Ontario Livestock & Poultry Council

Livestock On-Farm Biosecurity Information Guide

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Ontario Livestock & Poultry Council

LIVESTOCK ON-FARM BIOSECURITY INFORMATION GUIDE

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1. Acknowledgement

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Gordon Coukell, OLPC Chair
Susan Fitzgerald, Project Coordinator
July 2012

2. Background

The Ontario Livestock and Poultry Council (OLPC), with the support of the Ontario Ministry of Agriculture, Food and Rural Affairs, has developed this guide as an introductory resource for producers when considering and applying biosecurity practices on farm.

National biosecurity standards are currently being developed for several commodities and will be rolled out over the next two to four years. At the time of writing, the standards being written include beef, dairy, sheep, goats, mink, bees, potatoes and grain/oilseeds. National standards for poultry were published in 2009 and the Canadian Swine Health Board issued standards for the swine sector in 2010. All agricultural commodities will eventually have national biosecurity standards. These standards are voluntary and are designed to be complimentary to any existing commodity-developed on-farm food safety program and/or good agricultural production practices.

The Canadian Food Inspection Agency's Office of Biosecurity has also developed generic national farm-level biosecurity planning guides for plants and livestock which are available on their website http://www.inspection.gc.ca/english/anima/biosec/anibioplane.shtml. These guides were used as references by OLPC in compiling this resource.

This manual is focused on livestock although many of the biosecurity concepts are relevant to any type of farming operation. There is a separate on-farm biosecurity information guide for plants. Many farms have both livestock and cropping operations or are located in close proximity to plant crops. We encourage you to review the complete plant biosecurity guide for further details specific to plant biosecurity.

In addition to the biosecurity guides, OLPC has produced a biosecurity video, information poster for farm workers and suppliers, and on-farm biosecurity signs. More information regarding these resources, as well as an electronic version of this manual, can be found on our website www.ontlpc.ca or by contacting our office:

Ontario Livestock and Poultry Council
39 William Street
Elmira, ON N3B 1P3
519-669-3350
Fax 519-669-3826
info@ontlpc.ca

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3. Definition of Terms

Anteroom: An area or room that immediately precedes the restricted access zone (RAZ) and provides a transition from the controlled access zone (CAZ).

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.

Biocontainment: Keeping a known hazard such as a pathogen on the farm or in the production unit and preventing it from spreading to others.

Biosecurity: The set of practices and measures that you put in place on your farm to minimize the risk to livestock and crops from any type of infectious or injurious agent whether viral, bacterial, fungal or parasitic and includes any plant described as a pest and also includes containment of these agents to prevent their spread within your operation or moving off-farm.

CFIA: Canadian Food Inspection Agency.

Closed Herd/Flock: Does not purchase replacement animals of any age; all replacement animals have been bred and raised on-farm (if animals have been taken to a show and returned, the herd/flock can no longer be considered closed unless isolation and/or quarantine protocols are followed before reintroducing the animals to the herd/flock).

Compost: Composting is the natural breakdown of organic matter. The decomposition is carried out by micro-organisms, mostly bacteria, but also yeasts and fungi. When temperatures are low, a number of macro-organisms, such as springtails, ants, nematodes, isopods and red wigglers also contribute to the process. When composting deadstock, the goal is to destroy the pathogens in the material by composting at higher temperatures (55°C and higher). To obtain this temperature, the mixture must contain the right ingredients in the correct balance. Refer to http://www.omafra.gov.on.ca/english/livestock/deadstock/index.html

Controlled Access Point: Visually defined entry point(s) through which traffic, such as workers, equipment, feed trucks, etc. enter the CAZ and/or the RAZ.

Controlled Access Zone (CAZ): The area of land and buildings constituting the production area of the property that is accessible through a securable controlled access point.

Disinfection: The application of a physical or chemical process to a surface for the purpose of destroying or inhibiting the activity of disease causing micro-organisms. The surface should be cleaned (removal of visible organic matter) prior to the application of a disinfectant.

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

Exotic Diseases: Exotic diseases are infectious diseases that normally do not occur in the region either because they have never been present there or because they were eradicated and then kept out by government control measures or agricultural practices.

Farm: A tract of land held for the purposes of cultivation, crop production, and/or the rearing of certain animals. Throughout this document "farm" is used to denote a physical location that produces crops, plant products, and includes nurseries, greenhouses, and plant propagators.

Foreign Animal Disease (FAD): A foreign animal disease is a disease caused by a transmissible infectious agent, currently exotic to Canada, with the potential for rapid spread.

Hazard: A disease or a biological, chemical, physical or radiological agent or factor that can cause harm. The provincial Animal Health Act, 2009 refers to hazards within its scope of influence.

Isolation: Physically separated such that new and returning animals or clinically sick animals, as well as their excretions and secretions, cannot contact resident animals.

Livestock (animal): Any animal (including birds, insects, and fish) 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.

OMAFRA: Ontario Ministry of Agriculture, Food and Rural Affairs.

Pathogenic: Capable of causing disease.

Pathogens: Biological agents, such as a bacteria or virus which have the potential to cause diseases.

Potable Water: Suitable for drinking.

Producer: A person who owns, leases, rents or otherwise uses land for cultivation, crop production, and/or rearing of certain animals.

Production Area: Includes buildings, range areas, areas used for feed storage and handling, pickup areas, and the area immediately surrounding buildings.

Protocols: A defined procedure or process to be followed.

Reportable Diseases: These diseases 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 may be initiated. Examples include: Bovine Tuberculosis, Scrapie, and Swine Vesicular Disease. A complete list can be viewed on the CFIA website http://www.inspection.gc.ca/english/anima/disemala/disemalae.shtml

Restricted Access Zone (RAZ): An area inside the CAZ that is used, or intended to be used, to house animals, including semi-confinement and range production and where personnel and equipment access is more restricted than for the CAZ. The RAZ, an inner biosecurity zone, is sometimes referred to as the production area or restricted area (RA).

Sewage Biosolids: Municipal wastewater treatment facilities separate the solids from the liquid in municipal wastewater to produce clean water that can be discharged to a nearby stream or river. The solids resulting from this treatment process undergo additional treatment (stabilization) to reduce the presence of potentially harmful microorganisms and the potential for the material to cause odour. The treated materials that result are sewage biosolids.

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 barn cleaning and disinfection procedure. SOPs should be written in generic terms so that anyone could come in and do your chores as you wish them done. SOPs are used to ensure protocols are done consistently by different people.

Transition Area: A designated location for the application of biosecurity procedures to people and equipment before entering a biosecurity zone (CAZ and/or RAZ). The transition area may be a controlled access point, controlled entry point or an anteroom.

Visitors: Include delivery people, veterinarians, livestock haulers, livestock-owning neighbours, livestock specialist, family members, 4-H groups, international visitors, utility personnel, contractors, disease surveillance technicians, artificial insemination or embryo technicians, ultrasound technicians, classifiers, feed industry personnel, sales representatives, equipment repair individuals, and anyone else who has had contact with animals or is travelling from another farm.

Zoonotic Diseases: Diseases transmissible from animals to humans, e.g. Anaplasmosis, Rabies, E. coli.

Zoonoses and Emerging Infectious Disease

Some livestock diseases and pathogens are also capable of infecting humans. These are called zoonotic diseases or zoonoses. 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 and water and 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.

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.

Biosecurity – Food Safety – Animal Welfare

There is sometimes confusion between biosecurity, food safety and animal welfare and whether they are the same, similar and/or overlap in their scope. Good operating practices in any one of these areas certainly facilitate the other two however each has a different focus.

In simplified terms:

- food safety focuses on protecting human health;
- biosecurity focuses on protecting the health of animals and plants (which also aids human health); and,
- animal welfare focuses on humane treatment of animals.

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Biosecurity: What it is and why it is important to producers

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4. Biosecurity:

What it is and why it is important to producers

What is biosecurity?

Biosecurity is a term we have come to hear frequently in recent years and can conjure up images of surveillance systems, security fences, complicated sanitizing processes, audits and inspections. However, biosecurity is really just the protection of livestock, poultry and crops from any type of infectious agent whether viral, bacterial, fungal, or parasitic. The Ontario Animal Health Act, 2009 refers to "hazards" within its scope which include diseases as well as biological, chemical, physical or radiological agents that can cause harm.

Definition of Biosecurity

"The set of practices and measures that you put in place on your farm to minimize the risk to livestock and crops from any type of infectious or injurious agent whether viral, bacterial, fungal or parasitic and includes any plant described as a pest and also includes containment of these agents to prevent their spread within your operation or moving off-farm."

People, animals, vehicles and equipment can be a source of disease pathogens and through their movement can transmit disease onto, within and off farm sites. Individual farms are less isolated than in the past and inputs are entering farms from further away, often from other countries. As well, people are travelling globally much more frequently and often to and from countries where reportable diseases are endemic, e.g. Foot and Mouth Disease is endemic in certain regions of Asia, Africa and South America. Although most diseases are mechanically spread (by people, animals and inanimate objects) some are transmitted by other means such as via air currents.

There are four stages in disease management and control:

- prevention;
- detection;
- response; and,
- recovery.

This resource binder is focused on farm-level biosecurity. Biosecurity at the farm level can be defined as management practices that help producers prevent the movement of disease-causing agents onto, within and off of agricultural operations. Among the many biosecurity procedures that can prevent disease transmission there are some simple measures which have little or no cost associated with them. In fact, you may already be following many good biosecurity practices on your farm without realizing it. If you have an on-farm food safety program or have completed an Environmental Farm Plan, some components will cover aspects of a biosecurity plan for your farm.

The basic concept is to "keep disease out" as a first line of defense but if an issue arises on your farm you want to "keep it in" to prevent its spread and "shut it down" as quickly as possible to reduce its impact on your production and/or possible impact on your commodity. Some diseases are very difficult to eradicate once they become established. In certain instances, producers may only be able to 'control' disease unless a significant financial investment is made to eliminate it from their animals.

Why is biosecurity important to Ontario and Canada?

Ontario is the largest producer and processor of livestock and poultry in Canada. It also has over one-third of Canada's total population with millions of people living in close proximity to millions of animals. This provides residents with access to a variety of locally produced food and Ontario farmers with a large consumer market. However, it also poses a potential challenge should there arise a transmissible animal disease outbreak with the potential to infect humans.

All levels of agriculture production share a responsibility in practicing biosecurity: regional, provincial, national and international. During an outbreak, many aspects of the economy are affected. These include agricultural services such as feed suppliers and meat processors as well as non-agricultural sectors such as tourism. The agri-food industry contributes more than $33 billion to the Ontario economy and employs about 700,000 people. The risk of exposure to significant economic disruption from foreign and domestic animal disease is high but through the efforts of individual producers and agricultural organizations the risk is being reduced. As well, disease prevention is a critical component of overall quality assurance programs being adopted by many commodities.

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.

> "It is estimated that PRRS costs the Canadian pork industry in the range of $130 million per year (The George Morris Centre 2011)."

Nationally, animal biosecurity is led by the CFIA's Office of Animal Biosecurity. This office is responsible for developing standards, protocols and strategies for livestock, poultry and agriculture production. Canada constantly monitors for signs of diseases, domestically and internationally. When disease outbreaks are suspected or detected abroad, the CFIA implements import restrictions to prevent the introduction of disease into Canada.

The Federal Health of Animals Act and the Ontario Animal Health Act, 2009 provide for the protection of animal health and for the establishment of measures to assist in disease management and control.

Economic Impact of BSE

The announcement of Bovine Spongiform Encephalopathy (BSE), commonly called Mad Cow Disease, in one cow in northern Alberta on May 20, 2003 led to a decision by more than 40 countries to immediately impose import restrictions on live ruminants (cattle, sheep, goats, bison, elk, deer), meat products and by-products from Canada.

The economic implications for the livestock sector, meat processors and animal feed manufacturers, and the vast array of service sectors, such as trucking, sales yards and brokers, which provide support to the livestock industry, was widespread. For the overall Canadian economy, it is estimated that for each $100 million in exports by the cattle sector, $80 million is added to the national gross domestic product (at market prices), $228 million is generated in total output, $41 million is added to labour income, and 3,000 jobs are created. Therefore, the potential negative impact on the Canadian economy from a $2.5 billion loss in cattle and calf exports due to BSE translates into a $2 billion loss in GDP, a $5.7 billion decline in total output in the Canadian economy, a $1 billion decline in labour income and a loss of 75,000 jobs.

According to a report prepared for the Canadian Animal Health Coalition, the direct economic cost to the Canadian livestock industry by early 2004 was estimated at nearly $3.3 billion. An additional loss in equity to the cow-calf sector was estimated at $3.0 billion, for a total economic impact from BSE of $6.3 billion.

Excerpt from: Mitura, V. and Di Piétro, L., Canada's beef cattle sector and the impact of BSE on farm family income 2000-2003, Statistics Canada, Cat. No. 21-601-MIE, No. 69, June 2004.

Why is biosecurity important to producers?

Some producers spend thousands of dollars each year fighting disease outbreaks. In addition to the costs of health care, valuable livestock and production are also lost. While diseases that lead to livestock mortalities are the most obvious and urgently treated, there are a large number of production limiting diseases which have a significant effect on the economic viability of the farming operation. An advantage of a good biosecurity program is that it will help reduce the spread of endemic disease (local diseases) such as PPRS[1] in hogs and Johne's disease in ruminants as well as foreign animal diseases. On-farm biosecurity practices will also help reduce the spread of potential human pathogens such as Salmonella spp., Listeria spp., E.coli O157:H7 and Campylobacter spp.

In the past, producers and the agricultural community generally relied on the use of vaccinations and antimicrobials for managing animal health and production. Vaccination and treatment protocols are significant tools to control disease, but with the evolution of antimicrobial resistance, emerging and re-emerging disease, and resistant strains of disease and pests, implementing improved biosecurity practices can help prevent the introduction of new disease and, in some cases, reduce the reliance on medications. A more holistic approach that incorporates proactive biosecurity, vaccination and medication, is now considered a more cost-effective method of protection against animal disease.

The best defence against disease is to implement sound biosecurity practices at the farm level. The first step is to know the risks to your enterprise; understand the ways your animals can be exposed to disease and then take steps to minimize these risks. Putting sound biosecurity practices into place often does not require major capital investment, only management and planning changes.

In this binder, we present some relatively easy to implement, generic biosecurity practices for livestock operations which will reduce the risk of disease entry and transmission on your farm. It is not an exhaustive list by any means but is intended as a starting point. Each small step is an added level of protection against disease and will enhance your disease prevention and biosecurity risk management system. As the livestock sector is a very broad audience, some protocols may not be applicable to your particular farming operation. Your marketing board or commodity association may have more prescriptive measures which you are required to follow as part of on-farm food safety programs, quality standards, etc.

Disease and pests can:

- reduce productivity;
- affect farm incomes and animal welfare;
- increase veterinary and labour costs;
- close export markets;
- affect domestic consumption; and,
- reduce prices that producers receive for their animals and products.

In addition to adverse effects on the agricultural economy, there can also be negative impacts to the environment and human health.

1 Porcine Reproductive and Respiratory Syndrome

Livestock Disease Calculator

An electronic livestock disease cost calculator developed collaboratively by several livestock commodity groups is designed to help producers put a price tag on disease outbreaks. Producers input a series of data into a spreadsheet, such as feed costs, average daily gain, mortality rate and other factors depending on the particular commodity, in order for the model to generate results.

For example, a low impact outbreak of Bovine Viral Diarrhea (BVD) in a 500–head beef herd can cost an operation $5,500 and a high impact outbreak could reach $275,000. A similar example of an outbreak of Caprine-Arthritis-Encephalitis in a breeding and meat goat operation showed costs between $710 and $28,900 depending on the severity of the disease.

The disease calculator model is available for download from www.agbiosecurity.ca

Photo Credit: Ontario Agriculture Photo Library

Disease Transmission

Disease in livestock can be spread in a number of ways, including:

- through diseased animals or animals incubating disease;
- 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, between animal groups or production areas on-farm;
- in contaminated feed, water, bedding and soil;
- from the carcasses of dead animals;
- on contaminated farm equipment and vehicles; or
- in airborne particles and dust blown by the wind and exhaust fans.

Every little bit helps. The old saying, "An ounce of prevention is worth a pound of cure", aptly applies to biosecurity. Consider spread (reproduction) of a cold if you and each infected person spread it to two new people. Even if only two new cases are generated per existing case, it can quickly spread to infect 62 people as shown in Diagram 1. The same is true of spread of disease between animals and farms. The following illustrations show how stopping the spread of disease at even one node can have a dramatic impact.

Diagram 1

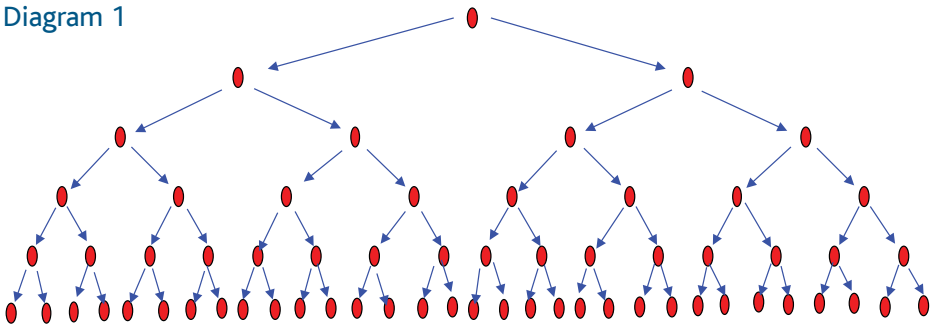
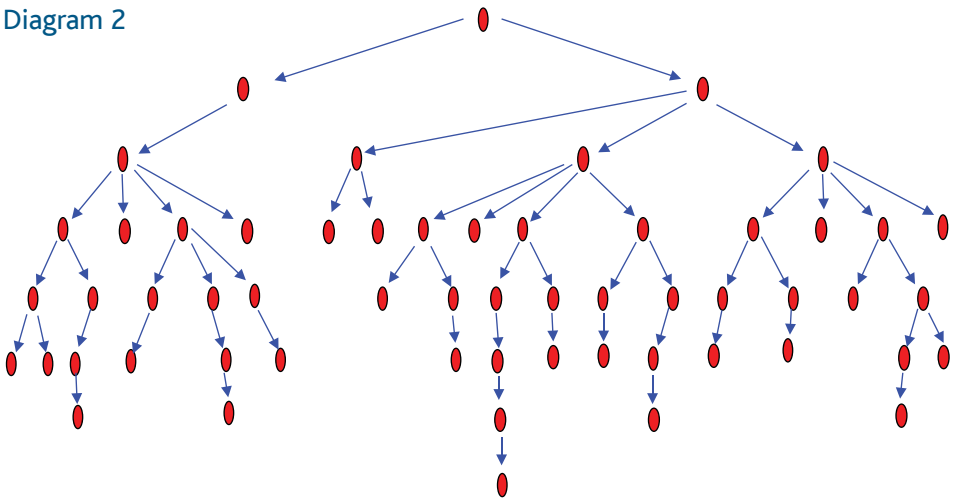


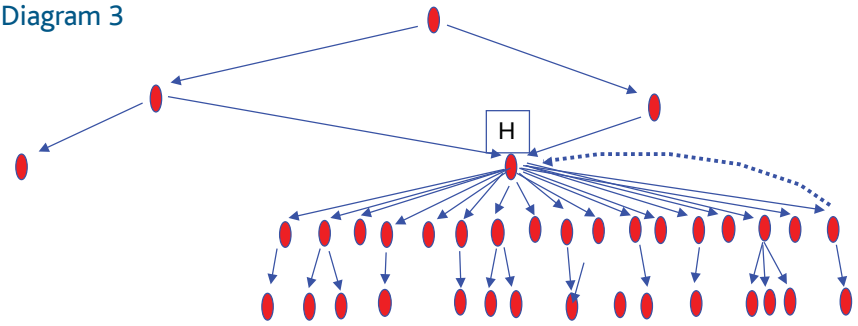
Diagram 2



Usually, the number of secondary cases (or infected farms) does not follow such a neat and equal transmission.

The number of infections would change between "generations" and would resemble something more like Diagram 2, which still results in 56 subsequent infections.

Diagram 3



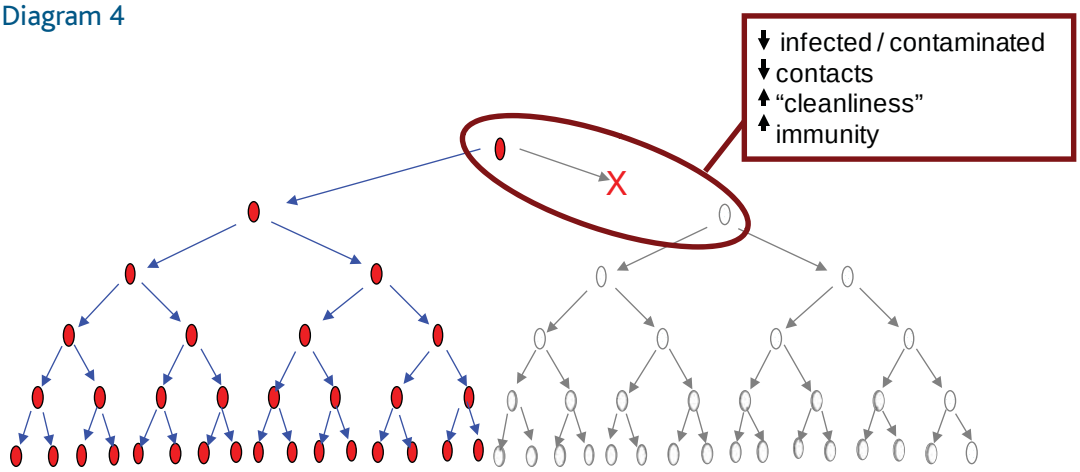
"Hubs" can have a significant influence on disease spread as illustrated in Diagram 3. In livestock, this would equate to a sales barn or livestock show/event, where mixing of animals can subsequently spread disease to many farms.

The dotted line represents reintroduction of the disease to the hub, e.g. an animal sold at auction and then subsequently resold through the facility.

Implementing biosecurity control practices (disease mitigation measures) at various points in the disease transmission chain (e.g. at "X" below in Diagram 4), can have an important impact on its spread. This is because not only does it block spread to the next farm or unit, but also, since that spread to the next unit did not occur, all other spread that would otherwise have occurred along that chain, is also prevented. This could be something as simple as insisting on hand washing and change of clothing for visitors entering your facilities or not allowing visitors' vehicles into your controlled access zone (CAZ).

This is what is meant when people say that disease-spread and control are "exponential" in nature. This is why little things matter in biosecurity, because they can have a big (exponential) impact.

Diagram 4

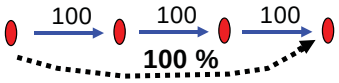


Every little bit helps; small steps can cumulatively have a big impact.

In the examples shown in Diagram 5, the likelihood of a disease being passed along to others in the chain is shown based on the effectiveness of each link's biosecurity.

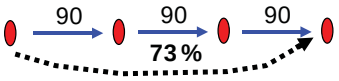
Diagram 5

a)



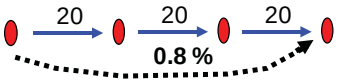
In the first example, there are basically no controls in place so each site has a 100% likelihood of passing on a disease.

b)



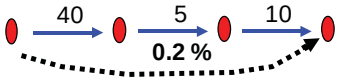
In the second example, each site has adopted some biosecurity measures and reduced their transmission rate to 90%. Even that incremental step has reduced the chance of the disease reaching the fourth node to 73%.

c)



Example c shows the dramatic reduction where each node now only has a 20% transmission rate.

d)



And, not all stakeholders need to implement the same level of prevention to have a positive impact. The final example shows three links with varying levels of disease control but the overall effect is to reduce the chance of transmission to the fourth farm, to 0.2%.

People, systems, procedures, and facility-design that address the biology by physically blocking spread of disease, are what matter. You and your employees' daily actions influence your/their personal health, and the health of your own and your industry's animals and economics, far more than you may have thought.

Source: Dr. Bruce McNab, Animal Health & Welfare Branch, Ontario Ministry of Agriculture, Food & Rural Affairs

Control Areas

There are various approaches to an effective and systematic biosecurity plan. It is important that whichever approach is used it is based on biosecurity principles, reflects the management of risks related to the movement of people, vehicles, equipment, animals and inputs onto, within and off the farm. Consideration must also be given to the potential risk associated with pets, wildlife, wind, natural waterways and topographical contour of the land.

We have organized the contents of this manual into three primary control areas:

- Access Management (people and vehicles);
- Animal Health Management (livestock); and,
- Operational Management which includes sanitation of equipment and facilities, wildlife and pests, and training and documentation.

The next section highlights the potential for disease exposure in each of these areas and suggests preventative measures.

1996 Stayner Anaplasmosis Outbreak Cancels Fall Fairs

On July 8, 1996, four cattle were imported from the U.S. to a farm in the Stayner area. Their disease tests and certificates met all Canadian health requirements. In early August, the USDA notified Agriculture and Agri-Food Canada (AAFC) that the documentation supporting the health status of the four animals was suspect. The Canadian importer was not aware of the irregularity.

On August 6, 1996, all four animals were ordered returned to the U.S. and were tested at the border by both AAFC and the USDA for all diseases required under Canada's import protocol. Three of the four animals tested positive for Anaplasmosis. This disease is spread by ticks and biting flies and causes anaemia which may lead to death or cattle which recover but become carriers. It is considered a Foreign Animal Disease in Canada but is present in some parts of the U.S. It is not transmissible to humans but does infect all ruminants.

Eighteen Canadian cattle that had been in close contact with the imported animals were also tested. One positive test came back and the farm involved was placed under quarantine along with all susceptible animals within a one km radius. The positive testing animal was ordered slaughtered and livestock testing within the one km control zone was started. The index farm had three more positive test results which led to the control zone being extended to a two km radius early in September. Testing was done on 520 cattle and 47 small ruminants in the first round and 300 cattle in the second round.

The Fair Boards at Collingwood and Stayner elected to cancel the ruminant classes at their Fall Fairs. A shipment of dairy cattle to Japan was temporarily delayed until assurance could be given that it did not include animals from the outbreak area.

Photo Credit: Ontario Livestock and Poultry Council

Lessons from 1952

Canada's last outbreak of Foot and Mouth Disease occurred in 1951-1952 in Saskatchewan. The disease was introduced from West Germany by an immigrant farm worker. The virus was transmitted either via his clothing, which he also wore on an infected farm in West Germany, or through dried sausage fed to pigs which the worker had brought with him from Germany (leftovers from his meal, not part of the regular feeding program). Forty-two premises were involved, of which 29 were infected and 13 were considered "in contact".

The livestock destroyed included 1,313 cattle, 294 swine, 97 sheep, one goat, 2,372 fowl and 15,828 eggs. The eradication costs were $1 million but owing to the ban on exports the value of livestock fell by $651 million and $70 million was spent in support prices. The total loss was $722 million plus one year's loss of trade in livestock and livestock products. That was in 1952 dollars!

Vaccinations for People Too

The Public Health Agency of Canada's standing recommendation is that all healthy Canadians over the age of six months get the flu shot each year as the vaccine is reformulated annually to protect against the "most current" strains of the virus.

The CFIA recommends seasonal flu shots for livestock and poultry producers, their families and workers to help prevent the spread of influenza viruses between people and animals. This also applies to veterinarians, service personnel such as feed truck drivers and workers handling inseminations and livestock vaccinations, as well as anyone visiting hog operations. Anyone with flu-like symptoms should also avoid contact with livestock. Several flu viruses can be transmitted between people and animals, and between different species of animals.

Apart from the damage influenza can cause in herds and flocks, human health professionals are concerned that certain strains such as the infamous H5N1 could mutate or combine with another flu virus, such as H1N1, that could spread more easily between people.

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Primary Biosecurity Control Areas

Access Management

Biosecurity Zones

Biosecurity zones are areas that involve specific biosecurity measures to be implemented for access, exit, and movement. The national biosecurity standards specifically refer to the Controlled Access Zone (CAZ) and the Restricted Access Zone (RAZ) representing separate zones of increasing risk.

To be effective, these zones should be visibly marked and controlled, with their importance understood by visitors, employees and family members. OLPC has produced two types of biosecurity signs which can be used to identify your CAZ and RAZ boundaries.

On-Farm Biosecurity Zones

- Create a CAZ (controlled outer biosecurity zone) and a RAZ (restricted inner biosecurity zone) for the production area.
- Provide appropriate and visible signage for the CAZ and RAZ.
- Define the boundaries of biosecurity zones (CAZ and RAZ).
- Control entry and exit points for biosecurity zones.

Photo Credits: Ontario Livestock and Poultry Council

Figure 1: Conceptual Farm Layout Incorporating Biosecurity Zones

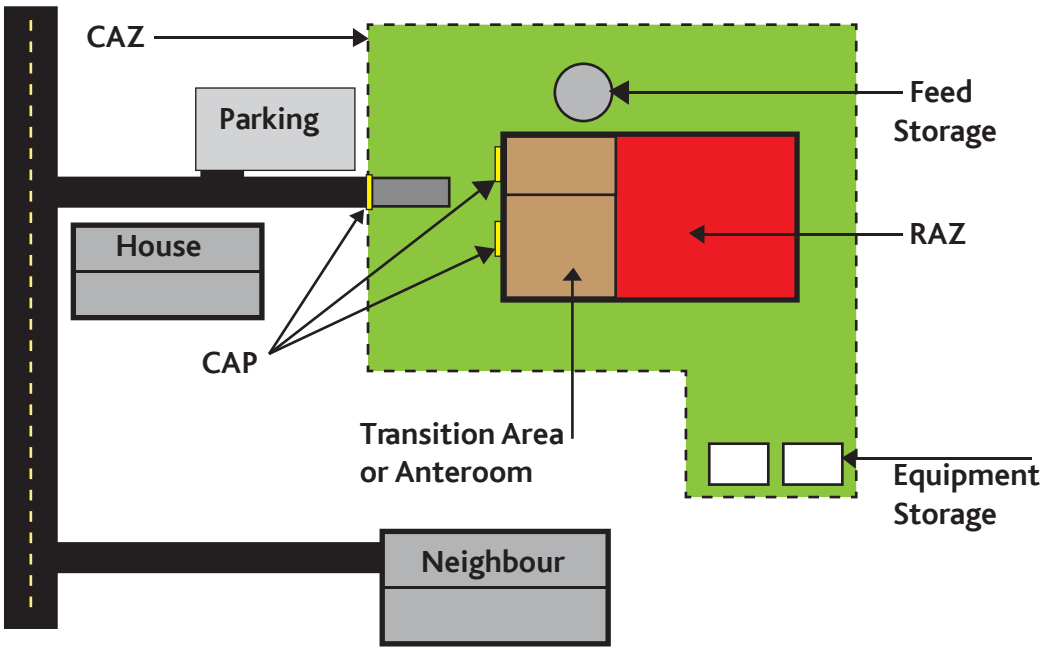

Figure 1: Houses (residence) and parking areas are located outside the first biosecurity zone called the controlled access zone (CAZ). The CAZ contains operational facilities indirectly involved in animal production (e.g. feed storage) and the restricted access zone (RAZ). The RAZ houses, contains or confines production animals. Both the CAZ and RAZ are accessed through a controlled access point (CAP).

Source: National Farm-Level Biosecurity Planning Guide: Proactive Management of Animal Resources, Canadian Food Inspection Agency

TIP: One swine and veal producer reports that he had problems with salespeople driving around his farm uninvited. He was concerned because he did not know on what other farms they had been or who they were.

The simple but effective solution was to string a rope across the laneway just past the house so any visitors now have to stop and ring the doorbell before going any further on the farm. He reports that a $10 investment in a piece of rope was all it took to resolve the issue. Many visitors may not think about the biosecurity implications of intruding on farm property; a simple barrier or sign provides that education or acts a reminder.

Visitor control is a critical component. People can spread disease and contaminated material on footwear, hands, hair and clothing. The first line of defense is to reduce the number of external visitors through your farm operation and facilities. You also need to be able to track those who have been in your barns. Knowing who has been there, where they have been and where they are going will be valuable information in the event of a disease outbreak. This could also help identify the source of infection, prevent additional exposures and possibly determine whether your farm has been infected by an outbreak originating elsewhere.

The term "visitors" includes a broad range of people who may be coming onto your farm, e.g. delivery people, veterinarians, livestock haulers, neighbours, 4-H groups, utility personnel, contractors, artificial insemination or embryo technicians, ultrasound technicians, classifiers, sales representatives, equipment repair individuals, and anyone else who has had contact with animals or is travelling from other farms.

Below are some practices which will reduce the risk of visitors bringing pathogens into your operation.

☑ Post restricted entry signs to keep visitors out of facilities without your permission.

OLPC has produced some generic on-farm biosecurity signs.
Contact your commodity association or our office if you wish to obtain a set.

☑ Ensure that gates and building doors are locked where appropriate.

☑ Provide clean routes, not contaminated by manure, for delivery and service vehicles.

☑ Ensure laneways and roadways used by visitor vehicles are kept free of manure and soil.

☑ Ensure visitors are aware of and comply with your biosecurity protocols.

OLPC has produced some generic on-farm biosecurity posters which can be placed in your milk house, feed room, anteroom, etc. These provide a simple, pictorial explanation of why on-farm biosecurity is important and what practices are expected of workers and service suppliers. Contact your commodity association or our office if you wish to obtain a copy. Also, speak directly to your employees and service providers (feed sales persons, equipment repair people, delivery drivers, veterinarians, AI technician, shearer, etc.) and ensure they fully understand what practices and protocols you expect them to follow when coming onto your farm.

☑ Locate a drop box a sufficient distance away from the barn entrance for feed samples, courier deliveries, bills and receipts.

TIP: For livestock in confinement housing, doors should be locked, especially when the producer or employees are not on the premises.

☑ Set aside a specific parking area for staff and/or visitors and post signage to clearly indicate that is where vehicles should be parked. Ensure the area is well-drained, gravelled, free of manure, and a minimum of 15 feet from the barn.

☑ Keep a visitor log book at each barn to record the name, contact information and date of visitors and service vehicles. A binder or clipboard with a pen or pencil attached by string is all that is required.

A sign-in book for visitors should be maintained. The sign-in book should include when and where the visitor was last around livestock as well as their printed name, signature and telephone number (or other direct contact information). The purpose of the sign-in book is to keep a running record of anyone who has been in contact with the herd/flock so that if a disease should break out, it may be possible to determine the origin of the pathogens and premises/farms/herds/flocks at risk.

A buzzer or other device, such as a hand-held radio, should be available at the barn/office/house entrance so that visitors can contact the producer or employees in the barn if no one is available in the house/office area. Ensure your telephone or cell phone number is posted and clearly visible. Consider keeping the entrance to the RAZ locked as standard practice where feasible.

TIP: Visitors coming to look at livestock?

Insist they clean and disinfect their boots or, better yet, purchase some plastic covers or rubber boots that are left on the farm and are disinfected prior to and after use.

☑ 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 used by visitors to the farm.

Animals of any kind should never pass through the employee/visitor entrance, anteroom, feed room, etc.

☑ Provide hand washing facilities or a bottle of hand sanitizer for visitors and insist they use it upon entry and exit from facility.

TIP: 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.

☑ Provide boots and coveralls for visitors at each barn (this includes veterinarians). If staff are moving between barns, consideration should be given to having separate boots and coveralls for them at each building.

☑ Clean footbaths and a scrub brush at the entry to the barn will *help* reduce pathogens but must be changed regularly and used properly. Disinfectant must be formulated according to manufacturers' specifications. (See text box regarding the effectiveness of footbaths.)

Photo Credit: Ontario Veal

Organic matter must be thoroughly removed from boots using a scrub brush and hose. Read product label for minimum contact time with the solution in order for disinfectant to be effective. Footbaths are difficult to maintain so that they are effective. When used alone they are not a sufficient means of disinfecting footwear. **It is preferable to have designated footwear for each facility.**

- ☑ If using a footbath, the barn should be equipped with a water hose and scrub brush for staff and visitors to wash organic matter off boots prior to using footbath.
- ☑ Keep a log book to record each time the footbath is changed if one is used.
- ☑ Restrict access to facilities to essential visitors only. Keep visitors out of animal pens and feed alleys and do not allow direct contact with animals if not essential.

TIP: Use disinfectants such as Virkon or Peroxigard, or mix three parts bleach to two parts water in a tub. Note: bleach is only an active disinfectant for a maximum of 20 minutes when mixed with water. Water temperature and pH is also a factor when mixing disinfectants.

For footbaths, the disinfecting solution should be changed regularly (based on usage, label recommendations, etc). Personnel should be aware that footbaths are effective only when the boots are free of organic matter (such as manure). Having separate footwear designated for barn use only is preferable.

- ☑ If visitors are from other countries or have travelled abroad and visited farms, find out where they have been and when. Consult your veterinarian to determine if they should be restricted from entry to your farm and, if so, for how long to minimize the potential introduction of disease.
- ☑ Provide a container or plastic bag immediately outside the facility or in the anteroom for collecting dirty clothing or disposable items used by visitors. This will ensure visitors do not carry waste material off the farm with them.

Evaluating the Efficacy of Footbaths in Biosecurity Protocols

Dr. Sandra Amass and her colleagues at Purdue University conducted research into whether the type of disinfectant, scrubbing of boots, or cleanliness of the footbath affects footbath efficacy. The study also looked at the length of time that manure-free boots must soak in disinfectant before disinfection occurs.

The results indicated:

- The type of disinfectant was irrelevant if manure was not removed from the surface of boots prior to disinfection.
- Scrubbing did adequately remove manure however this was only beneficial if the boots were cleaned of visible manure prior to stepping into the bath.
- Contaminated footbaths **increased** boot contamination during cleaning.
- Disinfection was accomplished after manure-free boots were soaked in Roccal™-D Plus for **five** minutes.

Implications:

- **Most on-farm boot washing protocols do not disinfect boots.**
- Proper disinfection of boots includes removing all visible manure and then soaking in a clean bath of disinfectant for the time recommended on the label.
- Improper boot cleaning wastes time and money and may place the herd/flock at risk of pathogen spread.

Amass, SF, Vyerberg BD, Ragland D, et al., Evaluating the efficacy of foot baths in biosecurity protocols. Swine Health Prod. 2000;8(4):169-173.

Conduct your own research regarding recent health advisories and countries where diseases are endemic. Listed below are two reference sites.

Canadian Food Inspection Agency:
http://www.inspection.gc.ca/plants/eng/1299162629094/1299162708850
http://www.inspection.gc.ca/animals/terrestrial-animals/diseases/eng/1300388388234/1300388449143

International Society for Infectious Diseases (includes plant, animal and human health alerts):
http://www.promedmail.org/

If you have recently travelled internationally, wash your clothes, shower and disinfect all footwear before coming into contact with your livestock. Use a disinfectant to wipe dirt and grime from personal items such as luggage and cameras. If possible, avoid contact with animals for at least 72 hours (three days) after returning to Canada. This is to ensure you do not pass on any viruses living in your nasal passages.

Whether you are visiting a farm abroad or at home, you have a role to play in helping to keep Canada's animals healthy. Remember, it is not just farmed animals which can pass on disease; it includes contact with wildlife, pets and zoo animals (including petting zoos). It could expose you to diseases or pests that could pose a threat to you, your family's health, your livestock, wild animals, other producers, and the economy.

Don't Bring it Back!

Food, plant material and animal products from other countries, including many common souvenirs, could introduce some of the world's most serious pests and diseases into Canada, threatening our valuable agricultural industries and environment.

All undeclared food, plants, animals, and related products brought into Canada by travellers are potential threats to the health of Canadians and Canada's environment.

These include things as diverse as:

- foods, such as sausages, potatoes and fruit;
- homemade articles, such as feather boas, or items made from plants or wood;
- live birds; and,
- plant cuttings from family gardens.

Food can carry animal diseases or plant viruses. Plants and plant products can carry invasive alien species, such as insects, harmful micro-organisms, viruses, fungi and bacteria.

In 2003, it was estimated that the annual loss of revenue caused by invasive alien species in Canada could amount to $16.6 billion.

http://www.beaware.gc.ca/english/declaree.shtml

Photo Credit: CFIA

Drumming Up Anthrax

Here is an example of how souvenirs and imported animal products can introduce disease.

When you hear Anthrax mentioned, a drum does not readily come to mind as the disease-causing agent. However, drum heads made from natural hides have been implicated in eight human Anthrax cases in North America and the United Kingdom since 1974 (four in the U.S., three in the U.K., and one in Canada in 2001).

Anthrax is an acute disease caused by the naturally occurring bacterium Bacillus anthracis. The spores are able to survive in the soil for decades or even centuries. Such spores can be found on all continents, even Antarctica. Herbivores are particularly susceptible to being exposed to the spores especially when grazing close to the ground during the dry season. There are effective vaccines against Anthrax and some forms of the disease respond well to antibiotic treatment. It can cause a skin infection (cutaneous Anthrax), gastrointestinal Anthrax from eating infected meat, or inhalation Anthrax when the spores are inhaled into the lungs.

Imported animal hides from countries where Anthrax is endemic in animals (e.g. Africa and Asia) can harbour Anthrax spores if improperly tanned or cured. The greatest risk of exposure to and inhalation of Anthrax spores is when making the drums (typically bongo style drums). However, at least three of the eight cases noted were attributed to inhalation of spores during playing the drums (drumming the hides released the spores).

The most recent case, at the time of writing, was in New Hampshire in December 2009. A woman became sick after participating in a drumming circle at a community centre. Two drums (of 66 present) and a light switch at the centre tested positive for Anthrax. All participants at the event were immediately offered antibiotics and the centre was closed until cleaning and disinfection took place. It was suspected that the woman contracted Anthrax contained within a drum, possibly when spores were suspended in the air through repeated banging. She then transferred spores from her hand to the light switch. The woman survived and was found to have had other health issues which may have increased her susceptibility to the disease relative to the other attendees. Attesting to the length of time the spores can persist, one of the contaminated drums had been purchased from an antique shop 12 years prior but had fortunately only been played rarely.

Ensure leather products purchased abroad have been properly tanned and are not on the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) list.

Animal Health Management

The most common method of disease transmission amongst animals is directly from an infected animal to an uninfected animal. Disease can spread amongst animals within your flock/herd and also be introduced by replacements. Animals that are recently recovered or appear healthy can still be a source of disease pathogens. There are some simple practices which can reduce the opportunity for diseases to be introduced to your operation and control the spread of disease when one occurs.

- ☑ Purchase replacement animals from herds of known disease status.
- ☑ Limit the frequency of introducing new animals to the herd/flock.
- ☑ Isolate any new animals or animals returning to the herd/flock. Consult with your veterinarian to assist in the determination of an appropriate isolation period.

Signs of disease can include:

- loss of appetite;
- weight loss;
- abnormal behaviour;
- unexplained production losses (decrease in milk production, abortions, etc.); and,
- unexplained death.

- ☑ Treat new animals with appropriate parasite treatments and vaccinations before introduction into the resident stock.
- ☑ Establish separate pens for isolation, sick livestock, new arrivals and maternity pens. Sick pens should only be used for sick animals and contact should be restricted between sick pens and maternity pens. Clean all manure from the pens and disinfect after use. Wash, disinfect, and dry pens between groups when appropriate.

- ☑ Properly disinfect livestock instruments and equipment (dehorners, hoof knives, trimmers, etc.) before and between uses.
- ☑ Establish protocols for handling sick animals.
- ☑ Minimize disease spread by working with livestock from youngest to oldest and healthy to sick.
- ☑ House young livestock away from older animals where appropriate. Young animals can acquire infectious diseases through exposure to older infected or carrier animals.
- ☑ Clean and sanitize nursing bottles and buckets after each feeding.

Photo Credits:
Ontario Agriculture Photo Library

- ☑ Use only commercially available milk replacers and colostrums or colostrum from your own animals of the same species. Do not bring in raw colostrum from other herds/flocks.

- ☑ For some types of operations, it may be possible to move livestock through pens using an all-in-all-out approach.

Photo Credit: Ontario Veal

Simple Changes Can Produce Big Results

A rabbit grower reports he was amazed at the improvement in animal health he experienced following implementation of some simple housing changes.

These included separation of pens to form four stations instead of continuous rows and staggered pens for better air flow. He also introduced footbaths at barn entrances and reports no rodents present in the barns after spreading three feet of gravel around the perimeter of buildings.

- ☑ Provide maximum pen space to avoid overcrowding and unnecessary stress.

- ☑ Prevent nose-to-nose contact between animals in different pens by using double fencing or alleyways.

- ☑ Separate feed and water troughs between different pens if possible.

- ☑ For outdoor livestock, prevent animals from having fence-line contact with livestock from other farms.

- ☑ Establish a herd health program, including vaccination and medication protocols, and review it with your veterinarian on a regular basis. Vaccinations can prevent some diseases.

- ☑ Observe and inspect livestock daily. Early detection of a disease concern and isolation or removal of individual(s) from the herd/flock is vital to minimizing its impact and to facilitating its containment to a premises or individual production units.

- ☑ Record treatments and mortalities.

- ☑ Minimize the risk of drug residues and antibiotic resistant bacteria by using all animal health products according to label and prescription directions. The appropriate use of medication can improve the efficacy of treatment and help reduce the risk of developing antimicrobial resistant pathogens.

Photo Credit:
Ontario Agriculture Photo Library

☑ Use new single use only sterile or disposable needles and syringes (one use).

☑ Use a semen supplier who regularly checks for viruses and other infectious diseases.

☑ Uniquely identify all animals for traceability and improved record keeping accuracy.

Observe Animals for Signs of Disease

Monitoring the appearance and behaviour of your animals is one of the many things you can do to protect animal health.

- Observe your animals' production levels, behaviour, clinical signs and feed and water consumption.
- Ensure (don't presume) workers are knowledgeable in recognizing signs of disease. Talk to them about what they should consider to be warning signs of a possible health issue. Write a standard operating procedure (SOP) to ensure everyone involved in the farming operation follows the same evaluation process.
- Contact a veterinarian if you see unusual rates of disease or unexplained death.
- Work with your veterinarian to have a "disease response plan" in place for suspected cases of contagious or reportable diseases. A disease response plan should include triggers for the response plan. For example, numerous animals showing signs of disease, a significant decrease in production, a lack of response to routine treatments, unanticipated mortality rates, etc.

Newborn rabbit kit
Photo Credit: Ontario Rabbit

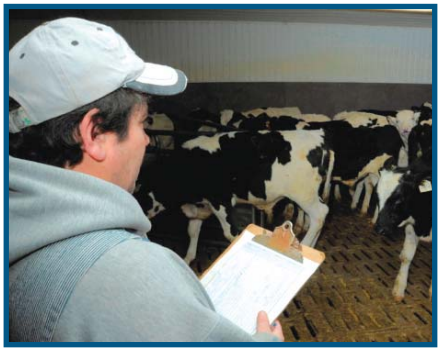

Photo Credit:
Ontario Agriculture Photo Library

When attending fairs, shows, and exhibitions:

- Determine health requirements prior to attending and discuss risks with your veterinarian.
- Consider vaccinations for your animals before attending the event if appropriate.
- Do not share equipment, tack, bedding, feed buckets, water buckets or trailers; use your own halters and clippers rather than borrowing them.
- Limit direct contact between animals from different locations attending shows or events.
- Wash and sanitize your hands if handling animals from other farms (before and after contact).
- Use clean footwear and clothing between your farm and the off-site location.
- Use the same pen for your animal throughout the exhibition.
- Ensure alleyways used to move animals within the site are cleaned and disinfected frequently.
- Monitor animals for signs of fever, loss of appetite, nasal discharge, depression or weakness, especially during the initial 14 days after returning from shows.
- Isolation of returning animals is ideal however if that is not possible attempt to minimize contact with the remainder of the herd/flock.
- Isolate any animals showing possible signs of illness from the rest of the herd/flock, allowing no direct contact.
- Clean and disinfect all equipment before reintroducing it to your facility. Remember that disinfectants are not effective unless a thorough cleaning has taken place first.
- Establish your own written protocols for fitting and showing. These include the practices you expect custom shearers, clippers, hoof trimmers, etc. to follow when working with your animals, e.g. thoroughly clean and disinfect equipment before beginning to work on your animals.

Photo Credits:
Ontario Agriculture Photo Library

TIP:
When shipping livestock from your farming operation, haulers should not be allowed inside your facilities or have contact with livestock remaining on the farm.

Isolation and Quarantine

Introducing new animals, or animals returning from an off-site activity (fair, show, competition, etc.), has the potential to introduce disease onto your farming operation. Quarantine of incoming animals is ideal. In some herds/flocks, minimizing contact with the rest of the herd/flock may be the only practical method of isolation.

To isolate new arrivals:

- use separate housing, feeding, and birthing areas (ideal); or
- use separate housing and feeding areas (acceptable); or
- prevent contact with other livestock (minimum acceptable);
- prevent manure movement from the isolation area to the rest of the herd/flock;
- isolate for 21-30 days (consult with your veterinarian);
- observe and examine for early disease detection;
- handle isolated animals last; and,
- test/treat for diseases prior to addition to the main herd/flock (this includes parasite control or vaccination as appropriate).

Equipment and Facilities

Photo Credit: Ontario Rabbit

In general, a clean environment will reduce the risk and spread of disease. Not only should the inside of the buildings be kept clean, but the area around the outside of the buildings should also be maintained. Trimming weeds will help to control rodents around and in the buildings.

- ☑ Inspect and maintain the water system. Clean and disinfect on a regular basis (depending on delivery system).
- ☑ Test water for bacterial contamination. Treat when indicated and have an alternative source if required.

Water sources and delivery systems have the potential to expose animals to disease-causing pathogens. Aquatic environments (ponds, lakes, etc.) cannot be controlled and are potential reservoirs for pathogens. Use "closed" water delivery systems where ever possible.

- ☑ Ensure feed and water is kept clean; minimize contamination by manure and urine.
- ☑ Clean and disinfect feed storage bins between loads if possible.

Ingestion of contaminated feed or contact with contaminated bedding can introduce and spread disease quickly. Contamination may occur off-site at purchase or on-site as a result of inappropriate storage.

- ☑ Ensure clean teats and udders for nursing young by providing clean birthing areas and bedding packs with clean straw or shavings.
- ☑ Remove dead livestock immediately and dispose of them in an approved manner (licensed collector, bury or compost according to provincial and municipal protocols, etc.). Clean and disinfect the area after carcass removal and wear protective clothing when handling deadstock. Deadstock pickup areas should be far away from the barn and ideally outside the controlled access zone (CAZ). Deadstock should be stored in a manner that prevents scavenger access and leakage of fluids.

TIP:

- Source bedding, feed and forages from reputable suppliers.
- Store bedding in a designated area to prevent contamination.
- Ensure that delivery and haulage personnel have no contact with livestock.
- If sourcing feed from commercial manufacturers or suppliers, ensure they operate under a quality assurance program that has a biosecurity component.

Photo Credit: Ontario Agricultural Photo Library

☑ Dedicate equipment for deadstock handling if possible. Clean and disinfect after use.

☑ Routinely clean and disinfect footwear, equipment, buildings and barns (as appropriate).

☑ Have different footwear for on and off farm.

☑ Keep your equipment clean; wash and sanitize equipment to be shared with neighbours and insist on clean equipment coming onto your farm.

Vehicles and farm equipment can spread disease from farm to farm through contaminated material on their tires, fenders and undercarriages. Proper sanitation of equipment between farms can reduce the spread of disease. This includes vehicle undercarriage and wheels as well. Complete drying of equipment and trucks is a very important component of the "cleaning" process. Verify that livestock transport companies have defined biosecurity protocols for delivery vehicles and drivers.

Equipment which should be routinely cleaned and disinfected also includes tools used by custom shearers, hoof trimmers, and clipping services.

☑ Designate a cleaning area for vehicles and equipment that is well drained and outside the production area and not an area through which people or other vehicles will travel.

For example, do not clean equipment immediately in front of an entranceway to your barn. People will walk through that area and transfer potential pathogens to the inside of the facility.

Dealing with Deadstock

Mortalities create risk situations in several ways. They may act as a reservoir of pathogens (death due to disease), attract pests, or transfer disease off-site (serviced removal). On-site considerations include movement around the facility, storage and/or containment areas, and compost or final disposal.

- Develop and implement a written plan for holding and disposing of dead animals.
- Make sure that mortality disposal adheres to municipal and provincial guidelines.
- Locate disposal and loading (mortality collection) areas outside the production area to prevent contamination of the site. The deadstock truck should not have to enter the CAZ.
- Design and locate temporary containment and disposal areas in a way to prevent access by people, domestic animals, wildlife, and pests.
- Manage post mortems and diagnostic tests to prevent further contamination.
- Appropriately dispose of contaminated bedding, animal products, manure, or feed.

Further details on deadstock handling and regulatory requirements may be found on the Ontario Ministry of Agriculture, Food and Rural Affairs website http://www.omafra.gov.on.ca/english/livestock/deadstock/index.html

Photo Credit:
Ontario Sheep Marketing Agency

- ☑ Park employee and family vehicles in a designated area outside the production area and away from traffic patterns of farming equipment.

- ☑ Maintain a vehicle and equipment arrival log; this can be part of your visitors' log.

- ☑ Limit recreational vehicle use on the premises. Snowmobiles and ATVs travelling across multiple farms can spread pathogens and pests.

An ATV or snowmobile trail through the property encourages people not associated with the farm to enter. If you allow recreational use by local associations, ensure the trail boundary is clearly marked. The same for service access to solar panels, wind turbines, and cellular towers.

ATVs Can Spread Weed Seeds and Soil Pests

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. 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. Outdoor sports enthusiasts riding in remote areas or riding ATVs off-trail are at higher risk for spreading weeds.

Researchers found vehicles picked up almost 20 times more seeds off-trail than on-trail. The study also found that thousands more seeds per mile were transported by vehicles during the fall than in the spring. These findings also apply to farm owned vehicles, recreational trail users (running through farm property) and to service suppliers who may be using ATVs for crop scouting or soil sampling.

To prevent the spread of weeds and soil borne pests, researchers recommend that you wash your vehicle frequently, especially after driving off-road or off-trail or along roads or fields bordered by high densities of weeds. The Montana State researchers evaluated the ideal duration and number of washes needed to remove weed seeds. Vehicles washed once for six minutes were judged to be the most seed-free.

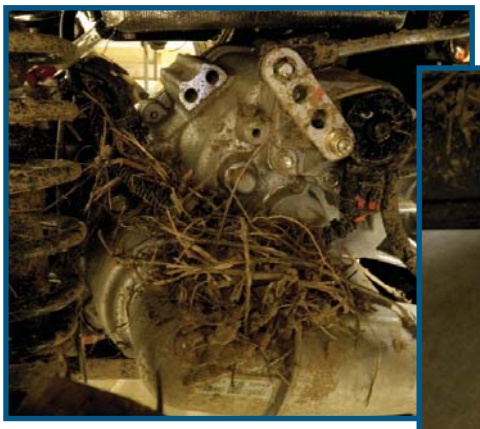

Photo Credits:
Ontario Livestock and
Poultry Council

Livestock Transport

Transport vehicles can be a source of pathogens for both the shipping site and the receiving site. Every time animals are moved onto or off the farm, there are associated risks of introduction and spread of pathogens from contaminated vehicles.

Ensure that trucks transporting livestock into or out of the farm travel by an approved route, making visits in the correct sequence, adhere to an appropriate sanitation program and have drivers that are trained to follow the farm loading and unloading protocols.

- Plan the traffic flow within and between farms/units to minimize the introduction of pathogens. The sequence of pick up or delivery should minimize contamination by travelling from herds/flocks of higher to lower health status.
- Vehicles dedicated to specific types of transport are encouraged for certain species, for example, PRRS negative pigs.
- Transporters delivering animals to farms should maintain a log documenting their route and stops.
- Implement a sanitation program for all vehicles. The frequency of vehicle sanitation (wash, disinfect and dry) will depend on the risk of contamination. Exposure to an abattoir or animals with a lower health status would require full sanitation. Sanitizing the interior of the trailer is as critical as the contact points.
- The proper protocol for vehicle sanitation must be taught to drivers. Verify that your commercial livestock hauler has defined biosecurity protocols and that the drivers have been trained. Farm employees must also be properly trained to clean and sanitize livestock trucks and trailers.
- Truck washes can be a source of contamination. Identify which commercial or farm truck washes may be used and provide clear instructions on how to use them.
- Use an entry log for vehicles not associated directly with the farm.
- The protocol for entry may include truck disinfection, including wheels, and driver communication with barn staff. Consider sanitation equipment (disinfectant and hose) at the access point. Automatic sprayers for vehicle disinfection are now used on some farms. However, they are only effective if organic material (e.g. manure, soil, plant debris) is first removed and spray coverage is adequate.
- Load outs should be built so that trucks with livestock do not directly contact the building.
- A protocol for the driver regarding boot and coverall change, disinfection, and surface contact rules is needed. Provide a written protocol to drivers and discuss your expectations with them and with their employer (if using a commercial hauler). The driver should always stay on or with the truck when loading and never enter the barn.
- Install facilities to prevent the backward movement of livestock when loading.
- Allow no contamination of truck material into the barn. A buffer area between the truck contact zone and the barn exit reduces the risk.
- A protocol for communicating with barn staff/farm owners at entry is needed to assist the driver with remaining biosecure.

Clean and Disinfect

Cleaning and disinfecting are key pillars of a strong biosecurity plan. These processes work in conjunction with zoning and other measures. Cleaning and disinfection reduces pathogen load in the facility as well as on people, equipment, and vehicles, which mitigates the risk of movement between and within production areas.

- Develop and implement a production facility cleaning and disinfection program.
- Plan acceptable downtimes between production cycles if applicable.
- Clean production areas and equipment after each production cycle.
- Remove all organic waste material regularly, during and after each production cycle.
- Include a pre-cleaning and sanitizing step to remove remaining organic material before disinfecting.
- Clean and disinfect the following:
  - removable equipment (remove and clean separately);
  - isolation or quarantine areas after use;
  - production areas following a disease outbreak;
  - loading and unloading bays after use; and,
  - shared and borrowed farm equipment before and after use (including custom operators' equipment).
- Drain, disinfect, and refill water systems.
- Routinely clean animal feeders and feeding areas.
- Select disinfectants based on target organisms and needs.
- Allow all disinfectants to completely dry prior to restocking with animals.

Photo Credits:
Ontario Pork Industry Council

Proper 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. Note the concentration required and the instructions for application including contact time and whether the product must be rinsed off following application.

For a particular application, determine if a product:

- has activity against bacteria, fungi or viruses;
- is active in organic debris (e.g. manure);
- is effective in hard water;
- requires a specific water temperature and/or pH to be effective;
- has decreased or enhanced activity in heat;
- has residual activity after application;
- is compatible with soaps;
- is caustic or has irritating fumes;
- can be used on feeding equipment;
- can be disposed of in accordance with provincial regulations; and,
- is appropriate for the intended use.

Manure

Many diseases can be transmitted by manure either directly or indirectly by contaminated clothing, vehicles, and equipment. To reduce the risk of spreading disease by manure:

☑ Designate equipment for clean jobs (feeding) and dirty jobs (manure handling and carcass disposal).

☑ Promptly clean feeders and waterbowls if they become contaminated with manure.

☑ Avoid sharing manure handling equipment with neighbours.

TIP :
Have separate equipment and tools for handling manure and feed. Mark your forks and shovels with coloured duct tape or paint to identify which is for manure and which is for feed.

This applies to tractor buckets as well. You should avoid scraping manure with the same bucket used for taking feed out of the bunk.

Require livestock conveyances to be cleaned and disinfected prior to arriving at the farm. Ask that your feed and other input suppliers have clean delivery vehicles and inquire whether they have an established protocol for cleaning and disinfecting their trucks.

☑ Store manure so it is inaccessible to livestock and to wildlife, scavengers, pets, etc. if possible.

☑ Ensure that manure storage and management practices adhere to leaching and spill prevention guidelines.

☑ Record movement of manure and/or compost from the production area or premises including sales.

☑ Ask neighbouring producers to not spread manure adjacent to your barns, production areas, or water sources.

Good "Housekeeping" Supports Biosecurity

- Put in place a routine facility/property maintenance program.
- Conduct routine inspections of equipment and buildings.
- Keep buildings and mechanical equipment in good repair.
- Have signage, fences, and boundaries in good repair.
- Production areas should be kept free of standing water (puddles) and effluent drainage.
- Make sure that buildings are easily cleaned and disinfected.
- Design buildings to prevent the entry of wild birds and animals, and limit the presence of vermin.
- Ensure that gates and building doors can lock.
- Maintain driveways and walkways in good repair and construct them in a manner which promotes adequate drainage.

Wildlife, Pets and Pests

Birds, rodents and insects can carry disease on their feet and fur, and they can destroy thousands of dollars worth of feed, supplies and buildings each year. You may be enticing wildlife to your production areas by feeding them either intentionally (e.g. bird feeders attract rats, squirrels, wild turkeys, etc. as well as song birds) or inadvertently by providing a feed source in spilled feed or access to feed storage.

- Implement a pest control program; wild birds and rodents may carry infectious disease or contaminate feed supplies.
- Screen all openings in naturally ventilated barns and exhausts.
- Seal off openings into silo roofs.
- Screen ledges which could be used as nesting sites.
- Properly store feed and clean up feed spills.
- Maintain bait stations.
- Minimize vegetation and debris around facilities.
- Consider a two to five foot apron of crushed stone/gravel around the perimeter of barns to deter rodents.

Photo Credit: Istock

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. Flies are also a frequent carrier of disease and have been shown to travel up to 1½ km from farm to farm.

Photo Credit: Paul Dalby

☑ Keep pets out of barns and vaccinate them for rabies and diseases common in your area.

☑ Include working dogs, livestock guardian animals and barn cats in your biosecurity plan. As with pets, they should be vaccinated and a parasite control program implemented. Manage their access to mortalities, livestock feed, birthing areas, etc.

☑ Manage and reduce risks posed by employees who own farmed animals, pets, and exotics by insisting they practice cleaning and sanitizing of hands, clothing, footwear, and vehicles. They should also be instructed to notify you of any disease in their animals which may impact your livestock.

☑ Control the fly/insect population by removing manure, using traps, baits or flypaper, insecticides, or a combination of control measures.

☑ Remove manure frequently from barns, yards and holding areas to prevent completion of life cycles of parasites and flies.

TIP:
Do not bring home meat scraps from restaurants or butcher shops to feed pets; they could contain viruses and bacteria.

This also applies to meat and agricultural products from other countries purchased while on vacation or business trips.

Food can carry animal diseases and plant viruses. Be aware and declare!

☑ Wash farm clothing separately from other household laundry and use detergents and bleach or washing soda. Wash coveralls in hot water. Drying in a hot dryer is also an important part of the cleaning process.

Landscape

While you want to minimize vegetation immediately around your farm buildings and production area, natural features, including vegetation, waterways, and topography can benefit a biosecurity plan by providing natural barriers and drainage. However, give careful consideration to your selection of species of trees, shrubs, flowers and other plants as well as the source of any introduced topsoil. Some shrubs and plants are poisonous to livestock. Ornamental plants can reseed in field crops and roadsides via wind or wildlife and have the potential to be considered an invasive species. Topsoil can introduce soil borne pests to field crops.

Listed below are some landscaping considerations which are beneficial biosecurity practices.

- Locate production areas and animal-housing areas on higher ground.
- Use natural barriers along roadways or neighbouring farm boundaries to enhance separation.
- Use landscaping to assist drainage and to reduce standing water in the production area.
- Minimize trees and shrubs near or within the production area.
- Manage vegetation within or around the production area.

Wild Birds As Polluters

Wild birds excrete a variety of pathogens in their droppings, including the bacteria Campylobacter, Listeria, Salmonella, Aeromonas, Vibrio cholerae, Yersinia and Escherichia coli O157, the protozoa Giardia and Cryptosporidium, as well as the bacterial indicators of pollution, fecal coliforms and enterococci. Therefore, wherever wild birds congregate, they are likely to pollute their immediate environment with some or all of these pathogens. A Canada Goose can deposit about a half a pound of fecal material on your pasture or cropland each and every day.

Wild birds act as a link between aquatic and farm environments for the transfer of disease-causing microbes. An epidemic of abortion in sheep on a Lancaster, UK farm was caused by gulls contaminating feeding troughs with Salmonella while finishing off food meant for sheep. Farm ponds, with their resident and migrating ducks, geese and wildfowl, are a particularly rich source of pathogens, such as Salmonella and Campylobacter, for livestock. Migrating birds have the potential to bring new, more virulent strains into the farm environment.

Fecal contamination of crops by birds is an important issue, particularly for growers of fresh fruits and vegetables.

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

Photo Credit: Tarlok Sahota
Thunder Bay Agricultural Research Station

Planning, Training and Documentation

Working through the process of writing a biosecurity plan will help you to assess your disease risks and identify where you can improve biosecurity practices. A little time spent adopting some proactive measures now may save a lot of time and money should you experience a disease outbreak on your farm in future and when a change occurs.

TIP:
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 farm's biosecurity risks and writing down your plan will help you identify areas you might overlook otherwise.

- ☑ Have a written biosecurity plan that is updated regularly. Review annually at a minimum.
- ☑ Ensure that employees receive proper training and resource materials so they can continue to follow the plan. New employees require training before they begin work activities on your operation. Updated training is required when the biosecurity plan is revised.
- ☑ Consider posting specific instructions in areas of concern.
- ☑ A map of the layout of your farming operation can assist in training new employees and in disease response planning. Understanding the logic of production movements and work patterns can be an important part for the development, implementation, and modification of a biosecurity plan.
- ☑ Implement a good record keeping system for dates of vaccination and medication, footbath changes, disease occurrences, mortalities, rodent bait changes, livestock movement in and out, etc. This will help you keep track of your biosecurity practices as well as flag any significant flock/herd health changes.
- ☑ Visitor and vehicle logs are an important component of your record keeping system.
- ☑ Prior to renting, leasing, or buying land and/or buildings, inquire about its biosecurity status (historical use and ownership, disease status of the area, etc.). Apply strict biosecurity protocols to all rented land and/or buildings.
- ☑ Ensure that before renting land and buildings to another producer, a strict biosecurity protocol will be applied to protect the biosecurity status of your property.

Share components of your biosecurity plan as appropriate with neighbours, visitors, and service providers (e.g. deadstock service, feed suppliers, veterinarian, artificial insemination technicians, etc.). The next section lists the items to consider including in your biosecurity plan.

Photo Credits:
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Developing Your Farm Biosecurity Plan

Developing Your Farm Biosecurity Plan

6. Developing Your Farm Biosecurity Plan

As noted in the previous section, working through the process of writing a biosecurity plan will help you to assess your disease risks and identify where you can improve biosecurity practices. A little time spent adopting some proactive measures now may save a lot of time and money should you experience a disease outbreak on your farm in the future.

In this section, we have included items for you to contemplate including in your biosecurity plan. If you experience a serious disease or hazard incident on your operation involving CFIA and/or OMAFRA response teams, they will request most of the information which we have suggested including in your biosecurity plan. By proactively compiling this information, you will be saving yourself time and facilitating a faster response in the event of a disease situation which will be a very stressful time for everyone involved.

The benefits of writing down your plan include:

- identifying potential concerns or problems;
- evaluating who and what enters and exits your farm;
- determining the risk level for specific diseases of concern;
- evaluating how diseases could enter and spread within and off your farm;
- targeting diseases against which the biosecurity plan will operate;
- identifying preventative biosecurity measures that will manage or minimize the risk factors for a disease(s) entry or spread;
- setting limits and standards for your farm;
- establishing uptake of the plan;
- implementing the biosecurity plan; and,
- establish an annual review date.

Your plan should also be updated when a change occurs and staff informed and trained accordingly.

An effective biosecurity plan can help:

- improve or maintain animal health, welfare and productivity;
- reduce the risk of the introduction and spread of endemic and foreign diseases;
- minimize the potential for increased health costs and revenue losses;
- protect human health;
- protect the ability to move animals;
- protect service industries (e.g. feed suppliers);
- protect export markets; and,
- assist in domestic marketing.

Consider consulting with your veterinarian regarding designing and implementing your biosecurity plan. Also, refer to any applicable federal, provincial, regional, and municipal regulations (e.g. for nutrient management, composting, carcass disposal, etc.) to ensure your on-farm practices adhere to the latest requirements.

Not all of the items listed in this binder will be applicable or practical for every situation. At a minimum, a biosecurity plan should focus on biosecurity interventions that minimize the:

- risk of entry of pathogens and pests into the production area;
- risk of transmission between production units; and
- release of pathogens and pests from your farm.

Plan and Train

- 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 and family members.
- Share components of your biosecurity plan as appropriate with neighbours, visitors, and service providers.
- Communicate and work with a veterinarian on a regular basis.
- Keep well informed on animal health developments (locally, regionally, nationally, and internationally).

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Access Management

Insert another page if you require more space to record information for any questions.

1. Your full contact information including:

   Name _____

   Lot, Concession, Fire Number _____

   City/Town _____

   County _____

   Postal Code _____

   GPS if available _____

   Premises ID_____

   Telephone numbers – residence, farm office, cell, other

   _____

2. Location of all premises comprising the farming operation including:

   Name of land owner (if you rent the land), Name of tenant (if you own the land but rent out the residence)

   _____

   Lot, Concession, Fire Number _____

   City/Town _____

   County _____

   Postal Code _____

   GPS if available _____

   Premises ID _____

   Telephone numbers – residence, farm office, cell, other

   _____

3. Contact information for employees including:

   Name _____

   Lot, Concession, Fire Number _____

   City/Town _____

   County _____

   Postal Code _____

   Telephone numbers – residence, business/farm office, cell, other

   _____

4. List all species and production categories of livestock and poultry at each site. For example, cows, heifers, calves, feeder/finisher, etc.

_____

_____

_____

_____

_____

_____

Don't forget to list non-production animals, e.g. donkeys or llamas used for predator control, hobby animals, horses, dogs, cats, exotics such as pet birds, etc. Non-production species can spread and contract diseases.

5. Veterinarian contact information.

_____

_____

_____

_____

6. Names and contact information of neighbours including types of farming operations (if known).

_____

_____

_____

_____

_____

_____

_____

_____

The immediately adjacent neighbours are a minimum. Be sure to also list any sales barns, processing plants, etc. in the vicinity (within 5 km).

7. Describe how you will control visitor and vehicular movement, e.g. controlled access via signage and barriers, visitor and vehicle log, etc.

_____

_____

_____

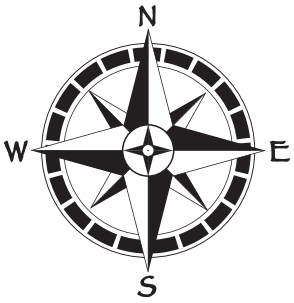
_____

_____

_____

8. Include a map of your property which shows buildings (residence and production facilities), yards and pasture areas that animals have access to, cropland, woodlands, any roads, railways, streams, ponds, lakes, public right of way or walking trails, any other significant feature. (If you have an Environmental Farm Plan (or other plan) you may already have this done.)

(map)



9. Describe your flock/herd health protocols.

_____

_____

_____

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_____

Note your medicine and health record keeping practices, if your plan is developed in conjunction with a veterinarian include contact information as noted earlier, isolation and quarantine practices, what triggers treatment and who administers vaccines/medicines, state your cleaning and disinfecting regime, etc.

If you already have a documented on-farm food safety program that includes health record keeping, simply reference those protocols. This point applies to more than just animal health management.

10. Animal record keeping protocols.

_____

_____

_____

_____

_____

_____

_____

_____

List what methods of record keeping you have or will implement regarding tracking animal movement onto and off premises. These should include the date of introduction of new animals, place purchased, previous owner name and location if known, etc. What type of animal identification or tagging do you use? How and where is this recorded?

You should also include details regarding the movement of animal products such as milk, eggs, meat, semen, etc. Note frequency, method of transportation, destination, service provider, etc.

11. Describe the sources of water used in your farming operation and document your testing/treating protocols.

_____

_____

_____

_____

How often will you test the water, at what levels will you decide to treat, and what treatment will you use.

12. List the contact information for your feed supplier and type(s) of off-farm feed sourced.

_____

_____

_____

_____

Note whether your supplier has a quality assurance and/or testing program in place.

13. Record any bedding materials purchased including type and contact information for the supplier.

_____

_____

_____

_____

14. Document how manure and sewage biosolids are handled, stored, spread and/or disposed of and keep a record of where and when manure is applied.

_____

_____

_____

_____

_____

_____

_____

_____

If you have a nutrient management plan, this will be covered in that document.
If you engage a commercial manure or biosolids hauler or spreader, include their contact information.

15. Describe your deadstock disposal plan.

_____

_____

_____

_____

_____

_____

Include how and where mortalities are stored until disposal, what method of disposal you use (burial, composting, incineration, commercial removal, etc.), how and what you record. If you use a commercial deadstock removal service, document their contact information.

If using an on-farm method, indicate burial or composting sites on your farm map. Be sure to take into consideration soil type, water sources, provincial and municipal regulations, etc. Further details on composting bin design, deadstock handling and regulatory requirements may be found on the Ontario Ministry of Agriculture, Food and Rural Affairs website
http://www.omafra.gov.on.ca/english/livestock/deadstock/index.html

16. Document how garbage waste (including household) is disposed of whether by municipal pickup, delivered to local landfill, composting, fed to animals, etc.

_____

_____

_____

_____

_____

_____

Note what is fed and to which species, this includes meat scraps and bones fed to dogs, etc. Include use of a "sharps container" to hold used needles, scalpel blades, etc. plus document and follow appropriate disposal arrangements.

17. Document your pest and wildlife control protocols.

_____

_____

_____

_____

_____

_____

_____

_____

Types of pests protected against, methods used (sprays, baits, traps and frequency of replacing), screening and sealing, "housekeeping" (vegetation control, cleaning up feed, manure management), etc. If you use a commercial pest control service, include the contact information for the company and primary contact person.

18. Ensure you go over your plan and the protocols and practices you wish followed on your operation with employees, family members, and service suppliers (e.g. deadstock service, feed suppliers, veterinarian, artificial insemination technicians, etc.).

19. Note any current gaps in your biosecurity protocols and practices that could improve your plan. Include target dates for incorporating these changes if applicable.

20. Note the date the plan was written and subsequent review/revision dates.

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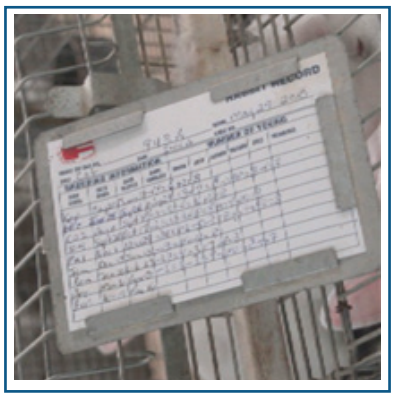
Sample Record Keeping Templates



Sample Visitors' Log

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

Sample Livestock Event Recording Sheet

The following page contains an example of a recording sheet you can use to record various farm events. As part of your record keeping system, you need to document dates of vaccinations, medications, footbath changes, disease occurrences, mortalities, rodent bait changes, livestock movement in and out, etc. This will help you keep track of your biosecurity practices as well as flag any significant flock/herd health changes. If you have a herd health software program, on-farm food safety or a quality assurance program, you may already maintain individual animal health records so some of this information will be captured in those documents and does not need to be duplicated in a separate recording sheet.

Listed below are some of the events for which you should consider keeping records. You may think of additional events which you will wish to document.

Event type:	Details to be recorded:
Vaccination	record specific vaccine, dosage, lot/batch numbers, animal(s) treated, who did vaccination(s) and include farm pets and livestock guardian animals
Medication	record specific medication name, dosage, lot/batch numbers, animal(s) treated, who administered medication
Disease/illness	record observation, animals affected, response/action taken
Mortality	cause if known, animal(s) affected, disposal method including the name and contact of deadstock company if used
Livestock purchased	animal numbers and description, name and contact information of seller
Livestock sold	animal numbers and description, name and contact information of buyer
Animals leaving farm but not sold Animals returning to farm, e.g. fairs, shows, breeding, health treatment off-farm	animal numbers and description, details regarding off-farm site
Footbath change	product and concentration used
Rodent bait change	product used, name and contact information of pest management company if used
Manure moving off or on-farm	origin or destination, contact name of commercial hauler and/or applicator if one used
Bedding purchased	type of bedding, name and contact information of seller
Barn cleaning /disinfection	product used and rate, name and contact information of service company if applicable

Sample Livestock Event Recording Sheet

Date	Event Type	Comments/Details

Sample Crop Recording Sheet

This is a fairly basic form which can be used to record crop production practices. A separate copy should be used for each field although you can group fields if they are treated the same, e.g. planted to the same crop. A new form would be started at the beginning of each cropping year. If you have an existing on-farm food safety or quality assurance program, the forms required within those programs will likely cover similar material and will suffice for biosecurity as well.

Crop Year: _____ Field number or description: _____

Total acres/hectares: _____ Crop planted: _____

Variety: _____ Lot numbers: _____

Seed supplier: _____ Seeding rate: _____

Seeding date(s): _____

Indicate if seeds were certified, treated, organic, etc. _____

Crop Inputs

List inputs used, e.g. commercial fertilizer, manure, biosolids:

_____

Supplier(s): _____

_____

Application rate: _____ Application date(s): _____

Pest and Disease Monitoring

Date: _____

Type of pest or disease observed (include observed wildlife damage):

_____

Assessment of crop damage: _____

Corrective action taken (if any) e.g. product applied, rate and date: _____

_____

Harvest

Harvest date(s): _____ Total amount harvested: _____

Yield per acre/hectare: _____ Crop use (feed, seed, sold): _____

Date sold: _____ Buyer: _____

Record the contact name for any custom services (planting, fertilizer or pesticide application, manure or biosolids hauler, harvesting, etc.):

_____

_____

_____

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References

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Best Management Practices Series

The Best Management Practices Series of publications may be useful resources in writing your biosecurity plan. There are currently 22 BMPs in print covering field crop production, soil management, manure management, nutrient management, deadstock disposal, sewage biosolids, etc. You can view the list of titles available on the OMAFRA website http://www.omafra.gov.on.ca/english/environment/bmp/series.htm

Hardcopies of publications can be ordered online at https://www.publications.serviceontario.ca/ecom/, by phone through the ServiceOntario Contact Centre, Monday to Friday, 8:30 a.m. to 5:00 p.m. 416-326-5300 or 1-800-268-7095. You may also order in person through a public access terminal available at ServiceOntario Centres located across the province.

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