

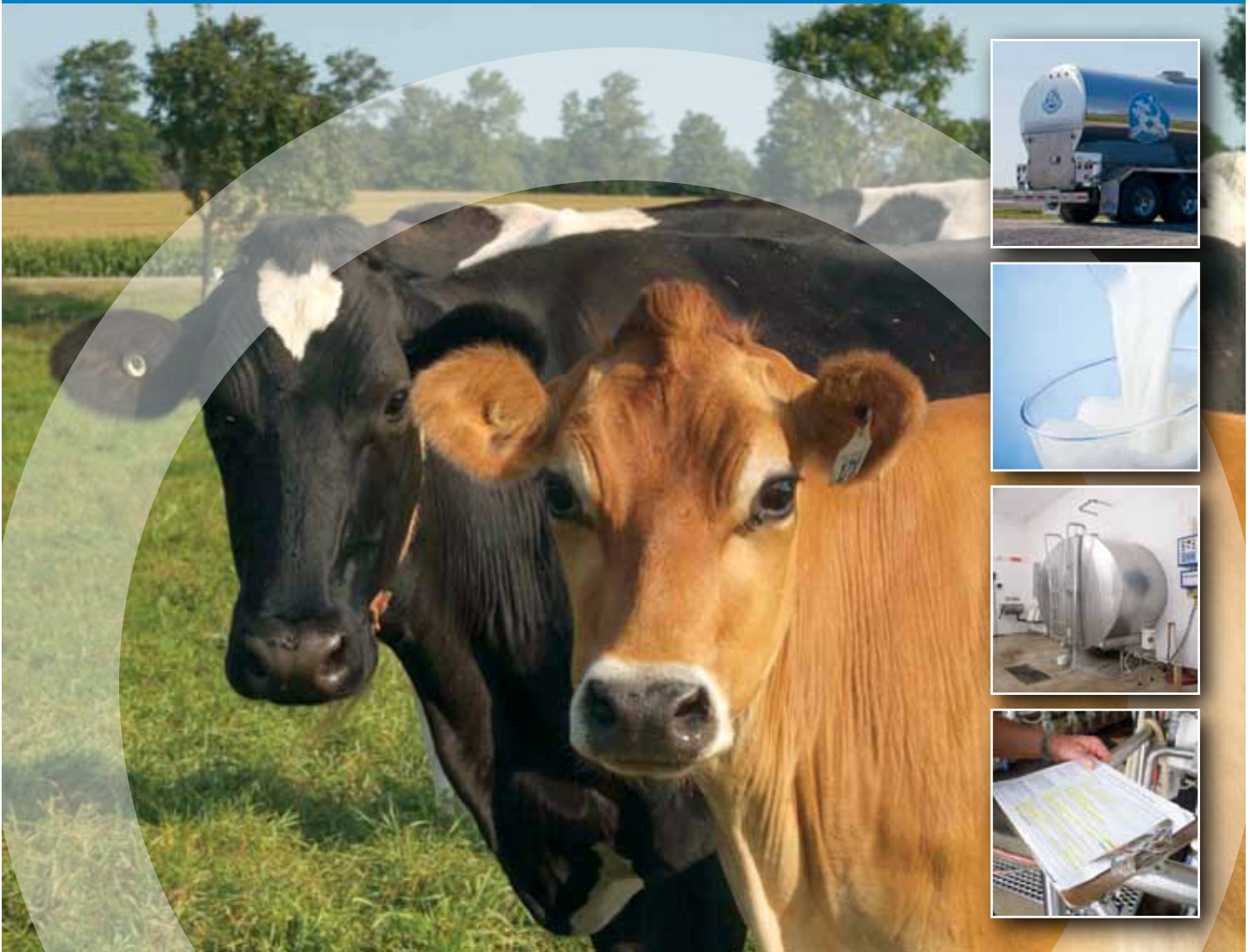


Canadian Food
Inspection Agency

Agence canadienne
d'inspection des aliments

Animal Biosecurity

Biosecurity for Canadian Dairy Farms National Standard



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Executive Summary

Biosecurity for Canadian Dairy Farms: National Standard provides the foundation for achieving consistent industry-wide biosecurity by dairy producers across the country. It identifies and builds upon the current state of biosecurity practices in Canada, presents an approach for the preparation of farm-based biosecurity plans, and provides rationale and strategies to carry them out.

The dairy industry in Canada realizes the importance of biosecurity in reducing disease risk, and thereby its positive impact on animal health and welfare, in improving farm productivity, in reducing zoonotic disease risk, and in maintaining and growing markets for its products, both domestically and internationally.

The National Standard is a set of risk management practices that are intended to address infectious diseases on all types and sizes of dairy production operations in Canada. It lists a set of principles and strategies that should be considered whenever possible by owners, managers, and farm workers when developing a farm-specific biosecurity plan. The National Standard also serves as a guide for continuous improvement and encourages a higher level of care. Recommendations in the National Standard should be followed to protect dairy farming operations and their animal industry neighbours against the likelihood of both foreign animal diseases and production-limiting diseases entering into and spreading through the dairy cattle population.

The National Standard focuses on four biosecurity control areas that together encompass the risks of disease transmission on dairy farms, each of which is accompanied by a set of strategies that are designed to achieve the target outcomes established for the Standard. An accompanying volume, the Producer Planning Guide, provides additional detail on the methods, as well as a set of resources, for dairy producers to use in developing their farm plans.

Table 1 (below) summarizes the structure and content of the National Standard. There are four control areas, and each control area has a target outcome and accompanying strategies.

Control Areas

Strategies

<p>1. Animal health management A herd health plan is in place that encourages resistance to diseases of concern and includes practices to track health status and respond proactively to disease risks.</p>	<ul style="list-style-type: none">• Maintain a client–veterinarian relationship• Observe, record, and evaluate• Recognize susceptibility and maintain separation• Regularly monitor and investigate sickness/death• Manage feed, water, and bedding
<p>2. Animal additions and movement If cattle are required to be added to the herd, their health status is reliably known at the time of purchase. They should then be adequately vaccinated and kept isolated from the herd until they represent no significant disease risk. Animal movement on the farm should be predetermined.</p>	<ul style="list-style-type: none">• Limit purchase frequency and number of sources• Know the health status of purchased animals• Segregate, isolate, and monitor• Test, vaccinate, and treat• Record location and movement• Manage movement within the production unit
<p>3. Premises’ management and sanitation Producers and farm workers all contribute to maintenance, cleaning, and disinfection, required throughout the production unit, and management of manure, waste, deadstock and pests in a prescribed manner.</p>	<ul style="list-style-type: none">• Provide materials, equipment, and instruction on use• Clean and disinfect equipment and vehicles• Clean, disinfect, and maintain production facilities• Manage manure, waste, deadstock, and pests
<p>4. Personnel, visitors, vehicles, and equipment Service sector personnel and visitors are required to follow the biosecurity conditions set by the producer with respect to limited access, clothing, and footwear worn, and movement of equipment and vehicles. Training, good communication, and regular updates are essential for all personnel.</p>	<ul style="list-style-type: none">• Control access• Use clean clothing and footwear• Control movement of vehicles and equipment• Plan, train, and communicate



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1. Introduction

Putting biosecurity practices in place to keep animals healthy has been a long-standing and successful practice on many Canadian dairy farms. Today's more intensive farm operations are more susceptible to diseases and therefore often demand stricter biosecurity protocols. As production has intensified, the importance of production-limiting diseases, such as contagious mastitis, Johne's disease, enzootic bovine leukosis, and bovine viral diarrhea (BVD), has become more significant. In addition, with intensified production practices, risks of contamination with *E. coli*, *Salmonella*, and other contaminants have risen.

Medication and vaccination have traditionally played a major role in preventing and treating diseases, but it is now widely accepted that they cannot, in isolation, prevent all the losses due to disease. Modern farming demands a more complete and global approach. A rigorous biosecurity program that is designed to maximize disease resistance and to minimize herd exposure to infectious agents is needed.

Moreover, these new animal health challenges and influences highlight the need for biosecurity:

- increasing numbers of emerging diseases
- more attention to zoonoses
- more attention to traceability
- greater focus on prevention
- changing epidemiology of disease due to intensive farming situations
- globalization and the mass movement of people and goods
- new production practices in agriculture

With the publication of the National Standard and its accompanying Producer Planning Guide, dairy producers are encouraged to prepare farm-specific on-farm biosecurity plans, using their principles and strategies. Securing a farm is about knowing the risks to the enterprise and the ways in which the cattle can be exposed to disease and then taking steps to minimize the risks. Prevention through biosecurity is the most cost-effective protection for animal diseases but in itself will not completely eliminate any occurrence of disease.

As the number of farms with biosecurity plans increases, the confidence of dairy producers will increase when dealing with other producers and with their service providers. The ability of the dairy industry to withstand a disease event will be influenced by each individual dairy producer's biosecurity plan and its effective implementation, as well as by the collective efforts of the entire dairy industry.

It is vitally important to the sustainability and profitability of animal agriculture that producers maintain the highest health status possible. The success of Canada's agricultural exports is closely linked to the health status of its animals. Future access to all markets will increasingly depend on our ability to demonstrate freedom from serious animal diseases and pests. Purchasers of live animals often require vendor health declarations as an element of their quality assurance programs and good biosecurity. Consumers today expect producers and farm employees to take good care of the health of the animals with which they work.

As the concept of managing the dairy farm for animal health and well-being, public health, and environmental health continues to gain support in the dairy industry, some producers and veterinarians are developing more formal biosecurity-type programs that contain all of these aspects of "One Health." Programs designed in this manner demonstrate the connectivity between biosecurity, animal health, public health, and environmental health, and are beginning to influence the approach in the international community.

Biosecurity standards are generally based on disease risk assessments, internationally accepted best practices, and best-available science that can help mitigate disease. They are designed to anticipate and address risks before they occur. Ongoing experience and methods' development will continue to guide practices and priorities in biosecurity programs. With this in mind, the National Standard is intended to be a living document, subject to revision as new information and issues emerge.



Biosecurity and Why it is Important to the Dairy Industry in Canada

Canada's dairy industry is a large and essential part of food production in the country. A total of 12,746 farms provide 7.66 billion litres of milk annually to dairy processors in Canada. Approximately 450 processing plants transform milk into over 1000 products, including over 660 types of cheese. Sales of milk and dairy products add \$10 billion to Canada's economy.¹ A vibrant dairy agricultural community is an important contributor to the well-being of all Canadians.

To operate good enterprises that produce safe and high-quality products, dairy producers in Canada are continually identifying and managing risks. Producers are well aware of the disease hazards that are always present and that can reduce the profitability of their enterprise and quality of their milk and milk products. Many of the diseases are of food safety or of economic concern.

Dairy producers are in the business of producing food for human consumption, and thus must be confident in the safety and quality of the milk and meat products that they produce. Good safe food is what drives the dairy agricultural industry; anything that compromises this priority hurts the overall sector.

Biosecurity gives dairy farmers, as the primary producers in the supply chain, the opportunity to add value to their meat, and milk and milk products by adopting production methods that satisfy the demands of processors, buyers, and consumers. This helps to ensure consumer confidence and demand for Canadian product, and, ultimately, the viability and sustainability of Canadian dairy enterprises. When adopted, biosecurity helps to support production and marketing of safe, quality-assured products.

Today, dairy farm production in Canada must combine productivity with the responsibility of protecting human health, animal health, animal welfare, and the environment.

1. Dairy Farmers of Canada. Our economic contribution. Available at: www.dairyfarmers.ca/what-we-do/our-economic-contribution.

2.1 Definition of Biosecurity

“Biosecurity is managing the herd to prevent the introduction and spread of infectious diseases.”

John B. Adams, Director of Animal Health & Farm Services, National Milk Producers Federation (USA)

“Farm-level biosecurity is a series of management practices designed to minimize or prevent and control:

- a) The introduction of infectious disease agents onto a farm;
- b) Spread within a farm production operation; and
- c) Export of these disease agents beyond the farm that may have an adverse effect on the economy, environment and human health.”

Canadian Food Inspection Agency

Biosecurity is believed by some to be important only in avoiding catastrophic or foreign animal diseases. However, biosecurity is also important in reducing the risks of endemic diseases,² which include digital dermatitis, Johne’s disease, contagious mastitis, BVD, and enzootic bovine leukosis (EBL). Biosecurity practices are also designed to be adapted when emerging diseases are discovered; in 2012, for example, international health and agriculture bodies are carefully watching the emergence of Schmallenberg virus in parts of Europe. Waiting until after the fact and attempting to control the spread of disease risks the animals’ well-being, and is difficult, costly, and often unsuccessful.

The economics of modern day dairy farming means larger herds that are kept in regions of high stock density. Increasing the size of herds under common management, keeping them in multiple premises and/or in livestock-dense areas in which there is increased potential of direct contact with numerous neighbours, not only increases biosecurity risks, but also makes biosecurity management more relevant.

The risk of transmission of both endemic and foreign animal diseases is therefore inherent in animal management and farm management practices and in natural circumstances on livestock farms. Dairy producers need to be aware of the diseases of concern on their farms, and the risks of both endemic and foreign animal diseases that occur in dairy cattle. These risks can be influenced by facility designs and farm layouts, and by the activities of service providers and farm visitors.

2. Also referred to as economically significant or production-limiting diseases.

Overall, these risks from diseases and pest impact the viability of farms and can

- reduce productivity,
- impact animal welfare,
- increase veterinary and labour costs,
- affect domestic consumption/consumer confidence,
- reduce prices that producers receive for their animals and products,
- close export markets,
- reduce farm incomes, and
- reduce the value of farmland.

In addition to adverse effects on the agricultural economy, diseases and pests can negatively affect the environment and human health.

A biosecurity plan addresses the risks associated with diseases and pests by focusing on three key actions:

- 1) **Exclude:** Prevent the introduction of pathogens to cattle on dairy farms.
- 2) **Manage:** Prevent the spread of pathogens among cattle within a dairy farm.
- 3) **Contain:** Prevent the spread of pathogens between dairy farms or from dairy farms to other animal populations.

Biosecurity is a proactive process that addresses risks that could exist, whether or not they are immediately evident. An animal infected with a pathogenic organism may or may not show outward signs of clinical disease. Nevertheless, the pathogen can be reproduced in the animal's body, which then sheds the organism through excretions, including saliva, nasal secretions, feces, urine, milk, or aerosols from its respiratory system. The organisms contained in these excretions may be invisible and contaminate the surfaces in the surrounding environment, including equipment, tools, and other animals.

There are many ways in which diseases can transmit between dairy cattle. Infectious disease agents (viruses, bacteria, and parasites) typically spread through recognized vectors for disease transmission. These include direct transmission via contact with other cattle – including pathogens shed by one cow to another or from a pregnant cow to a fetus, dead or sick animals, and animal products (semen and embryos) – and by indirect transmission, via airborne spread, or contact with contaminated people, clothing, farm and service equipment, vehicles and farm implements, feed and water, feces and urine, birds, wildlife, pests, and other animals. These vectors for disease transmission, together with the operating procedures and the design of each farm facility, are the subject of a biosecurity risk analysis.

2.2 Benefits of a Biosecurity Plan

Data to demonstrate specific, measurable benefits of proper and effective biosecurity management are limited today, due to the highly complex nature of the system within which biosecurity practices operate. However, the economic costs of infectious diseases are well established and clearly documented, and there is little doubt of the financial benefits in avoiding them.

Looking beyond the direct economics of disease reduction, the benefits of implementing on-farm biosecurity practices are significant. For producers, they include:

- improving animal health and welfare;
- keeping out new diseases;
- cutting the cost of disease prevention and treatment;
- reducing the use of medication, such as antibiotics, with an associated reduction in the risk of emergence of resistant pathogens;
- producing safe, wholesome, and high-quality products;
- increasing consumer and buyer confidence;
- protecting human health;
- minimizing the potential for farm income losses;
- enhancing the value of the herd; and
- maintaining and accessing new markets for genetics.

A Biosecurity Plan provides overall benefits to the dairy industry in that it

- decreases economic losses from some diseases that cannot be treated or controlled using vaccinations or other management strategies (e.g. mastitis, Johne's disease);
- helps to prevent the introduction of foreign diseases;
- controls the spread of infection from region to region and farm to farm;
- facilitates early recognition of emerging disease threats;
- prevents zoonoses;
- produces safe wholesome milk and meat;
- negotiates more favourable global trade policies; and
- maximizes genetic export markets by the prevention of disease.

Service providers, veal producers, feed businesses, and other business partners of dairy producers also benefit from farm biosecurity. Healthier day-to-day farm performance and the reduced risk of catastrophic disease events that severely impact farm customers protect their markets.

Appendix A provides a glossary for the terms that are generally used in farm-level biosecurity.



Development of the National Standard

3.1 Purpose

The National Standard explains the framework and scope of biosecurity planning in Canada's dairy industry. It is intended for use by individuals and groups who need to understand the direction of the industry to

- enable the consistent adoption of biosecurity practices in all regions of the country;
- adopt a structured approach in planning, implementation, performance measurement, and continuous improvement through innovation;
- support the efforts of dairy producers by designing programs that interface and coordinate with on-farm biosecurity practices;
- coordinate activities among livestock industries; and
- communicate with Canada's trading partners.

Therefore, key audiences for the National Standard are as follows:

- dairy producers;
- national and provincial producer boards, and associations;
- dairy industry stakeholders, including customers and suppliers throughout the supply chain;
- national and provincial governments;
- researchers, educators, and program development specialists;
- veterinarians; and
- buyers and consumers.

3.2 Development Process

The Dairy National Standard was developed under the guidance of the Dairy Farmers of Canada (DFC), the Canadian Food Inspection Agency (CFIA), and an advisory committee comprised of producers, veterinarians, producer group representatives, academic experts, and provincial government representatives, in collaboration with Agriculture and Agri-Food Canada. An experienced consulting firm led a carefully designed process over a two-year period, using the following tools:

1. a review of published research and lay documents to identify best practices on dairy farms in Canada and elsewhere in the world.

-
2. a benchmark measurement to establish the current use of biosecurity and animal health practices on farms across Canada.
 3. a gap analysis to identify practices that require development and to highlight ways in which available best practices could be better used to benefit the dairy industry.
 4. an iterative consultation cycle, first among the members of the Advisory Committee and then among the provincial dairy boards and associations across the country, to develop and refine the National Standard and to initiate discussion of the cost-benefit implications of implementing the Standard.
 5. a communications package to make the information in the National Standard more readily available to industry participants in all regions of the country.

3.3 Guiding Principles

It is important that the National Standard fit into the normal production practices that dairy producers in Canada follow. To ensure that the National Standard achieved this goal, eight guiding principles were developed by Advisory Committee members to support their work.

Table 2 (below) outlines the eight guiding principles of the National Standard.

The Dairy Biosecurity Standard is...

1. farm-based, providing a set of strategies and best practices that dairy producers can apply on all types of farms across Canada.
 2. dairy-farm specific, with biosecurity best practices that are compatible with recognized production practices used in the industry.
 3. flexible, enabling producers to identify and address their own risk profiles in a manner that suits their operation.
 4. designed to address all types of infectious diseases.
 5. science-based, built on current knowledge of disease transmission risks, and designed to develop specific practices to reduce these risks.
 6. based on risk assessments of farm practices, farm layouts, and specific diseases of concern.
 7. complementary to such existing industry programs as Canadian Quality Milk (CQM) Program, the National Traceability Program, and the Codes of Practice.
 8. cost effective – designed to drive benefits both at the farm level and for the industry.
-

3.4 Structure

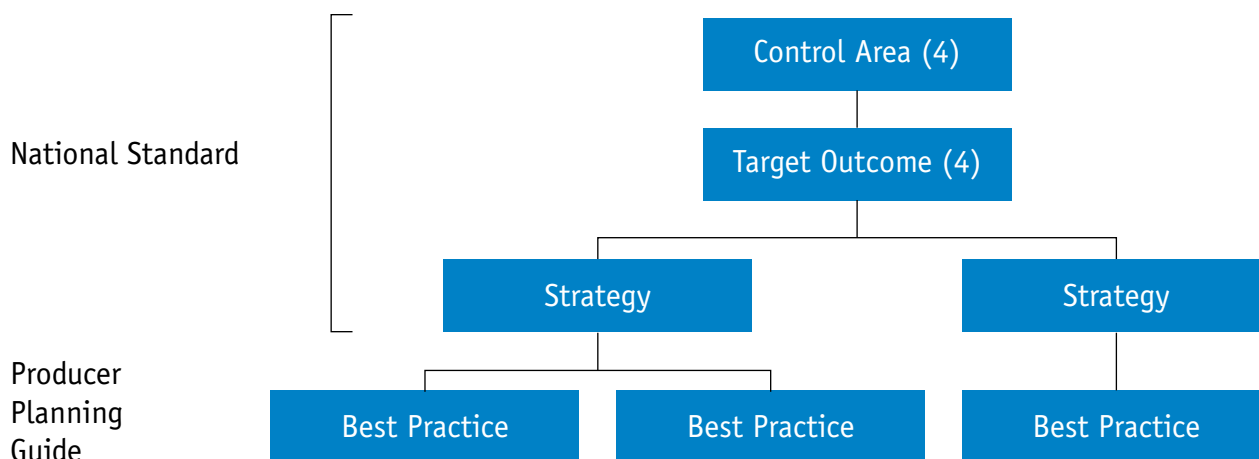
The National Standard for dairy consists of four sections, each relating to an on-farm biosecurity control area:

1. animal health management
2. animal additions and movement
3. premises management and sanitation
4. personnel, visitors, vehicles, and equipment

A target outcome has been identified for each biosecurity control area, and a series of strategies have been developed to provide the overall direction for reducing disease-transmission risks. The target outcome approach provides the flexibility for producers to design biosecurity plans that will work on their farms.

A Producer Planning Guide accompanies the National Standard. This Guide identifies critical points of biosecurity intervention that are applicable for producers as they work to implement the National Standard on their farms. The National Standard and the Producer Planning Guide work together to provide an integrated framework for use by dairy producers. For each strategy, a set of best practices has been developed for use in farm plans to help producers achieve the intended outcomes in each key risk area, and to demonstrate the flexibility that will be needed to work with all of the production practices and farm types across Canada.

Diagram 1: National Standard and Producer Planning Guide



This diagram outlines the structure of the National Standard and Producer Planning Guide.

The National Standard is comprised of four control areas. Each control area has an accompanying target outcome and strategy.

The Producer Planning Guide consists of the best practices for each of the strategies in the National Standard.

3.5 Developing a Biosecurity Plan

The process of evaluating a farm to determine its potential risks of entry or spread of disease and to identify practical methods of limiting or mitigating these risks is the foundation for developing a systematic biosecurity plan. The evaluation process should be conducted in consultation with the herd veterinarian, extension specialist, and nutritionist, considering the facility design and layout, type, and size of the operation, farm team makeup, herd disease status, and the animal health and facility management strategies.

The following steps are typically involved in developing a farm-level biosecurity plan:

- Complete a rational risk assessment to determine the disease problems, their magnitude, and the likelihood in occurring.
- Establish producer's goals for production and animal health.
- Create a diagram of the dairy farm layout, identifying the production areas and animal-movement pathways.
- Assign risk levels to the various production and management areas of the farm to determine the areas of greatest concern and vulnerability.
- Identify the specific disease(s) of concern.
- Determine the risk tolerance or intolerance to loss from infectious disease.
- Outline the methods of prevention and control.
- Adopt the farm biosecurity program.

Most aspects of farm-level biosecurity do not involve capital investment unless the infrastructure is poor. Indeed, many biosecurity programs can be developed solely on changes to current farm management practices and improved husbandry.

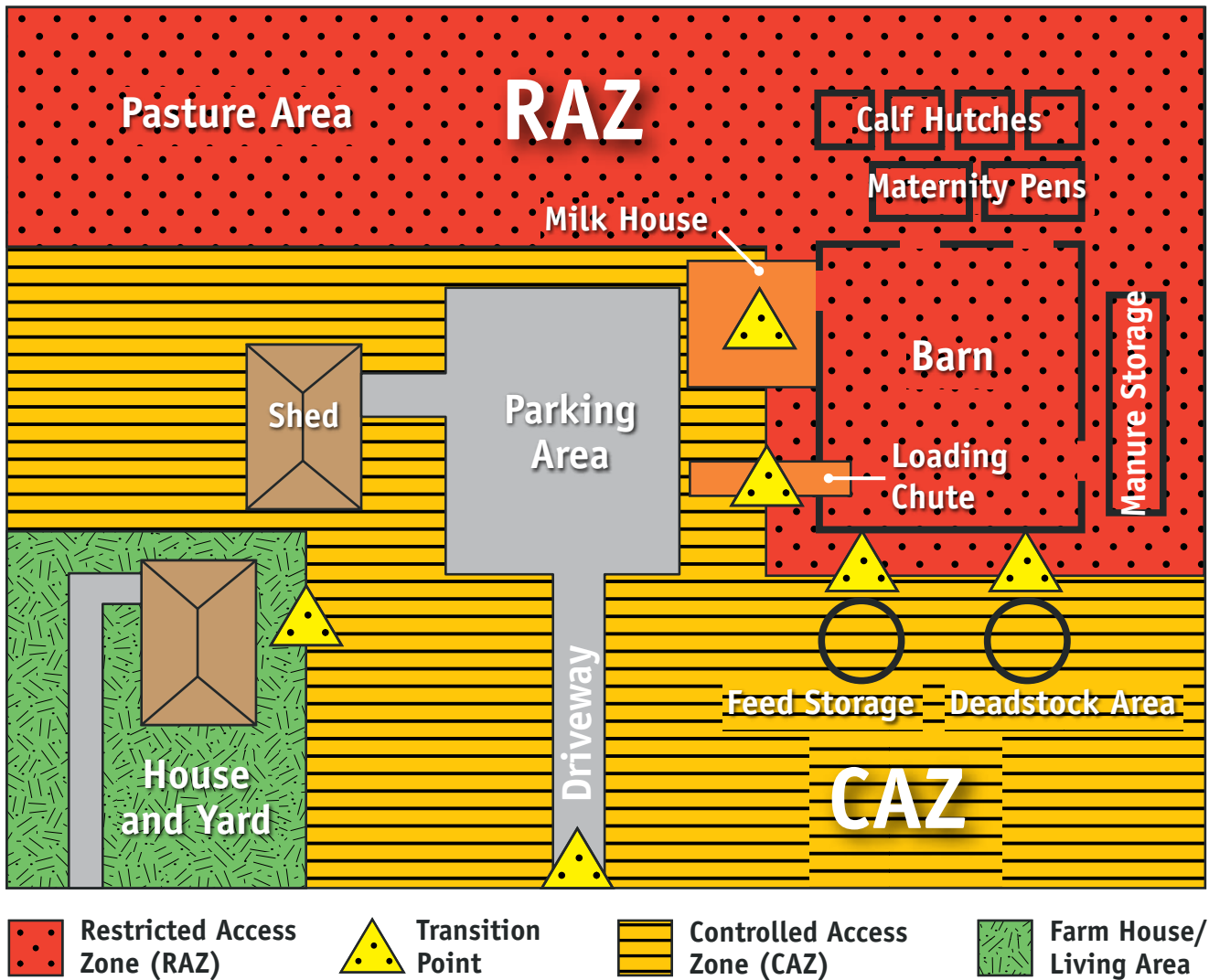
It is important that producers review their production practices in relation to disease prevention on a frequent basis and ensure that their strategies are being carried out. An effective farm-level biosecurity plan should remain flexible and open to new scientific knowledge and technology as they become available.

3.5.1 Establishing Biosecurity Zones

In the past, much of the emphasis on biosecurity has been focused on animals and infectious disease agent(s). An important component of biosecurity that often has been overlooked is the influence of the dairy farm environment. Facility design, layout, and traffic patterns can significantly affect the spread or prevention of disease and have significant influence on the effectiveness and efficiency of a farm-level biosecurity plan.

The concept of setting up a Controlled Access Zone (CAZ), transition points, and a Restricted Access Zone (RAZ) is being adopted worldwide. The reasons for establishing the CAZ and the RAZ are 1) to protect the dairy herd from contamination carried in by outside agents (animals, people, vehicles, equipment, feed, water, and pests) that enter a zone and 2) to manage and contain any disease issues within the herd.

Figure 1: Sample dairy farm diagram with a controlled access zone and restricted access zone



This figure shows a Controlled Access Zone (CAZ) and a Restricted Access Zone (RAZ) for a simple dairy farm site, comprised of one barn with a limited number of outbuildings.

The RAZ contains the high risk areas including the animal housing (barn, calf hutches, and maternity pens) as well as pasture areas and manure storage. The CAZ surrounds the RAZ, separating it from the house and yard, and contains storage sheds for feed and deadstock, as well as visitor parking. A transition point is present at each location where there is access to either the CAZ or the RAZ. Transition points are present at the entrance from the home and road and the parking area into the CAZ. The milk house and loading chute are transitions points for the RAZ. The farm house is a separate area outside of the CAZ.

To help conceptualize the biosecurity plan as it is being developed, prepare a diagram of the farm and production areas to highlight the RAZ and CAZ for the particular dairy farm. The components of a dairy farm within the CAZ and RAZ should not all be considered equal in levels of risk relative to biosecurity concerns. On almost every dairy farm there are groups of animals that are more susceptible to disease and activities that can potentially affect animal groups differently. Identifying the dairy facilities, management activities, and animals according to relative risk will highlight biosecurity advantages or challenges. Colour-coding a dairy farm's operational components and relative risk areas may help in visualizing and understanding the interactions of risk zones, susceptible animals, and traffic patterns.

Focusing resources and efforts in the areas of major biosecurity concerns and vulnerability assists in simplifying farm-level biosecurity programs and in gaining better uptake. To focus efforts in critical areas, identify the following on each farm: 1) animals at the highest disease susceptibility and 2) farm areas with the highest potential risk for disease spread. Dairy farm flow patterns, sanitation practices, and physical location can influence which animal is or is not potentially exposed to disease.

Farm layouts today generally are designed to streamline animal flow, feeding, manure handling, and other inputs and outputs, but sometimes they have not considered biosecurity concerns. Where layout and design changes cannot be made to existing facilities, other biosecurity principles and attributes can be applied to achieve the same goals. Biosecurity concerns should be added to the planning process in times of expansion, remodelling, or new construction on the dairy farm.

3.5.2 Planning Guide

The National Standard is intended to encourage producers to implement the use of sound disease prevention and control practices at the farm level and industry wide in Canada. The accompanying volume, "Biosecurity for Canadian Dairy Farms: Producer Planning Guide" details the development of farm-level biosecurity plans. The materials for developing a step-by-step approach to preparing a biosecurity plan for a producer's dairy farm, including risk assessment and planning models, best practices and plan resources, are included. The Guide is available from Dairy Farmers of Canada and from the Canadian Food Inspection Agency, Office of Animal Biosecurity.



The National Standard: Control Areas, Target Outcomes, and Strategies

The National Standard for dairy has identified four control areas for biosecurity interventions, with each having a target outcome. For each control area, strategies have been developed that are designed to move producers toward the target outcome. These components of the National Standard are summarized at the beginning of each section 4.1 – 4.4.

4.1 CONTROL AREA 1: Animal Health Management

Target Outcome:

An effective health management plan is in place and is actively in use.

Strategy:

Objective(s):

- | | |
|--|---|
| 1. Maintain a client–veterinarian relationship | Producers work together with their herd veterinarian to develop an Animal Health Management Plan that will work for each farm to keep animals healthy and maintain farm biosecurity. The Plan includes health assessment of cattle and appropriate response when a change in disease pattern is detected. |
| 2. Observe, record, and evaluate | Producers maintain and use animal health records, as specified in their Animal Health Management Plan. Records of individual disease occurrence, treatment provided, and herd disease summaries are maintained and analyzed at suitable intervals to improve the effectiveness of biosecurity and to enhance food safety. |
| 3. Recognize susceptibility, and maintain separation | The distinctive production/management areas on the dairy farm and their risk levels are identified, and contact between each is minimized. Separate youngest from the adults, healthy from the sick, most susceptible from the least susceptible. |

Strategy:**Objective(s):**

- | | |
|---|--|
| 4. Regularly monitor, and investigate animal sickness/death | Cattle are routinely observed for early detection of signs of disease. Sick cattle should be attended to quickly and kept isolated from the remainder of the herd to prevent disease spread. Cases of unusual diseases are reported to the herd veterinarian. |
| 5. Manage feed, water, and bedding | Feed and water are always available in acceptable quantity and quality to ensure the health and well-being of cattle at all stages of development, and the wholesomeness and safety of the milk and meat produced. Feed, water, and bedding inputs are regularly monitored to ensure that they do not contain animal disease agents. |
-

An Animal Health Management Plan enables a producer to assess risk and take the appropriate precautions to prevent the introduction and spread of disease. Maintaining the health of their cattle is a primary goal for all dairy producers. Achieving that goal requires an Animal Health Management Plan with both proactive and responsive capability. Proactive elements of the plan include providing adequate food and water, and suitable facilities for all aspects of dairy production, as a foundation for good health and disease resistance.

For common diseases, every farm should have a herd health plan that includes the selection of appropriate vaccines and the design of appropriate vaccination programs. A herd veterinarian has a large role in establishing the plan and in responding to specific problems.

Producers who have no Animal Health Management Plan are encouraged to develop a plan that includes the principles and elements introduced in this document. Those who have a plan are recommended to review their plans against this information, and to regularly review and adjust plan elements in response to their herd health experience, changes in the herd, and/or changes in any aspect of their dairy operations. An Animal Health Management Plan takes into account a producer's individual risk tolerance, and is designed specifically for each dairy operation.

An Animal Health Management Plan considers the current cattle health status, as well as historical health problems on the farm (e.g. common diseases and their frequency). The likelihood of additions or re-entries to the herd, as well as specific requirements for genetic sales or organic farm status, should also be considered.

Table 3 outlines the components that may be included as part of the Animal Health Management Plan. The specific details of the plan vary from farm to farm.

What may be included in an Animal Health Management Plan

- routine health assessment of all cattle
 - vaccination strategy for various age groups on the farm
 - disease monitoring/test strategies, including necropsies
 - treatment protocols for common diseases on the farm
 - euthanasia protocol and guidelines for decision making
 - meat and milk withholding times and strategies
 - management strategies for sick animals under treatment
 - strategy for identifying and culling of animals
 - colostrum management program for calves
 - at least an annual review of the plan with the herd veterinarian
-

The plan should be written and reviewed with farm staff to enable a good understanding of its expectations and the role of each staff member. It should be compliant with the requirements of the CQM Program and any other relevant public and regulatory programs, including environment, food safety, animal health, and animal welfare.

4.1.1 Strategy 1: Maintain a Client–Veterinarian Relationship

Producers work together with their herd veterinarian to develop an Animal Health Management Plan that is specific for each farm to keep animals healthy and to maintain farm biosecurity. The Plan includes a health assessment of cattle and an appropriate response when a change in disease pattern is detected.

Section 3.4 of the Dairy Farmers of Canada’s *Code of Practice for the Care and Handling of Dairy Cattle* requires that producers establish a working relationship with a practising veterinarian. Its “Recommended Best Practices” suggests that producers “work with the herd veterinarian to develop a Herd Health Management and Biosecurity Program. The Code of Practice model for these interactions is the ‘Veterinarian-Client-Patient Relationship (VCPR) used by many herd veterinarians in the dairy sector.”

The herd veterinarian can be consulted about cattle health practices and concerns, and is available when required for intervention and treatment on the farm. The relationship helps in developing a comprehensive Animal Health Management Plan, reliable disease prevention, and ongoing monitoring programs that are designed to ensure healthy cattle, and safe milk and meat production.

Herd health programs are important in preventing endemic disease outbreaks and in ensuring early treatment when identified. A commitment to ongoing monitoring, and either applying preventative treatment when effective, or culling as necessary, should be incorporated.

4.1.2 Strategy 2: Observe, record, and evaluate

Producers maintain and use animal health records, as specified in their Animal Health Management Plan. Records of individual disease occurrence, treatment provided, and herd disease summaries are maintained and analyzed at suitable intervals to improve the effectiveness of biosecurity and to enhance food safety.

In the benchmarking study, most producers report that they maintain individual animal records for all cattle under their management. This strategy recommends that these records include lifetime health information for each animal, including vaccination details, production and performance, calving records, disease records, and detailed treatment records.

Animal identification and record keeping are critical to important management decisions about feeding, grouping, selecting, medicating, breeding, and culling an animal from the herd. Effective record keeping shows compliance with training and animal identification, and helps to monitor the effectiveness of the colostrum's management, and vaccination programs and biosecurity plan.

These health status records should be made available to anyone purchasing or moving the animal for any other reason that may involve its commingling with other cattle. Individual animal health records may be kept manually, or exist in electronic form for easy access, evaluation, and transfer. What is important in record keeping is consistency, and maintaining for a period of at least 24 months after an animal has been marketed or sold.

4.1.3 Strategy 3: Recognize susceptibility and maintain separation

The distinctive production/management areas on the dairy farm and their risk levels are identified, and contact between each is minimized. Separate the youngest from the adults, the healthy from the sick, and the most susceptible from the least susceptible.

All components of the farm should not be considered at equal risk to biosecurity concerns. Identify the production areas on the farm that require special biosecurity attention, isolating from one another to reduce the risk of disease transmission if the disease risk is high. Prioritize

the management groups on the farm, based on susceptibility and farm areas with the highest risk potential for disease spread. Maternity and calf-raising areas have animals with the highest susceptibility, whereas hospital or sick-cow pens, feed mixing, and preparation areas, as well as manure holding and storage, have a high-risk potential for disease spread.

Construct housing and management systems for dairy cattle to minimize contact between the young and the old. Calves can acquire infectious diseases through exposure to older infected or carrier animals. Allow sufficient time for young animals to develop immunity to disease before joining with the older animals. Also, maintain the milking herd separately from dry cows, heifers, and calves. Vaccination practices and disease susceptibility differ among these groups.

4.1.4 Strategy 4: Regularly monitor and investigate sickness/death

Producers routinely observe cattle for early detection of signs of disease. Attend to sick cattle quickly and keep isolated from the remainder of the herd to prevent disease spread. Report cases of unusual diseases to the herd veterinarian.

Monitor the herd closely during day-to-day operations, observing animal behaviour and body condition, taking temperatures and checking for signs of disease. Ensure that all personnel involved in the daily monitoring and handling of animals are aware of the importance of early detection of a production-limiting or foreign animal disease and know what action to take if they suspect an animal may be exhibiting signs of disease.

Promptly investigate clinical diseases to determine the underlying cause(s), so that animals can be treated appropriately to prevent further cases. Where practicable and indicated, promptly treat and keep sick animals isolated on the farm to minimize the spread of infectious disease agents. Make available an isolation facility (to house sick animals) that is easy to clean and disinfect after each usage.

Immediately involve the herd veterinarian if there are unusual signs of sickness, production, or consumption losses, or a sudden increase in illness or deaths. Have a veterinarian examine all dead animals, and collect samples from all cattle that abort. Determine whether to submit carcasses, tissues, or blood samples to a laboratory for testing to screen for disease.

It is important to carry out herd screening on a regular or annual basis. Monitoring the disease status of the herd provides supporting information for evaluating biosecurity and vaccination protocols.

4.1.5 Strategy 5: Manage feed, water, and bedding

Dairy producers always have feed and water available in acceptable quality and safety to ensure the health and well-being of cattle at all stages of development, as well as the food safety of the milk and meat produced. Feed, water, and bedding inputs are regularly monitored to ensure that they do not contain animal disease agents.

Manage feed and water on a daily basis. This strategy ensures that these essentials are delivered in required quantity and quality to the herd, meeting the nutritional needs of the cattle. Test the source water at its point of use at least annually, and whenever a specific situation occurs. The proper operation of any purifying equipment and regular checking for effectiveness may be required on a regular basis.

Purchase feed from suppliers in Canada that have demonstrated good production practices with a biosecurity component to ensure its quality and safety. Inspect feed upon delivery and prior to distribution to maintain quality and safety. Apply similar quality standards to the feed grown on-farm. Use feed records to identify sources and dates of delivery (“lots” or “batches” from a traceability perspective), which allows for the withdrawal of a potentially contaminated lot. Store feed in a desired area with proper storage facilities, and have dedicated handling and mixing equipment to prevent contamination by cattle and pests.

Feed, water, and bedding made available to cattle are also easily contaminated with feces, urine, and other matter that represent a wellness and disease risk. For example, the spread of *Salmonella*, *Mycobacterium avium paratuberculosis* – Johne’s disease – or *Mycoplasma bovis*, a cause of mastitis in adults and arthritis and pneumonia in calves, can all be shed in excretions by a diseased or disease-carrying herdmate. Thus, have the watering and feeding systems designed and located to prevent contamination and to facilitate ease of cleaning and sanitizing. If frequent contamination occurs, then apply a regular cleanout and sanitization process. Purchase bedding from a known supplier, ensuring that it is free of bacterial or chemical contamination and appropriately stored.

4.2 CONTROL AREA 2: Animal additions and movement

Target Outcome:

Cattle are purchased and moved in a manner that minimizes the risk of introduction and spread of infectious diseases.

Strategy:

Objective(s):

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| 1. Limit purchase frequency and number of sources | Maintain a closed herd to the extent practicably possible. When necessary, cattle are added in limited numbers from as few sources as possible, with a known health status, to prevent the entry of disease. |
| 2. Know the health status of purchased animals | Buy cattle of known health status (both herd and individual animals). Health status of cattle acquired and introduced to the herd is determined prior to or at the time of purchase. Source semen and embryos from known and reputable suppliers. |
| 3. Segregate, isolate, and monitor | Control cattle introduction into the resident herd using isolation where indicated. Newly introduced and re-introduced animals are isolated and monitored for a sufficient time to reveal the presence of clinical disease and to allow for pathogen shedding to cease. |
| 4. Test, vaccinate, and/or treat | While in isolation, individual animals may be retested, vaccinated, and/or treated before introduction or reintroduction into the resident herd. Appropriate samples – blood, milk, or feces – are collected and tested no later than upon arrival and/or completion of isolation. |
| 5. Record location and movement | Use traceability methods and systems to record premises' identification, track location, and movement of animals, and to maintain a link to their herd and their health status. |
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Strategy:**Objective(s):**

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| 6. Manage movement within the production unit | Pathways for cattle movement on the farm premises are predetermined. Animals are moved in a manner that reduces exposure to diseased or susceptible animals. Sources of contamination are avoided. |
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The introduction of animals to the home herd may be undertaken to add genetics, accommodate high cull rates, expand herd numbers, or provide adequate numbers of replacements. It is potentially the highest-risk major activity on a dairy farm. Risk also exists for cattle returning to the farm from off-site activities, such as shows and fairs. The cattle brought onto a farm may be infected, and may show signs of clinical disease. They can therefore be a source of new pathogens that can then be transmitted to other cattle in the herd.

4.2.1 Strategy 1: Limit purchases and number of sources

Maintain a closed herd to the extent practicably possible. When necessary, cattle are added in limited numbers, from as few sources as possible, with a known health status, to prevent the entry of disease.

Truly closed dairy herds are uncommon, and the purchase, sale, and movement of cattle have become an intrinsic part of the Canadian dairy industry. It is unlikely that modern dairy farms can resist the introduction of new cattle. The pressures of increased herd size, increased turnover of adult milking cows, milk quota requirements, and culling of cattle for disease are leading to a greater need for additional and replacement cattle, and resulting in higher levels of cattle introductions on many farms. To improve or expand herds, cattle sometimes must be purchased from outside sources.

Producers should first attempt to raise as many of their own replacement stock as possible, and then limit the number of cattle from other sources when possible. Planning for replacements in the herd is key. Producers should know the animal health practices of all their suppliers and their compatibility with the practices of their home farm. (Refer to 4.2.2.) It is preferable to purchase from farm sources with equivalent or better health status. All cattle suppliers should provide health and disease records for all animals that they sell, as well as for the herd(s) from which they originate.

Transport any purchased cattle in farm-owned trucks or trailers, or have hired transporters begin with a sanitized truck. While in transport, avoid commingling new purchases with cattle from other farms.

4.2.2 Strategy 2: Know the health status of purchased animals

Buy cattle of known health status (both herd and individual animals). Health status of cattle acquired and introduced to the herd is determined before or at the time of purchase. Source semen and embryos from known and reputable suppliers.

This strategy requires open communication between buyers and sellers, supported by documentation identifying or verifying the immune and disease health status of individual animals and their herd(s) of origin. Information exchanged in anticipation of a transfer should include the individual animal's health record, the health management plan of the herd of origin, any laboratory results, and the type and timing of vaccination(s) and treatment(s) given. Producers who are acquiring additions to their herds also should know the health profile that is compatible with their herds. Herd veterinarians for both the buyers and the sellers may have a role in facilitating this exchange of information and in assessing the compatibility between the herds' health status.

To allow this communication and exchange of information to take place, producers should source animals directly from the herd of origin and not through commingled sources such as a dealer or an auction market until such time as those intermediaries can reliably provide that information.

These disclosure principles allow dairy producers who acquire replacement or additional stock to make a better informed determination of the risk to which they are exposing their herd, enabling proper preparation for the entry of these animals into their herd. Clearly, full disclosure of this information avoids costs of unnecessary precautionary or disease-management treatments, and reduces the risk of loss of production from the acquired animals.

Work with the herd veterinarian to develop protocols for introducing new and returning dairy cattle. It is impossible to protect the herd against BVD, infectious bovine rhinotracheitis (IBR), Johne's disease, and contagious mastitis on segregation and isolation alone. Conduct appropriate screening tests, as recommended by the veterinarian at the time of purchase. Be aware that careful screening and appropriate tests help to limit the addition of animals with unwanted infectious disease agents; in addition, understanding the limitations of testing is important for such diseases as Johne's disease. Applying the appropriate screening diagnostic test, coupled with obtaining an adequate herd source herd history, allows for sound judgement regarding the risks of potential herd additions.

Semen is well regulated in Canada's domestic market, and when purchased, imported semen must meet Canadian requirements. Similarly, purchasing commercially produced embryos is generally low risk from a biosecurity point of view. Local purchase and transfer of embryos should, however, only be carried out from suppliers with known and disease-free status.

Records of purchased cattle are needed. Producers should record their health status, point of origin, point of purchase, and transportation used.

4.2.3 Strategy 3: Segregate, isolate, and monitor

Control cattle introduction into the resident herd, using isolation where indicated. Isolate and monitor newly introduced and re-introduced animals for a period of time that is sufficient to reveal the presence of clinical disease and to allow pathogen shedding to cease.

Producers who isolate cattle on entry provide a buffer between the new animals, particularly those with unknown disease status, and the home herd; cattle from the resident herd returning from a commingling activity (e.g. fairs or shows) would also be considered during this time as unknown disease status. This period of isolation from the resident herd provides an opportunity for any disease that might be carried by one or more of the additions to become evident and to be observed and properly diagnosed. Likewise, any planned treatment or vaccination can also be allocated an appropriate time to take effect.

Many infectious diseases of cattle can be present in animals as asymptomatic carriers. Detecting these diseases, including Johne's disease, BVD, bovine leukemia virus, and contagious mastitis, in an isolation period alone is unlikely. In all cases, the period of isolation upon arrival should provide sufficient time for an additional round of testing and receipt of laboratory results for these diseases.

Under this strategy, producers may hold all animals that enter the premises in isolation for a period of time (2 to 4 weeks) – one that is assessed as appropriate to their condition and disease status, while observing for signs of disease until confident of their health/disease status. The incubation period for most dairy cattle diseases is two weeks or less. Discuss the precise isolation time with the herd veterinarian. During this period, isolate the animals from all other herd members, and implement enhanced biosecurity measures between isolation areas and the rest herd to avoid disease transmission.

Separate new cattle into a dedicated area (separate housing) with no sharing of water, feed, equipment, facilities, or bedding with resident cattle. Keep away any discharges from all isolated cattle, including manure, urine, and fetal fluids from the resident herd. In addition, consider isolating cattle from different source herds separately.

Acknowledge that there is a challenge to isolating milking cows in this manner. Cows need to be milked, and when larger numbers are involved, manual milking or isolation from the milking parlour is difficult. Carry out the milking of new cattle last to prevent the spread of contagious mastitis. Avoid purchasing lactating cows, as isolation cannot be effectively maintained in the milking parlour.

Consider animals that are re-introduced to the herd as new additions when they are returning from situations in which they have been commingled with animals off-farm, such as at shows or fairs, or in any cases of shared pasturing.

4.2.4 Strategy 4: Test, vaccinate and/or treat

While in isolation, individual animals are tested, vaccinated, and/or treated before introduction or reintroduction into the resident herd. Appropriate samples (blood, milk, or feces) are taken and tested no later than upon arrival and/or completion of isolation.

The Animal Health Management Plan discussed in section 4.1 should include disease testing strategies, treatment regimes, and vaccination protocols for common diseases in accordance with the herd veterinarian's recommendations. These testing, treatment, and vaccination approaches should be used to prepare animals for introduction and re-introduction into the resident herd. Collect blood, milk, feces, and other samples from new entrants for specific diseases of concern, and conduct laboratory tests and analysis of samples before their exposure to the main herd. Examples of pre-purchase screening tests are milk somatic cell counts and/or culture, and serologic or culture testing for BVD, leukosis, and Johne's disease, respectively.

Use the isolation period, described in Strategy 3, to further screen cattle, detecting any disease conditions that might have been missed in the initial herd assessment and screening tests. Any animal that becomes ill shortly after purchase or during the isolation period should undergo a thorough diagnostic workup and receive adequate treatment, or in a more extreme situation, be culled.

Have resident cattle properly vaccinated according to the manufacturer's and the herd veterinarian's recommendations before bringing new cattle into the herd to avoid compromising the resident herd status. Vaccinate new cattle while they are in isolation to ensure their integration into the dairy farm's vaccination program.

4.2.5 Strategy 5: Record location and movement

Traceability methods and systems are used to record premises identification, to track location and movement of animals, and to maintain a link to their herd and their health status.

Dairy producers are familiar with using animal identification for production management purposes, especially those with electronic data collection for oestrus, mastitis detection, milk production, feeding and inventory management. In addition to these uses, all cattle require individual identification with their history of vaccination and disease.

Traceability of cattle and the use of individual animal identification can also be accomplished, using the computerized systems that are in use for herd management. These systems make extensive evaluations easy and efficient, though hand-kept record systems still remain effective. Each system has its own merits. What is important is consistency in keeping records that are legible, easily retrieved, and maintained for a period of at least 24 months after shipment of an animal to a new location, new owner, or for slaughter.

Although the general principle is to minimize animal movement, the information collected and maintained for each animal is expected to include where each animal was born, where it was raised,

and its movement since birth. Animal identification and traceability is mandatory in some provinces, and producers are required to declare animal movement to a central database. This does not preclude internal traceability systems being maintained for production and tracking purposes on-farm.

4.2.6 Strategy 6: Manage movement within the production unit

Pathways for cattle movement on the farm premises are predetermined. Animals are moved in a manner that reduces exposure to diseased or lower-resistance animals. Sources of contamination are avoided.

Prepare a movement/flow plan that considers the risk points throughout the production area and their potential impact on cattle at different stages of development. The plan should also consider the order of movement of cattle through the facility when using the same alleys and routes. Generally, the order should be from younger to older, more susceptible to less susceptible, and healthy to sick, if necessary. Avoid isolation and treatment areas.

Keep movement paths clear of manure, and clean after use by any sick or unknown health status animals. Careful planning of movement will both avoid direct contact between animals of different disease status and reduce the potential of indirect contact through manure or other potentially infectious materials.

4.3 CONTROL AREA 3: Premises' Management and Sanitation

Target Outcome:

Maintenance and sanitation programs are established for the facility/property to reduce the pathogen load and to minimize the risk of introduction and further spread of diseases.

Strategy:

Objective(s):

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| 1. Provide materials and equipment for cleaning and disinfection, and instruction on their use | Farm workers, service personnel, and other visitors are made aware of the need to clean and disinfect for biosecurity purposes, are provided with suitable materials and equipment, and know how to carry out sanitization practices for all areas of the farm. |
| 2. Clean and disinfect equipment and vehicles | Farm workers, service personnel, and other visitors follow prescribed farm practices to clean and disinfect their equipment and vehicles during their on-farm activities, and when entering or leaving the premises. |
| 3. Clean, disinfect, and maintain production facilities | Bedding is removed from stalls and disposed of in a prescribed manner, and manure is cleared from alleyways and moved to a suitable storage area. High-risk areas of the production facilities, including isolation and calving pens, milking parlour, and water and feed areas are cleaned and disinfected on the farm's planned schedule. Facilities are maintained in good repair. |
| 4. Manage manure, waste, deadstock, and pests | Manure, waste, and deadstock are removed from the cattle housing and treatment areas and out of potential contact with cattle, and are isolated from scavengers; disposal is carried out in an accepted manner. A regular program of pest control is followed. |

Good sanitation practices are a key activity in a strong biosecurity plan. Though frequently the least attractive element in a biosecurity plan, sanitation is often the key factor in minimizing and limiting the course of infectious diseases. Sanitation processes work in conjunction with zoning and the effective management of high-risk pathways and areas within a production unit. Unlike the swine and poultry sectors, an "all in" or "all out" stocking policy is unrealistic.

Good sanitation practices, including both cleaning and disinfection, can reduce the transmission of disease pathogens that could potentially infect the herd. Make available specific cleaning materials, ensuring that farm workers and visitors know how to use these products to sanitize vehicles, material and equipment, and facilities. The risk of disease transmission can also be reduced by careful management of manure, deadstock, and pests.

Apart from the obvious need to protect the stock from bringing disease onto or spreading within the farm, the safety of the consumer has to be of paramount consideration, as well, in this activity.

4.3.1 Strategy 1: Provide materials and equipment for cleaning and disinfection, and instruction on their use

Farm workers, service personnel, and other visitors are made aware of the need to clean and disinfect for biosecurity purposes, are provided with suitable materials and equipment, and know how to carry out sanitization practices for all areas of the farm.

Good farm hygiene is the responsibility of all farm personnel. All personnel should know and be capable of explaining the farm's sanitation plan to all visitors. Infectious diseases can be carried onto a dairy farm by people, their clothing and boots, and their equipment, and thus spread disease indirectly to cattle.

Educate farm workers, service personnel, and other visitors about the purpose and outcomes of proper cleaning and disinfection, with a view to encouraging the use of effective materials and practices. Develop instructions for use in cleaning and disinfecting specific types of equipment, facilities, and vehicles, and train farm workers in carrying them out. A summary of the procedures can be posted near the barn and other facility entrances to reinforce these practices and work as a review for visitors and farm workers.

As an ongoing aspect of maintaining best practices in cleaning and disinfection on the farm, seek out information on cleaning and disinfection materials that are effective in important areas of the farm and in specific disease risks of concern, ensuring their availability for use.

4.3.2 Strategy 2: Clean and disinfect equipment and vehicles

Farm workers, service personnel, and other visitors follow prescribed farm practices to clean and disinfect their equipment and vehicles during their on-farm activities, and when entering, within, and on exit from the production unit or premises.

One of the most important cleaning and disinfection practices on a farm is to ensure that equipment is clean before and after use (e.g. between animals, groups of animals, dirty and clean tasks). Methods of cleaning different and specialized types of equipment should be individually designed, with cleaning/decontaminating and clean equipment storage areas provided.

The frequency and effective methods for cleaning and disinfecting specific equipment used in selected circumstances should be followed, based on their use and the possibility of cross-contamination (e.g. larger units such as feed mixers and manure scrapers). Specialized equipment used in higher-risk practices, such as artificial insemination (AI) and treatment of sick animals, should have specific cleaning and sanitizing protocols, possibly employing specialized products.

Develop and enforce practices to ensure farm vehicles that circulate into or across zones and/or close to the herd and production areas are cleaned when they arrive and/or before they enter the production unit and upon leaving the cattle areas or premises. Provide a designated area and facilities for washing and disinfecting vehicles.

4.3.3 Strategy 3: Clean, disinfect, and maintain production facilities

Bedding is removed from stalls and disposed of in a prescribed manner, and manure is cleared from alleyways and moved to a suitable storage area. High-risk areas of the production facilities, including isolation and calving pens, milking parlour, water and feed areas, are cleaned and disinfected on the farm's planned schedule. Facilities are maintained in good repair.

The presence of pathogens is visually undetectable. Therefore, it is important to remove potentially infectious material, and material that is known to provide a pathway for pathogens, including

- manure and body fluids
- discarded milk
- soiled bedding
- spilled or leftover/excess feed

Keep all areas of the production facility clear of potentially infectious material. In stall areas, remove and renew bedding on a regular schedule to minimize risk. If disease is suspected or confirmed in any stall area or if unusual levels of soiling are experienced, cleaning and possibly disinfection may be needed to avoid infection of cattle using that stall and/or those in adjacent stalls.

To clear manure, regularly scrape alleyways used as pathways for cattle movement. Clean and possibly disinfect if disease is suspected or confirmed in any cattle that have used the alleyway.

In particular, identify isolation and calving pens or facilities as requiring additional cleaning and disinfection, either on a scheduled or per-use basis. Routes within the production area that are travelled by the herd or used for removing these risk materials also require special attention. To reduce contamination, identify barn surfaces, stalls, water troughs, and feeding areas, and/or systems as areas that require special attention. Regularly scheduled cleaning and disinfection practices should be documented.

Develop routine sanitation and disinfection procedures for all animal-holding areas from which disease agents could be spread. Further, to improve the effectiveness of cleaners and disinfectants and the efficiency of these practices, consider installing cleanable walls, floors, and other facility parts during renovation or when designing a new barn or other facilities.

Good construction, regular maintenance, and renovation of facilities strengthen a biosecurity plan by aiding cleaning and disinfection effectiveness. Smooth integrated surfaces and those that are finished with a non-porous coating provide fewer places for potentially infectious materials to lodge, and allow easier and more complete cleaning. Well-maintained gates and doors on buildings ensure that areas can be secured from intrusion and from unintended commingling. Signage, fences, and barriers should be in good repair. Design and maintain production areas, driveways, and walkways to avoid standing water or effluent.

4.3.4 Strategy 4: Manage manure, waste, deadstock, and pests

Manure, waste, and deadstock are removed from the cattle housing areas and out of potential contact with cattle, and are isolated from scavengers; disposal is carried out in an accepted manner. Producers follow a regular pest control program.

Handle manure, deadstock, and waste with equipment that is not used for other functions, or that is cleaned and disinfected between uses. Move manure, deadstock, and waste from housing and milking areas directly to a barn or pen exit to minimize contact with cattle and potential contamination of the alleyways and production areas in the barn.

Store manure in a dedicated area away from traffic areas, and in a way that is accessible to the production area. Construct the storage area to ensure that runoff will not reach active production areas, and that especially avoids risk of contamination of the feed storage or transfer areas. If used as nutrient, spread the first application of manure on the fields as soon as possible in the spring to decrease the attraction and breeding of flies, and to reduce feed sources for vermin and scavengers.

Remove other wastes to municipal landfill or to a hazardous waste site as appropriate.

Have in place a control program for mice, rats, and birds, vermin, and other scavengers to prevent the harbouring of pathogens and their spread around the farm, particularly in feed storage and delivery areas. Good sanitation and regular clean-up practices will aid in the control of pests or vermin. Fly control may require using a combination of controls; frequently removing manure from barn pathways, yards and holding areas to prevent the completion of their life cycle; and using traps, baits, fly paper, or insecticides.

Deadstock must be composted, buried, or picked up by a deadstock collector in compliance with regulations, within 24 to 48 hours to prevent scavengers and vermin from contacting the carcasses. “Scavengers” in this context also include farm pets, especially farm dogs and cats that can also serve as mechanical carriers of pathogens within a production unit. Their role in disease transmission is often overlooked but may be important in diseases such as Neospora, rabies, and others.

4.4 CONTROL AREA 4: Personnel, visitors, vehicles, and equipment

Target Outcome:

Producers and their employees, service providers, and visitors are aware of and follow the farm biosecurity measures to prevent the spread of infectious diseases.

Strategy:

Objective(s):

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| 1. Control access | Access by farm workers who live or travel off the farm, farm services personnel, and all other people who visit the farm for business or personal reasons is planned and managed. Access is purposeful. Farm visitors understand the potential impact of their actions and comply with the farm protocols in place to minimize the introduction of diseases to the herd. |
| 2. Use clean clothing and footwear | Farm workers and service personnel use dedicated farm-specific clothing and footwear when on the farm. Clothing and footwear is cleaned and changed between visits and as required when moving between production areas. |
| 3. Control movement of equipment and vehicles | Farm workers, service personnel, and other visitors use equipment in a manner that minimizes the risk of cross-contamination between animals. They restrict the movement of their vehicles to permitted areas, and limit cross-contamination between facilities and between production areas on the farm. |
| 4. Plan, train, and communicate | Farm personnel should be aware of and understand the importance of biosecurity and the farm-specific biosecurity plan of the dairy operation where they work. All farm personnel should be trained in biosecurity protocols, record keeping, and dairy cow behaviour. Every person who visits or works on the dairy farm should know that a biosecurity plan has been prepared for the farm and that they are expected to follow it. |

People may inadvertently introduce pathogens to farms. Pathogens can survive on hands, feet, clothing, on tools and equipment, and in and on vehicles, and can be transmitted to animals or their surroundings. Their actions are potentially an indirect path for disease agents onto farms. Reduce the risk of this type of transmission in three steps:

- 1) Limit access by people, their equipment, and vehicles.
- 2) Require that people and their clothing be clean.
- 3) Require cleaning of equipment and vehicles.

The service providers who pose the greatest risk for transmitting disease are those who have direct contact with cattle; for example, the herd veterinarian, the AI technician, or the hoof trimmer. Next are people who walk through barns and feed alleys: nutritionists, classifiers, buyers, etc. This principle of relative risk, based on the closeness of their interaction with cattle can be applied to the circulation of all visitors and service providers throughout the farm premises.

Further, it is important to understand that *every* person poses a risk, due to possible cross-contamination. For instance, even if a person comes onto a farm wearing clean boots, their boots can become contaminated by infectious material and then, spread it. (For example, they accidentally step into the manure from a cow with winter dysentery and then expose a healthy calf, which leads to scours.)

There is also a concern for the health of people visiting the farm. Some of the diseases of concern on dairy farms can be zoonotic, and thus can potentially infect people. Potential contact with these and other contaminants are also a consideration in the occupational health and safety of farm workers.

4.4.1 Strategy 1: Control access

Plan and manage access by farm workers who live or travel off the farm, by farm services personnel, and by all other people who visit the farm for business or personal reasons. Access is purposeful. Farm visitors understand the potential impact of their actions, and comply with the farm protocols that are in place to minimize the introduction of diseases to the herd.

For many dairy producers, visitors to the farm are an important part of their business and social life. Dairy farms are relatively open environments, and thus require active control of all types of visitors, using a risk-based approach to farm entry and to facility access. Visitors need to acknowledge that each farm's biosecurity practices should be followed.

Producers are advised to disallow anyone with no reason to be on the farm. Visitors are expected to contact the producer or another responsible individual before their arrival to confirm their visit and to be informed of the practices to follow during their visit. Preparations for their visit can then be made. Producers should consider keeping a record of all visitors who come and go, including consultants, salesmen, deliverymen, haulers, maintenance workers, and veterinarians. It may be possible to designate an area where visitors enter and congregate without coming into contact with the cattle, feed, equipment, and/or barns. Visitors should be discouraged from entering the housing and feed areas and from touching cattle and calves.

Establishing a CAZ and a RAZ are recommended on all dairy farms to identify areas of relative risk. Practices are then designed for transition points into each zone and for actions taken within each zone. (Refer to section 3.5.1.)

For barns, facilities, and all areas housing the herd, post signage to direct visitors to a main office before they enter the barn areas, identifying the biosecurity area(s) and prohibiting entry, except under specified circumstances. Secure, wherever possible, doors and other entryways to these areas. Prohibit anyone from entering the RAZ, unless there is a legitimate and agreed reason for access. Producers are recommended to advise service providers of the access practices to follow on-farm, and to consider these practices as a condition of doing business.

While these specific recommendations focus on control by producers, the strategy also proposes that all visitors to dairy farms understand the impact of their presence on the farm, as well as their interaction with cattle, equipment, and facilities on the biosecurity of the farm and the health of the herd. Awareness of these factors by visitors will increase their willingness to follow each farm's practices.

Ask foreign visitors to provide information about recent farm and animal contacts. It is recommended that foreign visitors be excluded from the livestock facilities for at least five (5) days after their arrival into Canada. Further, ensure that these visitors have taken the appropriate precautions to avoid carrying foreign disease agents on their clothing, shoes, or other articles, including cameras, jewellery, and watches.

In addition to controlling access by visitors, there are a number of specific practices that are intended for visitors to follow. Strategies 2 and 3 and subsequent subsections present these practices.

4.4.2 Strategy 2: Use clean clothing and footwear

Farm workers and service personnel use dedicated farm-specific clothing and footwear when on the farm. Clothing and footwear is cleaned and changed between visits and as required when moving between production areas.

If there is a need to address the risk of transmission of potentially infective material by farm workers and service personnel, focus on the availability of clean clothing and footwear, and their ability to clean exposed areas of their bodies. Clean clothing and footwear can either be clean permanent clothing and footwear, or disposable coveralls and foot coverings, with both provided by producers or supplied by the workers and service personnel. Consider providing a transition area or anteroom at the entrance to the active production area where farm workers, service providers, and visitors can don and remove clothing and footwear, and wash and sanitize their hands. These are decisions producers will make in designing their farm practices.

Producers will ensure that all service providers with access to the herd are informed of their biosecurity requirements with respect to clothing, footwear, and hand washing. Visitors and service providers should bring suitable clean clothing and footwear for use upon arrival in the production

area(s), donning upon entry to each risk zone. If necessary, producers will provide all the equipment, supplies, and clothing necessary to meet the standards on the farm, and may provide all staff with farm-specific clothes and boots.

Farms' biosecurity plans should ensure that all visitors bring clean clothes and boots, or disposable coveralls and foot coverings when arriving at the farm or that producers provide farm-specific clothing and boots, or disposable coveralls and foot coverings upon arrival, and that they don them prior to entering the production areas. Ensure that visitors change clothing and clean foot coverings (again) if they enter the RAZ. Similar requirements within the zones could also apply when moving into specified risk areas, such as the calving area, the heifer area, or the isolation area.

In both cases, clothing and footwear, and cleaning hands and other exposed areas are strategies that apply to movement into the CAZ and between the CAZ and the RAZ. It is important to provide and maintain effective boot-washing facilities, solutions, and brushes. Producers should insist that visitors brush and wash their boots to remove manure, disinfecting upon arrival and departure from every dairy farm.

4.4.3 Strategy 3: Control movement of equipment and vehicles

Farm workers, service personnel, and other visitors use and control equipment in a manner that minimizes the risk of cross-contamination between animals. They restrict the movement of their vehicles to permitted areas, and limit cross-contamination between facilities and between areas on the farm.

Another strategy for people is controlling the equipment used and vehicles driven on the farm by farm workers, services personnel, and visitors. Equipment and vehicles can transmit potentially infectious materials, which are picked up at other farms and livestock facilities, onto their farms, and thus risk the transmission of those materials, directly or indirectly, to the dairy herd. Movement control includes traffic onto a dairy farm and traffic patterns within the operation.

Normal use of the equipment, and passage of vehicles through certain areas of the farm and their appropriate use for transport of animals, deadstock, or other organic materials can result in contamination by potentially infective materials. Therefore, it is important to keep vehicles away from high-risk areas and to establish work practices that avoid cross-contamination caused by equipment that workers and service providers use. Strategy 4.3.2 addresses cleaning and disinfecting vehicles and equipment following contact with potentially infectious material.

Producers should establish a designated parking area for all visitors and service providers, located away from the barn and other animal facilities, and from routes travelled by animals and/or mobile farm equipment, such as tractors, skid-steers, wagons, etc., and have one combined entrance and exit if practicable. The farm biosecurity plan should require that transporters, milk trucks, and feed trucks – vehicles that must approach the animals or animal housing areas – have routes to follow in carrying out their duties, minimizing the potential for spreading any potentially infectious

materials. Likewise, these routes should reduce the potential for picking up any such materials and redistributing elsewhere on the farm or to other farms. Practices that avoid contamination of the cab or loading areas of these vehicles should also be in place.

4.4.4 Strategy 4: Plan, train, and communicate

Farm personnel should be aware of and understand the importance of biosecurity and the dairy-specific biosecurity plan to the dairy operation where they work. All personnel should be trained in biosecurity protocols, record keeping, and dairy cow handling and behaviour. Every person who visits or works on the dairy farm should know and be expected to follow the biosecurity plan.

The success of biosecurity plans will require the involvement and cooperation of several groups and individuals: suppliers, haulers, family members, farm workers, visitors, farm service providers, and the herd veterinarian.

They all need to understand the importance of biosecurity and biosecurity best practices that guide their activities on the farm. In addition, they should ensure that their own biosecurity plans include safeguards that coordinate with the farm plan.

Also important is the need to involve the family members and employee(s) in developing and implementing the biosecurity plan, as well as the annual review, and to educate family members and staff about the importance of following the biosecurity plan and their role in enforcing and making the plan work. It may be worthwhile to designate a family member or employee, on a rotational basis, who will be responsible for implementing biosecurity and food safety standards daily on the farm.

Producers, their family members, farm workers, and visitors benefit from training in the specific biosecurity strategies and objectives found in the Standard, as they are adapted for each farm production area, to help ensure cooperation and buy-in. Farm service providers also require training in established practices for the farms they service to ensure they can carry out and accommodate these practices within their own operational and biosecurity practices.

Farm personnel should also be trained on biosecurity protocols, record keeping, and dairy cow handling and behaviour. All farm personnel involved in the daily monitoring and handling of dairy cattle should be made aware of the importance of early detection of disease and what actions to take if they suspect an animal may be exhibiting clinical signs of an economically important or foreign animal disease.

It will be worthwhile to strengthen the media/communications skills for the dairy farm by preparing an external communications plan for the general public, veterinarians, and farm service providers. Every person who visits or works on the dairy farm should be aware that they are expected to follow the biosecurity plan.



Acknowledgements

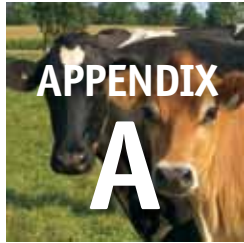
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Table 4: The Advisory Committee members are acknowledged, with each member listed along with affiliation.

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Pauline Duivenvoorden	Dairy Farmers of Canada
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Hans Gorter	Dairy Farmers of Canada
Pierre Lampron	Dairy Farmers of Canada
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Jean Baril	Canadian Association of Bovine Practitioners
Henry Ceelen	Canadian Veterinary Medical Association
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Glossary

The following terms, with a working definition for each, may be used in the National Standard and are generally used in biosecurity and animal health documents:

Aerosol: A cloud of solid or liquid particles suspended in a gas form that can be distributed or dispersed in the atmosphere.

Animal Health Management Plan: A facility- or operations-based plan that describes and communicates the practices that support animal health, respond to disease, and serve to limit disease risks on a dairy farm.

Biocontainment: Practices that serve to limit the possible movement of disease agents outside of an area determined to be infected with, or carrying a disease.

Bio-exclusion: Practices that serve to keep disease-risk agents away from susceptible animals.

Bio-management: Practices that are followed on a day-to-day basis to limit and control the potential impact of disease agents and the materials that house them.

Biosecurity: A set of herd management practices to prevent the introduction and spread of infectious diseases.

Biosecurity control area: Any one of four categories that have been used in the Dairy Standard to help organize, explain, and communicate how biosecurity practices apply on dairy farms.

Biosecurity protocols: Those measures specific to a dairy operation used to prevent the introduction and the spread of disease within the cattle population and from that cattle population.

Calf ranch: Term used in the U.S. for “calf pens” or other similar facilities.

Cleaning: A practice that removes accumulated organic matter and dirt – may be followed by disinfection.

Closed herd: A population of cattle that have all been bred and raised on-farm, with no purchased replacement animals of any age. If cattle are taken to a show and returned, the herd can no longer be considered closed.

Commingle: The act of mixing cattle, either with other cattle from different farms or production facilities or with other animal species, resulting in direct or close indirect contact among them.

Controlled access zone (CAZ): 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 transmitted to an animal. For example, disease organisms shed by sick or carrier animals can be transmitted from manure to feed by the use of a common bucket or shovel.

Dairy operation: Includes the buildings, paddocks, corrals, and pastures used at any time of the year to manage any livestock, including dairy cattle; may have one or more than one location.

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

Disinfection: A practice that inactivates or destroys disease organisms – must be preceded by cleaning.

Emerging disease: A disease that has either been newly discovered or is new to a geographic area or population and has been increasing in incidence. An example is Schmallenberg virus.

Endemic disease: A disease that may commonly exist in a species, in a region, or in the national herd. Examples include enzootic bovine leukosis (EBL) and bovine viral diarrhoea (BVD).

Equipment: Farm machinery, implements, and livestock conveyances; does not include vehicles for personal or business transport.

Foreign animal disease (FAD): A range of biological threats to livestock, poultry, and wildlife that are not normally found in Canada. Examples include foot-and-mouth disease and Schmallenberg virus.

Hazard and control points: Terms borrowed from Hazard Analysis Critical Control Point (HACCP) programs to denote points of risk, and the manner of addressing them.

Herd of origin: The herd within which the animal was born and raised.

Isolation: The action of 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, either because it is known to be diseased or because its disease status is currently unknown. The location is known as an isolation facility.

Known health status: The current state of health of the animal or the herd, including its condition and any disease(s) that the animal(s) may have or carry. Disease history, herd health management practices, vaccination program details, and housing and movement data contribute important information to determining the health status and should be made available prior to purchase.

Other livestock: Animals other than dairy cattle.

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).

Pathogen (also, “pathogenic”): A bacterium, virus, or other micro-organism that can cause disease.

Paths of transmission: The physical or theoretical lines along which disease pathogens or materials potentially containing them are seen or are believed to move.

Personnel: All full-time and part-time staff, plus any family members who work in the operation.

Pests: All non-livestock and non-domestic animals, birds, and insects that may pose a health risk, either disease or predatory, to the herd; domestic scavengers such as guardian animals and farm pets that have free access to the herd and most areas on the farm. For the purpose of this standard, pests refer to vermin and wildlife. Examples include rodents such as rats and mice, porcupines, raccoons, opossum, and skunks.

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

Premises: A singular term that refers to a contiguous property, including buildings and other additions, used in the National Standard to describe a dairy farm.

Primary location: The main or “home” farm where the home and/or business centre of the dairy operation is located.

Producer: One who owns or operates a farm, raising dairy cattle for producing milk and milk products.

Protocol: Defined and documented procedure designed to meet an objective.

Reportable disease: Any disease outlined in the Health of Animals Act and Reportable Diseases Regulations that, if an animal is contaminated with or suspected to be contaminated with, requires immediate notification to a CFIA district veterinarian. Specific control or eradication measures exist due to the potential significant impact on animal and/or human health and the Canadian economy. Examples include bovine spongiform encephalopathy, brucellosis and bovine tuberculosis.

Restricted access zone (RAZ): An area inside the controlled access zone where animals are housed and where access by people or equipment is further limited.

Sanitation: An overarching set of practices that reduce the presence of organic material and debris as well as the presence, survivability, and infectivity of disease agents.

Segregation: The act of physically separating animals, equipment, or vehicles to prevent contact and cross-contamination.

Transition zone: A designated location for the application of biosecurity procedures to people and equipment before entering a biosecurity zone (CAZ and/or RAZ).

Visitors: Any non-farm personnel that come to the premises, including in general use, service providers, unless specified otherwise. Examples include salespeople, delivery people, veterinarians, livestock haulers, artificial insemination or embryo technicians, and feed industry personnel.

Zoonosis/zoonotic disease: A disease that can be transmitted to humans from animals, or to animals from humans. Examples include cryptosporidiosis and salmonellosis.



APPENDIX

B

Bibliography

Appendix B provides a list of the selected documents from the full literature review that are directly relevant to the National Standard for dairy. These documents contain references for the outcome statements and the best practices in the National Standard, and have provided additional background and subject matter knowledge for its development.

Australian Government Department of Agriculture, Fisheries and Forestry. *A Review of the Structure and Dynamics of the Australian Dairy Cattle Industry*; 2005.

Australian Government Department of Agriculture, Fisheries and Forestry. *Livestock Movement in Australia and Emergency Disease Preparedness*.

Bickett-Weddle D, Ramirez A. *Dairy Biological Risk Management*. Center for Food Security & Public Health, Iowa State University; 2004. Available at: www.cfsph.iastate.edu/BRM/resources/Dairy/DairyBRMDocumentMarch2005.pdf.

Bovine Alliance on Management and Nutrition (BAMN). *Biosecurity of Dairy Farm Feedstuffs*; 2001. Available at: www.aphis.usda.gov/animal_health/nahms/dairy/downloads/bamn/BAMN01_Feedstuffs.pdf.

Bovine Alliance on Management and Nutrition (BAMN). *Biosecurity on Dairies*; 2001. Available at: www.aphis.usda.gov/animal_health/nahms/dairy/downloads/bamn/BAMN01_BiosecurityDairies.pdf.

Cattle Health Certification Standards (CheCS), United Kingdom. *Technical document: Incorporating Rules for Cattle Health Schemes*; 2009.

Collins M. *Biosecurity on Dairies ... Are We Doing Enough?* University of Wisconsin, School of Veterinary Medicine. Available at: www.johnes.org/handouts/files/Vita_biosecurity.pdf.

Collins MT, Eggleston V. *Healthy Cows for a Healthy Industry: Proven Practices for Johne's Disease Control and Prevention*. Hoard's Dairyman; 2009.

Department for Environment, Food and Rural Affairs (DEFRA). *Development of farm-specific biosecurity risk management strategies for cattle herds and sheep flocks*; 2006.

Department for Environment, Food and Rural Affairs (DEFRA). *Farm Practices Survey 2007*; 2007.

Enticott G. *Biosecurity, "Sound Science" and the Prevention Paradox: Farmers' Understandings of Animal Health*. The Centre for Business Relationships, Accountability, Sustainability and Society; 2008.

European Commission. *A New Animal Health Strategy For The European Union (2007–2013) Where Prevention Is Better Than Cure*; 2007.

Farm Biosecurity. *Biosecurity Plan Australian Dairy Industry farm biosecurity*; 2003. Available at: www.dairyaustralia.com.au.

Faust MA, Kinsel ML, Kirkpatrick MA. *Characterizing Biosecurity, Health, and Culling During Dairy Herd Expansions*. *Journal of Dairy Science* 2001; 84(4):955-65. Available at: <http://linkinghub.elsevier.com/retrieve/pii/S0022030201745547>.

Hoe FG, Ruegg PL. *Opinions and Practices of Wisconsin Dairy Producers about Biosecurity and Animal Well-Being*. *Journal of Dairy Science* 2006; 89(6):2297-2308. Available at: <http://linkinghub.elsevier.com/retrieve/pii/S0022030206723013>.

Hutchinson LJ, Smith TL, Burns CM. *Pennsylvania Dairy Health and Biosecurity Manual*. Pennsylvania State University.

Jordan E, Dement AI, Faries FC. *Biosecurity Practices for Dairy Operations*. AgriLIFE Extension, Texas A&M System.

Kelton D. *What's Mine is Yours Ontario Perspectives on Managing Animal Health*. Department of Population Medicine, Ontario Veterinary College, University of Guelph; 2010.

Maunsell F, Donovan GA. *Biosecurity and Risk Management for Dairy Replacements*. *Veterinary Clinics of North American Food Animal Practices* 2008; 24(1):155-90.

Ministry of Agriculture and Forestry Biosecurity New Zealand. *Review of Selected Cattle Identification and Tracing Systems Worldwide*; 2009.

Moore DA, Adaska JM, Higginbotham GE, et al. *Testing New Dairy Cattle for Disease Can Boost Herd Health, Cut Costs*. *California Agriculture* 2009; 63(1):29-34.

Moore DA. *Guarding Against the 'Trojan Horse': Practical Biosecurity Measures for Dairy Farms*. University of California, Davis; 2000.

Moore DA, Leach DA, Bickett-Weddle D, et al. *Evaluation of a Biological Risk Management Tool on Large Western United States Dairies*. *Journal of Dairy Science* 2010; 93(9):4096-104. Available at: <http://www.ncbi.nlm.nih.gov/pubmed/20723684>.

Moore DA, Merryman ML, Hartman ML, et al. *Comparison of Published Recommendations Regarding Biosecurity Practices for Various Production Animal Species and Classes*. *Journal of the American Veterinary Medical Association* 2008; 233(2):249-56.

Moore DA, Payne M. *An Evaluation of Dairy Producer Emergency Preparedness and Farm Security Education*. *Journal of Dairy Science* 2007; 90(4):2052-7. Available at: <http://www.ncbi.nlm.nih.gov/pubmed/17369248>.

National Farm Animal Care Council. *Code of Practice for the Care and Handling of Dairy Cattle*; 2009.

Patrick I, Jubb T. *The Economic Benefits of Implementing Biosecurity Measures in a NSW North Coast Cattle Herd*. Animal Health Australia; 2008.

Raymond MJ, Wohrle RD, Call DR. *Assessment and Promotion of Judicious Antibiotic Use on Dairy Farms in Washington State*. Journal of Dairy Science 2006; 89(8):3228-40. Available at: <http://linkinghub.elsevier.com/retrieve/pii/S002203020672598X>.

Reichel MP, Hill FI, Voges H. *Does Control of Bovine Viral Diarrhoea Infection Make Economic Sense?* New Zealand Veterinary Journal 2008; 56(2):60-6.

Sibley R. *Biosecurity in the Dairy Herd*. In *Practice* 2010; 32(7):274-80. Available at: <http://inpractice.bmj.com/cgi/doi/10.1136/inp.c3913>.

Talafha AQ, Hirche SM, Ababneh MM, et al. *Prevalence and Risk Factors Associated with Bovine Viral Diarrhea Virus Infection in Dairy Herds in Jordan*. Tropical Animal Health and Production 2009; 41(4):499-506. Available at: <http://www.ncbi.nlm.nih.gov/pubmed/18654834>.

Tomsche DS. *Commingling: A Herd Health Time Bomb?* Western Dairy Management Conference. Las Vegas, Nevada; 1999. p. 19-26.

United States Department of Agriculture. *Biosecurity in Practice Series: Dairy Herds: A Guide to Biosecurity in Dairy Herds*; 2002. Available at: www.farmandranchbiosecurity.com/Dairy_Herds_Insert.pdf.

United States Department of Agriculture. *Dairy 2002: Animal Disease Exclusion Practices on U.S. Dairy Operations*; 2004.

United States Department of Agriculture. *Dairy 2007: Biosecurity Practices on U.S. Dairy Operations 1991-2007*; 2010. Available at: www.aphis.usda.gov/animal_health/nahms/dairy/downloads/dairy07/Dairy07_ir_Biosecurity.pdf.

United States Department of Agriculture. *Dairy 2007: Part II: Changes in the U.S. Dairy Cattle Industry, 1991-2007*; 2007.

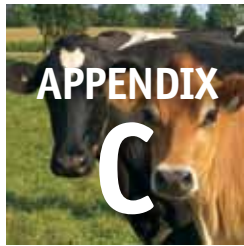
Van Saun RJ. *Biosecurity for Herd Expansion and Herd Entrance*. Proceedings X Congreso Internacional De Medicina Bovina, Asociación Nacional de Especialistas en Medicina Bovina de España (ANEMBE); 2005. p. 45-49. Available at: http://vbs.psu.edu/extension/resources-repository/publications/Expansion_Biosecurity.pdf. p. 45-49.

Villarroel A, Dargatz DA, Lane VM, et al. *Suggested Outline of Potential Critical Control Points for Biosecurity and Biocontainment on Large Dairy Farms*. Journal of the American Veterinary Medical Association 2007; 230(6):808-19. Available at: <http://www.ncbi.nlm.nih.gov/pubmed/7601706>.

Wells SJ. *Biosecurity on Dairy Operations: Hazards and Risks*. Journal of Dairy Science 2000; 83(6):2380-6. Available at: <http://linkinghub.elsevier.com/retrieve/pii/S0022030200751277>.

Wells SJ, Ott SL, Hillberg Seitzinger A. *Key Health Issues for Dairy Cattle - New and Old*. Journal of Dairy Science 1998; 81(11):3029-35.

Young I, Rajic A, Hendrick S, et al. *Attitudes Towards the Canadian Quality Milk Program and Use of Good Production Practices Among Canadian Dairy Producers*. Preventive Veterinary Medicine 2010; 94(1-2):43-53. Available at: <http://www.ncbi.nlm.nih.gov/pubmed/20022647>.



DFC Code of Practice Section 3.4

Appendix C provides a reproduction of Section 3.4 of the Dairy Farmers of Canada *Code of Practice for the Care and Handling of Dairy Cattle*.

3.4 Veterinary Care and Herd Health Management Programs

Animal health is an integral component of animal welfare. Producers should maintain the health of their animals through appropriate nutrition, appropriate housing, disease prevention, detection, and treatment. Veterinarians should have a key role in helping producers meet these animal health obligations.

A Veterinarian/Client/Patient relationship (VCPR) (35) exists when all of the following conditions have been met:

- the veterinarian has assumed the responsibility for making clinical judgments regarding the health of the animal(s) and the need for medical treatment, and the client has agreed to follow the veterinarian's instructions.
- the veterinarian has sufficient knowledge of the animal(s) to initiate at least a general or preliminary diagnosis of the medical condition of the animal(s). This means that the veterinarian has recently seen and is personally acquainted with the keeping and care of the animal(s) by virtue of an examination of the animal(s) or by medically appropriate and timely visits to the premises where the animal(s) are kept.
- the veterinarian is readily available for follow-up evaluation, or has arranged for emergency coverage, in the event of adverse reactions or failure of the treatment regimen.

An effective Herd Health Management Program contributes to animal well-being by providing a strategy for disease prevention, rapid diagnosis, and effective treatment.

REQUIREMENTS

Producers must establish a working relationship with a practicing veterinarian (VCPR).

RECOMMENDED BEST PRACTICES

- a. work with the herd veterinarian to develop a Herd Health Management and Biosecurity Program (refer to Appendix K – Resources for Further Information)
- b. have a Herd Health Management Program which includes the following components:
 - vaccination protocols
 - observation of all animals for injury or signs of disease
 - complete, accurate, and reliable record keeping
 - protocols for the prevention, detection, and treatment of disease or injury, including lameness
 - protocols for pest control
 - training programs and protocols for animal handlers
 - individual animal identification and treatment records to ensure no animal is shipped prior to drug withdrawal times
 - ability to isolate new arrivals to the herd
 - calving protocols.

