coloured) water. Record the date of cleaning and initial on Record 4: Medicated Feed Mixing and Batch Water Mixing.

2.3.8 Have procedures posted which instruct on what to do if medicated feed or water is mixed incorrectly. Take action immediately to correct the problem, if possible. Do not distribute the feed until you are certain of the concentration and the proper withdrawal date. Record the problem and any corrective actions that you take on Record 7: Problems and Corrective Actions. Consult a veterinarian if uncertain on how to handle the situation. Note any corrections made to a batch of feed or water in the comments area of Record 4: Medicated Feed Mixing and Batch Water Mixing. Retrain employees as necessary and record on Record 8: Worker Training.

A2.4 Administering Medicated Feed and Water

In addition to the good production practices in Sections A1: Animal Health Products; and, A2.1: Purchasing, Handling and Storing Feed and Bedding, there are some additional considerations for administering medicated feed and water.

Food Safety Concern:

Medicated feed and water must be administered to the correct animals and at the correct levels to ensure product withdrawal periods are met and prevent residues in the meat or milk.

Good Production Practices for Administering Medicated Feed and Water:

2.4.1 Administering medicated feed and/or water should be treated the same as administering any other animal health product. Check Record 2B: Medicated Feed Inventory; and, Record 4: Medicated Feed Mixing and Batch Water Mixing, as well as the appropriate product label(s) or veterinary prescription, for any medicated ingredients to ensure proper dosages, treatment duration, withdrawal periods, etc. Record medicated feed or water treatments on Record 1: Animal Health Product Treatments. For short-term treatments, record the dates of treatment. For long-term treatments, record the first and last dates of treatment.

2.4.2 Ensure that medicated products are evenly distributed to the target animals by annual maintenance of feeding and watering equipment used to distribute medicine.

2.4.3 If unintended changes or mistakes occur when feeding medicated feed or water (e.g. fed to the wrong animal, at the wrong dosage, or for a longer period than prescribed), record the duration of treatment and identification of all affected animals' on Record 7: Problems and Corrective Actions. Retrian employees as necessary and record training on Record 8: Worker Training. Comply with withdrawal periods, or consult with a veterinarian if withdrawal period is not known.

A2.5 Water Quality

Food Safety Concern:

Water contaminated by hazardous materials may be absorbed into animal tissue resulting in a food safety hazard.

Good Production Practices for Water Quality:

2.5.1 Prevent livestock consumption of potentially contaminated water sources such as septic tank pump-outs (See Appendix III: Canadian Water Quality Guidelines for Livestock).

2.5.2 Test the water supply annually, even municipal water sources, or if using new, existing but newly used, or repaired wells. Retest following required disinfecting and again one to three weeks after disinfecting.

2.5.3 Have a plan for an alternate water supply in the event of contamination due to floods, droughts, power outages or other occurrences.

2.5.4 Prevent access to watering sources by wildlife, rodents and vermin, as fecal material or dead animals may contaminate water sources. If using cisterns, keep cisterns closed and clean regularly.

2.5.5 Check and clean watering devices and other water sources regularly and prevent growth of blue-green algae which may be toxic.

2.5.6 If sheep become exposed to contaminants in the water, record the incident and actions taken to correct the problem on Record 7: Problems and Corrective Actions.

A3. Buying, Selling and Shipping Animals

A3.1 Buying Animals

Food Safety Concern:

Communication with the seller is necessary to ensure that animals with animal health product residues or other food safety hazards are properly dealt with to eliminate or reduce potential risks to the consumer.

Good Production Practices for Buying Animals:

3.1.1 Record receiving dates, sources and descriptions of all animals purchased, and keep records for two (2) years. Request a signed shipping record or Record 5: Declaration of Potential Food Safety Hazard from the seller.

3.1.2 Keep purchased animals for a minimum of 60 days, or as advised by a veterinarian when a signed shipping record or Record 5: Declaration of Potential Food Safety Hazard is not provided by seller and record animals on Record 7: Problems and Corrective Actions.

3.1.3 If animals contained broken needle fragments, have the seller provide a signed shipping record or Record 5: Declaration of Potential Food Safety Hazard.

3.1.4 Purchase stock (i.e. live animals, embryos, semen) from producers participating in the Food Safe Farm Practices Program.

A3.2 Selling Animals

Food Safety Concern:

Producers must ensure that animals sold for slaughter, finishing or as breeding stock are free from food safety hazards, or that the purchasers are directly informed of any potential food safety hazards.

Good Production Practices for Selling Animals:

3.2.1 Check the following before shipping animals:

- Record 1: Animal Health Product Treatments to ensure drug withdrawal periods are met and there are no needle fragments, for each animal shipped; and,
- Animal condition to ensure fit for transport (i.e. relatively free of tag, able to walk and stand properly, not too thin).

3.2.2 Animals with potential food safety hazards can only be sold to known buyers (e.g. private sale). When selling animals that have a potential food safety hazard (e.g. have not met animal health product withdrawal periods or have broken needles), provide buyers with a signed Record 5: Declaration of Potential Food Safety Hazard, identifying the animals and the potential food safety hazard. If you provide Record 5 to a buyer, keep a copy for your records.

3.2.3 Have procedures in place in the event animals are accidentally shipped with a potential food safety hazard. Notify the buyer immediately if an animal is suspected to have been shipped with a potential food safety hazard and record the incident on Record 7: Problems and Corrective Actions. Retrian employees as necessary, and record on Record 8: Worker Training.

3.2.4 Keep an up-to-date contact list for your veterinarian, abattoir, auction market, processor, etc. accessible to everyone working on your farm.

A3.3 Shipping Animals

Food Safety Concern:

If exposed during shipping, animals may ingest or absorb hazardous chemicals, which could contaminate the meat. Unsanitary conditions during shipping can cause excessive manure on the fleece, which increases the risk of bacterial transfer and contamination of the meat during slaughter.

Good Production Practices for Shipping Animals:

3.3.1 Ensure there are no hazardous chemicals present in the animal holding area of the transport vehicle before loading animals. Hazardous chemicals include, but are not limited to: cleaning agents, fertilizers, pesticides, paints, stains, medicated products and treated seed.

3.3.2 Cover the truck or trailer floor with straw or other bedding material to reduce soiling of the fleece with manure and mud.

3.3.3 When using commercial agents, confirm that procedures are in place to ensure sanitary animal containment. If conditions are undesirable, take corrective action, if possible, and record the incident on Record 7: Problems and Corrective Actions, as well as on the shipping manifest.

A4. General Farm Management

Farm chemicals, including those used with sheep and those for other farm practices, manure and fertilizers present a potential source of contamination.

A4.1 Pesticides and Farm Chemicals

Producers must follow all Federal, Provincial and Municipal Legislation in relation to purchasing, storing and using pesticides and farm chemicals, including all applicable licensing requirements. Where Legislation stipulates more stringent practices, the Legislation supersedes the practices required in the Food Safe Farm Practices Program.

Potential sources of contamination include, but are not limited to:

- Pesticides used on grazing lands;
- Farm chemicals (e.g. oil, hydraulic fluid);
- Unapproved markers used on stock; and,
- Cleaners and sanitizers.

Food Safety Concern:

If sheep are exposed to chemical contaminants in their environment, these contaminants may be absorbed by the sheep and result in a food safety hazard.

Good Production Practices for Pesticides and Farm Chemicals:

4.1.1 When applying pesticides to grazing land, follow the manufacturer's instructions for application and grazing restrictions, as well as for storage and disposal of any unused product and containers. Keep a copy of pesticide instructions (e.g. package insert) for two (2) years. If unsure about proper use and disposal, consult the chemical company or your local agrologist. Record all pesticide usage on grazing land using Record 6: Pesticide Use in Grazing Areas, and review Record 6 prior to releasing animals on pasture to ensure withdrawals are met.

4.1.2 Ensure pastures are free of chemical containers, batteries and other hazardous materials. Prevent access by sheep if potentially hazardous materials cannot be removed. Dispose of herbicide and pesticide containers according to regulations and/or product label.

4.1.3 Hazardous chemicals should be stored in a secure location to prevent contamination of feed, water, sheep and housing areas.

4.1.4 Maintain and store machinery and equipment so that fuel, oil, antifreeze, brake fluid or hydraulic fluid cannot contaminate feed, water, sheep and housing areas. All received equipment should be in good working order to prevent contamination.

4.1.5 If sheep are exposed to chemical contaminants or pesticides, identify and isolate the animals. Consult a veterinarian for appropriate measures to prevent a food safety hazard and treatment of animals involved. Record the incident on Record 7: Problems and Corrective Actions. Retrain employees as necessary, and record on Record 8: Worker Training.

4.1.6 Purchase properly labeled farm chemicals from licensed dealers. Check labels to ensure the correct product is received.

4.1.7 In the absence of provincial guidelines, take chemicals to a designated hazardous waste facility for disposal. Empty containers are to be rinsed three times and disposed of in the same manner as the chemicals themselves.

4.1.8 Collaborate with neighbours to ensure that pesticide application does not adversely affect any livestock.

A4.2 Manure/Dead Stock Handling, Nutrient Management and Animal Management

Nutrient management involves monitoring the amounts of fertilizers, manure and municipal sludge that is applied to the soil in order to avoid a build up of excess nutrients. Please note that you are required to follow any provincial and municipal regulations for nutrient management and dead stock handling applicable in your area, and where more stringent practices are specified, those regulations supersede the requirements of this manual.

Food Safety Concern:

Excessive manure on the fleece may come into contact with the carcass at slaughter, transferring bacteria to the meat. Soiled fleece is a greater problem if manure is not managed properly in sheep housing areas.

Excessively applying nutrients to the soil used to grow feed can lead to a potentially harmful build up of nutrients that may contaminate crops and/or water sources.

Good Production Practices for Manure/Dead Stock Handling and Animal Management:

4.2.1 Minimize manure on fleece with sufficient bedding and/or cleaning of animal housing areas. Provide bedding as necessary.

4.2.2 Consider establishing a nutrient management plan for your farm. Consult with a nutrient management specialist when developing your plan.

4.2.3 Properly dispose of dead stock to prevent contamination of feed, bedding, sheep and housing areas.

4.2.4 Equipment used for animal management activities, such as tail docking, castrating, ear tagging, shearing, breeding, etc. should be visibly clean prior to use.

A5. Training Workers

A5.1 Full-time, Part-time and Seasonal Workers (Including Family Members)

Food Safety Concern:

Good communication will help ensure that workers are aware and understand the good production practices necessary to ensure food safety. The necessity and importance of good production practices and record keeping must be effectively communicated to workers to ensure the risk of food hazards is reduced.

Ongoing training will help ensure all workers are aware of changes important for food safety, such as identifying and tracking animals treated with animal health products, moving animals between pens, or changes in the location of medicated feed.

Good Production Practices for Training Workers:

5.1.1 Training is required only for tasks a worker is to perform. Employee training must be updated on an ongoing basis. Until employees are fully trained and have reviewed the relevant material in the manual, direct supervision is required for all **"Must Do"** practices. Training must include observation of employees at work at least annually. This will ensure maintenance of appropriate records, understanding by staff of the system, and updates due to management changes. Training/ observations by the farm manager/supervisor, even for family members, are to be recorded on Record 8: Worker Training (and Record 8A for Dairy Practices).

5.1.2 Workers are to be aware of the location of relevant on-farm food safety records.

5.1.3 Establish a communication system such as a morning information session or a white board in the barn to ensure workers are updated on changes such as relocation of medicated animals, medicated feed, etc.

A5.2 Casual Workers

Food Safety Concern:

Casual workers, even if familiar with sheep production, need to be aware of the particular good production practices and record keeping on your farm for ensuring food safety.

Good Production Practices for Casual Workers:

5.2.1 Update casual workers every time they are employed on current management practices that may affect food safety. Clearly identify for the worker, animals that are receiving medicated rations and animals treated with animal health products that have not met product withdrawal periods.

5.2.2 Employers must supervise casual workers when performing duties classed as **"Must Do"** such as administering animal health products, shipping animals, mixing medicated feed or water, etc.

5.2.3 Use Record 8: Worker Training (and Record 8A: Worker Training for Dairy Operations) every time a casual employee is employed on your farm to record the dates and the training received.

Table of Contents

CHAPTER 1 – ON-FARM FOOD SAFETY

Section B – On-Farm Record Keeping Forms

One of the key components of the Canadian Sheep and Lamb Food Safe Farm Practices Program is maintaining an accurate and verifiable record keeping system.

In this section of the manual you will find the following nine records:

Record 1: Animal Health Product Treatments
Record 2A: Animal Health Product Inventory
Record 2B: Medicated Feed Inventory
Record 3: Incoming Feed and Bedding Inventory
Record 4: Medicated Feed Mixing and Batch Water Mixing
Record 5: Declaration of Potential Food Safety Hazard
Record 6: Pesticide Use in Grazing Areas
Record 7: Problems and Corrective Actions
Record 8: Worker Training

By maintaining these records, you will have a concrete and traceable means of ensuring that you are following the program on a daily basis. All records should be kept on file for a minimum of two (2) years. If you are supplying a record to someone, for example supplying Record 5: Declaration of Potential Food Safety Hazard to a buyer, you should maintain a copy for your records.

You are not required to use the record forms provided with this program if you already have a system for recording the same information. However, as the auditor will be familiar with these forms, using them may decrease the length of your on-farm audit.

Record 1: Animal Health Product Treatments*

Must Do

Animal or Pen ID	Treatment Date		Reason Treated	Product Name	Prescription (P) or Non-prescription (NP)	Estimated Animal Weight/Number of Animals Treated	Dose	**Route (See Abbreviation Codes below)	Withdrawal Date		Treated by (Initials)
	First Trt	Final Trt							Meat	Milk	
Pen 2	*05/02/10*		*Pneumonia*	*Drug A*	*NP*	*70 kg (8 ewes)*	*(3cc/45kg*70kg) =4.7 cc/animal*	*IM*	*05/16/10*	*-*	*JD*

**Route Codes: IW – In the water; IF – In the feed; TT – Topical Treatment (e.g. pour-on); OR – Oral; SQ – Subcutaneous; IM – Intramuscular; IV – Intravenous; IMM – Intramammary

Note: If a needle breaks in an animal during an injection, record the animal's identification, location of the needle, and date it occurred, in the comments section.

Comments: _____

_____

_____

Auditor's Initials: _____ Audit Date: _____

* Includes medicated feed or water.

Record 2A: Animal Health Product Inventory

Must Do

Use Record 2B: Medicated Feed Inventory, for recording medicated feed purchases and maintaining an inventory of medicated feed.

Date Received	Purchased From	Product Name	Amount Purchased	DIN# or Batch Numbers	Expiry Date	Storage Location	Quantity Remaining at time of Review and Date of Review	Disposal Comments and Date	Initials
02/05/01	*Co-op*	*Drug A*	*(1) 500 mL bottle*	*00000345*	*05/10*	*Fridge in barn office*	*1/2 bottle (250 mL) on 05/05/03*	*05/05/10 set aside for vet pick-up*	*JD*

Comments: _____

_____

_____

Producer's Signature: _____ Date of Review: _____

Producers are to review record before signing.

Auditor's Initials: _____ Audit Date: _____

Record 2B: Medicated Feed Inventory

Must Do

Use Record 2A: Animal Health Product Inventory, for recording all other animal health product purchases and maintaining an inventory of animal health products.

Date Received	Suppliers Name	Product Name	Amount Received	DIN# or Batch Numbers	Expiry Date	Storage Location	Sampled (Y/N)	Quantity Remaining at time of Review and Date of Review	Disposal Comments and Date	Initials
01/05/10	*Company A*	*Feed A*	*2 tonnes*	*00000456*	*05/10*	*Bin #3 (inside main door)*	*Y*	*3/4 tonne 05/05/10*		*JD*

Comments: _____

_____

_____

Producer's Signature: _____ Date of Review: _____

Producers are to review record before signing.

Auditor's Initials: _____ Audit Date: _____

Record 3: Incoming Feed and Bedding Inventory

Recommended

It is recommended that all non-medicated feed, feed ingredients and bedding purchases for your farm be noted on this record. Use Record 2B: Medicated Feed Inventory, for recording all medicated feed purchases and for maintaining an inventory of medicated feed.

Date Received	Source of Feed	Description	Quantity	Storage Bin	Sampled Y/N	Initials of Person Handling the Feed
05/01/10	*Company A*	*Hay*	*100 square bales*	*Hay shed*	*Y*	*JD*

Comments: _____

Record 4: Medicated Feed Mixing and Batch Water Mixing

Must Do

If you mix any medicated feed on-farm, note both the medicated and non-medicated rations, and sequence of mixing the rations on this record.
If storing medicated feed on-farm after mixing, feed should also be recorded on Record 2B Medicated Feed Inventory.

Date Mixed	Type of Feed/Water	Name of Medication	Medication Withdrawl Period (days)	Amount of Medication Added	Total Amount of Feed/Water Mixed	Storage Location of Feed/Water	Lines Flushed/ Equipment Cleaned	Initials of Person Mixing
05/02/10	*Lamb Feedlot ration*	*Drug A*	*14*	*0.20 kg/tonne or 200 gm/tonne*	*2 tonnes*	*Bin #5 purple lid*	*05/02/10*	*JD*

Comments: _____

_____

Date equipment last calibrated and initials: _____

Auditor's Initials: _____ Audit Date: _____

Record 5: Declaration of Potential Food Safety Hazard

Must Do

(Use when shipping animals with a potential food safety hazard or when receiving animals that will not be held for 60 days before reselling)

Owner's Name (person/company): _____

Address: _____

_____

_____

Total Number of Animals Sold: _____

Number of Animals Flagged or Specifically Identified: _____ (specify animal identification number(s) below).

Animal Identification Number(s) (and Visual Markings)	Animal Health Product(s)		Physical Residues (Y/N)
	Product Name	Withdrawl Date	
Example: 2,102 - red line	*Drug A*	*05/31/10*	*Y - broken needle*

I, _____ , the seller of these animals declare to the best of my knowledge the information on this form is accurate.

_____ _____

Signature of Owner Date Animals Shipped

I, _____ , the transporter of the aforementioned animals, agree to give this form to the purchaser of these animals.

OR

I, _____ , the transporter AND purchaser, have read and understand the form.

_____ _____

Signature of Transporter or Purchaser/Transporter Date

Record 6: Pesticide Use In Grazing Areas

Must Do

Date of Application	Pasture or Field Location	*Pesticide (Brand Name, PCP#, Lot#)	Size of Pasture Treated	Application		Date Safe to Graze	Date Animals put on Pasture	Treated by (Initials)
				Quantity Used	Method			
04/20/10	*North pasture*	*Brand X*	*1 acre*	*20 gallons per acre*	*Spray*	*05/05/10*	*05/05/10*	*JD*

* Pesticide means any insecticide, herbicide, fungicide or rodenticide.

Comments: _____

_____

_____

_____

_____

Auditor's Initials: _____ Audit Date: _____

Record 7: Problems and Corrective Actions

Must Do

Date	What was the problem?	How was the problem controlled? (Your actions, person(s) contacted, etc.)	What can be done to prevent the problem from occurring in the future? (Your Prevention Plan)	Completed by (Initials)
05/06/10	*Medicated feed was accepted without a proper label.*	*Feed company was contacted and a copy of the label was requested.*	*Inform feed company that medicated feed will not be accepted without a label. Re-train personnel responsible for receiving feed.*	*JD*

Use this record to note any potential food safety problems (e.g. mistakes when administering animal health products, mixing medicated feed or using pesticides; exposure of sheep to chemical contaminants; shipping animals not meeting animal health product withdrawal periods). Mistakes will happen on even the best-run farm. Keeping a record of how you deal with problems clearly shows that due diligence is being taken on your farm to minimize food safety risks.

Producer's Signature: _____ Date: _____

Producers should review this record at least annually and sign to ensure problems have been fully addressed.

Auditor's Initials: _____ Audit Date: _____

Record 8: Worker Training (Dairy Producers please use Record 8A)

Must Do

For full-time, part-time, seasonal workers and family members. Training is only required if workers will be performing duties related to **"Must Do"** practices in any of the areas listed below.

Worker's Name:		Start Date:			
Area	Reviewed Applicable Section of Manual (Date)	Shown How to Do Task (Date)	Initials of Trainee	Date of Verification by Producer/Trainer	Producer/ Trainer Initials
	05/01/10	*Y*	*JH*	*05/01/10*	*JD*
A1.1: Animal Health Product Treatments					
A1.2: Animal Health Product Usage					
A1.3: Purchasing and Storing Animal Health Products					
A1.4: Injecting Animal Health Products					
A2.1: Purchasing, Handling and Storing Feed and Bedding					
A2.2: Purchasing and Storing Medicated Feed					
A2.3: On-Farm Mixing of Medications in Feed and Water					
A2.4: Administering Medicated Feed and Water					
A2.5: Water Quality					
A3.1: Buying Animals					
A3.2: Selling Animals					
A3.3: Shipping Animals					
A4.1: Pesticides and Farm Chemicals					
A4.2: Manure/Dead Stock Handling and Nutrient Management					
A5.1: Full-time, Part-time and Seasonal Workers					
A5.2: Casual Workers					

Comments: _____

Auditor's Initials: _____ Audit Date: _____

Section C – On-Farm Assessment Forms

SECTION C IS TO BE COMPLETED BY YOU PRIOR TO THE ON-FARM AUDIT AND WILL BE REVIEWED BY THE AUDITOR DURING THE ON-FARM VISIT.

Section C – On-Farm Assessment Forms is divided into two parts: Written Descriptions and Checklists.

Part 1: Written Descriptions

Part 1 involves listing information and answering questions pertinent to good production practices on your sheep operation in order to help you develop a food safety plan specific to your farm. The number(s) in parenthesis behind each question corresponds to the number of the good production practice in Section A. The answers given in this section may be used to develop:

- Standard procedures for performing tasks important to food safety such as identifying and tracking animals treated with animal health products, or cleaning equipment.
- Action plans specific to your farm in the event of an emergency, such as animals are incorrectly treated with an animal health product or medicated animals are shipped to slaughter.

Part 2: Checklists

Part 2 consists of the following twelve checklists:

- Operations
- A1.1 Animal Health Product Treatments
- A1.2 Following Instructions When Using Animal Health Products
- A1.3 Purchasing and Storing Animal Health Products
- A1.4 Injecting Animal Health Products
- A2.1 Purchasing, Handling and Storing Feed and Bedding
- A2.2 Purchasing Medicated Feed
- A2.3 On-Farm Mixing of Medications in Feed and Water
- A2.4 Administering Medicated Feed and Water; and,
  A2.5 Water Quality
- A3. Buying, Selling and Shipping Animals
- A4.1 Pesticides and Farm Chemicals; and,
  A4.2 Manure Handling and Nutrient Management
- A5. Training Workers

The checklists are designed to help you identify if you are compliant with the Canadian Sheep and Lamb Food Safe Farm Practices Program requirements. Except for the checklist entitled “Operations”, the numbering on the heading of each checklist corresponds to the numbering of the headings in Section A of this manual. The number(s) in parenthesis behind each question on the checklist correspond to the number of the good production practice in Section A.

If there are any questions on the checklists that do not apply to your farm, answer with "Not Applicable (N/A)". If you answer "No" to any of the questions provide a brief explanation in the comments section at the bottom of the checklist. Some of the questions on the checklists require more detailed information and/or records to be completed. When a question is identified as requiring more detail, additional information should already be filled out in Part I: Written Descriptions. If the checklist indicates that a record is required, you will need to go to the appropriate record in Section B.

All records and good production practices identified as **"Must Do"** must be maintained and completed prior to the on-farm audit in order to be compliant with the program.

Part 1: Written Descriptions

A1: Animal Health Products:

1a. Explain how you identify and track animals that have been individually treated with animal health products on your operation. (A1.1.3)

1b. Explain how you identify and track animal(s) that receive animal health products or medicated feed and are then moved to other pens (e.g. pens of animals on medicated feed, animals moved from pens fed medicated feed). (A1.1.3)

2. What would you do if animal(s) were incorrectly treated with an animal health product? What corrective actions would you take (i.e. who would you contact for advice, what precautions would you take to ensure withdrawal periods were met)? (A1.1.5)

3. How do you prevent needle breakage during treatment (e.g. animal restraint, administration route, injection technique)? (A1.4.3)

A2: Purchasing, Handling and Storing Feed and Bedding:

4. What machinery and/or equipment are used to handle feed on your farm? (A2.1.8)

5. What cleaning and/or maintenance do you do to machinery used to handle feed in order to prevent contamination of the feed (e.g. cleaning after moving medicated or non-ruminant feeds, regular maintenance to prevent fuel leaks)? (A2.1.8)

A2.3 On-Farm Mixing of Medications in Feed and Water:

(If you do not mix medicated feed or water on-farm, go on to Question 14).

6. List the types of feeds that are mixed on your farm. Identify each ration as either medicated or non-medicated. (A2.3.3)

7. List the mixing instructions for each type of medicated ration (e.g. amount of each type of feed; type and concentration of animal health products or medicated premix). (A2.3.2)

8. When are the feed mixers cleaned/flushed (e.g. between batches of medicated and non-medicated feeds, between rations containing different types of animal health products)? (A2.3.7)

9. List the steps taken when cleaning, flushing or sequencing feed mixers. (A2.3.7)

10. Explain how you calibrate feed mixing and weighing equipment. (A2.3.4)

11. List the steps you would take if it was noticed during mixing, a batch of feed was mixed incorrectly or a medication was accidentally added to a non-medicated ration (e.g. correction to the batch, information that you would record, who you would consult for advice). (A2.3.8)

12. What types of medicated water do you mix on-farm? (A2.3.3)

13. Explain the mixing procedures for each type of medication mixed into the water. (A2.3.2)

A2.4 Administering Medicated Feed and Water:

14. How do you ensure that medicated feed is only distributed to the intended pens of animals (e.g. identification of pens, cleaning equipment between rations)? (A2.4.2)

15. How do you ensure that medicated water is only distributed to the intended pens of animals (e.g. identification of pens, flushing water lines)? (A2.4.2)

16. List the actions you would take if animals were accidentally given an animal health product in their feed or water with an unknown withdrawal time (e.g. feed or water that was mixed incorrectly). (A2.4.3)

17. List the actions you would take if the wrong group of animals were given animal health products in the feed or water. (A2.4.3)

A3. Buying, Selling and Shipping Animals:

18. List the steps you take before shipping animals for slaughter (e.g. check truck for hazardous materials, check animal health product treatment records, bed truck). (A3.2.1)

19. What would you do if an animal that poses a food safety risk was shipped for slaughter? (e.g. hadn't met an animal health product withdrawal period, contained a broken needle) Who would you contact, what records would you check etc.? (A3.2.3)

A4. Pesticides and Farm Chemicals:

20. What would you do if an animal or group of animals were exposed to hazardous farm chemicals? (A4.1.5)

A5. Training Workers:

21. Explain your system for ensuring that all workers are aware of day-to-day changes in management areas important to food safety (e.g. medicating animals, feeding medicated feed to particular animals). (A5.1.3)

Producer's Signature

Date

Part 2: Checklists

Operations	Yes	No	*NA
1. Do you have a diagram of your sheep operation?			
2. Do you keep the records and forms relating to the Canadian Sheep and Lamb Food Safe Farm Practices Program in a place(s) accessible to all farm workers?			
3. Do you have all the necessary records and other documents available for the auditor? This will include written instructions for prescription animal health products, label inserts for animal health products, feed labels and applicable records provided in Section B (and E for dairy producers) of this manual. All paperwork should be kept on file for a minimum of two (2) years.			

*NA = Not Applicable

A1.1 Animal Health Product Treatments	Yes	No	*NA	Details Required Part 1		Record Required	
1. Do you keep a record of all animal health product treatments? (A1.1.1)						Y	Record 8
2. Do you keep copies of written prescriptions from your veterinarian and/or package label inserts containing instructions? (A1.1.2)						Y	Veterinarian Prescription or Package Insert
3. Do you identify and track animals or groups (pens) of animals that have been treated with an animal health product? (A1.1.3)				Y	Questions 1A and 1B		
4. Do you review Record 1 prior to shipping/selling animals to confirm that the proper withdrawal periods are met? (A1.1.4)						Y	Record 1
5. Do you record the incident, if an animal health product is accidentally administered to the wrong animal or at a different dose, by a different route or for a longer period of time than stated on the product label or instructions? (A1.1.5)				Y	Question 2	Y	Record 7
Comments:							

*NA = Not Applicable

A1.2 Following Instructions When Using Animal Health Products	Yes	No	*NA	Details Required Part 1		Record Required	
1. When using registered animal health products, do you follow the manufacturer's instructions exactly as stated on the product? (A1.2.2)							
2. Do you calibrate and check all multiple-dose needling equipment to ensure the accuracy of the dosages being delivered? (A1.2.3)						Y	Record 1
3. If you use animal health products in an extra-label manner, do you have a valid patient/client/practitioner relationship? (A1.2.4)							
4. Do you have written instructions from your veterinarian for all prescription animal health products used in an extra-label manner on your farm? (A1.2.5)						Y	Veterinarian Prescription

Comments:

*NA = Not Applicable

A1.3 Purchasing and Storing Animal Health Products	Yes	No	*NA	Details Required Part 1		Record Required	
1. Do you store all animal health products in a secure area and according to the manufacturer's instructions? (A1.3.1)							
2. Do you keep up-to-date inventories of all animal health products and medicated feeds? (A1.3.2)						Y	Record 2A and 2B
3. Do you review your animal health product and medicated feed inventories at regular intervals (e.g. monthly, yearly)? (A1.3.2)							
4. Do you discard used, outdated, improperly labeled or packaged containers, products incorrectly stored, or products that are potentially contaminated by any other means? (A1.3.2)							
5. Do you only purchase approved animal marking products to identify your animals? (A1.3.3)							
6. Do you immediately move to a proper storage location or dispose of product not properly stored? (A1.3.4)						Y	Record 8
Comments:							

*NA = Not Applicable

A1.4 Injecting Animal Health Products	Yes	No	*NA	Details Required Part 1		Record Required	
1. Do you properly restrain your animals prior to injecting an animal health product? (A1.4.3)				Y	Question 3		
2. Do you replace all needles before they become dull and check the needles to ensure they are not bent? (A1.4.4)							
3. Do you dispose of used needles in a sharps container? (A1.4.5)							
4. Do you record the details on Record 1 of the location of the needle if a needle breaks in an animal? (A1.4.6)						Y	Record 1 and 8

Comments:

*NA = Not Applicable

A2.1 Purchasing, Handling and Storing Feed and Bedding	Yes	No	*NA	Details Required Part 1		Record Required	
1. Do you have documented verification that purchased feed does not contain any prohibited animal by-products? (A2.1.3; A2.1.4)						Y	Bill of Sale, Feed Tag, or Certificate of Verification
2. Do you check with your forage and bedding supplier to ensure that these products are not contaminated with chemical residues such as wood preservatives? (A2.1.5)							
3. Do you ensure that the equipment and vehicles used to transport feed and bedding are thoroughly cleaned and properly maintained? (A2.1.8) *				Y	Questions 4 and 5		
4. Do you store hazardous materials away from feed and bedding? (A2.1.10)							
5. Do you store all non-ruminant feed clearly labelled in a secure location? (A2.1.13)							

Comments:

*NA = Not Applicable

* Use Record 4B to record equipment cleaning if cross-utilizing equipment for ruminant and non-ruminant feeds.

A2.2 Purchasing Medicated Feed	Yes	No	*NA	Details Required Part 1		Record Required	
1. Do you maintain an up-to-date inventory of your medicated feeds and review this inventory at regular intervals (e.g. monthly, yearly)? (A2.2.1)						Y	Record 2B
2. Do you ensure that all medicated feeds and medicated feed additives are received, clearly identified and stored separately from other feeds? (A2.2.2; A2.2.3)							
Comments:							

*NA = Not Applicable

A2.3 On-Farm Mixing of Medications in Feed and Water If you **do not mix** medicated feed on-farm, go on to Checklist A.2.4.	Yes	No	*NA	Details Required Part 1		Record Required	
1. Do you check the expiry date on all medicated ingredients? (A2.3.1)							
2. Do you carefully read the directions and accurately measure the ingredients when mixing medications into the feed or water, with detailed mixing instructions posted in an accessible location? (A2.3.2)				Y	Questions 7 and 13	Y	Vet Prescription or Product Insert
3. If medicated feed or water is mixed on-farm, do you record when each batch is mixed and the sequence the batches are mixed for both medicated and non-medicated rations? (A2.3.3)				Y	Questions 6 and 12	Y	Record 4 and 2B
4. Do you regularly maintain and calibrate your medicated water and feed mixing equipment, with detailed instructions accessible to all workers who mix medicated feed or water? (A2.3.4)				Y	Question 10	Y	Record 4
5. Do you post instructions for flushing water lines in a location that is accessible to all workers? (A2.3.5)							
6. Do you have instructions for cleaning equipment such as feeders and waterlines, which detail the cleaning between mixing medicated and non-medicated feeds, to remove all visible residues of medicated product, posted in an accessible location? (A2.3.7)					Questions 8 and 9		Record 4
7. Do you clearly identify and store all medicated feed away from non-medicated feed and animals, and immediately clean up any spills to avoid accidental consumption or contamination of animals or non-medicated feed? (A2.3.6)						Y	Record 4 and 2B
8. Do you have an action plan in place in the event that a batch of medicated feed is mixed incorrectly or a medication is accidentally added to a batch of feed? (A2.3.8)				Y	Question 11	Y	Record 7 and 8
9. Do you record when corrections are made to a batch of feed that is mixed on-farm? (A2.3.8)						Y	Record 4
Comments:							

*NA = Not Applicable

A2.4 Administering Medicated Feed and Water; and, A2.5 Water Quality	Yes	No	*NA	Details Required Part 1		Record Required	
1. Do you keep a record (Record 1) of all relevant information (e.g. treatment dates) for short-term or long-term feeding of medicated feeds and/or water? (A2.4.1)						Y	Record 1
2. Do you regularly maintain equipment used to administer medicated feed and water to ensure that the medications are evenly distributed to the target animals? (A2.4.2)				Y	Questions 14 and 15		
3. Do you have an action plan in place in the event that animals are accidentally given feed or water containing an unknown concentration of a medication; therefore, have an unknown withdrawal period? (A2.4.3)				Y	Questions 16 and 17	Y	Record 7and 8
4. Do you record the incident if your sheep are exposed to hazardous contaminants in the water? (A2.5.6)						Y	Record 7
Comments:							

*NA = Not Applicable

A3. Buying, Selling and Shipping Animals	Yes	No	*NA	Details Required Part 1		Record Required	
1. Do you maintain records of receiving dates, sources and description of all animals purchased? (A3.1.1)						Y	Shipping Manifest and/or Record 5
2. Do you keep all purchased animals for 60 days before re-selling if the seller is unable to supply a signed animal shipping record? (A3.1.2)							
3. Do you check your records for potential food safety hazards (withdrawal times, broken needles) and animal condition before shipping any animals? (A3.2.1)				Y	Question 18		
4. Do you have an action plan in place in the event animal(s) that may pose a food safety risk are accidentally sent to slaughter or to public auction? (A3.2.3)				Y	Question 19	Y	Record 7 and 8
5. Do you only sell animals with a potential food safety hazard to known buyers and supply a signed Record 5: Declaration of a Potential Food Safety Hazard identifying animals that do not meet product withdrawal periods or contain a broken needle? (A3.2.2)						Y	Record 5
6. Do you identify animals that may pose a food safety risk in a highly visible manner before shipping? (A3.2.2)							
7. Do you have an up-to-date list of important contact numbers posted in a location accessible to all farm workers? (A3.2.4)							
8. Do you ensure animal holding areas of transport vehicles are clear of any hazardous materials prior to loading the animals? (A3.3.1)							
Comments:							

*NA = Not Applicable

A4.1 Pesticides and Farm Chemicals; and, A4.2 Manure Handling and Nutrient Management	Yes	No	*NA	Details Required Part 1		Record Required	
1. Do you follow the manufacturer's instructions and keep records when using pesticides (i.e. herbicides, insecticides and fungicides) on grazing land? (A4.1.1)						Y	Record 6
2. Do you restrict sheep from accessing any area(s) where hazard materials (e.g. pesticide containers) are stored on your farm? (A4.1.2)							
3. Are all potentially hazardous materials stored away from feed, water supplies and areas where your sheep are penned or housed? (A4.1.3)							
4. Do you take precautions to ensure machinery is stored and maintained in a manner that prevents chemical contamination of sheep housing areas? (A4.1.4)							
5. If any of your sheep are exposed to chemical contaminants, do you isolate and identify the animal(s) and record this information? (A4.1.5)				Y	Question 20	Y	Record 7 and 8
6. Do you only purchase farm chemicals that are licensed for use in Canada and are from a reputable dealer? (A4.1.6)							
7. Do you dispose of agricultural and industrial chemicals according to provincial guidelines? In the absence of provincial guidelines do you take them to a designated hazardous waste facility? (A4.1.7)							
8. Do you dispose of dead stock in a manner to prevent contamination of feed, bedding, sheep and housing areas? (A4.2.3)							
Comments:							

*NA = Not Applicable

A5. Training Workers	Yes	No	*NA	Details Required Part 1		Record Required	
1. Have all workers performing **"Must Do"** production practices received the relevant training? (A5.1.1)						Y	Record 8
2. Do you maintain a record of training (Record 8 and 8A for dairy producers) for each person working on your farm including family members? (A5.1.1)						Y	Record 8
3. Do you ensure that all workers are aware of the location of relevant on-farm food safety records? (A5.1.2)							
4. Do you have a communication system in place to ensure all workers are aware of changes in management areas/procedures (e.g. location of medicated animals) important to food safety? (A5.1.3)				Y	Question 21		
5. Do you thoroughly update casual workers on the status of any relevant management areas important for food safety (e.g. identifying any animals currently receiving animal health products, pens of animals that are receiving medicated feed etc.) every time they are employed? (A5.2.1)							
6. Do you supervise casual workers when they perform duties outlined in this program as **"Must Do"**? (A5.2.2)							
7. Do you maintain a record of the dates when casual employees are working on your farm? (A5.2.3)						Y	Record 8
Comments:							

*NA = Not Applicable; **Dairy producers please use Record 8A **in addition to** Record 8

Record 1: Animal Health Product Treatments*

Must Do

Animal or Pen ID	Treatment Date		Reason Treated	Product Name	Prescription (P) or Non-prescription (NP)	Estimated Animal Weight/Number of Animals Treated	Dose	**Route (See Abbreviation Codes below)	Withdrawal Date		Treated by (Initials)
	First Trt	Final Trt							Meat	Milk	
Pen 2	*05/02/10*		*Pneumonia*	*Drug A*	*NP*	*70 kg (8 ewes)*	*(3cc/45kg*70kg) =4.7 cc/animal*	*IM*	*05/16/10*	*-*	*JD*

**Route Codes: IW – In the water; IF – In the feed; TT – Topical Treatment (e.g. pour-on); OR – Oral; SQ – Subcutaneous; IM – Intramuscular; IV – Intravenous; IMM – Intramammary

Note: If a needle breaks in an animal during an injection, record the animal's identification, location of the needle, and date it occurred, in the comments section.

Comments: _____

_____

_____

Auditor's Initials: _____ Audit Date: _____

* Includes medicated feed or water.

Record 7: Problems and Corrective Actions

Must Do

Date	What was the problem?	How was the problem controlled? (Your actions, person(s) contacted, etc.)	What can be done to prevent the problem from occurring in the future? (Your Prevention Plan)	Completed by (Initials)
05/06/10	*Medicated feed was accepted without a proper label.*	*Feed company was contacted and a copy of the label was requested.*	*Inform feed company that medicated feed will not be accepted without a label. Re-train personnel responsible for receiving feed.*	*JD*

Use this record to note any potential food safety problems (e.g. mistakes when administering animal health products, mixing medicated feed or using pesticides; exposure of sheep to chemical contaminants; shipping animals not meeting animal health product withdrawal periods). Mistakes will happen on even the best-run farm. Keeping a record of how you deal with problems clearly shows that due diligence is being taken on your farm to minimize food safety risks.

Producer's Signature: _____ Date: _____

Producers should review this record at least annually and sign to ensure problems have been fully addressed.

Auditor's Initials: _____ Audit Date: _____

Record 2A: Animal Health Product Inventory

Must Do

Use Record 2B: Medicated Feed Inventory, for recording medicated feed purchases and maintaining an inventory of medicated feed.

Date Received	Purchased From	Product Name	Amount Purchased	DIN# or Batch Numbers	Expiry Date	Storage Location	Quantity Remaining at time of Review and Date of Review	Disposal Comments and Date	Initials
02/05/01	*Co-op*	*Drug A*	*(1) 500 mL bottle*	*00000345*	*05/10*	*Fridge in barn office*	*1/2 bottle (250 mL) on 05/05/03*	*05/05/10 set aside for vet pick-up*	*JD*

Comments: _____

_____

_____

Producer's Signature: _____ Date of Review: _____

Producers are to review record before signing.

Auditor's Initials: _____ Audit Date: _____

Record 2B: Medicated Feed Inventory

Must Do

Use Record 2A: Animal Health Product Inventory, for recording all other animal health product purchases and maintaining an inventory of animal health products.

Date Received	Suppliers Name	Product Name	Amount Received	DIN# or Batch Numbers	Expiry Date	Storage Location	Sampled (Y/N)	Quantity Remaining at time of Review and Date of Review	Disposal Comments and Date	Initials
01/05/10	*Company A*	*Feed A*	*2 tonnes*	*00000456*	*05/10*	*Bin #3 (inside main door)*	*Y*	*3/4 tonne 05/05/10*		*JD*

Comments: _____

_____

_____

Producer's Signature: _____ Date of Review: _____

Producers are to review record before signing.

Auditor's Initials: _____ Audit Date: _____

Record 4: Medicated Feed Mixing and Batch Water Mixing

Must Do

If you mix any medicated feed on-farm, note both the medicated and non-medicated rations, and sequence of mixing the rations on this record.
If storing medicated feed on-farm after mixing, feed should also be recorded on Record 2B Medicated Feed Inventory.

Date Mixed	Type of Feed/Water	Name of Medication	Medication Withdrawl Period (days)	Amount of Medication Added	Total Amount of Feed/Water Mixed	Storage Location of Feed/Water	Lines Flushed/ Equipment Cleaned	Initials of Person Mixing
05/02/10	*Lamb Feedlot ration*	*Drug A*	*14*	*0.20 kg/tonne or 200 gm/tonne*	*2 tonnes*	*Bin #5 purple lid*	*05/02/10*	*JD*

Comments: _____

_____

Date equipment last calibrated and initials: _____

Auditor's Initials: _____ Audit Date: _____

Record 6: Pesticide Use In Grazing Areas

Must Do

Date of Application	Pasture or Field Location	*Pesticide (Brand Name, PCP#, Lot#)	Size of Pasture Treated	Application		Date Safe to Graze	Date Animals put on Pasture	Treated by (Initials)
				Quantity Used	Method			
04/20/10	*North pasture*	*Brand X*	*1 acre*	*20 gallons per acre*	*Spray*	*05/05/10*	*05/05/10*	*JD*

* Pesticide means any insecticide, herbicide, fungicide or rodenticide.

Comments: _____

_____

_____

_____

_____

Auditor's Initials: _____ Audit Date: _____

Record 11: Milking Equipment Sanitation

Must Do

Date	Check Sanitization Level of Equipment (✔ clean **x** unclean)																																
	Milking Equipment**																																
	Water Temperature																																

Potential areas to inspect:

**Milking Equipment: receiver jar, pipeline inlets, inflations, milk hoses, claws, meters, weigh jars, gaskets, filter coil, buckets, pails, sanitary trap

Auditor's Initials: _____ Audit Date: _____

Record 5: Declaration of Potential Food Safety Hazard

Must Do

(Use when shipping animals with a potential food safety hazard or when receiving animals that will not be held for 60 days before reselling)

Owner's Name (person/company): _____

Address: _____

_____

_____

Total Number of Animals Sold: _____

Number of Animals Flagged or Specifically Identified: _____ (specify animal identification number(s) below).

Animal Identification Number(s) (and Visual Markings)	Animal Health Product(s)		Physical Residues (Y/N)
	Product Name	Withdrawl Date	
Example: 2,102 - red line	*Drug A*	*05/31/10*	*Y - broken needle*

I, _____ , the seller of these animals declare to the best of my knowledge the information on this form is accurate.

_____ _____

Signature of Owner Date Animals Shipped

I, _____ , the transporter of the aforementioned animals, agree to give this form to the purchaser of these animals.

OR

I, _____ , the transporter AND purchaser, have read and understand the form.

_____ _____

Signature of Transporter or Purchaser/Transporter Date

Record 3: Incoming Feed and Bedding Inventory

Recommended

It is recommended that all non-medicated feed, feed ingredients and bedding purchases for your farm be noted on this record. Use Record 2B: Medicated Feed Inventory, for recording all medicated feed purchases and for maintaining an inventory of medicated feed.

Date Received	Source of Feed	Description	Quantity	Storage Bin	Sampled Y/N	Initials of Person Handling the Feed
05/01/10	*Company A*	*Hay*	*100 square bales*	*Hay shed*	*Y*	*JD*

Comments: _____

Record 8: Worker Training (Dairy Producers please use Record 8A)

Must Do

For full-time, part-time, seasonal workers and family members. Training is only required if workers will be performing duties related to **"Must Do"** practices in any of the areas listed below.

Worker's Name:		Start Date:			
Area	Reviewed Applicable Section of Manual (Date)	Shown How to Do Task (Date)	Initials of Trainee	Date of Verification by Producer/Trainer	Producer/ Trainer Initials
	05/01/10	*Y*	*JH*	*05/01/10*	*JD*
A1.1: Animal Health Product Treatments					
A1.2: Animal Health Product Usage					
A1.3: Purchasing and Storing Animal Health Products					
A1.4: Injecting Animal Health Products					
A2.1: Purchasing, Handling and Storing Feed and Bedding					
A2.2: Purchasing and Storing Medicated Feed					
A2.3: On-Farm Mixing of Medications in Feed and Water					
A2.4: Administering Medicated Feed and Water					
A2.5: Water Quality					
A3.1: Buying Animals					
A3.2: Selling Animals					
A3.3: Shipping Animals					
A4.1: Pesticides and Farm Chemicals					
A4.2: Manure/Dead Stock Handling and Nutrient Management					
A5.1: Full-time, Part-time and Seasonal Workers					
A5.2: Casual Workers					

Comments: _____

Auditor's Initials: _____ Audit Date: _____

Record 8A: Record of Worker Training for Dairy Operations

Must Do

For full-time, part-time, seasonal workers and family members. Training is only required if workers will be performing duties related to **"Must Do"** practices in any of the areas listed below.

Worker's Name:		Start Date:			
Area	Reviewed Applicable Section of Manual (Date)	Shown How to Do Task (Date)	Initials of Trainee	Date of Verification by Producer/Trainer	Producer/ Trainer Initials
	05/01/10	*Y*	*JH*	*05/01/10*	*JD*
D.1: Legislation					
D2.1: Farmyard and Surroundings					
D2.2: Animal Housing Area					
D2.3: Milking Parlour					
D2.4: Milkhouse					
D2.5: Dairy Equipment					
D2.6: Chemical Use and Storage					
D3: Flock Health					
D4:1 Worker Hygiene					
D4.2: Milking Procedures					
D4.3: Milking Parlour and Milkhouse Sanitation					
D4.4: Equipment Sanitation					
D4.5: Handling Milk from Medicated Ewes					
D5: Water Quality					
D.6.1: Milk Packaging					
D6.2: Cooling, Freezing and Storing Milk					
D6.3: Transporting Milk					
D7: Training Workers for Dairy Operations					

Comments: _____

Auditor's Initials: _____ Audit Date: _____

Record 9: Daily Freezer/Bulk Tank Temperatures

Must Do

Month:

Date	Time	Freezer Temperature (°C)	Reader's Initials	Date	Time	Bulk Tank Temperature (°C) p.m.	Reader's Initials
June 1	*8:27 a.m.*	*-18°C*	*JD*	*June 1*	*8:28 a.m.*	*-1°C*	*JD*

Temperature Calibration Date(s): ____________ Freezer/Cooler (circle one) Auditor's Initials: ____________

____________ Freezer/Cooler (circle one) Audit Date: ____________

Record 10: Raw Milk Transport

Must Do

This form must be completed when transporting milk to the processor.

Receiver's Name (person/company): _____

Address: _____

_____

_____

Producer's Name: _____

Address: _____

_____

_____

Fluid Milk:
Temperature of Milk at Shipping: _____

Temperature of Milk at Receiving: _____

Frozen Milk:
Condition of Milk at Shipping (i.e. frozen): _____

Condition of Milk at Receiving (i.e. frozen): _____

Milk Production Period (i.e. day, week or month)	Container Size	Number of Containers	Milk Production Period (i.e. day, week or month)	Container Size	Number of Containers
May 7-10, 2010	*15 litres*	*4*			

Total Amount of Milk: _____

Date of Shipment: _____

I _____ , the producer of the milk, declare to the best of my knowledge, that the milk is of good quality and safety; and was produced under the Canadian Sheep and Lamb Food Safe Farm Praticies Program.

_____ _____

Producer's Signature Date

_____ _____

Receiver's Signature Date

CANADIAN VERIFIED SHEEP

Animal Care Chapter

Canadian Verified Sheep Program

CSF•FCM
Canadian Sheep Federation
Fédération Canadienne du Mouton

Table of Contents

CHAPTER 2 – ANIMAL CARE

Section G – Animal Care

CSF•FCM
Canadian Sheep Federation
Fédération Canadienne du Mouton



Welcome

Welcome to the Canadian Verified Sheep Program (CVSP) Animal Care chapter. This is an animal care Program, chaired by the Canadian Sheep Federation. The Program is being implemented to meet consumer and value chain concerns involving animal welfare in sheep and lamb production practices. Improved animal care directly results in more productive animals.

Why is an on-farm animal welfare Program necessary?

Responsible animal care is increasingly becoming a consumer and value chain demand. With today's strong animal activist presence, being able to demonstrate responsible animal care during the production of sheep and lamb products is becoming a priority of processors, retailers and consumers alike.

These standards were developed to help assure consumers that their sheep and lamb products have been raised with the upmost responsibility and in management system meeting all requirements of animal care.

Like most sheep producers, many of these practices will already be in place in your production system. However, a verifiable method of monitoring animal care will aid the industry to secure consumer confidence and meet market place demands.

What is the Program based on?

The CVSP Animal Care chapter was developed based on the National Farm Animal Care Council's (NFACC) "Sheep Code of Practice". The Animal Care chapter takes the requirements or **"Must Do's"** of the Sheep Code of Practice and presents it as a deliverable, trainable and verifiable format.

The Codes of Practice are nationally developed guidelines for the care and handling of farm animals. They serve as our national understanding of animal care requirements and recommended practices. Codes promote sound management and welfare practices for housing, care, transportation and other animal husbandry practices. The Codes of Practice have been developed for virtually all farmed animal species in Canada. National Farm Animal Care Council's (NFACC) website provides access to all currently available Codes (www.nfacc.ca).

The Codes of Practice are the result of a rigourous Code development process, taking into account the best science available for each species, compiled through an independent peer-reviewed process, along with stakeholder input. The Code development process also takes into account the practical requirements for each species necessary to promote consistent application across Canada and ensure uptake by stakeholders resulting in beneficial animal outcomes. Given their broad use by numerous parties in Canada today, it is important for all to understand how they are intended to be interpreted.

How does the Program work?

The CVSP Animal Care chapter provides a standardized system of GPP's (Good Production Practices) and record keeping to monitor animal care. The Program can be used on all Canadian Sheep and Lamb operations. The Animal Care chapter is currently voluntary, however this may change as consumer and value chain demands increase.

Are there benefits to the Program?

By maximizing the care of sheep and insuring that all basic needs are met, while taking into consideration natural behaviour, will directly result in animals experiencing less stress. Animals reared with minimal stress perform much better, in turn increasing your bottom line. Other benefits include:

- Increased consumer confidence in industry;
- Improve flock management and productivity;
- Enhanced performance of animals;
- Greater access to domestic and international markets; and
- Ability to meet consumer demands.

How do I Implement the Program material?

The Canadian Verified Sheep Program (CVSP) Animal Care chapter provides you with all the information to comply with the Program. Given this manual you will need to:

- Participate in the training provided online, or in person through your provincial delivery agency;
- Adapt the material to the unique needs of your farm;
- Follow GPP's (Good Production Practices) and record-keeping system on your farm;
- Ensure all workers, and family members are properly trained on the Program; and
- Properly document mistakes when they happen to minimize future occurrences.

The Canadian Sheep and Lamb Animal Care Practices Manual

The CVSP Animal Care chapter contains all essential GPP's that impact animal care and welfare. The manual details:

- Areas that influence animal care on farm;
- Production practices that maximize animal care; and
- How to properly address sick or injured animals on-farm.

The information in the manual is reviewed on an annual basis to ensure that it contains the most up-to-date information and can be adapted to all sheep and lamb farms. If updates are required, producers who have been audited will receive the revised sections of the manual, or if necessary, a revised copy of the manual in its entirety.

Organization of this Manual

The CVSP Animal Care chapter is organized into two sections. Section A is GPP's, and Section B is the Flock Health Plan and Self Assessment Forms.

All producers participating in this chapter should have a copy of the NFACC Code of Practice available.

SECTION A – ANIMAL CARE PRACTICE FOR PRODUCERS

Section A identifies all the **Must Do's** and recommended practices included in the Sheep Code of Practice. Section A is broken into seven sub-sections; Environmental Conditions, Facilities, Feed and Water, Health Management, Husbandry Practices, Transportation and Euthanasia. Each subsection identifies **Must Do** GPP's (Good Production Practices) related to their specific area of production management.

The **"Must Do"** practices are identified in **bold lettering**, and are critical to animal care. All **"Must Do"** practices must be met in order to comply with the requirements of the Canadian Verified Sheep Program. The Program was developed taking into consideration the various styles of sheep rearing nationally.

Must Do's will be verified through:

- Record keeping;
- Self-assessments/Checklists;
- Evidence of training; and
- Interview process during on-farm audit.

At the end of each subsection is a list of *"Recommended"* GPP's which are of significant concern to animal care and welfare but posed less concern of affecting animal well-being. *"Recommended"* practices are beneficial to reducing the risk of sickness, injury and mortality on farm.

SECTION B – ON-FARM COMPLIANCE MATERIALS

Section B contains all documentation required in order to prove compliance with the **"Must Do"** GPP's listed in the subsections of Section A. These documents include:

- Flock Health Plan;
- Flock Health Protocol Form;
- Self-Assessment Checklists; and
- Proof of Training.

Successfully gaining conformance on the Program requires full compliance with all **"Must Do"** practices.

Section A – Animal Care Practices for Sheep Producers

This section of the manual identifies seven major of major areas of sheep production where animal care issues may arise:

A1. Environmental Conditions
A2. Facilities
A3. Feed and Water
A4. Health Management
A5. Husbandry Practices
A6. Transportation
A7. Euthanasia

Within Section A, animal care concerns are emphasized along with the good GPP (Good Production Practices) that can be used to maximize animal care.

While all **"Must Do"** practices are essential to animal welfare, they also serve as critical control points; specific practices where the producer can apply controls to reduce, prevent or eliminate animal care concerns.

All record-keeping forms referred to can be found in Section B – Flock Health Plan, Flock Health Protocol Form and Self-Assessment Checklists.

RESPONSIBILITY

An animal care program involves GPP's used to address all areas of concern related to animal welfare. It is important to be aware of your responsibility as a producer:

- Monitoring Procedures: Regular observation of your animal's health and well-being, as well as the factors that influence the rearing process.
- Deviation Process: Corrective actions taken by the farm when a deviation from a practice is observed.
- Verification Procedures: Procedures that need to be verified by someone other than the producer. This is done by the auditor as part of the audit cycle for the program, which may include a review of relevant records and documentation, observation of tasks being performed in an interview of the person who performed the task(s).

Producers also need to ensure they follow all Federal, Provincial and Municipal Legislation in relation to agricultural practices, including those related to the usage of animal health products, animal feeds, nutrient management, and dead stock handling/disposal. Where Legislation stipulates more stringent practices, the Legislation supersedes the practices required in the Animal Care chapter.

Section A1: Environmental Conditions

A variety of production systems exist in Canada for rearing sheep. The welfare of sheep is greatly impacted by their living conditions. Region, climate, season, lambing season, breed and the type of production system will directly affect the type of housing and shelter required. Various sheep management systems have the ability to provide good welfare for the animals raised within them, provided adequate resources can be applied as needed. Adaptability, physical attributes, and behaviour patterns of sheep must be taken into consideration.

With proper care and management, sheep are able to adapt physiologically and behaviourally to cope with the wide range of Canadian climatic conditions. The relationship between an animal and its environment is important to animal welfare. Provision of shelter and shade are important for protection from adverse weather conditions as described in this section.

Sheep acclimatized to particular environmental temperatures/conditions will face challenges if suddenly required to adjust to extremes of temperature outside the range to which they are accustomed (e.g. hot to cold or cold to hot). If appropriate action is not taken, sheep are at risk of developing hypothermia, frost bite, heat stress, and other possible stressful conditions.

1.1.1 Producers must promptly assist individual sheep displaying signs of heat or cold stress.

1.1.2 Sheep entering the flock that come from a different environment or production system, must be monitored closely during the acclimation period, and action taken to help promote their health and welfare as required.

1.1.3 Develop a contingency plan for extreme and sudden changes to weather conditions and be prepared to put the plan into action within hours. Be prepared to relocate the sheep, giving priority for shelter to the most vulnerable.

A1.2 High Temperature, Humidity and Provision of Shade

Signs of heat stress in sheep can include:

- Continual panting;
- Rapid breathing;
- Weakness;
- Inability to stand; and
- Elevated rectal temperature.

If the body temperature continues to rise, the sheep will eventually collapse and die. Sheep that have been recently shorn have less protection from solar radiation (e.g. sunburn and radiant heat) provided by the fleece.

1.2.1 Producers must plan for elevated heat conditions and take steps to mitigate heat stress by:

- **Monitoring frequently for individual animals showing signs of heat stress;**
- **Providing shade (e.g. allowing access to treed area, bringing in wagons, erecting a canopy, stacking bales);**

- **Ensuring adequate access to clean, fresh drinking water (demands for water will increase during hot weather) (See Section A3.4 on Water);**
- **Avoiding the handling and moving of sheep during the heat of the day;**
- **Allowing sheep to rest during the heat of the day (e.g. allow rest breaks as needed if trailing sheep long distances); and**
- **Selecting an appropriate shearing season.**

A1.3 Provision of Shelter During Cold and Windy, and Cold and Wet Conditions

When conditions are cold for the sheep, they will:

- Face away from the prevailing winds;
- Seek shelter from the wind;
- Huddle together;
- Shift positions within the group; and
- Shiver.

Wind combined with cold, wet conditions can compromise the welfare of sheep:

- Cold, wet and windy conditions reduce the insulation value of the fleece;
- Sheep can experience wind chill;
- Wind chill can have a severe impact on the effective temperature experienced by sheep and cause hypothermia; and
- Newborn and very young lambs, freshly shorn sheep, and compromised sheep are more susceptible to hypothermia.

Without planning for cold, stormy weather events and providing an appropriate plan, sheep could succumb to the effects of cold and wet weather.

1.3.1 Sheep must have access to shelter, either natural or man-made, that provides appropriate relief for the regional and seasonal climatic conditions and is appropriate for the individual production system. Properly designed and maintained hedgerows and windbreaks can be adequate, as can natural land features (e.g. lee side of a hill, bush, gully, coulees) for certain classes of animals.

1.3.2 Producers must plan the lambing period for the available shelter and to match local climatic conditions (e.g. provide shelter for young lambs and freshly shorn sheep).

1.3.3 Special considerations for management and shelter during lambing will be required under some conditions. (See Section A5.11 on Pregnancy, Lambing and Neonatal Care)

1.3.4 When planning for extreme weather events and winter management, a producer must consider and be able to:

- **Manage their flock to minimize the risk of hypothermia;**
- **Monitor flock closely for signs of cold stress and take immediate action to provide relief if it occurs;**
- **Relocate sheep to a sheltered area or shed;**
- **Provide more feed (energy);**
- **Provide extra bedding where appropriate; and**
- **Manage timing of shearing events to minimize risk of hypothermia (e.g. if bad weather is predicted, make alternate arrangements such as delaying shearing or increasing available shelter).**

RECOMMENDATIONS

- Select a breed or type of sheep that is suitable for the location, climate and management system.
- Consult a veterinarian to establish a protocol for treatment options for sheep showing signs of hypothermia, and include this in the flock health plan.
- If adverse conditions are expected, postpone shearing.
- Use a cover comb (or comb lifter) to provide some protection against cool temperatures, insects and solar radiation as this leaves more wool than a regular comb.

Section A2: Facilities

Various production systems are practiced for rearing sheep in Canada. The main systems include:

- Pasture-based;
- Total confinement; and
- Hybrid (indoor and outdoor).

All facilities used in the rearing of sheep must be suitable for sheep. Describing all types of facilities used is beyond the scope of this Program.

There are many resources available for producers wanting details relating to siting and construction of sheep facilities, including floor space allowances, bunk space allowances and heights, etc. Some of these resources include:

- Canadian Sheep Federation's Virtual Toolbox (www.cansheep.ca)
- Ontario Sheep Marketing Agency Production Manual (www.ontariosheep.org)
- Alberta Lamb Producers Production Manuals (www.ablamb.ca)
- Canada Plan Service (www.cps.gov.on.ca)
- Le Centre de référence en agriculture et agroalimentaire du Québec Guide : L'élevage du mouton (www.craaq.qc.ca)
- Centre d'expertise en production ovine du Québec (www.cepoq.com)

Additional resources:

- Modern Shepherd Program offered through Dalhousie University, Faculty of Agriculture (www.dal.ca)
- Shepherding 101: Getting Started in the Sheep Industry offered through Olds College (www.oldscollege.ca)

A2.1 Space, Feeders and Design

Sufficient floor space is required for all sheep to be able to lie down at the same time in a normal resting posture; adjust their posture; turn around; move freely around the pen/enclosure; seek shelter, food and water; and a comfortable location to rest and ruminate without interference from other sheep.

There must be sufficient feed space to allow sheep to eat adequate amounts; the amount of space required per sheep will vary with sheep size, fleece length, presence of horns, pregnancy status, type of feed and feeding system. See Table 2.1 on Minimum Recommended Floor & Feeder Space for recommended space allowances in the NFACC Code of Practice.

How water systems are designed and maintained is critical to sheep having access to clean, palatable water.

Segregated areas or "sick pens" must be accessible to house sick or injured animals. Sick pens allow for better surveillance of compromised animals, as well as extra resources such as additional space, bedding, protection, isolation of diseases, and easy access to feed and water. Where possible, sheep should have visual contact with other sheep.

Animal Safety Concern:

Sheep should not be overcrowded and exposed to an increased risk of injury, disease or thermal distress due to inadequate space. When sheep are offered feed together, there must be sufficient trough/feeder space to ensure that each sheep is able to feed unimpeded to meet it's nutritional requirements.

2.1.1. Barriers, pen dividers, other penning or handling structures, must be suitable for sheep, and maintained and cleaned to minimize potential illness and injury (e.g. ensure there are no sharp edges and projections that might injure sheep).

2.1.2 All applicable equipment and services including water bowls and troughs, ventilating fans, heating and lighting units, milking machines, fire extinguishers and alarm systems must be inspected and cleaned regularly and kept in good working order.

2.1.3 Feeding equipment must be suitable and safe for the type of sheep.

2.1.4 Sheep must not be housed on solid concrete floors without providing adequate bedding.

For sheep handling:

2.1.5 Producers and stock people must have access to equipment for safe handling, treatment, restraint, segregation, loading and unloading of sheep. (See Section A4.2 on Stockmanship Skills Related to Animal Health and Welfare).

2.1.6 Handling area must have surfaces that provide good traction.

2.1.7 Handling systems must be designed to utilize natural sheep behaviour and managed to minimize unnecessary noise. (See Section A5.1 on Handling, Grouping and Moving Animals).

2.1.8 Equipment must be maintained in good repair.

In housing, grazing and loafing areas:

2.1.9 There must be sufficient space for all animals to simultaneously lie down and ruminate, stand up, turn around, adopt resting postures and move around easily.

2.1.10 Producers must be able to make provisions for a hospital pen/area when required.

2.1.11 All sheep must have access to a well-drained lying area. Constantly standing in mud is not acceptable.

2.1.12 Housed sheep must have access to a dry lying area.

A2.2 Temperature, Humidity and Air Quality

The air and environmental conditions inside the housing can affect air quality depending on external temperature, humidity, cold air drafts, ventilation systems, stocking density and bedding management. To promote the health and well being of the sheep air circulation, dust levels, temperature, relative air humidity and ammonia concentrations must be kept within limits. A well-designed ventilation system that is well maintained and operated properly will help to optimize air quality in the housing.

To avoid high humidity, diligent bedding management will minimize excessive moisture in the air, and help to maintain healthy ammonia levels within in the housing areas.

Sheep are able to bear low temperatures reasonably well if they have shelter from wind, drafts and precipitation, are in good health, and have ready access to sufficient appropriate feed.

Excessive ammonia inside buildings can pose a health threat to both sheep and animal handlers. Very high concentrations (e.g. 45ppm) can affect growth and are aversive to sheep, but some detrimental effects can occur at about 15ppm of exposure in as little as 12 days. Effective ventilation avoids damaging ammonia levels. There are no guidelines for acceptable levels of ammonia in livestock buildings, but the Occupational Health and Safety guidelines

cite an exposure level of 25ppm for humans for an 8-hour workday and a short-term exposure level of 35ppm. If ammonia is detectable by the human nose upon entry into the housing, it is generally considered to be at a level that requires action to be taken.

Animal Safety Concern:

High temperatures, poor air quality, and excessive humidity may cause health problems in housed sheep. Respiratory diseases and heat stress are of the most common side effects.

2.2.1 Indoor air quality and temperature must be maintained at levels to promote good health and welfare of sheep.

2.2.2 When ammonia concentrations at sheep level exceed 25ppm, take immediate action.

2.2.3 Producers must consider prevailing winds when constructing shelter for sheep to ensure adequate airflow and protection from cold winds.

A2.3 Social Environment and Enrichment

Sheep are social animals. Sheep social behaviours have evolved as part of the protective mechanism against predators. The ability of sheep to recognize the faces of numerous other sheep, and to interpret the emotional relevance of these facial features is beneficial during social interactions and the formation of social bonds. Fighting to establish a social hierarchy occurs more in single-sex, single-age groups than in mixed-sex groups of varying ages.

Animal Safety Concern:

Providing visual contact with other sheep is essential to avoid isolation stress.

2.3.1 Sheep must have visual contact with other sheep.

A2.4 Lighting

Light is necessary to ensure appropriate care of the animals by the stockperson. Sheep kept in well-lit buildings can be thoroughly inspected at any time and the sheep can be handled appropriately during emergencies, shearing, and during daily care routines.

Sheep are seasonal animals and sensitive to photoperiod. Sheep must be provided with natural daylight cycle, including a period of dark every 24 hour period but they should not be kept in permanent darkness.

Exterior lighting of facilities can help minimize predator problems, but care must be taken to avoid affecting the diurnal cycle of the sheep.

Sheep prefer moving towards lighter areas. Shadows can startle sheep and make moving them more difficult. Appropriate lighting for handling areas is also important for the welfare of sheep.

Animal Safety Concern:

Inadequate lighting prevents stockpersons from inspecting sheep properly, which can lead to injury and illness going unnoticed.

2.4.1 Sheep housed indoors must be exposed to a natural daylight cycle (using either artificial or natural light), except for breeding animals under a controlled light regime.

2.4.2 Lighting must be sufficient to allow appropriate care and inspection by stock people.

2.4.3 Ensure six hours of darkness in a 24-hour period for housed sheep.

A2.5 Bedding and Manure Management

Bedding should be provided in all buildings used for rearing sheep, with the exception of systems using slotted floors, to create a clean, comfortable, dry surface.

In bedded pack systems, it is important to add fresh bedding material as necessary to promote good welfare of the sheep. Wet bedding will contribute to humidity and ammonia build-up in the barn.

Bedding is particularly important during lambing. Bedding in lambing pens should be clean, dry and replaced regularly. Waste, such as spoiled feed, soiled bedding and afterbirth presents the risk for spread of disease or other contaminants. Waste may attract predators and pests. Waste management plans establish what is to be done with the various wastes generated at the site, including manure. Waste management plans should include details on removal, transportation, storage and disposal of manure focused on minimizing potential risks associated with the waste.

Animal Safety Concern:

All sheep housing areas, regardless of system, should be well-drained to avoid wet conditions that can create welfare and health challenges (e.g. foot rot) for the sheep.

2.5.1 Bedding must be provided in all buildings used for rearing sheep, with the exception of systems using slotted floors.

2.5.2 Bedding must be clean and dry.

2.5.3 Sheep must not be housed on solid concrete floors without providing adequate bedding.

2.5.4 When lambing inside in cold temperatures, extra bedding must be provided.

2.5.5 Where waste is stored, it must be stored in a manner to avoid run off getting into sheep housing areas, water sources, feed and bedding supplies, or attracting scavengers to the housing area.

RECOMMENDATIONS

- Consider the amount of space needed for moving sheep and/or equipment easily when designing and setting up facilities.
- Slope or mound feedlot pens, loafing areas and yards appropriately to provide dry areas and promote drainage.

- Allow space for sick/hospital pens when building or setting up a facility.
- Consider biosecurity when designing and managing animal facilities.
- Plan exit doors for emergencies and to provide protection from snow/ice slides from roofing.
- Consider alleyways and movement pathways within structures.
- Construct internal surfaces of housing and pens of materials, which can be cleansed and disinfected or be easily replaced when necessary.
- Consider housing and feeding needs when developing on-farm emergency plans.
- Seek competent advice on the design, construction or modification of buildings.
- Consider local topography when siting buildings or altering accommodations.
- Take action if ammonia is detectable by people entering the building.
- Check for drafts at animal level and adjust ventilation to eliminate drafts.
- Establish a waste management plan that includes details and procedures for waste removal, storage, transport and disposal.

Section A3: Feed and Water

A3.1 Nutrition and Feed Management

Feed resources must be well managed and readily available. Feed rations should be adjusted according to the animals' changing needs, stage of production system, and in accordance with changing environmental conditions. Body condition of sheep need to be monitored regularly. Sheep that are not fed adequately will lose body condition and will not achieve their capacity.

Body condition scoring (BCS) is a tool widely used by livestock producers as an aid to flock management. BCS can be a key tool for on-farm assessment and management of sheep welfare.

Ewe body condition has a major effect on fetal development and lamb survival, as well as ewe milk and colostrum production. Target body condition scores will vary depending upon stage of production. Body condition scoring also allows producers to optimize the utilization of feed resources and animal productivity. Be aware that body condition scores are most applicable to mature sheep and may be of little use for lambs under 6 months of age. See Appendix 8: Body Condition Scoring.

Animal Safety Concern:

Both emaciation and obesity can compromise the health and welfare of the individual sheep as well as the flock. Obesity is a particular welfare concern for pregnant ewes, which may experience reduced appetites and be at risk for developing pregnancy toxemia. Emaciation may result from inadequate feed intake, chronic disease, or teeth problems.

3.1.1 Ensure sheep have sufficient access to feed (including salt and minerals) of adequate quality and quantity to maintain them in good health, fulfill their nutritional and physiological needs and promote a positive state of well-being and vigour. The quality and quantity of feed required will depend on factors such as: age, frame size and body condition, reproductive status, health status, level of production, competition and weather.

3.1.2 Where salt and mineral are supplemented, it must be formulated specifically for sheep and suited to the geographical region.

3.1.3 With the exception of feedlot lambs, sheep must have access to forage.

3.1.4 All sheep kept in confinement must be inspected at least once a day to ensure the availability of feed and water.

3.1.5 Monitor animal performance, behaviour, body condition score and health on an ongoing basis and adjust the feeding program accordingly if the average body condition score of the flock falls below the target for the stage of production. Seek the help of a nutritionist or veterinarian if required.

3.1.6 Take corrective action when the body condition score for individual sheep with a score of less than 2 out of 5 for meat breeds and 1.5 out of 5 for dairy/prolific breeds of sheep. (See Section A4.4 on Sick, Injured or Cull Animals).

3.1.7 Producers must provide alternative feed for winter-grazing sheep that no longer have easy access to forage due to heavy or crusted snow or severe weather conditions.

3.1.8 Particular attention must be paid when feeding a high-energy diet to prevent health problems such as grain overload, bloat or other diseases. Diet changes must be made gradually.

3.1.9 Take all reasonable steps to prevent exposure of sheep to toxins (e.g. weeds toxic to sheep, lead batteries, fertilizer, treated seed, antifreeze, nitrates) and to feed with physical qualities (e.g. awns) that could cause injury or limit intake.

A3.2 Colostrum Consumption

The early nutritional status of lambs has a marked influence on their later productivity. Colostrum is the first milk produced by newly lambed ewes and is characterized by high energy and antibody content. (See Section A5.11 on Pregnancy, Lambing and Neonatal Care for requirements relating to colostrum consumption).

Colostrum intake affects the immediate and future health and welfare of lambs.

A3.3 Artificial Rearing

Neonatal ruminants are not initially capable of digesting starch and sucrose. Lambs that are artificially reared require a milk replacer that is high in milk fat and has good quality milk based protein in the first weeks of life. Lambs being artificially reared need a good quality milk substitute available until they are able to consume sufficient solid feed for their needs. With time and access to a fibrous diet, ruminants develop the ability to digest plant based diets. A lamb creep ration, high quality roughage (e.g. hay) and clean fresh water should be available on a free choice basis by one week of age to promote rumen development.

Lambs weaned early, between 15 and 30 days of age and weighing between 7 and 13.5 kg (15 and 30 lbs.), need specialized care by a competent person aware of extra needs.

Animal Safety Concern:

Artificial rearing of lambs requires a knowledgeable stockperson as improper management of weaned lambs can lead to dehydration, malnutrition and other serious or fatal health issues.

3.3.1 Newborn lambs that are taken from their dams must receive colostrum within six hours of birth. (See Section A5.11 on Pregnancy, Lambing and Neonatal Care).

3.3.2 Milk replacer used must be formulated for lambs.

3.3.3 Artificially reared lambs must receive a volume and quality of milk replacer to promote health, growth and vigour.

3.3.4 Prior to being weaned, lambs must be consuming adequate amounts of clean water and solid feed daily to ensure health, growth and vigour.

A3.4 Water

Consumption of sufficient water is essential for bodily functions and plays an important role in temperature regulation. Level of consumption of water may vary greatly depending on the type and size of the sheep, physical state, health, level of activity, dry matter intake, quality of water, temperature of water, and the environmental temperature. The water intake requirement is affected by the amount needed for body growth, fetal growth or lactation, and that lost in urine, feces, respiration and sweat. As a general rule, voluntary water consumption is 2 or 3 times dry matter consumption and increases with high-protein and salt-containing diets. During the winter, it is important that feed intake is not limited by a lack of water, as there are increased energy needs during periods of cold temperatures.

Water quality is important to sheep. Water quality may adversely affect water consumption and animal health. Lack of water consumption can result in reduced feed intake and interfere with mineral utilization from feed. Sheep are adaptable to a certain amount of variation in water quality and composition given time to adjust to the change.

Watering systems must be suitable for sheep (e.g. placed at appropriate heights and run with appropriate water pressure). Lactating sheep require more water than dry ewes. Dairy sheep require more water than non-dairy flocks to meet their needs. Dairy operations have high water demands (e.g. sanitation, equipment).

Sheep that do not have access to adequate good quality water are at risk of developing serious health issues such as dehydration.

3.4.1 Sheep must have daily access to a source that provides sufficient, clean and palatable water to satisfy their water intake needs.

3.4.2 Watering systems must be suitable for the sheep.

3.4.3 Snow is not an acceptable source of water for wethers, feedlot lambs and lactating ewes.

3.4.4 Snow is acceptable as a sole water source for the breeding flock if:

- **It provides sufficient water each day to satisfy their water intake needs;**
- **The sheep do not show signs of dehydration;**
- **The sheep are gradually acclimated early in the cold season;**
- **The sheep are healthy, non-lactating and maintain a good body condition (e.g. a score of 3 or higher);**
- **Feed intakes remain at levels that promote health and welfare;**
- **The sheep have the physical ability to move to clean snow and eat it;**
- **The snow is not hard packed, trampled or soiled;**
- **All sheep, their environment and snow conditions are monitored daily; and**
- **A back-up water source can be made available without delay, either by moving the sheep to an area with a source of water or by hauling water if the snow source becomes unsuitable because of trampling, soiling or winter thaws etc.**

3.4.5 Ice alone is not an adequate source of water whether outside or in watering devices.

3.4.6 Where hand-watering is employed, producers must provide enough water and sufficient access, to meet consumption demands of all individual sheep.

3.4.7 Producer must ensure all sheep in the flock can easily walk to and access an adequate source of water.

3.4.8 Troughs must be designed and installed in such a way as to ensure young lambs cannot get into them and drown.

3.4.9 Inspect watering devices daily to ensure they are functioning and not frozen.

RECOMMENDATIONS

- Test nutrient content of feed ingredients used and balance rations as necessary; consult a nutritionist for advice.
- Become familiar with potential micronutrient deficiencies or excesses in the geographic area and use appropriately formulated supplements.

- Manage feedstuffs in a way to maintain quality and minimize spoilage.
- Follow proper sanitation procedures for milk feeding equipment and utensils.
- Keep feeders and water containers clean and remove any stale feed or milk. Automatic feeding equipment should be cleaned and sanitized at regular and frequent intervals.
- Use feeding practices that will reduce the risk of abomasal bloat. This includes ad lib feeding of cold fresh milk replacer, use of acidified milk replacer, or other methods as recommended by the flock veterinarian or nutritionist.
- Provide water at all times, especially during lactation.

Section A4: Health Management

A4.1 Relationship of Animal Health to Animal Welfare

Animal health is an important component of animal welfare and can be affected by many factors, including: nutrition, ventilation, biosecurity, housing and management practices. Health issues can affect an animal's well-being and is impacted by pain and discomfort.

Flock health plans, and biosecurity protocols can help prevent and contain diseases. On-farm record keeping relating to health issues serve as tools to help assess animal health and welfare at the flock level, such as rates of disease as well as certain measure of productivity.

On-farm record keeping could include: diagnosis, treatment, drug administration, vaccination, reproductive weights and mortality. Health problems that are caught and dealt with quickly will affect fewer animals and improve overall flock health.

Animal Safety Concern:

Improper management of animal health put the entire flock at risk of life threatening illness and disease.

4.1.1 Keep accurate and detailed animal health records.

A4.2 Stockmanship Skills Related to Animal Health and Welfare

On-farm management practices influence animal health, animal welfare and productivity. Stockmanship skills help producers to:

- Prevent illness, disease and injury;
- Provide early identification of potential health and welfare issues; and
- Reduce stress and accommodate natural behaviour of sheep.

Familiarity with sheep behaviour will ensure workers have a better chance of identifying abnormal behaviour quickly. Health problems that are identified and dealt with quickly will affect fewer animals.

Lack of stockmanship skills can cause undue pain and suffering due to failure to notice health and welfare issues.

4.2.1 All people working with sheep must have access to a copy of the NFACC Code of Practice.

4.2.2 Producers must have the resources for, and knowledge of the basics of care as stated in the NFACC Code of Practice and ensure such care is provided.

4.2.3 Stockpeople must be familiar with, and provide the basics of care as stated in the NFACC Code of Practice.

4.2.4 The stockperson responsible for the monitoring and care of the sheep must be knowledgeable of basic sheep behaviour and common signs of illness and injury.

4.2.5 All producers are responsible for ensuring all stockpeople working with the sheep are trained.

4.2.6 All producers and stockpeople must understand the reporting requirement for reportable diseases and immediately consult the flock veterinarian when suspected cases occur.

4.2.7 Sheep must be monitored at intervals sufficient to ensure well-being in accordance with all sections of the NFACC Code of Practice.

4.2.8 The frequency of inspection will depend on factors that affect sheep welfare at any particular time, such as: housing; lambing; predation; fly-strike; introduction of new sheep; adverse weather conditions; and must be at least daily.

A4.3 Veterinary Care and Flock Management Programs

When establishing and implementing effective flock health plans, veterinarians are an important resource for helping producers. A valid veterinary-client-patient relationship (VCPR) is necessary to familiarize your veterinarian with your flock and management practices so that appropriate animal health decisions can be made in the event that a problem occurs.

Each province regulates veterinarians licensed to practice within that province. Each province requires that veterinarians, when dispensing drugs or making treatment decisions for animal or flock of animals, may only do so within a valid veterinary-client-patient relationship.

Provincial veterinary medical associations have each defined what constitutes a valid VCPR in their own jurisdictions. Please consult with your provincial veterinary medical association and your veterinarian to determine the specific conditions for a VCPR on your farm.

In a VCPR relationship, the producer and veterinarian make decisions on health and welfare outcomes for sheep based on the various aspects of the production system. VCPR helps producers to develop a flock health plan.

A flock health plan should cover the yearly production cycle and will differ depending on the flock size and management system. This plan is best structured around the development and implementation of written protocols and action plans. This plan should be available to all employees, family and all other stockpeople.

A valid VCPR is essential for producers to obtain prescription only drugs.

Suggested elements of an effective plan include:

- A record-keeping system with associated benchmarks and targets;
- A schedule for inspection of stock;
- A pain control strategy;
- Breeding management;
- Nutritional/pasture management;
- Disease prevention and management strategies;
- A risk benefit analysis of painful husbandry procedures;
- A plan for reducing lamb mortality;
- SOPs medical emergencies, culling and euthanasia;
- Managing biosecurity threats (refer to the CFIA National Sheep Producer Biosecurity Planning Guide; available from the Canadian Food Inspection Agency; visit their site: www.inspection.gc.ca);
- An emergency action plan (e.g. for flood, fire, power outage, market breakdown);
- A corrective action plan for key problems;
- Records to allow assessment of flock performance must be maintained as part of a flock; and
- A flock health plan.

Animal Safety Concern:

A veterinarian-client-patient relationship is essential for providing maximum and efficient care in the production system. The absence of a VCPR can compromise preventative and maintenance management practices that directly effect animal health and welfare.

4.3.1 All producers must have a valid veterinary-client-patient relationship (VCPR) with a licensed veterinarian.

A4.4 Sick, Injured or Cull Animals

Everyone responsible for sheep care should be able to recognize both normal behaviour and signs of sickness, injury or disease. Health problems will be identified earlier if stockpeople monitor the flock routinely and not just at feeding time.

When treatment fails or is not advisable, sick, injured or diseased sheep should be culled or euthanized without delay.

A veterinarian should perform any surgeries, as well as first aid, that are not listed in Section A5: Husbandry Practices. If in doubt about the sheep's health or most effective treatment, contact a veterinarian right away.

Keeping records is an important practice for animal health and welfare and food safety. Producers are encouraged to establish a record-keeping system suitable for their farm. The

Food Safe Farm Practices (FSFP) chapter has treatment record-keeping templates available. Records are important for disease prevention, disease surveillance, consistency and continuity of treatment, food safety and traceability, breeding selection and improvements in production.

Animal Safety Concern:

Good flock management can minimize the risk of sickness and injury. In the event of sickness/injury, providing sheep with comfort and appropriate care is a top priority of animal welfare. Pain management and illness action plans should be covered in the flock health plan.

4.4.1 All stockpeople must be knowledgeable of normal sheep behaviour and signs of illness, injury and disease; or work in conjunction with an experienced stockperson.

4.4.2 Stockpeople must not cause, nor allow, unnecessary pain or unnecessary distress by leaving a sheep to suffer.

4.4.3 Sick, injured or diseased sheep must receive prompt treatment and nursing care, or be euthanized immediately. The treatment must be appropriate for the condition. If in doubt about the sheep's health or the most effective treatment, consult a veterinarian without delay.

4.4.4 For sick, injured or diseased sheep that are not responding to treatment, producers must, without delay, obtain veterinary advice on appropriate care and treatment or euthanize the sheep.

4.4.5 Surgeries other than those referenced in Section A5: Husbandry Practices and first aid, must be performed by a licensed veterinarian.

4.4.6 Monitoring of sick, injured or diseased sheep must be appropriate for the condition and at least daily.

4.4.7 Sick, injured or diseased animals must be segregated where it is advantageous for treatment or to limit disease transmission.

A4.5 Fly-Strike

Fly-strike occurs when the eggs of blowflies are laid and hatch in moist or manure-stained wool and the maggots migrate to the skin and begin feeding on the flesh of the live animal. In Canada, there is no approved product to prevent or treat fly-strike; therefore, producers must rely on sound practices to reduce risk. An important skill is identification of fly-strike.

The risk of fly-strike is influenced by weather, management strategies that impact the number of flies, geographical region and individual animal parameters (e.g. wet conditions, dags on hindquarters, footrot, and head wounds in rams).

Common indicators of fly-strike include:

- A small visible damp spot;
- Severe irritation/scratching;
- Biting or rubbing the hindquarters; and
- Difficulty keeping up with the flock.

Animal Safety Concern:

Fly-strike is a serious welfare issue for sheep. The maggots create painful multiple wounds, which, if undetected, can debilitate the animal to the extent that it eventually dies of shock, secondary infections and blood poisoning.

4.5.1 Sheep affected by fly-strike must receive prompt treatment.

4.5.2 Producers must understand the basic biology of the blowflies that cause strikes.

4.5.3 Producers must determine the relative risk of fly-strike based on:

- **Predisposing environmental factors;**
- **Predisposing sheep traits;**
- **Relative risk factors (dags and long tails; wet wool in warm, humid conditions; footrot; open wounds); and**
- **The seasonal presence of blowflies.**

4.5.4 Producers must take steps to reduce the attraction of flies to sheep:

- **Consider the risk of fly-strike in the risk/benefit analysis when deciding to tail dock (See Section A5.7 on Tail Docking);**
- **Preventing diarrhea or treating it quickly if cases do occur and crutching accordingly;**
- **Cleaning and treating wounds quickly; and**
- **Shearing animals before fly season.**

4.5.5 Monitor flock for fly-strike as soon as fly season begins and during prolonged damp and humid weather.

A4.6 Parasite Control

Parasites can be a major issue for sheep flocks in Canada. Preventing and controlling parasites is important for sheep welfare, economic reasons, and welfare of other species. Resistance to treatment needs to be considered when developing parasite control strategies. It is important to work in conjunction with the flock veterinarian to accurately assess the problem and develop specific control and treatment strategies.

Parasites cause a range of welfare problems including disease, emaciation, anemia, irritation and can kill animals if left unchecked.

4.6.1 Producers must understand the basic biology of parasites that affect sheep.

4.6.2 Stockpeople must monitor flock for signs of internal/external parasitism.

4.6.3 Parasite control and treatment strategies must be developed and implemented on-farm; work with the flock veterinarian to develop a control strategy tailored to the farm location and management.

4.6.4 Parasite control and treatment strategies for tapeworms (e.g. *Cysticercus ovis*) in dogs must be developed and implemented on farm.

A4.7 Lameness

Lameness in sheep is a serious condition affecting sheep welfare. Lameness in sheep is usually an indication of pain and suffering. Common causes of lameness in sheep include:

- Footrot;
- Scald;
- Laminitis;
- Foot abscesses;
- Arthritis;
- Joint ill; or
- Injury.

In some of these conditions, hoof trimming may be required. (See Section A5.5 on Hoof Trimming). A locomotion scoring system can be a useful tool to evaluate progress of a lameness reduction strategy (See Appendix 8: Body Condition Scoring).

Animal Safety Concern:

Lame animals have difficulty moving to find food and water, so they quickly lose condition and may be more susceptible to predation.

4.7.1 Producers must monitor flock closely for lame sheep.

4.7.2 Stockpeople must be able to recognize lameness, assess severity and take action to resolve the lameness as quickly as possible.

4.7.3 Producers must avoid maintaining sheep in wet or muddy conditions for long periods of time.

4.7.4 Producers must consult their flock veterinarian regarding appropriate treatment and control strategies, which may include pain control.

4.7.5 Chronically lame sheep must be culled (See Section A6.1.1 on Fitness for Transport), euthanized or under the direct care of a veterinarian.

RECOMMENDATIONS

- Participate in continuing education activities related to animal health and welfare.
- Participate in animal health/surveillance programs.
- Incorporate written best management practice protocols within the flock health and welfare plan.
- Ensure all staff are trained in and apply best management practices.
- Prepare a written health plan for each flock. It should be developed with appropriate veterinary and technical advice and reviewed and updated annually.

- Participate in an established flock health program.
- Keep up-to-date with diseases of livestock and the preventative strategies and remedial treatments available.
- Observe flocks in confinement at least daily, more often during late gestation through early lactation.
- Configure pens and yards to facilitate easy visual inspection of all areas used by the sheep.
- Keep records of disease occurrence and all treatments provided.
- Maintain records of reasons for culling, euthanasia or death on farm to identify trends and reduce on-farm mortalities.
- Be aware of advances in fly-strike control and treatment options.
- Consider implementing a baiting system for specific fly species.
- Include parasite control and treatment strategies in the written flock health plan.
- Cull chronic carriers of infectious conditions.
- Institute a biosecurity protocol that protects against bringing foot diseases onto the farm.
- Monitor lameness by regularly observing and recording locomotion scores on all sheep.
- Consider using locomotion scores when implementing a lameness reduction strategy as a tool to measure progress.

Section A5: Husbandry Practices

A5.1 Handling, Grouping and Moving Animals

Understanding the behaviour of sheep facilitates ease of handling, leading to reduced stress and injury and improved handler safety (See Appendix 11: Understanding Sheep Behaviour). Sheep are handled and subjected to different management procedures for health reasons (e.g. vaccination, drenching, foot bathing) and for production reasons (e.g. shearing and sorting).

The handling environment will affect their responses. Understanding the behaviour of sheep facilitates handling, leading to reduced stress and injury and improved handler safety. Sheep are social animals with very strong flocking and following instincts. These behaviours can be utilized to facilitate handling procedures.

Unfamiliar humans, movement, shouting and proximity to dogs, particularly if barking, can cause fear. Minimizing the fearfulness of sheep when handled can increase handling efficiency, reduce injuries, create a more relaxed flock, and improve performance.

Sheep are capable of learning from one experience and can remember good and bad experiences. Previously learned aversion to a stressful handling procedure might diminish

over time if it is not repeated.

A well-trained dog can save a producer a great deal of effort when herding and moving sheep. If using herding dogs, they must be well trained. Most breeds of herding dogs have strong instincts to stalk and chase livestock. If these instincts have not been properly channeled through training, herding dogs will generally do more harm than good.

Animal Safety Concern:

Minimal amount of restraint possible should be used when handling sheep (e.g. hand restraint under the jaw). Do not lift, drag or pull sheep by the fleece, tail, legs, ears, neck or horns as this can cause pain and bruising. In an open area, a crook can be used to catch a sheep by the neck or leg.

5.1.1 All stockpeople must be competent in sheep handling techniques and have an understanding of sheep behaviour, or be under the direct supervision of an experienced stockperson.

5.1.2 Stockpeople must work calmly and quietly with sheep at all times; this includes minimizing noise (e.g. from people, herding dogs and equipment) as much as possible.

5.1.3 Plan procedures to minimize the frequency, duration and degree of restraint.

5.1.4 Sheep must be handled at all times in such a way as to minimize the risk of pain, injury or distress. For example sheep must not be:

- **Dragged or lifted by the fleece, tail, legs, ears, neck or horns;**
- **Grabbed by the fleece; and**
- **Held on their side or back for more than a few minutes at a time especially if the rumen is full or if they are heavily pregnant.**

5.1.5 Electric prods are ineffective and must not be used on sheep.

5.1.6 Mistreating animals is unacceptable. This includes, but is not limited to: kicking, striking and slamming gates on sheep.

5.1.7 Electro-immobilization must not be used.

5.1.8 Stockpeople using dogs to move sheep must be trained to handle dogs, or be under the supervision of a trained dog handler.

5.1.9 Dogs must be under good command and must not be allowed to force the sheep too fast, nor to continue to force the sheep when they have nowhere to go.

5.1.10 Dogs must not be allowed to nip or bite the sheep.

5.1.11 Dogs must not be allowed to work the sheep without the handler present.

A5.2 Identification

In Canada, all sheep must be identified with an approved identifier before leaving the farm of origin. For more information on the *Canadian Sheep Identification Program* visit www.cansheep.ca. Animal identification is essential to a successful sheep operation; for animal health, on-farm management, food safety, and quality assurance. The most common forms of permanent identification for sheep are ear tagging, notching and tattooing.

There will be some stress associated with catching and handling a sheep for identification, but this is transient. Employing proper hygiene practices and well-maintained, sharp application equipment helps reduce the potential for infections related to identification methods. Proper handling and restraint help minimize the risk of ear damage during application.

Tags must be suitable for the age and breed of sheep. Tags should be inserted at the correct location, avoiding significant blood vessels and ideally not introduced on days when fly activity is high.

Animal Safety Concern:

Lack of proper identification directly affects the control/spread of infectious disease throughout the national flock.

5.2.1 Producers must ensure all materials used to mark sheep for identification purposes are designed for use in sheep or are non-toxic.

5.2.2 Sheep identification must be performed or supervised by a competent stockperson in a way that causes the minimum of handling stress.

5.2.3 Proper restraint that is appropriate for the size of the sheep must be used when tagging, notching or tattooing.

5.2.4 For permanent identification methods, it is important to practice good hygiene because the skin on the ear will be broken. Ensure the applicators, ears and the stockperson's hands are clean and dry before the procedure.

5.2.5 Producers must ensure applicators are sharp and that all related equipment is in good working order and maintained according to the manufacturer's instructions.

5.2.6 When using tags:

- **Use a tag suitable for the age, size and breed of sheep;**
- **Use two tags maximum per ear to avoid interfering with the ear's natural position; and**
- **Ensure the tag is positioned correctly (according to manufacturer's instructions).**

5.2.7 Branding is only an allowable practice if specifically required by export regulations. Where export regulations require branding, choose freeze branding instead of hot iron branding, if allowable. Use pain control, in consultation with your flock veterinarian to mitigate pain associated with branding. Branding must be performed by a competent operator. Branding

must not be done on wet sheep.

5.2.8 Producers must ensure all identification requirements (e.g. Canadian Sheep Identification Program [CSIP], export requirements) are met for all sheep leaving the farm.

A5.3 Predation Control

All classes of sheep are susceptible to predation. There are many management practices that producers can employ to try to reduce the threat of predation to their flock. Check with local or provincial authorities for possible predator control methods suitable for a specific area.

Sheep are vulnerable to predators because they do not have a way of defending themselves from a predator. Their behaviour has evolved to provide attentiveness to predation that makes them fearful of sudden unfamiliar events and can cause them to run away from the predator and as a flock together or scatter. The sheep that are not injured are likely to experience considerable stress from being chased.

Potential methods of predator control include:

- Supervision;
- Predator proof fencing;
- Confinement;
- Moving sheep to a less vulnerable area;
- Repellants;
- Livestock guardian animals; and
- Lethal control.

When predator attacks do happen, producers must deal with the situation promptly and in such a way to minimize pain and suffering for the animal. Predation control strategies should be re-evaluated when a kill occurs to assess if predator control can be improved in any way. Check with municipal and provincial regulations to familiarize with wildlife control regulations.

Animal Safety Concern:

Predation of livestock by wild, feral or domestic animals can have severe consequences on animal welfare, by causing fear, stress, pain or injury. In many cases sheep that have been attacked are not killed, but are left with significant injuries.

5.3.1 Producers must be aware of predation risks in their area and develop and implement a strategy for minimizing the risk of predation.

5.3.2 Producers must provide prompt and appropriate care for sheep that have been attacked by predators. (See Section A4.4 on Sick, Injured or Cull Animals and Section A7: Euthanasia).

A5.4 Shearing and Crutching

Shearing must be done at least annually. Crutching is commonly done prior to lambing. In some situations, additional trimming at other times of the year to prevent fly-strike or wool blindness may be desirable. Shearing may be done using hand operated shears

or powered devices (e.g. electrical).

Shearing must be performed by, or under the direct supervision of a competent shearer, using techniques designed to minimize animal stress. (See Section A5.1 on Handling, Grouping and Moving Animals).

All shearing equipment must be disinfected and clothing freshly laundered between farms at a minimum, and equipment disinfected between animals within a flock if there is known disease transfer risk. Shearing removes the most of the insulation used for protection from bad weather, wind and solar radiation. Wool also protects sheep from biting insects. It is important to consider the time of year, expected weather, local insect seasons, and available shelter when planning shearing.

Animal Safety Concern:

Shearing has been shown to be stressful for sheep; however, a bulky fleece can interfere with the mobility of sheep and predisposes them to casting. It also helps to minimize external parasites, wool blindness and fly-strike. Having too much wool increases the susceptibility of the sheep for overheating.

5.4.1 All wool sheep must be shorn at least annually and as frequently as necessary, to mitigate animal health and welfare concerns.

5.4.2 Shearing must be performed by, or under the direct supervision of a competent shearer using techniques designed to minimize animal stress and injury.

5.4.3 Shearing of pregnant ewes in the last month of gestation must only be done by an experienced shearer.

5.4.4 All shearing related injuries must be attended to promptly and according to the flock health plan.

5.4.5 Farms must have a suitable area that can be set-up for shearing that is adequate in size, clean and well-lit to ensure the well-being of both the sheep and the shearer.

5.4.6 All shearing equipment and clothing that moves between farms with the shearer must be cleaned and disinfected between flocks at a minimum, and disinfected between animals within a flock if there is known disease transfer risk.

5.4.7 When planning shearing, producers must take the time of year, expected weather, local insect season and available shelter into consideration and take steps to prevent the potential negative outcomes associated with shearing (e.g. hypothermia, sunburn, biting insects, health problems)

A5.5 Hoof Trimming

Hoof care is an important aspect of animal management. Hooves should be regularly checked for disease and excess growth. The need for and frequency of hoof trimming

will vary depending on the specific conditions.

Animal Safety Concern:

Hoof trimming is done to eliminate and prevent excessive hoof growth.

Hoof health can affect an animal's performance, disease resistance and welfare.

5.5.1 Hooves must be inspected regularly and trimmed as required to maintain hoof health and sheep well-being.

5.5.2 Hoof trimming must be performed by, or under the supervision of competent personnel, using accepted techniques.

5.5.3 Personnel trimming hooves must have the ability to identify signs of footrot and other diseases.

5.5.4 Trimming equipment must be clean and well-maintained. Equipment must be disinfected between flocks and between sheep within a flock where warranted because of the presence of disease.

A5.6 Castration

Producers should consider carefully whether castration is necessary within any given flock. Castration is unlikely to be necessary where lambs will be finished and sent to slaughter before reaching puberty. When male and female lambs are reared together, measures need to be taken to prevent unwanted pregnancy, in lambs destined for feedlots, or to avoid adverse health effects that evolve from an unwanted pregnancy.

To minimize disruption of the ewe/lamb bond and to avoid disruption of colostrum intake, it is commonly recommended that lambs not be castrated during the first 24 hours after birth. Castration should be carried out as soon as possible after the lamb is 24 hours old.

All methods of castration at any age cause pain. Pain relief reduces the impact of suffering during castration and should be used when and wherever possible. Drugs effective for pain mitigation in food animals are available in Canada but their use in lambs constitutes an extra-label drug use and these drugs must be prescribed and dispensed by a veterinarian. Desensitization of the scrotum and its contents can be achieved by the use of an injectable local anaesthetic and post-operative analgesia can be achieved when a non-steroidal anti-inflammatory drug (NSAID) is administered at the time of the procedure.

Some of the considerations for deciding to castrate are expected age of maturity, ability to separate post pubertal rams from females, and the housing of young rams together, which may increase some risk of disease.

Veterinarians must work with sheep producers to develop practical, safe and effective protocols for reducing pain resulting from castration and these protocols should form part of each farm's flock health plan.

Castration using rubber rings is acutely painful. The pain associated with the use of rubber rings can be mitigated by any or all of the following:

- Combining the use of a rubber ring with a clamp;
- Injecting local anesthesia into the scrotal neck and cord or the testis; and

- Using an analgesic (e.g. non-steroidal anti-inflammatory drugs [NSAID]).

Short scrotum castration, a method where the testes are pushed against the body wall and the ring applied below the testes so the scrotum dies and drops off but the testes survive, is not an acceptable practice in Canada.

Animal Safety Concern:

Rams that are not castrated increase the risk of unwanted pregnancy and aggressive behaviour. If castration is not completed in the appropriate timeline, using a suitable method, sheep run this risk of increased pain and suffering, as well as infection.

5.6.1 The decision to castrate must be based on a welfare risk/benefit analysis rather than as a routine; include the basis for this decision as part of the flock health plan.

5.6.2 Castration must be performed by or under the direct supervision of competent personnel using proper, clean, sanitized and well-maintained tools, and accepted techniques.

5.6.3 Producers must consult with their flock veterinarian who can provide an appropriate pain control protocol for castration.

5.6.4 Producers must monitor for signs of post-operative complications and take appropriate corrective action.

5.6.5 Short scrotum castration must not be practiced.

5.6.6 All castration must meet the method, age range and pain control as decided on, in your flock health plan, as discussed with your veterinarian.

5.6.7 Castration of rams beyond 10 weeks of age must be done by a veterinarian using anesthesia and perioperative analgesia.

A5.7 Tail Docking

Studies have shown that tail docking can reduce the risk of fly-strike in situations where fly-strike is likely to occur. Fly-strike is a risk in most parts of Canada. Docking tails also helps to address food safety concerns, as there is generally a decrease in dag (manure build up) on a docked animal, helping to avoid contact of the meat with bacteria at processing.

There are five main methods for tail docking;

- Hot iron;
- Rubber ring;
- Rubber ring combined with clamp;
- Crush and cut; and
- Surgical method.

The evidence on the relative severity of pain associated with various methods of tail docking is not clear. Some research indicates that these pain responses are not as apparent with the hot iron method as compared to rubber ring, rubber ring and clamp, or surgical method.

Animal Safety Concern:

Tail docking is painful. The decision to tail dock needs to be based on the welfare of the sheep rather than as a routine performed. It is not necessary to tail dock short-tailed breeds and may not be necessary to tail dock breeds with hair (no wool) tails. A contributing factor to the need for tail docking is the lack of access to an approved insecticide with long residual activity to reduce the risk of fly-strike. Pain relief reduces the negative impact of tail docking on an animal's welfare and should be used when and wherever possible.

Tail docking in sheep is done for health and hygiene reasons. Docking a tail too short can lead to more problems than not docking (e.g. increased risk of rectal prolapse and fly-strike). Tails should be docked no shorter than the distal end of the caudal fold, sufficient tail should remain to cover the vulva in ewes and the same length is required in rams.

5.7.1 The decision to tail dock must be based on a welfare risk/benefit analysis rather than as a routine; the basis for this decision should be part of the flock health plan.

5.7.2 Tail docking must be performed by, or under the direct supervision of, competent personnel using proper, clean, sanitized and well-maintained tools, and accepted techniques.

5.7.3 Producers must monitor for signs of post-operative complications and take appropriate corrective action.

5.7.4 Tail docking using a surgical technique (e.g. using a blade alone) must be done by a licensed veterinarian with anesthesia and analgesia.

5.7.5 Tail docking for lambs over six weeks of age must be done by a licensed veterinarian with anesthesia and analgesia.

5.7.6 Rubber rings must not be applied beyond six weeks of age.

5.7.7 Docked tails must cover the vulva in ewes and the equivalent length in rams. Tails must be docked no shorter than the distal end of the caudal fold. (See Appendix 12: Tail Docking).

A5.8 Mulesing

Mulesing has never been, nor is currently a practice used in Canadian sheep production. Regardless, mulesing is not acceptable.

5.8.1 Mulesing must not be performed.

A5.9 Dehorning/Horn Trimming

Dehorning and disbudding are not recommended practices for sheep. Many of the common breeds raised in Canada are polled, so dehorning is not needed in most circumstances.

Consult your veterinarian regarding the choice of an appropriate tool. In certain circumstances, it may be necessary to trim a substantial portion of the horn, or completely dehorn a sheep.

Animal Safety Concern:

A licensed veterinarian must perform such procedures.

For some horned sheep, it may be necessary to trim the tips of the horns to prevent injury from ingrowing horns or interference with sight or normal eating and drinking. The amount of horn trimmed should be kept to a minimum to avoid damage to soft internal horn tissue, which is sensitive and bleeds easily.

5.9.1 Horned sheep, especially rams, must be inspected regularly to ensure that neither the tip, nor any other part of the horn is in contact with the face.

5.9.2 Minor horn trimming (removal of tips) must be performed by, or under the direct supervision of, a competent stockperson.

5.9.3 Consult with a veterinarian regarding concerns about horns on sheep. If disbudding, dehorning or substantial horn trimming (removal of more than just the tip) is necessary; it must be performed by a licensed veterinarian using anesthesia and perioperative analgesia.

A5.10 Breeding

Sheep are seasonal breeders. The length of the breeding season varies by breed, with photoperiod being the most important contributing factor. The natural breeding seasons generally ranges between August and January, but in some breeds may be considerably longer or year-round. Natural breeding, artificial insemination (AI) and embryo transfer (ET) are breeding methods used; with natural breeding being most common in Canada.

The marketing, management, and breeding objectives of the farm will dictate which breeds are best fitting to an individual operation. Breeding records are crucial to support sound breeding decision-making. Identification of individual sheep is important for managing breeding and keeping correct records.

There are conventional production systems, where ewes lamb once a year as well as accelerated lambing systems where ewes are bred inside and outside of the normal breeding season. In their lifetime, ewes may lamb more frequently than once per year. There are several accelerated systems used in Canada, each resulting in a different lambing interval. In accelerated flocks or those breeding out of season to meet specialized market demands, there are increased demands for sound management and labour; therefore, only experienced producers should consider these types of systems.

For more information on breeding, ram management and controlling estrus, see Appendix 13: Lambing and Neonatal Care.

Further reading resources include:

- Sheep Code of Practice (www.nfacc.ca)
- Canadian Sheep Federation's Virtual Toolbox (www.cansheep.ca)
- Ontario Sheep Marketing Agency Production Manual (www.ontariosheep.org)
- Alberta Lamb Producers Production Manuals (www.ablamb.ca)
- Le Centre de référence en agriculture et agroalimentaire du Québec Guide : L'élevage du mouton (www.craaq.qc.ca)

- Centre d'expertise en production ovine du Québec (www.cepoq.com)

There should be a specific breeding exposure so that the pregnant ewe and her subsequent lambing can be properly managed. This will involve removing the ram from the breeding flock once the breeding period is complete.

Animal Safety Concern:

Making responsible mating decisions, considering the ewe and ram genotype, phenotype, and their previous progeny, can help reduce the risk of lambing difficulties due to congenital defects, or dystocia due to large lambs.

5.10.1 Producers must make responsible and informed decisions when selecting breeds and matching rams with ewes, to reduce the risk of lambing difficulties.

5.10.2 Producers need to be aware of the risk of genetic disorders that might be associated with different breeds and genetic lines and take steps to avoid propagation of such abnormalities.

5.10.3 Producers must plan breeding such that appropriate supervision and shelter at lambing will be available.

5.10.4 Producers must carefully consider the knowledge, skills and resources (human and physical) required before using an accelerated lambing system (e.g. breed selection, maintenance of ewe body condition, care of low birth weight lambs and provision of extra supervision and care).

5.10.5 If performed, vasectomies, laparoscopic artificial insemination, and embryo transfer are considered surgical procedures and must be done by a veterinarian.

5.10.6 Electroejaculation is a procedure that must only be performed by a veterinarian.

5.10.7 Rams must be managed taking into account the risk of aggressive behaviour to avoid risk of injury due to fighting.

5.10.8 During the breeding season, producers must increase the frequency of monitoring of rams for injuries, health and lameness.

A5.11 Pregnancy, Lambing and Neonatal Care

Pregnancy

Balanced nutrition, coupled with proper management during gestation is important for fetal development, lamb vigour and survival at birth. Correct nutrition during gestation is essential to prevent nutritional disorders, which may impact the health and performance of the ewe, her lambs and influences milk production of the ewe. (See Section A3: Feed and Water).

Pregnancy diagnosis using ultrasound is a useful tool for managing the nutrition of pregnant

Animal Safety Concern:

ewes to avoid large single lambs or avoid under feeding ewes pregnant with multiples.

Shearing or crutching ewes with long fleece prior to lambing helps to reduce the risk of disease transmission, improves colostrum consumption and facilitates suckling.

Lambing

Responsible planning and breeding management can help reduce the incidence and severity of dystocia. Assistance may be required for ewes experiencing a difficult birth. Knowing when and how to provide assistance during lambing is an important management skill. Signs that an ewe may require lambing assistance include:

- The ewe has been straining for more than 30-40 minutes without progress;
- The water bag is visible and no progress has been made after 30 minutes;
- A limb or tail appears alone and no progress is being made after several minutes of straining;
- The lamb appears to be stuck. There has been no progress for several minutes since the limbs have appeared;
- The head of the fetus is visible with no limbs present;
- If the ewe is weak or exhausted. If lambing indoors, a clean dry area in which to give birth must be provided. (See Section A2: Facilities for further reading resources on lambing facility design); and
- In a pasture setting, ewes should be disturbed as little as possible. All lambing should be supervised so problems can be given prompt attention.

Neonatal Care

The starvation-mismothering-exposure complex is a common cause of death in neonatal lambs. These three causes of death can act independently but often there is some association between them.

Lambs are born with very few body reserves and need the high-energy colostrum soon after they are born. Colostrum contains antibodies to help protect the newborns from various diseases. Lambs that do not receive colostrum will generally not survive. The lambs' ability to absorb colostrum is substantially reduced six to eight hours after birth. The ability of the lamb to defend itself against infectious diseases is directly related to the amount, quality and timing of colostrum intake.

The result of inadequate colostrum intake is a low concentration of circulating immunoglobulin (Ig) in the blood of a lamb, a condition known as 'failure of passive transfer'.

The welfare of both ewes and lambs can be compromised through difficulty at birth, also known as dystocia. The vast majority of lambs are born without incident. However, difficult births can affect the lamb's development in the post-natal period. Lambs may be delayed in performing natural behaviours like raising their heads, standing and suckling. Ewes may delay in performing natural behaviours (e.g. standing, grooming the lamb) following a long labour. The risk of dystocia can be influenced by many factors including: breed (ewe and ram), litter size, birth weight, age of the ewe, nutrition during gestation and sex of lambs (in some breeds).

Newborn lambs are susceptible to hypothermia especially when still wet from the birthing process. Lamb mortality usually results from exposure and starvation. Frostbite is also a risk

in extremely cold conditions, plan to mitigate frostbite risk (e.g. extra shelter and bedding).

5.11.1 During gestation, monitor body condition scores and health on an ongoing basis and adjust the feeding program to maintain suitable body condition scores; seek the help of a nutritionist or veterinarian if required.

5.11.2 Supervise lambing and take timely action as required, while keeping disruption and disturbances to a minimum.

5.11.3 All stockpeople must be able to recognize the signs of lambing difficulty and know when and how to provide appropriate assistance and when to seek assistance from an experienced producer or veterinarian.

5.11.4 All stockpeople who will be involved with caring for sheep affected by vaginal or uterine prolapse must be competent, or be under the direct supervision of an experienced stockperson who is competent with managing these conditions. (See Section A4.4 on Sick, Injured and Cull Animals). Other obstetrical surgeries must be performed by a veterinarian.

5.11.5 Embryotomy must only be performed on dead lambs.

5.11.6 Good hygiene and sanitation must be practiced when lambing assistance is required.

5.11.7 In confinement systems, a clean dry area for lambing must be provided.

5.11.8 Newborn lambs must be monitored for evidence that they have suckled and for signs of starvation, hypothermia and frostbite. Prompt appropriate corrective action must be taken.

5.11.9 Promptly provide newborn lambs that do not nurse voluntarily within 6 hours of birth, with sufficient colostrum to help protect them from disease during their post-natal development. (See Appendix 13: Lambing and Neonatal Care).

5.11.10 All milk replacers used for lambs four weeks of age or younger must have been formulated for lambs.

A5.12 Milking Procedures

As dairy sheep are highly productive, particular attention must be paid to nutrition during pregnancy and lactation (See Section A3.1 on Nutrition and Feed Management). Sheep behaviour in the milking parlour is likely to be influenced by both genetic factors and their previous handling experience.

The milking system, including milking procedures, udder and milker hygiene, and milking system function are essential for the health and welfare of dairy ewes.

Complete sanitation practices reduce the risk of environmental mastitis. Vacuum level, pulsation and milking units are the main components of the milking system. They are closely connected to each other and effect milk ejection. In order to encourage the welfare of the

dairy ewes and optimal functioning of the milking system, these three factors must be well balanced.

Animal Safety Concern:

Milking management is a critical point on dairy sheep farms. Procedures and time allocated to adaptation to milking machines, training to milking parlour and type of milking (e.g. hand or machine milking), can markedly affect the welfare, health and production performance of dairy sheep.

Malfunction of the milking system, due to incorrect installation, lack of maintenance, or improper use, can cause animal stress during milking and mammary gland diseases. Stray voltage in barns can also cause stress for the sheep.

5.12.1 Producers must ensure that milking machines are functioning correctly by carrying out proper maintenance and adjustment of vacuum levels, pulsation rates and ratios, in accordance with the manufacturers' recommendations.

5.12.2 Pens, ramps, milking parlours and milking machines must be suitable for sheep and be inspected and maintained to prevent injury, disease and distress.

5.12.3 To prevent mastitis, proper dairy hygiene must be practiced; before, during and after milking, and must include facilities sanitation.

5.12.4 Milking must be frequent enough to ensure that the ewes are not left with unrelieved, distended udders. Milking should be carried out at least daily.

5.12.5 All stockpeople milking ewes must be competent, or under the direct supervision of a competent milker.

5.12.6 Handling of the ewes must be done in a calm quiet manner to minimize fear.

5.12.7 Stockpeople must develop protocols to train ewes in their first lactation to the system and use patience in their handling.

5.12.8 Ewes under treatment with drugs that require milk withdrawal must continue to be milked regularly.

A5.13 Early Weaning of Dairy Lambs

Animal Safety Concern:

Dairy lambs are either removed from their mothers shortly after colostrum consumption and reared on milk replacer, or are weaned at a later age (usually 30 days).

Lambs that are weaned incorrectly are at risk of dehydration, stress, starvation and other serious health risks.

5.13.1 Early weaned lambs (e.g. around 30 days) must be consuming adequate amounts of clean water and solid feed daily to ensure health,

growth and vigour.

RECOMMENDATIONS

- Use a well-designed, easily operated handling system, designed specifically for sheep, that is appropriate in size and scale to suit the flock numbers.
- Ensure handling facilities and equipment are in place and in good working order.
- Familiarize sheep with the handling facilities to help facilitate willingness of the sheep to enter the handling system.
- Consider positive reinforcement (e.g. feed rewards) to encourage positive response for future handling.
- Take advantage of the natural behaviour to encourage free movement (See Appendix 11: Understanding Sheep Behaviour).
- Employ methods on farm (e.g. gentling) to help sheep become accustomed to the presence of people.
- Minimize isolation of individual sheep.
- Working sheep with dogs can be stressful and should be limited to times where their use is necessary.
- Apply identification at times when fly activity is low.
- Consult with a veterinarian if infection or other problems develop.
- Include a predation control strategy within the flock health plan.
- Use predation control measures appropriately to avoid non-predators being exposed to traps, relaxed cable restraints, snares, etc.
- Consider the feasibility of keeping sheep in areas of lower predation or changing the production system to reduce the risk of predation.
- Recognize the signs of predation and examine dead or injured sheep to identify likely predators.
- Report predation incidents to the appropriate authorities (e.g. provincial agency).
- Consider using a cover comb or comb lifter to leave an insulating layer of wool, if shearing must take place during poor weather conditions or shelter is limited.
- Provide extra feed, shelter and shade for sheep after shearing.
- Take steps to reduce rumen and bladder fill prior to shearing.
- Crutch full-fleece ewes if they cannot be shorn prior to lambing.
- Avoid hoof trimming immediately before shearing to reduce the chance of injury to sheep and shearers.

- Avoid hoof trimming during periods of stress (e.g. late gestation, hot weather).
- Trim hooves when they are soft (e.g. due to heavy dew or rain).
- Leave ram lambs intact in management systems where rams are weaned early, reared separately, marketed prior to puberty and not sold into feedlots.
- Avoid castrating lambs on rainy days in pasture situations.
- Castrating using rubber rings should be performed between 24 hours - 7 days of age.
- Administer pain relieving drugs (anesthetics and/or analgesics) when and where ever possible.
- Ensure tetanus vaccinations for ewe flock are up to date.
- Collaborate with the flock veterinarian to formulate practical, safe and effective protocols for reducing pain resulting from castration and these protocols should form part of each farm's flock health plan.
- Base the decision to tail dock on a welfare risk/benefit analysis rather than doing out of routine; the basis for this decision should be part of the flock health plan.
- Tail dock using rubber rings should be performed between 24 hours - 7 days of age.
- Use the hot iron method when and where ever possible.
- Administer pain-relieving drugs (anesthetics and/or analgesics) when and where ever possible.
- Consider performing tail docking and castration at the same time.
- Scan (ultrasound) females for pregnancy diagnosis at 45-60 days of gestation to better manage pregnant ewes.
- Seek veterinary advice for pain management for obstetrical problems such as dystocia and prolapse.
- Ensure the ewe is capable of producing sufficient, high quality colostrum through management of nutrition and udder health during the final 6 weeks of gestation.
- Ensure all stockpeople can palpate udders and identify ewes that have poor udder health.
- Ensure all stockpeople can identify lambs that have not suckled and early signs of hypothermia. Be prepared to implement corrective actions promptly (e.g. have a warming box, stomach tube and supplemental colostrum readily available, seek expert advice (e.g. veterinary or specialist) on appropriate management procedures to (a) reduce the risk of hypothermia and (b) treat hypothermic lambs (See Appendix 13: Lambing and Neonatal Care).
- Ensure adequate colostrum consumption, either directly from the ewe or by bottle or tube feeding:
    - 50 ml per kg of bodyweight within two hours of birth
    - 200 ml per kg of bodyweight within the first 24 hours

- Seek veterinary advice regarding risks associated with supplemental colostrum.
- Use claiming pens or privacy screens in indoor systems to allow the maternal bond to be firmly established before the ewe and her lambs are mixed with other ewes and their lambs.
- Euthanize lambs with frostbitten feet.
- Keep mortality records to help identify possible causes and solutions. If newborn lamb mortality is high (>10%), set goals to reduce it by conducting post-mortems, reviewing management procedures in consultation with the flock veterinarian and update the flock health plan.
- Develop good milking practices including:
    - High standards of hygiene;
    - Carefully handling teats to avoid injury;
    - Examining the foremilk for signs of ill health;
    - Avoiding excessive stripping;
    - Following a regular routine;
    - Ensure the interior of the milking parlour is free of protrusions or other hazards and that gates and restraining devices of individual holding units operate safely;
    - Keep records of udder health problems and treatment, abnormal milk, and milk production and quality;
    - Include a mastitis control strategy in your flock health plan; and
    - Annual inspection of milking equipment by a qualified person.

Section A6: Transportation

The federal requirements for animal transport are covered under the Health of Animals Regulations (Part XII). The Canadian Food Inspection Agency (CFIA) enforces them with the assistance of other federal, provincial and territorial authorities. Some provinces also have additional regulations related to animal transport. Each person responsible for transporting animals in Canada, or arranging for their transport must ensure that the entire transportation process (including loading, transit and unloading) does not cause injury or suffering to the animals.

The producer is responsible for ensuring animals are fit for transport, selecting the mode of transport, and selecting a carrier that follows Canada's animal transport requirements.

A6.1 Pre-Transport Decision Making – Fitness for Transport

The responsibility for guaranteeing that animals are fit for transport lies with the party that is shipping or loading the animals. To assess fitness for transport, those arranging transport need to be aware of how long the animals may be in transit. If in doubt, assume the longest travel that might occur. Transit time includes intermediate stops, such as auction markets or assembly yards. Those arranging shipping will also need to know whether the transporter needs to provide additional services (e.g. feed, water, rest, milking, etc.) during transit.

Animals that are to be shipped must be deemed fit for transport. You must assess and be sure each animal is fit to withstand the stress of the intended journey. If you are unsure if an animal is fit for the trip, contact your flock veterinarian or the CFIA before preparing the animal for shipping. There are three categories for defining fitness for transport: (a) fit, (b) unfit, and (c) compromised. Appendix 14: Guidelines for Dealing with Compromised Sheep contains tips for determining fitness of an animal for transport.

Animal Safety Concern:

Animals that are unfit to withstand transport are at risk of going down during transport, sustaining injury or even fatality.

6.1.1 The fitness for transport of every animal must be evaluated within the context of each trip. (See Appendix 14: Guidelines for Dealing with Compromised Sheep).

6.1.2 Unfit animals must not be transported, except for veterinary treatment or diagnosis on the advice of a veterinarian.

6.1.3 Compromised animals must not be sent to auction markets or collection yards.

6.1.4 Compromised animals, if transported for slaughter, must go directly to a local abattoir. (See Appendix 14: Guidelines for Dealing with Compromised Sheep).

6.1.5 Sheep with injury or obvious clinical signs of disease must not be sent to auction or other sales.

6.1.6 If it is probable that an animal will give birth during the journey, they must not be transported.

6.1.7 Neonatal lambs unaccompanied by their dam must not be transported off farm until their navel is healed and they reach seven days of age.

6.1.8 Producers must take expected weather conditions into consideration when making shipping arrangements.

A6.2 Arranging Transport

Producers are responsible to ensure that the people they are hiring for transporting animals are trained and competent. Certification with the Canadian Livestock training is recommended. Each person involved in the handling or transporting of sheep should be properly instructed and be skillful in handling sheep. Employers are responsible for ensuring that personnel directly involved with the transport of sheep are adequately trained and knowledgeable of their care.

Animal Safety Concern:

Incompetent transporters are not aware of the heath and welfare needs of sheep during transport.

6.2.1 Producers must be familiar with federal and provincial transport regulations.

6.2.2 Producers must ensure that a competent stockperson oversees loading and unloading.

A6.3 Preparing Sheep for Transport

Management practices focused on meeting the health and welfare needs of the sheep will help ensure animals are fit for transport.

Animal Safety Concern:

Sheep that are not properly prepared for transport can suffer from dehydration, digestive upset, and undue stress.

6.3.1 Sheep must be fed within the five-hour period immediately prior to being loaded unless the expected duration of the animal's confinement on the vehicle is less than 24 hours from the time of loading. (See your provincial transportation regulations).

6.3.2 Sheep must have access to water until time of loading.

6.3.3 Lactating dairy ewes must be milked out immediately before being transported.

6.3.4 Heavily lactating ewes must be dried off before shipping to auction/collection yards unless they have suckling lambs accompanying them, or are intended for a production/replacement sale.

6.3.5 Ensure all departing sheep and lambs are identified with an approved Canadian Sheep Identification Program (CSIP) form of identification.

A6.4 Loading and Unloading

People involved with loading and unloading should have sound knowledge of sheep behaviour and understand how those natural behaviours can be used to assist the loading/unloading process. Properly designed handling systems and loading ramps help to improve the ease of loading.

Loading and unloading can be the most stressful aspects of transport. Any efforts by the shipper and the transporter to reduce stress during these times will improve welfare.

Animal Safety Concern:

If loading and unloading is not performed properly, the chance of stress and injury during loading or unloading is substantially higher.

6.4.1 The requirements for loading and unloading procedures, and equipment are described in your provincial transportation regulations must be complied with.

6.4.2 Sheep must never be handled by grabbing their wool as this causes pain and bruising.

6.4.3 Appropriate methods must be used for moving sheep; electric prods must not be used on sheep.

6.4.4 Producers must confirm that trucks are in good repair, clean and adequately bed.

6.4.5 Producers must evaluate the need for feed and water after unloading animals on farm.

RECOMMENDATIONS:

- Ensure all documentation is completed to avoid unnecessary delays at inspections stations or other checkpoints along the way, or for shipments leaving the province or country.
- Ensure loading areas are uniformly lit, or go from dimmer to brighter lighting but not drastic change; a light in the trailer can help encourage sheep to enter.
- Allow sheep to move at a pace that capitalizes on their strong instinct to follow the leader.
- Load sheep calmly and quietly.
- Consider the appropriate loading densities and the factors that influence densities (e.g. weather, fleece length, length of journey).

Section A7: Euthanasia

7.1 Euthanasia Decision Making

On-farm euthanasia of animals is necessary when medical care to alleviate pain and suffering is not feasible, or there is no reasonable prospect for recovery.

Education, attitude and behaviour can greatly influence the timeliness, effectiveness and humaneness of the euthanasia procedure. Stockpersons that have received comprehensive training that covers all aspects of euthanasia have greater confidence to make timely decisions on when to euthanize an animal and the skills to perform the procedure competently.

Comfort and confidence with making decisions about euthanasia can be improved by developing an on-farm euthanasia action plan (protocol). Euthanasia action plans or protocols for on-farm euthanasia of sheep should be developed in consultation with a veterinarian and include:

- Identification of the person(s) that will be performing euthanasia;
- Euthanasia training;
- Emergency euthanasia in remote locations;
- Criteria to guide euthanasia decisions:
    - Is the animal in pain or distress?

- Is the animal likely to recover?
- Can the sheep be provided with appropriate care that would ensure a full recovery?
- Is the animal showing clinical signs of a reportable disease?

Animal Safety Concern:

Animals that are seriously ill or injured must be euthanized as soon as possible to avoid extensive pain and suffering. Euthanasia must be performed with the correct method to ensure the euthanasia process is effective.

7.1.1 Sheep must be euthanized without delay if experiencing pain or distress and does not have a reasonable expectation of improvement and or appropriate veterinary diagnosis and treatment is not feasible. (See Appendix 7: Examples of Decision Tree for Euthanasia).

7.1.2 All farms with employees must have a written euthanasia action plan for each phase of production that indicates the criteria for deciding when to euthanize an animal and the appropriate method(s). (See Appendix 16: Signs of Sheep in Pain, Appendix 7: Examples of Decision Tree for Euthanasia).

7.1.3 Producers not familiar with euthanasia decision-making and/or methods must consult with a veterinarian regarding euthanasia.

7.1.4 All stockpeople must recognize when an animal needs to be euthanized, what method should be used, appropriate tool and who has been designated to perform euthanasia.

A7.2 Methods of Euthanasia

All methods of euthanasia must be quick, cause minimal stress and pain, and result in a rapid loss of consciousness followed by death without the animal regaining consciousness.

When choosing a method of euthanasia also consider the following:

- Human safety;
- Ability to effectively restrain the sheep;
- Appropriateness for the type of sheep (e.g. animal age, weight or horns);
- Degree of difficulty of the procedure;
- Procedural costs;
- Emotional effects on the operators or observers; and
- Disposal options.

See Appendix 18: Euthanasia.

7.2.1 An acceptable method for euthanizing sheep must be used. (See Table 7.1: Methods of Euthanasia in the NFACC Code of Practice, and Appendix 18: Euthanasia).

7.2.2 The method of euthanasia must be quick, cause minimal stress and pain, and result in rapid loss of consciousness followed by death without the animal regaining consciousness.

7.2.3 Every farm must have the ability to euthanize animals (e.g. readily available tools or access to someone who does).

7.2.4 All individuals performing euthanasia must have the required skills, knowledge, abilities, access to appropriate tools, and be competent to perform the procedure.

7.2.5 All stockpeople must be trained on the Euthanasia Action Plan and associated euthanasia methods. (See Appendix 18: Euthanasia).

7.2.6 All equipment used for euthanasia, such as firearms or captive bolt devices must be maintained according to manufacturer's instructions to ensure proper function.

7.2.7 Unnecessary handling and movement of sheep prior to euthanasia must be avoided. Animals must not be dragged, prodded, forced to move on broken limbs, or made to move when pain and suffering will occur.

A7.3 Confirmation of Death

Death is a process and does not necessarily occur immediately. Acceptable methods either cause immediate death or render the sheep insensible/unconscious, followed by death.

The presence of any eye movement or blinking is evidence of regaining consciousness. If any sign of rhythmic breathing, blinking or coordinated movement is detected, the animal is not unconscious. The method must be repeated immediately.

Animal Safety Concern:

It is essential that sheep being euthanized are rendered unconscious immediately and remain so until dead to avoid unnecessary pain and suffering.

7.3.1 If there are any indications of returning consciousness, the euthanasia procedure or an alternate one must be repeated immediately.

7.3.2 Monitor the animal until death is confirmed by lack of respiration, lack of heartbeat and dilated pupils.

7.3.3 Death must be confirmed before moving, leaving or disposal of the animal.

7.3.4 All carcasses should be disposed of according to all federal/provincial/territorial and municipal regulations.

RECOMMENDATIONS:

- Restrain as necessary for euthanasia; choose the safest and least stressful method of restraint possible.
- Consider, in consultation with a veterinarian, using sedation to help minimize fear.

Section H – Flock Health Plan and Protocol Form

CSF•FCM
Canadian Sheep Federation
Fédération Canadienne du Mouton



Section B – Flock Health Plan

Healthy Sheep Canada

Name: _____ Farm Name: _____

Address: _____ City / Region: _____

Postal Code: _____ Email: _____

Work / Cell Phone: _____ Premise ID: _____

Date Performed: Time Period Included: From: To:

Section A:

Describe your flock management (last 3 years but emphasis on last 12 months if different)

1. Check purpose of flock (☑ all that apply)

☐ Meat production ☐ Dairy production ☐ Wool sales ☐ Breeding stock sales

☐ Show (Purebred / 4H) ☐ Lifestyle (hobby) ☐ Feedlot (no breeding)

2. Breeding management

☐ Annual lambing – only one breeding / lambing group Number of lambing groups: ☐

☐ Annual lambing but more than one breeding / lambing group Number of lambing groups: ☐

☐ Accelerated lambing in which ewes may lamb more than once / yr. Number of lambing groups: ☐

3. Breeds used in the flock including F1 crosses (list)

☐ Breeding ewes _____

☐ Breeding rams _____

☐ Market lambs (if different from above) _____

4. Labour available for flock enterprise (family & hired; 1 FTE = full-time worker) = _____

5. Check type of housing / management style for this flock (confinement = in barn or drylot/corral with access to a shelter)

☐ Total confinement flock – whole flock year round – no grazing allowed

☐ Partial confinement flock – whole flock housed during non-grazing season & pastured during grazing season – adults and lambs

☐ Partial confinement flock – whole flock housed during non-grazing season & adult sheep only pastured during grazing season; lambs not on pasture

☐ No confinement flock – whole flock is on pasture at anytime of the year

6. Equipment available for handling your flock (☑ all that apply)

☐ Weigh scale for adult sheep ☐ Weigh scale for newborn lambs

☐ Chute / run for sheep and older lambs ☐ Sorting gates to use with chute system

☐ Flip cradle ☐ Lamb handling cradle ☐ RFID Reader ☐ Hand-held or built-in data logger

☐ Other: describe _____

7. Do you routinely have your ewes pregnancy checked?

☐ Yes, with fetal counting ☐ Yes, no fetal counting ☐ No

If yes, what method is used?

☐ Ultrasound ☐ Doppler (heart beat) ☐ Other: specify _____

8. Describe your lambing management (☑ all that apply)

☐ Lambs born in confinement only ☐ Lambs born on pasture only

☐ Lambs born both on pasture and in confinement

9. Describe how you rear "orphan" lambs (lambs not able to be reared by the dam)

☐ Fostered ☐ Artificial milk feeding system ☐ Both systems used

10. Describe what replacement breeding stock is obtained (☑ all that apply)

☐ Raise all replacement stock – no purchases OR PURCHASE/BORROW

☐ Ewe-lambs ☐ Ram-lambs ☐ Mature ewes ☐ Mature rams

11. If replacement breeding stock is purchased / borrowed, indicate sources used in last 3 years (☑ all that apply)

☐ Not applicable
☐ A single breeder-closed flock (direct)
☐ Multiple breeders (direct)
☐ Livestock sales facility
☐ Flock of origin of known health – status
☐ Artificial insemination / embryo transfer
☐ A single breeder-open flock (direct)
☐ Breeding stock sale – multiple flocks
☐ Other
☐ Flock of origin – unknown health status

Section B. Flock Veterinarian Information

Name: _____ Clinic Name: _____

Address: _____ City / Region: _____

Postal Code: _____ Email: _____

Clinic Phone: _____ Cell Phone: _____

I, the undersigned agree that I have a valid veterinary-client-patient relationship with the veterinarian named above.

_____ _____

Signature of Flock Owner / Manager Date:

I, the undersigned agree to provide flock health services to this client within the context of a valid veterinary-client-patient relationship.

_____ _____

Signature of Veterinarian as Named Above Date:

The Veterinary-Client-Patient Relationship (VCPR) as outlined by Health Canada:

- "The client (owner or owner's agent of the animal [s]) has given the responsibility of medical care to the veterinarian and has agreed to follow the instructions of the veterinarian, and;
- The veterinarian has assumed the responsibility from the client for making clinical judgment regarding the health of the animal(s), the need for medical treatment, and for ensuring the provision of ongoing medical care for the animal(s), and;
- The veterinarian has sufficient knowledge of the health status of the animal(s) and the care received or to be received. The knowledge has been obtained through a recent examination of the animal(s) and the premises where they are (it is) kept or through a history of medically appropriate and timely examinations and interventions, and;
- The veterinarian is readily available, or has made the necessary arrangements with another veterinarian, for ongoing medical care in case of adverse reactions or therapy failure."

Section C: Flock Health Performance, Goals & Activities

The following section assists the producer to understand current flock performance and to utilize flock health tools based on that performance, flock goals and capacity of the producer to implement flock health programs. Work with your flock veterinarian to prioritize action items.

Calculating Flock Performance: At the top of some management areas, you are requested to fill in some figures from your flock records and then perform simple calculations of flock productivity and health as they occurred in your flock in the last 12 months (or a 12 month period that you select). For this exercise, consider those lambings and lambs raised to weaning that occurred in the time period. Consider only those breedings that resulted in those lambings in that period[1]. These values will be used to discuss flock health needs.

Goal Setting: In consultation with your flock veterinarian, indicate your goal for this flock that you believe is achievable in the next three years. The goal can be identical to flock performance if you are satisfied with flock performance.

Developing a Flock Health Plan: In the left box are suggested tools and actions that may help to improve health and productivity. In the right box, ☑ if a protocol is written to address this health area. (see Flock Health Protocol Form)

Writing Protocols: Some flock health plans may require a written protocol that includes specific instructions on a procedure or activity. The right box can be used for notes and to refer to these protocols developed by the veterinarian and producer.

RED FLAG statements help the producer and veterinarian to prioritize areas for improved flock health.

1. Reproductive Management

Improved reproductive management will assist in getting ewes pregnant when exposed to the ram, having ewes conceive to the first exposure, and improving prolificacy.

RED FLAG: Low pregnancy / lambing rates; long lambing season; low prolificacy.

If you only have a lamb feedlot operation, ignore this section.

	From Your Records Last 12 Months	Your Flock	Your Goal
1.	Number of breeding exposures[2] for ewes that lambed in the last 12 months[3] =		
2.	Number of lambings from those breeding exposures =		
3.	**Proportion of the ewes that lambed (fertility) = (2/1)[4] =**		
4.	Number of lambs born alive and dead from those breeding exposures =		
5.	**Lambs born per breeding (fertility & prolificacy) = (4/1) =**		
6.	**Lambs born per lambing (prolificacy) = (4/2)**		

[1] It is possible that the breedings occurred earlier than the 12 month period selected. For example, if the lambs were born in January, then the breedings occurred 5 months before in the previous year. If the lambs were born in September, then the breedings occurred within the same year.

[2] A breeding exposure is defined as an opportunity for a ewe to be bred by a ram with the expectation that the ewe will become pregnant from that exposure. It includes ewes that did not become pregnant, e.g. if 60 ewes were exposed to the ram and only 50 became pregnant, the number of breeding exposures = 60.

[3] Whenever "the last 12 months" is mentioned, it refers to the time period described in Section 1.

[4] These numbers represent the number of the row. Use the value from that row to calculate the flock performance.

1. Reproductive Management

Ewes • Pre-breeding & breeding nutrition • Body condition score prior to breeding • Synchronization / induction of estrus out of season (e.g. hormones, photoperiod manipulation, ram effect) • Appropriate ram-ewe ratio • Length of breeding exposure • Pregnancy diagnosis	☐ ✓ if protocol for breeding ewes and pregnancy diagnosis
Rams • Pre-breeding & breeding nutrition • Body condition score prior to breeding • Breeding soundness examination • Measure breeding activity (ram harness) • Use of teasers • Management when not breeding	☐ ✓ if protocol for managing your breeding rams

2. Management of the Gestating Ewe

Proper nutrition of the pregnant ewe is critical to both her health and the health of the lambs.

RED FLAG: Increased disease due to pregnancy toxaemia, hypocalcaemia, vaginal prolapse. Birth of small, weak lambs. Inadequate colostrum production.

Nutritional Management of the Ewes • Sort at mid-gestation by BCS • Balance ration (energy, protein, mineral, salt) for level of prolificacy • Free-choice/incorporated premix includes selenium, zinc, cobalt, iodine, vitamin E • Feeder space allowing all pregnant ewes to eat at one time if limit fed	☐ ✓ if protocol for managing nutrition of the gestating ewes
Prevention of Pregnancy Toxaemia • Monitor flock for ketone (BHB) levels • Detect early cases & treat early	☐ ✓ if protocol for preventing & monitoring pregnancy toxaemia
Prevention of Hypocalcaemia • Assure adequate calcium in the diet of late gestation ewes • Avoid transportation, adverse weather or holding off-feed in last month of gestation • Recognize signs of hypocalcaemia & treat promptly	☐ ✓ if protocol to prevent & manage hypocalcaemia in late gestation ewes
Prevention of Vaginal Prolapse (VP) • Proportion of flock that develops VP • Risk factors: quality of forage, feeder design, culling practices of VP ewes	☐ ✓ if protocol for preventing cases of vaginal prolapse

3. Control of Abortion

Abortion is not uncommon in sheep flocks and may be due to infectious causes and possibly nutritional or other management causes. Consider all abortions as zoonotic and a risk to pregnant women, children and the elderly.

RED FLAG: More than 5% of ewes aborted from a breeding group, or if abortions occur in a cluster of time. Consider that an increased proportion of stillborn and weak lambs may be due to abortion diseases.

	From Your Records Last 12 Months	Your Flock	Your Goal
7.	Number of abortions observed from breeding exposures in Number 1 =		
8.	**Abortion proportion = (7/1) =**		

Diagnosis of Abortion • Submit placenta & fetuses to diagnostic lab using flock veterinarian • Isolate ewes that have aborted & cull to slaughter once discharges have stopped	☐ ✓ if protocol for diagnosing abortions that occur in your flock
Control of Abortion • With flock veterinarian – vaccination, feed additives, nutritional improvement • Prevent introduction of high-risk animals from flocks with abortion problems	☐ ✓ if protocol for developing a control program for abortions diagnosed in your flock
Reducing Zoonotic Risk • Assist all births wearing protective gear (e.g. coveralls, gloves) • Isolate aborting ewes; promptly remove all products of birth & compost; burn or bury • Disinfect pens where abortions occurred • Change clothing & wash hands before entering the house or eating • Don't allow pregnant women, children, the sick & elderly into the livestock rearing areas • Promptly report illness to your physician	☐ ✓ if protocol to protect the health of people working with sheep that may be aborting

4. Improving Survival of Lambs

Lamb survival starts with pregnant ewe nutrition but also encompasses lambing management, and care to the lambs after birth.

RED FLAG: Greater than 5% stillborn; greater than 5% die pre-weaning; poor growth; requirement to cross-foster or artificially rear a large proportion of lambs; disease rates in nursing lambs are high; high number of assisted lambings (dystocia).

	From Your Records Last 12 Months	Your Flock	Your Goal
9.	Number of lambs stillborn =		
10.	Number of lambs dying from birth to 10 days of age =		
11.	Number of lambs dying 11 days to weaning =		
12.	Number of lambs weaned =		
13.	**Proportion of lambs stillborn = (9/4) =**		
14.	**Proportion of lambs dying birth to 10 days of age = (10/(4-9)) =**		

	From Your Records Last 12 Months	Your Flock	Your Goal
15.	**Proportion of lambs dying 11 days of age to weaning = (11/(4-9-10) =**		
16.	**Lambs weaned per lambing = (12/2) =**		
17.	Number of lambs dying post-weaning =		
18.	**Proportion of lambs dying post-weaning = (17/12) =**		

4. Improving Survival of Lambs

Pre-Lambing – Pregnant Ewes • Know expected lambing dates & sort • Booster clostridial vaccination 3 weeks prior to first expected lambing date • Feed for stage of gestation and BCS • Housing / environment is appropriate • Supplies for assisting ewes & reviving lambs	☐ ✓ if protocol for preparing your pregnant ewes for lambing
Lambing Management • Assist difficult lambings as appropriate • Assure colostrum intake is adequate (ewe has enough & lambs are able to ingest) • Facilitate ewe-lamb bonding (e.g. claiming pens) • Supplementary colostrum is available if lambs are born weak or ewe has inadequate colostrum • Protection from adverse environmental conditions	☐ ✓ if protocol for managing lambing, adequate colostrum intake in lambs, & ewe-lamb bonding
Lamb Processing • ID lambs soon after birth • Dip navels with appropriate disinfectant • Assure ewe-lamb bonding is secure • Vitamin E selenium injection if not in ration • If necessary, follow tail-docking & castration procedures as indicated in *Code of Practice* • If necessary, treat cases of entropion promptly to prevent pain & blindness	☐ ✓ if protocol for processing neonatal lambs
Management of Chilling / Starvation • Recognition of chilled / starved lambs • Ability to treat & save these lambs • Understanding risk factors & modify lamb management to reduce risk	☐ ✓ if protocol to manage lambs that are mismothered & chilled/starved & prevent new cases
Management of Orphan Lambs • Record reason for ewe's failure to raise lambs • Fostering management • Artificial rearing system: milk replacer, equipment, cleaning protocols • Losses due to abomasal bloat	☐ ✓ if protocol to manage lambs that cannot be raised by their dam, either by fostering or artificial rearing

4. Improving Survival of Lambs	
Investigation of Lamb Deaths • Record all lambs deaths & reason • Perform postmortem & classify time of death & causes	☐ ✓ if protocol to investigate why lambs die
Control of Ewe Mastitis • Stocking density & ewe nutrition to reduce stealing • Clean, dry environment (e.g. bedding) • Eradicate *maedi visna* • Detection of mastitis & treatment • Cull ewes with bad udders	☐ ✓ if protocol to manage ewes & mastitis
Nutritional Management of Lactating Ewes • Sort by nursing lambs & BCS • Balance ration (energy, protein, mineral, salt) • Free choice / incorporated premix includes selenium, zinc, cobalt, iodine, vitamin E • Feeder design allow all ewes to eat requirements	☐ ✓ if protocol to optimize milk production & nutritional health of the ewes
Housing of Ewes & Nursing Lambs • Stocking density (25 sq ft/ ewe-lamb pair) • Bedding type & cleanliness • Available water • Air quality • Ability to clean & disinfect to break infection cycle • On pasture – protection from predators & shelter from adverse weather to reduce chilling	☐ ✓ if protocol to assure that housing contributes to good health
Nutritional Management of Nursing Lambs • Assure ewes are milking & lambs bonded • If confined - creep area & creep available from 2 weeks of age; adequate protein; available free-choice • Access to clean, palatable water from 2 weeks of age	☐ ✓ if protocol to assure that lambs receive adequate nutrition while nursing
Management of Weaning • Ensure lambs are consuming good quality feed prior to weaning • Reduce energy to ewes but not water • Remove ewes from lambs • Monitor ewes for mastitis	☐ ✓ if protocol to make sure that weaning is low-stress to both ewe & lambs

5. Control of Common Infectious Diseases of Lambs

Lambs are at high risk of a variety of infectious diseases.

RED FLAG: Outbreaks of disease in a group of lambs that involves more than 10% of the group.

Septicaemia / Joint Ill • Assure that all lambs receive 5% of body weight in colostrum as soon as born & 20% of body weight in first 24 h of life • Dip navels with an effective disinfectant at birth • Lambing area must be kept clean & dry	☐ ✓ if protocol for assuring adequate colostrum intake & cleanliness at birth
Neonatal Diarrhea • If lambs start to scour, make sure no new lambs are introduced to that environment • Clean & disinfect the lamb housing area • Make sure those that treat the sick lambs, change & wash hands prior to handling other animals	☐ ✓ if protocol for managing an outbreak of diarrhea in nursing lambs
Pneumonia • Assure stocking density is not too high • Assure air quality is good; bedding is deep & dry; and no cold drafts on the lambs • Assure that sick lambs are promptly detected & treated with input from flock veterinarian	☐ ✓ if protocol to prevent pneumonia outbreaks & manage pneumonia cases
Coccidiosis • Assure that environment is kept clean & dry • Prevent feces from contaminating feed & water • Use an anti-coccidial agent in the feed, water or as a drench as recommended by your flock veterinarian	☐ ✓ if protocol to control coccidiosis
Clostridial Diseases (Tetanus, Pulpy Kidney/Enterotoxaemia) • Vaccination program for ewes & lambs that includes giving a primary series at the correct age to lambs (12 & 16 weeks of age) & an annual booster to ewes 3 weeks prior to lambing • Change feed slowly including changes to lush pasture & to increased grain	☐ ✓ if protocol to prevent losses of lambs to pulpy kidney & tetanus

6. Prevention of Nutritional Diseases

Nutritional diseases may be due to an excess of some nutrients, a deficiency or improper feeding management.

RED FLAG: Increased level of diseases related to poor nutritional management and / or ration balancing.

Nutritional Management the Flock • Routine body condition scoring, particularly pre-breeding & mid-gestation • Sort animals & feed based on BCS • Analyze all forages including silages fed to sheep; assure sufficient quality to meet needs • Care taken to assure feeds are safe to feed (e.g. risk of listeria in ensiled feeds, mycotoxins minimized) • Balance ration (energy, protein, mineral, vitamin) based on analysis • Free-choice / incorporated premix includes selenium, zinc, cobalt, iodine, vitamin E • Assure all animals consume needed ration on a daily basis	☐ ✓ if protocol to manage the nutrition of the flock year-round & monitor BCS
Prevention of Vitamin E Selenium Deficiency Diseases • Assure vitamin E & selenium is included in the ration in adequate amounts to all stock on a daily basis	☐ ✓ if protocol to prevent diseases due to inadequate selenium & vitamin E
Prevention of Copper Toxicity • Assure all feeds formulated for sheep with no added copper • Test all forages for copper levels • Assure that rations > 10 ppm DW copper are assessed for risk • Hold back samples of formulated feeds in case of copper toxicity	☐ ✓ if protocol to prevent disease due to excess copper in the diet
Prevention of Grain Overload & Bloat • Make sure grain-containing diets are gradually introduced over several days • Manage the bunk to prevent grain engorgement • Prevent accidental access to grain • Introduce to pastures with legumes (e.g. clover, alfalfa) slowly • Monitor animals	☐ ✓ if protocol to prevent feeding of rations that may result in rumen digestion issues
Prevention of Urinary Stones • Diets fed to male lambs & sheep must be properly balanced for calcium & phosphorus • Fresh, palatable water must always be available • Salt must be always available in the diet • Urinary acidifiers may be used to dissolve stones	☐ ✓ if protocol to prevent urinary stones from developing in feedlot lambs & rams

7. Raising Healthy Market Lambs

Market lambs must be well-grown, clean-fleeced and free of residues from veterinary drugs and pesticides. A variety of diseases may prevent the production of market lambs, some of which are dealt with previously (grain overload, bloat, urinary stones, coccidiosis, pneumonia). Other diseases, issues are covered below.

RED FLAG: Increased level of disease that reduces growth, increases days to market and / or reduces carcass quality.

Indicate class of market lambs produced (☐ all that apply).

☐ up to 64 lbs ☐ 65-79 lb ☐ 80-94 lb ☐ 95-110lb ☐ > 110 lb

	From Your Records Last 12 Months	Your Flock	Your Goal
19.	Class of lamb _____ unadjusted average daily gain (kg/lb) =		
20.	Class of lamb _____ unadjusted average daily gain (kg/lb) =		
21.	Class of lamb _____ unadjusted average daily gain (kg/lb) =		
22.	Class of lamb _____ unadjusted average daily gain (kg/lb) =		

Nutritional Management • Balanced ration including minerals, salt, energy & protein • Free-choice fresh palatable water with adequate watering space • Bunk management to assure feed is fresh (unspoiled) • Assure all animals consume needed ration on a daily basis	☐ ✓ if protocol to manage the nutrition of the market lambs
Prevention of Dog Tapeworm Infection • Do not allow any farm dogs to scavenge sheep carcasses • Cook or freeze sheep carcasses prior to feeding to dogs • Deworming farm dogs (working, pet & guardian) with a drug prescribed by the flock vet that will kill tapeworms (Taenia ovis, Taenia hydatigenia)	☐ ✓ if protocol to prevent tapeworm cysts in the liver or muscle of lamb carcasses

Prevention of Important Lamb Diseases
• See above boxes for:
  • Pneumonia • Coccidiosis
  • Urinary stones • Grain overload
  • Pulpy kidney (enterotoxaemia) & tetanus
	☐ ✓ if protocol to prevent diseases important specifically in your market lambs

Prevention of Drug & Pesticide Residues • Don't use any drug without a published meat withdrawal for lambs intended for slaughter unless with a written & signed veterinary prescription by your flock veterinarian • Maintain good records with accurate ID of treated animals to prevent accidental shipping • Maintain written protocols & train all personnel working with the sheep to follow them	☐ ✓ if protocol to assure that lambs shipped to slaughter contain no drugs or pesticides

7. Raising Healthy Market Lambs

Prevention of Carcass Damage • All injectable treatments & vaccinations to be given in the neck • Record all broken needles • Use sterile needles & syringes • Don't vaccinate if sheep are wet • Muzzle all dogs herding the sheep prior to shipping • Never catch or restrain by grabbing the wool • To reduce risk of fecal contamination of the carcass: keep bedding clean, control diarrhea diseases, shear or crutch wool from perineum in order to reduce fecal dags on the wool	☐ ✓ if protocol to assure no damage to the carcass occur prior to slaughter

8. Raising Healthy Replacements

Replacement ewe lambs and ram lambs should grow well to mature at an optimal age for successful breeding. It is important that they are not over- or under conditioned. A variety of diseases may prevent the growth of replacement lambs, some of which are dealt with previously (grain overload, bloat, urinary stones, coccidiosis, pneumonia). Other diseases, issues are covered below.

RED FLAG: Increased level of disease that reduces growth, increases days to breeding and / or reduced breeding success.

If you do not raise replacement lambs for breeding, ignore this section.

1. Indicate proportion of ewe-lambs born & raised in your flock that you
   a) retain for breeding _____% b) sell for breeding _____%

2. Indicate proportion of ram-lambs born & raised in your flock that you
   a) retain for breeding _____% b) sell for breeding _____%

	From Your Records Last 12 Months	Your Flock	Your Goal
23.	**Ewe Lambs – avg. age to breeding weight (70% of mature) (mo.) =**		
24.	**Ram Lambs – avg. age to breeding weight (70% of mature) (mo.) =**		
25.	**Avg. age of ewe lambs at first lambing (months) =**		
26.	Number of ewe lambs exposed to ram =		
27.	Number of ewe lambs lambing =		
28.	Number of lambs born alive and dead to ewe lambs =		
29.	**Proportion of ewe lambs lambing (fertility) = (27/26) =**		
30.	**Lambs born per ewe-lamb breeding (fertility & prolificacy) = (28/26) =**		
31.	**Lambs born per ewe-lamb lambing (prolificacy) = (28/27) =**		

8. Raising Healthy Replacements	
Nutritional Management • Feed replacement ewe-lambs on a different ration than market lambs after 4 months of age (to prevent overconditioning) • Balanced ration including minerals, salt, energy & protein • Free-choice fresh palatable water with adequate watering space • Bunk management to assure feed is fresh (unspoiled) • Assure all animals consume needed ration daily	☐ ✓ if protocol to manage the nutrition of the replacements to optimize age of puberty & decrease issues with overconditioning females

Prevention of Important Lamb Diseases
• See above boxes for:
  • Pneumonia
  • Coccidiosis
  • Urinary stones
  • Grain overload
	☐ ✓ if protocol to prevent diseases important specifically in your replacement lambs

Clostridial Vaccination • Assure that all replacements are vaccinated twice at 12 & 16 weeks of age • Assure that all replacements are vaccinated again at one year of age or one month prior to lambing, whichever comes first	☐ ✓ if protocol to prevent clostridial diseases in your replacements & in lambs born to those female replacements
Selection of Replacements • Use record of production of ewes & genetic selection programs to select the best replacements based on dam & sire records (e.g. GenOvis) • Maintain good records with accurate animal ID	☐ ✓ if protocol to assure that lambs selected as replacements reflect your breeding goals & improve future flock productivity

Prevention of Adult Diseases
• Some infectious diseases that affect adult productivity, are acquired as lambs:
  • *Maedi visna*
  • Johne's disease
  • *Caseous lymphadenitis*
• See control programs for these diseases below
	☐ ✓ if protocol to reduce the risk that a replacement will acquire an infectious disease from the adult flock

9. Protecting the Flock on Pasture

Pasture grazing reduces the reliance on stored feeds and decreases cost of production. But there are many health issues associated with grazing: internal parasites, foot disease, predators.

RED FLAG: Increased level of disease that reduces growth, death on pasture associated with gastrointestinal nematode parasites. Losses to predators.

If you do not pasture your flock at any time in the year, ignore this section.

1. Estimated number of grazing days for adult flock _____ (days).
2. Estimated number of grazing days for lamb flock (nursing or weaned) _____ (days).
3. Annual losses due to predators:

   a) Number of adults: _____ b) Number of lambs: _____

Lameness • Inspect feet of lame sheep to determine cause of lameness: footrot, foot scald, foot abscess • Fence sheep out of wet, marshy areas including wet & dirty yards to prevent foot scald • If footrot, work with flock veterinarian to develop a treatment & control program using footbaths or systemic antibiotics & pasture management	☐ ✓ if protocol to control & prevent lameness in the flock
Predator Control • When predation losses occur, accurate identification of the problem predator is crucial for successful prevention program. Seek professional help if you cannot ID the problem predator. • Utilize control measures that may involve one or more of the following: guardian animals, fencing, yard at night, targeted removal	☐ ✓ if protocol to reduce losses due to predators
Control of Gastrointestinal Parasitism • Develop a sustainable integrated parasite control program with your flock veterinarian • Components include: evasive grazing & reducing pasture contamination, monitoring for evidence of parasitism, treat animals correctly only when they need it with an appropriate anthelmintic, treat only those animals that need it, investigate treatment failure, prevent introduction of animals infected with resistant parasites	☐ ✓ if protocol to control gastrointestinal parasitism in a sustainable & integrated manner

9. Protecting the Flock on Pasture

Control External Parasites & Fly Strike • External parasites are not present in all flocks. Few pesticides are approved for sheep. Develop a flock health plan with your veterinarian to control biting & sucking lice, chorioptic mange & keds • Green-bottle flies (Lucilia seracata) are attracted to the odour of decaying organic material to lay their eggs (e.g. deadstock, dirty wool, wounds). Reduce the attractants, keep wounds clean, crutch the wool if not shorn, & be alert for animals on pasture acting depressed or irritated	☐ ✓ if protocol to reduce risk from external parasites & fly strike
Reducing Risk of Disease from Pasture Plants • Know if toxic plants are growing in your pasture – identify & either remove the plants, reduce overgrazing of affected pasture, or avoid grazing if necessary • If plants associated with frothy bloat are in the pasture, first feed dry hay before turnout & monitor for signs of bloat. Turn out after dew off grass & leave on pasture.	☐ ✓ if protocol to reduce risk from harmful pasture plants

10. Improving the Longevity of the Adult Flock

The breeding flock should remain productive through reducing the effects of chronic diseases and by selecting the correct animals to cull. Flock turnover should be monitored, not just for turnover rate but also reason.

RED FLAG: Greater than 5% of adult flock dying annually. Greater than 15% of the flock being culled for involuntary reasons. Greater than 10% of the flock dying or needing to be culled due to a disease causing chronic wasting.

If you only have a feedlot operation, ignore this section.

	From Your Records Last 12 Months	Your Flock	Your Goal
32.	Average number of breeding ewes =		
33.	Average number of breeding rams =		
34.	Average total number of adult sheep (32+33) =		
35.	**Number of adults died =**		
36.	**Proportion of adult flock that dies annually (35/34) =**		
37.	Number of adults culled for any reason =		
38.	Number of adults culled for involuntary reasons =		
39.	**Proportion of adult flock that is culled annually (37/34) =**		
40.	**Turnover of flock annually ((35+37)/34) =**		
41.	**Proportion of adult flock lost for involuntary reasons ((35+38)/34) =**		

10. Improving the Longevity of the Adult Flock	
Investigate Adult Sheep Death & Disease • When unexpected illness or death occurs in the adult flock, have a postmortem performed by the flock veterinarian • As advised, perform additional diagnostic testing (e.g. serology, fecal PCR, culture) to detect specific disease pathogens	☐ ✓ if protocol to monitor important diseases that cause death & wasting in your sheep flock
Purchase Only Low-Risk Replacements • Replacement breeding stock may appear healthy but may be carrying infectious pathogens at risk to flock • Only purchase replacements from a vendor who declares the flock's health status, preferably using a flock health program & specific disease testing • Isolate all purchases & test for specific diseases or carryout prophylactic treatments as advised by vet	☐ ✓ if protocol to prevent diseases from being introduced to the flock from new introductions
Recognize Dental Disease • Cull sheep with dental disease to slaughter before weight loss is severe (BCS ≤2) • Recognize when adult sheep lose incisors that will impede their ability to graze (broken mouth) • Recognize when sheep lose a molar or premolar which will prevent proper cud chewing	☐ ✓ if protocol to recognize dental disease & cull affected animals to slaughter before weight loss becomes severe
Eradicate *Maedi Visna* (MV) • Recognize the signs of MV (hard udder, respiratory disease) & test suspect animals (serology or postmortem) • If MV is diagnosed, enroll in an MV status program if available • If not available, perform testing of the adult flock & cull all seropositive animals	☐ ✓ if protocol to eradicate *maedi visna* virus infection
Control Johne's Disease • If an animal with wasting is diagnosed with Johne's disease, consult with flock veterinarian to design a control program • Cull suspect sheep & market their lambs direct to slaughter • Compost all manure & don't spread on pastures or hay fields • Keep lamb rearing environment clean	☐ ✓ if protocol to control Johne's disease

10. Improving the Longevity of the Adult Flock

Control Caseous Lymphadenitis (CL) • Monitor sheep for abscesses & culture those suspected of being CL • If CL diagnosed in the flock, implement a vaccination program based on advice from your flock veterinarian • Isolate affected sheep & treat abscess. • Cull animals with repeated abscesses or weight loss • Instruct the shearer on biosecurity precautions to prevent introduction & spread of CL	☐ ✓ if protocol to lower the incidence of abscesses due to CL
Detect and Eradicate Scrapie • Have the brains of all adult sheep with wasting or neurological disease, tested for scrapie (CFIA) • Enroll in the Canadian Voluntary Scrapie Program to ensure scrapie isn't present in your flock • If scrapie risk in your flock is unknown, an option is to use only 171RR rams in your breeding program	☐ ✓ if protocol to monitor your flock for scrapie

11. Removing Sheep from the Flock Humanely

All sheep should be culled to slaughter when still in good health, (e.g. can be transported without stress and are not a risk to humans if consumed); those not suitable should be euthanized on-farm using a humane method.

RED FLAG: Animals sold to slaughter that are condemned as unsuitable for consumption. Animals suffer during transportation or sales. Animals are allowed to die a slow death on-farm.

Decisions for Culling • Assure that sheep destined for culling are in good health & do not fall into the category of compromised or fallen • Use only licensed livestock transporters • Minimize the distance to transport for adult animals intended for slaughter • Assure no drug or pesticide residues present on the date of transportation • Consult your flock veterinarian if unsure if the animal is suitable for slaughter	☐ ✓ if protocol to assure that animals to be culled are in good health & suitable for slaughter

11. Removing Sheep from the Flock Humanely

Euthanasia Protocols • If an animal is determined to not be suitable for slaughter, or for treatment – then euthanasia must be carried out promptly using a humane method • Animals not to be euthanized must be treated with an effective protocol • Develop protocols for euthanasia following the requirements of the Code of Practice; consult the flock veterinarian where necessary • If captive bolt is to be used, a secondary method must be used to ensure death once the animal is insensible • Equipment used must be in good working order and always available	☐ ✓ if protocol to assure euthanasia is carried out promptly when needed, & to assure no animal dies a painful and slow death

12. Protecting the Flock Using Biosecurity Practices

Biosecurity encompasses those practices that prevent the introduction of diseases to the flock, prevent their spread around the flock, and prevent the release from the flock.

RED FLAG: Disease outbreaks new to your flock, or moving from group to group within the flock, or spread from your flock to other livestock operations.

Develop a Biosecurity Plan • Draw a diagram of your farm & identify all Controlled Access Zones (CAZ) & Restricted Access Zones (RAZ) on your farm(s) • Develop protocols for movement of people & equipment between zones, including changes of protective wear, cleaning & disinfection, signage & barriers (e.g. locked doors) • Develop protocols for movement of animals within & between the zones, including isolation facilities & direction of animal movement • Train all persons working on the farm to follow these protocols	☐ ✓ if protocol to develop a biosecurity plan
Isolate Sick and Diseased Animals • Identify an area of the premise that can house animals with disease, restrict access & prevent spread of disease • Facility should allow an individual sheep to be in visual contact with other sheep; allow proper treatment of the sheep • Facility should allow for proper cleaning & disinfection once the animal(s) leave	☐ ✓ if protocol to have a facility that allows for proper isolation of sick sheep

12. Protecting the Flock Using Biosecurity Practices

Isolate New or Returning Sheep • Identify an area that can accommodate sheep for a period of time before introducing to the flock; this area should fulfill the same requirements as for an isolation facility for sick animals • While in isolation, these sheep can be monitored / tested for disease or treated prophylactically to prevent introduction of disease pathogens	☐ ✓ if protocol to prevent new & returning introductions from introducing disease pathogens
Have a Plan to Manage Deadstock • Deadstock should be promptly removed from animal management areas • Deadstock should be removed from the farm or properly composted or otherwise disposed in such a manner to prevent scavenging & contamination of livestock rearing areas & feed & bedding storage areas	☐ ✓ if protocol to reduce risk from deadstock
Have a Plan to Manage Manure • Manure should be properly composted (minimum of 90 days) before being spread on fields • Manure storage should be adequate for at least 90 days • Runoff from manure piles should be prevented from contaminating livestock rearing areas and feed & bedding storage areas	☐ ✓ if protocol to reduce risk from manure

13. Producing Quality Milk from Healthy Udders (Dairy Sheep)

Dairy ewes are producing milk intended for human consumption. It is very important that the milk be of high quality (e.g. low bacterial counts, low somatic cell counts, free of adulterants such as water, drugs, pesticides, other chemicals, and be of free of obnoxious odours and taste).

RED FLAG: High proportion of ewes treated for clinical mastitis; high level of ewes culled due to mastitis; high flock somatic cell counts and / or bacterial counts; loads rejected because of poor milk quality.

	From Your Records Last 12 Months	Your Flock	Your Goal
42.	Number of dairy ewes milked =		
43.	Number of cases of clinical mastitis treated =		
44.	**Proportion of ewes treated for clinical mastitis = (43/42) =**		
45.	Number of ewes dying due to mastitis =		
46.	**Proportion of ewes dying of mastitis = (45/42) =**		
47.	Number of ewes culled due to mastitis =		
48.	**Proportion of ewes culled due to mastitis = (47/42) =**		
49.	**Average somatic cell count in flock =**		
50.	**Number of shipments with elevated bacterial counts (> 50,000 cfu/ml) =**		
51.	**Number of shipments rejected due to unacceptable milk quality =**		

13. Producing Quality Milk from Healthy Udders (Dairy Sheep)	
Monitor Ewes for Mastitis • Examine milk using a strip cup every milking • Use a California Mastitis Test (CMT) or Somatic Cell Counts (SCC) to screen glands for subclinical mastitis • Culture suspect glands for mastitis using aseptic technique	☐ ✓ if protocol to routinely monitor for evidence of mastitis
Use Good Milking Procedures • Using only milking equipment in good working order; check for evidence of wear and tear & replace as appropriate • Set-up milking equipment using specifications for dairy sheep • Milk only clean & dry, properly prepped udders & teats; use single-service towel to clean; properly stimulate for milk let-down • Wear clean gloves to milk to prevent bacterial transmission • Do not over-milk • Post-milking teat dip properly applied using approved products • Keep ewes standing in a dry environment for at least 30 minutes post-milking	☐ ✓ if protocol to milk ewes properly using equipment in proper working order
Treat Mastitis Properly • All medications administered to a milking dairy sheep must be by veterinary prescription only • Administer intramammary products properly; clean & disinfect the teat end; do not split mastitis tubes • Identify all treated ewes & milk separately until withdrawal period is ended; communicate treatment information to all workers • Administer dry-period mastitis treatment under the guidance of the flock veterinarian • If antibiotic residues are suspected, test the milk using an approved test for inhibitors	☐ ✓ if protocol to properly treat & control mastitis
Eradicate Mastitis Pathogens • Institute a *maedi visna* eradication program; 7 to 12% milk loss if ewe is infected • Identify all ewes carrying *Staphylococcus aureus* infections in the udder; milk last; cull if fail to cure from dry-period treatment • Do not allow lambs with orf to nurse ewes • Cull ewes with incurable mastitis; blind teats or glands	☐ ✓ if protocol to eradicate mastitis pathogens

13. Producing Quality Milk from Healthy Udders (Dairy Sheep)	
Investigate Milk Quality Problems • If bacterial counts are high (> 50,000 cfu), review all cleaning procedures, equipment repair, udder health practices, milk cooling practices • If somatic cell counts are high (> 500,000 cells/mL/milk), investigate subclinical mastitis using CMT or individual SCC + milk culture; work with your flock veterinarian to interpret results • If inhibitors are found, investigate with your flock veterinarian all drug use, withdrawal recommendations & record-keeping	☐ ✓ if protocol to manage milk quality issues

Section I – Self-Assessment Checklists

CSF•FCM
Canadian Sheep Federation
Fédération Canadienne du Mouton



Section I – Self-Assessment Checklist

Records Review	Detail Required (for audit)	Record Required (for audit)	Producer Comments
1. Written protocol for extreme weather provided for both extreme cold and heat.		Protocol Form	
2. Inspection of facilities, equipment including water and feeders.			
3. Flock Health Plan provided.			
4. Proof of dog training for dogs involved in the moving of sheep.	(certificates, proof of training, receipts OR working demonstration		

Self-Assessment Checklists

Environmental Conditions Contingency Plans	**Detail Required (for audit)**	**Record Required (for audit)**	**Producer Comments**
1. For sheep reared on pasture, producers have identified means of providing water during extreme weather. The water source is reasonable proximity to sheep. (1.2.1)			
2. Appropriate shelter and alternative facilities are available in the event of extreme weather (1.2.1, 1.3.1)			
3. Shearing records reflect time of year appropriate to regional seasonal temperatures (1.3.4)	Description or Record of Shearing Protocols		
4. Lambing period records/plan reflects local climatic conditions and available shelter (1.3.3)			

Self-Assessment Checklists

Facilities **Housing and handling for all sheep**	**Detail Required (for audit)**	**Record Required (for audit)**	**Producer Comments**
1. Barriers, pen dividers and other housing and handling are maintained and clean. Free from hazards (sharp edges) (2.1.1)			
2. All applicable equipment including water bowls, troughs, ventilating fans, heating and lighting units, milking machines, fire extinguishers and alarm systems are cleaned and inspected regularly. Written inspection protocol provided (2.1.2)		Protocol Form highlighting inspection routines	
3. Feeding equipment is at a suitable and safe height and design for sheep (2.1.3)			
4. Adequate clean and dry bedding is provided in all buildings used for rearing sheep (2.1.4)			
5. Proper equipment that is in good repair is available for: (2.1.5) • Safe handling • Treatment • Restraint • Segregation • Loading and unloading			
6. Handling area have surfaces that provide good traction (2.1.6)			
7. Does the housing area compare to number of housed animals align with standard? (2.1.10)			
8. Is a permanent sick pen present, that still allows visibility of other sheep? (2.1.11)			
9. Do housed sheep have access to a dry laying area? (2.1.13)			

Self-Assessment Checklists

Facilities (continued) **Housing and handling for all sheep**	**Detail Required (for audit)**	**Record Required (for audit)**	**Producer Comments**
10. Does ammonia level exceed 25ppm (2.2.2)			
11. Sheep have visual contact with other sheep? (2.3.1)			
12. Is sufficient lighting provided to allow inspection of sheep and housing areas? (2.4.2)			
13. Is artificial lighting provided to animals not exposed to sunlight. If animals are under controlled lighting regimes was breeding season light plan provided? (2.4.1)			
14. Is waste storage area positioned to avoid run off into: (2.5.5) - Sheep Housing areas - Feed storage - Water supply			
15. Is milking machinery inspected regularly and functioning properly according to manufacturer recommendations - Vacuum levels - Pulsation rates and ratios		Provide manufacturer recommendations	
16. Pens, ramps, handling and holding facilities for milking machines is inspected regularly and suitable and safe for sheep			

Self-Assessment Checklists

Feed and Water	Detail Required (for audit)	Record Required (for audit)	Producer Comments
1. Is the flock Body Condition Score appropriate in relation to stage of production? (3.1.5)	Nutritional sections of Flock Health Plan		
2. Salt and mineral is presented in a way that is adequate and accessible to all sheep (3.1.2)			
3. Is an adequate amount of forage available? (3.1.3)			
4. Is alternative feed stored and available for sheep that are winter grazing? (3.1.7)			
5. Does fecal consistency resemble that of an energy balanced diet? Is there evidence of bloat within the flock? (3.1.8)			
6. Explanation of process for new born lambs that are taken from dam, that promotes proper health and nutrition (3.3.1) ▪ Colostrum within six hours	Flock Health Plan		
7. Artificially reared lambs are managed appropriately in health, nutrition and water (3.3.3)	Flock Health Plan		
8. Adequate clean, water is provided and accessible (3.3.4, 3.4.1)			
9. Water source is suitable for sheep and prevents lambs from drowning. Inspected daily for proper function (3.4.2, 3.4.8)			
10. Management plan outlines use of snow as a water source, fields and paddock have sufficient snow and water available (3.4.3, 3.4.4, 3.4.5, 3.4.6)			

Self-Assessment Checklists

Health Management	Detail Required (for audit)	Record Required (for audit)	Producer Comments
1. Reportable disease protocols (fact sheets) signed and easily accessed (4.2.6)			
2. Producer is knowledgeable in body condition scoring			
3. Valid veterinary client patient relationship provided, developed within last twelve months (4.3.1)	Provided of veterinarian letterhead with Flock Health Plan		
4. Flock Health Plan Provided and meets requirements (4.3.2) ı Flock health plan is validated by VCPR	Flock Health Plan		
5. *Euthanasia Decision Tree* accessible by all employees (4.4.2, 4.4.3)			
6. Flock appears to be sound, animals presenting Lameness have been treated (4.4.6)			

Self-Assessment Checklists

Husbandry Practices	Detail Required (for audit)	Record Required (for audit)	Producer Comments
1. Dogs used in sheep production appear to be under good control by handler (5.1.9, 5.1.10)			
2. Marking materials are non toxic and suitable for sheep (5.2.1)			
3. Proper restraint is available and appropriate for the size of sheep (5.2.3)			
4. Gloves and disinfectant are present and used during permanent identification (5.2.4)			
5. Identification equipment is in good work order and sharp (5.2.5)			
6. Identification tag is a suitable size and position, application spot is healthy and properly healed (5.2.6)			
7. Where branding is present it has been carried out by a veterinarian or experienced stock person (5.2.7)			
8. All animals appear to be shorn annually (5.4.1)	Shearing Protocol Form		
9. Foot trimming equipment is in clean good working order (5.5.4)			
10. A plan has been provided for castration (5.6.1)		Protocol Form	
11. Mulesing has not been performed (5.8.1)			
12. Breeding plans reflects supervision and shelter available during lambing (5.10.3)	Flock Health Plan		

Self-Assessment Checklists

Husbandry Practices continued	Detail Required (for audit)	Record Required (for audit)	Producer Comments
13. Emergency Lambing Kit is present and contains: - Soap - Disinfectant - Obstetrical lubricant - Sterile syringes 10ml and 1ml - Hypodermic needles of sized suitable for ewe and the lamb - Lambing cords, lambing snare - Clean towels - Sterile pail for warm water - Vet prescribed treatments - Vet emergency contact information			
14. Lambing protocol provided	Flock Health Plan		
15. Signs of lambing difficulty appendices accessible for all employees			
16. A tail docking plan has been provided		Protocol Form	
Transportation			
1. Fitness for transportation decision tree is accessible for all employees (6.1.1)			
2. Producer is knowledgeable in the decision making process to transport (6.1.1)			
3. Waters are present where animals are housed before shipping (6.3.2)			
4. Loading and unloading areas are safe, minimize stress, and appropriate for the movement of sheep (6.4.1)			
5. Trucks and trailers appear to be in good repair, suitable for sheep and clean (6.4.3)			
6. Ramps are appropriate and at a acceptable angle for the safe loading and unloading of sheep			

Self-Assessment Checklists

Euthanasia	Detail Required (for audit)	Record Required (for audit)	Producer Comments
1. Euthanasia Decision Tree is posted and visible for all employees			
2. Emergency Contingency Plan contains action plan for euthanasia			
3. All stock people are knowledgeable of euthanasia decision making and method		Protocol Form	
4. Euthanasia method chart is accessible by all employees			
5. Equipment to humanely euthanize animals is present and in good working order (7.2.3, 7.2.6)			
6. Producers is knowledgeable in the proper disposal of carcasses (7.3.4)			

CANADIAN VERIFIED SHEEP

Biosecurity Chapter

Canadian Verified Sheep Program

CSF•FCM
Canadian Sheep Federation
Fédération Canadienne du Mouton

Table of Contents

CHAPTER 3 – BIOSECURITY

Section J – Biosecurity

CSF•FCM
Canadian Sheep Federation
Fédération Canadienne du Mouton



Welcome

Welcome to the Canadian Verified Sheep Program (CVSP) Biosecurity chapter. This Biosecurity chapter is chaired by the Canadian Sheep Federation. The Program is being implemented to improve the transmission of infectious disease and improve the overall health of the national flock in Canada.

Why is a biosecurity Program necessary?

Biosecurity is important in avoiding production limiting diseases or foreign animal diseases (FADs). In addition to having a positive impact on the prevention of FADs, biosecurity is intended to be proactive in helping to reduce the risks of endemic diseases. These are diseases that commonly occur at some level on farms in Canada, and if they can be reduced, flock productivity and the financial well-being of the industry can be enhanced. Biosecurity practices are also intended to minimize the risk of disease transmission when developing diseases are discovered.

What is the Program based on?

The CVSP Biosecurity chapter is based on the Biosecurity Standard developed by the Canadian Food Inspection Agency.

The Standard provides the framework and scope for biosecurity planning in the sheep sector in Canada, by establishing a minimum set of biosecurity standards that can be used by sheep producers in all producing regions. It is intended to assist sheep producers in developing biosecurity plans for their specific farm operations, to serve as a guide for continuous improvement, and to encourage a higher level of care.

How does the Program work?

Biosecurity applies and is incorporated in various areas of sheep production. Good Production Practices (GPP) in both the Food Safe Farm Practices chapter and Animal Care chapter apply to biosecurity on-farm. Compliance with the biosecurity chapter requires appropriate record keeping, and maintaining an appropriate level of biosecurity protocols on farm.

Are there benefits to the Program?

The benefits of implementing on-farm biosecurity practices are significant. They include:

- More secure financial health for farm workers and for farm service industries such as feed suppliers, processors and veterinarians;
- Protection of human health;
- More secure market access, both local and national;
- Reduced use of veterinary drugs, thereby reducing medical costs and decreasing the risk of antibiotic resistance;
- Improved animal health and welfare; and
- More secure financial health for producers.

All producers participating in this chapter should have a copy of the NFACC *Code of Practice* available and the *National Sheep Producer Biosecurity Planning Guide*, a part of the National Sheep Biosecurity Standard (developed by the Canadian Food Inspection Agency) available on www.inspection.gc.ca.

How do I Implement the Program material?

The CVSP Biosecurity chapter provides you with all the information to comply with the Program. Given this manual you will need to:

- Participate in the training provided online, or in person through your provincial delivery agency;
- Adapt the material to the unique needs of your farm;
- Follow Good Production Practices and record-keeping system on your farm;
- Ensure all workers, and family members are properly trained on the Program; and
- Properly document mistakes when they happen to minimize future occurrences.

The Canadian Verified Sheep Biosecurity Practices Manual

Biosecurity directly affects all areas of sheep production, including animal care and food safety. Many **Must Do** practices and record-keeping practices required in *Chapter 1 Food Safe Farm Practices (FSFP) and Chapter 2: Animal Care (AC)*, are necessary for compliance of the Biosecurity chapter. The Flock Health Plan contains important sections for Biosecurity.

SECTION A – FARM DIAGRAM AND MUST DO PRACTICES

Section A of the Canadian Verified Sheep Biosecurity chapter identifies all the requirements and **Must Do** practices required. As a requirement of the Program, a farm diagram identifying risk areas around your farm must be developed. Section A contains the requirements of the farm diagram. Section A contains all the **Must Do** required for compliance of the Biosecurity chapter and the GPP location.

As a part of the on-farm audit, you are required to provide a farm diagram of your operation that outlines the various risk areas within your management system. The flock health plan contains sections and protocols pertaining to biosecurity and will be reviewed during the on-farm audit.

A1. Animal Health Management Practices

A1.1 Prepare and Use a Flock Health Plan

Producers should have a Flock Health Plan that defines the health goals and management practices for their flocks. A flock health plan, developed with your flock veterinarian will be a key reference for the diseases of concern for each flock.

1.1.1 A program that describes the flock health regimens and practices is used for day-to-day flock management. It is the basis for monitoring flock health and is a key source when considering flock performance. A biosecurity plan is integral to, and supportive of, the flock health plan. (See Chapter 2: Animal Care, Section 4.3.2)

A1.2 Sourcing Sheep

Building a flock, replacing culled or lost sheep, and adding stock to improve the genetics of a flock may require purchasing sheep to be integrated into an existing flock. A written protocol for purchasing sheep and lambs, that takes into consideration diseases specific to the farm, will provide some guidance when evaluating these purchases. Different production categories will need different protocols. Having a list of questions to ask that are specific and relevant to the sourcing route will also help determine risk.

Biosecurity Safety Concerns:

Risks

- Purchased sheep may have a disease(s) that will negatively impact their production and/or growth.
- Purchased sheep may have or may be carrying a disease and transmit it directly or indirectly to your flock.
- Purchased sheep may have been vaccinated or treated in a manner that is incompatible with your flock, and either the acquired sheep or your flock become infected.

See Appendix 1.1: Risk Management Practices on the CFIA Sheep Biosecurity Standard website for more information on managing risk within your farm.

1.2.1 Additions are limited and when necessary, animals are sourced from suppliers with flocks of an unknown health status. As few sources as possible are used. New stock is isolated upon arrival. (See Chapter 1: FSFP, Section 3.1.4, Recommended Practices)

A1.3 Manage Sheep that Leave and Return to Home Farm

A normal part of the industry for many producers is attendance at fairs and shows, or loaning rams for breeding purposes. Show performance may be related to success at selling breeding stock. However, this puts your sheep in environments in which biosecurity may not be

consistent with, or as rigorous as your practices. An off-farm location is much like a part of your farm, and your biosecurity practices ideally need to be replicated during the event.

Loaning or borrowing rams for breeding purposes is a useful way to balance production and progress genetics in a flock. Moving and shifting a ram from one farm to another sheep operation is generally in your control, and therefore can be managed carefully from a biosecurity point of view.

Biosecurity Safety Concerns:

Risks

- Sheep and/or other stock attending the event may have, or may be carrying a disease, and may transmit it directly or indirectly to your sheep. Sheep and/or other stock attending the event may be transported in contaminated vehicles and may introduce pathogens onto the facility.
- Event organizers, judges, people attending the event, etc. may transmit pathogens on their hands, clothing and/or footwear and come into close contact with your sheep.
- Facilities and equipment at the event may not have been cleaned from previous uses and/or may not be cleaned and disinfected during the event.
- The vehicle used to transport your sheep to and/or from the show/fair may not have been cleaned and disinfected before loading your sheep. The vehicle used to transport your sheep may be carrying other sheep and livestock that infect your sheep. The vehicle used to transport your sheep may not be cleaned and disinfected before arriving at your farm and may deposit contaminated material on your loading dock and/or other areas of the farm.
- Returning sheep may be infected with a disease from contact at the event and transmit it to your flock.
- The flock to which the ram is loaned may have or may be carrying a disease and transmits it directly or indirectly to the rams.
- The ewes in the flock to which the ram is loaned may have a sexually-transmitted disease and pass it directly to the ram.
- The flock from which the ram is borrowed may have or may be carrying a disease and the ram transmits it directly or indirectly to the receiving flock. The borrowed ram may have a sexually-transmitted disease and may pass it directly to the bred ewes.
- The returning ram may be infected with a disease from contact at the borrowing farm and transmits it to the home flock. The returning ram may be contaminated with infective material and deposits it in the production area(s) of the home farm.

1.3.1 If sheep are moved off the farm, they have biosecurity practices consistent with their home-farm practices, and upon their return, they are treated as newly-sourced animals. (See Section 3.1.3: Risk Management Practices for sheep leaving and returning to the home farm included on the CFIA website – National Sheep Producer Biosecurity Planning Guide)

A1.4 Isolate Sick Sheep, Flock Additions and Returning Sheep

Direct contact between animals, via aerosols for some diseases and via excretions can be avoided more easily when newly-arrived, returning and sick sheep are isolated from the rest of the flock. Isolating sick sheep or sheep of unknown disease status is very effective in reducing the risk of disease transmission

An isolation area should be available as well as a dedicated pen or enclosure that is separated from movement pathways, and other pens and enclosures and ideally has a separate airspace. Access to the pen is also convenient for workers and veterinarians. Sheep that are isolated in this manner can be observed and treated individually. Separate records can be kept, and when the isolated sheep are confirmed to be recovered from the disease they were suffering, or tested free of disease of concern, or when vaccination and/or treatment has taken effect, the isolated sheep are (re)integrated with the flock.

It is important to note that there are limits to the effectiveness of isolation for sheep, and that isolation protocols need to be disease-specific. Some diseases of sheep will not display visible clinical signs during limited isolation and are not reliably diagnosed by testing.

Biosecurity Safety Concerns:

Risks

- Animals that have been brought to the farm, or brought back from a show or fair, may transmit a disease to the home flock.
- Diseased animals may transmit the disease they are suffering to their flock-mates.
- Pathogens may be transmitted to the main flock on the hands, clothing and/or footwear of farm workers, and others who are required to enter the isolation area(s).
- Visitors may enter the isolation area(s) on purpose or by accident and subsequently transmit pathogens to the rest of the flock.
- Excretions and secretions from diseased sheep and from sheep of unknown disease status in the isolation area may be spread to the main flock area(s) by equipment and tools or by guardian animals, dogs, cats and pests.
- Delay in the removal of deadstock in the isolation area may provide the opportunity for them to be scavenged by guardian animals, dogs, cats and/or predators that may then transmit pathogens to the main flock.

1.4.1 Sheep showing signs of disease are moved into an isolation area away from the healthy flock until the disease has been resolved. Animals brought onto the farm are held in isolation until disease status has been determined or is resolved. (See Chapter 2: Animal Care, Section 4.3.2) (See Section 3.1.4: Risk Management Practices for sick sheep, flock additions and returning sheep included on the CFIA website – National Sheep Producer Biosecurity Planning Guide)

A1.5 Manage Contact with Neighbouring/Other Livestock

Fenced areas can be designed and put to use to avoid direct contact between pastured sheep and other animals on the farm, and between your flock and animals on adjacent farms.

However, most fencing systems will not eliminate contact with all wildlife. Pasture management on the farm: knowing what diseases are common risks among the livestock on a farm (e.g. diseases that can be spread among different livestock – e.g. cattle and sheep), and using both separated pasture areas and scheduling pasturing of sheep and other livestock in the areas, can minimize contact and risk. Use of guardian animals to defend the flock from wildlife that may be present can also help reduce disease transfer risks.

Biosecurity Safety Concerns:

Risks

- You co-pasture your sheep and cattle. When you turn out a group of sheep onto the pasture after a breeding cycle, they could encounter a cow that you have not noticed is suffering from bovine viral diarrhoea (BVD), and one or more of the sheep could become infected.
- Sheep and other livestock on your farm are housed in different areas of the same barn facility. Due to the layout of the barn, the pathways used by all species lead through some of the sheep pen areas, and pathogens may be transmitted to the sheep from manure deposited in the pathways.
- Your farm has single fence lines around all of your pastures, and sheep are sometimes nose-to-nose with sheep or other livestock in the adjacent farm's pasture. Unbeknown to you, the sheep on the adjacent farm may have an infectious disease, to which your sheep are not immune, and it can be transmitted via direct or aerosol means to members of your flock. Other livestock with a disease to which sheep are also susceptible can represent the same potential risk.

1.5.1 Sheep in the home flock are housed, moved and pastured in such a manner that the risk of contact with neighbouring livestock or other livestock on the farm is addressed. (See Section 3.1.5: Risk Management Practices for neighbouring/other livestock included on the CFIA website – National Sheep Producer Biosecurity Planning Guide)

A1.6 Plan Sheep Movement Through Production Unit

Sheep are moved regularly in the production unit. Dairy operations move milking ewes through the milking unit daily from their pens and back; movement to and from working pens; and to and from the pasture are less frequent but are similarly planned and managed. Movement to and from the isolation and lambing pens happens on a less frequent basis, but is important since it involves the movement of potentially diseased sheep and more susceptible lambs.

Using the farm maps/diagrams, decisions can be made about where sheep are potentially at risk when moving and where they represent risk to others; routes can be planned and practices can be put in place to reduce the risks identified. The map or farm diagram will identify where pathways between areas of the farm are used for sheep movement; the diagram of the barn and the main production area will help you identify where pathways run past areas of identified risks.

Biosecurity Safety Concerns:

Risks

- Diseased animals may transmit disease directly to sheep that are passing closely by their pens by direct contact or by aerosol means.

- Susceptible sheep may be exposed to pathogens from feces or other excretions deposited in pathways by diseased or more resistant flock-mate.

1.6.1 Sheep are moved through and within the production unit by pathways that limit their exposure to diseased or potentially infectious animals and materials. Consideration should be given to health status, age and production stage. (See Section 3.1.6: Risk Management Practices for sheep movement through the production unit included on the CFIA website – National Sheep Producer Biosecurity Planning Guide)

A1.7 Implement Sheep Health Protocols for Specific Situations

Some of your regular flock management activities may expose them to risks of disease transmission. These activities include lambing, abortion management, milking, disease testing, vaccination and parasite control. By their nature, some require grouping of sheep in close quarters; some expose individual sheep to specific disease risk; some involve two or more sheep at different stages of development and therefore of different levels of susceptibility; and some produce by-products that themselves present disease risks.

Biosecurity Safety Concerns:

Risks

- Pathogens present in pregnant ewes may be passed to their offspring or to other ewes or lambs during lambing, or may contaminate the lambing site.
- Lambs may not be checked soon enough after lambing and managed early enough for neonatal conditions and the lambs' disease susceptibility is thereby increased.
- Pathogens present in pregnant ewes may be released into the farm environment during abortion and may be transmitted to other animals in the flock directly or via pests, dogs, cats, wildlife or working animals.
- Mastitis severity and spread of contagious mastitis pathogens, or exposure to environmental pathogens, may be increased by lacking or incorrect udder preparation, and care before and after milking.
- Disease testing may be incomplete, leaving some diseased sheep unidentified and untreated and they may then shed disease into the flock.
- Vaccination may not be undertaken for a disease of concern on your farm, and avoidable sickness and production losses may be experienced.
- Treatment for internal and external parasites may not be undertaken on your farm, and avoidable conditions and production losses may result.

1.7.1 Protocols to limit risks of disease transmission are in place for specific production activities, and farm workers understand and employ them. (See Section 3.1.7: Risk Management Practices for sheep health protocols for specific situations included on the CFIA website – National Sheep Producer Biosecurity Planning Guide)

A1.8 Limit Access by Pests, Dogs, Cats, Predators and Wildlife

Pests, dogs, cats and predators may carry diseases or parasites that can directly infect sheep (e.g. parasitism such as toxoplasmosis from cats and some dog tapeworms). They also have the opportunity to encounter infected material and to transport it to and possibly deposit it on your sheep. Infected material may be feces and other secretions, deadstock, placentas and aborted fetuses, and in some cases material picked up from live sheep or other animals, including blood and tissue. The infected material may be deposited directly on your sheep, but is more likely to be distributed in their environment – in feed and water, in bedding and on surfaces within their pens, sheds, etc. In the case of aggressive contact by predators, direct infection with rabies and other specific pathogens is possible.

Biosecurity Safety Concerns:

Risks

- Sheep may be infected by external parasites and/or the intermediate stage of dog tapeworms (e.g. *Cysticercus ovis*).
- Infected material may be transmitted physically to the sheep environment – on feed, bedding and in waterers – either directly or through the pet's/pest's/predator's digestive system.
- Cats with access to the flock may infect sheep with toxoplasmosis.

1.8.1 A pest control program is in place and its required procedures are followed. Dogs and cats are vaccinated, spayed and treated for diseases of concern. Their access to sheep housing areas and to manure, placentas, deadstock and other potential sources of contaminated material is controlled (e.g. reduce risk of infection with toxoplasma or dog tapeworms). A predator control plan is in place. (See Section 3.1.8: Risk Management Practices for access by pests, dogs, cats, predators and wildlife included on the CFIA website – National Sheep Producer Biosecurity Planning Guide)

A1.9 Implement Health Standards for Guardian and Working Animals

All guardian and working animals should be vaccinated against rabies and any other diseases of concern. De-worming with a product that is effective against tapeworms is also an important practice to maintain their health and to protect other animals on the farm.

Biosecurity Safety Concerns:

Risks

- Guardian animals may encounter wildlife that is infected with rabies and become infected themselves, and may transmit it to your sheep.
- Guardian animals may be attracted to a dead sheep or lamb, or to placentas, or abortion materials, and transmit pathogens to your flock.
- Camelids (llamas, alpacas) share some diseases with sheep, and may infect them during close contact or by being housed in common facilities.
- Guardian dogs may ingest tapeworm larvae or other larvae when scavenging deadstock, and these might enable the development and transmission of tapeworms or larvae of different types to your sheep.

Risk Management Practices

Guardian animals should be vaccinated for rabies, and guardian dogs should be treated effectively for tapeworm.

If guardian animals are fed from deadstock, the deadstock should be frozen for a minimum of 14 days or cooked before feeding, to destroy and thereby avoid the transmission of any pathogens, especially *C. ovis*.

1.9.1 Guardian and working animals are vaccinated, dewormed (e.g. tapeworms) and treated for diseases of concern. (See Chapter 2: Animal Care, Section 4.6.4)

A2. Record Keeping

A2.1 Maintain and Review Farm Records

Farm records should include:

- Visitor log;
- Production records;
- Feed records and bedding records;
- Drug records;
- Animal identification;
- Movement records;
- Monitoring/surveillance of disease occurrences and interventions –
  - notes describing observations of clinical signs and the progress of the disease from earliest stages to resolution;
- Vaccination and drugs;
- Veterinary care; and
- Disease-specific programs and control.

Biosecurity Safety Concerns:

Risks

- Health status records may not be available for review with potential purchasers; sales are missed or unnecessary risks are encountered by purchasers in the stock they buy from you.
- Accurate drug treatment records may not be available and may lead to improper drug withdrawal times, and increase the risk of selling animals with drug residues.
- Performance records may not be available to allow you and/or your flock veterinarian to assess ongoing health of individuals and the flock, and to determine the efficacy/ effectiveness of your vaccination, treatment and health programs.
- Disease status may not be recorded, and required biosecurity practices might not be implemented by farm workers or others on the farm.
- Records of zoonotic disease in the flock may not be available to farm workers; they might not take appropriate precautions and contract the disease.

- Sourcing, vaccination, treatment, disease and movement information on an individual animal may not be available in sufficient detail, or in a useable form to assist you and/or your flock veterinarian in health assessment and diagnosis when needed.
- Health issues may not be recorded and not reviewed, and may result in missed or incorrect response and/or treatment by farm workers and/or your veterinarian; disease spreads further into your flock.
- Records of visits and movement of people on the farm may be needed to trace the progress of a disease outbreak and are not available.

2.1.1 Farm records for production, operations animal health and biosecurity are integrated together. Records include goals, analysis of the records to determine current flock status and strategies to reach goals, and are reviewed regularly. Records of health events and diagnostic test results are used both to initiate interventions and initiate a change to the flock health plan, and are important when selling animals to other producers.

A2.2 Record Education and Activities

Farm workers need to be fully capable to carry out their assigned responsibilities in your sheep operation. They also need to be able to identify unusual behaviour and signs of diseases of concern in your animals. Farm workers should also know and be able to carry out all of your biosecurity practices, especially those relating to zoonotic diseases.

Biosecurity Safety Concerns:

Risks

- Workers may not recognize abnormal or disease signs so isolation and/or treatment might not be initiated, leading to the spread of disease and/or deterioration of the animal's condition.
- Workers may not recognize signs of zoonotic disease or might not understand the importance of guarding against such infection, and may contract the disease themselves.
- A worker may be harmed by a disease or contaminant, resulting in pain and suffering for the employee and loss of his/her work on your farm.
- If records cannot be provided to confirm that a worker has been trained in the proper practices to avoid a disease contracted on your farm, costs, possibly including penalties, might accrue to you as the employer (please check the provincial labour laws that apply to your area).

2.2.1 Records of education and training of farm workers are important both for internal farm purposes and to ensure that information potentially required for labour standards is available.

A2.3 Develop a Response Plan for Disease Outbreaks

It is important also that you have a response plan in case a disease outbreak does occur on your farm, on a farm or facility that you have interacted with, or on a farm that is adjacent or in your region. Its purpose is to identify and detail practices that respond specifically

to the subject disease, to increase your defenses from acquiring the disease on your farm if the outbreak is elsewhere in your region, and to ensure that it is contained if it occurs on your farm. It will include trigger points – information, observations and actions taken that will indicate that a response at some level is required.

The response plan will entail improvements to your day-to-day biosecurity practices, such as: more frequent and extensive cleaning/disinfection; more frequent changes of clothing and footwear; and more restrictive visitor policies and access controls. However, some additional activities may be required, possibly including movement restrictions, disease-specific vaccination, and pre-emptive culling.

A list of reportable diseases is available on the CFIA website.
http://www.inspection.gc.ca/animals/terrestrial-animals/biosecurity/standards-and-principles/sheep-on-farm/eng/1368456677456/1368456778304?chap=0

Biosecurity Safety Concerns:

Risks

- A significant change in health status (a disease outbreak) may occur on your farm and because appropriate responses are not known, it might spread throughout your flock and causes widespread suffering and loss.
- A disease outbreak may occur on your farm and because appropriate responses are not known, it might spread to neighbouring farms and farms and facilities elsewhere in the industry, causing suffering and loss.
- A highly-contagious non-reportable disease outbreak may occur on a neighbouring farm or in a farm or facility elsewhere in the industry and because appropriate responses are not known, it might spread to your farm via farm workers, service providers and/or visitors, causing widespread suffering and loss.
- A reportable disease or FAD outbreak might occur on a neighbouring farm or in a farm or facility elsewhere in the industry and because required responses are not known or cannot be executed, it might spread to your farm via farm workers, service providers and/or visitors, causing widespread suffering and loss.
- A recovery plan is not in place, and return-to-business protocols following a disease outbreak may not be carried out in reasonable time, leading to increased financial losses.

2.3 1 A response plan is needed to guide farm activity in rapidly-developing and large-scale changes in health status. Enhanced biosecurity will be required and a recovery plan needs to be prepared (See Section 3.2.3: Risk Management Practices for developing a response plan for disease outbreaks included on the CFIA website – National Sheep Producer Biosecurity Planning Guide)

A3. Farm, Facilities and Equipment

A3.1 Create Diagram of Farm Layout, Identify Risk

The physical layout of the farm will have considerable impact on your ability to house and move sheep in a way that minimizes disease transmission risk. The layout determines where,

and how closely you house animals of different disease status and different disease susceptibility, and how closely animals of these characteristics pass by one another when they are being moved. The concerns being direct (nose-to-nose) transmission, aerosol transmission and contamination with potentially-infective organic matter. There is also a concern for transmission of risk materials from high-risk areas via tools and equipment and people to the pens and enclosure areas. The ease of access by service providers and visitors to sheep held in pens and other enclosed areas also represents an increased risk.

Areas that should be highlighted on the farm diagram as important areas of biosecurity risk include:

- Access points;
- Gates and barriers;
- Visitor parking area(s);
- The barn, other shelters and housing areas;
- Pastures;
- Receiving and storage areas; and
- Shipping area(s); the loading chute, manure and deadstock management areas.

Addressing these risks requires a risk analysis of the locations and pathways, and the animals, people and equipment that use them. A diagram that depicts the layout of the farm, including buildings, pens (general and special-use), pastures and pathways, that allows simulations of housing and movement of sheep of different ages, disease susceptibility and disease status will help you carry out the analysis.

Biosecurity Safety Concerns:

Risks

- Susceptible lambs may be housed adjacent to sheep that have had contact with diseased animals, resulting in the lambs' contracting a disease to which they are not immune.
- Sheep may be housed in a pen that is down-wind from the isolation area; acquired sheep might be being treated for a disease that can be transmitted via an aerosol plume (e.g. Q Fever).
- Regular movement of dairy sheep to the milking room may take them past an isolation area used for sick animals; they are potentially exposed to diseased sheep and to any potentially-contaminated manure and bedding that is left in the area or spilled in the pathway.
- Manure-handling equipment may move directly past the lambing pens due to their location, and the same equipment might be used in the isolation area(s).
- Visitors may be able to walk directly to the lambing pen(s) via the loading chute without encountering a barrier nor a notice of their entry into a high-risk area(s).

3.1.1 A farm diagram is used to assist in the risk assessment, based on the diseases of concern (See Section 3.3.1: Risk Management Practices for creating a diagram of the farm layout and identifing risk areas included on the CFIA website – National Sheep Producer Biosecurity Planning Guide)

A3.2 Clean and Disinfect Facilities, Equipment and Vehicles

Cleaning and disinfection is a routine set of activities in certain areas of the farm for most producers – the milking parlour, the barn entry, and probably the isolation area for sick sheep. Equipment and tools are cleaned and disinfected before and after use in most cases, especially when contamination with excretions and body fluids are involved. On some farms, vehicles have been cleaned and some disinfected when they are scheduled to deliver sheep. Cleaning and disinfection of footwear and hands is also a practice when farm workers and service providers are entering and leaving high-risk areas on many sheep farms, although different standards are applied to certain personnel.

Most disinfection products will specify concentrations of product to be used, exposure times, and effectiveness on specific surfaces and will require drying of the surface before it is put back into service.

Biosecurity Safety Concerns:

Risks

- Healthy animals may be exposed to potentially infectious body fluids, manure and possibly tissue from other sheep and animals that may have come in contact with tools and equipment used by farm workers and service providers on the farm.
- These contaminants may have come from high-risk areas of your farm, or might have been transported to your farm from another location.
- Healthy animals may be exposed to potentially infectious body fluids, manure and possibly tissue from other sheep and animals that have come in contact with surfaces, including waterers and feeders, on your farm.
- Healthy animals may be exposed to potentially infectious body fluids and manure from other sheep and animals that have been transported in vehicles moving your sheep to and from the farm.
- Farm workers, service providers and visitors may move potentially infectious material from area to area around your farm, and may bring such material to your farm, depositing it on your sheep or other livestock and/or in areas they move through.
- Surfaces in your facilities may be constructed from materials that are rough and porous; potentially infectious materials can harbour in the porous materials, may not be effectively eliminated, and may be transmitted to your healthy sheep.

3.2.1 Cleaning and disinfection methods that are effective in reducing the risk of disease transmission are in place and are used for facilities, equipment and vehicles on the farm. (See Section 3.3.2: Risk Management Practices for cleaning and disinfecting facilities, equipment and vehicles included on the CFIA website – National Sheep Producer Biosecurity Planning Guide)

A3.3 Reduce Risk in Barns/Pens

The identification of zones and specific risk areas on the farm will bring attention to certain facilities and services on the farm. Many aspects of farm facilities – building styles and materials, location of entryways, location of pens and the milking room layout, for example –

cannot easily be changed to improve biosecurity risks, unless new construction or renovation for other reasons is planned. However, consideration for the maintenance and use of existing facilities will be an important part of your overall program.

Some production processes can also be adopted that will enable reductions in biosecurity risk, determined by your diseases of concern and your existing facility designs.

Biosecurity Safety Concerns:

Risks

- Construction materials used to enclose the pathway from the milking ewe area(s) to the milking room and the walls in the milking room may be rough and porous, and limit the effectiveness of daily cleaning and disinfection; they therefore may harbour infectious materials that are frequently exposed to the milking sheep.
- The loading area may be adjacent to pathways or pens that are used by long-term and/or more susceptible members of the flock; newly-arrived animals may transmit pathogens to the sheep using these areas before they are moved to isolation or elsewhere on the farm.
- The barn layout and feed storage location may require that feed is distributed to all pens and production areas from one barn access point; movement of feed distribution equipment therefore crosses all production areas and potentially cross-contaminates the pathways.

Risk Management Practices:

Facility Design

Where layout changes cannot be made, other biosecurity principles can be used to reduce risks that remain inherent in your facility:

- sequence of movement of animals with certain attributes,
- more frequent cleaning and disinfection of certain areas (e.g. lambing pens), and
- use of alternate pens, buildings or facilities for certain practices (e.g. isolation area for new introductions).

For the longer term, when remodelling and/or new construction is considered, you can refer to the CFIA *National Sheep Producer Biosecurity Planning Guide* when designing the new facility, and include biosecurity solutions in the location of areas of differing risk and in the pathways between them:

- Designs that provide less opportunity for potentially-contaminated material to remain in pathways and facilities will represent less risk to your sheep.
- Materials that are less porous/open, and materials that are painted/coated to create a smooth and resilient surface, will both resist build-up of organic material that can contain pathogens, and be more easily and successfully cleaned and disinfected.

Management Practices:

In meat operations, a modified all-in/all-out scheduling process can be adopted if facilities permit housing of several groups with common disease risk profiles. This will allow group handling for convenience and efficiency, and reduces concern for commingling among animals from different sources or of different disease susceptibility.

Similarly, sheep of different susceptibility can be sequenced for handling and for common production activities, such as shearing – youngest and most susceptible to older/less susceptible; sick sheep last.

3.3.1 Facility design and management practices reduce specific risks.

A3.4 Reduce Risk from Equipment

In some sheep operations, where size permits and where risk analysis indicates that use of equipment in multiple areas of the farm or for multiple purposes is not advisable, equipment that is dedicated to a purpose or restricted to work performed in one area can be a solution.

For instance, using the same equipment, such as a loader bucket or a barrow, for moving feed and managing manure can introduce a significant risk of feed contamination from the manure. Not cleaning and disinfecting between uses is a major risk.

Equipment that is used on many farms and brought to your operation by service providers also represents a risk of disease transmission. Shearing equipment, hoof trimmers and handling equipment are examples of equipment that could be provided at the farm, and used only with your sheep, thereby avoiding the risk of disease transmission from other sheep operations.

Biosecurity Safety Concerns:

Risks

- Contaminants, such as manure or deadstock residue on buckets or other loading equipment, may be transmitted to feed when the equipment is used for that purpose.
- Nicks from normal shearing activity may become infected by pathogens on shearing equipment brought to your farm by your shearer.
- Pathogens on hoof trimming equipment may be transmitted to your flock by the hoof trimmer in his normal activity.

Risk Management Practices

1. Based on your analysis of the risks presented, you should purchase and use a dedicated set of equipment for use in each of the following areas:

- Isolation areas for sick sheep;
- Isolation areas for new additions; and
- Lambing pens.

2. Based on your analysis of the risks presented, you should purchase and use a dedicated set of equipment to perform each of the following tasks:

- Manure handling;
- Deadstock management;
- Feed management; and
- Bedding management.

3. Your biosecurity plan should include the use and maintenance of this dedicated equipment in practices designated for these areas and activities.

4. If dedicated equipment for specific risk areas or for individual activities/tasks is not feasible in your operation, you should ensure that all equipment and tools are cleaned and disinfected after each use and stored in a clean area.

3.4.1 Equipment can be dedicated for one purpose or dedicated for use in one risk area; equipment can be supplied by the farm for use by contracted service providers.

A3.5 Reduce Risks from Vehicles

Vehicles arriving from off the farm to deliver feed or other goods, to pick-up or deliver sold/acquired animals, to pick-up or deliver manure, and to pick-up deadstock, all represent differing levels of risk to your flock. These vehicles and their drivers/passengers need to move to different areas of your farm to complete their tasks, and may not be adequately prepared for their visit with regard to the potential contaminants they might be carrying, either on the outside of the vehicle, in the load area, in the cab, as well as on any equipment and tools they might bring along.

While having requirements for cleanliness for all of these vehicles and a clear set of routes for each to follow, given their purpose, will be an important part of your farm's biosecurity plan. Enforcing those requirements is sometimes difficult, due to sequence of delivery, time of year, economics and so on. An alternative is to undertake as many of these tasks with your own dedicated vehicle, particularly those with inherently higher risks.

Biosecurity Safety Concerns:

Risks

- The undercarriage of a truck from off your farm may harbour contaminated material from a visit at a previous farm or other facility, and may deposit it in an area of your farm across which sheep are moved when returning from pasture.
- The interior load area of the vehicle might not have been sufficiently cleaned and disinfected after its last use, and contaminated material may be delivered along with the feed that is off-loaded.
- A driver who is not familiar with the zone boundaries and the biosecurity practices on your farm may drive to the loading chute and walk through the barn to the milking parlour looking for direction and may deposit contaminated material along the way.

Risk Management Practices

1. Continue to enforce the core practices for cleaning and disinfection of all vehicles entering your farm, as determined by the risks they represent, and the routes they follow while on your farm.

2. Replace off-farm vehicles by farm-controlled vehicles for high-risk activities such as movement of animals and transport of manure.

3.5.1 Vehicle use patterns determine the relative risk of vehicles; cleaning and disinfection is the principle biosecurity tool for reducing vehicle-related disease risk. Using farm-based vehicles can improve producers' control over vehicle use patterns.

A3.6 Manage Manure

Removal of manure from the production area is an ongoing and normal part of sheep farming. However, if a disease is present in the flock, manure is also a very effective medium for the survival of pathogens and their transmission to other members of the flock.

Equipment that is used to move manure has been discussed in earlier strategies – it should not be used for other purposes, particularly the movement and handling of feed or bedding, and needs to be cleaned and disinfected regularly.

Biosecurity Safety Concerns:

Risks

- Manure that is harbouring pathogens may remain in the production area and comes in contact with healthy sheep, thereby risking disease transmission.
- Manure from potentially-infected sheep, (e.g. in the isolation area or the isolation area for sick sheep), may be spilled during movement in a pathway used by highly susceptible sheep in your flock, or finds its way into their pen(s).
- A bucket on a skid-steer used to move manure may not be (properly) cleaned and disinfected before being used to transport feed from storage to the feeders; potentially disease-carrying material might then be distributed into many of the feeders and be ingested by several flock members.
- Runoff from the manure storage area could flow across a pathway used by sheep returning to the barn from pastures.

3.6.1 Manure is removed regularly and moved in a manner that limits exposure to the sheep. Tools and equipment used for manure handling are not used for feed or bedding and they are cleaned and disinfected between uses. Storage is secure and separated from the production area(s). Distribution is controlled.

A3.7 Manage Feed, Water and Bedding

Sufficient feed of good quality is secured and made available to the flock; standards for feed include freedom from toxins, especially copper, which is a significant concern for sheep health.

Fresh water is provided to the flock sufficient to their needs. Bedding is produced on the farm and/or purchased from off-farm sources. It is stored for use on the farm, facilities for which are determined by local weather conditions and available space.

Biosecurity Safety Concerns:

Risks

- Purchased or grown feeds may not contain sufficient food value for optimum health in your flock.
- Feed may contain naturally-occurring toxins and/or is degraded by toxins that form in storage.
- Feed may lose quality and food value through spoiling due to wet or contaminated storage, and nutritional value received by your sheep is lost.

- Feed may be contaminated by faeces deposited by rodents, wildlife, pests, dogs and cats that are able to enter its storage facility.
- Feed bunks and other feeders may become soiled by manure and other contaminants that are then ingested by healthy sheep.
- Clean water may not be available in sufficient quantity to satisfy the needs of the flock.
- Water bowls, troughs and/or other waterers may become soiled by manure or other contaminants that are then ingested by healthy sheep.

3.7.1 Feed, water and bedding serve to support sheep health and therefore the flock's resistance to disease. Adequate and quality supplies are required, and storage is secure from contamination. (See Section 3.3.7: Risk Management Practices for feed, water and bedding included on the CFIA website – National Sheep Producer Biosecurity Planning Guide)

A3.8 Applying Shearing Protocols

Shearing is usually provided by a specialist who visits your farm on a regular cycle and/or when called. Generally, the shearer brings specialized equipment that is designed to safely and efficiently shear sheep of all ages and conditions on your farm, and works continuously until all of the sheep have been sheared. Some farms have or use a segregated working area in which the shearer can operate; sheep are then brought to the working area for shearing.

As with on-farm shearing, consideration for the order of shearing, and maintaining the cleanliness of the equipment, should any potential disease concerns surface, are ongoing concerns. Nicks and some cuts are normal by-products of shearing, and these minor injuries are fertile sites for development of abscesses and are potential entry points for disease.

Biosecurity Safety Concerns:

Risks

- The shearer's equipment may not have been cleaned/disinfected between uses/flocks and it might transmit pathogens from another flock to your sheep via their nicks and cuts.
- The shearer may have attended several shearing jobs before arriving at your farm and his/her coveralls and boots may be soiled from the previous visits with potentially infectious materials.

Risk Management Practices

1. Sheep should be sheared in order from youngest to oldest, most susceptible to least, and healthiest to least well.
2. Shearing equipment should be cleaned and disinfected between each use, and ideally also between groups of your sheep that are of different disease status and susceptibility.
3. The shearer should change into clean outerwear, wash and disinfect his/her hands, and clean and disinfect his/her footwear before entering your shearing area. Ideally the shearers should repeat these activities between groups of your sheep that are of different disease status and susceptibility.

4. Cuts and nicks should be treated immediately, so that abscesses are minimized.

3.8.1 Order of shearing is important to reduce the risk of disease transmission within the flock; equipment should be cleaned and disinfected between groups when health status is different, and contract shearers should wear clean outerwear and cleaned/disinfected footwear when they enter the premises.

A3.9 Manage Needles and Sharps

Vaccination and treatment with injectables are generally done by producers on their own flocks. While reuse of needles is a high-risk activity, costs and convenience/efficiency lead some producers to reuse needles until they are worn. Disinfection of needles between uses is also not frequently practiced, partly due to the inconvenience of doing so and partly due to the incorrect belief that pathogens and bacteria are all destroyed in injectable products.

Three sections of the Food Safe Farm Practices chapter relate directly to needles and sharps, and they are inserted below for your reference.

Section 1.3.5 "Needles should be removed from bottles before storage to help prevent contamination of the animal health product".

Section 1.4.4 "Check and replace needles before they are dulled or bent. Do not straighten bent needles as they are more likely to break".

Section 1.4.5 "Dispose of all used needles in a puncture resistant sharps container".

Reuse of sharps (e.g. scalpel blades) and needles is a high-risk activity because their surfaces become contaminated with blood and other bodily fluids during use – in the case of needles, on both the inside and the outside. It is practically impossible to successfully clean and disinfect a needle. The risk of reuse is higher if the needle contains blood, has been used to treat a diseased animal, or has sat for any length of time between uses. The risk is lower if needles are used to administer a drug subcutaneously to a series of healthy animals at one time using one product.

Biosecurity Safety Concerns:

Risks

- Needles used for vaccination of all or part of your flock may be reused; it is later discovered that one of your flock is suffering with a disease and may have infected the sheep that were vaccinated after her.
- Reusable injection units used for treatment might be stored in an open area; bacteria that have settled on the unit could contaminate one of the sheep in treatment and an infection could result.
- Reuse of a single-dose injection unit (and needle) could cause the contamination of medication when it is repeatedly reloaded; the contaminated medications can cause abscesses, and *maedi visna* or *caseous lymphadenitis* propagation.
- As sheep are usually considered a meat product, all improper injections, sites or techniques may affect meat quality and value.

Risk Management Practices

1. Ideally, needles are not reused.
2. A new needle should be used to withdraw medications from their bottles.
3. When reusing needles, producers should change needles frequently, before they are dulled or bent.
4. When needles are reused, their use should be limited to a group of sheep that are of identical or of similar disease risk.
5. A needle should not be left in the bottle when finished with a drug.
6. Multi-dose syringes should be disassembled, cleaned and disinfected, and stored in a clean, sterile place.
7. Sharps should be cleaned and disinfected after each use and stored in a clean, sterile place.

3.9.1 Needles and sharps should not be reused; if they are reused, a risk assessment is conducted to evaluate the risk. Reusable needles are available for use in multi dose injection syringes. Proper injection practices are followed and sharps are disposed of appropriately. (See Section 3.3.9: Risk assessment for multiple use of needles included on the CFIA website – National Sheep Producer Biosecurity Planning Guide)

A3.10 Manage Deadstock

Deadstock management includes addressing risks for removing deadstock from the production area, movement on the farm, storage on farm, and eventual disposition.

Deadstock are moved from the production area as soon as they are noticed, and are taken directly to a secure holding area.

Movement to this holding area avoids contact with any sheep in the area surrounding the route. Disposal options are dictated by local regulations, where they exist, and disposal, if on-farm, should ensure that contact between disposed deadstock and the rest of the flock is avoided, either directly, or via pests, wildlife, guardian animals and/or dogs and cats.

Biosecurity Safety Concerns:

Risks

- Deadstock may not be discovered in a timely manner and might therefore be accessible by their flock-mates and by scavengers (e.g. wildlife, dogs, cats, etc.) thus exposing some members of the flock directly or indirectly to a disease.
- Disposal may not be secure from scavengers (e.g. wildlife, dogs, cats, etc.) and other flock members are potentially indirectly exposed to a disease.

Risk Management Practices

1. Offal and other tissue should be treated in the same manner as deadstock.
2. Deadstock should be removed immediately from the production area and from contact with the flock, and with guardian animals (e.g. wildlife, other predators, scavengers, dogs and cats).
3. Equipment used for removal should be dedicated for the purpose, and/or cleaned and disinfected between uses.
4. Disposal methods should adhere to local/provincial regulations.
5. Movement from the pens and other production areas should take the most direct path to the disposal area, and avoid pens and areas in which highly susceptible sheep are kept.
6. The deadstock holding area should be away from the production area and be secured from access by farm animals and predators.
7. If deadstock are to be disposed on-farm, contact with guardian animals, dogs and cats is minimized.
8. If deadstock are to be picked up by a disposal service, they are deposited in a secure holding unit or area away from the active production area.
9. Movement off-site, if contemplated, requires care in accessing the holding area, respecting farm zoning practices, and avoidance of contamination of farm areas upon exit.

3.10.1 Deadstock are removed immediately from livestock rearing areas and moved in a manner that limits cross-contamination with the flock. Placentas, aborted material and other tissue are managed as deadstock. The deadstock holding area is located away from the production area and is secured against dogs, cats and scavengers. Disposal respects local regulations and is done in a manner that limits disease exposure to the flock. (See Chapter 1: FSFP, Section 4.2.3 and Chapter 2: Animal Care, Section 7.3.4)

A4. People

A4.1 Risk Assessments for People Entering the Farm

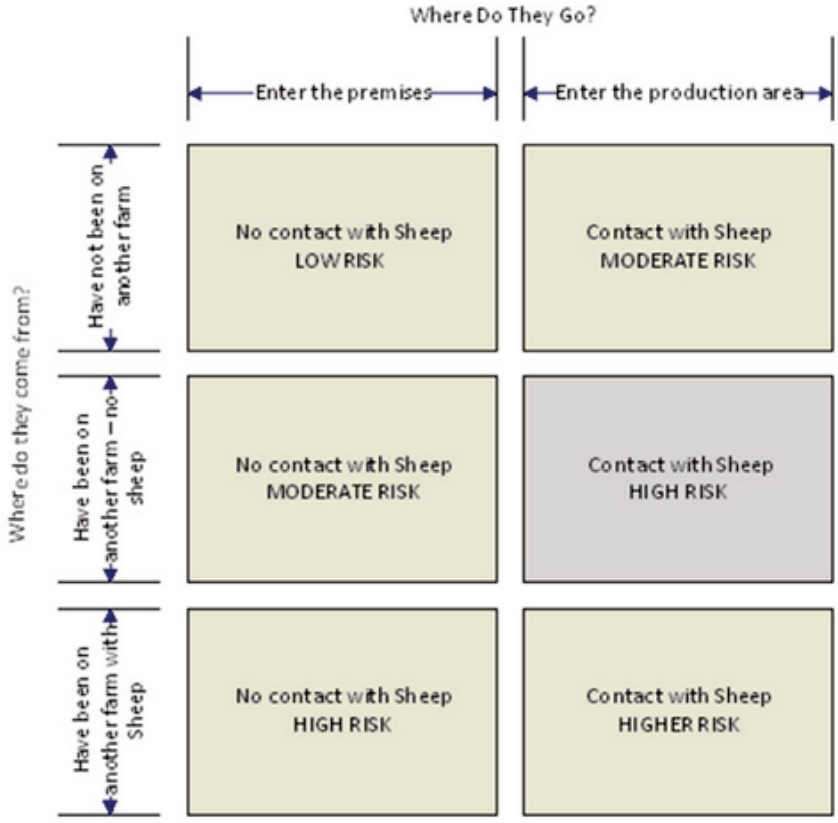
Family and farm workers are most frequently and intensively present on the farm. It is imperative that they clearly know their roles and how to ensure that they do not play a role in transmitting disease on the farm. They also need to be aware of potential zoonotic risks when working with animals and their products. For these reasons, family and farm workers would be considered to operate within the highest risk level, based on the risk assessment approach recommended here. Because of their highly personal and professional involvement in the farm operations, family members and farm workers can also serve as sources of information about farm operations and farm biosecurity practices for service providers and other visitors.

Service providers and visitors also play an important role on your farm. Being able to manage their activities properly and determining what level of biosecurity practices need to be used during their time on your farm can be done objectively, based on a risk assessment model. Essentially, what service-provider personnel and visitors might bring with them when they arrive and what they are here to do, determine the risk they represent to your flock:

- Have they visited other farms before arriving at yours?
- Did they interact with sheep or other similarly susceptible species when there?
- Where do they need to go on your farm? and
- What is the extent of their interaction with your sheep while on your farm?

For more information on managing and assessing risk of people entering your farm, please see the chart below.

Risk Assesment: All people entering the farm



Biosecurity Safety Concerns:

Risks

- Family members may not be familiar with the expression of zoonotic diseases in sheep and could become infected with these zoonoses.
- Farm workers may not be familiar with the required biosecurity practices in some areas of the farm, and are needed to undertake some work in one of those areas.
- Farm workers may not have a clear and logical way to explain your biosecurity requirements to service providers and visitors.

- People may be unaware of or may not understand the risk they represent to the health of your flock and might not believe that following your biosecurity practices is necessary.
- People may enter the Controlled Access Zone (CAZ) or the Restricted Access Zone within a CAZ (RAZ) either accidentally or on purpose and may not follow your required practices.

Risk Management Practices

1. Family members should be intensively trained in all of the biosecurity practices throughout the farm operations, including their extension to off-farm activities.
2. Farm workers should be intensively trained in all of the biosecurity practices throughout the farm operations.
3. A risk assessment should be performed on all types of service providers and visitors, and a record of the risk levels should be entered in a permanent record; a summary of the practices required to be followed by each should be included.
4. The risk assessment summary should be reviewed with your farm workers and they should be encouraged to relate it to service providers and visitors with whom they interact on your farm.
5. The risk assessment structure should be used to demonstrate to service providers and visitors the reasons for using your biosecurity protocols during pre-visit preparations and upon their arrival.

4.1.1 All people entering a farm are subject to a risk assessment.

A4.2 Develop and Enforce Risk Management Practices for all People Visiting the Farm, Using the Risk Assessment Outcomes

Any person planning to enter your farm, especially someone who works in agriculture, may have been exposed to an animal disease, and may inadvertently carry pathogens on their bodies and/or clothing. In addition, the diseases people encounter in other countries or in other regions of Canada may not be prevalent in your region, and therefore your sheep will not have developed resistance naturally, and you may not be familiar with how to treat for them. Their visits may be of important financial and operational benefit to your farm, and so a way to have them safely carry out their visits needs to be available.

Biosecurity Safety Concerns:

Risks

- Visitors and service providers may harbour pathogens on their body or on their clothing and/or footwear.
- Visitors and service providers may transport pathogens on their tools and equipment (cell phones, computers, notebooks, etc.).

Risk Management Practices

1. A full discussion of your biosecurity practices should be undertaken during planning for their visit and all intended visitors should understand and agree to your requirements.

2. If you frequently have visitors to your farm, you should keep current about disease prevalence in your region, in other areas of Canada, and in other countries.

3. For people who are identified to be of high risk, those who have been on a farm recently and who have contacted other animals that are or may be diseased, one or more of the following practices can be used:

   - Wait a minimum period of time before visiting your farm; CFIA currently recommends a period of 5 days for foreign visitors;
   - Shower, clean and disinfect clothing and tools/equipment they need to bring to your farm before their arrival; and
   - Accompany your visitor at all times during their visit, and help them to carry out your required biosecurity practices.

4.2.1 People working on, providing service to or visiting the farm are guided by risk management practices based on the risk assessment.

A4.3 Know What People are on your Premises

Several service providers and visitors might be on your farm on any given day. While the number may not be overwhelming, producers and farm workers are busy and may not always be available to greet them when they arrive and direct them throughout their time on the farm. It is important that all visits are known in advance so that proper biosecurity planning can be done, and unplanned visitors need to participate in a risk assessment and not be permitted to enter the farm before doing so.

Biosecurity Safety Concerns:

Risks

- Visitors might arrive at the farm and not be aware of your biosecurity requirements; they may proceed onto the property, into the production area and through the barn looking for someone with whom they would like to meet, and may not follow any of your required biosecurity practices. Their risk of transmitting pathogens to your farm or flock would not be known.
- Service provider personnel might arrive at your farm without advance notice to perform a service and could proceed to their intended work area without proper cleaning and disinfection having been done.
- People who are on your farm for one purpose might move into another control zone without your knowledge and without following required biosecurity practices.

Risk Management Practices

1. All farm visits should be planned in advance and be sanctioned; a risk assessment should be completed, and you and the service provider or visitor should both understand and agree to the schedule and biosecurity requirements for the visit.

2. Visitors should report themselves to the producer or a farm employee upon arrival. A sign with contact information should be posted at the farm entrance to inform and remind visitors to do so.

3. All farm visitors should be met when they arrive, outside the CAZ, and should record their visit in your visitors' log; they should be instructed about the layout of your farm, where they are permitted to go, and what practices need to be applied in that location(s)

4. The producer and/or the appointed in-charge worker should be made aware of the arrival of all service providers and visitors.

4.3.1 Producers know who is on the farm, where they are, and what their purpose is.

A4.4 Train Farm Workers and Communicate with Them about Biosecurity; Inform all Visitors and Service Providers

Your family members and farm workers should know what is required of them in all circumstances when they are on the farm. They should understand both what to do and why it needs to be done, in order to fully commit to your practices. They should also be confident in explaining your biosecurity requirements to service providers and other visitors on the farm when necessary. Focused training in all of the requirements of your biosecurity plan will be needed when a new biosecurity plan is put in place, and when changes are made to its practices and methods. You need to be sure that they know what to do and can explain it to others.

Biosecurity Safety Concerns:

Risks

- Family members or farm workers may not be certain of the practices that are needed upon entry into or exiting the CAZ and RAZ, and what is required in areas of specific risk, and by their actions may cause the infection of a highly susceptible animal or contaminate an area within the production area.

- Family members and farm workers may not be able to explain your biosecurity practices to service providers and visitors on the farm, who proceed onto the farm without proper compliance with your practices.

Risk Management Practices

1. Regularly scheduled training sessions should be carried out with all family members and farm workers, both in one-on-one and groups sessions and ensure there is an understanding of what is required.

2. Training sessions should be scheduled and carried out whenever a practice is changed or a new practice is added to your biosecurity plan.

3. Family members and farm workers should be monitored during their activities and work on the farm; you should praise and reward good performance; and address and correct any areas of incomplete knowledge and ability.

4.4.1 All farm workers and family members are trained in the farm's biosecurity practices. The farm biosecurity protocol is communicated to visitors and service providers and they comply with it.

A4.5 Recognize Zoonotic Risks

Zoonotic diseases are those which can infect humans. Several diseases of sheep are zoonotic and producers, your family members, service providers and other visitors need to know that they exist and understand the risks they represent. These are in three categories: abortion agents; enteric disease; and orf.

Biosecurity Safety Concerns:

Risks

- Your sheep may be infected with a zoonotic disease, and family members and farm workers could come in contact with pathogens from direct contact with your sheep. Their exposure could come from helping with lambing and managing abortions, and/or from inhaling aerosol forms of the pathogens (e.g. dust, dried manure, vapour).
- Service providers and visitors could be exposed to zoonotic pathogens directly by handling sheep in the course of their planned activities on your farm and also from aerosol sources.

Risk Management Practices

1. Advise all family members and farm workers when a zoonotic disease has been diagnosed in the flock.
2. Advanced biosecurity practices and added cleaning and disinfection should be in place whenever a suspected or confirmed case of a zoonotic disease is present on your farm.
3. In particular, additional hand washing and sanitizing should be practised throughout your farm, and pregnant and potentially-pregnant people should be excluded from the active farm area.
4. You should participate in disease surveillance and management programs to reduce the likelihood of occurrence of zoonotic diseases on your farm, and to reduce their impact if they are present.

4.5.1 Family members, farm workers, visitors and service providers understand zoonotic diseases and take full precautions to protect themselves.

For more information on risk management practices, please visit the CFIA *National Sheep Producer Biosecurity Planning Guide* at: http://www.inspection.gc.ca/animals/terrestrial-animals/biosecurity/standards-and-principles/sheep-on-farm/eng/1368456677456/1368456778304?chap=0

Glossary

Animal Health Product

A substance that is i) intended for use in the prevention or treatment of disease in livestock, or ii) a substance other than feed, that is intended to affect the structure or function of the body of the livestock. These may include, but are not limited to, antibiotics, parasiticides, vaccines, hormones, medicated milk replacers, probiotics, naturopathic products, growth promotants, etc.

Auditor

A qualified person who is responsible for assessing the compliance of an operation with the requirements of a national on-farm food safety program.

Biological Hazard

Viruses, bacteria, and the toxins produced by some bacteria. Transmissible spongiform encephalopathy (TSE) agents and parasites that can cause disease in humans. Examples are *E.coli, Salmonella spp.* and *Sarcosporidian* parasite.

Biosecurity

Practices designed to protect the health of livestock by preventing the transmission of harmful agents such as viruses, bacteria (toxins) or parasites.

Certificate of Verification

A signed affidavit provided by a feed supplier verifying the ingredients of a particular feed or bedding product. A Certificate of Verification may be provided attesting that a feed has been produced without any animal by-products safe for consumption by ruminants.

Chemical Hazard

Chemicals including heavy metals, pesticides, parasiticides, insecticides, fungicides, fertilizers, mechanical lubricants and fuels, and animal health products that can cause harm to humans through the consumption of contaminated meat or milk.

Chronic Disease

A disease that persists over an extended period. If a chronic condition is not successfully treated, performance will be negatively affected and the condition of the animal may deteriorate.

Cleaning

To remove residues, either through the use of water and/or detergents (i.e. washing equipment used to handle manure) or by wiping, brushing or blowing away visible residues (i.e. feed residues on feed handling equipment).

Compendium of Veterinary Products

A list of animal health products approved for use in Canada, which are acceptable for use as per label direction or veterinary prescription. The compendium can be accessed at www.cansheep.ca under “Links”.

Corrective Action

Any action taken in an attempt to correct a problem, mistake or deviation from a **“Must Do”** good production practice.

Critical Control Point (CCP)

Any point or procedure where control can be applied and a food safety hazard can be prevented, eliminated, or reduced to an acceptable level. For example, an on-farm CPP would be to properly restrain your sheep prior to giving an injection to prevent the chance of a needle breaking off inside the animal.

Cull Sheep

A sheep that is removed from the flock for any reason (e.g. disease, advancing age, loss of productivity or milk producing ability).

Dead Stock	A carcass, or any part thereof, that has died from any cause other than slaughter.
Dead Stock Disposal	Animals that die from any cause other than slaughter must be disposed of in accordance with provincial legislation. Contact your local Ministry of Agriculture for any legislation on dead stock disposal in your area.
Drug Identification Number (DIN#)	An eight digit number assigned by Health Canada to a drug product prior to being marketed in Canada, which uniquely identifies all drugs sold in a dosage form. The DIN is located on the label of prescription and over-the-counter animal health products that have been evaluated and authorized for sale in Canada.
Drug Residue	A drug level that can be detected in meat, organs or milk at specified times after the drug is administered.
Extra-label Use	Refers to the use or intended use of a drug approved by Health Canada in an animal in a manner not in accordance with the label or package insert. It also includes the use of all unapproved drugs, including unapproved bulk active pharmaceutical ingredients (APIs) and compounded drugs. Also referred to as “off-label” use.
Euthanize	To destroy an animal that is unable to recover from an ailment or is unfit for human consumption, in a humane manner.
Flushing	Involves taking a known non-medicated ingredient and moving a quantity through feed handling equipment to “flush” out any medicated feed that remains. The flushed material or “flush” is often included in the next ration which would contain the same medication for the same species or can be properly disposed of like any other medicated feed.
Good Production Practices (GPPs)	General steps, measures or procedures that control the operational conditions within a production unit, allowing for environmental conditions that are favourable to the production of safe food. These include, but are not limited to: facilities, handling, storage and equipment, inputs, personnel training, sanitation, maintenance of equipment and facilities, feeding, animal handling and management, animal pest control, water management, animal health, biosecurity, drugs and medications, recall of livestock or products, record keeping, or transportation. (General practices commonly described by a HACCP-based program).
Hazard Analysis Critical Control Point (HACCP)	HACCP (pronounced “haa-sip”) is a systematic approach used to assure food safety. The approach was originally developed by Pillsbury during the USA’s aeronautical space missions in the 1960s, and is now an internationally recognized system for addressing food safety.
Intramuscular Injection	An injection given into the muscle of the body.
Intravenous Injection	An injection given into a vein.
Intra-mammary	An animal health product administered directly into the mammary gland through the teat opening.
Medicated Feed	A mixed feed that contains any animal health products.

"Must Do" Production Practices

Good production practices identified by the Canadian Sheep and Lamb Food Safe Farm Practices Program as being critical to food safety, identified in **bold text.** These practices must be followed at all times by producers in order to comply with this program.

Over-the-Counter (OTC) Medications

Animal health products that can be purchased without a Veterinary prescription from veterinarians or any store selling livestock supplies. Producers assume the responsibility of following label directions and withdrawal times. OTC medications are not available in all provinces.

Physical Hazard

Foreign objects that may be found in meat and milk products, such as a broken needle, and can cause possible injury to anyone consuming the product.

Potable

Suitable for human consumption, according to Health Canada's Guidelines for Canadian Drinking Water Quality.

Prescription

Written or verbal instructions from a licensed veterinarian, given to a specific client with whom the veterinarian has a proper veterinarian/client/patient relationship. The prescription state the specific instructions for use and storage of the animal health product.

Prescription Drugs

Drugs restricted in their sale and use by, or on the order of, a licensed veterinarian. They require a proper diagnosis of the case and full and recent knowledge of the health of the particular animal(s). They are not available "on demand" and cannot be sold over-the-counter by non-professional staff. They must be adequately labelled with specific instructions for use.

Processed Feed

A feed that has been either physically, chemically, thermally or bacterially (or any combination of the above) altered prior to feeding it to the animal.

Recommended Good Production Practice

Production practices that can help to further decrease the risk of a food safety hazard, but are not required in order to comply with the Canadian Sheep and Lamb Food Safe Farm Practices Program.

Reportable Diseases

Diseases prescribed as "Reportable" by the federal Minister of Agriculture, as regulated by the Health of Animals Act. Federal authorities must be notified if a disease classified as "reportable" is suspected. See Appendix I for additional detail.

Sanitize

Procedures used during post-washing and pre-milking to ensure milking equipment is free of pathogens and other materials that may contaminate the milk.

Sequencing

This is a predetermined schedule of mixing and feeding that may start with the higher levels of medications first and ending with low levels, flushing, then followed by nonmedicated feed. Feed records must be detailed enough to denote the last batch/ration and where in the sequence the medicated feed was processed and fed.

Sharps Container

A watertight, puncture resistant container for disposing of used needles. Empty Javex bottles or other heavy plastic containers are often used.

Somatic Cell Count (SCC)

Count of the mixture of dead epithelial cells (covering of the internal surfaces of the body) and leukocytes (white blood cells) that are transferred from the udder into the milk.

Subcutaneous (SQ) Injection	The injection of an animal health product just under the skin of an animal.
Tag (on hides/fleeces)	Dirt and manure on the fleece and hide of an animal.
Therapeutic Treatment	The treatment of an animal, usually with a drug, as a means of providing relief or cure from a disease or debilitating condition.
Veterinarian/Client/Patient Relationship	A relationship that exists when: i) the veterinarian has (VCPR) assumed the responsibility for making medical judgments regarding the health of the animals and the need for medical treatment, and the client (owner/caretaker) has agreed to follow the instructions of the veterinarian; ii) there is sufficient knowledge of the animal(s) by the veterinarian to initiate at least a general or preliminary diagnosis of the medical condition of the animal(s) by virtue of an examination of the animal(s) and/or by medically appropriate and timely visits to the premises where the animal(s) are kept; and, iii) the practising veterinarian is readily available for follow-up in case of adverse reactions or failure of the regimen of therapy.
Veterinary Prescription Feeds	Medicated feeds manufactured according to a written prescription supplied by a licensed veterinarian.
Withdrawal Period	The number of days required after the last treatment with a drug or vaccine before the animal may be slaughtered or milked to ensure chemical residues are in compliance with applicable standards.
Zoonosis	Diseases that can be transferred from animals to humans such as ringworm and some contagious abortion causing organisms. Some “Reportable” diseases are also in this category.

Appendix I: Diseases

The information provided here is intended to identify diseases that potentially affect food, human safety and contagious diseases that have similar signs. It is not intended to be a sheep disease reference manual. Please contact your flock veterinarian for specific disease information and up-to-date advice.

1. Reportable Diseases Affecting Sheep

The following diseases are defined as “Reportable” by the Canadian Food Inspection Agency. The Federal Health of Animals Act and Regulations regulates control of these diseases. Reportable diseases have been divided into two lists: those that have been reported since 2008 (recent or occurring) and those that have never or not recently occurred in Canada. Being familiar with the signs and methods of introduction to the flock will help to control or eradicate these diseases.

Producers, through their flock veterinarians, MUST report the suspected existence of these diseases to the nearest Canadian Food Inspection Agency (CFIA) district office. CFIA will determine the appropriate follow-up for the situation. The information provided in this appendix is a guideline for information purposes and current only at the time of printing. For further information, call your local CFIA district office or visit their website at www.inspection.gc.ca. The following table is based on information obtained or refined from these postings. More information can be found from the World Organization for Animal Health (http://www.oie.int/eng/en_index.htm). Provincial governments may require the identification of additional diseases for monitoring purposes. Contact your provincial veterinarian for a list.

1. Reportable Diseases Affecting Sheep

http://www.inspection.gc.ca/english/anima/disemala/disemalae.shtm (Z) = zoonotic disease

DISEASES REPORTED IN CANADA (Since 2008)

CAUSE	SIGNS	COMMENTS
ANAPLASMOSIS Caused by a rickettsial bacteria found in red blood cells. *Anaplasma marginale.* Transmitted by ticks, biting insects, blood contaminated equipment from infected cattle.	Sheep rarely show signs. Primarily a disease of adult cattle. Depression, high fever, anemia and death.	Blood test and destroy affected animals. In 2009 and 2010 disease reports restricted to Manitoba and BC. Risk is highest from imported infected cattle from USA.
ANTHRAX (Z) Caused by the bacteria *Bacillus anthracis.* Spores are found in contaminated soil – rarely from contaminated wool and hides. Spores are inhaled; enters through GI tract or wounds.	Sudden death, with black tarry blood around body orifices. Usually on pasture. Humans can develop wound infections or if inhaled, severe pneumonia. Very serious.	Deep burial or incineration of intact carcass. Do not open carcass! Vaccination with a live spore vaccine where outbreaks have occurred. Most outbreaks reported in prairie provinces.
RABIES (Z) Caused by a virus (rhadbdovirus). There are many strains depending on wildlife reservoir (e.g. bat rabies, fox rabies, skunk rabies, raccoon rabies).	Dumb rabies: hind end paralysis, drooling, coma. Furious rabies: aggressive behaviour, hind end paralysis. It is best to consider any sheep exhibiting neurological signs as potentially having rabies. 100% fatal in humans once clinical signs occur so must receive prophylactic treatment immediately post-exposure.	Don't approach a suspect animal but call veterinarian, particularly if known wildlife contact (e.g. fox attack). If human contact with suspected rabid animal, immediately contact your physician. Vaccines approved for use in sheep are available, if history of rabies in area – or if substantive human contact (e.g. petting farm).
SCRAPIE Abnormal prion protein PrP^{SC} + genetic susceptibility are required before the disease is expressed. The PrP^{SC} is shed at lambing by the infected ewe, only if the lamb is genetically susceptible. PrP^{SC} is very persistent in the environment. Lambs most susceptible to infection and later expression of disease.	Adult onset disease (3+ yrs) but usually infected as lambs when exposed to contaminated lambing grounds. Chronic wasting most common sign (see Table 2). Other signs are apprehension; teeth grinding; ataxic; stumbling; high stepping gait; maniacally itchy – may cause bilateral wool loss from trunk. Always progresses to being unable to rise, coma over several months, and always death.	Rams cannot transmit the disease to other sheep – only pregnant ewes that subsequently infect the lamb. Diagnosis is made on brain tissues submitted to the CFIA. Flocks affected undergo supervised slaughter and testing by CFIA with federal compensation for destroyed animals. Quarantine and eradication are helped with good flock records. The Voluntary Scrapie Certification program, based on surveillance and inventories, and optionally on genetic testing, can verify the flock is not infected. Disease occurs sporadically in most provinces.

DISEASES REPORTED IN CANADA (Since 2008) - continued		
CAUSE	SIGNS	COMMENTS
TUBERCULOSIS (Z) Caused by the bacteria *Mycobacterium bovis*	Tumour-like masses or firm abscesses called tubercles in lungs and lymph nodes; may be involvement of other sites including the intestines. Shed in milk or other excretions. Raw milk is a significant risk to humans consuming it.	No cases since 2008 (Manitoba – bovine). Found by testing suspect lesions on live animals, at slaughter and post-mortem or by using live animal tuberculin skin test. Flocks affected undergo supervised slaughter and testing by CFIA. Federal compensation for destroyed animals.
DISEASES NOT REPORTED IN CANADA		
BLUETONGUE Caused by the Bluetongue virus. Transmitted by specific species of biting midges, usually in the fall before a frost. Reservoir species include domestic cattle and wild deer. Concern that with "global warming" the disease will spread north as it has in Europe since 2006.	Fever, reddening of oral and nasal cavities, swelling of lips, tongue and gums, erosions. Lameness, swelling of coronary band. Case fatality rate of 10 to 50%. When first introduced to a naïve population, can be very economically devastating.	Disease in sheep has not been reported since 1988; however, risk for infection of sheep is very high in the western provinces. All serotypes are foreign to Canada except occasional sero-conversion in cattle in the Okanagan Valley. The midge is only found in southern BC, and the prairie provinces. Only serotype 8 is reportable (foreign to North America).
BRUCELLOSIS (Z) Brucella abortus and Brucella melitensis are reportable but not Brucella ovis. B. ovis causes epididymitis in rams and rarely abortion. It is not zoonotic.	B. abortus was eradicated from Canada in the 1980's except for bison in northern Alberta. B. melitensis is foreign to Canada. Both cause abortion and still-birth. Both are shed in the milk, making raw milk consumption of risk to humans.	Brucellosis is found on post mortem examination of aborted or nonviable lambs or by blood testing older animals. Has not been reported in sheep in decades in Canada. Flocks affected undergo supervised slaughter and testing by CFIA. Federal compensation for destroyed animals.
FOOT AND MOUTH DISEASE Caused by the Foot and Mouth virus. There are many strains but all cause disease in cloven-hooved animals. Highly contagious.	Sheep rarely have marked signs similar to cattle: salivation, fever, anorexia, lameness; and painful blisters on lips, tongue, gums, skin/hoof junction and teats. High fevers and decreased milk production usually precede the blisters. Often the disease is very mild in sheep with only a few small lesions and lameness.	Not reported in Canada since early 1950's (Saskatchewan). Detection and immediate eradication. Quarantine and destroy animals under CFIA supervision. If traveling to infected countries, do not visit farms and stay away from Canadian farms for 5 days upon return. Wash and disinfect all personal effects, particularly footwear. Implement a biosecurity plan for your farm. Visit the CFIA website for a complete plan.

DISEASES NOT REPORTED IN CANADA - continued

CAUSE	SIGNS	COMMENTS
PESTE DES PETITS RUMINANTS Caused by a virus (morbillivirus).	Fever, nasal discharge, coughing, abortion, dehydration, emaciation, death.	Never reported in North America. Found in Africa, Arabian peninsula, Middle East and India.
RIFT VALLEY FEVER (Z) Caused by a virus (phlebovirus).	Fever, anorexia, weakness, nasal discharge, abortion.	Never reported in Canada. Only found in Africa. Can also infect humans.
RINDERPEST Caused by a virus (morbillivirus).	Also known as "Cattle Plague". Sheep and goats only mildly affected. High fever for 6-9 days. Inflammation and swelling of the mouth, nasal cavity, vagina/vulva.	Never reported in Canada. Usually found in eastern Africa, India, Pakistan and Sri Lanka. A highly contagious and devastating disease.
SHEEP AND GOAT POX Caused by a virus (capripoxvirus).	Mild to severe fever and depression. There may be a few to many nodules on the skin, which may extend to the digestive and respiratory tract.	Never reported in Canada. Endemic in Africa, Middle East and Asia.

2. Other Contagious/Zoonotic Diseases

Remember to handle products from animals (e.g. feces, aborted material, (stillborn lambs and afterbirth), dead animals) with care, using gloves and disposal by burning, burial or proper composting which prevents scavenging by animals including vermin, that may carry an agent that is risky to humans (marked "Z" for zoonotic disease).

ABORTION DISEASES THAT ARE ALSO ZOONOTIC

CAUSE	SIGNS	COMMENTS
CHLAMYDIOSIS (Z) also called ENZOOTIC ABORTION A bacterial agent: Chlamydophila abortus. Used to be termed Chlamydia psittaci – sheep abortion strain.	Affects sheep and goats. Most ewes show no clinical signs before aborting. May see abortion (starting 3 weeks before lambing), stillbirth, weak lambs and sometimes early embryonic loss. Severe inflammation of the placenta (afterbirth). Can cause abortions in women, so care should be taken.	Ewes resistant (immune) after aborting but may shed. No immunity before aborting. Results inconsistent after injecting long-acting tetracycline. Vaccination prior to breeding will reduce abortions but not eliminate infection. Lambs infected at birth will abort when they become pregnant.

ABORTION DISEASES THAT ARE ALSO ZOONOTIC - continued

CAUSE	SIGNS	COMMENTS
TOXOPLASMOSIS (Z) A protozoan parasite of cats. Toxoplasma gondii. Source is from infected cat feces and, less commonly from ingested, infected mice or placenta.	Affects sheep and goats. Early embryonic deaths causing open ewes, abortion, mummified fetuses, stillborn and weak lambs. Buttons (cotyledons) of placenta (afterbirth) may have pinpoint white spots. Cats show no signs. Kittens catch infected mice – pass eggs (oocysts) for ~ 14 days, then develop immunity.	Infected sheep can develop immunity at any time. Only abort if initial infection occurs when pregnant. As kittens are primary source of contamination, either remove cats, spay cats, or provide litter box. There are some prophylactic medication options – consult flock veterinarian. Infected cat feces can cause congenital infection in human newborns.
CAMPYLOBACTERIOSIS (Z) also called VIBRIOSIS Most abortions are caused by these two species: *Campylobacter* fetus subsp. fetus and *Campylobacter jejuni.*	Late abortions, stillborns or weak lambs. Placenta (afterbirth) slightly thickened. Carrier ewes shed bacteria in feces.	Scavenging birds may spread from other farms. *Campylobacter* are often resistant to tetracycline, so it's important to have sensitivity performed on isolates. Vaccination before breeding.
Q FEVER (Z) Caused by the bacteria Coxiella burnetii; can infect any animal including birds and insects. The small cell variant of the bacteria can survive for months or longer in the environment.	Affects sheep and goats. Late-term abortions, stillbirth, weak lambs. Placenta is thickened and discharge is abnormal. Organism can be shed in normal births as well as abortions (i.e. placenta, birthing fluids, urine, feces and milk).	Highly contagious to humans in aerosol state (birthing fluids, dried manure). Also can infect through raw milk products. Can cause very severe disease in humans: pneumonia, high fevers, headaches – should immediately seek medical attention for proper diagnosis and treatment.
LISTERIOSIS (Z) Listeria monocytogenes. Widespread in environment (e.g. soil, manure, poorly ensiled feed). Shed in feces and milk – of risk to humans.	Abortion, rotten fetus. Ewe sick with metritis. More commonly presents as neurological disease: "circling" disease – attacks nerves of the face and head. Most often fatal in sheep.	Most outbreaks associated with poor quality silage feeding. pH should be < 5 to inhibit growth and should be free of soil and manure contamination. Feed on clean cement or elevated. Discard waste. Pasteurize milk for human consumption.

CONTAGIOUS CHRONIC WASTING DISEASES

Chronic wasting (CW) diseases of adult sheep involve a small proportion of the flock at any given time and are independent of nutritional status or stage of production. The most common cause of CW is dental disease (loss of incisors and/or molars). Parasitism can also cause CW but is more of a problem in young stock than adults. Scrapie most commonly presents as CW rather than neurological disease. There are several contagious diseases that are important causes of CW at the flock level.

CAUSE	SIGNS	COMMENTS
MAEDI VISNA also known as OVINE PROGRESSIVE PNEUMONIA (OPP) Caused by a slow (retro) virus called maedi visna virus. Maedi = respiratory disease. Visna = wasting with neurological disease. Sheep are infected for life.	Adult sheep (> 3 yrs). Causes a uniformly hard udder with normal-appearing but decreased milk supply. Lambs starve or grow poorly. May also see chronic respiratory disease that always ends in CW and death.	No treatment and infected sheep shed virus to infect others. Can be easily eradicated by serological testing and culling of positive animals. Are some provincial "status" programs. Purchase replacements from negative flocks.
CASEOUS LYMPHADENITIS (Z) Caused by the bacteria Corynebacterium pseudotuberculosis. Mildly zoonotic.	Affects sheep, goats, llamas and alpacas. External and internal abscesses of the lymph nodes and organs, particularly lungs. Internal abscesses cause sudden death and CW. Major cause of carcass condemnations/ trim at slaughter.	Abscess material is extremely contagious and persistent in wood, manure, straw, soil and water. Blood test and vaccine available. No cure. Should cull chronically affected sheep. Use proper biosecurity precautions when shearing or purchasing animals.
CONTAGIOUS OVINE FOOTROT Caused by the bacteria Dichelobacter nodosus. There are many strains – mild to very serious. The bacteria cannot survive off the sheep's foot for more than one week. Usually with Fusobacterium necrophorum.	Initial infection with F. necrophorum causes "foot scald", infected area between toes and skin/hoof junction. Presence of D. nodosus will eat at sole causing under-running. Sheep are very lame, feet smell and may become fly-struck. May graze on knees. Lose weight. Chronic disease causes deformed feet. Untreated footrot is a welfare issue.	Control is through foot-bathing (10% zinc sulphate + laundry soap). Must soak for a minimum of 20 minutes to allow penetration. Hold on dry ground for two hrs before turning onto pasture with no sheep for one week. Repeat in five days. Cull non-responders. Systemic antibiotics should be used only on the advice of the flock veterinarian. Bacteria can only spread sheep-to-sheep under moist and warm (> 10°C) conditions.
JOHNE'S DISEASE (Z) Caused by the bacteria Mycobacterium paratuberculosis. There are several strains: sheep strains don't tend to infect cattle; cattle strains can infect goats but not often sheep – but some strains are intermediate so consider cattle and goats a risk to sheep.	Adult sheep > two years of age. Chronic weight loss in face of reasonable appetite. Diarrhea not a common feature – may see terminally. Lambs most susceptible to infection. Mounting evidence that this bacteria is linked to Crohn's disease in humans. Bacteria shed in feces and milk, not always killed by home pasteurization.	Bacteria can survive > one year in environment. Control: prevent infection in young stock (fecal-oral transmission; colostrum from healthy animals); don't purchase from unknown health status flocks. Thin sheep should have an appropriate post mortem to diagnose disease. Serology and fecal culture may miss infected animals.

MISCELLANEOUS DISEASES WITH ZOONOTIC / PUBLIC HEALTH RISK

CAUSE	SIGNS	COMMENTS
CONTAGIOUS ECTHYMA (Z) Caused by a parapoxvirus. Also called sore mouth, orf or scabby mouth. Also affects goats, deer and perhaps llamas and alpacas.	Scabby raised lesions around muzzle, teats, inside the oral cavity and occasionally feet, prepuce. When on teats, important cause of gangrenous mastitis in nursing ewes. Immunity is not passed through the colostrum.	Always wear gloves when treating as virus is zoonotic. Topical antiseptic ointments may help. Virus can live in dry scabs for years. Sheep can become carriers (poll lesions, skin tags). No vaccine licensed in Canada.

INTERMEDIATE STAGE PARASITES OF DOGS AND WILD CANIDS (Z)

There are several parasites of dogs that use sheep and other ruminants as an intermediate host. Some are a public health risk and some are a food quality risk but share a common mode of transmission.

CAUSE	SIGNS	COMMENTS
Cysticercus hydatigenia *Cysticercus ovis* *Echinococcus granulosus* (Z) *Sarcosporidia* spp Dogs/wild canids become infected when allowed to scavenge sheep carcasses. Cycle is completed when canids contaminate sheep feed with feces.	The first three are the intermediate stage of a dog or wild canid (coyotes, foxes, wolves) tapeworm. Sarcosporidia are similar to toxoplasma (coccidia-like). In sheep, C. hydatigenia causes cysts in the liver; C. ovis causes cysts in skeletal muscle; Echinococcus causes large bladders in abdominal/ pleural cavity; Sarcosporida causes microscopic lesions in muscle.	Economic impact is partial or total carcass condemnation. For full prevention, consult Canadian Sheep Federation pamphlets on C. ovis control. C. ovis is on an epidemic rise in Canada. Humans can be infected with Echinococcus eggs from dog tapeworms, and develop large cysts internally filled with hundreds of tapeworm larvae – if burst, can die. Very dangerous! Prompt removal of dead sheep is critical to prevent.
LEPTOSPIROSIS (Z) Leptospira pomona is the strain most commonly associated with animal and human disease.	Disease in sheep is rare, but may present as abortion, fever, anaemia. Wildlife, swine and cattle can also be infected.	Spread by urine and urine in water. Risk to abattoir workers. If diagnosed by flock veterinarian, vaccination of flock can be instituted.
CRYPTOSPORIDIOSIS (Z) Caused by the protozoal parasite Cryptosporidium parvum. Very common in young livestock species including kids and calves.	Lambs three days to six weeks of age most at risk, but most common at one to three weeks of age. Severe watery diarrhea, weight loss. Supportive treatment with oral electrolyte therapy only, but tends to be self-limiting when used with proper nursing care.	Highly contagious to people handling affected animals. Risk to humans is high from environmental contamination including water sources (e.g. wells, ponds) of oocysts (eggs) from diarrheic lambs. Aggressive cleaning and hygiene is required to control.

INTERMEDIATE STAGE PARASITES OF DOGS AND WILD CANIDS (Z)

CAUSE	SIGNS	COMMENTS
GIARDIASIS (Z) Giardia duodenalis. Protozoal parasite found in intestines of infected people (with or without symptoms), wild and domestic animals, including pets and livestock.	Recognized as one of the most common causes of waterborne illness in humans. Found in every region of the world. Can cause diarrhea, abdominal cramps, nausea in humans. Often no disease seen in infected animals.	Also known as "beaver fever" when parasite shed into water reservoirs. Important preventive measures include washing hands thoroughly after toilet visits or handling manure; carefully disposing sewage/manure so as not to contaminate surface water or groundwater; and, avoid consuming improperly treated drinking water.
E. COLI 0157:H7 (Z) E. coli 0157:H7 is not a pathogen of ruminants but causes very serious disease in humans.	Cattle, sheep and goats commonly shed bacteria in manure. Can cause severe bloody diarrhea in humans (children, elderly and immune compromised adults) and occasionally irreversible kidney failure and death. Risk to humans from contamination of: water sources with manure; meat from dirty hides at slaughter; raw milk; secondary food contamination from raw meat.	Bacteria are destroyed by cooking food and chlorination of water sources. Important preventive measures include washing hands before handling/ preparing food; carefully disposing of sewage/manure so as not to contaminate surface water or groundwater; avoid consuming improperly treated drinking water; and, food preparation care to thoroughly cook meat and prevent contamination of fresh foods.
SALMONELLOSIS (Z) There are many species of Salmonella which cause disease in livestock and humans. One of the most pathogenic is S. Typhimurium.	Salmonella can cause abortion, severe bloody diarrhea in lambs and septicaemia in young stock. Bacteria are shed in the feces, milk and can contaminate carcasses at slaughter.	Antimicrobials should not be used indiscriminately to treat animals, as salmonella rapidly develops antimicrobial resistance. Human illness can be mild (like food-poisoning) to life-threatening. Use the same precautions as with E. coli 0157:H7.

Edited: April, 2010 - Dr. P. Menzies, DVM - Ontario Veterinary College, University of Guelph.

For more information on these diseases, please contact your flock veterinarian.

Sources from Previous Version of Manual:

1. A Practical Guide to Profitable Sheep Production by Dr. Meg Smart, DVM; 1996 Aspen Hills Enterprise
2. Western Canadian Flock Health Program, Alberta Sheep and Wool Commission, 2000.
3. EPIX Emergency Preparedness Information Exchange, Foreign Animal Diseases website, http://hoshi.cic.sfu.ca/epix/topics/animal. School of Communication, Simon Fraser University, Vancouver, BC.
4. Office International des Epizooties (OIE) - World organization for animal health website, http://www.oie.int/subsection on Diseases.
5. Expert advice of veterinarians across Canada.

Appendix II: Canadian Water Quality Guidelines for Livestock

ITEM	MAXIMUM RECOMMENDED LIMIT (mg/L)
Major Ions	
Calcium	1,000.0
Nitrate and nitrite	100.0
Nitrite alone	10.0
Sulphate	1,000.0
Total Dissolved Solids (TDS)	3,000.0
Heavy Metals and Trace Ions	
Aluminum	5.0
Arsenic	0.5*
Beryllium	0.1**
Boron	5.0
Cadmium	0.02
Chromium	1.0
Cobalt	1.0
Copper	0.3
Fluoride	2.0***
Iron	no guideline
Lead	0.1
Manganese	no guideline
Mercury	0.003
Molybdenum	0.5
Nickel	1.0
Selenium	0.05
Uranium	0.2
Vanadium	0.1
Zinc	50.0

Source: *Task Force on Water Quality Guidelines*, 1987
* 5.0 if not added to feed
** Tentative guideline
*** 1.0 if fluoride present in feed

Appendix III: Livestock Biosecurity

(Adapted from the Canadian Animal Health Coalition 'Livestock Biosecurity' bulletin)

A 'Foreign Animal Disease' (FAD) in your flock can have a devastating effect on the health and welfare of your livestock, and the economic viability of your business.

The same is true for every flock in Canada. We have only to look at the recent experience in the UK to see that an outbreak in Canada would permanently alter your business and Canada's livestock industry, and cost billions.

You can reduce the chance of an outbreak – or the impact, if it occurs – by having your own biosecurity program.

WHAT IS IT?

A management program to prevent the spread of disease

WHY DO IT?

To reduce – in your flock and the national flock:

- The risk of introducing disease;
- The spread of disease; and,
- The cost of disease.

HOW TO DO IT?

As part of the management program for your operation; consider your inputs, the products you produce, the assets you manage (i.e. the livestock, feed, equipment and buildings), and the costs and risks you are prepared to bear.

WHERE TO GET HELP?

From your veterinarian, commodity group, provincial veterinary service, the CFIA and the Canadian Animal Health Coalition.

WHEN TO DO IT?

Now. Implement a control program for your operation right away… and keep it current.

WHO HAS TO DO IT?

You. You are responsible for animal health on your operation – that is a critical control point in preventing or controlling the spread of disease to the national flock.

Your program will assist those responding to a major outbreak.

Do your part…
Prevent foreign animal diseases from entering Canada…
Implement a biosecurity program.

Contact Canadian Animal Health Coalition
'…promoting a collaborative approach to animal health'
www.animalhealth.ca

This bulletin supported by the Western CARD Council

Your Livestock Biosecurity Checklist

(Adapted from the Canadian Animal Health Coalition 'Livestock Biosecurity' bulletin)

Visitors

☐ Control traffic on and off the farm

☐ Post prominent signage to restrict access and provide directions to the farm office, using words appropriate to your location and operation

☐ Discourage unnecessary visitors
- All visitors must be accompanied, and prohibited or limited from accessing structures or pens containing animals, medications or feed

☐ Keep a 'visitor log'
- All visitors, service calls and deliveries – no exceptions
- Date, name, business, contact information, next farm visit, previous farm visit (see www.animalhealth.ca)

☐ Ask visitors to arrive in clean clothes, footwear and vehicles
- On arrival, instruct visitors as to your sanitation practices
- Provide clean clothes and footwear if this condition is not met

☐ Discuss visitors from other countries with your veterinarian or the CFIA, to assess the risk and appropriate measures

Livestock

☐ Purchase healthy livestock from reputable suppliers following good management practices and recognized on-farm food safety programs

☐ Isolate purchased livestock for a minimum of two weeks

☐ Purchase quality feed from feed mills that follow good manufacturing practices

☐ Separate sick from healthy animals

☐ Deadstock should be:
- Removed immediately from other animals;
- Disposed of as soon as possible according to provincial regulations; and,
- Necropsied to confirm cause of death, if you suspect a contagious and/or reportable disease.

Sanitation

☐ Keep clean... all personnel, buildings, yards, equipment, instruments, feed storage areas and feed equipment

☐ Disinfecting
- Choose the right product for the job
- Clean items with warm water and detergent before disinfecting

☐ Use disposable equipment once and discard

Wildlife & Pests

☐ Control or eliminate vermin

☐ Protect your feed and water supplies from fecal contamination by wildlife

Canadian Food Inspection Agency
Animal Health and Production

Farm Biosecurity – A Common Sense Guide

What is farm biosecurity?

Biosecurity refers to protecting the health of livestock by preventing the transmission of disease. Any disease that could jeopardize the health of these animals represents a threat to the economic viability of the farm and the welfare of the herd. Taking common sense precautions to prevent disease from coming on to your farm is the best investment you can make.

Infectious diseases are caused by a large number of agents. These range in size from things that we can see, like bot eggs on the legs of a horse, to submicroscopic particles, like viruses. We cannot see most infectious agents, so we cannot tell if an article is contaminated by looking at it. However, we must assume that any article that is dirty is contaminated.

Infectious diseases can be spread a number of ways. Some are spread by direct contact between animals, others can be spread by indirect contact, such as by a contaminated water bowl. Still others are spread by the wind, through insect bites, on human's contaminated clothing, in feed or water, or through contact with wildlife, including vermin. Just as there are many types of infectious agents, some are easier to destroy than others. Many will survive well in dirty, damp, dark and cool conditions. Most are eliminated in clean, dry, warm environments.

There are a number of methods for destroying disease-causing agents. These include steam cleaning, fumigation and chemical disinfectants. Many disinfectants are in common use, each having been formulated for a specific purpose. Some products will kill bacteria, but not viruses, and most will not kill spores. Soil and organic matter rapidly inactivate most disinfectants, so it is important to first thoroughly clean the objects with warm water and detergent. Then apply the appropriate disinfectant. Footbaths are important, but only work properly if boots are washed before using the footbath, and by keeping the disinfectant properly replenished. Your veterinarian or provincial extension agent can advise you as to which disinfectant is most suitable for your application.

What can be done to minimize the risk of introducing disease?

Bringing new animals onto the farm poses the risk of spreading disease between the introduced and the resident farm animals. Buying a new bull, ram or boar are common practices that can potentially compromise the biosecurity of your farm.

1. Consider vaccinating your herd against the common diseases in your area. Your veterinarian can advise you as to the best choice of vaccines to use. Arrange to have new animals properly vaccinated to match your herd program.
2. Quarantine new arrivals for at least two weeks. This can be done by confining the animal to a separate pen that does not allow nose-to-nose contact with other animals or the sharing of feed and water supplies.
3. Buyer beware! Purchase from herds with a known clean health status.
4. Livestock feed obtained off-farm should be from known, reputable sources.

Farm Visitors

Some operations, such as integrated poultry and swine barns, have a well-developed biosecurity plan designed to protect the high health status of the herd or flock. The following recommendations are directed toward smaller operations and offer practical steps for protecting the health of the herd. Accepting visitors from countries with serious animal diseases requires special precautions. They must not be allowed contact with susceptible species on your farm for at least 14 days after arrival in Canada.

Low Risk Visitors

Visitors coming from urban areas that have no other contact with livestock pose very little risk of spreading disease to your livestock.

Recommended Precautions:

- Ask visitors to arrive on the farm with clean clothing and footwear. If anyone arrives with dirty boots, they must be cleaned and disinfected before proceeding. Or, you may provide your own clean boots or disposable footwear.
- Accompany visitors and ask them not to enter pens, or contact the animals. As the degree of contact with livestock increases, so does the risk both to the animals, and to the visitors.
- When visitors leave, ask them to wash soiled boots and hands with water and detergent.

Moderate Risk Visitors

People that travel from farm to farm, but have no direct contact with livestock pose a moderate risk for disease transmission. These would include salesmen, feed distributors, farm equipment mechanics and various types of inspectors.

Recommended Precautions:

- Same precautions as above with additional requirements.
- Clean coveralls should be worn if there is any contact with feed, water, soil samples, manure or farm equipment.
- Sampling equipment should be cleaned after each use.
- When leaving the farm, dirty boots must be cleaned and disinfected, and soiled coveralls should be removed before entering the vehicle.

High Risk Visitors

These are visitors that travel from farm to farm and have direct, often intimate contact with livestock. These would include veterinarians, inseminators, processing crews, livestock haulers and neighbours.

Recommended Precautions:

- Same precautions as above with additional recommendations.
- Visitors should arrive with clean outerwear, boots and equipment. Vehicle interiors should be clean and be equipped with easily removable rubber floor mats. Livestock trailers should be clean prior to arrival on the farm.
- Livestock instruments and equipment such as dehorners, castrators and syringes should be clean and sterile before use. DO NOT use chemical disinfectants on syringes or needles used to deliver live vaccines. Use disposable needles and syringes wherever possible.

- Wear disposable plastic sleeves and gloves whenever there is direct contact with body fluids, tissues or excrement. These situations would include assisted births, inseminations, post-mortems or butchering.
- Before leaving the farm, soiled equipment and footwear must be cleaned and disinfected. Wash hands with detergent. Remove dirty coveralls before entering the vehicle.

Neighbours

When neighbours arrive on your farm to help, it is sometimes a delicate matter to bring up concerns about biosecurity. Ensuring that you have a few extra pairs of clean coveralls on hand, and providing convenient access to a boot-washing tub will encourage your neighbour to respect your protocol. Offense can usually be avoided if you explain that you want to protect the health of your neighbour's herd as well.

A Practical Choice of Outerwear

Coveralls: consider purchasing nylon coveralls for use in wet, dirty conditions. Although not completely waterproof, they are less permeable than cotton and are less apt to soak through. They are also windproof, light and stand up well in the washing machine. They can be damaged in the dryer but they do air dry quickly.

Coats and Jackets: it is very difficult to frequently wash parkas and insulated jackets. A good choice for outerwear is the so-called three-in-one jacket. These consist of an outer detachable shell made of nylon, and an inner liner of nylon and polypropylene. These stand up well to frequent washing.

Wildlife and Vermin

Wildlife and vermin are often very mobile and present an opportunity to spread diseases such as rabies and leptospirosis to farm animals. It is wise to take precautions to eliminate contact with these animals. Make the farmyard environment unattractive to skunks and other vermin by cleaning up old buildings, debris, and spilled grain. The mere presence of a cat or a dog will act as a deterrent to many vermin. To summarize, you are in the best position to safeguard your herd and your pocketbook from these and other infections by following basic principles of disease control and prevention:

- maintain a closed herd/flock;
- purchase from known healthy sources;
- isolate purchases;
- restrict visitors;
- practice good biosecurity. Insist on clean footwear, clothing, and equipment;
- identify all animals; and,
- keep accurate records.

Together we can work to safeguard the health of Canada's livestock and poultry sectors. For further information on developing your biosecurity plan, contact your own veterinarian, your nearest CFIA veterinarian, or your provincial extension specialist.

Appendix IV: Reference Material List

The following are some of the available written resources for production practices.

Recommended Code of Practice for the Care and Handling of Sheep; Canada 1995; coordinated by Canadian Agri-Food Research Council (CARC). Available from Canadian Sheep Federation and/or specific provincial sheep associations, or online at:

Alberta Flock Herd Health Manual, 1998-99.
Courtesy of Alberta Sheep and Wool Commission.

Western Canadian Sheep Production Manual, 1999;
Alberta Sheep and Wool Commission, Saskatchewan Sheep Development Board and South Saskatchewan Wool Growers.

A Practical Guide to Profitable Sheep Production; Dr. Meg Smart, DVM, PhD;
Western College of Veterinary Medicine, University of Saskatchewan, Saskatoon SK.

SID Sheep Production Handbook, American Sheep Industry Association Inc;
Denver Colorado USA

The following websites provide some additional information.

a) Canadian Sheep Associations (national and provincial groups):

Canadian Sheep Federation: www.cansheep.ca
Canadian Sheep Breeders Association: www.sheepbreeders.ca
Canadian Cooperative Wool Growers: www.seregonmap.com/SCM/
British Columbia: www.bcsheepfed.com
Saskatchewan Sheep Development Board: www.sksheep.com
Alberta Lamb Producers: www.ablamb.ca
Manitoba Sheep Association: www.mbsheep.ca
Ontario Sheep Marketing Agency: www.ontariosheep.org
Féderation des producteurs d'agneaux et moutons du Quebec: www.agneauduquebec.com
New Brunswick Sheep Breeders Association: n/a
Sheep Producers Association of Nova Scotia: www.sheepnovascotia.ns.ca
Prince Edward Island: n/a
Sheep Producers Association of Newfoundland and Labrador: www.nfld.net/spanl

b) Federal Government:

Agriculture and Agri-food Canada (AAFC): www.agr.gc.ca

Canadian Food Inspection Agency: www.inspection.gc.ca

- Feeds Act and Regulations: http://laws-lois.justice.gc.ca/eng/acts/F-9/
- Canadian Food Inspection Agency Act: http://laws-lois.justice.gc.ca/eng/acts/C-16.5/
- Meat Inspection Act and Regulations: http://laws-lois.justice.gc.ca/eng/acts/M-3.2/
- On-Farm Food Safety Recognition: http://www.inspection.gc.ca/english/fssa/polstrat/reco/recoe.shtml
- Health of Animals Act and Regulations: http://laws-lois.justice.gc.ca/eng/acts/H-3.3/
- Food and Drugs Act and Regulations: http://laws-lois.justice.gc.ca/eng/acts/F-27/

c) Provincial Governments:

You should contact your provincial Ministry of Agriculture for additional and up-to-date information on provincial regulations applicable in your area. Many provinces have provincial regulations governing: disposal of dead stock; nutrient (manure) management; pesticide purchase and/or use; waste water management (dairy); dairy production; etc.

British Columbia: www.gov.bc.ca/agri/

Saskatchewan: www.agr.gov.sk.ca

Alberta: www.agric.gov.ab.ca/

Manitoba: www.gov.mb.ca/agriculture

Ontario; www.gov.on.ca/OMAFRA/

Quebec: www.mapaq.gouv.qc.ca/fr/Pages/Accueil.aspx

New Brunswick: www.gnb.ca/0027/Index-e.asp

Nova Scotia: www.gov.ns.ca/agri/

Prince Edward Island: www.gov.pe.ca/agriculture/index.php3

Newfoundland: www.nr.gov.nl.ca/nr/

d) Other:

American Sheep Industry Association: www.sheepusa.org

Meat and Wool New Zealand: www.meatnz.co.nz

Sheep Meat Council of Australia: www.sheepmeatcouncil.com.au

Canadian On Farm Food Safety Working Group: www.onfarmfoodsafety.ca

National Farm Animal Care Council: www.nfacc.ca

Compendium of Veterinary Products: www.naccvp.com
Available online at www.cansheep.ca under 'Links'

OIE/World Health Organization: www.oie.int/eng/en_index.htm

Compendium of Medicating Ingredients Brochure (MIB):
www.inspection.gc.ca/english/anima/feebet/mib/cmibe.shtml

HOW TO READ A DRUG LABEL (Provided by the Ontario Ministry of Agriculture):
www.omafra.gov.on.ca/english/livestock/dairy/facts/need.htm

Appendix V: Provincial Regulations for the Handling and Disposal of Dead Stock

British Columbia

The disposal of dead animals is specified in the Code of Practice, Part 8, Sections 23 and 24 of the Agricultural Practice for Waste Management. The disposal of animals on-farm is allowed if producers practice burial, incineration or composting. (www.agf.gov.bc.ca).

Alberta

The handling and disposal of dead animals is legislated under the Livestock Diseases Act Regulations which require that dead animals be properly handled, stored and/or disposed of within 48 hours. (www.agric.gov.ab.ca)

Saskatchewan

Saskatchewan regulations state that all dead animals must be disposed of in 48 hours with the five commonly acceptable methods of storage and disposal being rendering, burial, incineration, refrigeration and composting. (www.agr.gov.sk.ca)

Manitoba

The handling of dead stock in Manitoba is covered under the Livestock Manure and Mortalities Regulation under the Environment Act. All mortalities must be stored and kept either refrigerated or frozen if they cannot be disposed of in 48 hours. Acceptable disposal methods include rendering, composting, burial or incineration. (www.gov.mb.ca)

Ontario

The disposal of dead stock is regulated through the Dead Animal Disposal Act, under which producers have three legal options for disposing of dead stock; rendering, burial or composting. (www.omaf.gov.on.ca)

Quebec

In Quebec, according to the Agricultural Products, Marine Products and Food Act there are only two options for non-renderable meat; rendering or incineration. A producer, however, may bury dead animals if the land is exclusively under his own production.

New Brunswick

In New Brunswick animal disposal procedures are specified by the Health Act. Carcasses must be disposed of within 24 hours by burial, incineration or any other method approved by a district medical health officer. (www.gov.nb.ca)

Prince Edward Island

Under the Environmental Protection Act, dead stock in Prince Edward Island can be disposed of by rendering, composting or on-farm burial. (www.gov.pe.ca)

Nova Scotia

There are no specific regulations for the handling of dead stock.

Newfoundland

There are no specific regulations for the handling of dead stock.

Appendix VI: Provincial Regulations for Dairy Sheep

A copy of the National Dairy Regulation and Code can be found at www.cfis.agr.ca/english/regcode/ndrc/amdmt_oct00/prod_frme.htm (English) or www.cfis.agr.ca/francais/regcode/codes_tbl.f.htm (French)

British Columbia

Dairy sheep fall under the same legislation as other dairy species with dairy farms being inspected in accordance to the Dairy Industry Act, which is in conjunction with the Food Safety and Quality Act. (www.agr.gov.bc.ca/ministry/legsum/mind.stm)

Alberta

In Alberta, the Dairy Industry Act covers all dairy animals including sheep. The Food Safety Division provides inspection services to all dairy farms in the province. (www.agric.gov.ab.ca/$department/deptdocs.nsf/all/acts6043?opendocument).

Saskatchewan

No information is available at this time.

Manitoba

The Manitoba Dairy Act and the Manitoba Diary Regulation cover all dairy animals including sheep. Dairy Sheep producers are inspected annually. (http://web2.gov.mb.ca/laws/statutes/ccsm/d010e.php and http://web2.gov.mb.ca/laws/regs/pdf/d010-203.87r.pdf)

Ontario

Dairy sheep producers in Ontario are not covered under the same legislation as dairy cattle producers. However, there are sections of the Health Protection and Promotion Act that includes dairy products from sheep. Producers are not inspected. Diary producers are encouraged to contact their local OMAF representative for more information (www.omaf.gov.on.ca)

Quebec

Dairy sheep producers in Quebec fall under the same legislation as dairy cattle producers and do receive routine inspections. The legislation can be found at www.publicationsduquebec.com under liste des publications.

New Brunswick

Dairy sheep producers are not regulated nor are they inspected in New Brunswick.

Prince Edward Island

Dairy sheep producers are inspected prior to be licensed to produce milk. The guidelines for the inspection are the same as those for dairy cattle producers. Dairy sheep producers are legislated under the Dairy Industry Acts. (www.gov.pe.ca/infopei/onelisting.php3?number=57467)

Nova Scotia

Currently there are no registered Dairy Sheep Producers in the province of Nova Scotia. However, dairy sheep would not be covered under the Nova Scotia Dairy Industry Regulations. (www.gov.ns.ca/just/regulations/regs/diadcomm.htm)

Newfoundland

In Newfoundland, dairy sheep are covered under the Food and Drug Act. Currently there are no dairy sheep producers in the province, however, if there were any they would be inspected under the same regulations as dairy cattle and dairy goats. (www.gov.nl.ca/hoa/sr

References

1. Canadian Sheep Federation (n.d.) The Virtual Tool Box - Housing. Available at: www.cansheep.ca/cms/en/Resources/VTBox/VTBox.aspx Accessed: March 10, 2012.
2. Dwyer C. (2008) Farming systems for sheep production and their effects on welfare. In: *The Welfare of Sheep. Vol. 6*. (Phillips C., ed.). Dordrecht NE: Springer.
3. Goelz J.L. (1998) *Heat Stress*. Pipestone Veterinary Clinic. Available at: www.pipevet.com/images/Heat%20Stress.pdf Accessed: September 30, 2012.
4. Schoenian S. (2010) Heat Stress in Sheep and Goats. University of Maryland. Available at: www.sheepandgoat.com/articles/heatstress.html Accessed: May 15, 2012.
5. Chesters L. (2010) *Sheep Welfare – Avoiding Losses Due to Hypothermia in Farmnote*. Western Australian Agriculture Authority. Available at: www.agric.wa.gov.au/objtwr/imported_assets/content/pw/ah/fn_sheep_welfare_hypothermia.pdf Accessed: October 15, 2012.
6. Waghorn G.C., Davis G.B. & Harcombe M.J. (1995) Specification of pen rail spacing and trough heights to prevent escape and enable good access to feed by sheep during sea shipments from New Zealand. *New Zealand Veterinary Journal* 43:219-224.
7. Cockram M.S. & Hughes B.O. (2011) Health and disease. In: *Animal Welfare*. (Appleby M., Hughes B. Mench J. & Olsson A., eds.). Wallingford UK: CABI.
8. Robertson A. (2010) *Ventilation for Livestock and Poultry Facilities*. Toronto ON: Ontario Ministry of Agriculture, Food and Rural Affairs (OMAFRA).
9. Phillips C.J.C., Pines M.K., Latter M., Muller T., Petherick J.C., Norman S.T. & Gaughan J.B. (2012) Physiological and behavioral responses of sheep to gaseous ammonia. *Journal of Animal Science* 90:1562-1569.
10. WorkSafe BC (2011) *Table of Exposure Limits for Chemical and Biological Substances in Guidelines Part 5*. Available at: www2.worksafebc.com/PDFs/regulation/exposure_limits.pdf Accessed: April 12, 2012.
11. Schoenian S. (2011) Sheep behaviour. In: *Sheep 201: A Beginner's Guide to Raising Sheep*. Available at: www.sheep101.info/201/behavior Accessed: November 18, 2012.
12. Boissy A. & Dumont B. (2002) Interactions between social and feeding motivations on the grazing behaviour of herbivores: sheep more easily split into subgroups with familiar peers. *Applied Animal Behaviour Science* 79:233-245.
13. Kendrick K.M., Da Costa A.P., Leigh A.E., Hinton M.R. & Peirce J.W. (2001) Sheep don't forget a face. *Nature* 414:165-166.
14. Tate A.J., Fischer H., Leigh A.E. & Kendrick K.M. (2006) Behavioural and neurophysiological evidence for face identity and face emotion processing in animals. *Philosophical Transactions of the Royal Society B-Biological Sciences* 361:2155-2172.
15. Stolba A., Lynch G.N., Hinch J.J., Adams D.B., Munro R.K. & Davies H.I. (1990) Social organisation of merino sheep of different ages, sex and family structure. *Applied Animal Behaviour Science* 27:337–349.
16. Federation of Animal Science Societies (FASS) (2010) *Guide for the Care and Use of Agricultural Animals in Research and Teaching, Third Edition*. Champaign IL: FASS. Available at: www.fass.org/docs/agguide3rd/Chapter04.pdf Accessed: June 16, 2013.
17. Parrott R.F. (1990) Physiological responses to isolation in sheep. In: *Social Stress in Domestic Animals* (Zayan R. & Dantzer R., eds.). Dordrecht NE: Kluwer Academic Publishers.
18. Baldwin B.A & Start I.B. (1981) Sensory reinforcement and illumination preference in sheep and calves. *Proceedings of the Royal Society of London Series B Biological Sciences* 211:513-26.
19. Schoenian S. (2011) Housing for sheep. In: *Sheep 201: A Beginner's Guide to Raising Sheep*. Available at: www.sheep101.info/201/housing.html Accessed: April 9, 2012.

20. Russel, A. (1984) Body condition scoring of sheep. *In Practice* 6:91-93.
21. Phythian C.J., Hughes D., Michalopoulou E., Cripps P.J. & Duncan J.S. (2012) Reliability of body condition scoring of sheep for cross-farm assessments. *Small Ruminant Research* 104:156-162.
22. Ministry of Agriculture and Forestry (n.d.) *Body Condition Score Key Messages*. Wellington NZ: Ministry of Agriculture and Forestry. Available at: http://maxa.maf.govt.nz/sff/about-projects/search/08-026/body-condition-score-key-messages.pdf Accessed: March 4, 2013.
23. Ontario Sheep Marketing Agency (n.d.) Chapter 7: Digestion and nutrition. In: *Sheep Production Manual.* Guelph ON: Ontario Sheep Marketing Agency. Available at: www.ontariosheep.org/LinkClick.aspx?fileticket=h9EiNFgz9GI%3D&tabid=96 Accessed: June 16, 2013
24. Van Soest P.J. (1994) *Nutritional Ecology of the Ruminant*. Itahaca US: Cornell Publishing Associates.
25. Alberta Lamb Producers and Alberta Goat Producers Association (2009) *Sheep and Goat Management in Alberta: Nutrition*. Available at: www.ablamb.ca/producer_mgmt/sheep_mgmt.html#nutrition Accessed: November 13, 2012.
26. Ontario Sheep Marketing Agency (n.d.) Chapter 8: Flock health. In: *Sheep Production Manual.* Guelph ON: Ontario Sheep Marketing Agency. Available at: www.ontariosheep.org/LinkClick.aspx?fileticket=rWI8VruFE5U= Accessed: September 8, 2011.
27. Rushen J. & de Passillé A.M. (2010) The importance of good stockmanship and its benefits. In: *Improving Animal Welfare: A Practical Approach* (Grandin T., ed.). Wallingford UK: CABI.
28. Lovatt F. (2004) Farm animal practice: developing flock health plans. *In Practice* 26:290-295.
29. Alberta Lamb Producers and Alberta Goat Producers Association (2009) *Sheep and Goat Management in Alberta: Health Management*. Available at: www.ablamb.ca/documents/management modules/sgma/sgma_health_module_ch1-3.pdf Accessed: May 22, 2012.
30. Australian Wool Innovation (2011) *Managing Breech Flystrike*. Available at: www.wool.com/Content/en-GB/Managing_Breech_Flystrike_June_2011.pdf Accessed: May 23, 2013.
31. Wenger I. (2005) *A Guide to Parasites in Sheep*. Alberta Sheep and Wool Commission. Available at: www.ablamb.ca/documents/factsheets/GuideToParasitesInSheep.pdf Accessed: May 14, 2013.
32. Kaler J., Wassink G.J. & Green L.E. (2009) The inter- and intra-reliability of a locomotion scoring scale for sheep. *The Veterinary Journal* 180:189-194.
33. Sheep Code of Practice Scientists' Committee (2013) *Code of Practice for the Care and Handling of Sheep: Review of Scientific Research on Priority Issues*. Lacombe AB: National Farm Animal Care Council. Available at: www.nfacc.ca
34. Grandin T. (2002) Behavioural Principles of Livestock Handling. American Registry of Professional Animal Scientists. Available at: http://lamar.colostate.edu/%7Egrandin/references/new.corral.html Accessed: September 10, 2011.
35. Shulaw W.P. (2005) Sheep Care Guide. American Sheep Industry Association. Available at: www.sheepusa.org/Publications. Accessed: May 14, 2013.
36. Dwyer C. (2008) Sheep senses, social cognition and capacity for consciousness. In: *The Welfare of Sheep Vol. 6*. (Phillips C., ed.). Dordrecht NE: Springer.
37. Davis H., Norris C. & Taylor A. (1998) Whether ewe know me or not: the discrimination of individual humans by sheep. *Behavioural Processes* 43:27–32
38. Peirce J.W, Leigh A.E, da Costa A.P.C & Kendrick K.M. (2001) Human face recognition in sheep: lack of configurational coding and right hemisphere advantage. *Behavioural Processes* 55:13-26.

39. Canadian Food Inspection Agency (CFIA) (2012) Canadian Sheep Identification Program. Available at: www.inspection.gc.ca/animals/terrestrial-animals/traceability/sheep-identification/eng/1328852777479/1328852957523 Accessed: May 2013.
40. Davies H. (2011) Sheep Tagging and EID. Available at: www.defra.gov.uk/fawc/files/Sheep-ear-tagging-8-August-2011.pdf Accessed: May 14, 2013.
41. Grant C. (2004) Behavioural responses of lambs to common painful husbandry procedures. *Applied Animal Behaviour Science* 87:255-273.
42. Dwyer C. (2008) The management of sheep. In: *The Welfare of Sheep Vol 6*. (Phillips C., ed.). Dordrecht NE: Springer.
43. Ontario Sheep Marketing Agency (n.d.) Chapter 9: Shearing and foot trimming. In: *Sheep Production Manual*. Guelph ON: Ontario Sheep Marketing Agency. Available at: www.ontariosheep.org/SHEEPPRODUCTIONINFO/Manuals.aspx Accessed: May 14, 2013.
44. Michigan Commission of Agriculture and Rural Development (2012) *Generally Accepted Agricultural Practices for the Care of Farm Animals*. Available at: www.michigan.gov/documents/mdard/2012_FINAL_ANIMAL_CARE_GAAMP_378553_7.pdf
45. Alberta Lamb Producers (2007) *Alberta Sheep: Shearing your Sheep*. Available at: www.ablamb.ca/documents/factsheets/ShearingYourSheep.pdf Accessed: May 10, 2013.
46. Schoenian S. (2011) Sheep hoof health and management. University of Maryland Extension Small Ruminant Program. Powerpoint presentation. Available at: www.slideshare.net/schoenian/sheep-hoof-health-and-management Accessed: May 13, 2013.
47. Schoenian S. (2012) The Welfare of Docking and Castrating Lambs. University of Maryland Extension. Available at: www.sheepandgoat.com/articles/welfaredockcast.html Accessed: April 14, 2013.
48. Bassett A. (2010) *Technical Paper No. 10: Castration of Sheep*. Animal Welfare Approved. Available at: www.animalwelfareapproved.org/wp-content/uploads/2011/03/TAFS-10-Sheep-Castration.pdf Accessed: April 14, 2013.
49. Farm Animal Welfare Council (FAWC) (2008) *FAWC Report on the Implications of Castration and Tail Docking for the Welfare of Lambs*. Available at: www.fawc.org.uk/reports.htm Accessed: April 14, 2013.
50. Canadian Veterinary Medical Association (2012) Position Statement: Castration of Cattle, Sheep, and Goats. Available at: www.canadianveterinarians.net/documents/castration-cattle-sheep-goats#.UlLhTxY-y0s Accessed: September 26, 2013.
51. Tierney L.A. & Hallford D.M. (1985) Mating behavior, serum testosterone and semen characteristics in vasectomized and short scrotum rams. *Theriogenology* 23: 535-545,
52. Ontario Sheep Marketing Agency (n.d.) Chapter 6: Reproduction and Lambing. In: *Sheep Production Manual*. Guelph ON: Ontario Sheep Marketing Agency. Available at: www.ontariosheep.org/LinkClick.aspx?fileticket=yhGBFtub1XI%3d&tabid=96 Accessed: April 15, 2013.
53. Canadian Veterinary Medical Association (2007) Position Statement: Pain Control in Animals. Available at: www.canadianveterinarians.net/documents/pain-control-in-animals#.UlLzMhY-y0s Accessed: September 26, 2013.
54. Federation of Animal Science Societies (FASS) (2010) Sheep and goats. In: *Guide for the Care and Use of Agricultural Animals in Research and Teaching*. 3rd ed. Champaign IL: FASS. Available at: www.fass.org/page.asp?pageID=216&autotry=true&ULnotkn=true Accessed: May 13, 2013.

55. Canadian Sheep Federation (n.d.) The Virtual Tool Box - Breeding. Available at: www.cansheep.ca/User/Docs/CANSHEEPBreeding%20Section%208_EC1.pdf Accessed: May 13, 2013.
56. Ontario Sheep Marketing Agency (n.d) Resource Library, Reproduction and Breeding-Breeding and Genetics. Guelph ON: Ontario Sheep Marketing Agency. Available at: www.ontariosheep.org/SHEEPPRODUCTIONINFO/ResourceLibrary.aspx Accessed: May 27, 2013.
57. Ontario Sheep Marketing Agency (n.d.) Resource Library, Reproduction and Breeding - Maintaining a productive flock – culling. Guelph ON: Ontario Sheep Marketing Agency. Available at: www.ontariosheep.org/SHEEPPRODUCTIONINFO/ResourceLibrary.aspx Accessed: May 27, 2013.
58. Engstrom D. (2010) *Factsheet Building Better Lambs 4: Managing Rams for Superior Performance*. Available at: www.ablamb.ca/documents/factsheets/BBL4ManagingRamsScreen.pdf Accessed: May 26, 2013.
59. Greinger S.P. (2006) Livestock Update: Ewe Management Tips: Mid and Late Gestation.Virginia Cooperative Extension. Available at: www.sites.ext.vt.edu/newsletter-archive/livestock/aps-06_11/aps-381.html Accessed: May 21, 2013.
60. Mellor D. (1990) Meeting colostrum needs of newborn lambs. *In Practice* 12:242-244.
61. Eales F.A. (1982) Detection and treatment of hypothermia in newborn lambs. *In Practice* 4:20-22.
62. Sevi A., Casamassima D., Pulina G. & Pazzona A. (2007) Factors of welfare reduction in dairy sheep and goats. *Italian Journal of Animal Science* 8 (suppl. 1):81-101.
63. Department for Environment, Food and Rural Affairs (DEFRA) (2000) *Code of Recommendations for the Welfare of Livestock: Sheep*. London UK: Defra Publications.
64. Canadian Food Inspection Agency (CFIA) (2008) *Livestock Transport Requirements in Canada*. Available at: www.inspection.gc.ca/english/anima/trans/transpoe.shtml Accessed: September 27, 2011.
65. Canadian Food Inspection Agency (CFIA) (2008) *Transportation of Animals Program - Compromised Animals Policy*. Available at: www.inspection.gc.ca/english/anima/trans/polie.shtml Accessed: June 17, 2013.
66. Scientific Committee on Animal Health and Animal Welfare (2002) *The Welfare of Animals during Transport (details for horses, pigs, sheep and cattle)*. European Commission. Available at: www.ec.europa.eu/food/fs/sc/scah/out71_en.pdf Accessed: September 27, 2011.
67. Ontario Ministry of Food, Agriculture, and Rural Affairs (OMAFRA) (2008) Euthanasia Action Plan for Sheep and Goats. Available at: www.omafra.gov.on.ca/english/livestock/animalcare/facts/info_action_plan_shg.htm Accessed: September 29, 2012.
68. American Veterinary Medical Association (AVMA) (2007) *AVMA Guidelines on Euthanasia (formerly Report of the AVMA Panel on Euthanasia)*. Schaumburg IL: American Veterinary Medical Association. Available at www.avma.org/issues/animal_welfare/euthanasia.pdf Accessed: September 29, 2012.
69. Turner P.V. & Doonan G. (2010) Developing on-farm euthanasia plans. *Canadian Veterinary Journal* 51:1031–1034.
70. Grandin T. (2010) *Improving Animal Welfare: A Practical Approach*. Wallingford UK: CABI.
71. Canadian Veterinary Medical Association (2011) Canadian Veterinary Medical Association Position Statement: Euthanasia. Available at: www.canadianveterinarians.net/documents/euthanasia#.Un0KkShWLg5 Accessed: September 30, 2012.

Livestock Safety Index Chart

The Livestock Temperature Humidity Index* (THI Table 1) was introduced by American animal scientists to alert producers of potential heat stress periods for livestock. The THI combines the effects of temperature and humidity into one value. The Livestock Safety Index (LSI) contains three stress categories (temperature given in Celsius [°C]):

- **Livestock Alert** - LSI 24-25.5: when the index reaches this range, heat stress will first appear. Precautionary measures should be taken to reduce heat stress conditions in confinement housing or livestock trailers.
- **Livestock Danger** - LSI of 26-28: an index in this category is dangerous for confined animals.
- **Livestock Emergency** - LSI of 29 or higher: These conditions are most likely to occur when air temperature exceeds 32°C (90°F). No cloud cover and little air movement are additional hazards found in such heat stress weather. Livestock should not be worked or shipped when the index reaches this level.

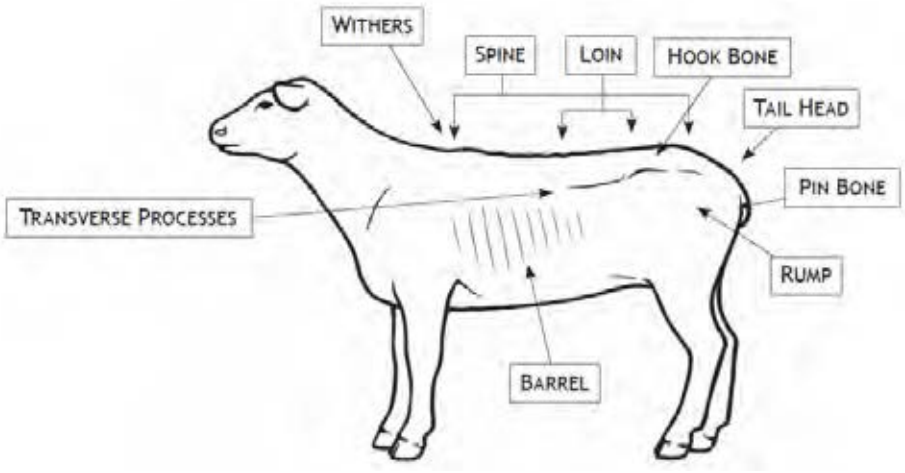
Table 1: Livestock Temperature Humidity Index* (THI) at specific temperatures and relative humidity levels.

Ambient air		Relative Humidity (%)					
Temp. °F	Temp. °C	20	30	40	50	60	70
100	37.8	26	29	30	31	33	34
98	36.7	26	28	29	31	32	33
96	35.6	26	27	28	30	31	32
94	34.4	26	27	28	29	31	32
92	33.3	25	26	27	28	29	30
90	32.2	25	26	26	27	28	29
88	31.1	24	24	26	27	27	28
86	30	23	24	25	26	27	27
84	28.9	22	23	24	25	26	27
82	27.8	22	23	23	24	25	26
80	26.7	21	22	23	23	24	24
78	25.6	20	21	22	23	23	24
76	24.4	19	21	21	22	22	23
Livestock Safety Index (°C)		Normal <23	Alert 24-25.5	Danger 26-28	Emergency >29		

* The Livestock THI was adapted from the human Humidex Chart, which can be found at: www.ccohs.ca/oshanswers/phys_agnets/humidex.html

Body Condition Scoring

Illustration of a sheep with a BCS score of 2.[1]



CROSS SECTION OF THE LOIN AREA

BODY CONDITION SCORING OF SHEEP

Throughout the production cycle, sheep producers must know whether or not their sheep are in condition (too thin, too fat, or just right) for the stage of production: breeding, late pregnancy, lactation.

Weight at a given stage of production is the good indicator, but as there is a wide variation in mature size between individuals and breeds, it is extremely difficult to use weight to determine proper condition. Body condition scoring describes the condition of a sheep, is convenient and is much more accurate than a simple eye appraisal.

A body condition score estimates condition of muscling and fat development. Scoring is based on feeling the level of muscling and fat deposition over and around the vertebrae in the loin region (Figures 1-3). In addition to the central spinal column, loin vertebrae have a vertical bone protrusion (spinous process) and a short horizontal protrusion on each side (transverse process). Both of these protrusions are felt and used to assess an individual body condition score.

FIGURE 1

Feel for the spine in the centre of the sheep's back, behind its last rib and in front of it's hip bone.

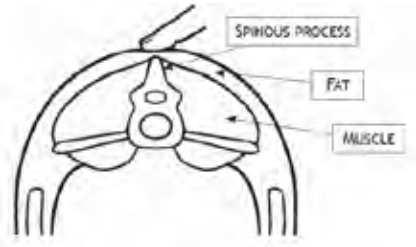


FIGURE 2

Feel for the tips of the transverse processes.

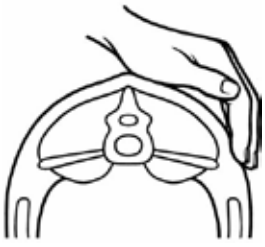
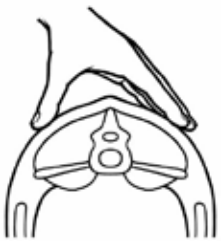


FIGURE 3

Feel for fullness of muscle and fat cover.



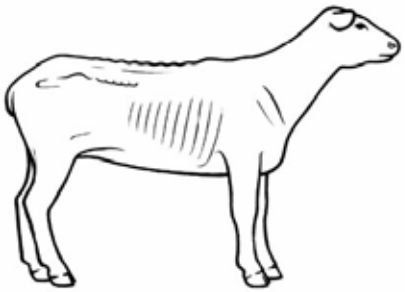
1 The source of the materials is www.agriculture.alberta.ca. The use of these materials by the National Farm Animal Care Council (NFACC) is done without any affiliation with or endorsement by the Government of Alberta. Reliance upon NFACC's use of these materials is at the risk of the end user.

Body Condition Scoring (continued)

BODY CONDITION SCORES FOR SHEEP

Overview of all the body condition scores for Sheep

BCS 1



WHOLE BODY

- Emaciated
- Boney processes can be easily felt

SPINE

- Dorsal spinous processes are sharp and prominent
- Easily felt through skin

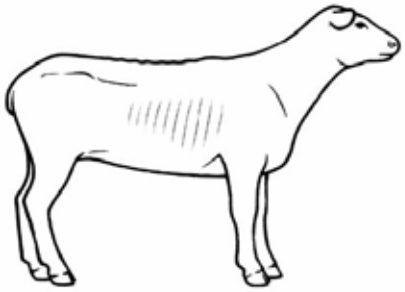
LOIN

- No fat cover
- Loin muscles very shallow

TRANSVERSE PROCESSES

- Transverse processes sharp
- Easy to pass fingers underneath them

BCS 2



WHOLE BODY

- Thin
- More difficult to feel between each process

SPINE

- Dorsal spinous processes still prominent, but not as sharp

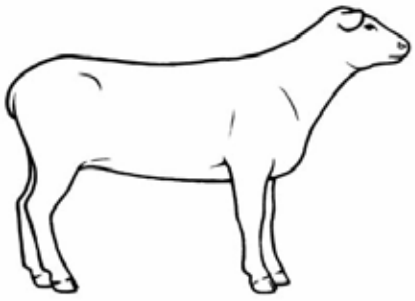
LOIN

- Loin eye muscle fuller
- Virtually no fat cover

TRANSVERSE PROCESSES

- Transverse processes rounder on edges
- Slight pressure needed to push underneath them

BCS 3



WHOLE BODY

- Average

SPINE

- Spinous processes smoother and less prominent
- Some pressure required to feel between them

LOIN

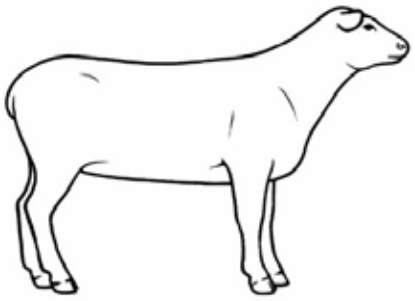
- Loin muscle full, some fat cover

TRANSVERSE PROCESSES

- Transverse processes smooth
- Firm pressure needed to push fingers under edge

Body Condition Scoring (continued)

BCS 4



WHOLE BODY

- Fat
- Fat accumulations over tail head

SPINE

- Considerable pressure needed to feel dorsal spinous

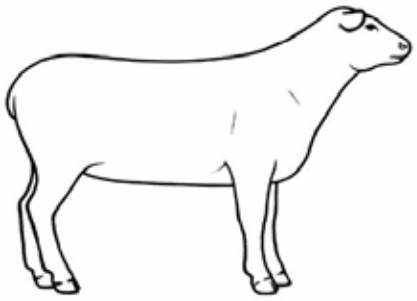
LOIN

- Loin eye muscle full with discernible fat cover

TRANSVERSE PROCESSES

- Transverse processes can't be felt

BCS 5



WHOLE BODY

- Obese
- Fat pad over tail head

SPINE

- Dorsal spinous processes can't be felt
- Depression often present where they would normally be felt

LOIN

- Loin eye muscle very full
- Thick covering of fat

TRANSVERSE PROCESSES

- Transverse processes can't be felt

NOTE: There can be extreme differences between breeds when body condition scoring sheep. Some maternal breeds lay down a lot of internal fat, not detectable externally. Whereas, the more muscular, meat terminal breeds can appear to have better condition over the loin area than the less muscular breeds.

Accessing Veterinary Services

Provincial Veterinary Organizations

These veterinary organizations may be able to help you locate veterinarians in your area if you are having finding a flock veterinarian. Some of the websites have search engines where you can search yourself, for others, you will have to call and ask.

College of Veterinarians of British Columbia
Suite 107, 828 Harbourside Drive
North Vancouver, BC V7P 3R9
www.cvbc.ca/cfm/index.cfm
E-mail: reception@cvbc.ca
Telephone: 604-929-7090
Toll free in BC: 800-463-5399
Fax: 604-929-7095

Alberta Veterinary Medical Association (ABVMA)
#950 Weber Centre, 5555 Calgary Trail NW
Edmonton, Alberta T6H 5P9
www.abvma.ca
E-mail: avma@avma.ab.ca
Telephone: 780-489-5007 or toll free 800-404-2862
Fax: 780-484-8311

Saskatchewan Veterinary Medical Association (SVMA)
102 - 108 Research Drive
Saskatoon SK S7N 3R3
www.svma.sk.ca
E-mail: svma@svma.sk.ca
Telephone: 306-955-7862
Fax: 306-975-0623

Manitoba Veterinary Medical Association (MVMA)
6014 Roblin Blvd.
Winnipeg, Manitoba R3R 0H4
www.mvma.ca
General E-mail: adowd@mvma.ca
Telephone: 204-832-1276
Fax: 204-832-1382

College of Veterinarians of Ontario (CVO)
2106 Gordon Street
Guelph, ON N1L 1G6
www.cvo.org
E-mail: inquiries@cvo.org
Telephone: 519-824-5600
Toll free in Ontario 800-424-2856
Fax: 519-824-6497

Ordre des medecins veterinaires du Quebec (OMVQ)
800, avenue Ste-Anne, bureau 200
Saint-Hyachinthe, QC J2S 5G7
www.omvq.qc.ca
E-mail: omvq@omvq.qc.ca
Tel: 450-774-1427
Toll Free: 1-800-267-1427
Fax: 450-774-7635

New Brunswick Veterinary Medical Association (NBVMA)
c/o Dr. George Whittle 1700 Manawagonish Rd.
Saint John, NB E2M 3Y5
www.nbvma-amvnb.ca
Telephone: 506-6351-8100

Nova Scotia Veterinary Medical Association (NSVMA)
15 Cobequid Road
Lower Sackville, Nova Scotia B4C 2M9
www.nsvma.ca
E-mail: info@nsvma.ca
Telephone: 902-865-1876
Fax: 902-865-3759

Licensing Body Newfoundland & Labrador College of Veterinarians
Box 718
Carbonear, NL A1Y 1C2
E-mail: andrewpeacock@gov.nl.ca
Telephone: 709-945-3007
Télécopieur: 709-945-3006

Prince Edward Island Veterinary Medical Association
The Farm Centre Building
420 University Avenue
Charlottetown, PE C1A 7Z5
www.peivma.com
Telephone: 902-569-4343, 902-367-3757 (voicemail)
Fax: 902-569-4563

Individual Examination and First Aid

Examination of the Individual

When health problems are identified and dealt with quickly, they affect fewer animals, decrease losses and reduce suffering. Examination of individual animals is an important adjunct to flock examination. Every stockperson should be capable of examining a sheep to identify important physical abnormalities. In many cases, methodical examination of one or more affected sheep can lead to a tentative diagnosis, or at the very least a short list of differential diagnoses, permitting first aid and development of a plan for further diagnostics, treatment and prevention, in consultation with the flock veterinarian.

It is important to be orderly and consistent when conducting a physical examination. First, observe the animal from afar, noting attitude and awareness of its surroundings, feed and water consumption, gait and posture, and any discharges around head and rear, especially excessive fecal staining of the wool suggesting diarrhea. Count the breaths taken per minute while the animal is undisturbed. Sheep that are disturbed or kept under high ambient temperatures will have higher respiratory rates than normal.

When moving the animal, note its gait and if this sudden activity induces a cough and whether urination and defecation occurs normally. Catch and restrain the sheep only to the degree required to conduct the hands-on part of the examination. Begin by taking the rectal temperature, preferably using a digital thermometer; rectal temperatures up to 40ºC are considered in the normal range. While you are waiting, record body condition over the loin and use a hand pressed in the left flank to assess rumen fill and contractions. Assess skin and fleece for abnormalities and infestations; "wool break" indicates stress or disease in the preceding weeks.

Examination:

- Examine the head:
  - check for bottle jaw, enlarged lymph nodes along the jawline, orf lesions and nasal discharge due to respiratory infections
  - assess the teeth for wear and other abnormalities
  - assess the colour of the oral mucous membranes and the conjunctiva (anemia check) and look for deviations of the eye, sunken eyes due to dehydration, or inflammation due to pink eye.
- Assess the character of the breathing use a stethoscope if you have one, or just watch and listen
- Record a heart rate, placing a stethoscope (if you have one) on the area of the chest under the left elbow
- Press and release your fists in the flanks to assess the gut, checking for abnormally sloshy, dry or gassy contents
- Palpate the udder or scrotum for asymmetry, heat, swelling, or scarring
- Check the vulva or prepuce for swelling and unusual discharges and odors
- Check the feet and legs for footrot (trim if necessary to complete your assessment) and other locomotor abnormalities
- When in doubt, compare findings to unaffected sheep in the same group.

Normal ranges for physical examination findings in sheep

Finding	Normal Range
Respiration	20-30 breaths/minute
Heart rate	70-90 beats/minute
Rectal temperature	38.9-40.0°C (average 39.5°C)
Rumen contractions	1-2 contractions/minute

Individual Examination and First Aid (continued)

Handling Disease Outbreaks

- Examine affected individuals
- Retain and chill recent dead animals for post mortem
- Retain the fetus and a portion of placenta from abortions
- Collate numbers affected, assess "risk factors" and call your veterinarian with the information
- Isolate affected animals if there is any chance an infectious agent is involved – biosecurity principles apply
- Consider removing feed if possibly feed-related
- Consider moving sheep elsewhere if toxin could be involved
- Arrange a veterinary visit
- Use mass-medication or vaccination only after veterinary consultation

Flock Medical Emergencies and First Aid

Some conditions are true emergencies and are best dealt with immediately, usually before a veterinarian can attend. Other conditions are straightforward to treat and do not require a veterinarian to attend (e.g. entropion, pink eye, minor wounds). You should have on hand certain medications and equipment for emergency treatment and you should be familiar with the correct methods of administration of these treatments. These standard operating procedures should form part of your flock health plan, which should be developed by you and your veterinarian in the context of a valid veterinary-client-patient relationship.

The following are examples of medical emergencies for which stockpersons should be prepared (knowledge and supplies): fly-strike; rumen overload; hypocalcemia (milk fever); ketosis (pregnancy toxemia); polioencephalomalacia; bloat; water belly (urinary calculi); rectal prolapse; vaginal prolapse; uterine prolapse; and stabilizing fractures.

There are a few things to remember when administering medications: always read the label on any medications; don't mix medications; confirm live weight if possible and dose appropriately; think about withdrawal times before treating and record all treatments. Talk to your veterinarian if extra-label drug use is required. Injecting wet or muddy sheep can be associated with post-injection infections. Needles can be multi-use in some cases (e.g. vaccinating), but replace frequently; always use a clean needle to drawing up drugs or vaccines. Take care with medical waste.

Understanding Sheep Behaviour

Fact Sheet

Introduction to Sheep Handling and Behaviour

Understanding sheep behaviour is the key when handling sheep.

Specific Behaviour Traits

Sheep are created with specific behaviour traits. Knowing what these traits are can make handling them much easier.

- Sheep are social animals, so try and prevent seclusion.
- Sheep by nature are followers; let them follow and don't drive them as you would cattle.
- Sheep are docile animals by nature.
- Sheep have good memories; these memories need to be positive ones as much as possible.

Sheep react to their surroundings, this includes the working environment and facilities; the following suggestions will help make the experience positive:

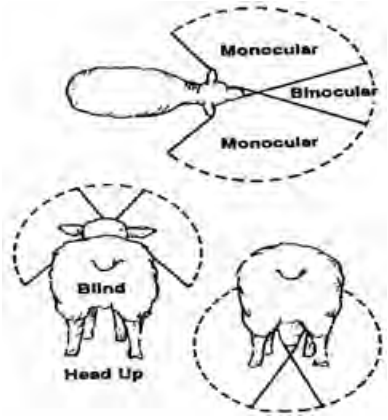
- Sheep like routine, so be patient when introducing something new.
- Sheep reactions are predictable, so use them.
- Sheep react negatively to loud noises and yelling.
- Sheep will bunch up in corners to protect themselves.
- When moving, gathering or sorting sheep, the more efficient the operation the better; wool grabbing and rough handling will cause bruising.
- Sheep tend to move in the opposite direction of the handler.
- Sheep have a flight zone, determine what this is for your flock.
- Sheep move best when not afraid, so work slowly and calmly.
- Sheep do not like to move into the darkness; place a chute facing a well lit area.
- Sheep move better on a flat surface or uphill.
- Sheep will move towards other sheep.
- Sheep will move to a partially full pen.
- Sheep will move better through long, narrow pens and chutes rather than square pens and wide chute systems.
- Sheep resist moving from one type of surface to another.
- Sheep have no depth perception, so shadows, dark surfaces and water are an issue.
- Sheep fear new visual objects.

Sight and Hearing

Sheep and other farm animals have a well developed sense of hearing. They capture a wider frequency of sound than is audible to our ears. Thus it is important while feeding and caring for the animals that you talk to them in a calm, reassuring voice. When they sense that you mean no harm, they will turn to their usual business of eating, drinking and feeding their young.

Humans have binocular vision, focusing both eyes simultaneously to achieve good depth perception and clarity for objects directly in front of them. However humans peripheral vision is very limited. Sheep see the world through a different set of eyes than ours. Sheep have their eyes set on the side of the head. They have a narrow field of binocular vision in front of their head and wide peripheral fields of monocular vision.

The area in the back of the sheep's head is a blind spot when their head is raised. If a sheep is approached from the rear, a handler can remain undetected visually and have a better chance at catching the animal. With its head down in a grazing position the sheep can see in all directions; a good defensive adaptation whereby the sheep can see predators' from all sides while grazing.



Saskatchewan Sheep Development Board
2213C Hanselman Ct.
Saskatoon, Saskatchewan
S7L 6A8

AGRICULTURE COUNCIL OF SASKATCHEWAN INC.

Saskatchewan Ministry of Agriculture

Agriculture and Agri-Food Canada
Agriculture et Agroalimentaire Canada
Canada

Understanding Sheep Behaviour (continued)

Sheep Behaviour

Moving Sheep

Sheep can be led by shaking a bucket of grain, driven from the rear by a mover, or both with a dog or person to help. When driving sheep use a distracting noise first to alert them. A plastic trash bag, rattle(plastic bottle filled with stones), sticks knocked together or a bark from the dog will get the sheep on their feet and moving away from the noise.

Pressure develops from being too close to the flock of sheep. Use a minimum of noise and pressure so the sheep travel slowly and take a steady course. Sheep have a psychological distance or "flight zone" within which they try to distance themselves from the handler. A safe distance to follow behind the flock is three body lengths (about 10-12 feet) behind the rear of the group.

Sheep at a run are out of control, except over long distance. If they are really frightened they will run away in a panic. When this happens only a swift dog can overtake the leader and turn the sheep around.

Guide the sheep to the pen by moving them at a brisk walk along physical barriers such as a fence line, laneway, the sides of a building etc. Sheep move best on level ground or uphill. Most of their weight is over their rear legs making it awkward to move quickly down hill, especially if the ewes are pregnant. Make sure all the gates are open to the gathering pen. As the sheep approach, ease the pressure on them so they can find their way through the restricted opening.

Holding pens should be rectangular so sheep flow down to one end, rather than square which may start a circular flow around the edges and back out of the pen. Holding pens and catch pens should have open sides so the sheep do not feel trapped. They should be able to see other sheep.

Decoys can be used in this manner to lure sheep into pens or chutes.

Crowd the sheep close in a smaller pen so that the shepherd can handle them easily without them running out of reach. If a small pen is not available, crowd the sheep into the corner of a large pen, using a portable hinged panel to close in the rear of the group. Secure the ends of the hinged panel to the sides of the pen to confine the animals. The crowding area should have corners with no less than a 90 degree angle to keep the sheep in the corners from being crushed or smothered.

A workable group will be up to five sheep deep, and four sheep across (or within arm's length on either side.) Deeper pens of sheep are more difficult to step through, front to back. The sheep should be gathered up tightly, with standing room only and a few feet to spare in the rear for you to work an individual. Sheep are too close together when some are piling on top of each other or the weak ones have dropped down out of sight.

Let the sheep quiet down for five to ten minutes before working them again. When you enter the pen, don't climb over rails, use a gate and enter in a non-threatening manner.

When moving sheep up a loading ramp or down a narrow chute stay approximately 10 feet back from the last sheep to avoid having animals in the rear turn around and run past you. Keeping this distance away from the group gives you time to react to the flow of sheep while still creating some pressure to move the sheep forward.

If sheep become wedged together in a narrow spot, move around the bunch to the front and use noise or visual distraction such as a broom or crook to force the sheep to step backwards. Avoid stepping through the center of the flock because there is no easy escape for you when they free themselves.

Do not move sheep in the heat of the day as they will be slow to gather and suffer from heat exhaustion.

List of Further Reading:

Canadian Agri-Food Research Council, *Recommended Code of Practice for the Care and Handling of Sheep*

Canadian Food Inspection Agency, Livestock Transport Requirements in Canada

Contacts:

Agriculture Knowledge Centre
1 - (866) 457-2377 aginfo@gov.sk.ca

Saskatchewan Ministry of Agriculture
Livestock Branch - Regina Rm 202 3085 Albert Avenue
(306) 787-4685 Regina, SK S4S 0B1

Livestock Branch - Saskatoon 3830 Thatcher Avenue
(306) 933-5992 Saskatoon, SK S7K 2H6

Saskatchewan Sheep Development Board
(306) 933-5200 2213C Hanselman Court
sheepdb@sasktel.net Saskatoon, SK S7L 6A8
www.sksheep.com

Tail Docking

Photos showing tail being docked at the distal end of the caudal fold

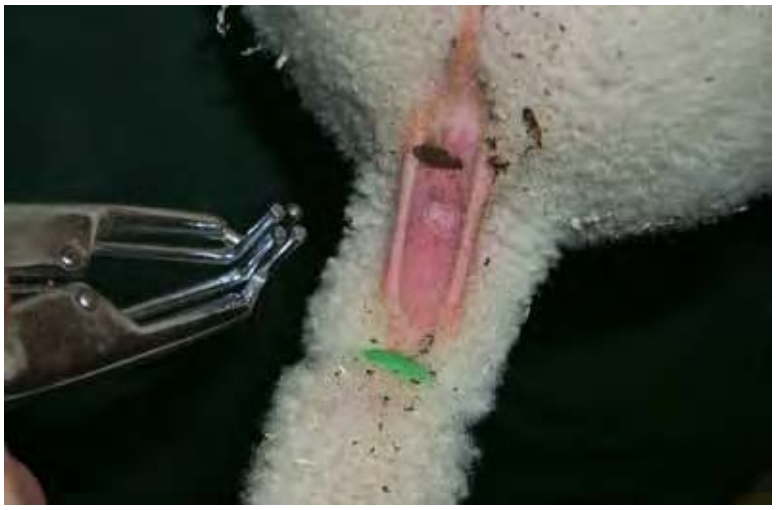


Photo credit to: Dr. Mary C. Smith, Cornell University

Lambing and Neonatal Care

G a: Assisting Ewes at Lambing

G b: Care of Newborn Lamb

G c: Treating Hypothermia (Chilling) and Hypoglycemia (Starvation) in Very Young Lambs

FACTSHEET

ORDER NO. 98-091

JANUARY 1998

AGDEX 431/23

Ontario Ministry of Agriculture, Food and Rural Affairs

ASSISTING THE EWE AT LAMBING

John Martin, Health Management, OMAFRA

This factsheet is one of a set of three, "Assisting the Ewe at Lambing", "Care of the Newborn Lamb", and "Treating Hypothermia (Chilling) and Hypoglycemia (Starvation) in Very Young Lambs", concerning lamb survival. They should be read together.

The ewe's gestation period is from 144 to 151 days, with an average of 147 days. The date that the first lambing is to be expected can be calculated from the date of the first exposure of the ewes to a fertile ram. Before lambing starts, a kit of lambing aids should be prepared. The essentials of this kit are:

- soap
- disinfectant
- obstetrical lubricant
- sterile syringes - 10ml and 1ml
- hypodermic needles of sizes suitable for the ewe and the lamb
- antibiotics and vitamin E/selenium injections
- lambing cords and lamb snare
- navel disinfectant - iodine based
- intra-uterine oblets
- clean towels or cloths
- clean pail for warm water.

Colostrum and milk replacer should also be available. The colostrum can be from ewe or cow, frozen in 500ml units. If lambing is to be inside a building, sufficient individual pens are needed to allow each ewe in the group 2 - 3 days individual housing with her lamb/s.

Signs of impending lambing

About 10 days before the ewe will lamb, the teats begin to feel firm and full of colostrum. Between then and lambing the lips of the vulva slacken and become slightly swollen. In the last hours before lambing, many ewes will separate from the flock. At this point they should be moved into a lambing pen.

At birth, the normal presentation of a lamb is spine upwards, forefeet with the head between them pointing toward the cervix. The cervix, itself, is still sealed by a mucous plug.

Lambing and Neonatal Care (continued)

The lamb is surrounded by two fluid-filled sacs, the allantois and the chorion. These first and second waterbags have acted as cushion to prevent injury to the developing foetus. They form part of the placenta. The placenta is attached to the wall of the ewe's uterus by about eighty small buttons, the cotyledons. It is through these and the placenta that the developing lamb has received nutrients from the ewe's blood supply. The placenta with the cotyledons will be expelled as the afterbirth.

Physiology of Parturition (lambing)

The mechanism by which any mammal gives birth is stimulated by changes to the dams hormone balance and the bulk of the uterine contents, (the foetus and the placental fluids). These stimuli cause the uterus to contract, pushing the foetus into the dilating cervix and expel it.

Lambing

In a normal lambing, there are three distinct stages:

1. *Dilation of the cervix*
   As the uterine contractions start, a thick creamy white mucous, the remains of the cervical seal, is passed from the vulva. This is often missed. Continued contractions of the uterus push the first waterbag into the cervix, stimulating its dilation. Eventually the cervix will be about the same diameter as the neck of the uterus. At this time the ewe is uneasy, getting up and down, switching her tail and bleating frequently. There may be some straining. This stage can take 3 - 4 hours.
2. *Expulsion of the lamb*
   As the uterine contractions become stronger and more frequent, the lamb and waterbags are pushed into the dilated cervix. The first waterbag bursts, releasing a watery fluid through the vulva. As the ewe continues to strain, the second waterbag is pushed through the vulva and ruptures, to release a thicker fluid.
   The rupturing of these bags has established a smooth, well-lubricated passage through the vagina. The hooves and nose of the lamb can often be seen in the second waterbag before it bursts.
   The ewe continues to strain, gradually expelling the lamb, forefeet first, followed by the head. The ewe may need considerable effort to pass the head and shoulders of the lamb through her pelvis. Once this happened, final delivery is rapid.
   The birth of a single lamb should take an hour or less from the rupture of the first waterbag. A ewe, lambing for the first time, or with a multiple birth could take longer.
3. *Expulsion of the afterbirth*
   The placenta serves no further function once the lamb has been born, and is passed 2 to 3 hours after delivery has finished. Nothing will be passed until after the first lamb has been born. In multiple births, there will be separate afterbirths for each lamb.

Signs of abnormal deliveries

Most ewes will lamb unaided and about 95% of lambs are born in the normal presentation, forefeet first. A normal delivery usually takes 5 hours from the start of cervical dilation to the delivery of the lamb, 4 hours for the dilation of the cervix and 1 hour for the actual delivery. The first 4 hours often go unnoticed.

If the ewe:

1. continues to strain, but there is no sign of the waterbags, or
2. continues to strain an hour after the rupture of the waterbags but there is no sign of a lamb, or
3. if the lamb appears to be wedged in the birth canal, or

Lambing and Neonatal Care (continued)

4. if there is an abnormal presentation, a leg back, head back etc., assistance may be needed. Any delay in assistance could mean the difference between a live and dead lamb.

Making the internal examination

Cleanliness is important to prevent infection of the uterus. Wash the area round the ewe's vulva with soap and a mild disinfectant to remove any manure and other debris. Scrub hands and arms with soap and a mild disinfectant, and lubricated with soap or an obstetrical cream. The hand is carefully slid into the vagina to feel the lamb and assess the situation. Obviously a person with a small hand is best suited for this task.

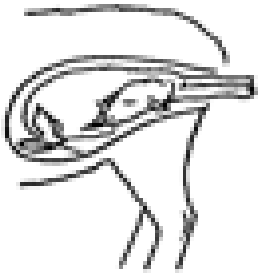
Normal presentation

In many cases the lamb will be presented normally, you will feel two forelegs with the head between them, in others there will be a malpresentation hindlegs instead of fore legs, or one or both hindlegs back, or a breech presentation, only the tail and rump felt.

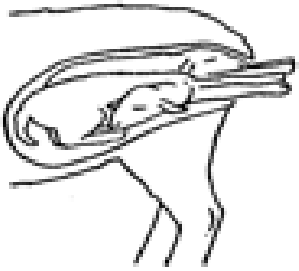
One leg back

Elbow lock

Both forelegs back



Head back



Four legs - one head

Twins - front and back

Breech presentation Hind Legs Only

Lambing and Neonatal Care (continued)

Resolutions

Normal Presentation - place the noose of a lambing cord over each leg above the fetlock joint and apply a firm steady pull synchronized with the ewe's straining. Lubricate the vagina around the lamb with obstetrical jelly to smooth the passage of the lamb. This is especially important if the waterbags have been ruptured for some time and the vagina has lost this natural lubrication.

Abnormal presentations must be corrected before attempting to pull the lamb. Do not attempt to convert a hind leg presentation to the normal delivery. Pull the lamb out hind legs first, straight back until the lamb's hind legs and pelvis are out of the vulva, then change the pull to downwards towards the ground behind the ewe. Pulling down before the lamb's pelvis is out will wedge the lamb in the pelvic canal of the ewe. Other malpresentations are possible.

Remember that multiple births are common. Two lambs may be presented with legs intertwined. Always ensure that the legs and head are part of the same lamb before attempting to pull it.

Occasionally, deformed lambs will be produced with enlarged heads, stiff joints or skeletal deformities. To successfully lamb a ewe in these situations may require help from an experienced shepherd or veterinarian.

As ewes often have multiple births, the same sequence of the rupture of the waterbag and expulsion of the lamb will be repeated for the delivery of each lamb. After an assisted lambing always check the ewe internally that there is not another lamb to be delivered.

Aftercare

In all cases, whether the delivery was natural or assisted, check that the lamb is breathing, its nostrils are clear of mucous and are not covered by any uterine membrane. At this time the lamb's navel should be disinfected to prevent infection.

The ewe usually starts to lick the lamb, this is a natural process and should be allowed to continue. Some ewes will eat the afterbirth, but this should be prevented as it can lead to digestive disturbance.

A healthy lamb struggles to its feet soon after birth and starts to nurse its dam. Lambs, weak from a protracted delivery should be helped to nurse, or given up to 250ml of colostrum by stomach tube. This first nursing is critical

as the colostrum contains antibodies to give the lamb immediate protection against infectious agents common to the flock. All lambs should nurse or be tube fed colostrum within 6 - 8 hours of birth. In the first 24 hours of life, each lamb should receive about one litre of colostrum. After 36 hours the lamb is unable to absorb any more antibody from the colostrum.

After any assisted delivery the ewe should be given an antibiotic injection and have an antibiotic oblet put into the uterus.

This factsheet was originally written by John Martin is a Veterinary Scientist, Sheep, Goat and Swine, Agriculture and Rural Division, OMAFRA, Fergus.

www.ontario.ca/livestock

Appendix Gb: Care of Newborn Lamb

FACTSHEET
ANIMAL SCIENCE
ORDER NO. 98-087
JANUARY 1999
AGDEX 431/23
Ontario Ministry of Agriculture, Food and Rural Affairs

CARE OF THE NEWBORN LAMB

J. Martin

This factsheet is one of a set of three, "Assisting the Ewe at Lambing", "Care of the Newborn Lamb", and "Treating Hypothermia (Chilling) and Hypoglycemia (Starvation) in Very Young Lambs", concerning lamb survival. They should be read together.

The profitability of a sheep enterprise depends on the number of lambs sold either for meat or as breeding stock. The number raised to market is a reflection of the complete management of the flock throughout the year. One of the critical points in this management cycle is lambing.

GESTATION CARE

The ewe is required to deliver strong healthy lambs and to have sufficient milk to raise those lambs. Her ability to do this is a reflection of the gestation management. After breeding a ewe should body score 2.5. Throughout much of the gestation period a diet of good hay should suffice. In the last six weeks, grain can be fed in addition to hay to allow for the growing lambs, the development of the udder, and the fat reserves of the ewe for lactation. The amount of supplementary feed depends on the size and body condition of the ewes and the quality of forage being fed. At lambing the body score should be between 3 and 3.5. Care must be taken not to feed too much grain early in gestation, gradually increasing the amount allows for lamb development. A leveling out or fall in late pregnancy grain intake can result in pregnancy toxaemia and death of the lamb(s) in utero. Conversely, too little grain will give an undersized, weak lamb with a poor chance of survival. Also, the ewe will have insufficient udder development for a good lactation.

Not less than four weeks before the due date of the first ewe, all the ewes should receive a booster vaccination against the clostridial group of diseases, (all first lamb ewes should have completed the primary vaccination course before breeding) and an injection of Vitamin E/selenium. If they are not to be sheared, they should at least be crutched to remove excess wool from the udder area.

LAMBING FACILITIES

Each ewe should have a lambing pen in which the bonding between ewe and lamb can be monitored, the lamb is easily caught for any procedures (tail docking etc.), and is seen to be nursing. Depending on the system used, the ewe can be put into this pen when lambing is observed to be imminent, or after the lamb has been dropped. The pen should be about 1.5m square with a corner divided off to give the lamb a safe area from the ewe. Once the lamb is vigorous and all treatments completed, it and the ewe can be let out into a larger pen with other ewe/lamb sets. After each ewe, the soiled bedding is removed and fresh bedding put down. On average, expect each ewe to spend three days in this pen.

LAMBING PREPARATIONS

To be prepared for lambing you will need two kits. One to assist the ewe at lambing (see Assisting the Ewe at Lambing, OMAFRA Factsheet No. 98-091) and the other to process each lamb as it is born.

LAMB PROCESSING KIT

This kit (see Figure 1) should contain:

- suitable syringe and needles
- iodine solution for dipping navels
- Vitamin E/selenium injection
- ear tags and applicators and/or tattooing pliers
- tail docking rings or cutter

LAMBING

The average gestation period for a ewe is 147 days, but some will always be early. Have the kit of lambing aids ready in advance.

The lamb should start breathing at birth. It may need help; check that there is no placenta covering the nostrils or mouth. A gentle rub over the chest with a

Lambing and Neonatal Care (continued)

towel or straw wisk, tickling the inside of the nostrils with a piece of straw or blowing into the nostrils (*do not allow your lips to come in contact with the wet lamb while doing this*) will often stimulate breathing. There is also a commercial device[1] for this task.

Figure 1. Lamb Processing Kit

TINT YOUR LAMBS

In the first few days of a lambs life there are several procedures that should be carried out. Once you are certain that the lamb has had adequate colostrum, TINT them.

T = Tails
I = Inject
N = Navels
T = Testicles

Tails

The tails need to be docked before the lamb is seven days old. (Code of Practice for Sheep). The tail can be removed with:

- electric or gas heated docker
- rubber ring
- crush and cut device
- rubber ring plus crushing device.

The docked tail should cover the anus of the ram or the vulva of the ewe. A good guide is to remove it at the joint in the tail bones just beyond the web on the underside of the tail.

Injection

In Ontario, newborn lambs can be born selenium deficient. As a routine, they should be injected with the appropriate dose of a Vitamin E/selenium preparation. Read the label on the bottle for the route of injection, either subcutaneous or intramuscular. Always inject into the neck area, never into the muscles of the hind quarters.

Navels

The navel of the new born lamb needs to be disinfected as soon after birth as possible. The untreated navel is an excellent route for infectious agents to enter the lamb causing internal abscessation or joint ill. An iodine solution is the most common disinfectant used. It is either sprayed onto the navel or the navel is dipped in a small container of the solution. If dipping the navels, replace the disinfectant solution in the container after every tenth lamb.

Castration

If the market lambs are to kept beyond three months of age, they need to be castrated.

Again, whether rubber rings, crushing or cut and pull is used, this should be done before seven days of age. (Code of Practice for Sheep).

Whether tattoos, ear tags, or ear notching is used, the lamb must be identified before it leaves the lambing pen.

FOSTERING

For any one of a variety of reasons, a lamb may need to be fostered onto another ewe. If possible fostering should be considered as an option before bottle feeding for the orphan.

Fostering should be as soon after birth as possible. If the lamb has not dried off, so much the better. If fostering from a set of triplets, choose the strongest lamb. Keep the ewe and the fostered lamb in a lambing pen until you are certain that the adoption has succeeded.

To persuade the ewe to accept the lamb, one of several techniques can be used. Rub the lamb in the placenta of the ewe's own lamb; if you are replacing a dead lamb, put its skin onto the adoptee; if the ewe still refuses, she can be put into a head gate to prevent her pushing the lamb away when it attempts to suckle. After a few days in the headgate, the ewe will usually accept the lamb.

John Martin is a Veterinary Scientist, Sheep, Goat and Swine, Agriculture and Rural Division, OMAFRA, Fergus.

www.ontario.ca/livestock

1 Constant Delivery Animal Resuscitator, McCulloch Medical.

POD
ISSN 1198-712X
Également disponible en français
(commande n°98-088)

98-087

TREATING HYPOTHERMIA (CHILLING) AND HYPOGLYCEMIA (STARVATION) IN VERY YOUNG LAMBS

Items to Have on Hand BEFORE Lambing Begins:

- ✓ Digital rectal thermometer to measure subnormal body temperatures (as low as 20°C).
- ✓ Frozen colostrum in small batches (150-250 mL or 5-8 oz).
- ✓ Lamb stomach tube and feeding syringe (60mL) or squeeze bottle (250 mL).
- ✓ Warming box with heater and thermostat.
- ✓ Aftercare unit: draft free pens that are warm, dry and well-bedded.
- ✓ Bottle of sterile 50% dextrose (500 mL bottle).
- ✓ Kettle for boiling water.
- ✓ Sterile 60 mL syringe with 20 gauge (pink) 1 inch needles.

Recognizing and Treating Hypothermia

The best way to recognize hypothermia is by taking the lamb's rectal temperature and observing its behaviour. The normal temperature of a lamb is 39-40°C.

The rectal temperature of any dull, weak lamb that seems unable or unwilling to suckle, should be checked. The SOONER action is taken, the better the lamb's chances of survival.

The basis of treatment of the hypothermic lamb is to warm it up and provide a source of energy to start heat production again.

Symbol definitions:
≤ less than or equal to
> greater than
< less than

Mild Hypothermia – Any Age

Temperature between 37 – 39 °C

Lamb is weak, depressed, appears empty but can stand.

ACTIONS

- Move lamb into shelter and dry off if wet.
- Feed colostrum by stomach tube (within the first hour of birth is best). Feed 50 mL/kg of bodyweight slowly over 5-10 minutes.
- Additionally feed 200 mL/kg bodyweight spread over three more feedings within the first 24 hours.
- Keep lamb with dam provided she is in a sheltered area.
- ENSURE lamb is nursing.
- Lamb is recovered once rectal temperature returns to normal; lamb and ewe can return to flock.

CAUTION Small lambs < 1.5 kg (3 lbs) at birth, may not have sufficient fat reserves to initiate heat production, even with colostrum.

ACTIONS

- In addition to colostrum, feed these small lambs an extra 50 mL/kg of a 20% dextrose solution by stomach tube 1 hour after the colostrum feeding.
- For small lambs (under 2 kg), wool pullovers worn for 2 to 4 days, helps to maintain body temperature. These very small lambs may do better in the orphan lamb pen.

Moderate to Severe Hypothermia

Temperature ≤ 37 °C

How old is the lamb?

Lambs over 5 hours old should be considered hypoglycemic (starved) as well as hypothermic. Do not warm before administering colostrum or glucose.

Can the lamb suckle and swallow?

Lambs with a suckle reflex can be tube fed. Lambs without a suckle reflex will need to be revived using intraperitoneal dextrose and then warmed prior to being tube fed.

If ≤ 37 °C; < 5 Hrs Old and Suckle Reflex (Able to Swallow)

Lamb is weak, empty, depressed and may be unable to stand.

ACTIONS

- Remove lamb from ewe and dry off if wet.
- Place in warming box until rectal temperature is >37°C.
- Administer warm colostrum by stomach tube. Feed 50 mL/kg bodyweight.
- Additionally feed 200 mL/kg body weight spread over three more feedings within the first 24 hours.
- Move to hospital pen with heat source and feed until strong and maintaining normal temperature of 39°C.
- Once strong, return to dam but make sure lamb is nursing (identify using livestock paint or marker).

If ≤ 37 °C; > 5 Hrs Old and Suckle Reflex (Able to Swallow)

CAUTION Assume that lamb has no fat stores and is hypoglycemic (starved). You must provide an energy source before warming. Lamb is tucked up, empty appearing and depressed.

ACTIONS

- Remove lamb from dam and dry off if wet.
- Administer warm colostrum by stomach tube. Feed 50 mL/kg bodyweight prior to warming!
- If you warm the lamb first, it will convulse and die.
- Place in warming box until rectal temperature is > 37°C.
- Again administer warm colostrum by stomach tube. Feed 50 mL/kg bodyweight. Additionally feed 200 mL/kg bodyweight spread over three more feedings within the first 24 hours.

(continued)

If ≤ 37 °C; > 5 Hrs Old and Suckle Reflex Continued

- Move to hospital pen with heat source (e.g. box in warm environment) and feed until strong and maintaining normal temperature (39°C).
- Once strong, return to dam but make sure lamb is nursing (identify using livestock paint or marker).

If ≤ 37 °C; > 5 Hrs Old and No Suckle Reflex (Not Able to Swallow)

CAUTION Do not attempt to stomach tube as this will result in the milk / colostrum being deposited in the lungs, which will kill the lamb. Lamb is often unable to stand.

ACTIONS

Reverse the hypoglycemia first before warming or lamb will convulse and die!

- The lamb must first be injected with a sterile solution of warm 20% dextrose at a dose rate of 10 mL/kg body weight into the abdominal cavity (intraperitoneal).

See techniques used to revive hypothermic and hypoglycaemic lambs below.

- Place in warming box until rectal temperature is > 37°C.
- Once revived and with a suckle reflex, administer warm colostrum by stomach tube. Feed 50 mL/kg bodyweight.
- Additionally feed 200 mL/kg bodyweight spread over three more feedings within the first 24 hours.
- Move to hospital pen with heat source (e.g. box in warm environment) and feed until strong and maintaining normal temperature (39°C)
- Once strong, return to dam but make sure lamb is nursing (identify using livestock paint or marker)

As in all conditions, prevention is the best cure for hypothermia. Good nutrition during gestation, good lambing environment, an awareness of weather conditions, observation of the ewe and lamb at lambing, and assisting where necessary, will go a long way to preventing lamb losses from hypothermia.

Techniques Used to Revive Hypothermic and Hypoglycemic Lambs

Using a Stomach Tube to Administer Warm Colostrum

- Sit with the lamb restrained on your lap. Measure the tube.
- The tube is passed into the side of the mouth in the space between the front and side teeth.

- Using gentle pressure, the tube is slid into the esophagus and down to the stomach.
- The tube will move easily. ANY resistance or COUGHING indicates that the tube has entered the windpipe and it should be removed immediately.

- The accidental passing of colostrum into the lungs will result in aspiration pneumonia and the death of the lamb.
- The esophagus is behind/beside the windpipe on the lamb's left. By placing your fingers on each side of the lamb's throat, you should be able to feel two tubes while sliding the stomach tube in; you will feel the windpipe and the tube passing down the esophagus.

- Slowly administer the warm colostrum either using a 60 mL feeding syringe or a 250 mL squeeze bottle.
- Colostrum should be administered over five minutes.
- Crimp the end of the tube over prior to removing to prevent aspiration.

Sourcing and Warming Colostrum to Feed to Hypothermic Lambs

Colostrum from a lamb's dam is best, other options listed in order of preference:

1. Individual healthy ewe colostrum from the same flock.
2. Pooled ewe colostrum from the same flock.
3. Pooled ewe colostrum from another flock (same disease status or better).
4. Pooled cow colostrum (use 30% more; feed every five hours in the first 24 hour period).
5. Any combination of the above.
6. Commercial colostrum replacement product.

Johne's Disease can be spread from infected cows and ewes through their colostrum. Use cows from a Johne's tested herd only. Occasionally lambs may develop severe anaemia from cow colostrum. Always identify source of colostrum so problem colostrum can be discarded.

Thaw frozen colostrum in a water bath at 35°C. Never microwave colostrum; it will destroy the proteins, destroying the antibodies in the colostrum.

Administering Dextrose Solution Using an Intraperitoneal (IP) Injection

- With a sterile 60 mL syringe, draw up 20 mL of sterile 50% dextrose using a sterile needle.
- Boil clean water and draw up 30 mL of this water into the same syringe.
- This will provide 50 mL of warm (38 – 40°C) 20% dextrose solution.
- The dose is 10 mL per kg bodyweight; 50 mL is sufficient for a 5 kg lamb.
- The lamb is suspended vertically by the forelimbs.
- The injection site is 2.5 cm (1 in.) below and to the side of the navel.
- Use a 20 gauge (pink) 1 inch needle.
- The needle is inserted at a 45 degree angle to the body wall (the needle is pointed in the direction of the lamb's pelvis). Ask your veterinarian to show you how to do it.

- The internal organs will be pushed away by the needle and not damaged.
- Both the **conscious** and **comatose** lamb can be injected in this manner.

Warming a Hypothermic Lamb

If temperature ≤ 37 °C

<u>Slowly</u> warm the lamb to restore body temperature (until it rises to 37°C). There are several acceptable methods to warm a lamb but some are more effective at increasing temperature.

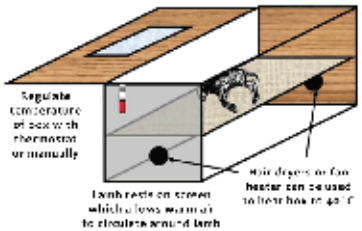
Warming a Hypothermic Lamb Continued

1. A warming box which allows circulation of warm air around the lamb (see diagram below).
2. A water bath warms most quickly but requires holding the lamb to prevent drowning, and immediate drying (towels and hair dryer) to prevent chilling again. This requires the most labour.
3. Heating pad and radiant heat. Both will warm the lamb but there is a risk of burning if used improperly.
4. Heat lamp alone is not recommended as it only warms one side.

Do not warm before administering an energy source (i.p. dextrose or warm colostrum.

Check rectal temperature every 30 minutes to avoid over heating.

A warm air heater is the preferred method.



A warming box can be constructed from cement board and wire mesh. Preferred heat source is a fan heater with thermostat, ideally a ceramic heater (must monitor temperature). A piece of plexiglass in the lid allows for lamb's condition to be monitored.

If temperature 37 °C to 39 °C

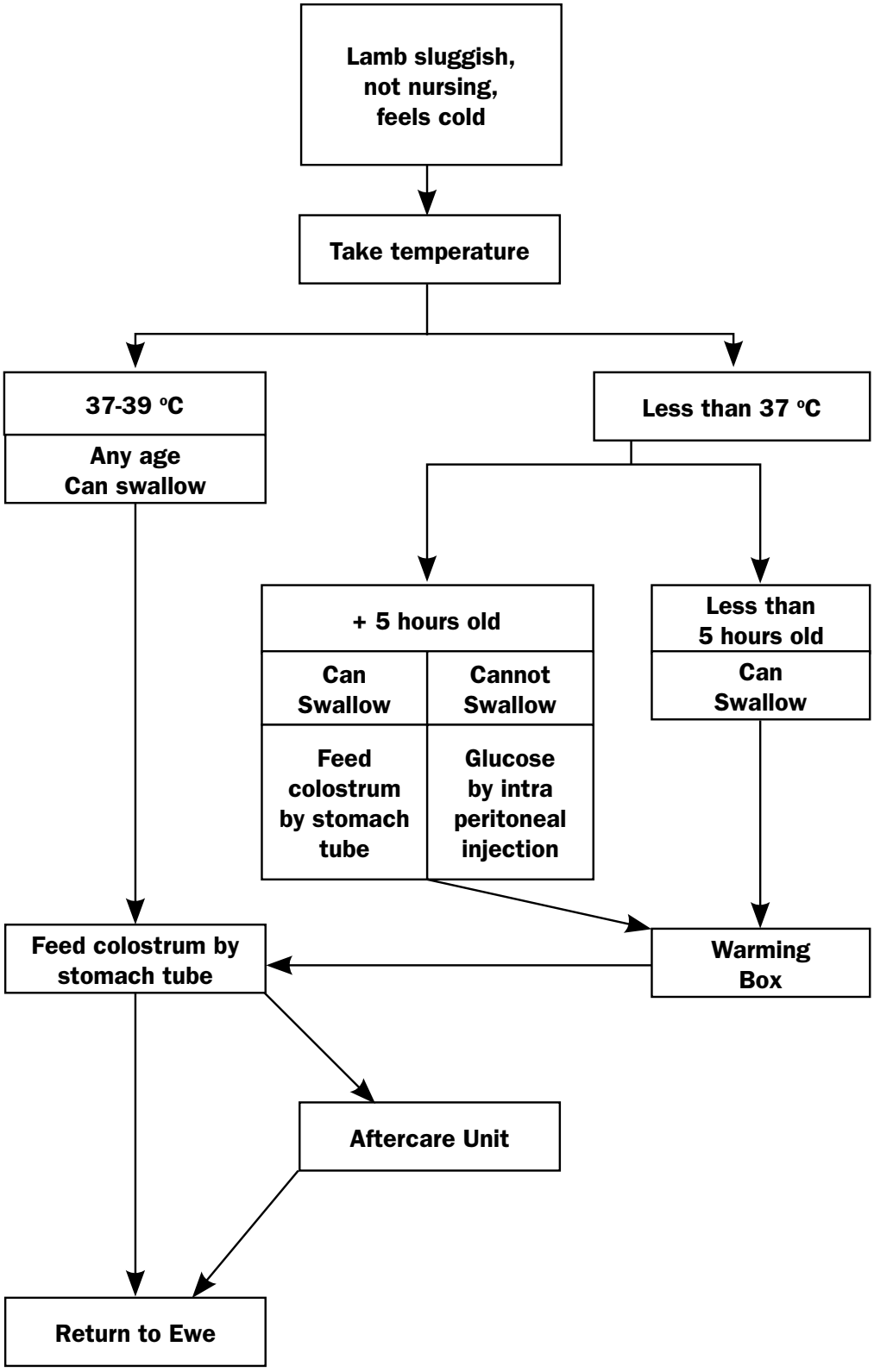
1. A heat lamp can be used to warm the lamb along with warm colostrum.
2. Keep separate from the dam until strong.
3. Suitable containers are disposable cardboard boxes, washable tubs or small pens made with square straw bales.
4. Make sure that can disinfect area if a disease outbreak occurs (e.g. scours)
5. Return to the dam once lamb is strong enough to nurse unaided.
6. Identify the lamb with livestock marker and keep in a small area so can observe easily. Watch for signs of rejection.
7. Lamb may need to be reared artificially if fails to thrive on the ewe.

UNIVERSITY of GUELPH

This chart is a summary of the factsheet Hypothermia in Newborn Lambs. Two other factsheets are available concerning lamb survival, Assisting the Ewe at Lambing and Care of the Newborn Lamb.
<u>Talk to your Veterinarian before lambing season begins. Discuss and review any techniques that you may need to revive chilled lambs.</u>

Ministry of Agriculture, Food and Rural Affairs
Ontario

Caring for the Hypothermic Lamb



Guidelines for Dealing with Compromised Sheep

Updated 06/13

SHOULD THIS ANIMAL BE LOADED?
Guidelines for Transporting Sheep

Load Healthy Animals

Do Not Load
Do Not Transport
STOP

Delay Transport, Provide Prompt Treatment and Reassess
- Exhaustion
- Lambing
- Dehydration
- Weakness/unstable
- Acute mastitis
- Ketosis
- Listeriosis (Listeria)
- Fever: > 103.3°F (39.6°C)
- Animals that have given birth within 48 hours

Euthanize
- Non-ambulatory (see box below)
- Lameness *(Classes 3, 4 ,5)* or Crippled
- All fractures examples include: *- jaw, spine, pelvis, limb*
- Significant injury *(e.g. predation)*
- Shock/Dying
- Arthritis in multiple joints
- Gangrenous Mastitis
- Extremely thin/Emaciation
- Pneumonia *(unresponsive e.g fever, cyanosis, weakness, difficulty breathing)*
- Prolapsed uterus *(unless prompt treatment given)*
- Nervous disorders must be reported to CFIA
- Water belly *(urinary calculi)*
- Hernia *(*see reverse)*

Any condition where an animal can not be transported without suffering.

Non-ambulatory animals: Unable to stand without assistance, or unable to move without being dragged or carried (downers). Do not load or transport.

Lame animals:
- Animals must not be loaded if at risk of going down in transit.
- Animals that can't bear weight on all four legs are in pain and are at risk of going down during transit. These animals are often euthanized at sales and plants.
- Do not transport any sheep where transport may cause suffering when being moved or transported such as significant foot rot, or excessively long feet or showing signs of pain such as arched back, very slow moving, unwilling to stand for more that short periods, or standing on its front carpus (knees)

Heavily Lactating Animals: Animals in heavy lactation requiring milking every 12 hours, or they will become unfit for transport.

Do Not Transport to a Sale or to a Collection Yard
STOP

Transport with Special Provisions Direct to Local Slaughter

Seek advice from your veterinarian and advise inspector at the destination plant.

- Abscess
- Blind
- Frost bite
- Lameness (Classes 1, 2)
- Left/right displaced abomasum *(without weakness, toxicity)*
- Penis injuries
- Pneumonia *(without fever, weakness or dehydration)*
- Bloat *(no pain or weakness)*
- Hardware with localized signs
- Intestinal accidents
- Recent minor injury
- Urethral blockage *(acute)*
- Smoke inhalation
- Recent prolapsed vagina or rectum without necrosis or infection

Animals with multiple conditions may not be fit to transport.

Special Provisions
The following three special provisions must be met when transporting a compromised animal:
- A compromised animal must be transported locally and directly to the nearest suitable place where it can receive care and attention, or be humanely slaughtered or euthanized.
- A compromised animal must be the last animal loaded and the first animal unloaded.
- A compromised animal must be segregated from all other animals, or it may be penned with one familiar companion animal.

Note: To prevent undue suffering, other special provisions, such as additional bedding, may be required, depending on the condition of the compromised animal. Always ask a veterinarian if you are unsure about the appropriate special provisions, when moving a compromised animal.

Guidelines for Dealing with Compromised Sheep

Federal Transportation Regulations (2012)
Health of Animals Regulations www.inspection.gc.ca

DO

- Segregate animals of different species, or substantially different weights and ages, or if incompatible by nature.
- Provide proper ventilation, drainage and absorption of urine.
- Have sufficient headroom for animals to stand in a natural position.
- Spread sand in the vehicle or have vehicle fitted with safe footholds, in addition to appropriate bedding.
- Ensure that animals unloaded for feed, water and rest remain at least five hours and longer if five hours is not enough, for all animals to receive food and water.
- Ensure that animals segregated in trucks receive extra protection from cold and wind chill; supply ample bedding.
- Euthanize animals promptly when you identify conditions outlined in the "Should this Animal be Loaded?" chart.

DO NOT

- Transport a sick or injured animal where undue suffering may result.
- Transport when the animal is liable to give birth during the journey, unless under the advice of a veterinarian for medical care.
- Continue to transport an animal that is injured, becomes ill, or is otherwise unfit to travel beyond the nearest place it can be treated.
- Use electric prods or goads on sheep
- Load or unload animals in a way that would cause injury or undue suffering.
- Crowd animals to such an extent as to cause injury or undue suffering.
- Transport livestock in trailers unless they are suited for safe handling of that species or class of livestock.

Source: Transporting Livestock by Truck (CFIA)

Lameness Classes

These categories can be used to determine the status of an animal's mobility, from normal to non-ambulatory.

Transport as soon as possible

Class 1
Visibly lame but can keep up with the group: no evidence of pain.

Class 2
Unable to keep up; some difficulty climbing ramps. Load in rear compartment.

Do not Load or Transport*

Class 3
Requires assistance to rise, but can walk freely.

Class 4
Requires assistance to rise; reluctant to walk; halted movement.

Class 5
Unable to rise or remain standing.

CFIA Livestock Emergency Transport Line
1-877-814-2342
(Ontario only)

**** Any animal, including Lameness Classes 3, 4, or 5 may only be transported for veterinary treatment, on the advice of a veterinarian.***

Hernias:

Do not transport an animal that has a hernia that meets one or more of the following criteria:

- *impedes movement (includes conditions in which the hind legs of the animal touches the hernia when the animal is walking)*
- *is painful on palpation*
- *touches the ground when the animal is standing in its natural position, and/or includes an open skin wound, ulceration, or obvious infection.*

*** this document adapted from Guidelines for Dealing with Compromised Cattle, Sheep and Goats version 05.10*

Livestock Transport Consignment Form

Consignor (Shipper) Information

Business Name (if applicable): _____

Contact Name: _____ Position: _____

Mailing/Billing Address: _____ City/Town: _____ P/C: _____

Carrier (Transporter) Information

Business Name (if applicable): _____

Contact Name: _____ Position: _____

Mailing/Billing Address: _____ City/Town: _____ P/C: _____

Driver Name: _____ Tractor Unit #: _____ Trailer Unit #: _____

Consignment (Load) Information

Date/Time Animals Loaded: _____ Duration of Loading Process (minutes): _____

Point of Origin: _____ City/Town: _____ P/C: _____

Point of Destination: _____ City/Town: _____ P/C: _____

Description of Destination: ☐ Intermediate point (e.g. – sales yard) ☐ Final point (e.g. – plant, feedlot)

Description of Load (check all that apply): ☐ Beef Cattle ☐ Dairy Cattle ☐ Swine ☐ Equne ☐ Sheep ☐ Goats

☐ Other _____ ☐ Weanlings ☐ Yearlings ☐ Mature (breeding stock) ☐ Mature (Cull) ☐ Other _____

Animal ID by: ☐ Individual Tags ☐ Lot #(s) ☐ None Head Count _____ Gender: ☐ M ☐ M (neutered) ☐ F ☐ Mixed

Average Weight/Animal: _____ ☐ lbs or ☐ kg Last Fed/Watered at (date/time or # of hours prior to loading) _____

Condition of Animals at loading: _____

_____

Trip Information

Expected Length of Trip (# hours) _____ Expected Delivery Date/Time: _____

Special Requirements during Transit

☐ Feed & Water ☐ Rest (unload for 8 hours) ☐ Milking ☐ Additional Bedding ☐ Segregation (describe) _____

☐ Increased Ventilation (hot weather) ☐ Reduced Ventilation (cold weather) ☐ Other (describe)

Special Instructions: _____

_____

Weather Conditions at Time of Loading (Insert temperature and check all that apply):

Temperature (°C) _____ ☐ Wind Chill ☐ Humid ☐ Rain ☐ Snow ☐ Other precipitation

Potential conditions during transit that could delay shipment (e.g. – extreme weather, road conditions, etc.)

_____

_____

_____ _____ _____

Signature (on behalf of shipper) Signature (on behalf of carrier) Date

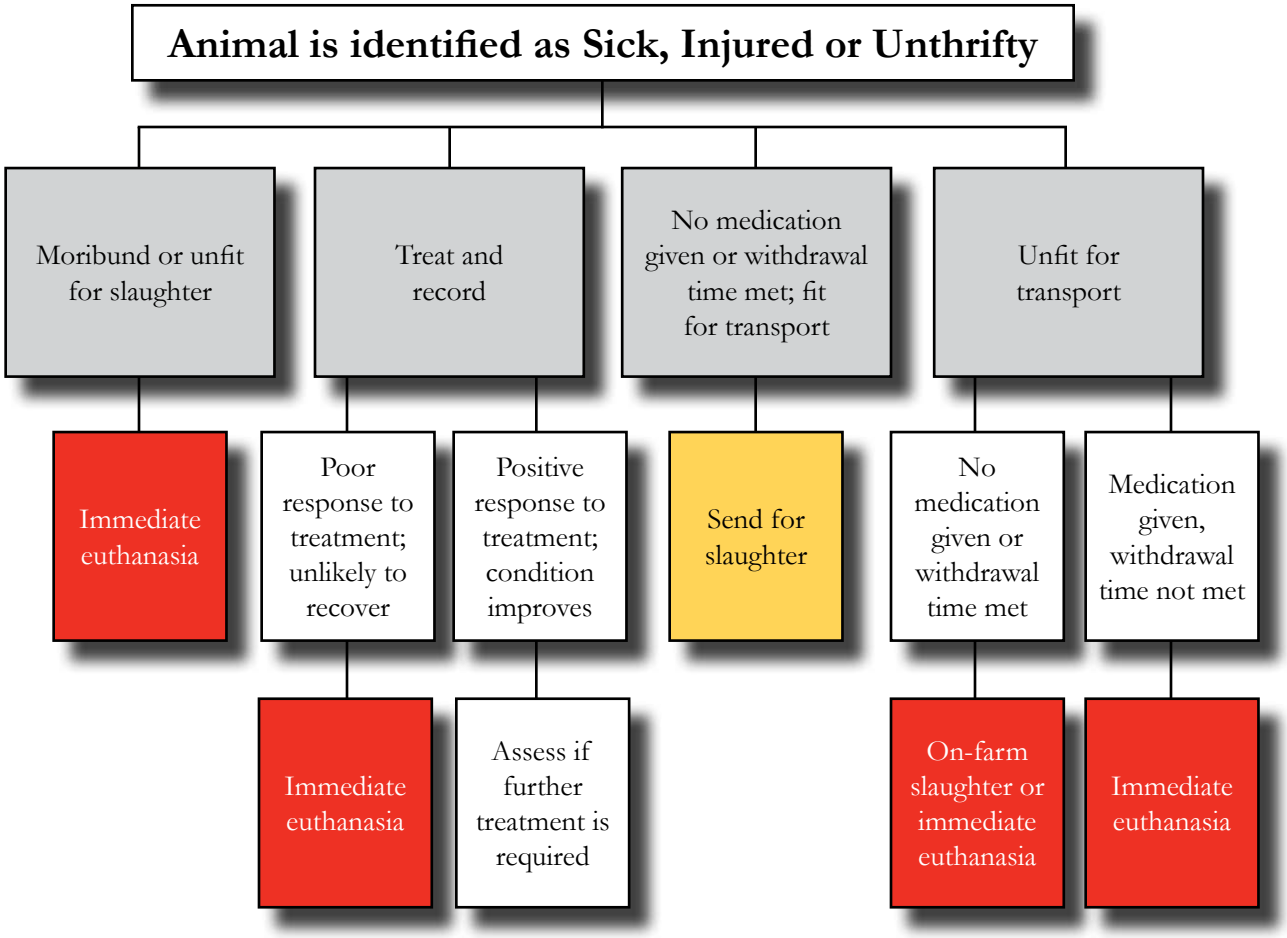
Courtesy of OTA Livestock Transporters' Division

Signs of Pain in Sheep

Sign	Explanation
Guarding	The animal alters its posture to avoid moving or causing contact to a body part (e.g. not allowing lambs to nurse when mastitis occurs).
Abnormal appearance	Obvious changed posture and a changed profile of the body (e.g. arched back) are all observable signs. Dullness.
Altered behaviour	Behaviour may be depressed; animals may remain immobile, or be reluctant to stand or move even when disturbed. They may also exhibit restlessness (e.g. lying down and getting up, shifting weight, circling, or pacing) or disturbed sleeping patterns. They may grunt, grind their teeth, curl their lips, repeated 'yawning', kneeling, altered gait, stomp, kick at their belly, or reluctance to breed (rams). Exhibit rapid and shallow breathing. Animals in pain may also show altered social interactions with others in their group. (e.g. isolated from flock).
Vocalization	Do not tend to vocalize when in pain.
Mutilation	Animals may bite, shake or rub a painful area, wool chewing, scratching or rubbing.
Inappetence	Animals in pain frequently stop eating and drinking, or markedly reduce their intake, rumination may stop.

* Adapted from Recognition and Alleviation of Pain in Laboratory Animals.
National Research Council (US) Committee on Recognition and Alleviation of Pain in Laboratory Animals. 2009. Washington (DC): National Academies Press (US) (www.nap.edu/);
National Academy of Sciences. Available at: www.ncbi.nlm.nih.gov/books/NBK32656/

Example of Decision Tree for Euthanasia



Examples of criteria for euthanizing sheep

- Weak, unable to stand
- Unable to eat or drink
- Severe injury (e.g. from predator attack)
- Broken leg with exposed bone
- Exposed internal organs
- Moderate to severe lameness
- Rectal or vaginal prolapse (persistent or damaged)
- Severe body weight loss (20% or greater)

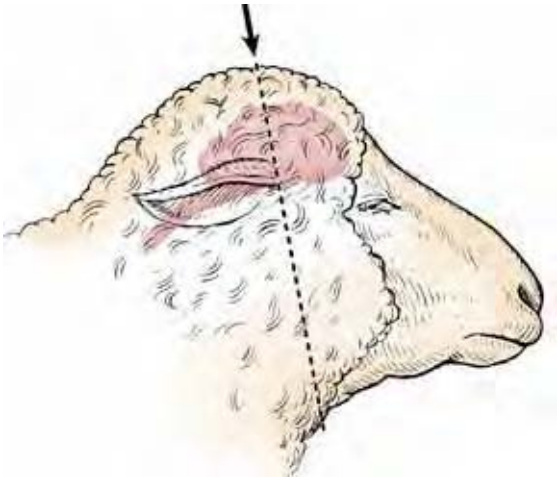
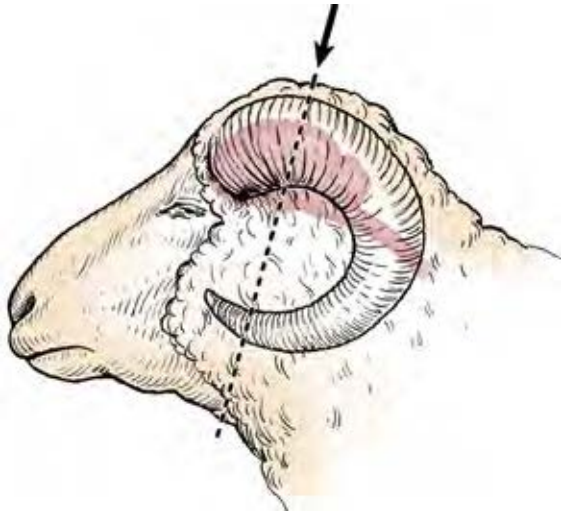
Refer to sections 7.0 Euthanasia, 4.4 Sick, Injured or Cull Animals and 6.1.1 Fitness for Transport.

Adapted from: Turner, P.V., Doonan, G., 2010. Developing on-farm euthanasia plans. Can Vet J. 2010 September; 51(9): 1031–1034. Available at: www.ncbi.nlm.nih.gov/pmc/articles/PMC2920162/ Accessed September 27, 2012.

Euthanasia

Appendix L a: Antomical Landmarks

Location of the brain within the skull of a mature sheep and the correct placement and direction of shot or captive bolt penetration for polled and horned sheep.

Not Between the Eyes! — but slightly behind the poll or on the top of the head	**Proper site in horned sheep is behind the poll as shown**
	

In horned sheep and rams the top of the head may not be the ideal location because of the thickness of the skull in this region. Instead, an alternate position and orientation for penetrating captive bolt or gunshot in horned animals is on a line from the poll and aimed downward toward the back of the throat. An alternative position for placement of the penetrating captive bolt or firearm in horned animals is the front of the skull directing the bolt or bullet toward the spinal cord.

J.K. Shearer and A. Ramirez, Iowa State University, College of Veterinary Medicine. Reprinted with permission.
See: www.vetmed.iastate.edu/HumaneEuthanasia

Further reading resources for Euthanasia:

Shearer,J. K. 2013. Procedures for Humane Euthanasia Brochure. College of Veterinary Medicine, Iowa State University. Available at: www.vetmed.iastate.edu/HumaneEuthanasia

Ontario Sheep Marketing Agency production manual; Chapter 8 Flock Health and Deadstock. Available at: www.ontariosheep.org/SHEEPPRODUCTIONINFO/Manuals.aspx

The Humane Slaughter Association out of the UK has some free and downloadable information as well as publications for order on their web-site www.hsa.org.uk/Information/Slaughter/Red%20Meat%20Slaughter.htm

Downloadable documents:

Captive bolt stunning of livestock - www.hsa.org.uk/Web/pages/captiveboltstunningdownload.pdf

Euthanasia (continued)

Appendix L b: Euthanasia Action Plan for Sheep and Goats

Work with your veterinarian to develop a euthanasia action plan appropriate for each species and stage of production on your farm. This plan should be kept in an obvious location in the barn. Review the plan with any new employees and annually with all staff and your veterinarian.

Farm Name: _____

Date: _____ Prepared by: _____

Phase of Production	Euthanasia Method	Alternative Method
Lambs and Kids		
Ewes and Does		
Rams and Bucks		

Important Telephone Numbers:

1. Veterinarian: _____

   Phone: _____

   After Hours/Emergency: _____

2. Transporter: _____

   Phone: _____

Euthanasia (continued)

Appendix L b: Euthanasia Action Plan for Sheep and Goats

Methods of On-farm Euthanasia and their Considerations

Method		Human Safety	Animal Welfare	Skills Required	Cost	Other
Overdose by Barbiturate	Intravenous administration of a barbiturate	Restrain the animal	Excellent rating	Proper technique for intravenous injection	Veterinary fee	Can only be administered by licensed veterinarian
Penetrating Captive Bolt	Penetration of the skull and brain by captive bolt, followed with bleed-out by cutting all the main arteries and veins in the neck	Restrain the animal Be cautious of falling or thrashing animals	Good rating Correct cartridge strength, target site and penetration angle on animal is essential	Correct and safe use of captive bolt pistol Correct and safe use of sharp knife	Low - after purchase of captive bolt pistol	Results in some body movement Results in large volume of blood that requires proper disposal
Gunshot	Penetration of the skull and brain by bullet	Restrain the animal Be cautious of falling or thrashing animals Be extremely cautious about bullet ricochet	Good rating Correct size of firearm and ammunition and correct target site and penetration angle on animal is essential	Correct and safe use of firearm	Low – after purchase of firearm	Results in some body movement and blood Requires firearm acquisition certificate Local by-laws may prohibit the use of firearms

Last updated 2008

Ministry of Agriculture and Food
Ministry of Rural Affairs
Ontario

Adapted from Ontario Pork's booklet On-Farm Euthanasia of Swine: Options for the Producer

Participants

Sheep Code Development Committee Members

Role	Committee Member	
Producers	John Hemsted (Chair)	Producer - Central
	Andrew J. Hebda	Producer - Eastern
	Valerie Gerber	Producer - Western
	Brian Greaves	Producer - Canadian Cooperative Wool Growers Ltd.
	Andrew Gordanier	Producer - Dairy
	Chris Eddy	Producer - Feedlot
	Fred Baker	Producer - Central
Transporter	Randy Scott	Hyndman Transport
Veterinarian	Jeff Wichtel, BVSc, Ph.D., DipACT	Atlantic Veterinary College
Animal welfare	Carol Morgan, DVM Ph.D.	Canadian Federation of Humane Societies
Animal welfare enforcement	Mike Draper	Ontario Ministry of Agriculture & Food (OMAF) and Ontario Ministry of Rural Affairs (MRA)
Retail and food service organization	Requested but position not filled	
Processor	Randy Smith	Canadian Lamb Producers
Agriculture Canada and/or CFIA	Nicole Cormier, DVM	Canadian Food Inspection Agency
Research/academic	Michael Cockram, B.Vet Med., Ph.D.	International Society for Applied Ethology
	Sébastien Buczinski, Dr Vét, DES, MSc, DACVIM	Faculté de médecine Vétérinaire, Université de Montréal
Technical expertise	Anita O'Brien	Ontario Ministry of Agriculture and Food (OMAF) and Ontario Ministry of Rural Affairs (MRA)

Sheep Scientific Committee Members

Organization	Representative
International Society for Applied Ethology - Canadian region	Michael Cockram, B.Vet.Med., Ph.D. (Chair)
Canadian Society of Animal Science	David Barrett, Ph.D.
Canadian Veterinary Medical Association	Paula Menzies, Dip ECSRHM

Thanks also to: Jennifer McTavish, Barb Caswell and Corlena Patterson - Canadian Sheep Federation, Nadine Meade who served as Code Development Secretary and the reviewer who assisted with translation. The Scientific Committee wishes to acknowledge and thank Brooke Aitken for her work as research writer and the peer reviewers of the Sheep Scientific Committee Report.

The contributions from all participants are greatly appreciated.