

National Farm-Level Biosecurity Standard for the Goat Industry

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Draft for Review

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National Farm-Level Biosecurity Standard for the Goat Industry

1 Introduction

1.1 What is biosecurity?

*Biosecurity*¹ is a set of *practices* used to minimize the transmission of disease-causing organisms in animal populations including their introduction, spread within the population, and release. Biosecurity is proactive and focuses on routine, day-to-day on-farm activities to protect the health of the herd.

1.2 Why is biosecurity important to the Canadian Goat Industry?

Animal health management has undergone a large amount of change in recent years, influenced by:

- Greater understanding of the risk of new and *emerging pathogens*,
- Increased awareness of *zoonoses* and concern for public health,
- Changing *epidemiology* of disease due to the concentration and *commingling* of animals and people in more intensive farming situations,
- New production practices in agriculture, including farm specialization,
- Globalization; increasing movement of people and goods,
- Opportunities to sell to additional markets, both in Canada and internationally, and
- More attention to *traceability* and the ability to identify product attributes and production conditions along *supply chains*.

As a result, the need to use a proactive approach as the first line of defence in animal health is more important now than ever before. *Livestock* sectors have therefore started to shift their focus to disease prevention and on-farm biosecurity.

The Canadian goat industry understands the need for a proactive approach; many producers have implemented proactive biosecurity practices on their farms and are working towards a consistent and systematic approach to address the risks in all goat production activities. Significant benefits, both to producers and the industry, can be achieved by increasing attention to on-farm biosecurity and its wide adoption in the goat industry in Canada, including:

- a) Enhanced disease risk management:
 - Lower risk of *infectious disease* transmission to a herd from purchased animals
 - Reduced *mortality* and *morbidity* in the herd
 - Reduced risk of new diseases entering the national herd and then arriving at the farm

¹ Words in *italics* are defined in Section 3: Glossary of Terms. These terms are italicised the first time they are used in the document; readers are advised to refer to the Glossary for any words that are not familiar, or whose definition is not clear in the context in which they are used.

- Reduced risk of exposure to zoonotic diseases by producers, their workers, families and *visitors*
 - Better access to timely and effective methods to determine the disease status of a herd
 - Improved disease testing and herd monitoring
- b) Strengthened animal and herd health management:
- Improved animal health and welfare through consistent on-farm management practices
 - Reduced need for drug use, contributing to reduced risk of *antimicrobial / anthelmintic* resistance
 - Increased awareness of vaccines and their use as a tool in a proactive biosecurity program
 - Increased attention to licensing of important animal health products (drugs and *biologicals*) for goats, including lactating dairy goats
- c) Operational gains:
- Increased profitability from improved productivity and reduced losses
 - More certain supply of high-quality goat products to Canadian marketers and retailers
 - Wider and more confident export markets
 - Improved food safety and increased consumer confidence in Canadian *goat products*
 - More open trade in genetics, leading to a stronger gene pool and improved genetic quality of the national herd

Clearly, biosecurity is important not only to improving animal health on the farm, but also to strengthening the Canadian goat industry as a whole.

1.3 Development of the Standard

The Standard was developed through a partnership of the Canadian National Goat Federation (CNGF) and the Canadian Food Inspection Agency (CFIA), in collaboration with Agriculture and Agri-Food Canada (AAFC). An advisory committee made up of producers, and representatives from regional and sector-specific goat industry organizations, colleges and universities, and the public sector, provided invaluable guidance throughout the process.

Prior to drafting the Standard, a literature review was completed to highlight the research currently available on biosecurity programs and practices in Canada, North America and the major goat producing regions of the world. Producer-level consultations were then carried out to determine the use of biosecurity practices on goat farms in all production sectors across the country as well as to identify best practices and gaps in biosecurity in the industry.

A Producer Guidance Document has been developed in addition to the National Biosecurity Standard to help goat producers prepare biosecurity plans for their farming operations. The guidance document provides additional information, best practices and examples that will help producers in understanding the concepts and outcomes in the Standard and how they apply on goat farms across the country.

1.4 Purpose of the Standard

The Standard is a tool for goat producers to be used in developing and implementing on-farm biosecurity plans. It contains a set of recommendations that can be adapted to the needs of each farm to raise its current level of biosecurity.

The Standard can also be used by producer organizations, veterinarians, *service providers* and other stakeholders in the goat industry. Although producers are responsible for the biosecurity on their farms, everyone has a role in biosecurity and can help to achieve consistent industry-wide biosecurity. Please see Appendix A: Users of the Standard for more information.

1.5 Developing a Biosecurity Plan

The National Farm-Level Biosecurity Standard for the Goat Industry identifies areas of the farm or farm practices that producers need to consider when developing biosecurity plans for their *goat operations*. Identifying the possible risks of introducing *infectious agents* to the farm and practical methods of limiting those risks is key to creating a biosecurity plan. Taking into account the farm facilities, the herd's disease status, individual goats' *health status* and genetics, and the farm's production objectives and management strategies will also improve its value.

Information in Section 2 of the Standard and in its appendices, and additional resource information in the accompanying Producer Guidance Document, will help producers build biosecurity plans to fit their farm operations.

Consultation with a herd veterinarian² will assist with a risk assessment of the *premises*, in particular identifying the farm's *diseases of concern*, and preparing plans for vaccination and other *prophylactic* treatments. Veterinarians can also offer help in developing and refining practices that fit the health status of each herd and that are effective in dealing with the farm's diseases of concern.

It is important to recognize, however, that veterinarians who specialize in goat production and health are not within easy access in many areas of the country, and that finding help from other sources will also be important. Veterinarians with an interest in small ruminants, feed formulators, provincial specialists, university faculty, commodity associations, and other producers can also be good sources of information in identifying the farm's risks and developing a farm's biosecurity plan. Some information is also available from public sources, including libraries and provincial government websites.

² In some provinces, annual on-farm visits are required in order to have a valid *veterinary client patient relationship* (VCPR) and this VCPR is needed before prescribing/selling any medications should the animal health situation change.

2 Key Areas of Concern

The Standard is designed to provide a systematic approach to proactive biosecurity at the farm level. The Standard is based on six Key Areas of Concern within which biosecurity risks are identified and possible solutions are provided.

Key Areas of Concern for Goat Producers

- 1. Sourcing and introducing animals**
- 2. Animal health**
- 3. Facility management and access controls**
- 4. Movement of people, vehicles and equipment**
- 5. Monitoring/records keeping**
- 6. Communications and training**

These Key Areas of Concern focus on proactive biosecurity practices that will reduce the risk of animals, people, inputs, equipment, and vehicles introducing infectious agents onto a farm and spreading them within a herd. They will also consider how facilities and operational activities can contribute to improved biosecurity. The producer-level consultation showed that producers are aware of these key areas of concern in their farming operations and respond by the implementing biosecurity practices.

Target outcomes have been established for each Key Area of Concern. These target outcomes are statements of the anticipated result that will be achieved by individual producers and by the industry overall through the use of biosecurity measures. Each target outcome is supported by a number of biosecurity recommendations that producers can use in working toward achieving these results.

The Standard has been designed in a workbook format. Producers can work step-by-step through the Standard as they develop their biosecurity plans. Before each target outcome, there is a self-evaluation checklist that producers can use to measure their current level of biosecurity in each Area of Concern. Following the recommendations presented in each Area of Concern, producers can write down their biosecurity gaps and develop goals to help determine how the biosecurity concepts could be integrated into their farms' biosecurity plans. As noted earlier, additional reference material and biosecurity best practices can be found in the [Producer Guidance Document](#).

2.1 Key Area of Concern 1: Sourcing and Introducing Animals

Increasing herd numbers and strengthening the herd's genetic diversity are important in achieving production goals. Semen and embryos can be purchased from *accredited* facilities to manage the genetic profile of the herd and reduce the risk of disease transmission that may accompany animal introductions.

When a producer chooses to purchase replacement animals from outside sources, or when goats are taken off the farm to attend fairs and shows and then returned to the home herd, biosecurity measures can address the disease-transmission risks they may bring to the farm.

Table 1.1: Self-Evaluation Checklist

The table below contains a series of activities that may occur on a goat farm to address the risks associated with sourcing and introducing animals into the home herd. Additional information can be found in the following section. Specific subsection reference numbers are provided for each activity.

Biosecurity practices for sourcing and introducing animals	Self-evaluation				Reference
	Always / frequently	Some- times	Never	N/A	
Artificial insemination is the method used to replace goats.					2.1.1
Embryo transfer is used to replace goats and/or grow the herd.					2.1.1
I raise as many replacement goats as possible and add new goats only when necessary.					2.1.1
I purchase new goats from a limited number of sources with a known health status. The source is of equal or higher health status.					2.1.1
When my goats participate at a show or a fair, I take preventive measures to reduce the risk of disease transmission from other goats. For example, I ask people to clean their hands before and after handling my goats, etc.					2.1.2
When I purchase new goats, I know the health status of the animals and of the <i>herd of origin</i> and/or <i>source herd</i> .					2.1.3
My goat purchases are supported					

Biosecurity practices for sourcing and introducing animals	Self-evaluation				Reference
	Always / frequently	Some-times	Never	N/A	
by documentation on the health and disease status of animals, such as <i>verified</i> test results for some specific diseases (e.g. CAE, Scrapie, <i>Staphylococcus aureus</i> , infectious abortion, Johné's Disease)					2.1.3
I avoid commingling of all types of animals of other farms during transportation.					2.1.3
All goats introduced or re-introduced (e.g. after going to a show, loaned goats) are isolated for a period of time recommended by my veterinarian. The time period required is adjusted specific to the diseases of concern.					2.1.4
Goats in an <i>isolation</i> pen are monitored daily for signs of clinical sickness.					2.1.4
The isolation area does not permit nose-to-nose contact and indirect contact (feed, water, shared equipment) with my main herd.					2.1.4
The enclosed sheltered isolation pen does not share common airspace (including direction of air movement) with resident animals.					2.1.4
The equipment used for treatment, handling and other husbandry chores in the isolation area is not used for the main herd; otherwise, the equipment is cleaned and disinfected between uses.					2.1.4
Separate dedicated personal protective attire is used to work with goats in the isolation area.					2.1.4

Biosecurity practices for sourcing and introducing animals	Self-evaluation				Reference
	Always / frequently	Some- times	Never	N/A	
My employees handle goats from resident animals (main herd) before handling goats in isolation pens.					2.1.4
I have a <i>protocol</i> in effect for releasing goats from isolation and it may include testing, vaccinating or treating for diseases of concern, as recommended by my herd veterinarian.					2.1.5

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Target Outcome: Animal introductions, re-entry and the use of semen and embryos do not present a risk to the health status of the herd.

Breeding solely on-farm, referred to as operating a closed herd, presents almost no risk of disease transmission from off the farm. For genetic diversity, artificial insemination using semen purchased from accredited sources is a strategy used by many producers that carries minimal risk, provided the purchased semen is tested and shown to be free of specific infectious agents. Embryo transfer is also a method that can help improve the genetic diversity of the herd with minimal risk of disease transmission.

While these low-risk strategies are available to producers, purchasing and introducing new animals into the herd is a routine activity on many goat farms. Purchases made from sources whose production and biosecurity practices are known present a lower risk of introducing infectious agents compared to purchases made from sources that are not able to provide that information. Risks in this case could include commingling animals from multiple herds and sales of animals whose health status is unknown. Also, goats are often taken off the farm to attend fairs and shows and are subsequently returned to the herd. Goats returning from these locations pose a high risk of disease transmission to the home herd, similar to new animal introductions. Biosecurity measures designed to address these risks are needed.

Risks to be considered:

- Exposing breeding stock to purchased semen or embryos that may contain infectious agents, resulting in infected offspring and/or contamination of areas of the farm in which birth or abortion materials are deposited;
- Exposing the home herd or individual herd members, especially those that are more *susceptible*, to:
 - New goats that may be sick or carrying infectious agents;
 - Goats that are returning to the home herd and that have commingled with animals that may be sick or carrying infectious agents, or have been exposed to infected feed, bedding, equipment, vehicles or facilities when away from the farm;
 - People, equipment, inputs (such as feed and bedding) and vehicles that transport the goats to the farm, that are contaminated with infectious agents acquired from other herds and animals;
- New goats may be susceptible to infectious agents in a home goat herd. Clinical signs may not be seen in the herd if goats have natural *immunity* or have been vaccinated.

2.1.1 Sources and sourcing

Summary: Producers can reduce the risk of bringing diseases onto their farm by controlling the way they source and introduce new animals and/or source artificial insemination and embryo transfer materials. Sourcing semen and embryos from accredited suppliers, limiting the frequency of animal additions and controlling the number and quality of sources of new animals will reduce the risk.

Bringing new goats onto the farm for replacements and to increase herd numbers poses a significant risk of disease introduction. Maintaining a closed herd, in which all replacement animals are raised on the farm, eliminates this risk. Using semen and embryo materials provided by an external supplier is a relatively low-risk way to increase herd numbers and/or improve the herd's genetic profile. However, it is important that suppliers used for this purpose are known to use procedures that make sure semen and embryos are free from infectious agents³. All AI products should be tested prior to sale.

Introduction of new genetics is also important to the health and productivity of the herd and cannot always be done through artificial insemination or embryo transfer. Therefore, from time to time, replacement goats need to be purchased from outside sources.

If additions to the herd are purchased, the risk can be reduced by carefully choosing the suppliers and limiting the number of sources that are used. Suppliers should be reputable and have biosecurity and animal health practices that are compatible with (i.e. equal to or higher than) the practices and health status of the home farm. Further, limiting the number of goats that are purchased and how often they are bought will reduce the risk of disease introduction.

2.1.2 Biosecurity practices at fairs, shows and off-site loan locations

Summary: When fairs, shows and other off-site locations do not provide adequate biosecurity for visiting goats, there are proactive measures that producers may implement to reduce the risks. These include: transport their animals in home-farm vehicles, bring feed, water, water delivery systems and other needed equipment from the home farm, apply biosecurity protocols at the off-site location and treat returning goats as new arrivals. Producers should inquire if the fair or show has a biosecurity policy and set of procedures to minimize risk of disease transmission. If no policy is in place, evaluation of the risks and the capacity to minimize risk needs to be part of the decision-making process.

Producers should ask about the biosecurity planned for goats' off-site visits. Some shows and fairs do have biosecurity plans that apply to all animals to be housed on site, including disease/health declarations and animal examinations upon arrival. Understanding the organizers' plans allows producers to make their own arrangements if they feel that the organizers' plans do not adequately reduce the risk of disease transmission.

However, off-farm visits generally involve contact with animals from other herds, with facilities and equipment that have had contact with many other animals, and with people who will have had contact with goats and other animals that pose a disease risk. In all cases, producers are wise to take specific measures to reduce the risk of disease transmission to their goats.

When they are returned to the home farm, goats should be isolated from the herd for a period of time so that an infected goat can be tested and treated and will cease *shedding* an infectious agent it might have acquired while off-farm. All equipment taken off-farm should be cleaned and disinfected before being returned to the production area, and leftover feed should be discarded.

³ Health of Animals Regulations, sections 2, 69, 115, 116-119, 160 and 161

2.1.3 Disease status at purchase/re-entry

Summary: Knowing the health status of new animals and animals that are re-entering the farm (e.g. animals attending livestock shows, borrowed or loaned goats) allows producers to implement biosecurity measures to minimize the risk of introduction and spread of disease to their existing herd.

Open communication between buyers and sellers including documentation is necessary for identifying or verifying the disease and immunity status of individual animals and the herd(s) of origin. Producers who acquire replacement or additional stock under these conditions will be able to better understand the risk they are exposing their herd to, and will be able to properly prepare for the entry of these animals into their herd. It is also clear that full availability of this information avoids costs of unnecessary prophylactic or disease-management treatments, and reduces the risk of loss of production from the acquired animals.

This approach will require that breeders and other suppliers, including agents, brokers and auction markets, be able to supply animal health records and proof of the programs under which the purchased animals have been raised (e.g. Voluntary Scrapie program in Canada). Goat producers will then be able to obtain health and disease records for the animals they acquire and the herd(s) they have come from.

In addition, producers who are purchasing additions for their herds should reduce the risks that exist when introducing new stock to their established herd and when commingling goats of unknown health status by:

- Knowing the disease status of their herd and the herd of origin and/or source herd and whether their health profiles are compatible (equal to or higher than the home herd),
- Sourcing animals directly from the herd of origin (i.e. from the birth herd) and limiting commingling during sourcing and transportation, and
- Working with their herd veterinarian to assess the compatibility of the herds' health status.

Herd veterinarians for both the buyers and the sellers may also be able to help this exchange of information.

2.1.4 Isolation upon arrival or re-entry

Summary: Isolating new or re-introduced animals for sufficient time will help to identify animals with acute infections that are still in their incubation period, allow the shedding of infectious agents to cease, and permit testing and treatment to be carried out. Some infectious agents may be difficult to detect within a normal isolation period.

Producers who isolate new goats on entry provide a buffer between the new animals and the home herd. Goats returning from a commingling activity (e.g. a buck loaned out for breeding or goats visiting shows or fairs) should also be isolated for a period of time on return. This period of isolation provides an opportunity for any disease that might be carried by one or more of the additions to show itself and be properly diagnosed. Any treatment that is planned can also be given time to take effect. When necessary, any new animals with a disease that is not present in the home herd can be culled before

they have the opportunity to infect others. In all cases, the isolation period for new or returning animals should allow for testing and delivery of laboratory results for all diseases of concern.

It is important to designate an isolation area(s). It should be separated from housing, pens or pathways used by resident goats and livestock on the farm with no opportunity for *direct contact*. The airspace should be separately ventilated to prevent transmission of airborne diseases such as Caprine Arthritis Encephalitis (CAE) virus and *Coxiella burnetii* (Q fever). It is preferable that the isolation facility be separated from the main herd by a solid partition and a lockable door.

However, many infectious agents of animals can be present in animals that are *asymptomatic* or are *carriers*. These diseases, including Johne's disease and Chlamydiosis are unlikely to be detected in an isolation period. Additional solutions will need to be discussed with the herd veterinarian to deal with the potential presence of such diseases.

Also, isolating⁴ milking does in this manner needs to be carefully planned. Milking does need to be milked, and when larger numbers are involved, manual milking or isolation from the milking parlour may not be possible. Planning the milking order can manage some of this risk, with the lower risk animals being milked first. However, after the higher risk animals are milked, all equipment including feeders, walkways, milkers and water delivery systems that may contain the infectious agents should be cleaned and disinfected prior to use by the lower risk animals again. It is also true that goats, as social animals, are stressed by being separated from their herd; isolation facilities should be designed with this in mind. Additions to the isolation area including the use of safety-glass mirrors may offset some of this stress.

2.1.5 Protocols for releasing animals from isolation

Summary: Isolation will only be effective if there are protocols in place for releasing animals at the appropriate time.

Producers should work with their herd veterinarian to develop suitable protocols for releasing animals from isolation. The Animal Health Management Plan discussed in section 2.2 below should include disease testing methods and treatment protocols for common diseases and diseases of concern on the farm that are to be used before goats are introduced or returned to the herd. Blood, milk, feces and other samples should be taken from new animals for specific diseases of concern, and submitted to a veterinary diagnostic laboratory. Laboratory tests and analysis of samples should be conducted before they are exposed to the main herd.

⁴ One reason for isolating milking does would be to prevent transmission of *Staph aureus* mastitis. This may entail something as simple as having separate pens for the "*Staph string*" so that the latter is milked last.

Developing the Biosecurity Plan

Based on the self evaluation and the information provided in this section on sourcing and introducing animals:

1. *What are the biosecurity gaps on my farm?*

2. *What are the biosecurity goals to address these gaps?*

3. *What steps can I take to achieve these goals?*

2.2 Key Area of Concern 2: Animal Health

Animal health is a top priority for all goat producers. Many activities, both preventive and responsive in nature, contribute to the health of the herd. The health of the herd and biosecurity plans are closely related; they work together to improve goat health management.

Table 2.1: Self-Evaluation Checklist

The table below contains a series of activities that may occur on a goat farm related to the management of animal health. Additional information can be found in the following section. Specific subsection reference numbers are listed for each activity.

Biosecurity practices for animal health	Self-evaluation				Reference
	Always/frequently	Some-times	Never	N/A	
I currently have in place an active herd health program developed in partnership with a licensed veterinarian.					2.2.1
My workers and I observe and evaluate the health of animals at least daily.					2.2.2
When a sick animal is identified, I have a protocol in place for isolation.					2.2.2
In my herd health program, there are specific clearly identified criteria (i.e. trigger points) for contacting my veterinarian with regards to animal health issues.					2.2.2
If there is unexpected or unexplained mortality in my herd, I contact my herd veterinarian for further diagnostic work-up (e.g. post-mortem, sample submission to a veterinary diagnostic laboratory).					2.2.2
I have written treatment protocols developed by my herd veterinarian for the management of sick animals.					2.2.3
My herd health program includes written protocols for disease control measures (e.g. vaccination, parasite					2.2.3

Biosecurity practices for animal health		Self-evaluation				Reference
		Always/ frequently	Some- times	Never	N/A	
control, disease testing, biosecurity) for various production groups.						
Milking for human consumption	Udder preparation for milking includes udder / teat <i>cleaning</i> and <i>disinfection</i> with an approved product, udder / teat drying, and single use paper towels for drying.					2.2.3
	Milk is routinely tested for bacterial counts.					2.2.3
	I test routinely for evidence of mastitis and I have specific protocols to manage goats with evidence of mastitis.					2.2.3
	After milking, teats are dipped in an approved product.					2.2.3
Kidding	I have a protocol in place for kidding that includes cleaning and disinfection of the area after each kidding, protective clothing for workers, heat-treating/pasteurizing additional milk and colostrum.					2.2.3
	When abortions occur, I remove the foetus and placenta and clean and disinfect the area and equipment immediately.					2.2.3
	I investigate the cause of abortions if the number of abortions increases.					2.2.3
	I have written herd health protocols in place for kids that include dipping the navel at birth, vaccination, parasite control and tagging.					2.2.3

Biosecurity practices for animal health	Self-evaluation				Reference
	Always/frequently	Some-times	Never	N/A	
Animals are managed so that the youngest / healthiest have no contact with the older and /or diseased animals. This applies to animal movement through the farm including milking order, and to worker contact with the animals.					2.2.4, 2.2.6
If I have other livestock species on my farm, I avoid direct and indirect (common equipment) contacts between them and the goats.					2.2.4
I have a biosecurity protocol for common or <i>community pastures</i> , if applicable.					2.2.4
I have a plan to move my animals within the production area from lower risk area (e.g. healthy animals) to higher risk area (e.g. sick animals).					2.2.6
Water provided to goats is tested regularly for suitability for livestock consumption.					2.2.7
Feed and bedding are sourced from known and reliable sources and are stored in a manner to avoid contamination by <i>pets, pests and wildlife</i> .					2.2.7

Target Outcome: Animal health, well-being and productivity will be optimized through proper implementation of herd health programs that also support the production of safe food.

Risks to be considered:

- Reduced effectiveness of preventive herd health practices
- Limited ability to detect changes in health status in a timely manner
- Increased susceptibility to disease in individual animals and the herd
- Higher risk of spread of infectious agents between goats of different health status and susceptibility
- Reduced effectiveness of response activities
- Increased use of veterinary drugs not licensed for use in goats with the risk of *residues* in meat and milk as well as antimicrobial and / or anthelmintic resistance.
- Increased risk of spread of infectious agents through feed, water and bedding
- Increased demands on producers and herd veterinarians for animal health care, consuming time for other productive activities and increasing production costs
- Increased risk of disease becoming established within the herd
- Decreased animal welfare and productivity
- Increased mortality and involuntary culling due to disease and low productivity

2.2.1 Implement a herd health management program

Summary: A herd health management program identifies the key components required for appropriate disease prevention, control and treatment for each farm. The herd veterinarian is a key partner for determining the specific risks to the herd and then designing and implementing the herd health management program.

Herd health management is intended to improve health and prevent disease in animals. It works within producers' and the industry's business structure, and recognizes the issues of animal welfare, human safety and environmental impact. In order to be effective, a herd health management program should be targeted towards the needs of each herd. Consideration should be given to the current profile of the herd, including age, production type and breed. Specific diseases of concern should be identified, including those diseases that are currently present in the herd as well as the diseases that are not present but that pose a risk of introduction. It also includes setting goals for health and productivity, based on an analysis of the current status of the herd, and developing protocols to reach them.

A herd health management program will include having a working relationship with a veterinarian, wherever possible.

The table below describes on-farm activities related to goat health that may be included in a farm's herd health management program. Specific components are identified and additional details are provided in the adjacent column.

Table 2.2: The Herd Health Management Program

Component	Examples
Herd health visits	Scheduled visits and communication with herd veterinarian; frequency based on operational type and health status
Routine monitoring	Daily observation of all animals for signs of disease or changes over time in behaviour and production parameters
Nutritional health management	Body condition scoring completed 2-4 times/year Consultation with nutritional specialist
Foot checks and trimming	Completed 2-3 times/year
Reproduction Program	Breeding schedule Ultrasound examinations for pregnancy Lighting and/or hormonal strategies for out-of-season breeding Buck breeding soundness examination annually or as needed
Milking routine	Udder prep; teat dipping Monitoring for evidence of mastitis Milking order
Kid health management	Navel-dipping Heat-treating/pasteurization of colostrum and milk Assuring appropriate intake of colostrum Attention to dystocias Investigating neonatal/kid mortality
Disbudding and castration	Performed with suitable timing and technique
Vaccination regime	Appropriate for each age and/or production group of animals
Parasite control program	Fecal sampling and testing of internal parasites for anthelmintic resistance Examination for external parasites
Disease testing strategies	Herd testing using a veterinary diagnostic laboratory for diseases such as Caprine Arthritis Encephalitis, Johne's Disease, Q fever, and caseous lymphadenitis. Individual testing as needed. Use of post-mortems to identify reasons for kid mortality, abortions, chronic wasting of adults and unexpected or unknown mortality.
Management and treatment protocols for common diseases and parasites	Isolation procedure for sick animals Drug and dosage recommendations for common conditions Meat and milk withdrawal times
Euthanasia	Guided by humane welfare considerations.
Federal and provincial disease monitoring programs	Voluntary National Scrapie program

Component	Examples
Disease/Emergency Response Plan	Enhanced biosecurity practices

If there are multiple species on a farm, a herd health management program should also be prepared for all other species, making sure to consider diseases and health risks common to all of the species. Areas of shared risk between the species on the farm should be highlighted, and practices should be coordinated to reduce *cross-contamination*.

Having a relationship with a herd veterinarian will help to ensure the success of the herd health management program. Herd veterinarians will work hand in hand with producers to complete the initial risk assessment of the premises, especially identifying the diseases of concern, and will provide guidance for the implementation of many parts of the program including vaccination and other prophylactic treatments.

It is important to continually re-evaluate the herd health management program and to adjust it to suit the changing needs of the farm business.

2.2.2 Observe and evaluate the health of animals

Summary: Regular observation of the goats for any change in health status is conducted on a daily basis and the findings are recorded. Trigger points exist to help dictate further action and allow a rapid response to potential disease.

Animals should be observed on a regular basis to detect any change in health status. What each producer is monitoring for should be set based on the diseases of concern included in the herd health program. These may include decreased production, abnormal behaviour, and specific signs of disease. All people who are asked to observe the animals should know how to recognize these signs and should record them in the Farm Management Records (see Section 2.5).

It is important to remember that regular observation also applies to animals in isolation. Special attention should be paid to their response to any treatment that has been administered.

Health records are useful for documenting these daily observations. Regular review can help to detect any changes in herd health, especially those that are subtle or that occur gradually over time.

In order to identify if the changes noted are significant, trigger points can be set as part of the herd health program. Examples of trigger points include percent of drop in milk production, numbers of animals affected with a specific clinical sign (e.g. numbers of abortions or clustering of abortions in a specific period of time) or a record of a specific clinical sign (e.g. blister around an animal's mouth or hoof). Protocols that require further action in response to these trigger points should also be documented. These may include:

- Isolation of sick animals in the isolation area,
- Contact with the herd veterinarian to complete a full diagnosis and treatment plan,

- Sampling for specific diseases of concern with submission to a veterinary diagnostic laboratory, and
- Notification of the federal veterinarian by the herd veterinarian in the case of suspected *reportable disease*.

It is important to ensure that protective clothing (coveralls, gloves and boots) is worn when handling suspect and sick animals and that the area where the sick animal was discovered is properly cleaned and disinfected. Ideally, designated protective clothing should be available and worn in the isolation areas.

In the event that an animal dies, aborts unexpectedly or is culled due to declining health, a *necropsy* performed by the herd veterinarian or by the regional Animal Diagnostic Laboratory may be a worthwhile investment. The necropsy could help identify the cause of sickness or death and therefore provide more information to help decide if additional action needs to be taken to protect the remainder of the herd.

Proper herd monitoring provides important information on the current health status of the herd and as a result can help producers take the required action for a rapid response to disease.

2.2.3 Implement herd health protocols

Summary: To guide the effective implementation of the herd health management program, a plan is in place outlining the schedule of tasks as well as the assignment of roles and responsibilities.

Records are maintained to document the progress and completion of each component.

Once the herd health management program has been completed, a plan should be developed to guide its implementation. Under each component of the herd health management program, a series of tasks should be listed that identify all steps required for implementation of the program.

A schedule can then be prepared that outlines the necessary timing and sequence of activities. This allows for time to be budgeted for the program, and this is valuable during busy times in the production cycle.

Each task needs to be assigned and roles and responsibilities detailed for each person involved in the program. This is more critical in larger operations that have more farm staff. By including all tasks, it ensures that no steps are overlooked and more importantly, that all staff receive the required training to fulfil their role. Also, it may be seen that some tasks require outside assistance and the necessary arrangements can be made in advance.

As the herd health management program is implemented, status of all tasks should be recorded. Details that are important include the status of each task, when completion is achieved, who is responsible for each task and when any follow-up is required.

2.2.4 Recognize susceptibility and maintain separation

Summary: To prevent disease spread within the population of goats on a premises, animals are grouped based on their current health status and level of immunity and are managed accordingly. Consideration is given to the sequencing of all activities to limit the risk of exposure to disease.

Individual animal factors determine susceptibility to disease. As a result, the age, health status and production stage of the herd should be assessed and the herd divided into groups based on these risk factors. These groups could therefore include newborn kids, weaned kids, doelings, lactating does, sick animals and new arrivals.

The groups should then be segregated to reduce the risk of disease transmission. The farm zoning map can be used to plan the housing arrangement for each group of animals (see Section 2.3.1). Segregation will vary from group to group and is typically based on both susceptibility and the farm's diseases of concern. For example, in some cases physically separating groups by pens may be enough, but in other instances groups may need to have a separate air space, their own feed and water troughs and dedicated equipment.

Once the housing arrangements have been determined, all on-farm activities should be sequenced to minimize the risk of disease transmission. The animals of highest susceptibility are handled before the animals of lower susceptibility. This order applies not only to day-to-day practices within the production area but also for all visits by service providers and other visitors. The recommended order is young to old, healthy to sick, most susceptible to least susceptible. This order also applies to milking. Contact with a specific group, especially those of higher susceptibility, only occurs if necessary. It may be beneficial to consider this sequencing when designing the farm zoning map so that the layout allows for logical movement around the premises.

If there are multiple livestock species on a premises, biosecurity planning should be designed to address the full population.

In some instances, community and/or shared pastures may be used. This practice brings an increased risk of disease transmission between herds, especially if the herd health status and biosecurity practices differ between farms. It is therefore important to communicate with all other producers using the community pastures to determine the health status of their herds and if they are safe for contact with the home herd. A protocol should be in place that requires all producers to communicate any change in their herd's health status to the other farms using the pasture.

2.2.5 Optimize nutrition and the use of veterinary biologicals.

Summary: Nutrition and vaccination plans are in place that address the specific needs of the herd and contribute to enhanced immunity and herd health.

Nutrition plays a key role in the health and production of the herd. Water, pasture, feed (forage, grains, and concentrates) and vitamins and minerals all contribute to good nutrition. Herd veterinarians or animal nutritionists can help producers design appropriate nutritional plans for their herds. Important

factors to consider include the age and production status of each group, potential deficiencies based on geographic location, and previously-identified nutrition-related herd health issues.

Raw milk either from the same herd or another herd can pose a specific disease risk for kids. Numerous infectious agents which the kid may be susceptible to (e.g. *Mycobacterium avium* paratuberculosis – the cause of Johne’s disease) can be present in milk. In these cases, pasteurization should be considered before feeding.

A number of plants can be toxic to goats, and these risks differ by geographic region. Regular screening of *pastures* for specific plants of concern should be conducted.

Immunity is acquired both passively and actively. Initially, *antibodies* are transferred from the dam to the neonate through colostrum. This is termed passive immunity, and ensuring that neonates receive sufficient volume of good quality colostrum shortly after birth, either from the dam or another donor, is critical for neonatal immunity.

Active or acquired immunity can develop either as a result of exposure to an organism through contact with an infected or “carrier” animal, or through vaccination. A vaccination program that is targeted to certain diseases of concern can help prevent their introduction and spread.

It is important to note that no vaccines are currently licensed in Canada for use in goats. Consultation with the herd veterinarian is therefore critical and will help to determine which vaccines should be considered for each group of animals.

2.2.6 Control movement of animals within the production area

Summary: When animals need to be moved within the production area, the movement is planned in advance to reduce the risk of disease exposure and spread to susceptible animals.

Movement of animals within a premises is done for two reasons: to move animals to a new production area because of a change of status (e.g. dry does to kidding area; kids on milk replacer are weaned and moved to grower pens) or to facilitate a management procedure (e.g. moving milking does to and from the milking parlour; moving cull or market animals to the *loading area* for trucking off-farm). Movement of animals within and through the premises raises the risk of disease being transmitted between groups. Therefore, movement should be conducted for a reason and only if necessary. A written movement plan that identifies and avoids disease-transfer risks will allow this activity to be carried out in a logical and coordinated fashion.

The farm map is a useful tool for a producer when planning movement. The goal is to choose a route through the premises that prevents commingling between groups of goats and limits cross-contamination in areas where goats of different health status and disease susceptibility are or have recently been present.

Many goat farms have multiple species on the premises, and any animal movement and/or commingling poses a potential risk to all species on the farm, especially those which have shared susceptibility to the farm's diseases of concern. If multiple groups are being moved throughout the premises, the movement plan should outline the sequence in which the goats are moved. Again, the goal is to prevent commingling and minimize cross-contamination.

Each group should be moved one at a time. Animals of higher susceptibility should be moved before those of lower susceptibility. When common pathways must be used, the pathways should be cleared of manure, debris and other potential contamination before they are used by susceptible groups.

Ideally, movement is planned to limit the potential for commingling and cross-contamination between susceptible animals. However, if commingling is the farm's practice, vaccination practices can be planned to provide immunity and common biosecurity practices can be designed to reduce the disease-transmission risk.

2.2.7 Manage feed, water and bedding

Summary: Management practices are in place to ensure that feed, water and bedding are of sufficient quantity and quality and free from any potential contamination.

Feed, water and bedding may all pose a risk of introduction of disease and other contamination. This can be from sources on and off the farm.

Feed should be purchased from a reliable source that operates under a feed assurance program. The composition of the feed must comply with the Feed and Health of Animal Act to ensure the feed does not contain prohibited animal by-products. Records of purchase, transport, storage and production information, including batch identification and composition, should be kept. Before use, feed should be stored in a secure dry area that does not permit access and potential contamination by pests, wildlife, livestock and other domestic animals. Goats are fed in feeders (troughs, racks, bunks) to raise the feed off of the ground. Any feed that has been, or may have been contaminated by manure, urine or other potentially infectious material, should be disposed of, and the contaminated feeders should be cleaned. All feed, including feed for other animals, should be stored where goats do not have access to it.

The relative risk of introducing infectious agents via drinking water is dependent on its source. Ideally, water should be from either a municipal source or from the drilled farm well sealed to prevent surface water contamination and tested regularly for bacterial quality. Allowing goats to have access to surface water (e.g. ponds, streams and ditches) should be avoided.

The use of water delivery systems is recommended. They can be designed to limit contamination with urine and feces and run-off water. Cleaning, disinfection and flushing of the water delivery system on a regular basis and after any potential contamination is a valuable practice.

An ample supply of clean, dry bedding is needed for all animals. Just as for feed, bedding should be acquired from a known, reliable source and should have proper documentation. Storage in a dry,

secure area will help to protect it from subsequent contamination on the premises. Protocols can be written to identify the bedding required by each group of animals and to outline the schedule for cleaning and replacement. This is particularly important in areas used for isolation and sick animals. If *dry pack* bedding is used, contaminated and potentially-contaminated material (e.g. abortions, placentas, manure) should be removed immediately.

Draft for Review

Developing the Biosecurity Plan

Based on the self evaluation and the information provided in this section on animal health:

1. *What are the biosecurity gaps on my farm?*

2. *What are the biosecurity goals to address these gaps?*

3. *What steps can I take to achieve these goals?*

2.3 Key Area of Concern 3: Facility Management and Access Controls

The farm facilities and all related management activities can have a large impact, either positively or negatively, on both the risk of disease introduction and transmission, and the implementation of biosecurity practices. Farm facilities are the physical environment in which biosecurity must work and therefore they should be carefully considered during the design of the biosecurity plan.

Table 3.1: Self-Evaluation Checklist

The table below presents a series of activities that may occur on a goat farm related to facility management and access controls. Additional information can be found in the following section. Specific subsection reference numbers are provided for each activity.

Biosecurity practices for facility management and access controls	Self-evaluation				Reference
	Always / frequently	Some-times	Never	N/A	
Biosecurity zones on my farm are identified and understood.					2.3.1
I use signs at access control points to describe my biosecurity protocol.					2.3.1
Protocols for movement of animals, equipment and vehicles are written and communicated to <i>farm workers</i> .					2.3.1
I provide a dedicated parking area for farm workers and visitors which is separate from animal management and housing areas.					2.3.1
I have perimeter fencing around my goat operation and it is inspected and maintained in a timely manner.					2.3.2
The animal facilities and equipment are cleaned and disinfected routinely using written protocols.					2.3.3
Animal facilities and equipment are cleaned and disinfected when recognized events (e.g. abortion outbreak) or risks are identified (e.g. sick pen, isolation area, etc.) using written protocols.					2.3.3
Feed bunks, troughs and other feeding areas are kept clean of old feed and manure.					2.3.3
Water bowls and water troughs are cleaned regularly.					2.3.3

Biosecurity practices for facility management and access controls	Self-evaluation				Reference
	Always / frequently	Some-times	Never	N/A	
Feeding bottles, milk and water pails for kids are washed, disinfected and dried after each use.					2.3.3
My facilities are routinely inspected and maintained to avoid pest and predator invasion and standing water, for example.					2.3.4, 2.3.7
My deadstock management includes immediate removal and secured storage from the herd, facilities, food and water - as well as scavengers, pets and pests.					2.3.5
My manure management considers removal and storage for composting or spread on cropland.					2.3.6
I have a pest and insect management program in place.					2.3.7
I have a protocol to prevent contact between wildlife and goats.					2.3.7
Dogs on the farm (working, guardian and pets) have a health program that includes vaccination against rabies and monthly treatment for tapeworms.					2.3.7
Farm cats have a health program that includes vaccination against rabies and mitigating risk of toxoplasma exposure to female goats.					2.3.7

Target Outcome: Management of farm access, facilities and risk areas enable limitation of introduction and spread of disease on farm.

Risks to be considered:

- Uncontrolled access to the farm and to zones and specific *risk areas*; not knowing the practices that will protect the herd from infection
- Infection acquired by and shared among goats from facilities, tools and equipment that are not properly cleaned and disinfected
- Transmission of diseases by contact with wildlife and with other animals when goats are in pasture and with rodents and pests when in their *barns* or other enclosures
- Exposure to infectious agents in manure, deadstock, or aborted tissue/fluids

2.3.1 Zoning and facility design

Summary: Farm facilities need to be zoned and special risk areas need to be identified so that animals, people and vehicles can move about the farm without unnecessary contact with the herd, and the appropriate biosecurity practices can be applied when doing so.

Zones and identified risk areas are very important to biosecurity. They help to identify where practices can be applied to reduce the potential contamination of the herd during day-to-day activities, and allow the separation of areas for special activities, including: milking, breeding, vaccination and other health treatments, disease observation and treatment, shearing/combing, and hoof trimming. If they are designed correctly, these practices can be followed with minimal disruption to normal production activities

In many countries, *Controlled Access Zones* (CAZ) and *Restricted Access Zones* (RAZ) have been developed and used, and they have been adopted by some livestock sectors in Canada. They are used to identify areas of the farm for biosecurity management based on the risk of activities carried out within them.

A CAZ is a buffer area that usually excludes the house and personal space of the farm family. The CAZ contains facilities that are indirectly involved in animal production and many areas in which farm service providers and farm workers circulate – laneways, parking areas and equipment sheds, for example. It may also include areas in which goats are less intensively managed – pastures, for example. The CAZ has its own specific biosecurity practices, and encloses the RAZ.

A RAZ contains or confines production animals and includes the area(s) of the farm in which goats are housed, milked, pastured, worked, bred, treated and isolated, including the areas through which they move. The layout and management practices of individual farms will help to decide whether manure storage, deadstock handling/storage and other production facilities that are directly involved in animal production are included within the RAZ.

Therefore, the CAZ and RAZ are used to identify two general areas of relative risk on the farm – a buffer zone between the family or public spaces and the zone in which goats are kept; and the active production zone that contains the goats.

In addition, within these zones, especially inside the RAZ, there may be separate areas in which certain practices are carried out, such as:

- barns or shelter areas;
- working areas in which goats are vaccinated, are held for clinical examination, pregnancy confirmation and/or are bred (e.g. group breeding, AI);
- milking parlour; pens or huts for isolation of kids or for individual breeding;
- maternity/birthing pens/area;
- nursery area;
- hospital pen and isolation area for newly-introduced goats or goats undergoing disease testing.

These are areas with specific disease risks, and therefore they may require additional practices over and above those identified for the CAZ or the RAZ within which they are located.

There may also be cases in which the whole goat farm might be treated as a single zone. This could occur on a farm on which the goats are housed together and are handled as a single unit, for example, and therefore share equal risk. This might be a common approach for smaller herds and also where facilities are not designed to allow separation. The principles established for zoning in the Standard will still apply to this approach.

Signs should be posted to mark the boundaries of all zones and to identify the controlled access points where biosecurity protocols (e.g. changing clothes/footwear, washing hands, using zone-specific tools/equipment, etc.) should be carried out.

Pathways for movement of animals and equipment, and roadways for vehicles, can be located to avoid close contact and/or cross-contamination between animals of different health status or susceptibility, and positioned to make sure that unnecessary contact between the goat herd and the tools, equipment and vehicles that are moved about the farm is avoided.

A dedicated parking area(s) for vehicles used by farm workers, visitors and service providers that is signed and clearly seen will reduce the potential for contamination of the production areas by vehicles that may have been on other farms or may have picked up contaminants from other locations. A controlled access point between the parking area(s) and any adjacent zone is also required, so that these people can prepare for their movement into the zone.

When barns, sheds and other buildings used to house goats are being built, repaired or renovated, biosecurity requirements can be taken into consideration. Specifically, the design should allow for segregation and movement practices and provide areas for biosecurity practices to be carried out (e.g. hand-washing stations, clothing and footwear change areas). Materials and finishes should be used that are smooth and have fewer seams and irregularities, so that they are less likely to harbour infected

material that can be transferred to the goats. Goats are typically inquisitive, and will often lick and chew their surroundings, and any infected material that is contained within these materials may be contacted in this way. Also, smoother surfaces can be cleaned and disinfected more effectively.

2.3.2 Perimeter and interior fencing

Summary: Fencing can be used to maintain separation between goats and other animals on the farm and between the herd and livestock on adjacent farms. Fencing also serves to separate certain goats from the rest of the herd under pre-planned circumstances.

Secure perimeter fencing will contain the herd on the farm property and will stop some animals from entering. Therefore, fencing will reduce some risks of access by animals while other risks are still present (e.g. predator attacks, feral or domestic animal movement). It may also reduce accidental or deliberate access by people who could represent a risk to the herd.

Interior fencing can be used to build areas that allow separation of groups of goats from one another – isolated new arrivals, weaned kids, or milking does, for example – and to allow separate biosecurity practices to be applied to them. Additionally, interior fencing is important for separating different species if they are present on the farm.

2.3.3 Cleaning and disinfection of facilities and on-farm equipment

Summary: Cleaning and disinfection is prior to and after use as well as routine maintenance of equipment and facilities. It is focused on the facilities that house and otherwise manage the herd, and the tools and equipment that are used in managing the herd and in handling individual goats.

Day-to-day cleaning and disinfection is required to reduce ongoing risk of disease transmission on the farm – for example, from diseased or carrier animals to susceptible goats or from a contaminated environment. Cleaning and disinfection as a regular production practice needs to become routine on the farm. Farm workers should know when and how to clean and disinfect equipment and facilities and have the required materials on hand where they are needed. Infectious agents are not visible to the eye, and therefore proactive cleaning and disinfection is the best way to reduce their spread on the farm by equipment, within facilities and on vehicles.

Cleaning and disinfection is necessary when there is an outbreak of disease or a suspected case of disease in the herd. The farm's biosecurity plan should include enhanced biosecurity measures when there is a suspect or confirmed disease situation, and additional cleaning and disinfection is a major part of such a plan.

Areas of the farm that could be contaminated more easily with infectious agents and that are more likely to be in contact with the herd are the greatest concern for cleaning and disinfection practices. These include:

- Any area that goats inhabit or pass through that could be chewed or licked,
- Any bedding, water delivery system, feed bunk, tether, railing or surface that is accessible to goats in a sick pen, isolation area or similar risk area, and

- The milking parlour.

Cleaning and disinfection practices need to be designed to eliminate a range of secretions wherever they are deposited on the farm. Saliva is included above, and feces, urine, milk (in the parlour), dander, vaginal discharges, discharges from wounds or abscesses, and respiratory secretions represent similar or higher risks to the herd.

In the same way, equipment and tools that are used to move feed or manure or to maintain the facility around the herd, especially those that are used near isolated or diseased goats, require specialized cleaning and disinfection practices. Tools and equipment that come in direct contact with the goats, such as de-horning or de-budding tools, hoof trimming equipment, shears, etc. should be cleaned and disinfected between uses, and at least daily, and require special attention should there be a suspected or real case of disease in the herd. Milking equipment is generally cleaned and disinfected between uses.

2.3.4 Facility maintenance

Summary: Well-maintained facilities are less likely to harbour potentially-infected material, are more easily cleaned, and are less accessible to rodents and other pests.

Surfaces throughout the farm, especially those that can come into direct contact with the goats, need to be kept in good condition so that infectious agents cannot hide in gaps and cracks, and also so that surfaces can be properly cleaned and disinfected as needed.

Facilities need to be kept secure so that potential carriers of disease – pests and rodents, for example – cannot come in contact with the herd directly, nor indirectly via their feed, bedding or other routes. Additionally, care needs to be taken to ensure that facilities are secure from the goats themselves. Goats are inquisitive animals and they may be able to figure out how to get into areas they are not intended to enter, and then contaminate those areas with urine, feces and other excretions.

2.3.5 Management of deadstock

Summary: Deadstock is a high disease-contamination risk for many common infectious diseases, and contact between deadstock and the herd should be minimized.

Deadstock should be removed from the herd as soon as they are seen, and the area(s) they have passed through should be cleaned and disinfected as soon as possible. This also applies to all aborted fetuses and placentas; they should be managed as deadstock and not included with the manure.

It is important that protective clothing (coveralls, gloves and boots) is worn when handling deadstock and that the area where the dead animal was discovered is properly cleaned and disinfected. Even if gloves are worn, it is still important to wash and clean hands with soap and apply sanitizer.

If deadstock are to be disposed of on-site, via composting, burial or other means, disposal will need to follow municipal and/or provincial regulations, including environmental provisions. Deadstock should be

moved to a location away from the active production area, so that there is no possibility of contamination either physically or by aerosol means. *Guardian animals* and pets that commingle with the herd should be kept away from deadstock disposed of in this manner.

If deadstock are to be picked up by a disposal service they should be moved directly to a deadstock holding area. The holding area should be secured from scavengers and located away from any contact with the herd. The pickup location should be in an area that can be accessed by the deadstock service without entering or passing near any of the production areas.

Regardless of storage location, deadstock should be kept completely covered

2.3.6 Management of manure

Summary: Manure is a high disease-contamination risk for most common diseases, and contact with the herd should be minimized.

Manure contains many infectious agents, some of which can live for long periods in the manure. Manure should be cleaned from stalls, holding areas, pens and pathways regularly, as part of day-to-day production practices. When a disease is suspected or confirmed on the farm, manure should be scraped and removed often from the area where the diseased goat(s) are kept, and stored in an area that is secure from the herd and from guardian and working animals and farm pets.

It is important to ensure that protective clothing (coveralls and boots) is worn and biosecurity protocols are followed to minimize the spread of disease. Ideally, have designated clothing and boots, or clean and disinfect boots before entering into other areas of the farm. Use designated equipment and if possible clean and disinfect it between uses. Wash and clean hands with soap, apply sanitizer after handling manure and prior to handling feed, bedding, live animals and products.

Manure should be moved directly from the cleaning site to the manure storage area via planned routes that do not contaminate pathways or come near highly-susceptible goats. Storage areas should be located away from the production area(s) and constructed such that run-off will not reach pathways, goat pens or holding areas, feed storage or feeding equipment, and water sources. Manure should be stored in a manner that limits access by pets, pests and scavengers. Enough storage space should be available to allow proper composting practices.

Storage, composting and application of manure is regulated in many municipalities and these regulations should be followed when handling manure on the farm.

2.3.7 Management of pests, wildlife, pets

Summary: All types of pests, wildlife and pets are high-risk sources of contamination for certain common diseases, and they should be excluded from the production area(s) as much as possible.

Producers should have an effective pest management program that includes both practices that limit access by pests and materials (e.g. bait) and procedures (e.g. traps) that control them. The barn should be as secure as possible from entry by birds, rodents, cats (pets and feral), bats and insects.

For their protection, goats at pasture can be accompanied by guardian animals that are able to defend against wildlife. These guardian animals should be vaccinated against rabies and other infectious diseases and be treated routinely for external and internal parasites, including tapeworms.

Access to the herd by pets (including barn cats), should be limited. Pets should also be vaccinated against rabies and other infectious diseases and routinely treated for external and internal parasites, including tapeworms.

Draft for Review

Developing the Biosecurity Plan

Based on the self evaluation and the information provided in this section on facility management and access control:

1. *What are the biosecurity gaps on my farm?*

2. *What are the biosecurity goals to address these gaps?*

3. *What steps can I take to achieve these goals?*

2.4 Key Area of Concern 4: Movement of People, Vehicles and Equipment

Movement of people, vehicles and equipment on and off and within the premises occurs throughout the day on many goat farms. This movement represents a potential threat to biosecurity and measures need to be in place for movement control.

Table 4.1: Self-evaluation Checklist

The table below presents a series of activities that may occur on a goat farm related to the movement of people, vehicles and equipment. Additional information can be found in the following section. Specific subsection reference numbers are provided for each activity.

Biosecurity practices for movement of people, vehicles and equipment	Self-evaluation				Reference
	Always / frequently	Some-times	Never	N/A	
Farm workers and visitors are informed of the biosecurity protocols in place. There are actions which monitor compliance with the protocols.					2.4.1, 2.4.2
Access by visitors and service providers is controlled.					2.4.2
I maintain a logbook for visitors and service providers.					2.4.2
Clothing, footwear and other protective equipment (e.g. masks) are provided to workers.					2.4.3
Visitors are provided designated personal protective attire before entering the facility.					2.4.3
I have a protocol for people when they move between biosecurity zones or to a risk area (e.g. isolation area).					2.4.3
Designated personal clothing and footwear is available for various production areas of the operation.					2.4.3
Equipment, tools and vehicles used on other <i>livestock operations</i> are cleaned prior to bringing back to the home farm.					2.4.6
Equipment is cleaned and					

Biosecurity practices for movement of people, vehicles and equipment	Self-evaluation				Reference
	Always / frequently	Some-times	Never	N/A	
disinfected between dirty (e.g. shovel used for manure) and clean (e.g. shovel used for feed) duties.					2.4.6
Livestock transportation vehicles are cleaned after each use and before returning to the farm.					2.4.6

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Target Outcome: Movement and activities of workers, visitors and service providers and their vehicles and equipment do not compromise animal and human health.

Risks to be considered:

- Workers can transmit disease-risk materials from one area of the farm to others, thereby infecting goats within non-infected zones, especially those with lower immunity
- Visitors and service providers bring infectious agents to the farm and do not follow the biosecurity practices that they are required to follow

2.4.1 Access management for farm employees

Summary: Farm workers should understand the biosecurity practices that pertain to working on the farm. Their knowledge is updated whenever a practice is modified or new practices are added.

When preparing the farm biosecurity plan, producers should establish practices for farm workers to follow when arriving at the farm, when moving from zone to zone, when entering and leaving the goat management area, and when leaving the farm. In particular, when moving within the production area, farm workers should know the importance of the order of their actions. That is, activities and movement should go from more to less susceptible, from healthy to diseased and from young to older animals.

A work schedule and an attendance record should be kept for each farm worker. This can be stored with the farm payroll records or in another convenient location for use should any disease emergency require it.

During the introduction of the farm biosecurity plan, and whenever a new farm worker is hired for the farm, producers should carry out education and training so that farm workers know and understand the plan with regard to entry to and exit from the farm and all production areas (see Section 2.6).

2.4.2 Access management for visitors and service providers

Summary: Visitors and service providers have necessary access only to areas of the farm and to the herd. They are aware in advance of the biosecurity practices that will apply to their visit and come prepared.

Visitors and service providers should only have access to the herd and the active production area for a specific purpose and by arrangement made in advance with the producer. The biosecurity practices that apply to the farm zones and to the specific risk areas on the farm, and those that apply to the activities that visitors and service providers are there to perform, should be discussed in advance. Any required preparation will be explained and completed before they arrive.

Visitors and service providers whose disease risk status is not known, including those who have come from or who have visited a foreign country in the recent past, should undergo a full risk assessment. That is, information concerning their movements and activities during the two-week period prior to their visit should be documented, with specific concern for the following:

- Presence on any farms or on other agriculture or agriculture-related premises,
- Access to and/or contact with any livestock,
- Access to and/or contact with any livestock-related vehicles, equipment or other *fomites*, and
- Existence or suspicion of any animal diseases on the premises or facilities or in the areas or regions they have visited.

Analysis of this and other information, including:

- Purpose of the visit, areas of the farm to be visited, and level of contact expected with any of the animals, facilities and equipment present on the farm, and
- Cleanliness and condition of all clothing, footwear and equipment worn or carried during a planned visit,

can be used to determine whether they are admitted to the farm and what biosecurity practices they will be required to follow while on the farm.

As a general rule, persons who have visited a farm in a foreign country and who are requesting access to the farm should wait a minimum of 5 days and follow advanced biosecurity protocols set by the producer. For more detailed planning, a list of specific disease risks by country is maintained by the world Organization for Animal Health (www.oie.int) that can provide guidance to the specific risk that might be presented by visitors from each country.

A visitor logbook should be kept in an easily-available location at or near the initial entry point to the farm⁵. All visitors should sign the logbook upon arrival at the farm and be aware that the record of their visit will be used in the event of a disease emergency.

Any visitors and service providers requiring access to the herd will follow best practices for cleanliness and will wear barn-specific clothing and footwear⁶. As included in the farm's biosecurity program, these controls will apply to general access to the herd, movement between the CAZ and RAZ, and access to specified-risk areas – the hospital pens, isolation area(s), and the nursery, for example.

Signage should be posted at all controlled access points so that visitors and service providers know where they are in the farm's biosecurity zoning, and what biosecurity practices they should be following. A hand-cleaning and change area should be situated at the controlled access points for each risk zone, and suitable supplies should be made available.

⁵ Samples of logbooks and logbook pages are available from several commodity associations; suggested content is included in the accompanying Producer Guide.

⁶ Whether the visitors and service providers provide their own (suitable) outerwear and footwear needs to be agreed in advance. Producers can maintain a stock of disposable coveralls, boot covers, rubber gloves and other required materials for use in unexpected circumstances.

2.4.3 Clothing and footwear

Summary: Everyone entering and working on or visiting the farm wears farm-specific protective clothing and footwear. Clothing and footwear will be changed when moving between farm zones and again when approaching certain high-risk areas of the premises.

Farm workers, visitors and service providers should agree to wear clean clothing and footwear in the production area(s) and put them on when preparing to enter each risk zone and to take them off and dispose of them when leaving.

Clothing and footwear and facilities in which workers can put them on should be available at each controlled access point. Producers and their farm workers will know and be able to tell visitors and service providers what clothing and footwear are required for each activity they are planning. Visitors and service providers will bring suitable clean clothing and footwear for use in the production area(s) and put them on just before entering each risk zone and remove them when leaving. Producers and their visitors and service providers should agree about what farm clothing and footwear is required before a visit to the farm.

Producers may have a supply of clean or disposable coveralls and boot covers for use when authorized visitors and service providers do not have enough or the right kind of farm-specific clothing available.

Storage areas need to be available for outerwear and footwear that is required to be changed in each farm zone and in the specific risk areas where biosecurity practices apply for workers, visitors and service suppliers. Examples of the latter include the milking parlour, the hospital pens, the isolation area(s), and the nursery.

2.4.4 Hand washing and Personal Protective Equipment

Summary: Everyone entering and working on or visiting the farm washes and sanitizes their hands upon entry and exit, when moving between farm zones and again when approaching or leaving certain high-risk areas of the premises.

Hand washing is an effective way to break the cycle of disease transmission and should be done on a regular basis. Specifically, hands should be washed before entering into the RAZ, before contacting any animals or moving between different groups of animals, before conducting higher risk activities such as milking, and whenever hands may be contaminated. Hand washing stations should be located so that it is easy to follow the required practices. If hands are not visibly soiled, an alcohol-based (60%) hand sanitizer is acceptable. However, if hands are visibly contaminated, hand washing with water and soap is needed.

There are many infectious agents, referred to as zoonoses, which can spread from goats to humans and cause disease in humans. Wearing personal protective equipment (PPE) is recommended during times of higher risk such as when dealing with abortions. Basic PPE – gloves and fitted N95 masks (able to filter 95% of pathogens) – should be available for use by all workers on the farm and farm staff should be trained in their proper use.

2.4.5 Movement control of equipment/tools and vehicles

Summary: In high-risk areas or for high-risk activities, the farm's equipment/tools and vehicles are dedicated to one activity or area. The farm's service equipment/tools and vehicles are cleaned and disinfected between uses. Equipment/tools and vehicles that are brought onto the farm are moved into a control area only if necessary. Service equipment/tools and vehicles that are brought onto the farm are cleaned and disinfected before arrival, and if they are used, are cleaned and disinfected between uses.

The biosecurity plan should include a practice to limit the movement of farm-owned tools and equipment between zones and among risk areas. Practices should apply to:

- mobile equipment (skid-steers, tractors, etc. and their accessories),
- hand tools including shovels, rakes and forks, and
- animal-handling equipment such as
 - halters/tie ropes,
 - shears for hoof trimming,
 - shearing/combing equipment,
 - clippers,
 - disbudding and dehorning equipment,
 - milk feeding equipment,
 - equipment used to administer medications, and
 - milking equipment .

Equipment that is limited to one area or one use is best; however, cleaning and disinfection practices can also be used that will reduce the risk of contamination from equipment that is moved from area to area and/or between zones.

Cleaning and disinfection procedures should be established for all areas and activities on the farm and be included in the farm biosecurity plan. Details for day-to-day cleaning and disinfection as well as cleaning and disinfection practices to be used when disease is present can be included. All cleaning and disinfection should be done using industry-approved methods and materials, following the required health and safety considerations.

Important information to outline with the procedures includes:

- Schedule of procedures,
- Roles and responsibilities for each task, and
- Products with instructions for safe use.

Any tools and equipment brought by service providers should be cleaned and disinfected using an effective protocol prior to arrival at the farm. Producers should provide suitable cleaning and disinfection materials and equipment for visitors' and service providers' use on farm when needed.

Any equipment and tools that need to be moved from area to area and/or between zones, including service equipment and tools in use on the farm, should be cleaned and disinfected between production areas in which they are used on the farm.

All vehicles should be cleaned before their arrival at the farm and should be parked in the designated parking zone. Vehicles should be considered “dirty” with respect to the farm zones, and should be cleaned before entry into and upon exit from these zones. This practice also applies to the interior of the vehicles coming to the farm. Operators who exit their vehicles on the farm should be required to put on farm-specific clothing and footwear required to be used in the zone(s) in which they will be operating.

Draft for Review

Developing the Biosecurity Plan

Based on the self evaluation and the information provided in this section on people, vehicles and equipment:

1. *What are the biosecurity gaps on my farm?*

2. *What are the biosecurity goals to address these gaps?*

3. *What steps can I take to achieve these goals?*

2.5 Key Area of Concern 5: Monitoring/Records Keeping

Gaps in knowledge can translate into gaps in biosecurity activities. An integrated set of information about the herd, including documentation of animal health, routine monitoring and farm management activities should be kept. It is a management tool and also will provide valuable information for assessing disease risk and implementing suitable mitigation practices.

Table 5.1: Self-Evaluation Checklist

The table below presents a series of activities that may occur on a goat farm related to monitoring and record keeping. Additional information can be found in the following section. Specific subsection reference numbers are provided for each activity.

Biosecurity practices for monitoring and record keeping	Self-evaluation				Reference
	Always / frequently	Some-times	Never	N/A	
I have records for every animal and for the herd collectively (ID #s, performance, disease experience, test results, movements, etc.)					2.5.1
I monitor and record all treatments, vaccinations, mortalities, and necropsy and laboratory results.					2.5.1
All goats are identified to link individual animals to health and production data.					2.5.1
I have records for all purchases: animals, feed, bedding, etc.					2.5.2
I have written protocols and records for cleaning and disinfection procedures.					2.5.2

Target Outcome: Information is maintained and used to improve the effectiveness of biosecurity practices. The status of animal health, identification and inputs may be verified by record review.

Risks to be considered:

- Records of practices and treatments are not available to assess their effectiveness, guide response to disease outbreaks, or help in improving and redesigning biosecurity practices
- Herd health records and records of health, treatment and disease for individual goats are not available when goats are sold or transferred to another owner.

2.5.1 Herd health records

Summary: Animals are observed on a daily basis and the findings are documented in the herd health record. Health records are reviewed regularly to detect any changes over time in animal health and production to initiate the necessary response.

General monitoring of all the animals in the herd should be completed on a daily basis. Herd health records are kept that detail these observations, including any signs of disease, or change in behaviour or production measurements. Animals in isolation require rigorous higher level of monitoring and records-keeping. Additional herd health records for non-routine activities are also helpful. Herd health programs act as a guide for producers to identify which information measures the program's ongoing successful implementation.

2.5.1.1 Individual animal records

Summary: Records are maintained for each animal to document data on health, productivity and movement throughout the individual's lifetime.

In addition to herd health records, individual animal health records provide valuable information to producers. If an animal is being purchased from another farm, all the available information on that animal should be acquired and used as baseline data in that individual's record. The record can then be updated on a regular basis throughout the goat's lifetime on the farm.

By maintaining individual animal health records, producers can provide for the specific health needs of their animals and implement management changes that will improve productivity. Moreover, producers can provide those records, whenever an animal is to be sold, to increase the buyer's confidence and improve market access.

2.5.1.2 Identification and traceability

Summary: Each animal is identified using industry-standard identification, which is used to link each animal with health and production-related data as well as track movement both on and off the farm throughout an animal's lifetime.

Every animal on the farm is unique. Therefore, each animal requires individual identification that allows it to be differentiated from its herd-mates throughout its life. Goat identification should be carried out according to industry standards.

Identification allows producers to link each animal with health and production data. It allows each animal to easily be traced and verified if any concerns arise related to exposure to disease and disease transmission, presence of drug residues or impact of genetics.

Individual animal identification also allows an animal to be tracked as it moves, both within a premises and to a new herd.

2.5.2 Farm Management Records

Summary: Records for farm management activities are maintained and reviewed regularly with animal health records to assess their effectiveness in the biosecurity plan.

All farm management activities should be recorded. Farm records help track if and when tasks have been finished and who completed them, and can include:

- cleaning and disinfection,
- pest control,
- manure and deadstock disposal,
- biosecurity training and communication, and
- any other biosecurity practices on the farm (e.g. sign posting, access restriction).

Ongoing analysis of these records allows producers to determine if all the required biosecurity activities are being followed and if there are gaps that need to be addressed. Additionally, biosecurity records and animal health records can be reviewed together to understand if biosecurity practices have contributed to changes in animal health on the farm.

2.5.2.1 Input records

Summary: Information on the source and quality for each purchase of feed, bedding and any other input is maintained and can be used as a reference if related health issues are suspected.

When feed is purchased, its source, lot number, date and manner of delivery, and storage location should be recorded. Feed may be analyzed for nutritional quality as well as for contamination, and these results should be included in the feed record. After the feed is distributed, which groups of animals received each batch can be added to the feed record, or conversely, the animals' health records can be updated with the feed identification.

Similar records should be maintained for all other input purchases, most notably bedding.

In the event that potential contamination was discovered at the source, a producer could use the recommended records to identify if the product (feed or bedding) in use is affected and if so, take the appropriate response actions. Additionally, if health issues arise that could be related to the product, the records can be used to trace back to the seller and the purchased batch.

Developing the Biosecurity Plan

Based on the self evaluation and the information provided in this section on monitoring and record keeping:

1. *What are the biosecurity gaps on my farm?*

2. *What are the biosecurity goals to address these gaps?*

3. *What steps can I take to achieve these goals?*

2.6 Key Area of Concern 6: Communications and Training

Once the biosecurity plan has been designed and implemented, *family members*, farm workers and visitors need to be made aware of the plan and their role in carrying it out. All people who come onto the farm have a role to play in on-farm biosecurity.

Table 6.1: Self-Evaluation Checklist

The table below presents a series of activities that may occur on a goat farm related to communications and training. Additional information can be found in the following section. Specific subsection reference numbers are provided for each activity.

Biosecurity practices for communication and training	Self-evaluation				Reference
	Always / frequently	Sometimes	Never	N/A	
Managers and I lead by example in terms of biosecurity compliance.					2.6.1
My biosecurity protocol is written and communicated to all employees.					2.6.2
My biosecurity protocol is communicated to all visitors and service providers.					2.6.2
My biosecurity protocol is posted.					2.6.2
Visitors, including service providers and family members, are escorted by farm workers or myself to ensure compliance with biosecurity protocols.					2.6.2
I provide biosecurity training to all my farm workers and expect all new employees to review the biosecurity protocol upon commencement of work.					2.6.3
The biosecurity training sessions are conducted at least annually.					2.6.3
I review my records to assess performance and effectiveness of biosecurity practices.					2.6.4
I review and update my biosecurity protocol at least once a year with the participation of my farm workers and herd veterinarian.					2.6.4

Target Outcome: Everyone entering the farm is knowledgeable and complies with current farm biosecurity practices.

Risks to be considered:

- Farm workers, service providers and visitors may be unaware of biosecurity practices for entry onto the farm and for movement between zones on the farm, and introduce infectious agents from other animal locations
- Farm workers, service providers and visitors may be unaware of the potential for transmission of zoonotic diseases to humans; they may not follow the practices included in the biosecurity plan and as a result contract a zoonotic disease
- Farm workers, service providers and visitors may be unaware of biosecurity practices for specific risk areas and activities and transmit infectious agents from one area of the farm to another
- Farm workers, service providers and visitors may be unaware of biosecurity practices for leaving the farm and transmit infectious agents from the farm to other animal locations

2.6.1 Producer leadership

Summary: Producers take the responsibility for establishing their farm's biosecurity plan and educating their family members and farm workers. Service providers understand the farm's plan and abide by its requirements.

Successful on-farm biosecurity requires the cooperation of many people – family members, farm workers, service providers, and visitors, in particular. However, producers themselves should take the responsibility for making people aware of their farms' biosecurity plans, especially those who can support the effort, and those who have a role in its success.

Therefore, producers should review their farms' biosecurity plans with their family members and farm workers, and train their family members and farm workers in the correct way to implement them.

Also, although many service providers are developing and adopting biosecurity plans for their own operations, producers should talk about their farms' biosecurity plans with visitors and service providers, and require that they are followed when these people are on their farms. Ideally, producers and their service providers will get together to coordinate their biosecurity plans. This will allow them to share their individual knowledge and experience, and to adapt their own plans to suit the practices and equipment of the other.

2.6.2 Communications with farm workers, service providers and visitors

Summary: Producers communicate the requirements of their biosecurity plans to farm workers, service providers and visitors.

Communicating with farm workers about the farm's biosecurity practices is important. Each producer should choose a method that is most suited to the farm. It is also important that producers and their farm workers are able to explain biosecurity practices and the farm's risk areas to all persons who enter the farm.

Ideally, visits by service providers and visitors should be planned in advance. During this planning, the purpose of their visits and the areas they are allowed to enter should be identified. Based on this information, the biosecurity practices that relate to each visit and the areas in which they apply can be explained in advance, and preparations that need to be completed before arrival can be done.

Signs to tell visitors and service providers that biosecurity practices are in use on the farm can be posted at the farm gate and on the barn door. More specific signs can be used at the entry to the CAZ and the RAZ, and in specific risk areas within the production area.

2.6.3 Training and education

Summary: Education of workers and service providers is undertaken whenever practices are added or changed; they are explained to visitors in advance of their arrival.

Producers should prepare training materials and hold education sessions with all farm workers. Training materials can include the contents of the biosecurity plan, of course, and may also include detailed "how-to" information on practices that are:

- general and apply to day to day activities on the farm, such as:
 - sequencing,
 - cleaning and disinfecting procedures and materials, and
 - records-keeping, and
- specific to certain production activities, such as:
 - milking,
 - kidding,
 - disposal of deadstock, and
 - manure handling.

During the introduction of the farm biosecurity plan, and whenever a new farm worker is hired for the farm, producers should carry out a training session so that farm workers know and understand all parts of the plan and how it is carried out on the farm and in the production areas (see Section 2.6.4). The training should make sure that farm workers understand how to apply the recommended practices and why they are important.

Retraining should be carried out at least annually, and whenever changes are made to the biosecurity plan. It should ensure that existing biosecurity practices are reinforced and teach workers about changed, updated and improved practices.

Training materials and education session plans should be updated at least annually, and whenever there is a change to an operating procedure or to a facility design or layout that affects biosecurity practices. These changes to the training program will work together with a review and update of the farm's biosecurity plan.

Producers can ask farm workers for their help in designing the farm's biosecurity plans and training materials. This will ensure that the plan and its training materials fit well with the workers. Also, their participation in designing the materials will increase commitment and understanding.

Giving feedback to farm workers on a regular basis also enhance compliance. Others in the farm workforce, such as farm managers and workers who follow the plan carefully may also help this effort.

2.6.4 Performance and effectiveness of the biosecurity plan

Summary: The effectiveness of the biosecurity plan is measured by the adoption of its biosecurity practices and their integration into daily routines; improvements to the farm's biosecurity plan are designed and implemented.

When a biosecurity plan is ready for use, producers can set goals for adoption of the biosecurity practices and compliance with the methods in the plan. With the plan in place, it will be important to understand what works and what can be improved in the plan and in its practices. Using the farm log, producers, their farm managers and farm workers can regularly record their observations of the use of biosecurity practices by workers, service providers and visitors. These records can be reviewed and analyzed from time to time, to determine how well the goals are being met, and to identify changes that can be made to the plan.

Developing the Biosecurity Plan

Based on the self evaluation and the information provided in this section on communications and training:

1. *What are the biosecurity gaps on my farm?*

2. *What are the biosecurity goals to address these gaps?*

3. *What steps can I take to achieve these goals?*

3 Glossary of Terms

The first occurrence of each term present in the glossary has been identified in the document with *italicized text*.

Accredited: Approved or recognized as meeting a prescribed standard

Acute: Of rapid onset, or short duration

Anthelmintic: An agent, usually a drug, which is destructive to intestinal worms

Antibodies: A product of the immune system that helps to recognize and facilitate the destruction of specific infectious agents such as bacteria or viruses within the body

Antimicrobial: An agent that kills or inhibits the growth of micro-organisms

Asymptomatic: Not exhibiting clinical signs of a disease or condition

Barn: A farm building used for storing farm products and sheltering livestock

Biologicals: Medical preparations made from living organisms or their products; examples include vaccines, toxoids, serum and antigens.

Biosecurity: A health plan or measures designed to protect a population from transmissible infectious agents

Biosecurity Protocols: Those measures specific to a goat operation used to prevent the introduction and the spread of disease within an animal population and from that goat operation

Carrier: An individual that is infected with an infectious agent, but is not showing any clinical signs of disease at that time; transmission of the infectious agent from a carrier may be possible

Cleaning: Involves washing with detergent in order to remove all organic matter, and includes both a dry (scraping and brushing) and wet clean

Commingling: Mixing of animals from different farms or production facilities in quarters resulting in direct or close indirect contact among them

Community pasture: A public grazing area shared by more than one producer and not owned by a single producer

Controlled Access Zone: A designated area in which biosecurity protocols are in place and monitored and within which livestock are managed (e.g. a location or primary location) and which is accessible to people/equipment/vehicles and livestock only through a securable (e.g. lockable) controlled access point

Cross-contamination: The act of mixing a material, especially a material that is potentially infectious, with another material, thereby introducing the risk that a contaminant could be transferred to an animal. For example, infectious agents shed by sick or carrier animals can be transferred from manure to feed by the use of a common bucket or shovel.

Direct contact: Any form of close contact in which goats can physically touch one another, including all forms of nose-to-nose contact

Disease(s) of concern: Those diseases which pose a high risk to the health and productivity of a herd; can be farm-specific, or applicable to an entire region or country

Disinfection: The use of a disinfection agent, i.e. a chemical that can kill microorganisms, on areas being cleaned

Dry pack: A bedding approach that is formed by adding more bedding on top of the existing bedding to reduce the frequency of manure removal. A bedded pack can stay dry and warm but it is important to clean it out periodically

Emerging pathogen: A bacterium, virus or other microorganism that has either been newly discovered or newly introduced to a geographic area or population

Epidemiology: The study of the determinants and distribution of health-related events (including disease) in a population; can be applied to disease control strategies

Family members: Any family members that work on the farm whether they live there or not.

Farm Worker: A person who works on the goat operation; may include family members.

Fomites: Any inanimate object that can carry and/or transmit an infectious agent

Goat operations: All of the activities involved in raising goats and working with goat products, including meat, dairy and fibre

Goat products: Any live animals, fresh meat, meat products, milk or milk products, fibre or fibre products.

Guardian animals: Includes dogs (e.g. guardian dogs, herding dogs), llamas, donkeys, horses etc that have contact with and are used to manage the goat for purposes such as moving the goat, or guarding the goat from predators

Health status: Current state of health of the animal or herd, including both its condition and any infectious agents present in the animal or herd.

Herd of origin: Herd(s) within which the animal was born.

Immunity: Resistance to infection and/or disease

Incubation: The period of time between exposure to an infectious agent and the onset of clinical signs of disease

Infectious agent: A microbial pathogen that has the potential to cause disease (bacteria, viruses, parasites, fungi and prions); agents may be shed from an infected animal that appears healthy and is either incubating disease, recovering from disease, or is a carrier without symptoms. Routes of shedding include saliva, milk, respiratory secretions, faeces, urine, epidermal shedding, and uterine or vaginal discharges.

Infectious disease: Disease caused by an infectious agent.

Isolation: Restricting an animal to a location that is physically separate from other livestock. The purpose of isolating an animal is usually to prevent it from transmitting a disease to another animal or

acquiring disease from another animal, either because it is known to be diseased or because its disease status is currently unknown. The location is known as an isolation facility.

Livestock operation: Includes the buildings / drylots / paddocks / corrals and pastures used at any time of the year to manage any livestock including goat. The operation may have one or more locations.

Loading area: An area that is designated for the loading and unloading of animals; this is not just the ramp but it also includes any holding area and handling facilities used for this purpose.

Location: A single location is defined as a property used to manage goat (or livestock) that is self-contained and not divided by land or public road-way (e.g. concession road, highway – but not private laneway or walking path).

Morbidity: A measure of the number of individuals affected by a disease in a population

Mortality: A measure of the number of deaths in a population

Necropsy: A post-mortem examination to determine the cause of death; may involve only gross examination, or additional sampling and laboratory testing for infectious agents and/or toxins

Other livestock: Animals other than goats that are used for food or fibre production, work, guardian activity and recreation. Specifically sheep, cattle (dairy, beef, veal), horses, bison, water buffalo, farmed deer / elk, alpacas, llamas, swine, poultry, turkeys, ducks, geese.

Pastures: Fenced areas used for livestock grazing at any time of year. Can include multi-use fields (e.g. graze after haying or aftermath feeding).

Pests and wildlife: Includes all non-livestock and non-domestic animals and insects that may pose a health risk (disease and/or predatory) to the goat herd.

Pets: Cats, dogs and any other household pet kept by the farm family, their neighbours and/or staff.

Practice: General procedure that is followed by a producer, and not necessarily documented or detailed to the extent of a protocol.

Premises: A defined area of land with all accompanying structures

Prophylactic: A preventive action or measure

Protocol: Description of a practice or method, usually written in a standard format that applies to a specific activity and has an intended result or outcome.

Reportable disease: Those diseases which are outlined in the Health of Animals Act and Reportable Diseases Regulations and are usually of significant importance to human or animal health or to the Canadian economy. Animal owners, veterinarians and laboratories are required to immediately report the presence of an animal that is contaminated or suspected of being contaminated with one of these diseases to a CFIA district veterinarian. Control or eradication measures will be applied immediately. Some provinces also have a list of reportable diseases and required response actions.

Restricted Access Zone: An area inside the Controlled Access Zone where goat are housed and where access by people or equipment is further restricted.

Risk areas: Any area on the premises that has an increased likelihood of disease introduction and/or transmission; this may be due to the nature of the activity that occurs in the area and/or the group of animals that are housed within it

Service Provider: A person, company or organization that provides goods or services to farms on a professional basis, including feed and feed additives suppliers, veterinarians, hoof trimmers, shearing/combing technicians, live animal transporters, deadstock pickup services, manure management, and many others. The nature of service providers' activities on a farm, especially their closeness to or interaction with the herd, determines the relative risk of disease transmission that they represent.

Shedding: Transmission of an infectious agent from an individual to another individual or to the environment; can occur in the absence of clinical signs

Source herd: The herd from which goats, sperm and/or embryos are purchased; may also be the herd of origin.

Supply chain(s): All stages of production, processing, distribution and sales for a product

Susceptible: Lacking sufficient resistance or immunity and therefore at higher risk of infection and disease

Traceability: The ability to follow a product through all stages of the supply chain

Verified: Proven to be truthful or accurate

Veterinary Client Patient Relationship (VCPR): An established rapport that exists between a veterinarian and each client/patient and is required before a veterinarian can prescribe/sell medications; in some provinces a valid VCPR requires on-farm visits at least annually.

Visitor: A non-service provider visiting the herd.

Zoonosis: Any infectious disease that can be transmitted (in some instances, by a vector) from non-human animals, both wild and domestic, to humans or from humans to non-human animals

4 Acknowledgments

Draft for Review

Appendix A: Uses of the Standard

Table 6: The table below illustrates the various applications of the National Standard. Although the primary audience is producers, many other stakeholders in the goat industry will benefit from the information provided in the document. Each stakeholder is listed as a potential target audience, with an accompanying description on how they may use the National Standard.

Target Audience	Intended Use
Producers	Information and understanding of the National Standard leading to the preparation of a biosecurity plan for each farm
Producer Associations – National, Provincial and Sectoral	Planning and design of implementation programs and ongoing monitoring
Governments and Funding Agencies – National and Provincial	Support for export development; Program support and funding decisions
Veterinarians	Framework for support of producers
Processors/Retailers/Consumers/Public	Reference to practices that promote reliability and food safety
Trading partners (Export)	Assurance of scope and purpose of the biosecurity program
Farm Service Providers and Visitors	Understanding the direction and priorities of the industry; coordination of programs, especially farm service suppliers
Academics/Researchers	Teaching new industry entrants/ planning and reference for required areas of research in biosecurity for the industry
Veterinary and Food Science Students	Reference and source material for study
Insurance Companies	Planning and costing of insurance programs

Appendix B: Summary of Key Areas of Concern

Table 7: The table below provides a summary of the Key Areas of Concern and accompanying target outcomes and strategies presented in the National Standard.

Areas of Concern	Target Outcomes	Strategies
1. Sourcing and Introducing Animals	Animal introductions, re-entry and the use of semen and embryos do not present a risk to the health status of the herd.	<ol style="list-style-type: none"> 1. Sources and sourcing 2. Biosecurity practices at fairs, shows and off-site loan locations 3. Disease status at purchase/re-entry 4. Isolation upon arrival or re-entry 5. Protocols for releasing animals from isolation
2. Animal Health	Animal health, well-being and productivity will be optimized through proper implementation of herd health programs that also support the production of safe food	<ol style="list-style-type: none"> 1. Implement a herd health management program 2. Observe and evaluate the health of animals 3. Implement herd health protocols 4. Recognize susceptibility and maintain separation 5. Optimize nutrition and the use of veterinary biologicals 6. Control movement of animals within the production area 7. Manage feed, water and bedding
3. Facility Management and Access Controls	Management of farm access, facilities and risk areas enable limitation of introduction and spread of disease on farm	<ol style="list-style-type: none"> 1. Zoning and facility design 2. Perimeter and interior fencing 3. Cleaning and disinfection of facilities and on-farm equipment 4. Facility maintenance 5. Management of deadstock 6. Management of manure 7. Management of pets, wildlife and pests
4. Movement of People, Vehicles and Equipment	Movement and activities of workers, visitors and service providers, and family members and their vehicles and equipment do not compromise	<ol style="list-style-type: none"> 1. Access management for farm employees 2. Access management for visitors and service providers 3. Clothing and footwear

Areas of Concern	Target Outcomes	Strategies
	animal and human health	<ol style="list-style-type: none"> 4. Hand washing and personal protective equipment 5. Movement control of service equipment/tools and vehicles
5. Monitoring and Records Keeping	Information is maintained and used to improve the effectiveness of biosecurity practices. The status of animal health, identification and inputs may be verified by record review.	<ol style="list-style-type: none"> 1. Herd health records 2. Farm management records
6. Communications and Training	All persons, employees (et al) are knowledgeable and comply with current farm biosecurity best practices	<ol style="list-style-type: none"> 1. Producer leadership 2. Communication with farm workers, service providers and visitors 3. Training and education 4. Performance and effectiveness of biosecurity plan

Appendix C: Developing a Farm-Level Biosecurity Plan

When conducting the initial assessment:

1. Evaluate the facilities:

- Develop a map of the farm
- **Farm zoning:** Areas defined by common/similar disease risk
 - Overall farm zoning approach
 - **Restricted Access Zone** is any area that houses or contains goats and/or where access to goats is possible.
 - **Controlled Access Zone** is the adjacent area within which movement is restricted and any potential fomites are controlled.
- Also/alternatively, areas within the barn and other areas of the farm can be defined more specifically, again using the concept of common/similar disease risk. Some examples of these more specific zones:
 - areas where all visitors are allowed;
 - areas where some / all visitors are restricted (e.g. must change clothing and wash hands before being admitted);
 - areas where animals of differing health status are housed (e.g. new introductions, sick/diseased animals, animals on a health program).

2. Evaluate the herd disease status:

- Identify diseases of concern for your farm/herd
- Document their modes of transmission and,
- Determine the preventive biosecurity measures by which the risk factors for the disease can be managed or minimized

3. Evaluate the animals:

- Genetics of productivity and health

4. Evaluate the operational management:

- Number of animals the farm loses annually
- Replacements and frequency
- Source of replacements and health status
- Herd size and expansion
- Source, quality and system for distribution of inputs (feed, bedding and water)
- Marketing requirements (live and product)

5. Evaluate the management team and strategy:

- Training and compliance to the biosecurity plan

6. Set goals to meet the operational and market objectives