Canadian Food Inspection Agency
Agence canadienne d'inspection des aliments

Animal Biosecurity

Biosecurity for Canadian Dairy Farms

Producer Planning Guide

Growing Forward
A federal-provincial-territorial initiative

Dairy Farmers of Canada
Les Producteurs laitiers du Canada

Canada

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1. About this document

1.1 Who should use this Guide?

This *Producer Planning Guide* has been developed for dairy producers across Canada to assist with the preparation of farm-specific biosecurity plans and the implementation of relevant biosecurity best management practices. Farm workers, family members, service providers and all others who conduct business with and/or visit the dairy farm can also use this guide. Everyone has a role to play in biosecurity and can contribute positively to biosecurity efforts on the farm.

1.2 Objective of this Guide

The document *Biosecurity for Canadian Dairy Farms: National Standard* outlines a set of target outcomes that every dairy producer should strive to achieve on the farm. The objective of this accompanying guide is to illustrate how producers can meet these outcomes through a set of best management practices and a list of key activities.

The best management practices have been compiled following producer-level consultations and a comprehensive literature review, which included an examination of existing international biosecurity initiatives. An advisory committee of producers and representatives from the dairy industry, academia and the public sector provided invaluable guidance.

Dairy producers are in the business of producing food for human consumption and as a result food safety is an industry priority. The application of good biosecurity best management practices will serve to underpin the production of safe, quality-assured dairy products in a sustainable manner to support the future of dairy farming in Canada on a local and regional scale.

1.3 How to use this Guide

Producers are encouraged to prepare biosecurity plans that are specific to their farm operations using the *National Standard*, and to refer to this Planning Guide for the best management practices that are relevant to the needs of their dairy farms.

This Guide presents a framework to assist in the development of a farm-specific biosecurity plan. Section 2 outlines the key steps for laying the foundation of a farm-level biosecurity plan and provides relevant resources for each of the preparatory steps.

To assist with building the plan, the highlighted best management practices are provided in Section 3. This section directly aligns with the approach of the document *Biosecurity for Canadian Dairy Farms: National Standard*. Using this approach, there are four biosecurity Control Areas:

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

As previously stated, within each of these control areas, a target outcome has been identified as a goal for the industry in Canada. A number of strategies are then listed for each control area with accompanying best management practices.

Additional reference material is provided in the indices and appendices. This Planning Guide is designed to be a resource for producers and it is not expected that producers will read the document cover to cover at one time, but work through the document as they develop their plans.

For those who require more detail for the best management practices, there is a corresponding index for each control area that provides specific activities associated with each best management practice. This material is comprehensive, but is not a complete listing of all practices that could be used to meet the target outcomes.

Explanations of important terms used in this document and in reference to biosecurity are provided in Appendix A: Glossary of Terms. Appendix B: Risk Assessment Tool contains a checklist to evaluate specific biosecurity risks on your farm. Biosecurity is a process of managing risk and therefore the use of this tool is a valuable step in biosecurity planning.

No single biosecurity plan will meet the needs of all farms or agricultural businesses. Each business must assess the potential risks and develop a flexible and practical biosecurity plan tailored to its operation. Also, because it is unlikely that all risks can be mitigated, a biosecurity plan must include a contingency or emergency plan for the farm in the event that a disease or chemical event might occur.

1.4 Other Relevant References

In developing this Planning Guide, information was taken from a number of documents. The *Code of Practice – For the Care and Handling of Dairy Cattle (2009)*; the *Canadian Quality Milk On-Farm Food Safety Program Reference Manual (June 2010)* and the *Biosecurity for Canadian Dairy Farms: National Standard* documents should be consulted where appropriate when developing a farm-specific biosecurity plan.

2. Laying the Foundation of Your Biosecurity Plan

A farm biosecurity plan identifies the biosecurity practices that are designed to manage the risks on your farm. Consideration should be given to farm layout, facility design and operational practices, along with the diseases of concern and their modes of transmission. All of these factors influence the risk assessment of your farm and determine which practices will be most useful in mitigating those risks. Developing a farm-level biosecurity plan is a team effort between you and your veterinarian and will be individual to each farm. A strong foundation must be laid before this plan can be built.

For dairy producers, a biosecurity plan aims to achieve three general goals:

1) **Exclude**: prevent the introduction of disease-causing organisms (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.

The following steps are involved in laying the foundation of your farm's biosecurity plan:

1. Create a diagram of the dairy farm layout and facility design, including the production areas.
2. Designate biosecurity zones for the premises.
3. Assign risk areas to the various production areas of the farm and outline the movement pathways.
4. Establish goals for production and animal health.
5. Determine the risk tolerance or intolerance to loss from infectious disease.
6. Complete a rational risk assessment to determine what the disease problems are, including their magnitude, and how likely they are to occur. Specific diseases of concern should be identified.

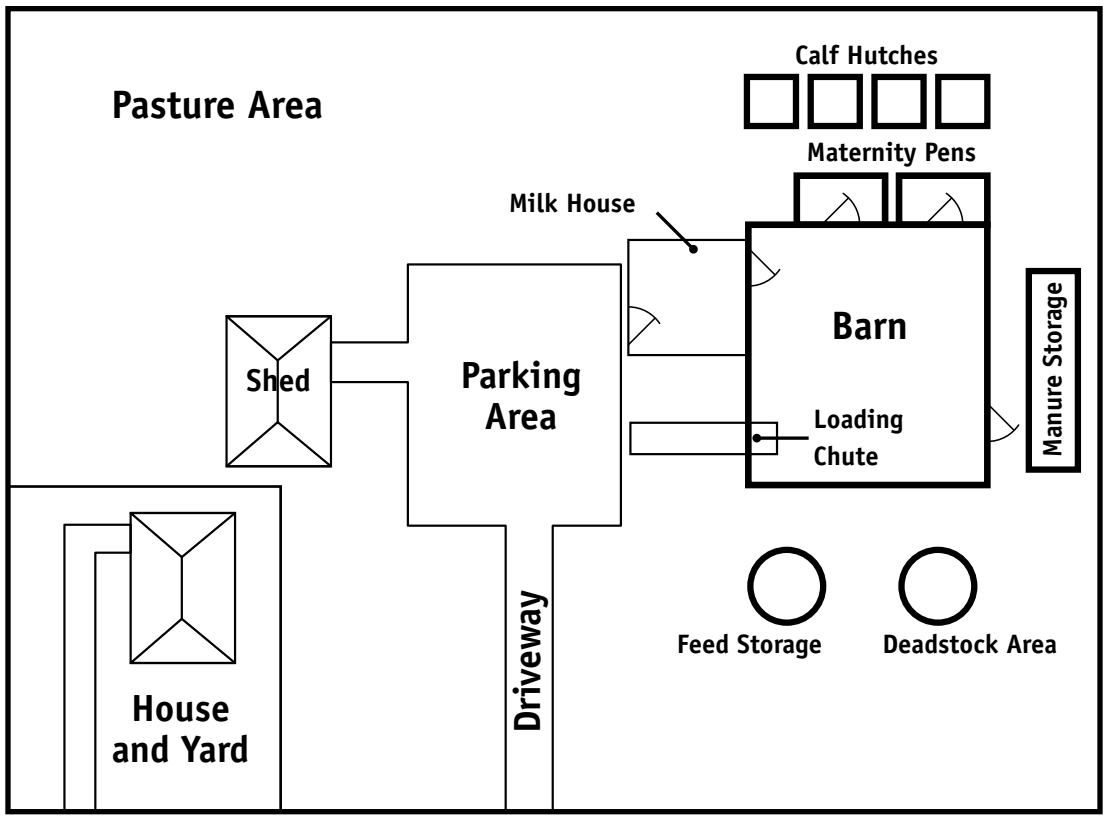
The tools provided in this section will guide you through these steps.

2.1 Create a farm diagram

The farm layout and facility design can have a significant impact, either positively or negatively, on the biosecurity risks on your farm. Indeed, the farm provides the backdrop in which biosecurity must operate and directly influences both the need for certain biosecurity practices as well as the practicality of implementing them.

A farm diagram allows you to visualize the important aspects of the layout and design. You may already have a farm diagram as a component of other on-farm programs. If not, a simple farm diagram, depicting the layout of all of the facilities on the farm, can easily be created, either using a pad and paper, aerial photograph of the farm or a printed Google® map.

Figure 1: Sample dairy farm diagram



This figure shows a simple dairy farm site, comprised of one barn with a limited number of outbuildings. Facilities that may be present on the diagram include the farmhouse, driveway(s), barn(s), milk house, calf pens/hutches, pasture(s), parking lot(s), storage shed(s), feed storage/bins, manure storage and deadstock storage.

Consideration should also be given to creating a second diagram specifically of the production area(s), indicating:

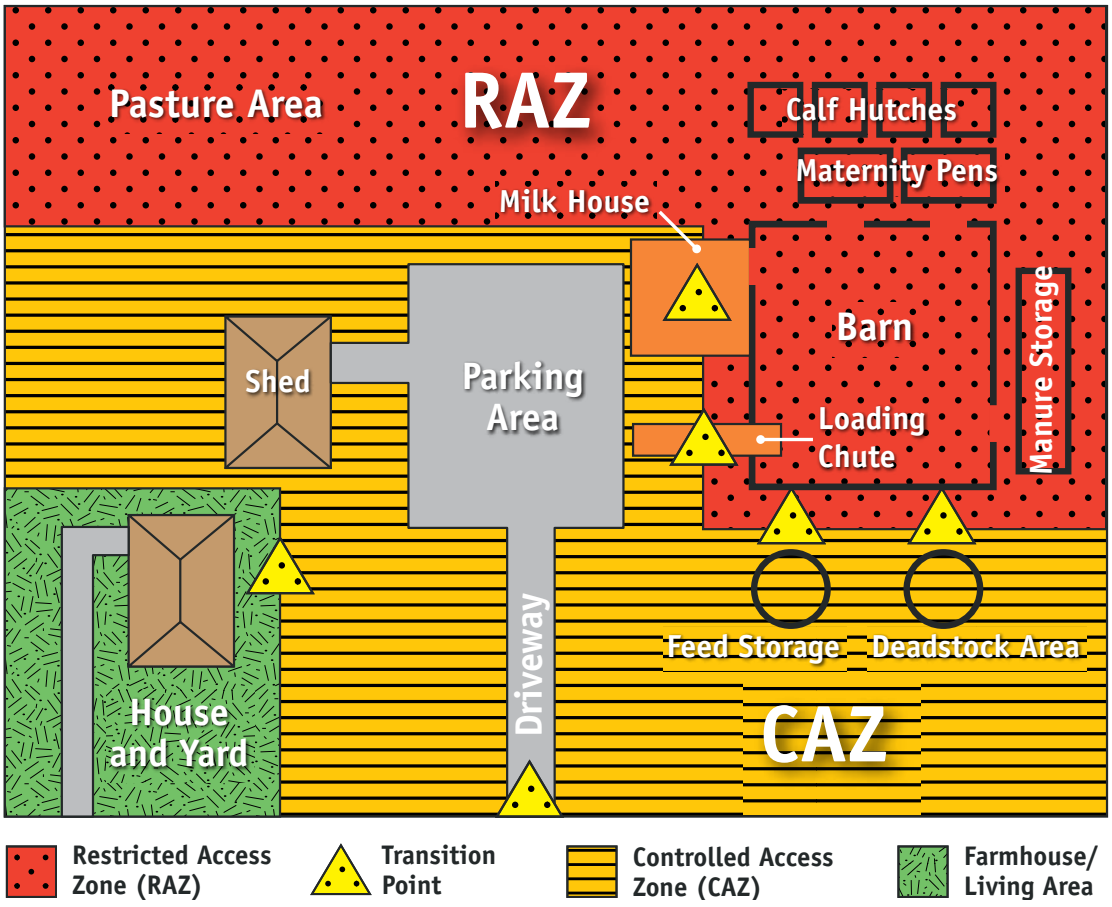
- milking parlour &/or tie stalls
- milking cow housing area
- heifer housing
- isolation area
- hospital pen / treatment area
- loading chute
- employee area
- maternity pen
- dry cow housing
- calf pen/hutches
- laneways/walkways
- cleaning and disinfection facilities
- chemical storage

It may be possible to include all of this information on one diagram, depending on the complexity of the farm.

2.2 Designate biosecurity zones

All components of a dairy farm should not be considered at equal risk relative to biosecurity concerns. Therefore, once the farm layout and facility design has been considered and the farm diagram(s) created, biosecurity zones can be established on your farm. The idea of zones is that they contain areas of similar biosecurity risk, and moving between them, generally through a predetermined access point, requires care and specific practices to avoid cross-contamination. Relative risk zones help to conceptualize the biosecurity plan as it applies to animals, facilities and management. The key idea is to concentrate the majority of efforts in identified high-risk zones.

Figure 2: Sample dairy farm diagram with a Controlled Access Zone and Restricted Access Zone



This figure shows two biosecurity zones, 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 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 farmhouse is a separate area outside of the CAZ.

The first zone entered when going onto a farm is the Controlled Access Zone (CAZ). When entering the CAZ there is a risk of bringing in pathogens from outside of the zone. When leaving the CAZ there is a risk of taking pathogens from within the zone into the production area or off the farm. For example, numerous vehicles travel among several dairy farms on a daily basis (i.e. milk truck, other service providers) and they could transmit pathogens if precautions are not taken. Biosecurity practices to reduce these risks should be included in the farm's biosecurity plan.

The second zone entered on the farm is the Restricted Access Zone (RAZ). The RAZ includes the active production areas of the farm. These are the areas in which direct contact with and between farm animals can occur and therefore are the areas of highest risk of disease transmission. Biosecurity practices to prevent the introduction, spread within and exit of pathogens from the RAZ will be included in the biosecurity plan.

The farmhouse and living area may be separate from your zones, if this area can be reasonably isolated[1] from the active production areas of the farm. Then, there would be no need for specific biosecurity protocols for people, vehicles or equipment entering this area from off the farm.

Transition points are points at which animals, people, tools, equipment and/or vehicles could be expected to enter or leave a zone, and at which biosecurity practices should be applied. At all transition points, the key concept is to leave behind, or clean and disinfect, any materials, clothing, equipment, or other fomites[2] when moving from one risk zone to another.

Examples of common transition points are:

1. Milk house – Often the most-used access point to the RAZ, and also an area frequently visited by milk pick-up personnel, inspectors and other service providers.
2. Loading chute – Creates an opportunity for cattle and people handling them to commingle in both the CAZ and the RAZ, especially if it leads directly to the active production area, and for the two areas to be contaminated by the movement of cattle between the two zones.
3. Feed storage – Requires access from both the CAZ (e.g. by feed delivery personnel and farm workers who are loading up feed produced on the farm), and from the RAZ (e.g. for provision of feed stores to cattle in the barn and elsewhere in the production area) creating multiple transition points.

1 Note that not all home zones can be isolated in this manner.

2 Fomites are any physical entities on which infectious material can be transmitted, but that are not themselves infected. Examples include footwear, clothing, equipment, tools, vehicles and bedding.

4. Deadstock storage – May require access from both the RAZ and the CAZ, and have multiple transition points.
5. Manure storage – May be a multiple-access area, depending on the disposal procedures for manure on each farm. The area may be enclosed within the RAZ, as shown in the diagram, or it may be a transition point, if manure is disposed of away from the production area.

Setting up these zones contributes to the organized and effective implementation of biosecurity practices. There will be considerable variability from farm to farm on the location of the zones, as they need to be established to meet the needs of the premises based on the risk assessment, farm layout and facility design.

2.3 Assign risk areas and outline movement pathways

Within the Restricted Access Zone (RAZ) there are groups of animals that are more susceptible to disease, specifically in the calf pens and the maternity area. There are also groups of animals, either in the isolation area or hospital pen, which are more likely to carry disease and pose a higher risk of disease transmission. Preparing a list of these areas and pathways, and/or locating them on a sketch of the production area will be useful in illustrating where there are areas of greater or lesser risk for disease transmission, and therefore where biosecurity best management practices must carefully be considered.

Movement of people, equipment and tools occurs between these areas on a daily basis. All movement poses a risk of contamination of the pathways and may ultimately lead to disease transmission between groups of cattle. It is crucial to consider the physical location of various groups of animals. Their proximity to others, their location relative to traffic barriers, and the air movement in the area, all impact the risk of disease transmission. This information can be used to develop a plan for the movement of people, animals and equipment that minimizes the risk of disease transmission.

2.4 Establish goals for production and animal health

The level of biosecurity implemented on your operation will depend on your goals for production and animal health. It is imperative to establish your goals before building your biosecurity plan. Many factors will influence these goals including the purpose of your herd (commercial vs. show herd), and the products sold from your dairy farm (milk, meat/cull cattle, calves, replacement heifers, milk cows, embryos and semen). Your future business plans play a significant role in your goals as well. When establishing your goals, consider the short, medium and long term. Goals can be both overarching for the entire operation as well as targeted to specific aspects of production and/or animal health.

2.5 Determine risk tolerance

Biosecurity is essentially a process of managing risk. You must determine what level of risk your farm is willing to assume or accept and then design your biosecurity plan accordingly to ensure that mitigation measures maintain the risk at an appropriate threshold. Again, many factors will influence the acceptable level of risk for your farm, including what products are sold or may be sold in the future (e.g. milk, meat, breeding animals, semen and embryos), as well as the resources available to devote to biosecurity interventions.

2.6 Complete a risk assessment for disease

In order to effectively begin to develop a biosecurity plan to manage the risks on your farm, it is important to complete a risk assessment for disease. Risk assessment is a way of determining the presence, distribution and severity of a given disease on your farm. The basis for risk assessment is not to eliminate all risks, but to segregate risks into various levels to assist with informed decision-making. Risk assessment helps to determine the specific factors that are most likely to lead to the introduction and spread of pathogens.

Work with your herd veterinarian to:

- determine your risk level for infectious diseases in general;
- determine which specific diseases are of the greatest concern to your operation and prioritize them;
- evaluate your dairy farm for possible risks and vulnerabilities that would contribute to the introduction and spread of disease, making sure to consider who and what comes onto and leaves your farm;
- categorize the risks as low, medium or high;
- identify the critical control points or areas where risk mitigation measures would be suitable;
- evaluate potential methods of disease prevention and/or control; and
- weigh the benefits of preventing or controlling risk against the costs and managerial demands of a biosecurity plan.

The attached *Biosecurity for Canadian Dairy Farms-Risk Assessment Tool* (appendix 2) can assist you in conducting a preliminary risk assessment for your farm. In addition, the listing of best management practices outlined in Section 3 can be used to evaluate your farm's practices relative to risk for the introduction or spread of disease.

With a solid foundation, you are now prepared to build a farm-specific biosecurity plan (see Section 3). Re-evaluation of this plan is important to ensure that the biosecurity plan is effective and reflects the current goals and priorities of your dairy farm operation. This should be completed annually at a minimum and more frequently if there are changes to your facilities or operational practices.

3. Building Your Biosecurity Plan

3.1 CONTROL AREA 1: Animal health management

Target Outcome:

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

Strategy	Objectives	Best Practices
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.	1. Develop a relationship with a veterinary practice. 2. Implement an Animal Health Management Plan in consultation with your herd veterinarian.
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.	1. Monitor animal health daily and maintain individual animal health and production records. 2. Keep detailed records of all sick animals. 3. Review these records regularly with the herd veterinarian to evaluate disease trends and effectiveness of treatments.

Strategy	Objectives	Best Practices
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. Youngest are separated from the adults, healthy from the sick, most susceptible from the least susceptible.	1. Separate cattle based on age and stage of production. 2. Separate the maternity area from the hospital area. 3. Segregate pre-weaned calves and have dedicated feeding, treatment and cleaning equipment.
4. Regularly monitor and investigate 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.	1. Isolate sick cattle from the remainder of the herd in a hospital pen and seek veterinary advice. 2. Perform diagnostic tests (milk culture, serology) as required on sick animals. 3. Develop a protocol to screen for diseases of interest (Bovine Viral Diarrhea (BVD), Johne's). 4. Maintain treatment protocols as required by the Canadian Quality Milk (CQM) program. 5. Develop a response strategy in case of a serious disease outbreak.
5. Manage feed, water and bedding	Feed and water are always available in acceptable quantities 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.	1. Ensure traceability of all feedstuffs coming onto the farm. 2. Control the storage conditions and management of feed. 3. Ensure and maintain feed quality and safety. 4. Ensure that a sufficient supply of clean and potable water is available and regularly checked and maintained. 5. Choose appropriate bedding material for your enterprise to control mastitis and promote cow comfort.

3.2 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	Objectives	Best Practices
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.	1. Grow from within your herd. 2. Establish a list of suitable suppliers if there is an acute need for expansion. 3. Plan your introductions. 4. Transport cattle in clean vehicles with no other animals.
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. Semen and embryos are sourced from known and reputable suppliers.	1. Conduct pre-purchase testing and examination. 2. Ask for a vendor's declaration as to the origin of the animal(s), their health, and vaccination status and treatment history. 3. Consult with your herd veterinarian before purchase. 4. Know the health status of semen, embryos and breeding bulls prior to purchase.
3. Segregate, isolate and monitor	Cattle introduction into the resident herd is controlled 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.	1. Isolate incoming and returning cattle in a designated area. 2. Observe and examine new purchases and returning cattle frequently for early disease detection.

Strategy	Objectives	Best Practices
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.	1. Conduct post-purchase/returning animal testing. 2. Vaccinate to align with the resident herd's vaccination program. 3. Adequately treat or cull.
5. Record location and movement	Traceability methods and systems are used to record premises' identification, track location and movement of animals, and maintain a link to their herd and their health status.	1. Identify all cattle at birth with an approved national ear tag in accordance with the National Livestock Identification for Dairy (NLID) program. 2. Work with your province to identify all premises. 3. Document all cattle movements and disposals.
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.	1. Map the layout of your dairy facility, identifying the various production areas, and develop a flow chart of animal movement within the facility. 2. Using the map, divide the facilities, management activities and animal production areas into low, medium and high risk categories. 3. Work with a veterinarian to establish the points of elevated risk and the order in which common/frequent movement of cattle should ideally occur within the production unit. 4. Include biosecurity concerns in expansion, remodelling or new construction activities.

3.3 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	Objectives	Best Practices
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.	1. Know your disinfectants, and how and when to use them. 2. Have an appropriate disinfectant(s) as well as the required tools available for cleaning and disinfecting footwear, clothing and equipment. 3. Store all chemicals away from cattle and feed. 4. Train all personnel in general sanitation and hygiene procedures.
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.	1. Designate a cleaning and disinfection area for vehicles and equipment. 2. Keep vehicles and equipment clean.
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, the milking parlour, and water and feed areas, are cleaned and disinfected in keeping with the farm's planned schedule. Facilities are maintained in good repair.	1. Develop a cleaning and disinfection program for your production facility. 2. Ensure facilities are clean and dry. 3. Complete regular facility maintenance.

Strategy	Objectives	Best Practices
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 acceptable manner. A regular program of pest control is followed.	1. Develop a manure management plan to address collection, handling, storage and disposal. 2. Develop and implement a written plan for holding and disposing of deadstock. 3. Develop and implement an integrated pest management program.

3.4 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	Objectives	Best Practices
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.	1. Limit nonessential traffic on the farm. 2. Conduct a risk assessment of all visitors. 3. Keep a record of all visitors and deliveries.
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.	1. Require that all visitors and service personnel put on clean clothing and footwear when entering the production areas. 2. Ensure all farm workers use dedicated farm-specific clothing and footwear. 3. Provide the necessary facilities for farm workers, visitors and service providers to change into clean clothing and footwear and wash hands.

Strategy	Objectives	Best Practices
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.	1. Control vehicle and equipment access to the farm. 2. Control traffic patterns 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.	1. Involve your entire farm team in the design of the biosecurity plan. 2. Train and educate your personnel. 3. Include your herd veterinarian in the development and delivery of training for farm workers. 4. Communicate your plan. 5. Regularly review your biosecurity plan and update at least annually.

Control Area 1: Animal health management

Strategy 1: Maintain a client-veterinarian relationship

Section 3.4 of the Dairy Farmers of Canada *Code of Practice for the Care and Handling of Dairy Cattle* requires producers to establish a working relationship with a practicing veterinarian. To align with this code, the *National Standard* and Planning Guide recommend a broadly-based relationship with your veterinarian that will reflect the specific needs of your herd.

Best Practice 1: Develop a relationship with a veterinary practice.

- Establish a working relationship with your herd veterinarian through regular on-farm and off-farm consultations.
- Routinely discuss issues related to herd management, including herd health assessment and monitoring, and biosecurity planning.
- Engage the expertise of a veterinarian for disease diagnosis, treatment plans and any other emergency veterinary services.
- Report any suspicious disease symptoms to your veterinarian and the Canadian Food Inspection Agency (CFIA) if there is concern of a Reportable and/or Foreign Animal Disease (FAD).

Best Practice 2: Implement an animal health management plan in consultation with your herd veterinarian.

- Design an Animal Health Management Plan with your veterinarian.

Table 1 outlines some important areas to consider in the preparation of your Animal Health Management Plan. The specific details for each area will be unique to your farm.

An Animal Health Management Plan may consider:

• routine health assessment of cattle	• common diseases and disease frequency on the farm
• individual animal health and production records	• risk tolerance of the operation for disease outbreaks
• animal additions and re-entries	• disease monitoring/testing strategies

• animal movement patterns on the farm	• evaluation of disease records to monitor new disease entry onto the farm
• animal housing layout	• isolation of sick animals
• animal nutrition	• treatment protocols for common diseases on the farm
• calving management	• evaluation of effectiveness of treatment protocols
• colostrum management	• meat and milk withholding times
• fresh cow management	• strategy to deal with a serious outbreak of disease on the farm
• mastitis prevention and treatment strategy	• culling strategy
• vaccination strategy for various age groups	• euthanasia protocol and guidelines for decision-making
• proper storage for vaccines and drugs	• regular (annual) review of the plan
• the need for specific considerations for organic status	• staff training

- Review this plan at least annually with your veterinarian and make adjustments as required depending on the changing needs of your farm.

Strategy 2: Observe, record and evaluate

Individual records are kept for all cattle, especially with respect to production. This strategy recommends that you collect health and disease information for all your cattle and have all of the individual animals' records accessible in an integrated manner. This is of benefit, as it not only provides a central source of information for regular monitoring, but also assists with disease analysis, traceability and on-farm management changes.

Best Practice 1: Monitor animal health daily and maintain individual animal health and production records.

- Observe all animals at least once daily. This may be completed during milking for lactating cows. Attention should be paid to:
  - attitude and behaviour

- rumen fill
- gait
- body condition
- temperature
- interaction with other animals

- Ensure all staff involved in daily monitoring know what to assess each animal for, the steps to take when there is suspicion that an animal may be exhibiting signs of disease and the overall importance of early detection of infectious disease.
- Collect production information for each animal, such as milk production, reproductive history (number of times bred and success, calving) and feed consumption.
- Collect health information for each animal that includes:
  - notable observations from routine monitoring
  - health concerns
  - vaccinations, deworming and any other disease prevention measures
  - disease testing and diagnosis
  - treatments applied and response
- Integrate the production data with the animal health information for each animal's records.
- Compile all of the records for the herd into one central source that is easily accessible to you, your staff and any service provider (e.g. herd veterinarian, nutritionist).

Best Practice 2: Keep detailed records of all sick animals.

- Document the following information for each disease occurrence:
  - clinical signs
  - observations from ongoing monitoring
  - test(s) completed including laboratory reports and analysis
  - diagnosis
  - treatment methodology
  - outcomes (e.g. success, failure, repeat treatments) of the intervention
- Incorporate the above records with each individual animal's health records.

Best Practice 3: Review these records regularly with the herd veterinarian to evaluate disease trends and the effectiveness of treatments

- Review records regularly to establish a complete picture of the herd's performance.
- Consult with your herd veterinarian if you have questions regarding observations or record analysis results in order to determine which direction you should take to address a specific health or production issue (e.g. treatment, vaccination, culling).
- Use these records when reviewing and reassessing management strategies, including your animal health management plan and biosecurity plan.

Strategy 3: Recognize susceptibility and maintain separation

Your cattle are more susceptible to disease at certain stages of their life and in certain production conditions. Feed requirements, housing, and vaccination practices also differ in these stages. Separating cattle in these groups reduces the possibility of disease transmission from a lesser to a more susceptible group and allows management efforts to be targeted to the needs of that group.

Best Practice 1: Separate cattle based on age and stage of production.

- Establish groups of cattle on your farm based on age and production. Suggested groups include milking cows, heifers, and pre- and post-weaned calves.
- Using the farm diagram in section 2, identify where each group is housed.
- Limit contact between each group by ensuring that there is sufficient space between the groups and that the pathways used within the housing area do not provide opportunity for direct or indirect contact.
- If feasible, raise heifers off-site from the rest of the herd and treat these animals as new arrivals when returning to the herd.
- Use separate vehicles for mature cattle and younger cattle to avoid commingling groups of different susceptibility.

Best Practice 2: Separate the maternity area from the hospital area.

- Establish separate areas for:
  - cattle under treatment
  - suspected diseased cattle (e.g. those exhibiting clinical signs)
  - maternity pens
  - calf-rearing
- Using the farm diagram in section 2, identify each housing area.
- Limit direct and indirect contact both between these groups of animals and with the remainder of the herd.
- Have dedicated feed, water, bedding and equipment for each area.

Best Practice 3: Segregate pre-weaned calves and have dedicated feed, treatment and cleaning equipment.

- Have a separate area for pre-weaned calves that prevents contact with other groups of animals on the farm.
- Use dedicated feed, water, bedding and equipment for this area.

Strategy 4: Regularly monitor and investigate sickness/death

Early detection of disease is important because it allows the appropriate intervention measures to be undertaken in a timely manner. Isolation of suspected cases, appropriate diagnostic testing, and targeted treatment measures should follow and have a higher likelihood of success if initiated in a quick, and organized fashion.

Best Practice 1: Isolate sick cattle from the remainder of the herd in a hospital pen and seek veterinary advice.

- Routinely check cattle for signs of sickness to detect diseases early.
- Attend to sick cattle quickly and house in the isolation area away from the remainder of your herd to prevent the spread of disease.
- Create an isolation area, over and above the hospital area, for cattle that are showing signs of a disease or that are known to have been exposed to a disease.
- Restrict access to your isolation area(s) to assigned personnel and their essential equipment. This is one of your most potentially infectious areas.
- Post signs explaining the purpose of the isolation area and directing all but assigned personnel to stay away. Reinforce signage with verbal communication to all staff.
- Build the isolation area with materials that are easily cleaned and disinfected. Smooth, impermeable material with limited seams and other openings are less likely to harbour pathogens and can be cleaned more effectively.
- Provide feeders, waterers and grooming equipment in the isolation area(s) that are not shared with other cattle.
- Allow for degrees of isolation that address the method of disease transmission for which you are concerned. For example:
  - for respiratory diseases, isolated cattle should not share the same airspace with resident cattle.
  - for BVD, isolated cattle should not be able to touch resident cattle.
- Contact your herd veterinarian for assistance with sick animals, including cases of unusual sickness.
- Observe cattle in the isolation area frequently (at least twice daily is recommended).
- Assign responsibilities for the care of the isolated cattle.
- Regularly remove all manure, straw and other materials that could have been contaminated by an infected animal. Fully clean the facility, including the water bowls and feed troughs after each use.

Best Practice 2: Perform diagnostic tests (milk culture, serology) as required on sick animals.

- Work with your herd veterinarian to determine the most appropriate diagnostic tests.
- Submit samples to an accredited veterinary laboratory for analysis.

Best Practice 3: Develop a protocol to screen for diseases of interest (BVD, Johnes).

- Based on your diseases of concern, establish a protocol for routine testing of your herd.
- Discuss testing with your herd veterinarian to determine the most appropriate tests given your herd demographics.
- Establish a response plan for abnormal test results. This could include:
  - isolation of affected animals
  - follow-up testing
  - prophylactic treatment of unaffected cattle (e.g. vaccination, deworming)
- Ensure that all testing is completed at an accredited veterinary laboratory.

Best Practice 4: Maintain treatment protocols as required by the Canadian Quality Milk (CQM) program.

- Use the CQM templates as a guide for establishing treatment records.
- Work with your herd veterinarian to write treatment standard operating procedures (SOPs) for each condition to be treated.
- Establish criteria for when to contact your herd veterinarian for additional diagnostics or for changes to treatment SOPs.
- Use the "lessons learned" from each disease occurrence to make the appropriate changes to the current treatment regimes.

Best Practice 5: Develop a response strategy in case of a serious disease outbreak.

- Determine the disease situations that could require additional interventions. Examples include:
  - any occurrence of a federally reportable disease or Foreign Animal Disease (FAD)
  - an outbreak of any highly infectious endemic disease
  - a sudden occurrence of high morbidity or mortality of undetermined cause
- Establish data points for monitoring. When these points are noted, they may initiate further response activities for mitigating potential disease transmission risk. Examples include:
  - significant drop in milk production
  - decreased feed consumption
  - observation of specific clinical signs (e.g. blisters around the mouth)
- Have a written emergency response plan that outlines the sequence of response activities that should be undertaken. This plan should include enhanced biosecurity measures.
- Report any suspicious disease symptoms to your veterinarian and the Canadian Food Inspection Agency (CFIA) if there is concern of a federally reportable disease and/or FAD.

Strategy 5: Manage feed, water and bedding

Farm inputs such as feed, water and bedding have the potential for the introduction and spread of pathogens. The key activities monitor these farm inputs to ensure that they do not contain or become contaminated with pathogens, chemicals or animal materials. Where farm inputs are purchased and, how they are handled, managed and stored, may have an impact on animal and human health.

Best Practice 1: Ensure traceability of all feedstuffs coming onto the farm.

- Purchase feed from reputable suppliers who maintain a Hazard Analysis Critical Control Points (HACCP) Program with a biosecurity component.
- Keep a log of all feed and feed ingredients received on the farm.
- If feed is produced on the farm, be able to identify all treatments applied to your crops (e.g. pesticides, fungicides).

Best Practice 2: Control storage conditions and management of feed.

- Minimize feed contamination on the farm by using proper storage facilities that prevent access of birds, dogs, cats, cattle and other wildlife.
- Label all chemicals, pesticides and medications appropriately and keep in a separate area from feed.
- Establish storage facilities for feeds for various classes of dairy cattle to avoid errors in feeding practices. Store medicated feeds separately from non-medicated feeds.
- Clean all storage areas (silos, bins and commodity sheds) between batches of feed.
- On a daily basis, clean feed bunks/mangers of feeds not consumed and other sources of contamination and pick up any spilled feed.
- Clean and disinfect equipment used for feed handling prior to use if it has previously been used for non-feed purposes (e.g. manure handling).
- Ensure all feed mixing and delivery equipment is cleaned out between uses.

Best Practice 3: Ensure and maintain feed quality and safety.

- Have a feeding plan for each production class (calves, heifers, dry cows, pregnant cows and milk cows).
- Routinely test all feeds for nutrient content as recommended to provide consistent and adequate cattle nutrition. Rebalance rations as necessary.
- Keep a record of feed testing results.
- Ensure dairy feeds are in compliance with Federal regulations regarding the prevention of Bovine Spongiform Encephalopathy (BSE), which prohibit the feeding of animal materials to ruminants.
- Rotate inventory to limit feed spoilage among stored feeds.
- Avoid storing feed refusals for more than 24 hours prior to feeding to prevent spoilage.
- Only provide feed refusals to those of lowest disease susceptibility.
- Where feasible or when high risk types of feeds are used, keep a frozen sample of all feed batches for at least 6 to 9 months in case there is a need to analyze the batch for possible contamination related to a suspected problem in the herd.
- Examine feedstuffs closely for contamination and spoilage before feeding. Reject feeds with visible mould, contamination, spoilage, unexplained discoloration or unusual odour.

Best Practice 4: Ensure that a sufficient supply of clean and potable water is freely available and regularly checked and maintained.

- Preferably use municipal or borehole/deep well water sources.
- If using surface water (ponds, streams), ensure water is treated effectively to destroy any pathogens.
- Maintain treatment units and routinely check for effectiveness.
- Protect water supply areas (well area, ponds and streams) from fecal and chemical contamination.
- Restrict dairy cattle from drinking from ponds, bogs and streams, which can easily become contaminated with manure and other run-off contaminants.
- Test water annually or more frequently if there is a problem, using a provincial or reputable private laboratory.
- Record water test results or any problems with water quality.
- Ensure there is sufficient access to water so that all cattle have a continuous supply of clean, fresh, uncontaminated water.
- Position waterers for easy and safe access for cattle.
- Design and install waterers to reduce the risk of contamination and allow for easy cleaning.
- Have procedures in place for regular (daily or weekly) cleaning of waterers (tanks, troughs, bowls and buckets).
- Disinfect waterers at least twice per year using an approved product.
- Provide adequate drainage in cattle-holding areas to minimize the pooling of water, manure and urine.

Best Practice 5: Choose appropriate bedding material for your enterprise to control mastitis and promote cow comfort.

- Provide adequate bedding to keep all cattle clean, dry and comfortable. Replace regularly.
- Source bedding from a reputable supplier who provides a consistently clean, dry product free from contamination.
- Examine bedding at source or before use for freedom from mould, other contamination or extraneous material.
- Store bedding in a dry area protected from access by dogs, cats, cattle, vermin, wildlife and pests.

Control Area 2: Animal additions and movement

Cattle may be added to the herd to increase the size of the herd, meet quota requirements, replace cattle lost due to disease or injury, account for low reproductive performance or address an aging herd. Regardless of the reason, bringing new animals onto your farm poses one of the greatest risks of introducing infectious diseases. It is critical to consider biosecurity practices to mitigate these risks.

Keeping a closed herd is one way to protect cattle, and it is a best practice to keep the herd closed whenever possible.

Before adding any cattle to your herd, it is beneficial to determine the underlying reasons contributing to the need to acquire additional animals. Whenever possible, consider whether alternative solutions could eliminate the need for new animals.

However, when cattle must be added to the herd, it is important that you plan the introductions and utilize the best management practices outlined below.

Strategy 1: Limit purchases and number of sources

Acquiring cattle and introducing them into your herd is a major risk factor for introducing disease-causing organisms onto your farm. You can reduce this risk by limiting the number of cattle you acquire, the frequency of introduction and the number of sources.

Ideally: Operate a closed herd

In a "closed herd", the herd is repopulated only with animals bred on the farm under common biosecurity and health management conditions. Cows, bulls, calves or heifers are not brought to the farm for any reason, and they are not returned to the farm if they are removed for any reason.

Operating a closed herd requires production practices that eliminate the need for new production animals to be brought into the herd, while ensuring that quota can be met with the existing herd management program. The herd management program may include the purchase of semen and embryos, under suitable biosecurity conditions, that would provide for herd additions and allow genetic planning for the herd.

Information on planning and managing a closed herd can be acquired by contacting your provincial dairy association, or by talking to your veterinarian. Although operating a closed herd has many biosecurity benefits, the practice in itself cannot be the only disease prevention practice on the farm.

Best Practice 1: Grow your herd from within.

It is understood that, in many instances, operating a closed herd at all times is not realistic. If live cattle are to be introduced, the following best practices should be considered.

Best Practice 2: Establish a list of suitable suppliers if there is an acute need for expansion.

- Assess every supplier by asking the following questions:
  - What is the current and past health status of their herd? Can this be supported by evidence such as disease records, treatment records, veterinary visits, and laboratory testing records?
  - What biosecurity practices do they employ?
  - Do they provide documentation with their cattle?
  - Do they commingle animals from a variety of sources on the source farm or during transportation?
  - How do they transport their cattle?
  - How does the health status of the source herd compare with that of my own herd?
- Whenever possible, choose only known reputable suppliers with herds of equal to or higher health status than your own, and with disease monitoring and prevention programs.
- Maintain a relationship with the suppliers who have reliably sold you cattle in the past that were of low disease risk.
- Avoid purchasing animals from unknown sources or commingled sources, such as sales barns.
- Limit the number of sources.

Best Practice 3: Plan ahead for all additions.

- Review your records to determine your requirements for necessary additions in the coming months.
- Consolidate your inputs into a longer cycle, thereby reducing the number of times animals need to be brought in.
- Contact your supplier(s) in advance to ensure that your needs can be met.

Best Practice 4: Transport cattle in clean vehicles with no other animals.

- Purchase and transport directly from the farm of origin.
- If feasible, transport purchased cattle or show animals in farm-owned trucks or trailers.
- If using a commercial or shared vehicle, ensure that the vehicle is thoroughly cleaned and disinfected prior to use.
- Avoid commingling animals from other sources during transport.
- Ensure all vehicles are cleaned and disinfected after each use.

Strategy 2: Know health status of purchased animals

The key to safely acquiring new animals is not to purchase only disease-risk free cattle – this can be difficult to ascertain and is impractical in most cases. Rather, you need to conduct a risk assessment to determine the likelihood that an animal has or may be carrying a disease(s). Complete and reliable information of an animal's current health status, its disease history and the status and history of the herd of origin is invaluable for this risk assessment. This provides a basis for your decision-making regarding the purchase of the animal, and the risk mitigation steps needed if that animal does come onto your farm.

Best Practice 1: Conduct pre-purchase testing and examination.

- Where possible, test animals prior to purchase, as recommended by your herd veterinarian. Testing should be based both on your diseases of concern and the health history of the animal and farm of origin.
- Inspect each animal prior to purchase on the farm of origin to assess their health status.
  - Look for hairy heel warts, foot rot and lameness.
- If possible, complete pre-purchase testing of all animals for:
  - Bovine Viral Diarrhea (BVD) virus
  - Bovine Leukosis Virus (BLV)
  - *Mycobacterium avium paratuberculosis* (Johne's disease)
  - *Staphylococcus aureus, Streptococcus agalactiae or Mycoplasma bovis* mastitis
- Use the guidelines from the Canadian Bovine Mastitis Research Network (CBMRN) for milk sampling.
- Have your herd veterinarian examine all new cattle immediately prior to introduction to your herd.

Best Practice 2: Ask for a vendor's declaration as to the origin of the animal(s), their health and vaccination status, and their treatment history.

- Gather information on an animal's current and past health status. Information of relevance includes:
  - disease history
  - vaccination status
  - laboratory results
  - treatments administered
  - transportation history
  - health status of the herd of origin, including disease history and vaccination program
- Assess the validity of the information. Ideally, there should be full disclosure and the documentation provided should be verified by their herd veterinarian.
- Ask for a vendor's declaration as to the property of origin and the health status and treatment history of the new stock.
- Ensure cattle identification can be cross-referenced to the property of origin for traceback purposes.

- Keep records of all new cattle introductions, including their health status, point of origin, identification numbers, point of purchase and method of transport.

Best Practice 3: Consult with your herd veterinarian before purchase.

- Review all information from the source herd with your herd veterinarian to assess the risk of purchasing each animal and introducing it to the herd.
- Request that your herd veterinarian be permitted to talk to the seller's veterinarian prior to purchasing cattle.
- Work with your veterinarian to determine an appropriate introduction strategy to address the potential risks. These recommendations could include testing, treatment, vaccination and isolation requirements.
- Complete a cost-benefit analysis relative to the price of the animal to decide whether or not to purchase the animal.
- Choose not to buy an animal that requires significant treatment and protracted isolation. This may be especially true when documentation is not available, or when you suspect it is not complete or accurate.

Best Practice 4: Know the health status of semen, embryos and breeding bulls prior to purchase.

- Inquire about biosecurity practices when choosing a commercial semen and embryo supplier. Specific details to discuss include:
  - disease testing practices
  - incidence of specific diseases
  - response to disease cases
  - participation in certification programs
- Request all supporting records and documentation.
- Purchase semen from known sources with certified production techniques.
- Keep semen tanks locked and allow only qualified people to handle semen.
- Consider the best practices in the first two sections – those related to purchase of cattle for all purposes – and also some elements related to semen – when purchasing breeding bulls.
- Use the information provided by the breeding bull vendor to determine if the bull presents excessive risk to your herd or if it would be a valuable addition to your herd. This information includes:
  - lineage of the bull
  - breeding soundness evaluations
  - individual and herd health records
  - additional test data regarding reproductive-related diseases

Strategy 3: Segregate, isolate and monitor

Once the decision has been made to introduce or re-introduce an animal(s) onto your farm, there should be a period of isolation and frequent monitoring. This will allow for early disease detection and response and ensure that there is a low risk of disease introduction into your herd.

Best Practice 1: Isolate incoming and returning cattle in a designated area.

- Designate an isolation area for incoming and returning cattle that is separate from other isolation areas (e.g. for sick animals or those under treatment).
- Determine the requirements for your isolation area based the mode(s) of transmission for your disease(s) of concern.
  - Cattle should be prevented from nose-to-nose contact (a minimum distance of 3 metres is recommended).
  - To prevent aerosol transmission, isolated cattle should not share the same airspace with resident cattle.
- Have dedicated isolation area feeders and waterers as well as equipment.
- Clean and disinfect the isolation area regularly and after each use. Promptly remove all manure and other wastes.
- Have farm workers who are handling these animals wash their hands, change their clothing and clean their footwear before working with other animals on the farm.
- Hold new cattle and returning resident cattle in isolation for 14 to 30 days or until surveillance and/or treatment/vaccination indicates a low disease risk.
  - Timing needs to be sufficient in order to receive any test results, observe clinical signs of disease, and apply appropriate preventive health measures.
    - Bacterial culture of milk and blood testing for specific diseases typically requires 14 to 30 days.
    - The incubation period for many cattle diseases is two-three weeks or less.
    - It is important to note the incubation period for some diseases is prolonged, and it is also possible for cattle to be asymptomatic carriers of certain diseases. In these instances, specific biosecurity measures to reduce the risk of disease introduction should be discussed with your herd veterinarian.
  - If cattle are re-entering or coming from known sources of equal or higher health status, 14 days is usually adequate.
  - If cattle are coming from an unknown source, have been commingled or imported from a foreign country, a minimum isolation time of 30 days is more appropriate.
- If feasible, isolate animals from different source herds separately.
- If lactating cows are introduced, establish a plan for milking. Ensure that the cattle in isolation are milked last, and that all equipment is cleaned and disinfected prior to its next use with the home herd.

- Reduce the risk of reintroducing cattle when off-farm by incorporating biosecurity measures into your off-farm activities (e.g. shows, fairs). It is recommended to:
  - inquire about any biosecurity requirements at the off-site location.
  - limit contact between your cattle and cattle, manure, bedding and other products from other farms.
  - require that anyone who needs to contact your cattle wash or sanitize their hands first.
  - bring and use only your own feed, watering equipment, bedding and grooming or handling equipment.
  - transport cattle in clean, farm-specific vehicles.

Best Practice 2: Observe and examine new purchases and returning cattle frequently for early disease detection.

- Observe and examine new additions frequently (at least twice daily).
- Create written protocols for monitoring. Consider monitoring:
  - temperature
  - attitude
  - feed consumption
  - clinical signs of disease (e.g. coughing, lameness)
- Record monitoring results and note any abnormalities in the animal's health record.
- Identify and train the staff who will monitor the animals.
- Have a plan to respond to any abnormalities.

Strategy 4: Test, vaccinate and/or treat

Ensuring that cattle new to your herd or re-entering your home herd are tested for diseases of concern, vaccinated and/or treated for any anticipated disease risk is a key step. The more complete your knowledge of the individual animal's health and disease history as well as the source herd's health and disease status, the more specific your testing and treatment can be.

Best Practice 1: Conduct post-purchase/returning animal testing.

- Follow a disease-testing program for new arrivals that is similar to the resident herd's program.
- Test herd additions as recommended during the isolation period and analyze the results before introducing them to the herd.
- Consult with your veterinarian about your disease-testing program, including interpretation of results.
- Collect and submit the appropriate samples as soon as the animals arrive in isolation, as it can take an extended period of time to receive test results depending on which tests are completed.
- If pregnant heifers are purchased, test both the dam and calves born subsequently to purchase for BVD virus to prevent the introduction of a persistently infected calf to the herd.
- Include embryo transfer recipients in your testing program.

Best Practice 2: Vaccinate to align with the resident herd's vaccination program.

- Consult with your veterinarian about your routine and purchased-animal vaccination programs.
- Initiate a vaccination (booster) series for new additions to match your herd's vaccination program.
- Vaccinate new additions while they are in isolation.
- Vaccinate your home herd, if required, according to your herd veterinarian's and the manufacturer's recommendations before introducing the new cattle into your herd.

Best Practice 3: Adequately treat or cull.

- Run purchased cattle through a medicated foot bath when they arrive at the home farm and repeat for 2-3 days after arrival.
- Complete a thorough diagnostic work-up for any new additions that become ill shortly after purchase. Rapid early detection can help prevent the initial case of a disease from spreading into the resident herd.
- Ensure appropriate treatment or cull, depending on the results of the diagnostic work-up. Discuss the potential options with your herd veterinarian.

Strategy 5: Record location and movement

Animal identification is a fundamental component of livestock traceability. The Canadian Cattle Identification Program (CCIP) was established by cattle producers in 2001 and is mandatory for all dairy cattle leaving their herd of origin. Each head of cattle in Canada must have a Canadian Cattle Identification Agency (CCIA) approved ear tag. All tags are visually and electronically embedded with a unique identification number. The unique identification number is allocated by the CCIA for most provinces in its national database, except Quebec, where the identification program is managed by Agri-Traçabilité Québec (ATQ). The unique number of each individual animal is maintained throughout its life, to the point of export or carcass inspection.

The purpose of the program is to be able to identify animals and their origins during an animal health or food safety event and maintain export markets. The dairy industry in Canada has developed the National Livestock Identification for Dairy (NLID), which meets the requirements of the national identification program, with additional rules to better suit the industry.

Best Practice 1: Identify all cattle at birth with an approved national ear tag according to the NLID program.

- Tag all (registered and unregistered) cattle shortly after birth.
- Identify all cattle with an approved ear tag before leaving the farm of origin.
- Identify all imported cattle, other than those for immediate slaughter.
- Link identification to existing databases for milk recording, production, genetic evaluation and herd health records.

Best Practice 2: Work with your province to identify your premises.

- Identify all premises where cattle are housed, including secondary sites such as heifer barns and dry cow facilities.
- Register this information with your province.

Best Practice 3: Document all cattle movement and disposals.

- Keep records of all cattle purchases, cattle sales and removal of deadstock.
- Communicate all movement of cattle to the ATQ and CCIA.
- Maintain records for a minimum of 24 months after shipment.

Strategy 6: Manage movement within the production unit

It is crucial to consider the physical location of various groups of animals. Their proximity to others, their location relative to traffic barriers, and the air movement in the area, all impact the risk of disease transmission. Supporting information for these best practices has been provided in Section 2: Laying the Foundation of Your Biosecurity Plan.

Best Practice 1: Map the layout of your dairy facility, identifying the various production areas, and develop a flow chart of animal movement within the facility.

Preparing a list of these areas and pathways, and/or locating them on a sketch of the production area will be useful in illustrating where there are areas of greater or lesser risk for disease transmission, and therefore where biosecurity best management practices must carefully be considered.

- Refer to Section 2.2: Create a farm diagram to map the layout of your dairy facility.
- Identify all separate areas within the production area.
- Mark pathways that are used for the most common animal movements.

Best Practice 2: Using the map, divide the facilities, management activities and animal production areas into low, medium and high risk categories.

- Refer to Section 2.3: Designate Biosecurity Zones.
- Identify risk points that bring animals of lower disease susceptibility into contact or close proximity with animals of higher disease susceptibility or unknown disease status. These may include:
  - housing arrangements or movement pathways within the production area
  - pastures with fencing that does not limit nose-to-nose contact
  - community pastures

- Review handling and processing practices to identify any that may increase the risk of spreading disease among production groups.
- Assign risk categories based on the likelihood of disease transmission.

Best Practice 3: Work with a veterinarian to establish the points of elevated risk and the order in which common/frequent movement of cattle should ideally occur within the production unit.

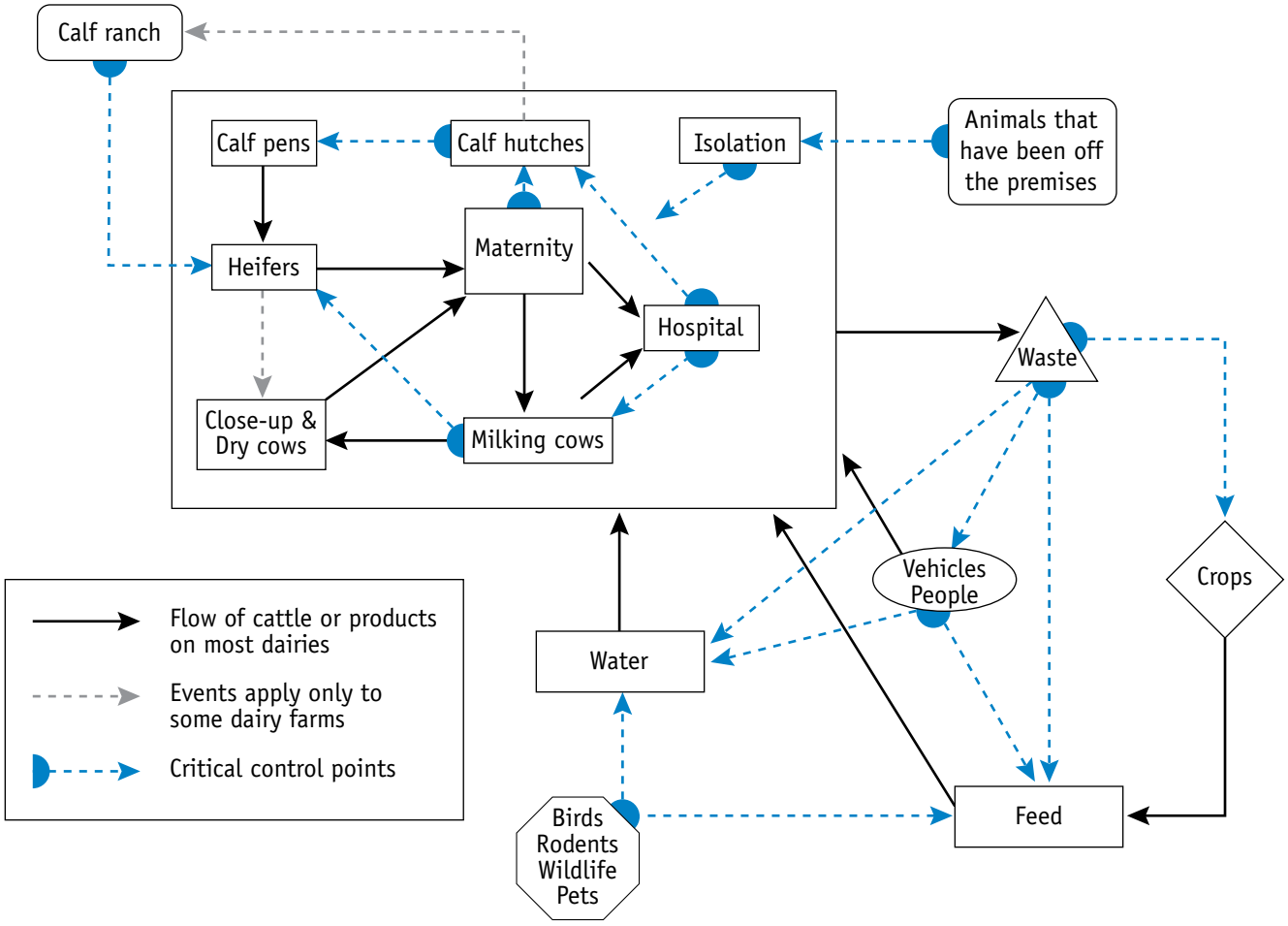
- Identify areas that require specific practices to reduce the risk of disease transmission. For example:
  - access and handling limitations
  - redirection of movement pathways
  - more frequent or specialized cleaning and disinfection practices
  - change of clothing and footwear
  - hand washing
- Establish the order in which the common animal movement and animal handling should occur. This is based on susceptibility and disease status and generally follows the pattern of:
  - younger to older
  - healthy to diseased
  - more susceptible to less susceptible
- Ensure that all movement pathways prevent direct contact with other groups of cattle, as well as indirect contact with their manure or excretions.

For more information on pathways and points of elevated risk, please see Figure 3.

Best Practice 4: Include biosecurity concerns in expansion, remodelling or new construction activities.

- Consider biosecurity when you are renovating or undertaking new construction activities. Some relevant questions to ask include, but are not limited to:
  - Does the layout and design support biosecurity (i.e. appropriate flow of animals and people through the facility, ability to adequately segregate different groups of cattle)?
  - Will the materials and surfaces permit effective cleaning and disinfection?
  - Will appropriate facilities be installed for biosecurity measures (i.e. hand washing stations, areas for cleaning and disinfecting equipment)?
  - Can access be sufficiently controlled?

Figure 3: Risk areas, routes of travel and critical control points of a dairy operation



This figure expands upon the concept of identifying the risk areas and routes of travel on a dairy operation. Specific points (areas or activities) where there is elevated risk of disease transmission are labelled as critical control points. Additional biosecurity measures are indicated in these areas or for these activities.

Within the dairy barn, the risk areas are the calf pens, calf hutches, heifer housing, close-up and dry cow pens, maternity pen, milking cow housing, hospital pen, and isolation area. Cattle and cattle products may flow between these areas. The critical control points are from milking cows to close-up

and dry cows, from the hospital to the milking cows, from the maternity pen to the calf hutches to the calf pens and any flow from the isolation area.

Outside the dairy barn, there is the calf ranch, animals that have been off the premises, waste storage, vehicles and people, crops, feed, water, birds, rodents, wildlife and pets. Again, cattle and products flow between these areas, as well as into the barn. The critical control points are from the calf ranch to the heifer housing, from animals that have been off the premises to the isolation area, and any flow from waste storage, vehicles, people, birds, rodents, wildlife and pets.

This figure was developed by Aurora Villarroel, David A Dargatz, V Michael Lane, Brian J McCluskey, and Mo D Salman in their article Food for Thought for Food Animal Veterinarians: Suggested outline of critical control points for biosecurity and biocontainment on large dairy farms, Journal of the American Veterinary Medical Association (JAVMA), 2007; 230:808. It has been reproduced and translated by CFIA with permission from the authors and the Journal of the American Veterinary Medical Association.

Control Area 3: Premises' management and sanitation

Cleaning and disinfection are key factors in minimizing the introduction and spread of infectious disease. Dairy producers understand sanitation practices, especially relating to the management of their milking operation and the quality of their product, and most include premises' management and sanitation in their standard operating procedures. Biosecurity builds upon these procedures to more widely applied day-to-day sanitation practices, with additional attention on the management of manure, deadstock and pests.

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

Premises' management and sanitation are advanced by day-to-day, regular activities that can be undertaken by all farm workers. The first step to effective cleaning and disinfection is choosing a disinfectant that is adapted to each situation and then ensuring that it is used appropriately.

Best Practice 1: Know your disinfectants, and how and when to use them.

Choosing a disinfectant can be a complex process. All disinfectants have strengths and weaknesses. Those that are excellent against bacteria may not be the product of choice against fungi, protozoa or viruses. Therefore, a single disinfectant cannot match all the different sources of contamination existing on a dairy farm. Ease of application and safety are also major considerations.

- When choosing a disinfectant, consider the following to determine if the disinfectant is appropriate for the intended use:
  - spectrum of activity (i.e. what bacteria, fungi, viruses will it eliminate?)
  - surfaces/materials on which it can be used
  - activity in water of different temperatures or mineral contents
  - compatibility with other disinfectants and soaps
  - animal safety, including use on feeding equipment or watering systems
  - human safety
  - residual activity
  - environmental impact, including method of disposal
- Consult your herd veterinarian or industry representative for recommendations.
- Only use disinfectants approved for use in dairy production.

- Always follow the manufacturer's directions. Read all labels thoroughly and respect the product expiry date.
- When preparing and using a disinfectant, ensure:
  - proper dilution
  - thorough removal of all surface gross contamination and organic debris prior to application
  - appropriate environmental conditions (e.g. surface material, temperature)
  - adequate contact time
  - complete rinsing (if required) and drying
- Use personal protective equipment where warranted.
- Dispose of any remaining disinfectant as directed.
- Follow any local or provincial regulations regarding the application and disposal of the disinfectant to ensure compliance with environmental and health and safety regulations.

For information on animal facility disinfectants, there is a searchable database on the CFIA website, accessible at: http://www.inspection.gc.ca/english/fssa/reference/refere.shtml. The North American Compendium provides label information for many disinfectants registered or sold in Canada.

Best Practice 2: Have an appropriate disinfectant(s) as well as the required tools available for cleaning and disinfecting footwear, clothing and equipment

- Ensure that the chosen disinfectant is readily available for use.
- Provide the required supplies for cleaning and disinfecting, which may include:
  - a variety of brushes
    - long handled brush
    - boot brush
    - specialized brushes for equipment
  - rubber or plastic containers for
    - collecting disinfectant solution
    - washing tools
    - washing footwear
  - trash bags for disposable boots and coveralls
- Have designated locations where cleaning and disinfection can occur, including ample access to hot water, appropriate drainage and storage for cleaning supplies.

Best Practice 3: Store all chemicals away from cattle and feed.

- Store all chemicals in a secure location that prevents access to cattle and other farm animals.
- Ensure that the chemicals do not contaminate the food or water supply or the surrounding environment. Comply with all regulations.
- Label the location(s) of stored chemicals on the farm map.
- Maintain records of chemical storage and use.

Best Practice 4: Train all personnel in general sanitation and hygiene procedures.

Adequate training of personnel in cleaning and disinfection is equally as important as the disinfectant and supplies. Indeed, all of the components go hand in hand and effective cleaning and disinfection is not possible without both the appropriate supplies and technique.

- Foster an understanding of the importance of proper cleaning and disinfection by all personnel.
- Outline the roles and responsibilities of each team member for cleaning and disinfection.
- Provide training on:
  - disinfectant products and indications for use
  - appropriate procedures for preparation and use
  - safety precautions
- Have written supporting information readily available for reference by all staff.
- Record all training provided and monitor personnel uptake and compliance.

Strategy 2: Clean and disinfect vehicles and equipment

Vehicles and equipment can act as mechanical vectors for disease transmission. If contamination has occurred off of the premises and precautions are not taken prior to coming onto the farm, disease may be introduced. Similarly, if contamination occurs while on the premises, vehicles and equipment can facilitate the spread of pathogens around and off the premises. Biosecurity practices focusing on routine cleaning and disinfection need to be considered to mitigate this risk.

Best Practice 1: Designate a cleaning and disinfection area for vehicles and equipment.

- Provide vehicle wash points at all entry points to the production area for those vehicles that require access.
- Ensure that these wash points provide:
  - disinfectant(s)
  - high pressure wash
  - adequate water supply
  - ample drainage
  - appropriate waste disposal
  - tools for cleaning the exterior and interior of the vehicle

Best Practice 2: Keep vehicles and equipment clean.

- Wash all farm vehicles regularly, especially after visiting another farm or co-mingled site and before entering the production area.
- Keep the interior of cabs of farm vehicles clean and free of dirty coveralls, footwear, equipment, and other debris.
- Restrict visitor vehicle access to the production area. If access is required, ensure that any visitors' vehicles are appropriately cleaned, including the undercarriage, wheels and wheel-wells.

Ideally, the vehicle should be scraped, power-washed and disinfected.

- Clean and disinfect all livestock transportation vehicles before and after use.
- Whenever possible, use your own equipment.
- If you need to share or borrow equipment:
  - acquire only from a known source.
  - clean and disinfect prior to use on the farm, and before returning.
- Designate equipment for each production area.
- Have equipment for clean and dirty jobs (e.g. separate equipment for feed distribution and manure handling).
- Regularly clean and disinfect equipment, specifically:
  - before introduction to the production area
  - between use with different groups of cattle
  - after use, especially when dealing with sick animals, deadstock or manure
- Disinfect reusable equipment, such as tattooing pliers, nose tongs, halters, and clippers, before and after use.
- Use new disposable needles for each animal when administering treatments.
- Sanitize nursing bottles and buckets after each calf feeding.
- Maintain clean water troughs, bowls (waterers), and feed mangers.
- Store all equipment in a clean location.

Strategy 3: Clean, disinfect and maintain production facilities

Unlike many poultry and swine operations, dairy farms do not operate on an 'all-in, all-out' system. This may create some challenges for cleaning and disinfection. You need to design an effective cleaning and disinfection program that is compatible with your operating practices. Routine general cleaning and disinfection as well as more rigorous measures in high risk areas should be considered. Ongoing facility maintenance is also important.

Best Practice 1: Develop a cleaning and disinfection program for your production facility.

- Prepare a written program for each area of the farm that addresses:
  - routine day-to-day cleaning of the production area
  - conditions that initiate additional cleaning and disinfection
  - considerations for high risk areas, including the hospital pen, isolation area, maternity pen, milking area and calf housing
  - additional requirements if there is a suspected or confirmed disease outbreak
- Design protocols for cleaning and disinfection that involve:
  - pre-cleaning, i.e. removal of all organic debris
  - high pressure washing using hot water or steam, if applicable
  - application of an appropriate broad-spectrum disinfectant
  - proper contact time of the disinfectant on the surface

- thorough rinsing of the area, if required
- adequate drying time

- Develop a schedule for cleaning and disinfecting each area that matches your operating practices and production cycle.
- Outline the roles and responsibilities for all components of the program and provide training as necessary.
- Maintain records for cleaning and disinfection. Review regularly with health and production records to highlight any potential gaps in practices.

Best Practice 2: Keep facilities clean and dry.

- Practice routine day-to-day cleaning of the production area to remove any gross debris and contamination.
- Ensure that all milking facilities and equipment are regularly cleaned and maintained as recommended in the CQM.
- Clean and disinfect the following high risk areas after each use:
  - isolation area
  - hospital pen
  - maternity pen
  - calf housing
  - loading and unloading areas
  - delivery areas
  - alleyways and other animal pathways, especially when moving sick animals or animals with a higher susceptibility for disease
  - any other high-risk area of your farm
- Clean and disinfect the production areas routinely, especially after each stock batch or if there is a disease outbreak.
- Consider cleaning and disinfecting lower-risk areas such as walls, doors, partitions and other places that may harbour pathogens, at least twice per year, or more frequently if needed.

Best Practice 3: Complete regular facility maintenance.

- Design a farm maintenance schedule for regular repairs to ensure that the production facilities are safe and secure, especially from pests, vermin and wildlife.
- Maintain surfaces in good condition. Ideally, surfaces should be smooth and impervious to prevent pathogens from harbouring within them and facilitate effective cleaning and disinfection.
- Apply appropriate surface treatments that are safe for contact with cattle.
- When building a new facility or renovating a pre-existing facility, incorporate biosecurity into the design.

Strategy 4: Manage manure, waste, deadstock and pests

Manure, other wastes and deadstock may contain pathogens and therefore have the potential to spread disease both on the dairy farm and to other neighbouring farms. Additionally, these wastes can cause environmental damage. Producers should consider manure removal, deadstock management and waste handling as high-risk activities that, if managed correctly, bring high value to the ultimate success of the farm's biosecurity program. It is also important to note that, in some provinces, the manner in which manure, deadstock and farm waste are managed is highly regulated and producers are required to abide by those specific rules.

Dairy farming creates a favourable environment to attract pests. Pests represent a disease transmission risk and also need to be considered in a farm's biosecurity plan.

Best Practice 1: Develop a manure management plan to address collection, storage, handling, and disposal.

- Have an appropriate manure and waste management system for your enterprise.
- Schedule the regular removal of manure and wastes from barns, pens/stalls/hutches and pathways, as well as yards and holding areas. When possible, use removal lanes to avoid cross-contamination of manure and wastes with the areas in which animals are housed.
- Use dedicated equipment for manure handling. Clean and disinfect this equipment regularly, especially if it will be used for other purposes.
- Store manure and other wastes outside of the production unit (RAZ) in a covered and fenced area that prevents access by dairy cattle, people, pests and other animals.
- Handle manure and wastes from livestock trucks and isolation and hospital pens separately. Do not sell this manure.
- Compost manure under the appropriate pre-determined conditions designed to eliminate the growth and persistence of many pathogens.
- If spreading manure:
  - choose a location(s) away from your barn, production area and water source.
  - prevent cattle from grazing on pastures where manure or slurry has recently been applied.
  - allow sufficient time after spreading prior to harvesting crops.
- Maintain a log of manure and/or compost movements and sales from the premises.
- Ensure that all activities related to manure management adhere to provincial and municipal waste, agriculture and environmental regulations.

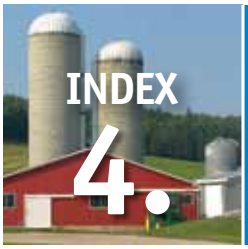
Best Practice 2: Develop and implement a written plan for holding and disposing of deadstock.

- Remove deadstock from the production area immediately.
- Limit exposure to other cattle and cross-contamination of the production area.
- Appropriately dispose of all contaminated bedding, animal products, manure or feed that was in contact with dead animals.
- Clean and disinfect the surrounding area and all equipment used during the removal of the carcass and contaminated material.

- Consider the cause of death when determining the most appropriate method of disposal. For example, special procedures apply for suspected cases of rabies, anthrax, BSE and some other diseases. Consult with your herd veterinarian to determine the appropriate course of action.
- If storing deadstock prior to pick-up by a rendering service:
  - locate the storage site in an isolated area outside of the production area.
  - secure the location to prevent access by dairy cattle, scavengers and wildlife to prevent further contamination.
  - establish transportation routes for pick-up that limit travel across the premises.
- If disposing of deadstock on-site:
  - designate approved burial sites and transportation routes. consider the location of important environmental sites like wells and waterways.
  - have protocols for composting and incineration.
- Ensure that all personnel take the necessary health and safety precautions when handling deadstock and associated materials, including:
  - wearing personal protective equipment.
  - cleaning and disinfecting clothing and footwear or dispose of afterwards.
- Adhere to municipal, provincial and federal regulations for on-farm deadstock disposal methods such as burial, incineration, and composting.
- Maintain records for all methods of disposal. Demonstrate your compliance with all regulations.

Best Practice 3: Develop and implement an integrated pest management program.

- Work with a reputable pest control company to establish and maintain an effective pest control program where necessary.
- Make buildings and barnyards unattractive to pests by:
  - maintaining facilities in good repair
  - securing entry points to animal housing areas, pens and barns
  - storing all feed in secure containers
  - regularly removing left-over feed, manure, debris piles, standing bodies of water and any decaying material
  - cutting grass and other forms of vegetation that may provide shelter
  - keeping garbage in sealed containers
  - promptly disposing of animal feed and milk waste
- Consider using specific interventions or a combination thereof, when necessary.
  - traps, baits, fly paper
  - insecticides
  - biological predators
- If feasible for the facility, prevent entry of birds by plugging all small and large nesting holes or perches, screening all openings used for natural ventilation and sealing off any openings into silos and ledges that may be used as nesting or roosting sites.
- Regularly inspect hay or bedding storage areas for evidence of pests.
- Restrict companion animals from the production area.



Control Area 4: Personnel, visitors, vehicles and equipment

Controlling traffic and visitors is an essential part of biosecurity, but it is commonly overlooked. Pathogens can be introduced and spread by contaminated footwear, clothing, and hands, as well as on vehicles, farm machinery and other equipment.

The risks of people, vehicles and equipment transmitting pathogens to cattle can be managed if those involved understand the risks and engage in the appropriate mitigation activities. Guiding the movement of visitors onto and within your operation will also minimize these risks.

Strategy 1: Control access

Different categories of service providers and visitors pose different levels of risk. All service providers and visitors should be made aware of the farm's level of biosecurity and follow their biosecurity protocols. The key activities are aimed at controlling who comes on to the farm and then taking steps to manage their visit based on the level of risk.

Best Practice 1: Limit nonessential traffic on the farm.

- Establish perimeter control with fencing and gates to reduce the number of entry points.
- Secure entry (e.g. have the ability to lock) to high risks areas such as:
  - milk house
  - barn
  - feed storage
  - chemical storage
- Plan ahead for all visits. Inform all visitors of biosecurity requirements, including where to park, and who to contact upon arrival.
- Designate a specific parking area for visitors and employees that is away from the cattle and not shared with farm vehicles.
- Have a single, clearly marked entrance for all visitors.
- Restrict access to all high-risk areas, including cattle housing facilities, to essential personnel only.
- Post signage that is clearly visible at all access points and provides clear instructions, including information on who to contact upon arrival, where to report and what biosecurity measures need to be followed.

Best Practice 2: Conduct a risk assessment of all visitors.

- Conduct a risk assessment of all visitors before you allow them into your operation.
- Consider asking visitors the following questions to assist you with your risk assessment:
  - When did you last have contact with livestock? With what species?
  - Have you recently travelled to another province or country?
    - Where did you travel?
    - Did you have contact with livestock?
    - When did you return?
- Based on this risk assessment, assign low, medium or high risk to each visitor (see glossary).
- In general, if you anticipate foreign visitors, require that they have been in Canada for at least five days and have had no animal contact.
- Prevent entry into your operation if you feel risk cannot sufficiently be reduced by implementing additional biosecurity measures, such as changing footwear and clothing, washing hands etc.
- Designate one area where visitors enter and congregate outside of the production area.
- Determine the required biosecurity measures for all visitors. It is recommended to:
  - only permit access to the cattle housing area and other high-risks areas if required.
  - instruct visitors not to touch the animals unless this is part of their job.
  - ensure that they employ a work order based on clean to dirty, young to old, healthy to sick.
- Have bull calves and other sale animals picked up without the dealer or transporter entering the production area.

Best Practice 3: Keep a record of all visitors and deliveries.

- Ensure you know who is on your farm at all times.
- Keep a visitor log recording:
  - date of the visit
  - names and addresses of the visitors
  - any animal contact they had in the 48 hours preceding their visit to your farm
- Store the log in an area that is easily accessible to all visitors and does not require entry into the production area, for example in the farm office.

Strategy 2: Use clean clothing and footwear

Footwear and soiled clothing need special attention, as these can serve as important mechanical vectors for pathogens.

Best Practice 1: Require that all visitors and service personnel put on clean clothing and footwear when entering the production area.

- Have a pre-established arrangement for the supply of suitable clean clothing and footwear. Options include:
  - visitors and service providers bring their own attire.

- farm-specific clothing and footwear are provided by the farm.
- disposable coveralls and plastics boots are available.

- If visitors or service providers are bringing their own footwear, require that they brush wash them to remove contamination and disinfect upon arrival. Visually inspect all personal clothing for gross contamination.
- Require that all visitors and service providers put on clean coveralls and footwear prior to entering the production area, especially if there will be any planned contact with animals, feed or manure.
- Ensure all visitors and service providers clean their footwear when moving between different animal housing areas.
- Provide disposable sleeves and gloves if there is contact with cattle.
- Collect all farm-dedicated or disposable clothing and footwear after each visit and dispose of them appropriately.
- If clothing and footwear is taken off of the farm, require that footwear is brush washed and disinfected before leaving and that clothing is removed.

Best Practice 2: Ensure that all farm workers use farm-dedicated clothing and footwear.

- Require all farm workers to report to work in clean clothing and footwear that have not been exposed to livestock.
- Determine your farm's protocol for farm clothing and footwear for farm workers:
  - Will you provide clean farm-specific clothing and footwear for all workers? or
  - Do workers have to provide their own clean coveralls and footwear?
- Require all coveralls to be cleaned, at a minimum, on a daily basis with detergent and bleach or washing soda.
- Routinely clean and disinfect footwear, especially:
  - before entering or leaving the farm
  - before entering or leaving the production area
  - when moving between high risk areas such as the isolation area, hospital pen, calving area, and deadstock disposal
  - after all times of gross contamination
- Change clothing between high risk areas such as the isolation area, hospital pen, calving area, and deadstock disposal.
- Provide appropriate personal protective equipment (gloves, fitted N95 masks) to all employees for use during high risk activities, including but not limited to calving, caring for sick animals, and handling manure or deadstock.
- Require all clothing and footwear worn in the production area to be changed or cleaned prior to entering the house or office area.
- If your enterprise has multiple premises, have dedicated footwear and clothing specific to each location.

- If family members or employees visit other livestock facilities, ensure all clothing worn on your premises, including caps and jackets, are changed before going to another farm.
- Consider carrying disposable footwear and coveralls with you for use when visiting other livestock facilities. Dispose of them prior to leaving.

Best Practice 3: Provide the necessary facilities for farm workers, visitors and service providers to change into clean clothing and footwear and wash hands.

- Have a transition area or anteroom at the entrance to the production facility, in which farm workers, service providers and visitors can put on and remove clothing and footwear and wash or sanitize their hands.
- Provide a storage area(s) for dedicated clothing and footwear, including coat hooks and boot trays. Consider keeping a contingency supply of extra footwear and pairs of clean coveralls or disposable coveralls and boot covers in a variety of sizes.
- Post appropriate signage directing visitors and service providers to a designated area to prepare for the farm visit.
- Have instructional material available on proper biosecurity practices.
- Maintain accessible, functioning hand washing stations at the entry to and between different production areas.
- Require that hands are washed with soap and water upon entering your production area, when moving between production areas and before leaving the production area. If there is no access to water, hand sanitizer can be used as long as hands are not visibly contaminated.
- Place hand sanitizers (60% alcohol) throughout the facility to encourage regular use.
- Provide and properly maintain footwear washing facilities, solutions and brushes at the entry to and between different production areas.

Strategy 3: Control movement of equipment and vehicles

Traffic control includes the movement of equipment and vehicles onto your operation as well as all movement within and off of your operation. Equipment and vehicles have the potential to introduce pathogens onto your farm, as well as move them within or off of your farm if they have been in contact with livestock and their products. You can make an assessment of the relative risk of each vehicle or piece of equipment based on its use, location of work, and movement patterns. Practices can then be established to appropriately address this risk on the farm.

Best Practice 1: Control equipment and vehicle access to the farm.

- Have one vehicle access point so you always know who is present on your farm.
- Minimize the number of vehicles you allow on your premises.
- Designate a parking area for vehicles entering the farm that is away from livestock, feed delivery areas and manure handling routes.
- Maintain a equipment and vehicle arrival log.

- Use farm-specific equipment and instruments whenever possible.
- If visitors' vehicles need access to the premises, ensure that they are free of visible manure and organic material and then cleaned and disinfected before entry. Ideally, if there is previous contact with cattle and cattle products, this is done prior to arrival. The inside of the truck bed, bottom of the vehicle and tires should be cleaned.
- If equipment is brought onto the farm, ensure that it is cleaned and disinfected before entry and use.
- Provide appropriate facilities for washing and disinfecting equipment and vehicles at all entry points.
- Clean and disinfect your own equipment and vehicles after visiting other livestock premises, sale yards or other places of unknown animal health status.

Best Practice 2: Control traffic patterns on the farm.

- Establish routes on your dairy farm specific to each visitor or service provider.
- Post signage directing specific vehicles to the desired location(s), especially at the entrance to all high risk areas.
- Provide clean routes free of contamination (manure, other debris) for essential vehicles. If possible, these routes should be separate from those travelled by dairy farm equipment and any laneways used for cattle movement.
- Whenever possible, only allow your farm's vehicles in the livestock handling and housing areas or around feed storage bins.
- Where the movement of equipment and vehicles is necessary outside of the specified area, and into higher risk areas such as livestock handling areas or feed storage, ensure that proper cleaning and disinfection is completed prior to entry.
- Require all equipment and instruments that have had direct animal contact be cleaned and disinfected before and after use, as well as between different cattle housing areas.
- Provide appropriate facilities for washing and disinfecting equipment and vehicles at the entry to all high risk areas.
- Limit recreational vehicle use on the premises.

Strategy 4: Plan, train and communicate

Everyone on the farm has an important role in implementing biosecurity. Each person should know and understand the importance of biosecurity and be able to implement the biosecurity practices in the area(s) of the dairy operation for which they are responsible. Additionally, those who are involved directly with the herd should be able to identify and respond to potential disease risk situations. Training and education, either formal or informal, as well as regular communication are essential for all personnel who live and work on the farm.

Best Practice 1: Involve your entire farm team in the design of the biosecurity plan.

- Involve your employees and family members when you are building your biosecurity plan.
- Provide them with the opportunity to comment on the practicality of the plan.
- Ensure that each production facility has a written copy of the biosecurity plan available to all employees, family members and visitors.
- Maintain records of key biosecurity activities.
- Have regular team assessments so everyone can comment on the positive and negative aspects of the biosecurity plan.
- Consider making adjustments to the biosecurity plan based on team feedback.
- Designate a family member(s) or employee(s) as a biosecurity officer for your farm. The responsibilities of the biosecurity officer include:
  - biosecurity training and education
  - records keeping
  - compliance assessment
  - review and revision of the plan

Best Practice 2: Train and educate your personnel.

- Identify the roles and responsibilities of each employee and family member present on the farm.
- Provide training to employees and family members on both the theoretical and practical aspects of biosecurity. Consider testing to gauge understanding and determine future training needs.
- Promote the importance of biosecurity to your employees and family members and their role in ensuring proper, consistent uptake of the biosecurity plan.
- Consider incorporating the following topics (not a comprehensive list) into your biosecurity training and education program:
  - the rationale of farm-specific clothing and footwear and the practices for putting them on, removing them and cleaning them
  - proper cleaning and disinfecting, including the safe and effective use of all materials
  - proper hand washing and sanitizing procedures
  - personal protective equipment, including when and how it should be used and any other relevant occupational health and safety standards
  - recognition of sick animals
  - basic use of livestock drugs, feed additives and farm chemicals (to prevent product misuse)
  - response activities in the event of a disease emergency
  - record keeping
- Maintain records on all training and educational activities.
- Repeat the training sessions regularly, especially if changes are made in the plan.

Best Practice 3: Communicate your plan.

- Inform every person working on or visiting your dairy farm that you have a biosecurity program and that everyone is expected to follow it.
- Share your written biosecurity plan with neighbours, visitors, the service sector, inspectors and industry associations.
- Establish effective communication channels between you and your management, employees, and family members. Possible avenues include regular staff meetings, bulletin board(s), weekly newsletters, posters, and social media.
- Prepare an external communication plan that provides information on your biosecurity plan to service providers and visitors.
- Devise a communication plan in the event of a disease outbreak.

Best Practice 4: Regularly review your biosecurity plan and update at least annually.

- Regularly review your biosecurity records with your herd veterinarian and assess them in conjunction with records for animal health and farm management activities. Use the information to help evaluate the effectiveness and efficiency of your program and then determine if corrective action(s) is needed.
- Routinely revisit your risk assessment to address any new areas of concern, including a change to the specific diseases of concern for your farm.
- Review and update your plan, if necessary, at least annually and more frequently if you have made changes to:
  - operational practices (e.g. new supplier of purchased cattle, new transportation practices, new practice of moving heifers to be raised at an off-site location)
  - facilities and farm layout
- Assess the compatibility of your biosecurity program with any new program(s) introduced in the dairy industry and integrate practices whenever possible.

Glossary of Terms

Following is a list of terms that may be used in the Planning Guide, and that are often used in discussing biosecurity, with a working definition for each:

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.

Bio-containment: 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 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.

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.

Controlled access zone: A designated area in which biosecurity protocols are in place and monitored and within which livestock are managed (e.g. a location or primary location). It 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 locations.

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 disease.

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 diarrhea (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 Schmallenburg 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 for determining health status and should be made available prior to purchase.

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

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.

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 guide, 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: 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.

Risk Assessment Tool

Using the Biosecurity Risk Assessment Tool

The Biosecurity Assessment Tool is based on *Biosecurity for Canadian Dairy Farms: National Standard* and designed for use by producers working with their herd veterinarian. The questions posed in this document pertain to biosecurity practices for all types of dairy production operations, and are intended to be used in developing an assessment of a farm's biosecurity at any point in time. There may be additional risk factors that are important for each individual farm, and further review of the biosecurity best practices provided in the Producer Planning Guide will assist with a more in-depth risk assessment.

The tool is designed to be used to identify biosecurity risk areas and lead to a focused discussion on the risk practices on the farm with a herd veterinarian. There may be risks that the producer chooses to accept and those that can be mitigated by changes in practices on the farm.

Farm Details

Date of Assessment:

Name of Farm:

Owner:

Address:

Livestock Type and Numbers:

Biosecurity Assessment

To complete this assessment, check the appropriate boxes as they relate best to your dairy operation. If a question does not apply to your farm, please select "not applicable" and continue with the assessment. After completing the exercise, review the areas that require additional efforts and then refer to the relevant sections in the Producer Planning Guide for recommended biosecurity best practices.

		Always	Sometimes	Never	Not Applicable
Section 1: Animal health management					
	Does your livestock operation…				
1-2	Have a relationship with a herd veterinarian?	YES ❑		NO ❑	❑
1-3	Have an Animal Health Management Plan?	YES ❑		NO ❑	❑
1-4	Have and follow a veterinarian-approved vaccination program against specific diseases of concern? Current list of diseases of concern: _____ _____ _____ _____	YES ❑		NO ❑	❑
1-5	Perform post-mortems for unexplained deaths to monitor disease?	❑	❑	❑	❑
1-6	Monitor the ongoing health status of cattle on a regular basis?	❑	❑	❑	❑
1-7	Keep lifetime animal health records for individual animals that include vaccination details, diseases, and treatments?	❑	❑	❑	❑
1-8	Pass animal health records along when animals are sold or moved?	❑	❑	❑	❑
1-9	Take measures to protect the feed or water supply from contamination by manure, rodents, pets or wildlife?	❑	❑	❑	❑

		Always	Sometimes	Never	Not Applicable
1-10	Test drinking water for bacterial contamination?	YES ❑	❑	NO ❑	❑
1-11	Purchase feed from suppliers with demonstrated good production practices?	❑	❑	❑	❑
1-12	Keep feed records on the source and dates of delivery?	❑	❑	❑	❑
1-13	Store feed in an area that prevents contamination (e.g. by urine, feces etc.)?	❑	❑	❑	❑
1-14	Group animals by susceptibility to disease (e.g. calves) and maintain separation between groups?	❑	❑	❑	❑

Section 2: Animal additions and movement

	Does your livestock operation…				
2.1	Operate a closed herd?	YES ❑		NO ❑	❑
	If no, do you…				
	I. Limit number of additions to the herd (i.e. only when necessary and with advance planning)	❑	❑	❑	❑
	II. Purchase replacement animals from herd with known health status?	❑	❑	❑	❑
	III. Source animals directly from the herd of origin?	❑	❑	❑	❑
	IV. Know the animal health practices of all suppliers?	❑	❑	❑	❑
	V. Test replacement animals for specific diseases of concern?	❑	❑	❑	❑
	VI. Isolate replacement animals for 14 to 30 days?	❑	❑	❑	❑
	VII. Transfer information including animal health records for all new animals?	❑	❑	❑	❑
2.2	Isolate:				
	I. New additions to the herd?	❑	❑	❑	❑
	II. New animals from different sites separately until their health status is known?	❑	❑	❑	❑
	III. Animals that return after leaving the farm?	❑	❑	❑	❑
	IV. Clinically sick animals?	❑	❑	❑	❑

		Always	Sometimes	Never	Not Applicable
2.3	Collect and keep information on individual animals? Does the information include: I. Where each animal was born? II. Where each animal was raised? III. The animal's movement since birth? IV. The animal's vaccination and disease history?	❑ ❑ ❑ ❑ ❑	❑ ❑ ❑ ❑ ❑	❑ ❑ ❑ ❑ ❑	❑ ❑ ❑ ❑ ❑
2.4	Have and follow a movement plan (e.g. work with animals from youngest to oldest, healthy to sick) if practical? If not, are other precautions taken?	❑ ❑	❑ ❑	❑ ❑	❑ ❑
2.5	Prevent direct contact between animals of different disease status and indirect contact through manure or other excretions?	❑	❑	❑	❑

Section 3: Premises' and sanitation management

	Does your livestock operation…				
3.1	Have a Restricted Access Zone (RAZ) and Controlled Access Zone (CAZ)?	YES ❑		NO ❑	❑
3.2	Prevent animals from having fence-line contact with livestock from other farms (i.e. provide a buffer zone that allows for a space)?	❑	❑	❑	❑
3.3	Have written instructions for cleaning and disinfecting different types of equipment?	❑	❑	❑	❑
3.4	Have written sanitation and disinfection procedures and schedules for all animal holding areas/facilities from which pathogens could spread?	YES ❑		NO ❑	❑
3.5	Have appropriate and effective cleaning and disinfection materials available for use?	❑	❑	❑	❑
3.6	Ensure that vehicles and equipment that circulate into or across zones are cleaned when they arrive or before crossing zone boundaries?	YES ❑		NO ❑	
3.7	Disinfect equipment (livestock related) between uses?	❑	❑	❑	❑
3.8	Practice sanitation to minimize contamination of livestock waterers by manure and urine?	❑	❑	❑	❑

		Always	Sometimes	Never	Not Applicable
3.9	Have specific cleaning and sanitizing protocols for higher-risk practices (e.g. AI or treatment of sick animals)?	YES ❑		NO ❑	❑
3.10	Keep buildings and facilities well maintained and in good repair?	❑	❑	❑	❑
3.11	Have walls, ceilings and facility parts that are easy to clean and disinfect?	YES ❑		NO ❑	❑
3.12	Remove and renew bedding on a regular schedule and dispose of used bedding so it does not contaminate animals, water sources and facilities?	❑	❑	❑	❑
3.13	Scrape manure from alleyways on a regular schedule?	❑	❑	❑	❑
3.14	Dispose of manure on the farm by spreading, storing and/or composting it in a way that prevents drifting, leaching and potential contamination of other areas?	❑	❑	❑	❑
3.15	Have a deadstock disposal protocol that: • Ensures dead stock is removed from animal housing quickly so that no other livestock have contact with the carcass? • Defines the pickup protocol for deadstock services? • Disposes of deadstock by burying, composting or pickup by a deadstock disposal service?	YES ❑ ❑ ❑		NO ❑ ❑ ❑	❑ ❑ ❑
3.16	Use equipment for a single purpose only (i.e. do not scrape manure and feed with the same shovel)?	YES ❑		NO ❑	
3.17	Avoid using equipment that is used on other farms (borrowing, lending, custom operators)?	YES ❑		NO ❑	
3.18	Have a pest control program (insects, rodents, wildlife, weeds)?	YES ❑		NO ❑	

Section 4: Personnel, visitors, vehicles and equipment

	Does your livestock operation…				
4-1	Prohibit visitors from entering the farm buildings without permission?	YES ❑		NO ❑	❑
4-2	Post biosecurity signage?	YES ❑		NO ❑	❑

		Always	Sometimes	Never	Not Applicable
4-3	Have a written copy of the farm's biosecurity protocol(s) with specific requirements for entry into controlled access zones and restricted access zones?	YES ❑		NO ❑	❑
4-4	Advise visitors and service providers of your biosecurity practices?	❑	❑	❑	❑
4-5	Have a visitor log to record all people who enter the farm?	❑		❑	❑
4-6	Prevent international visitors from visiting the livestock within five days of arrival?	❑		❑	❑
4-7	Inquire about recent animal contact by visitors?	❑		❑	❑
4-8	Require everyone working with the herd to wear clean coveralls and footwear dedicated only for use in the animal holding facilities?	❑	❑	❑	❑
4-9	Require everyone working with the herd to change coveralls when moving between different animal groups, including isolation areas?	❑	❑	❑	❑
4-10	Require everyone working with the herd to disinfect or change footwear when moving between different animal groups?	❑	❑	❑	❑
4-11	Require visitors and farm service providers to wear clean coveralls and boots or plastic booties?	❑	❑	❑	❑
4-12	Require truck drivers to stay in their cab while loading or unloading?	❑	❑	❑	❑
4-13	Have a designated, signed parking area for visitors and farm service workers that is away from the barn, animal facilities, and routes travelled by animals and/or mobile farm equipment?	YES ❑		NO ❑	❑
4-14	Ensure that vehicles that must approach animals or animal housing areas (e.g. milk trucks or feed trucks) have specified routes to follow?	❑	❑	❑	❑

Action Plan

(consider practices associated with questions that were answered "no" above):

Things that are done well:

Opportunities for improvement: