

National Biosecurity Guide

for the Livestock and
Poultry Feed Sector



Acknowledgements

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About ANAC

The Animal Nutrition Association of Canada (ANAC) is the national trade association of the livestock and poultry feed industry. Our 165 members include feed and ingredient manufacturers and distributors, as well as suppliers of a wide range of goods and services to the feed industry. Taken together, ANAC's membership represents 90 percent of the commercial feed manufactured in Canada.

Disclaimer

This document is intended to be used as a guide to feed mill biosecurity. The authors and the Animal Nutrition Association of Canada do not take responsibility for the application of any or all suggestions, advice, or information contained in this document. Professional advice should be obtained for any product safety or emergency situation.

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1. INTRODUCTION

Why is biosecurity important?

At the national and international level, maintenance of the highest possible animal health and biosecurity status is vitally important to the sustainability and profitability of the Canadian agricultural sector. Future access to markets will increasingly depend on our ability to demonstrate freedom from serious animal diseases and pests as well as the ability to trace movement of animals, farm inputs (including feed), and animal products.

Biosecurity is a form of risk management. The risks in this case are disease-causing organisms (viruses, bacteria, fungi, and parasites), pests (insects, birds, vermin) and weeds/invasive plants and their impact on a specific farm or the agriculture industry as a whole. All agriculture stakeholders share a responsibility in practicing biosecurity. During an outbreak of a federally reportable or other serious animal disease, many aspects of the economy may be affected beyond the farm gate. These include agricultural services such as feed suppliers and meat processors as well as non-agricultural sectors such as tourism.

Endemic, production limiting diseases must also be managed due to their negative impact on producers and farm revenue. For example, Johne's Disease (paratuberculosis) is a chronic wasting disease that causes considerable production losses in adult cattle, sheep, and goats and can be transmitted via manure, colostrum, and milk.

What role does the feed industry play?

The feed industry can reduce the risk of the transmission of pathogens throughout all phases of feed manufacturing and transport. For example, raw materials and processed feed ingredients can be a source of Salmonella and have the potential to introduce the organism into the feed mill. Salmonella is a pathogen which has the potential to cause disease in animals and poses a possible serious human health risk. As well, feed ingredients may be contaminated with rodent or bird feces, moulds or mycotoxins all of which have the potential to negatively impact animal health. Good manufacturing practices address many aspects of biosecurity and also ingredient contamination.

The focus of the National Biosecurity Guide for the Livestock and Poultry Feed Industry is to provide recommendations and industry best practices for day-to-day biosecurity practices and additional biosecurity considerations for use during a disease outbreak or a biosecurity alert.

How does feed play a role?

Livestock and poultry feed manufacturers use a variety of feed ingredients. These ingredients can be from plant- and animal-based sources; both can present challenges regarding contamination with biological hazards.

Biological hazards in livestock and poultry feed can be categorized as transmissible spongiform encephalopathies (such as bovine spongiform encephalopathy commonly known as BSE) and microbiological contaminants (such as Salmonella spp.). More recently, feed has been identified as a vector for the transmission of viral particles, specifically porcine epidemic diarrhea virus (PEDv).

With a large portion of livestock and poultry feed being produced at commercial feed mills, these facilities play an important role in preventing the introduction of biological hazards from contaminating finished feeds.

Although the complete elimination of biological hazards in feeds is not realistic, multiple interventions can be taken to reduce the risk. Documenting and implementing those interventions at a feed mill constitutes a biosecurity plan.

Adapted from Food and Feed Safety Systems and Analysis, Chapter 4: Animal Feed Mill Biosecurity: Prevention of Biological Hazards, Anne Huss, Roger Cochrane, Mary Muckey, Cassie Jones

From a regulatory context, the Canadian Food Inspection Agency (CFIA) verifies that livestock feeds manufactured and sold in Canada, or imported, are safe, effective, and labelled appropriately to contribute to the production and maintenance of healthy animals and safe foods of animal origin. The primary focus of the CFIA feed program has not been on biologic contamination and disease spread but rather on the quality standards and efficacy of feeds. The presence of pathogens, specifically certain strains of Salmonella, has been addressed through policy. However, as the feed program continues to evolve, regulatory control of pathogens and the need to minimize the risks posed by pathogens in all livestock and poultry feeds will take on increased significance.

In addition to animal-related pathogens that can cause disease in animals, feed can also be contaminated by plant

pathogens, through crop infestation of pests or weeds. As well, vehicle movement on and off farm can track weed seeds and soil borne plant pests in mud, manure and crop residue stuck to tires and wheel wells. The primary focus of the National Biosecurity Guide for the Livestock and Poultry Feed Sector is on animal-related pathogens. However, biosecurity practices to mitigate the introduction and movement of those pathogens also reduce many of the risks associated with spreading plant pathogens to and between your farm customers.

Why have a biosecurity plan?

An effective biosecurity plan can help:

- improve or maintain productivity;
- reduce the risk of the introduction and spread of endemic and foreign animal diseases;
- minimize the potential for increased herd or flock health costs and revenue losses;
- safeguard human health;
- protect business reputation;
- protect service industries (e.g. feed suppliers); and,
- maintain export and domestic markets.

Development of this guide

The goal of this guide is to provide Canadian feed manufacturing companies and their employees with a set of guidelines to use both within their own company and in conjunction with producers to limit the opportunity for the introduction and spread of pathogens. Preventing a disease occurrence is far more preferable to, and cost effective than, the control of a disease and its associated impacts.

National biosecurity standards and producer implementation guides have been developed for most farmed animal species and some plant commodities by the Canadian Food Inspection Agency in collaboration with specific industry sectors, provincial/territorial governments, and academia. The animal biosecurity standards can be accessed at <http://www.inspection.gc.ca/animals/terrestrial-animals/biosecurity/standards-and-principles/eng/1344707905203/1344707981478>. The plant commodity standards are available at <http://www.inspection.gc.ca/plants/grains-and-field-crops/biosecurity/eng/1439172965986/1439172969111>.

This National Biosecurity Guide for the Livestock and Poultry Feed Industry will assist feed suppliers to identify areas where they can improve their approach and implementation of biosecurity or areas that will require collaboration with suppliers and producers to reach biosecurity goals.

Pathogens

In this document, pathogens refer to any disease-producing agent or microorganism including but not limited to bacteria, fungi, viruses, prions, and parasites.



The first step is to know the risks to your company/products by understanding the ways feed, feed ingredients, equipment, and people can be exposed to and spread pathogens. Measures can then be taken to minimize these risks. Renovations and retrofits may be beyond the immediate reach of some companies. However, some biosecurity practices do not require major capital investment, only management and planning changes. Each preventative measure or protocol you are able to implement lowers the risk of pathogen spread. Success is achieved through the consistent application of risk management processes and plans.

How should this document be used?

In this document, some relatively easy ways to implement generic biosecurity practices which will reduce the risk of pathogen contamination and spread are presented. It is not an exhaustive list and is intended as a starting point. Each step is an added level of protection against pathogens and will enhance your pathogen prevention and biosecurity risk management system.

As there is substantial variability amongst feed facilities across Canada and even greater variability in customer farm set-up, some protocols may not be applicable to your particular business. Relevancy will be slightly different for each company. For example, the on-farm considerations will not be directly applicable to aquatic feed suppliers. All activities on fish farm sites, including biosecurity requirements in relation to feeds, are established in the conditions of licence that fish farms must meet. These requirements are verified during third party certifications such as the Global Aquaculture Alliance BAP and the Aquaculture Stewardship Council.

As well, some biosecurity best practices may not be achievable due to gaps in infrastructure and the logistics involved in implementing best practices. Efforts should be made to identify gaps that impede biosecurity implementation and to work on appropriate solutions. Conversely, some of your customers may have more prescriptive or more stringent measures, as part of their on-farm biosecurity protocols, which you are required to follow.

How can I make this work?

Some facilities may not be set up to implement biosecurity protocols easily. The task may seem overwhelming and not worth the time, effort and cost.

The biosecurity measures in this document are best practices and are provided as guidance. The key point is to focus on identifying practices that could be implemented by you and your company and start with those.

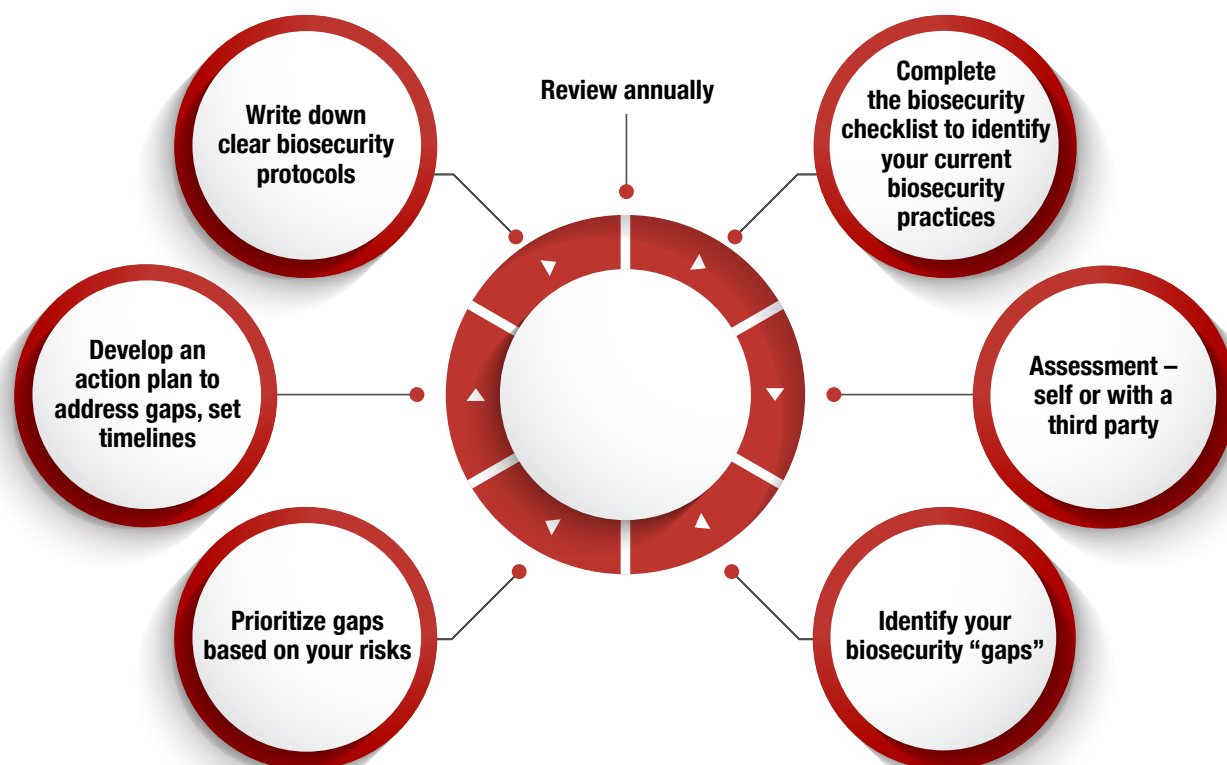
Each biosecurity practice you are able to implement will help to reduce animal and plant health risk.

Select what is pertinent, adapt what is possible, and set aside (for now) what is not.

The biosecurity recommendations outlined in this guidance document are based on current knowledge. As our knowledge increases, biosecurity recommendations may change. Moreover, there is always the risk of new, emerging pathogens that may require additional biosecurity measures not mentioned in this document. Consequently, even if your company is currently adhering to all checklist categories in section eight of this document, you might still be at risk of pathogen introduction in the future.

To stay abreast of developments in recommended biosecurity practices and livestock and poultry disease alerts in your area, look into websites or email alerts offered by your provincial ministry of agriculture and the livestock and poultry associations. You can also sign up for email notifications from the Canadian Food Inspection Agency (CFIA) at www.inspection.gc.ca (under Stay Connected at the bottom of the web page). The CFIA website also has sections devoted to [biosecurity](#) and [diseases](#) (under Animals – Terrestrial Animals).

Steps to developing a biosecurity plan



Many aspects of ANAC's FeedAssure® feed safety program also address biosecurity concerns. It is recommended that you go through the biosecurity checklist included in [Chapter 8](#), identify practices you have already adopted and pinpoint risks or biosecurity “gaps” which may still need to be addressed. Consider asking a third party to review as there may be risks within your operation that you overlook due to familiarity. Biosecurity risks should be identified as control points in the manufacturer's feed safety plan.

Identify biosecurity measures to manage the “gaps”. Write down clear protocols to be followed by employees, suppliers, and other visitors on your premises and develop an action plan to address the gaps. You should review your biosecurity protocols at least annually or when any change to current practices occurs.

How this document is organized

Following this introductory chapter, [Chapter 2](#) provides definitions of terms which defines the intended scope of the word as used within this document.

Chapters [3](#), [4](#) and [5](#) outline biosecurity risks and suggested mitigation measures for people and equipment at the mill site, internal feed milling processes and protocols, and on-farm activities respectively.

[Chapter 6](#) lists additional or enhanced biosecurity measures to consider when there is an elevated risk or confirmed disease outbreak.

Everyone involved in your company has an important role in implementing biosecurity measures. Developing a written biosecurity plan for each production area, ensuring that personnel understand and are trained how to follow protocols, as well as regular communication with staff, customers and suppliers are essential steps to effectively incorporating biosecurity practices into your business. [Chapter 7](#) presents considerations for planning, training and documentation.

A self-evaluation biosecurity checklist is included in [Chapter 8](#). Working through the checklist will help you recognize which biosecurity risks you have already addressed, which could be improved upon and spot where there are gaps.

[Chapter 9](#) is a four-page factsheet intended as an employee educational tool and refresher. It is a brief summary of the main points in the resource. It could be reproduced separately from this manual and provided to employees.

The factsheet in [Chapter 10](#) is meant for producers who supply feed ingredients to your mill or pick up their feed from your site. It is intended to raise awareness with them regarding the importance of coming onto your property with clean vehicles and supplying pathogen-free ingredients.

There are numerous references throughout the manual to the use of a visitors' log to record who has been on your property. The log will be a valuable source of information for tracking in the event of a disease outbreak on any of your customers' farms or should a feed or feed ingredient be identified as a pathogen hazard. A sample visitors' log sign-in sheet is provided in [Chapter 11](#).

2. DEFINITIONS

Approved: When used in reference to chemicals, such as rodenticides, means approved by the appropriate regulatory authority for the specific usage mentioned in the text.

Batch: All of the feed resulting from one mixer load of feed ingredients added according to the mixing sheet for that specific product.

Biosecurity: Procedures and physical measures designed to reduce the risk of introduction, establishment and spread of animal or plant diseases, infections or infestations to, from and within a population.

CFIA: Canadian Food Inspection Agency.

Cleaning: The practice of removing undesirable substances (such as chemicals, residues, organic matter) from an object's surface. Cleaning can be a two- or three-step process; dry cleaning by scraping out and removal of organic matter followed by a wet cleaning with water and a detergent; and, a high volume flush to remove the remaining loose organic matter and biofilms.

Direct contact: Close physical contact between animals (for example: nose to nose, social interaction or breeding).

Disinfection: The process that is used to inactivate, decrease or eliminate pathogens from a surface or object.

Endemic diseases: Diseases which are constantly present within a region or population.

Enhanced biosecurity: When a disease outbreak is suspected on the premises or has been identified in the vicinity, extra biosecurity measures may be required and increased emphasis placed on existing biosecurity procedures.

Flushing: The process of passing a substance in sufficient quantity through the equipment to clean out residue from the previous lot or batch of feed.

Foreign animal disease: An existing or emerging animal disease that poses a severe threat to animal health, the economy, and/or human health that is not usually present in the country. Foreign animal diseases of greatest concern could cause significant illness and/or death in animals or people or result in economic devastation and have international trade implications.

Health challenged: The term is used within this document to describe herds or flocks which are infected with any type of pathogen, e.g. virus, parasite, bacterium, and toxin, and where the terms "diseased" or "ill" may not appropriately describe their condition.

Health status: Current state of health of the animal, herd or flock, including both its condition and the presence of pathogens in the animal, herd or flock. Information used to establish the health status includes the disease history and the results of any diagnostic testing, herd/flock health management practices, vaccination and deworming protocols.

Indirect contact: Refers to contact with a pathogen without directly coming into contact with the source (for example: aerosol or contaminated equipment).

Infection: The invasion and multiplication or reproduction of pathogens such as bacteria, viruses, and parasites in the tissues of a living animal.

Infectious disease: Disease caused by pathogens (for example: parasites, bacteria, viruses, fungi or prions).

Livestock: Any mammal intentionally reared in an agricultural setting for the purposes of profit or subsistence, whether for food, fur, fibre, dairy, draft, breeding, sport, or hobby purposes, or other product or labour.

Lot (or Run): All of the feed resulting from the manufacturing of consecutive batches of the same feed formulation, prepared with the same feed ingredients added according to the formula and the mixing sheet for that specific product. In the case of continuous mixers, a lot would constitute all of the feed manufactured continuously, without interruption, according to the specific formula and mixing sheet for a specific product.

Notifiable diseases: Generally, immediately notifiable diseases are diseases exotic to Canada for which there are no control or eradication programs. Only laboratories are required to contact the CFIA regarding the suspicion or diagnosis of one of these diseases. Annually notifiable diseases are diseases for which Canada must submit an annual report to the World Organisation for Animal Health (OIE) indicating their presence within Canada. In general, they are diseases that are present in Canada, but are not classified as reportable or immediately notifiable. Some provinces also list these diseases as provincially reportable which require any clinical suspicion to be reported to the provincial Chief Veterinarian.

PPE: Personal protective equipment (PPE) is equipment used to reduce or prevent a worker's exposure to health and safety hazards. There are many different types of PPE including safety boots, goggles, ear plugs/muffs, hard hats, gloves, disposable (one-use) coveralls and boot covers, and fall arrest devices.

Pathogens: In the broadest sense, pathogens are anything that has the potential to cause disease. In this document, pathogens refer to any disease-producing agent or microorganism including but not limited to bacteria, fungi, viruses, prions and parasites.

Pests: Includes insects, birds and vermin (including mice and rats).

Potable: Suitable for drinking.

Producer: A person who owns, leases or rents land for cultivation, crop production, and/or rearing of farmed livestock, fish or poultry.

Production area: For farms, the production area includes buildings, pasture areas, areas used for feed storage and handling, and the area immediately surrounding buildings. For feed mills, the production area includes buildings and storage areas used for feed, ingredients and supplies.

Protocols: A defined, written procedure or process to be followed.

Reportable diseases: These diseases at the federal level are outlined in the Health of Animals Act and Regulations and are usually of significant importance to human or animal health or to the Canadian economy. Animal owners, veterinarians and laboratories are required to immediately report the presence of an animal that is contaminated or suspected of being contaminated with one of these diseases to a CFIA district veterinarian. Control or eradication measures will be applied immediately. Examples include: anthrax, notifiable avian influenza, bovine tuberculosis, scrapie, and swine vesicular disease. A complete list can be viewed on the CFIA website: <http://www.inspection.gc.ca/english/animal/diseases/diseases.shtml>

Standard Operating Procedure (SOP): Documented procedure based on generally accepted good practices that describe in detail the steps followed to meet an objective. For example, an SOP that details the truck cleaning and disinfection procedure. SOPs should be written in generic terms so that anyone can understand the intent and process. SOPs are used to ensure protocols are done consistently by different people.

Visitor: A person who is not an employee of the feed mill and is on the premises (such as, delivery people, ingredient suppliers, utility personnel, contractors, equipment service and repair technicians).

Zoonotic diseases: Zoonoses are diseases and infections that are naturally transmissible between vertebrate animals and humans, e.g., Listeria, Salmonella, E. coli.

Zoonoses and emerging infectious disease

At least 61% of all existing human pathogens are zoonotic (transmissible between animals and people). These are transmitted through a number of routes including contaminated food, water or direct contact. Of the new, emerging infectious diseases, 75% are zoonotic. A new disease emerges every four months; many are trivial, but HIV and avian influenza illustrate the huge potential impacts of such emerging diseases.

Source: IFPRI (International Food Policy Research Institute) and ILRI (International Livestock Research Institute), Agriculture for Improved Nutrition and Health (Washington, DC, and Nairobi, Kenya: IFPRI and ILRI, 2010). Available at <http://crp4.cgxchange.org>, refer to page 44.

3. PEOPLE AND VEHICLES

Pathogens can be spread in a number of ways, including:

- through animals that are clinically infected (they show signs of disease) and animals that are sub-clinically infected (they are infected yet appear healthy);
- through animals other than livestock and poultry (pets, wild birds and other wildlife, vermin, and insects);
- on the hands, clothing and shoes of visitors and employees moving from farm-to-farm or between production units on-farm;
- in contaminated feed or incoming ingredients, water, bedding and soil;
- from deadstock;
- on contaminated equipment and vehicles; or
- in airborne particles and dust blown by the wind and exhaust fans.

This chapter looks at the biosecurity risks posed by visitors (including suppliers), employees, and vehicles and risk reduction practices relating to your feed facility.

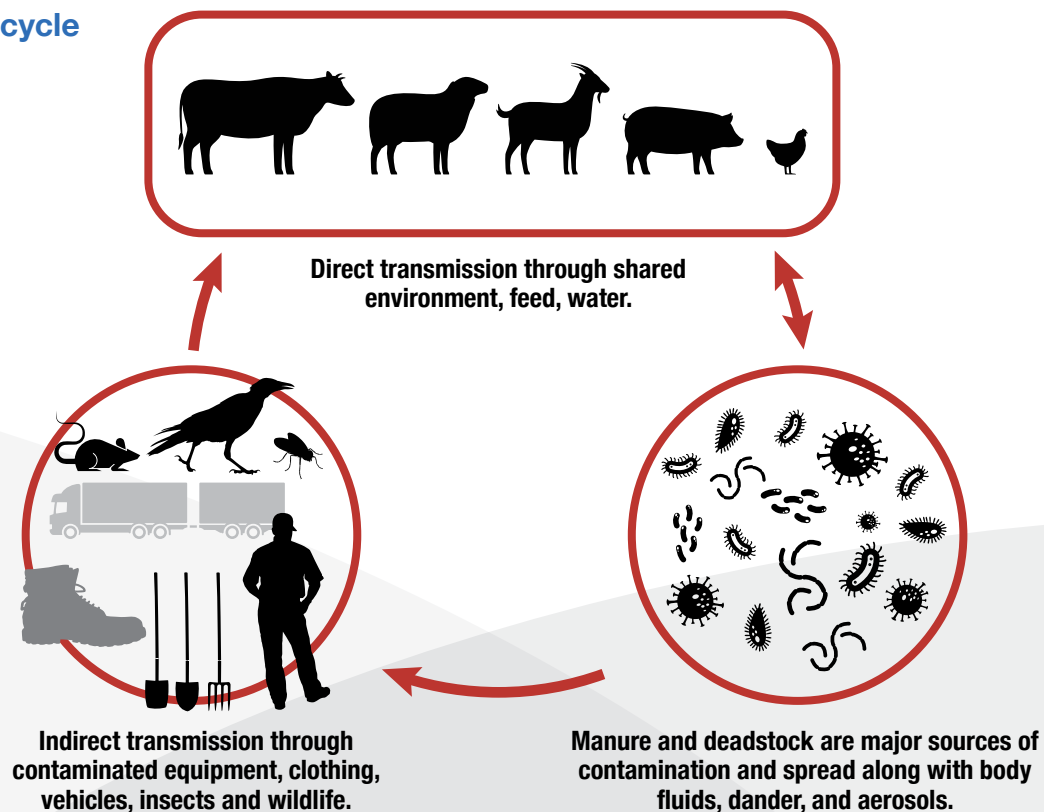
The term “visitors” includes a person who is not an employee of the feed mill and is on the premises (such as, delivery people, ingredient suppliers, utility personnel, contractors, equipment service and repair technicians).

Visitor control is a critical biosecurity component. People can spread pathogens and contaminated material on footwear, hands and clothing. The first line of defense is to reduce the number of visitors through your feed production operation and facilities. You also need to be able to track those who have been on your site.

In addition, all visits made to farms by your personnel and vehicles should be documented (refer also to [Chapter 5](#), On-farm considerations). Knowing which of your employees may have been on a particular farm and where they have been before and after their visit is valuable information in the event of a disease or pathogen outbreak on a farm.

Below are some practices that will reduce the risk of employees and visitors bringing pathogens onto your site via their clothes, footwear, hands and vehicles.

The disease cycle



Employees

- Instruct all employees to wear clean clothes and footwear when they report to work. Advise them to ensure that hands are washed with soap and water or sanitized upon arriving at work.
- Require employees to shower and change clothes at home on a daily basis and have separate footwear for home and your feed facility if they own or live at a location with livestock or poultry.
- Inform employees that personal vehicles are to have a visibly clean exterior and interior free from dirt, manure, feathers, and other organic matter.
- Direct employees to park personal vehicles in a designated spot away from any service vehicles or potentially contaminated area (e.g. the truck wash zone), upon arriving at work. This area should have signage to indicate staff parking.

Visitors

- Designate a specific parking area for visitors and post signage to clearly indicate that is where vehicles should be parked. Locate this area as far away from production and feed ingredient receiving areas as practical.
- Identify the entrance you wish visitors to use as the access point to your facilities. Post a durable and clearly visible sign stating “Visitors’ Entrance” and directional signs if needed to restrict access points. There should be only one entrance to the operation used by visitors.
- Post “restricted entry” signs to keep unauthorized visitors out of facilities.
- Ensure that gates and building doors can be locked and are locked at appropriate times.
- Provide clean access routes for delivery and service vehicles. Ideally, there would be a driveway for feed delivery vehicles and a second designated entry for visitors and staff with signs posted to direct traffic flow.
- Ensure visitors are aware of and understand your biosecurity protocols, e.g. have a biosecurity factsheet posted at the entrance, or communicate protocols upon initial contact with the supplier. Be prepared to turn away visitors if non-compliant.
- Keep a visitor log book to record the name, date and last known exposure to livestock or poultry for visitors and service vehicles.

Vehicles and feed delivery equipment can also spread pathogens from farm to farm and between the farm and feed production site through contaminated material on the tires, fenders and undercarriages. Proper sanitation can reduce the spread of pathogens; complete drying of equipment and trucks is a very important component of the “cleaning” process.

Service vehicles going to farm site (such as, sales, nutritionist, feed)

Supplier delivery vehicles visiting the feed mill site are dealt with in [Chapter 4](#).

- Ensure vehicles going to farms are visibly clean inside and on the outside.
- Pay special attention to cleaning organic material from the vehicle’s wheel wells and undercarriage. Tires should be clean.
- Keep interiors free of loose papers, garbage, dirty clothing and footwear, or organic material and cleaned regularly.
- Wipe down hard surfaces using clean water and soap first followed by the application of a sanitizer or disinfectant and then allowed to dry. No visible dust, dirt, manure or feathers should remain.
- Clean and disinfect the floor mats, steering wheel, and bucket and brush used for boot cleanup. Use rubber floor mats, which are easy to remove, wash, and sanitize.
- Provide hand sanitizer and boot/shoe sanitizer for use in the vehicle (to spray bottoms of shoes after removing overshoes or booties).
- Store sampling equipment in a closed container. Clean and disinfect any equipment used in the barn before using in another barn.

“Clean” and “dirty” zones

For service vehicles going on farm, consider designating a “clean” and a “dirty” zone within the vehicle. Clean supplies and clothing are kept in one area of the vehicle and used or “dirty” items in a different area. For example, sampling supplies are kept in the back seat but completed farm samples (inside their closed container) are only transported in the trunk.

- Properly clean and disinfect containers that have been used for transporting animal samples and also the area in the vehicle where the container was placed.
- Store disposable boots, coveralls or rubber boots which have been disinfected in a separate, closed container from items which have not been sanitized.
- Record all movements of service vehicles in a log specific to the vehicle. Visits should be recorded so that, in a case of a disease outbreak, tracing of vehicle movements can be done quickly.

Feed delivery vehicle cleaning protocols

- Sweep out feed delivery vehicles off-farm after each load and prior to re-loading if possible. Particular attention must be paid to corners and crevices, to the underside of the tarp and to areas above the fill line. Airlocks must be free of residual feed materials to avoid cross-contamination. On trucks outfitted with proper safety railings, the tops of trucks can also be swept clean of dust and debris. Swept materials are to be disposed of in the trash. Due to the configuration of some trucks, sweeping out may not be possible. Visually check whether the unit is empty and flush with air.
- Wash feed delivery vehicles once a week at a minimum. They may require additional washing when the vehicle or driver has been exposed to manure, visited a farm with a known health challenge, or is deemed to be dirty.
- Designate a cleaning area for vehicles and feed delivery equipment that is well drained, outside the production area and not an area through which people or other vehicles will travel. For example, do not clean vehicles and feed delivery equipment immediately in front of an entranceway to your facility. People will walk or drive through that area and potentially transfer pathogens to the inside of the facility or their vehicles.
- Protect waterways (e.g. streams, storm drains, ponds) and other sensitive habitat from contamination by cleaning chemicals (e.g. detergents and disinfectants).
- If utilizing a commercial truck washing facility, ensure it is not shared with livestock or poultry transport trucks.
- Maintain a record of vehicle cleaning and servicing including date, disinfectant used and contact time.
- Park clean and disinfected feed delivery vehicles in an area that is separate from service vehicles that have not been cleaned or disinfected and away from exhaust fans, dusty areas, rodents and wildlife (i.e. don't park under trees).

Feed delivery vehicles: assessing and mitigating risk

- Anything that contacts organic matter on a farm creates a higher biosecurity risk. Therefore, driving slowly and avoiding mud is the first priority.
- Second, ensuring that boots, gloves and the truck cab are cleaned between farms is best-practice. The most practical is not as extensive as the weekly cleaning, but includes removing all visible organic material and utilizing a disinfectant on boots, gloves, and interior cab surfaces such as handles, steering wheel, and shifter.
- Third, some attention should be paid to blower pipes that come in contact with the ground. Solutions to this include leaving blower pipes on-farm or disinfecting the blower pipe between farms.

Recommended external cleaning steps

1. Remove large accumulations of organic debris from all surfaces of equipment and vehicles (including the vehicle's undercarriage) with brushes, scrapers, or other tools.
2. Using low pressure (to avoid dispersing debris), thoroughly wet the undercarriage and other more heavily soiled areas of vehicles and equipment with a solution of hot water and a detergent. Follow manufacturer's label instructions regarding mixing, applying and contact time.
3. Wash the vehicles and equipment from the top down until the surfaces are visibly clean.
4. Add propylene glycol to pressure washers to prevent freezing of solutions during cold weather. The volume of propylene glycol required depends on the temperature. Avoid using ethylene glycol (antifreeze) as it is highly toxic to animals.
5. Rinse surfaces with water to remove any remaining detergent and debris. Use low to medium pressure at this time. Rinse surfaces from the top down.
6. Allow all surfaces to thoroughly dry. Supplemental heat may be required in cold or wet weather.

7. If using a disinfectant, follow manufacturer's directions including any safety requirements when adding the disinfectant. The effectiveness of disinfectants is reduced in the presence of organic material; surfaces must be visibly clean prior to application. Water pH, mineral content and air temperature also impact effectiveness. Select, mix, and apply according to the manufacturer's recommendations on the label and adhere to the recommended contact time. Lower temperatures increase contact time for disinfectants.
8. Wear appropriate dedicated rainwear, footwear and gloves to minimize contaminating porous clothing with pathogens that could then be transferred to farms.
9. Wear appropriate safety equipment when mixing and applying disinfectants; they may be hazardous in both concentrated and diluted forms. Gloves and goggles are recommended. Extra care is required when applying disinfectant in windy conditions.
10. Move the vehicle and equipment ahead to a dry area.

Recommended process for cleaning interior

1. Remove and dispose of all garbage and disposable items.
2. Remove loose objects and containers then clean and sanitize the exteriors before returning them to the cleaned vehicle. "Dirty" containers must be emptied and cleaned and sanitized inside and out.
3. Thoroughly clean and sanitize all equipment used.
4. Remove, wash and sanitize floor mats and trunk liner.
5. Vacuum interior of vehicle including seats, floors and trunk.
6. Clean panels, windows, steering wheel, door handles, shifters, and floor pedals with detergent and disinfectant (spray or use disinfectant wipes).
7. Clean any truck or trailer "cubby" compartments using these same processes, e.g. clean and sanitize removable items and vacuum.
8. Return containers, mats, and other removed items to their appropriate spots when dry.

Use of disinfectants

Information about disinfectants is available on the product label or from farm supply dealers, veterinarians, the Canadian Animal Health Institute and the product manufacturers.

Familiarize yourself with the product information contained on the product label or package insert before making a selection. For a particular application, determine if a product:

- has activity against bacteria, fungi or viruses;
- is active in organic debris (manure);
- is effective in hard water;
- requires a specific water temperature or pH to be effective;
- has decreased or enhanced activity in heat (whether water or ambient temperature);
- has residual activity after application;
- is compatible with soaps;
- is caustic or has irritating fumes;
- is safe to use on equipment coming into contact with feed;
- is appropriate for the intended use; and,
- is environmentally friendly (i.e. breaks down to harmless, non-toxic compounds) or can be disposed of in accordance with provincial regulations. NOTE: This is required for "trait" programs like "raised without antibiotics" (RWA).

4. FACILITIES, EQUIPMENT AND PROCESSES

Many of the suggested best practices in this section are also covered, in greater detail, from the perspective of good manufacturing practices relating to feed safety in the FeedAssure® Prerequisite Program Manual. Quality assurance and feed safety programs also enhance biosecurity and vice versa, however, each has a different focus.

Biosecurity should be considered during the hazard analysis for the facility. As with the feed safety and quality assurance programs, the biosecurity program and protocols should be re-evaluated periodically to ensure that protocols are appropriate, and risks are being managed.

Premises

- Inquire or be aware of neighbouring businesses and whether activities conducted on those premises have the potential to spread pathogens to your facility, e.g. presence of manure, livestock or poultry, wildlife, dust, organic debris, etc. The same applies to other non-feed business operations on your premises. Apply biosecurity practices to mitigate risks those operations may pose to your business.
- Validate that all chemicals, lubricants, paints and cleaners on feed contact surfaces are suitable for use in feed manufacturing.
- Maintain good drainage to eliminate puddles and wet surfaces. Pooled water can attract wildlife and pests, serve as a breeding ground for insects, and facilitate the survival of pathogens.
- Maintain adequate lighting to permit visual identification of potential pest contamination of ingredients and for effective cleaning.
- Use only potable water in feed and feed ingredients. If not using municipal water, have your water source tested for contaminants at least annually and document results.
- Provide adequate hand washing facilities that are supplied with soap and drying equipment to control the spread of pathogens and medication residue. Gloves can also spread pathogens and residue. They should be cleaned, changed or dedicated for specific use as appropriate to the situation.

Contamination of grain and feed by birds

Wild birds excrete a variety of pathogens in their droppings, including bacteria such as *Campylobacter*, *Listeria*, *Salmonella*, *Aeromonas*, *Vibrio cholera*, *Yersinia* and *Escherichia coli* 0157, and protozoa such as *Giardia* and *Cryptosporidium*, as well as the bacterial indicators of pollution, fecal coliforms and enterococci.

Therefore, where wild birds congregate, they are likely to pollute their immediate environment with some or all of these pathogens. For example, a Canada Goose can deposit about a half a pound of fecal material on cropland each and every day.

Fecal contamination of crops, and of feed and feed ingredients, is an important issue.

Adapted from: Jones, K., Flying hazards: birds and the spread of disease, *Microbiology Today*, November 2005.

Manufacturing process (flow)

Physical separation of different activities and products is a good biosecurity practice. As such, the design of the facility and locations for receiving, production and storage should be considered when designing facilities or when operating an existing facility. A one-way flow, where possible, should be maintained to prevent contamination of “clean” zones by movement of people, equipment and supplies from “dirty” zones. (For example, there may be a higher potential for pathogens in raw materials compared to finished product that has undergone a pelleting process.) This one-way flow also applies to ventilation and air movement.

- Set up the processing system and equipment to prevent cross contamination of feeds and feed ingredients, particularly those where there is a risk to animal health such as medication residues and prohibited material. Use verified flushing and CFIA permitted sequencing to reduce the probability of batch-to-batch contamination.
- Sustain adequate ventilation to prevent contaminated air or steam contacting feed products.

Imported feed and feed ingredients

The potential risk of disease transmission from imported feed and feed ingredients was raised by an investigation carried out in the U.S. regarding the possibility that PEDv could have been introduced to that country through imported feed or feed ingredients.

All feed ingredients have the potential to introduce pathogens; the additional concern with imported components is the presence of foreign animal diseases in the country of origin.

Implementing good biosecurity practices at feed mills will mitigate this risk. This includes only sourcing ingredients and supplies through validated suppliers and periodic testing of feed ingredients for pathogens and contaminants.

Risks Associated with Imported Feeds and Spread of Swine Diseases, e-Biz Professionals Inc. commissioned by the Ontario Pork Industry Council, 2017



The photo above shows the delivery truck unloading a feed ingredient which is missing the receiving pit. In the photo below, the truck is correctly positioned.

Photos courtesy Kansas State University



Supplier program

- A rigorous supplier approval and verification program is an important aspect in minimizing biosecurity risks. Purchase feed ingredients and materials from approved suppliers with adequate written assurance of compliance for identified hazards (e.g. letters of guarantee).
- Communicate your company's biosecurity protocol and expectations with suppliers including transport companies. Consider adding biosecurity compliance questions to your approved supplier questionnaire, i.e. Do ingredient delivery trucks also haul feed or feed ingredients onto farms? Ask for supplier biosecurity protocols if applicable.

The movement of feed ingredients from mill to mill is also a biosecurity risk especially if it is not known from where the ingredients originate, how they have been transported, and if the original suppliers were approved by the incoming mill.

Receiving

- Do not accept delivery vehicles into the facility if there are visible contamination hazards (e.g. mud or manure, or previous product residues). This includes producer owned vehicles that are picking up feed or delivering grain. Inquire regarding what was shipped or transported in the vehicle previously when receiving feed ingredients.
- Inspect feed ingredients at delivery for any signs of pathogen contamination, e.g. rodent or bird feces, and moulds. Examine bags for integrity of packaging and potential contamination including surface contamination. Raw materials have a high potential for introducing pathogens into the feed mill e.g. Salmonella, mycotoxins, moulds. Develop a company protocol for appropriately addressing contaminated shipments flagged at receiving.
- Implement routine sampling and testing of feeds and feed ingredients for pathogens and other contaminants, e.g. Salmonella, mycotoxins, fungi.
- Confirm the identification of ingredients at receiving (e.g. label check, product name, and delivery date), record required information, and ensure feed and non-feed materials are adequately segregated in storage to prevent cross-contamination.
- Best practice is not to accept returned feed, used skids, pallets, totes or bags into your facility that have been stored on farm. Items that have been on-farm pose a biosecurity risk.

- Train employees on proper ingredient inspection techniques and how to determine when delivery vehicles or ingredients should be rejected. This is the same for the returning of feed, skids, pallets, totes or bags, especially if this represents a change in policy. Staff need to feel supported when dealing with difficult clients.
- Maintain a clean receiving area. Minimize the accumulation of debris, dust and ingredients.
- Keep covers over the dump pit until the truck is ready to unload. Do not sweep any spilled ingredients or debris into the pit.
- Secure receiving pits against pest or water entry.
- Flush receiving pit or common lines where incompatible materials are received before re-use.
- Restrict driver movement and establish cleaning protocols and documented training for personnel when moving from the receiving area to other areas within the feed plant. The receiving area may be exposed to pathogens from arriving vehicles and outside suppliers. Foot traffic from the receiving area could move pathogens into the feed manufacturing plant.

Importance of testing for mycotoxins

Mycotoxins are naturally occurring byproducts of moulds and can contaminate various agricultural commodities in the field and postharvest. Commodities such as corn, wheat, soy, rye and oats can be contaminated with mycotoxins, depending on growth and storage conditions. The consumption of mycotoxin-contaminated products may have acute toxic health results in animals as well as chronic health effects, and decreased production and growth.

Mycotoxins and some moulds are not visible to the eye and require laboratory tests to determine the presence of toxins. Additionally, mycotoxin content is not necessarily related to the amount of mould present. Even after testing, mycotoxins may continue to be produced in storage, particularly if unfavourable storage conditions exist.

Good “housekeeping” supports biosecurity

- Put in place a routine facility/property maintenance program.
- Conduct routine inspections of equipment and buildings.
- Maintain buildings and mechanical equipment in good repair.
- Have signage and boundaries clearly marked and maintained.
- Keep areas around the production facility well drained and free of standing water (puddles).
- Make sure that buildings can be easily cleaned and disinfected.
- Design buildings to prevent the entry of wild birds and animals and limit the presence of vermin.
- Ensure that building doors and gates can be locked.
- Maintain driveways and walkways in good repair and construct them in a manner which promotes adequate drainage and reduces tracking of soil and organic material.
- Document all maintenance, repairs and inspections.

Storage

- Keep storage containers clean, in good repair and clearly identified (including bulk and bags).
- Rotate inventories of ingredients and finished feed using first in first out principles to minimize deterioration and contamination.
- Avoid condensation in raw material and finished product which can promote mould growth and increase the risk of insect infestation. Storage areas should be constructed in such a way that the interior can be kept cool and dry with adequate ventilation.

Cleaning and maintenance

In general, a clean environment will reduce the risk and spread of pathogens. Not only should the inside of the buildings be kept clean, but the area around the outside of the buildings should also be maintained.

- Require regular cleaning of equipment and sweeping of floors. Dust from the floor, equipment sweepings, or dust collection equipment should not be placed into the manufacturing system. Be cautious not to blow dust around; vacuum or suction it up.
- Properly identify, store and use dust collector materials, feed for reprocessing, returned product and flush materials in a manner that prevents contamination of other feeds and ingredients.
- Isolate waste containers from the main feed production areas and ensure they are leak proof. Clearly label the containers and regularly clean and maintain them.
- Ensure waste is clearly identified and disposed of in accordance with local environmental regulations.
- Conduct equipment maintenance on a regular basis. Do not use defective equipment, with an impact on feed safety, until verified to be operating within acceptable limits.

Wildlife and pest management

Birds and rodents can be infected by pathogens, transmit pathogens on their feet, feathers/fur and other parts, and destroy thousands of dollars' worth of feed, supplies and buildings each year. You may be inadvertently enticing wildlife to your production areas by providing a feed source in spilled feed or access to feed storage.

- Document and implement a pest control program and/or contract pest control services from a reputable provider.
- Screen all openings in naturally ventilated buildings and exhausts.
- Seal off openings in roofs and walls.
- Screen ledges that could be used as nesting sites. Eliminate these areas from new designs.
- Clean up feed spills.
- Maintain bait stations. Regularly check bait consumption (e.g. every four weeks) and move bait stations periodically. Bait stations should be easily accessible for verification.
- Minimize vegetation and debris around facilities.

- Consider a two to five-foot apron of crushed stone/gravel around the perimeter of buildings and storage areas to deter rodents.
- Control the fly population by using traps, baits or flypaper, insecticides, or a combination of control measures.

Deterring birds

The photo shows a scare-eye balloon which can be hung from rafters to deter birds from entering buildings. They retail for approximately \$20 and are available at farm supply stores and also on-line. Different bird species react most strongly to certain colours. For example, blackbirds reportedly do not like the colour yellow and will avoid areas immediately around yellow scare-eye balloons.

Any type of bird deterrent must be moved frequently to new locations in and around the buildings to help prevent habituation.



Rodents and flies

A rat deposits 25,000 droppings and a mouse 17,000 droppings in one year. Even a small population of these rodents may severely contaminate feed supplies.

Rule of thumb – A hole the size of a dime is enough for a mouse to squeeze through. A rat can squeeze through a hole the size of a quarter.

Flies can also carry disease and have been shown to travel up to 1½ km from farm to farm.

Plant pathogens

In addition to pathogens that can cause disease in animals, feed could be contaminated by plant diseases (depending on the crops used), plant pests (such as insects and nematodes) and weeds that can then be spread to farms. This is another reason why it is so important to check incoming ingredients at the mill to protect the safety and integrity of the finished product.

Vehicles and farm equipment can spread plant and animal pathogens from farm to farm, farm to feed mill, and from mill to farm through insects, manure, soil and plant debris. Seeds and soil can stick to tires, bumpers, wheel wells or the underside of a vehicle and sometimes travel great distances before falling off. Montana State University conducted a research trial on the role vehicles play in the spread of invasive weed species. They found that even after 160 miles, many seeds stayed attached to vehicles. Wet conditions make it easier for seeds to be picked up by a vehicle. If seeds are lodged in mud that dries on the vehicle, they can travel almost indefinitely or at least until it rains again and the road surface is wet. Weed seeds and plant and animal pathogens can thus be transported considerable distances facilitating their spread. For example, Clubroot is a serious soil-borne disease of cruciferous crops and has become a key disease for the canola industry since it was first detected in that crop in Canada in 2003.

5. ON-FARM CONSIDERATIONS

Sales staff, nutritionists, feed delivery drivers, and other employees who will be visiting customers' farm locations must be aware of your company's biosecurity protocols for farm visits as well as any biosecurity requirements set by the farm. Whichever biosecurity standards are more stringent, are the ones that should be followed. For example, as noted in the Introduction, the on-farm considerations contained in this chapter will not be directly applicable to aquatic feed suppliers. All activities on fish farm sites in Canada, including biosecurity requirements in relation to feeds, are established in the conditions of licence that fish farms must meet. These requirements are verified during third party certifications such as the Global Aquaculture Alliance BAP and the Aquaculture Stewardship Council.

Not all procedures may apply to your role in the feed supply chain.

Follow biosecurity protocols

- Ask producers for their biosecurity protocols prior to your visit and comply with them.
- If your customers provide you with a copy of their farm protocols, keep them on file and provide to staff for all visits. Contact customers regularly (e.g. annually) to determine whether protocols have changed.
- Identify and record the health status of animals at the premises and any known disease risks in the customer's file.

On-farm challenges

The biosecurity measures in this chapter are best practices and are provided as guidance. The variability in farm lay-out and structures across Canada, across species and even within commodity groups is acknowledged. Some suggested practices may not be feasible. Implement the practices that are feasible and make suggestions for improvement to customers where appropriate. Each biosecurity practice you are able to implement will help to reduce risk.

- Inquire whether a diagram of the farm site and locations for entry and feed delivery is available. Knowing what to expect in advance provides the opportunity to better manage possible risks.
- Practice the higher level of biosecurity, either your company's biosecurity standards or those of the farm.

Feed mill employees who own livestock, poultry or pets

Farm visitors, who own livestock or poultry, even pet birds and pot-bellied pigs, are a potential risk to farming operations. Establish a company policy and specific protocols for each species to minimize the risk of your staff introducing pathogens to farms you service.

- Require feed mill employees who own livestock or poultry to shower and don clean clothing and footwear before visiting a farm after being in their own barn or animal facility.
- Request that employee vehicles used for farm visits or coming to the mill site are visibly clean and do not contain potential sources of pathogens such as equipment from their home farm premises.

Clothing – before arriving for work

- Instruct all employees who go on-farm to shower before arriving for work and wear freshly laundered clothing and disinfected footwear. To disinfect footwear, scrub free of organic material, wash with water and detergent, apply a disinfectant and allow to dry. If gloves are worn on-farm, they must also be clean.

Sequence of farm calls

- Sequence farm calls to minimize contamination by travelling from herds and flocks of higher to lower health status and from youngest to oldest. High biosecurity, high health farms should be scheduled earlier in the week/day. For example, visits to poultry breeders or hatching egg flocks should occur before market ready broiler operations.



Driving onto farm

Encourage customers to maintain access routes that are free of manure, crop residue, water and mud (well-drained gravel avoids the latter). Organic matter, potentially contaminated with pathogens, can accumulate on wheels, wheel wells and the undercarriage, if farm access routes are contaminated and are poorly maintained. These pathogens can be transmitted to other farms or back to your mill.

- Follow posted biosecurity signs and instructions.
- The feed delivery truck, and other feed representatives, must only enter the farm via the designated farm entrance.
- *Drive slowly* (less than 15 km/h) to minimize dust when near barns and to reduce accumulation of debris in wheel wells and undercarriage of vehicle.
- Avoid large puddles, heavy mud, effluent (e.g. silo runoff) and obvious manure whenever possible. Unsuitable driving conditions should be reported to the company office or dispatch.
- Avoid driving near barns that contain livestock and poultry if possible.

Parking, windows and vents

Keeping vehicles 15 m or further away from barns, specifically the inlet and exhaust ducting of barns, will reduce the risks associated with intake dust and exhaust fumes to the livestock and poultry in the barns. It will also reduce the risk of potential contamination of service vehicles from exhaust fans.

- Keep vehicle windows and doors closed at all times to limit entry of flies or other insects which could transmit pathogens to other farming premises.
- Avoid parking by exhaust fans and air inlets unless required as part of loading or unloading.
- For non-feed delivery vehicles, look for designated visitor parking.

Delivering feed and medications

Ideally, producers should purchase their own feed blower pipes that will remain on their premises. Moving equipment between farms is a biosecurity risk.

Tip – managing footwear

A good rule of thumb is that your off-farm footwear should never touch the farm and the farm (i.e. dirt on bottoms of your footwear) should never touch the interior of your vehicle.

- Delivery staff are to put on toe rubbers or disposable boot covers when exiting their vehicle. Care should be taken to place covers on shoes as you are stepping out of the vehicle to prevent contact between the shoe/boot cover and the floor of the vehicle. Note: Plastic boots and boot covers may pose a safety concern during wet and cold weather. See point on the following page regarding cleaning and disinfecting permanent footwear.
- Deliver bagged feed to a secondary building and preferably not into the barn and definitely not onto an animal loading chute. An alternative may be to unload bags onto a cart or wagon parked outside the barn or from the feed truck to farm truck and have the farm owner or manager transfer them to the inside of the barn.
- If delivery of bagged feed or medications does require entrance to barns, advise producers that these products should be dropped in a designated area as close to an entry point as possible and preferably not near livestock or poultry, especially young stock.
- Ensure the cold-chain can be maintained, without compromising biosecurity, when delivering medications. For example, arrangements should be made to ensure that the refrigerator is not located too far within the barn.
- Communicate any biosecurity concerns to the farm operator, i.e. feed bins located next to compost pile, deadstock, load-out chute, manure pit, and fans. Cleanliness of the feed bin area is important to prevent pathogen contamination of the feed delivery vehicle, equipment and driver (potential to spread to other sites).
- Ensure the feed blower pipe, brooms, shovels, and other removable items do not touch the ground.
- Clean up feed spills as best possible; but do not load back onto the truck. Drivers should check with the farm owner or manager where to dispose of spills.
- Leave invoices in a designated area, such as mailboxes attached to the bin leg or outside of the office.

- Remove the toe rubbers or boot covers as the driver steps into the cab upon return to the vehicle so no contact is made with the inside of the cab. Place the toe rubbers or boot covers in a plastic bag or 'dirty box'.
- Wash and dry toe rubbers and place in a clean area before being used on another farm premises.
- Wash, **disinfect** and dry any footwear that has been in contact with manure.

Assessing on-farm risks

The greatest biosecurity risk is anything that contacts organic matter on the farm. Therefore, driving slowly and avoiding mud and manure is the first priority.

Second, ensuring that the interior of the truck cab is kept clean and boots and gloves are cleaned between farms is best-practice. The most practical is not as extensive as the weekly cleaning, but includes removing all visible organic material and utilizing a disinfectant on boots, gloves, and cab surfaces.

Third, some attention should be paid to blower pipes that come in contact with the ground. Solutions to this include farm owned blower pipes, leaving blower pipes on-farm, or disinfecting blower pipes between farms (remove all visible organic matter from the exterior of the pipe and spray/apply a disinfectant).

Entry to livestock or poultry housing area

- Do not enter any building on the property except where you need to deliver service unless you have the permission of the producer or farm manager.
- Sign the visitor log book.
- If you must enter the area where livestock or poultry are housed, changing of clothes depends on the hygiene requirements of the farm visited. For shower-in, shower-out facilities, on-farm clothing is typically provided. Otherwise, follow the farm's protocols regarding donning clean coveralls, disposable boots, and hairnets as appropriate.
- Disinfect hands with hand sanitizer or wash hands in the washroom facilities if available before entering the animal housing area.

Keep it out, keep it in

The key point is to avoid tracking pathogens into or out of the barn.

People can spread pathogens and contaminated material on footwear, hands, hair and clothing or on equipment.

Barn exit

- Dispose of disposable boots and clothing (if worn) before re-entering the vehicle.
- Sanitize any equipment used in the barn or place in a "dirty" container.
- Clean, disinfect and dry any equipment used in the barn before using in another barn.
- Leave trash and disposables at the farm, if possible, to prevent pathogen spread from the farm to another farm or back to home base. If it is not possible to leave it on the farm, place it in a secured plastic bag for later disposal.
- If disposable footwear is not used, scrub footwear of visible organic matter and spray with disinfectant adhering to the label recommended contact time and allowed to dry before entering the vehicle.
- Remove washable coveralls without contaminating street clothing and seal in plastic bag and keep in dirty section of vehicle. Coveralls used in-barn must be washed before being worn again.
- Leave on gloves until all exit activities are completed; they are the last item to dispose of or place in the sealed container. Regardless of whether gloves are used, remove organic matter from hands, wash with soap, or apply a sanitizer before entering the vehicle.

If no wash facilities are available on the premises, consider bringing a mixture of water and soap, and add propylene glycol to limit freezing in the winter.

- Keep your own records identifying where you have been and when, e.g. a vehicle log or a personal log if different vehicles are used.

Hand sanitizer

When using a hand sanitizer, be sure to use enough to cover all surfaces of your hands, including between your fingers, and rub your hands until they are dry. Also, the alcohol content of the sanitizer must be at least 60% to be effective and check the expiry date.

6. HEIGHTENED BIOSECURITY ALERTS AND DISEASE OUTBREAKS

Sometimes, farm locations with herds or flocks that are known to have challenged health may need to be visited by feed personnel and require feed delivery. Encourage your customers to notify your office when they are experiencing a health challenge on their farm so that you are able to respond accordingly. Likewise, remind feed mill staff to ask about animal health status when scheduling visits. Additional biosecurity measures may be required in order to prevent the spread of pathogens to other farm locations or back to home base.

Health challenged herds or flocks

In addition to the biosecurity best practices listed in the other sections of the document, some additional practices should be incorporated into feed delivery and farm calls.

- Always service the health challenged herd or flock last if multiple farm sites are visited the same day.
- Ideally, the producer will own their own feed blower pipe which is designated to that farm and remains on farm. Otherwise, disinfect the blower pipe immediately prior to leaving the farm or auger off feed if possible.
- Inquire whether there is an option for the producer to shuttle feed from the feed delivery truck, at the end of the driveway, to the feed bins to reduce the contamination risk to the feed truck.
- For known health challenged herds or flocks, inquire if it is possible to turn off exhaust fans located near the feed bins during feed delivery to prevent pathogens from the inside of the barn contaminating the delivery vehicle.
- Use disposable items such as coveralls, gloves, masks and boot covers (as safety considerations allow) if you must enter the livestock or poultry housing area,
- Remove disposable wear when exiting the barn and leave on the farm in a garbage bag for the producer to dispose of.

- If not using disposable items provided by the producer, place clothing and footwear inside a sealed garbage bag or tote before putting these items inside the vehicle for removal from farm. Wash clothing and clean and disinfect boots prior to visiting another farm.



- Spray or wipe other equipment used on the farm (e.g. scales, computer, samplers) with disinfectant and allow to dry before using on another farm.
- Clean and disinfect the vehicle's wheel wells and undercarriage as far as practical prior to exiting premises. Always follow the manufacturer's recommendations regarding disinfectant application and contact time.
- Choose a route that passes as few farms with the same or susceptible species as possible on the way to the end destination.

Reportable or notifiable disease alerts

In the event of a reportable, notifiable or disease of economic significance, industry, provincial or federal governments will provide specific biosecurity measures to be followed. Biosecurity measures may include movement restrictions and permits.

In addition to routine biosecurity practices and those listed above for health challenged herds and flocks, the following are additional considerations for farms with susceptible species.

- Schedule only essential services when an alert situation exists.
- Designate someone to be responsible for accessing the most recent CFIA, provincial government or industry updates regarding: zoning changes, prohibited roadways, location of disinfection stations, infected premises, and routing.
- Designate someone to communicate to other employees appropriate disease alert information and biosecurity protocols to be followed.

- Practice proactive biosecurity by using clean and disinfected boots, premises-designated boots, boot covers, or new boots, clean coveralls, or premises-designated coveralls. In an alert situation, one of the most important factors in the spread of disease is people.
- Urge the producer to supply any disposable PPE clothing rather than taking supplies onto a farm in the disease alert area.
- If they exit the vehicle, employees must wear disposable coveralls or remove their outer clothing before re-entering their vehicle for departure. The removed clothing must be securely bagged, removed from the site, cleaned and disinfected.
- Clean and disinfect the vehicle's wheel wells and undercarriage as far as practical prior to entry and exiting premises.
- Do not take feed samples from farms in the heightened biosecurity zone.
- For feed mills that deliver to multiple species, it is important to know the susceptibility of each species to a specific disease outbreak. Ranking susceptibility and going to the species-susceptible farm last could drastically reduce the number of trips inside a zone. However, if a farm is deemed quarantined by a government agency (not positive for disease but a susceptible species within a government-controlled zone), control measures will be in place which may include vehicles being cleaned and disinfected prior to and after delivery.

Be aware that producers may request additional cleaning and disinfection of vehicles and equipment prior to entry onto the premises, as well as on exit. Communicate with the producer to identify where cleaning and disinfection should occur on the premises, the recommended protocol, and the supplies available.

Vehicle washing

Vehicles should be washed a minimum of once daily when conducting farm calls or delivering in a heightened biosecurity zone.

- Completely wash the vehicle exterior and clean the interior of the cab after leaving a heightened biosecurity zone.
- Wear coveralls and boots during the process if using a pressure washer; remove upon completion and before entering vehicle.
- Clean from top to bottom, outside to inside. The sequence for cleaning is important.

Recommendations for exterior cleaning:

1. Ideally use a pressure washer, set on low, to remove all visible organic material, including wheel wells, wheels and exposed chassis. Inspect to be sure no organic material/debris remains.
2. Wash all areas with detergent suitable for vehicles using the water temperature and pressure as recommended on the product label.
3. Using a pressure washer (low to medium pressure), rinse all external areas (can be cold water). Inspect to be sure no organic material/debris remains.
4. Some disease situations will require the use of a disinfectant; ensure the disinfectant is effective against the pathogen in question. Follow manufacturer's directions regarding concentrations and contact time. Be aware that the water pH can impact the efficacy of the disinfectant.
5. Once the exterior of the truck has been washed and sanitized, move the truck a minimum of one truck length from where the exterior was cleaned before the cleaning of the interior may proceed.

Recommendations for interior of vehicle:

1. Remove and dispose of all garbage and disposable items.
2. Remove loose objects and containers and clean and sanitize the exterior of these objects and containers before returning them to the cleaned vehicle. "Dirty" containers must be emptied and cleaned and sanitized inside and out
3. Thoroughly clean and sanitize all equipment used.
4. Remove, wash and sanitize floor mats and trunk liner.
5. Vacuum interior of vehicle including seats, floors and trunk.
6. Clean panels, windows, steering wheel, floor pedals with detergent and disinfectant (spray or use disinfectant wipes).
7. Inspect entire vehicle and associated objects for adequacy of cleaning. Re-clean any deficient areas.
8. Return containers, mats and other removed items to their appropriate spots.
9. Clean up cleaning area.

7. PLANNING, TRAINING AND DOCUMENTATION

Working through the process of writing a biosecurity plan or a set of protocols will help you to assess your pathogen risks and identify where you can improve biosecurity practices. After reading this manual, the next steps could include:

1. Identify potential concerns or problems.
2. Evaluate who and what enters and exits your site. Consider from where traffic and products are coming and whether the point of origin poses a biosecurity risk.
3. Determine the risk level for specific pathogens of concern.
4. Evaluate how pathogens could enter your production site and spread within and off the property.
5. Identify preventative biosecurity measures that will manage or minimize the risk factors for pathogen entry or spread.
6. Create biosecurity protocols for your operation.
7. Establish a training program for staff.
8. Consider what communications are necessary to convey biosecurity expectations to suppliers and customers.
9. Set an annual review date.

Extra set of eyes

Consider inviting a third party to review your facility's biosecurity control points and biosecurity plan. There may be risks within your operation that you overlook due to familiarity.

Going through a formalized process of assessing your site's biosecurity risks and writing down your plan will help you identify areas you might overlook otherwise.

Assessing risk

There is a biosecurity checklist included in the next section of this manual. Complete the checklist as step one above, identify potential concerns or problems. It will help assess which biosecurity practices are already being followed at your facility and flag areas for improvement. The checklist could also be completed after a biosecurity plan and practices have been put in place or as an annual review.

Establishing goals

In order for a biosecurity plan to be effectively implemented, the policies and protocols must be communicated to everyone involved in the operation. Education about the biosecurity policies and protocols should be incorporated into the company's orientation and training program.

Management plays a key role in establishing a "culture" or commitment to biosecurity practices. This includes participation in the process as well as providing resources to ensure the success of implementation and then on-going maintenance of the recommended practices. This commitment is demonstrated by establishing and maintaining written policies or protocols and in company communications to personnel, which should be clear and on-going.

Implementing practices

- Establish a good record keeping system (e.g. log books) for: cleaning and disinfection, servicing of vehicles, equipment and buildings; rodent bait changes; farm disease occurrences; and staff training.
- Maintain production records for feed ingredients and feed products to enable tracking in the event of a pathogen concern.
- Incorporate visitor and vehicle logs into your record keeping system.
- Inquire about the biosecurity status (historical use and ownership) of land or buildings prior to renting, leasing, or buying.
- Write down your biosecurity protocols and update regularly; review annually at a minimum.
- Ensure that employees receive proper training and resource materials so they can continue to follow the plan. Refresher training should be provided at least once every three years and whenever there are changes to protocols. New employees require training before they begin work activities in your operation.

Employee training

Staff training may involve:

- having employees read written factsheets and protocols, sign off that they have done so and understand the content;
- conducting classroom style presentations and group discussions;
- demonstrating to staff how to carry out certain practices and having them execute the task to confirm competency; or
- running a simulation exercise to test how well certain practices would work.

Keep a log of training dates, names of those trained, topics taught, and who led the training.

- Train employees on proper ingredient inspection techniques and how to determine when delivery vehicles or ingredients should be rejected. Ensure they are aware of the procedure for rejecting deliveries and also the policy on returned feed, skids, pallets, totes or bags especially if this is a change from past practice. Staff need to be supported by management if suppliers or customers challenge a decision.
- Create a map of the layout of your site to assist in training new employees. Understanding the logic of production movements and work patterns can be an important part for the development, implementation, and modification of a biosecurity plan.
- Post specific instructions in areas of concern.
- Share components of your biosecurity plan as appropriate with suppliers, customers, neighbouring property owners, and visitors to your site (e.g. equipment technicians, courier and delivery).

Summary: biosecurity planning

- Define the biosecurity goals and standards that you wish to maintain.
- Develop and implement a written and workable biosecurity plan.
- Ensure that each production facility has a copy of the biosecurity plan.
- Monitor and change as situations change and new knowledge becomes available; review at least annually.
- Maintain periodic training and discussion sessions with staff.
- Share components of your biosecurity plan as appropriate with suppliers, neighbouring businesses, service providers, and customers.
- Keep well informed on plant and animal health developments (locally, regionally, nationally, and internationally).

8. BIOSECURITY SELF-EVALUATION CHECKLIST

This self-evaluation checklist is intended to assist your company identify which biosecurity risks you have already addressed, which could be improved upon and where there are gaps.

Note: The list does not contain all of the points you should consider in developing biosecurity protocols for your operation. As well, not all practices listed may be possible or appropriate for your particular facility or site.

Biosecurity practices	Self-evaluation checklist				Notes
	Always/ frequently	Some- times	Never	N/A	
People and vehicles					
Employees have been directed to report for work wearing clean clothing and footwear and with clean vehicles.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
There is designated and signed parking for employees.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
There is designated and signed parking for visitors.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Biosecurity or restricted entry signs are posted at appropriate entry points.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Visitor entrances are clearly marked.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Gates and building doors are locked where possible.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Driveways and access routes used by visitor and delivery vehicles are maintained and kept free of mud and feed residue.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
A visitor log book tracks who has been in the production area and their last known contact with livestock or poultry.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Facilities, equipment and processes					
A protocol is in place to ensure feed delivery and service vehicles going on-farm are clean, with no visible contamination inside or on the outside of the vehicle.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
There is a designated, well-drained equipment cleaning area outside the production area through which people or other vehicles will not travel.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
All chemicals, lubricants, paints and cleaners are validated for use in feed manufacturing.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Areas around the production facility are kept free of standing water (puddles) and are properly drained.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		

Biosecurity practices	Self-evaluation checklist				Notes
	Always/ frequently	Some- times	Never	N/A	
Delivery vehicles to the mill site are assessed for their potential to introduce pathogens.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Inputs are purchased from suppliers with a quality feed assurance program that includes written guarantees of pathogen control, nutritional value, and safety from physical or chemical hazards.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Feed ingredients are inspected for contamination at receiving.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Feed and non-feed materials are adequately segregated in storage to prevent cross-contamination.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
The flow of people, product and equipment is organized to prevent pathogen introduction and cross-contamination.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
The facility has adequate ventilation and lighting.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Water is routinely tested and only potable water is used in feed.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
All storage and waste containers are clearly labeled, cleaned and maintained regularly.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
There is a written protocol for routine sampling and testing of feeds and feed ingredients for pathogens. It includes how to manage feed and ingredients that may have pathogen or pest contamination.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Hand washing facilities are available and are equipped with soap and drying equipment.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Staff perform regular equipment and facility cleaning and maintenance.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Control measures are in place for birds, rodents and wildlife.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Weeds and vegetation are controlled around production areas.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
On-farm considerations					
Farm calls and deliveries are scheduled so that farms of higher health status are visited before lower health status sites.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Feed personnel are directed to use designated farm entrances, and avoid contact with debris, organic material such as manure and minimize generating dust.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		

Biosecurity practices	Self-evaluation checklist				Notes
	Always/ frequently	Some- times	Never	N/A	
While on farm, vehicle windows and doors are closed and staff park in designated areas.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Delivery staff put on toe rubbers or disposable boot covers before exiting their vehicle and remove before re-entry. Toe rubbers are cleaned before being used on another farm.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Delivery of bagged feed or medications into barns near livestock or poultry is avoided.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Feed delivery drivers have been directed to take care the feed blow pipe, brooms, shovels, and other removable items do not touch the ground. Feed spills are cleaned up but not loaded back onto truck.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
If staff must enter the animal housing unit, they wear clean or disposable clothing, sign the visitor log book, and disinfect hands before and after entering the barn area.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Any equipment used in the barn is cleaned, disinfected and dried before being used in another barn.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Trash and disposables used on the farm are left on the farm.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Planning, training and documentation					
Your company has written, heightened biosecurity protocols for delivering to and visiting farms with health challenged herds or flocks.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Records are maintained for: cleaning and maintenance of vehicles, equipment and buildings; visitor and vehicle logs; and farm health status.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Equipment purchases are evaluated for their cleaning ease before buying or leasing, i.e. trucks, trailers, milling equipment.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Employees are aware of and educated about your biosecurity protocols.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Employees receive proper training and resource materials before they begin work activities in your operation so they can follow your biosecurity protocols.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		

9. LIVESTOCK AND POULTRY FEED SUPPLIERS' BIOSECURITY FACTSHEET

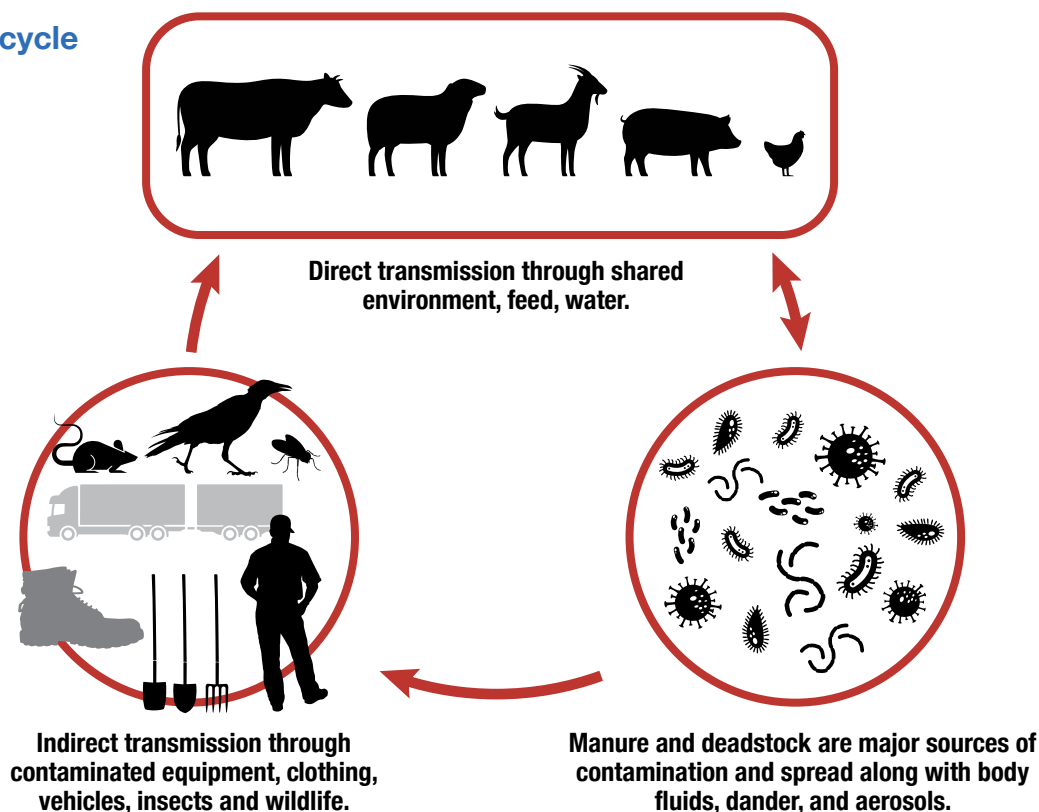
This factsheet is based on the National Biosecurity Guide for the Livestock and Poultry Feed Industry produced by the Animal Nutrition Association of Canada. It is intended to provide recommendations to employees for routine day-to-day biosecurity. Owners and managers should refer to the manual for additional details regarding best practices for mill operations and processes.

The feed industry encompasses a wide variety of jobs and activities so not all of the points listed in this factsheet may apply to you. As well, different types of services performed at the production site and on farms have different levels of biosecurity risk. For example, a nutritionist who enters the animal housing facilities on farm has a higher potential risk of transferring pathogens than a sales representative who meets in a separate farm office and has no other on-farm calls that day.

Pathogens are anything that has the potential to cause disease such as a bacterium, virus, fungus, parasite, and prion. They can be spread in a number of ways, including:

- through infected animals that are clinically infected (they show signs of disease) and animals that are sub-clinically infected (they are infected yet appear healthy);
- through animals other than livestock (pets, wild birds and other wildlife, vermin, and insects);
- on the clothing, hair and shoes of visitors and employees moving from farm-to-farm or between production units on-farm;
- in contaminated feed, water, bedding and soil;
- from deadstock;
- on contaminated equipment and vehicles; or
- in airborne particles and dust blown by the wind and exhaust fans.

The disease cycle



People and vehicles

- Instruct employees to arrive at work wearing clean clothes and footwear and with clean vehicles (interior and exterior).
- Require employees to shower and change clothes daily before reporting for work if they own or live at a location with livestock or poultry.
- Park vehicles in designated area at feed production facility or office.
- Ensure visitors park in the appropriate location, only use visitor entrances, sign the visitor log, and do not enter any restricted areas.
- Keep gates and building doors locked where required.



Ingredients, supplies and feed processes

- Do not accept delivery vehicles and incoming materials into the facility if there are visible hazards (e.g. rodent infestation, mud or manure, previous product residues).
- Purchase feed ingredients and materials from approved suppliers, with written assurance of compliance for identified hazards.
- Confirm the identification of ingredients at receiving and record required information.
- Ensure feed and non-feed materials are segregated in storage to prevent cross-contamination.
- Be diligent in following your company's protocols regarding the movement, order, flushing and storage of product and equipment to prevent pathogen introduction and cross-contamination of feed and feed ingredients.
- Use only potable water in feed and feed ingredients.

- Best practice is to not accept returned feed, used skids, pallets, totes or bags into the facility that have been stored on farm. Items that have been on-farm pose a biosecurity risk.



Cleaning and maintenance

- Properly identify, store and use dust collector materials, feed for reprocessing, and flush materials in a manner that prevents contamination of other feeds and ingredients.
- Wash your hands with soap and thoroughly dry to prevent the spread of pathogens or medication residue.
- Keep birds, rodents and other wildlife away from the production facility. Monitor bags for signs of damage.
- Follow your company's cleaning, maintenance and inspection program for equipment and buildings; document all maintenance, repairs and inspections.
- Maintain areas around the production facility free of standing water, weeds and vegetation that might harbour pests.

Planning and preparing for farm calls

- Be aware of and comply with the farm's biosecurity protocols. If your company biosecurity standards are higher than those of the farm, practice the higher level of biosecurity.
- Communicate with the producer when scheduling the farm visit and determine the health status of animals and biosecurity requirements of the site.
- Schedule farm calls and deliveries so that farms of higher health status are visited before lower health status sites.
- Feed delivery and service vehicles going on-farm are to be clean, with no visible contamination inside or on the outside of the vehicle.

- Clean vehicles in the designated area at the production site or use a commercial vehicle wash that is not shared with animal transport units.
- If animal samples have been transported in the vehicle, clean and disinfect the container and the area in the vehicle where the container was placed.



Arriving on-farm

- Avoid driving near barns that contain live animals if possible.
- Drive slowly when near barns to minimize dust.
- Avoid parking by exhaust fans and air inlets.
- Look for designated visitor parking unless making a feed delivery.
- Keep vehicle windows and doors closed.
- Do not enter any other barn or structure on the property, except where the service is provided or with the permission of the producer or farm manager.

Feed deliveries

- Use farm supplied feed delivery pipe if possible.
- Do not allow brooms, shovels, and other removable items to touch the ground.
- Clean up feed spills; but do not load back onto truck.
- Avoid delivery of bagged feed or medications into barns near livestock or poultry.



Entering barns

- If entering the animal housing unit, wear clean or disposable clothing and footwear, sign the visitor log book, and disinfect hands with soap or hand sanitizer before and after entering the barn area. Some facilities may require showering in and out of the housing area. Follow the farm's protocols.
- Remove clothing, footwear and disposables worn in the barn prior to getting into your vehicle.
- Leave trash and used disposables on the farm. Place "dirty" clothing and footwear in sealed bags or containers before putting them in your vehicle.
- Clean and sanitize your hands after placing equipment and clothing in the vehicle and prior to starting your vehicle,
- Clean and disinfect any equipment used in the barn before being using it on another farm.
- Keep your own records identifying where you have been and when.

Using hand sanitizer



I have read and understand the contents of this factsheet.

Employee signature: _____

Date: _____

10. BIOSECURITY REQUIREMENTS FOR INGREDIENT DELIVERY OR FEED PICK UP

What is biosecurity?

- It is a form of risk management.
- The risks in this case are disease-causing organisms (viruses, bacteria, fungi, and parasites), pests (insects, birds, vermin) and weeds/invasive plants and their impact on a specific farm or the agriculture industry as a whole.

Why should you care?

Diseases and pests:

- reduce productivity and yields;
- increase veterinary and labour costs;
- complicate pest management (in the case of crop pests);
- affect farm incomes and animal welfare;
- reduce the value of farmland (e.g. soil based crop pests);
- close or limit export markets;
- affect domestic consumption; and,
- reduce prices that producers receive for their animals and products.

There can also be negative impacts to the environment and human health (e.g. a disease that is transmissible between animals and humans).

How is feed manufacturing impacted?

- Feed ingredients coming into the mill could be contaminated with rodent or bird feces, pathogens, moulds or mycotoxins in grain.
- Raw materials can be a source of Salmonella. It is a pathogen which has the potential to cause disease in livestock and poses a serious human health risk.
- In addition to pathogens that can cause disease in animals, feed can be contaminated by plant diseases, plant pests, and by weeds that can then be spread.
- Vehicle movement on and off farm can track weed seeds and soil borne plant pests in mud, manure and crop residue stuck to tires and wheel wells.



What is expected from producers who deliver ingredients to our feed mill or pick up their own feed?

- Implement a pest control program for your farm buildings especially grain storage areas.
- Check feed ingredients moving off your property for disease, weeds or insects.
- Have a clean vehicle when coming onto the feed mill property to deliver ingredients or pick up feed, e.g. no manure, crop residue (chaff, plant stalks), previous product residues, excessive mud (clinging clumps), and feathers.
- Follow posted biosecurity signs and instructions.
- Use the driveway designated for delivery and customer pick up vehicles if there is one.
- Look for signed visitor parking if you are not delivering or picking up product.
- Sign the visitor log book.
- Wear clean footwear, e.g. no manure or caked on mud or crop residue.
- Feed mill staff will inspect feed ingredients at delivery for any signs of pathogen contamination, e.g. rodent or bird feces, and moulds.
- Do not bring returned feed, used skids, pallets, totes or bags into the feed mill that have been stored on farm. Items that have been on-farm pose a biosecurity risk.
- Drivers should not wander through the feed mill. Foot traffic from the receiving or loading area could move pathogens into the feed manufacturing plant.

11. SAMPLE VISITORS' LOG

Date	Print Name	Company Name (if applicable)	Telephone No.	Purpose of visit	Date of last contact with livestock

12. REFERENCES

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