

DRAFT

National Farm and Facility Level Biosecurity Standard for the Equine Sector

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Section 1: Glossary

Access management: The process of controlling the movement of horses, equipment, vehicles, and people on-and-off a farm or facility, as well as movement between different areas of a farm or facility. It may include physical barriers (for example: fencing and gates that clearly indicate entry and exit points) and /or procedural barriers (for example: hand washing, boot cleaning and **disinfection**)

Aerosol: Solid or liquid particles suspended in air that can be distributed over short distances.

Best practices: For this document a best practice is a program, process, strategy, or activity that has been shown to be most effective in preventing and controlling disease. Best practices may have to be modified before implementation to accommodate a specific farm or facility and enhance practicality.

Bio-exclusion: A set of practices to minimize the introduction of pathogens into a population of animals from an outside source.

Bio-containment: A set of practices to minimize the release of pathogens from a population of animals in a particular location (for example: a farm or facility).

Bio-management: A set of practices to minimize the transmission of pathogens within a population of animals (for example: the spread of disease among horses within a farm or facility).

Biosecurity: A set of practices used to minimize the transmission of pathogens and **pests** in animal and plant populations including their introduction (**bio-exclusion**), spread within the populations (**bio-management**), and release (**bio-containment**).

Biosecurity zone: A defined area on a farm or facility established by natural or man-made physical barriers and/or the use of biosecurity procedures designed to reduce the transmission of pathogens (for example: a **controlled access zone** and or restricted access zone)

Closed herd: A population of animals that remains distinct by preventing the introduction of new animals from external sources, maintains their own breeding stock, and prevents **direct contact** with other herds of similar species.

Commingle: Where horses from different locations or different health status are brought together and exposed to each other, either directly or indirectly; may be short or long term. Some examples of commingling sites include boarding stables, auctions, summer pastures, staging sites, horse shows, rodeos, 4-H events, and horse clinics.

Controlled access zone (CAZ): The CAZ is a buffer area that contains facilities indirectly involved in the care for horses, and areas where farm personnel access the facilities. A few examples include laneways, equipment, storage sheds, and riding arenas, although some of these may be in the restricted access zone in other facilities. It usually excludes the house and office space for the farm owner and manager. The CAZ may include pastures and barns that horses are not currently occupying. A controlled access zone has its own specific biosecurity protocol and often encompasses the restricted access zones.

Custodian: Any person who has control of a horse and is responsible for its care, whether on a short term or long term basis. This may include owners, stable owners and staff, volunteers, clients, service providers and family members.

Disease: A change from the normal state, a deviation or disruption in the structure or function of a tissue, organ or part of living animal's body.

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

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

Emerging disease: A new infection resulting from the evolution or change of an existing pathogen or parasite resulting in a change of host range, vector, pathogenicity or strain; or the occurrence of a previously unrecognized infection or disease.

Endemic disease: The continued presence of a disease in a specific population or area usually at the same level- often a low level. Also may be referred to as enzootic disease.

Events: An organized gathering of horses from 2 or more farms or facilities for a set amount of time. A horse event or activity is defined as any market, sales or auction, fair, parade, race, horse show, meeting, recreational activity, demonstration or clinic, rodeo, competition, or any other horse gathering.

Foreign animal disease: An existing or emerging animal disease that poses a severe threat to animal health, the economy, and/or human health that is not usually present in the country.

Facility: A defined area of land and all associated buildings used for the care and maintenance of horses for commercial purposes and events (for example: competition grounds, race tracks, auctions, and larger boarding operations).

Farm: A defined area of land and all associated buildings used for the care and maintenance of horses for recreational purposes.

Fomite: Any physical entity, object or substance, such as clothing, footwear, equipment, tack, water or feed that mechanically transmits a pathogen from one individual to another.

Health status: Current state of health of the animal or herd, including both its condition and the presence of pathogens in the animal or herd. Information used to establish the health status includes the disease history and the results of any diagnostic testing; herd health management practices; vaccination and deworming protocols in sufficient detail to determine compatibility with the resident herd; and housing and movement detail sufficient to identify any potential recent disease exposure.

Higher risk or High risk horse: Horses that are a higher risk for harbouring and transmitting pathogens. This includes horses that are: visibly ill (clinical infection), infected but not showing signs of illness

(subclinical infection), known to have been exposed to ill horses, and those that have recently recovered from illness.

Horse: Refers to all domestic equine species, namely horses, ponies, miniature horses, donkeys, mules and hinnies.

Immediately notifiable disease: In general, immediately notifiable diseases are diseases exotic to Canada for which there are no control or eradication programs.

The CFIA can undertake control measures for such diseases when notified of their presence in Canada. This category also includes some rare indigenous diseases. A herd or flock of origin must be certified as being free from these diseases in order to meet import requirements of trading partners. Some provincial ministries may require notification for surveillance and/or control of certain immediately notifiable diseases.

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

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

Infectious disease: Disease caused by a pathogen (for example: a parasite, bacterium, virus, fungi or prion).

Medical waste: Waste generated by administration of treatments (for example: needles, syringes, expired medications, and disposable materials used in the treatment of horses).

Mode of transmission: The method whereby pathogens are transmitted from one animal or place to another. An example of direct transmission is nose to nose contact. Examples of indirect transmission may include contact with a contaminated bodily fluids, *vectors* or *fomites*.

Monitoring: This refers to the systematic observation and recording of clinical signs that reflect the health parameters of the horse [for example: heart rate; respiratory rate; temperature; for mental status (responsive and alert); for gait and posture (normal, coordinated, not lame); for body condition (thin, normal, obese)]. The level of monitoring is dependent on the health status of the horse.

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

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

Normal carrier or Subclinical carrier: A horse that displays no signs of illness but is harbouring a pathogen.

Pathogens: Bacteria [including *Mycoplasma*], viruses, fungi, parasites and other microorganisms that can cause disease.

Peer group: Horses of similar age (for example: yearlings), use (for example: broodmares and school horses), or health status (for example: same preventable health program).

Pests: Includes insects, spiders, ticks, rodents, birds and other animals that pose a nuisance to horses.

Physical barriers: The use of physical structures and items to minimize exposure to pathogens. This includes the use of fences and gates to manage access and traffic flow and solid pen partitions to minimize contact between horses. It also includes the use of protective clothing, boots and gloves that provide a barrier to contamination and/or infection of a person.

Procedural measures: The use of processes such as hand washing and cleaning and disinfection to minimize the transmission of pathogens; procedures for assessing the health status of new horses and vaccination to protect horse health.

Reportable disease: Refers to diseases in federal and/or provincial acts and regulations. Federally, reportable diseases are outlined in *the Health of Animals Act and Reportable Diseases Regulations* and are usually of significant importance to human or animal health or to the Canadian economy. Animal owners, veterinarians and laboratories are required to immediately report the presence of an animal that is contaminated or suspected of being contaminated with one of these diseases to a CFIA district veterinarian. Control or eradication measures will be applied immediately. A list of federally reportable diseases is available on the CFIA website at:

<http://www.inspection.gc.ca/animals/terrestrial-animals/diseases/reportable/2014/eng/1329499145620/1329499272021>

Lists of provincially reportable diseases can be obtained by contacting the respective provincial agriculture department.

Restricted access zone (RAZ): The RAZ is the innermost zone on a farm or facility and represents areas where horses commonly reside. These zones include the pens, barns, and pastures, as well as separation areas used for new, visiting and ill horses. The layout and management practices of individual farms and facilities determine whether manure storage and other production facilities directly involved in animal care and maintenance should be included within the restricted access zone.

Risk: Low risk/High Risk and provide examples (facility and disease)

Sanitize: A process that reduces the number of pathogens without completely eliminating all microbial forms on a surface.

Separation: Using physical barriers or distance to prevent direct contact between horses. Separation is a management tool to minimize the risk of introduction and spread of disease. *Other terminology such as isolation and quarantine is commonly used for specific purposes of separation*

Quarantine

- A quarantine is used to separate and restrict movement; it is a 'state of enforced isolation'.
- The term is often erroneously used synonymously with the medical version of the term isolation, which is "to separate ill persons who have a communicable disease from those who are healthy."

Isolation

- Not to be confused with biocontainment, or quarantine;
- The medical community refers to different degrees of isolation:
 - Strict isolation
 - Contact isolation
 - Respiratory isolation
 - Blood and body fluids precautions
 - Reverse isolation

Sharps: Includes needles, scalpels, scissors, staples, and other objectives capable of puncturing or cutting skin.

Sharps container: A container used to safely store used needles and other sharps for disposal. Only “approved” sharps containers should be used as they are designed to prevent injuries by being puncture resistant and to prevent spillage or removal of disposed items.

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

Standard operating procedure (SOP): A defined and documented procedure to be followed, detailing the steps to be taken to meet an objective. This includes any formal process that a **custodian** uses to define how they manage their operations on a day to day basis. The protocol may be formally documented or a non-documented process that is strictly followed. The intent is to focus on the process rather than the documentation.

Sterilization: A process that inactivates all disease causing organisms including bacteria, viruses, spores, and fungi on a non-living surface.

Susceptible host: A person or animal who lacks the immunity or ability to resist the invasion of pathogens which then multiply or reproduce resulting in infection.

Vector: An organism such as a mosquito, fly, flea, tick, rodent, animal or person that transmits pathogens from an infected host (a horse) to another animal. A **biological vector** is one in which the pathogen develops or multiplies in the vector’s body before becoming infective to the recipient animal. A **mechanical vector** is one which transmits an infective organism from one host to another but which is not essential to the life cycle of the pathogen.

Zoonotic disease: Pathogens that can cause disease in both animals and humans (for example: Methicillin resistant *Staphylococcus aureus* (MRSA) and *Salmonella* spp).

Section 2: Introduction and Background

Introduction and Background Information on **disease** transmission, special biosecurity considerations and a glossary of terms are included in the standard. *The terms in the glossary appear in bold and italic text.*

2.1 What is biosecurity?

Biosecurity is a set of principles and practices that are used to reduce the risks posed by **pathogens**. The biosecurity standard provides measures that **horse** owners and **custodians** may take to minimize the introduction of **pathogens** onto a property, their spread within the operation, and spread off the property.

Biosecurity is not a new concept, nor are most biosecurity measures difficult or expensive to implement. Many daily activities that horse owners and custodians perform include biosecurity measures (for example: hand washing and monitoring horse health).

Biosecurity relies on the consistent use of a combination of **physical barriers** and **procedural measures** designed to disrupt the transmission of pathogens. These barriers and measures target opportunities for transmission that occur during routine horse care (for example: contact with other horses), risks posed by less frequent activities (for example: introduction of new horses to the herd) and changing risks (for example: increased movements of resident horses off of and onto a property). To be effective, biosecurity measures must be applied consistently. Like the links of a chain, the failure of any one element weakens the entire chain.

Biosecurity may be defined as: “A set of practices used to minimize the transmission of pathogens and *pests* in animal and plant populations including their introduction (*bio-exclusion*), spread within the populations (*bio-management*), and release (*bio-containment*).”

The threat of infectious disease is always present. Ideally, biosecurity would eliminate the threat and completely prevent the exposure and transmission of pathogens. Eliminating all threats is impractical and rarely achievable, therefore, at the farm level, it is more appropriate to view biosecurity in terms of risk management.

Biosecurity requires balancing the:

- **risk of disease transmission;**
- **consequences of disease occurring; and**
- **measures required to minimize disease.**

The level of disease risk (or protection from disease) that is considered acceptable is likely to vary among horse owners based on their goals, the use of their horse, and the importance of their horse and the industry to them. Similarly, farm and facility owners and managers may have different tolerances for disease risk depending on the use of the property and the clientele (boarders or participants) they may serve. Biosecurity measures need to be tailored to the needs of individual **farms** and **facilities**.

Biosecurity plans should be developed with the assistance of the attending veterinarian taking into account the owner's or manager's goals, management practices and the internal and external disease threats. Biosecurity plans must be understood, practical, achievable and sustainable. Because the consequences of disease are many and far reaching, horse owners and farm and facility owners and managers should not look at their biosecurity and risk tolerance in isolation of the industry.

2.2 Why is equine biosecurity important?

Goal: To achieve a Canadian Herd that has a high health status with horses in good condition, with strong immunity to pathogens and a decrease in the number of pathogens. To maintain a country that is eligible to export horses worldwide.

Infectious disease in horses continues to rank as one of the major challenges to the equine industry, leading to illness (and potentially death), financial costs, welfare concerns and potential risks to human health. The need for preventive measures will always be an important management process against the backdrop of ongoing or rapidly spreading regional or global concerns and **emerging** or re-emerging **diseases** in the Canadian herd.

The impacts of infectious disease in horses are significant and can be devastating. Disease can range from mild illness to death, from sporadic cases to extensive disease outbreaks. Even mild disease can result in chronic or permanent damage and impaired function. Farms and facilities with poor biosecurity may become a significant risk to the rest of the industry. Every horse farm and facility should have a biosecurity plan that they implement. Biosecurity can:

- reduce the transmission of **endemic, newly emerging, and foreign animal** diseases ;
- enhance animal health and welfare by reducing the negative outcomes of disease which can include: decreased function, permanent disability and occasionally death;
- protect public health by reducing the transmission of **zoonotic diseases** (diseases that can be spread from horses to people) including salmonellosis (*Salmonella*), *Clostridium difficile* infection, dermatophytosis (ringworm) and Methicillin-resistant *Staphylococcus aureus* (MRSA) infection;
- reduce direct costs for the treatment of disease;
- reduce indirect costs to the equine industry resulting from disease control activities including decreased revenue from sparsely attended or cancelled events, reduced purses for participants and unemployment; and
- protect Canada's horse health status, thereby maintaining export markets and the ability to move horses internationally.

Your Horse – Part of a Larger Herd



Figure 1: Your Horse – Part of a Larger Herd This diagram illustrates the relationship of an individual horse to the national and international horse industry. It emphasizes the impact that disease left uncontrolled from an individual horse can have on the horse industry in Canada. Modified from *Equine Biosecurity Principles and Best Practices: Disease Transmission; Government of Alberta*.

Disease control and prevention is complex. This complexity is compounded by the inherent biosecurity challenges in the equine industry, including the:

- various environments to which horses are exposed;
- significant degree of horse movement locally, regionally, nationally, and internationally;
- close proximity and / or contact of animals from different owners (**commingling**) both on individual premises and during events;
- different vaccination and deworming programs used among horse custodians;

- different management practices (for example: grouping foals, yearlings and senior horses together);
- layout of farms and facilities and competition schedules that may not permit adequate separation of horses of different health status;
- absence of vaccines and treatments for all pathogens;
- variability of vaccines to provide adequate protection from disease;
- increase in antimicrobial and anthelmintic resistant organisms;
- variability of owner or custodian compliance with biosecurity measures; and
- absence of a consistent national approach to biosecurity in the horse industry across Canada.

2.3 Who is this document for?

Everyone in the horse industry has an important role to play in biosecurity.

This document is for everyone who is involved with horses.

All have a role protecting the health and well-being of horses from infectious diseases. Biosecurity in the horse industry is a shared responsibility between:

- horse owners and **custodians** of farms or facilities;
- organizers and their staff and volunteers of any event at which horses **commingle** including but not limited to auctions, competitions, gymkhanas, clinics, trail rides, and race tracks;
- everyone who handles horses including coaches, riders, drivers and grooms
- service providers (for example: veterinarians, farriers, feed suppliers, transporters) accessing horse farms and facilities;
- horse associations, industry bodies, and government; and
- visitors to any horse facility.

The guidance in the document is primarily for **custodians**, those individual directly responsible for the care of horses or have influence on those directly responsible.

“Closed herd”? Many horse owners have the perception that their horses are safe from disease because they have a **closed herd** since there is no movement of horses on or off the property. However, all diseases risks have not been eliminated and the horses are still vulnerable to **pathogens** transmitted in a variety of ways including disease **vectors**, contaminated feed, service providers, transfer from contaminated clothing or equipment, and other **fomites**.

2.4 What is the purpose of a National standard?

This document has been developed to serve as a national standard that provides guidelines and recommendations to assist horse owners and custodians in minimizing the risk of disease to horses. The standard is a tool for developing individual and farm or facility biosecurity plans. It is a resource to

create awareness, to educate and to provide a common understanding of biosecurity practices. The standard recognizes the importance of horses and the industry to Canadian society and to the economy. It signifies an ongoing commitment by industry and government to protect horse health and welfare. It is a resource to guide industry and government programming.

The document provides guidelines and recommendations rather than indicating what *must* be done on all farms and facilities. The complex and variable nature of the horse industry, regional differences, limited data, and other factors prevent the development of one set of specific guidelines and recommendations that are optimal for all farms and facilities. This document provides a national framework for industry and government to proactively manage disease by minimizing the transmission of pathogens.

This document is accompanied by a biosecurity guide that provide additional recommendations targeted to provide more details specific to biosecurity interventions at the farm and facility level.

Diseases respect no boundaries. Every horse in Canada is part of the national herd and can be affected by diseases from another area.

2.5 How to use the document (organization of the document).

The standard consists of seven biosecurity components that comprise a comprehensive on farm or facility biosecurity program:

- 1) Developing your biosecurity plan: Self- evaluation assessment checklist
- 2) Monitoring and Maintaining Animal Health and Disease Response
- 3) Herd Additions, Returning Horses, Movements and Removals
- 4) Access Management
- 5) Facility Management
- 6) Biosecurity Awareness, Education and Training
- 7) New Facility Location, Design and Layout

For each biosecurity component a broad goal is established which is supported by a number of **best practices** to provide the overall direction for reducing disease transmission risks. The owner of a single horse that rarely leaves an isolated property faces different biosecurity challenges than horse owners or **custodians** and managers at a busy boarding facility or race track. Some components of biosecurity recommendations are divided into two groups: small farms and facilities and large facilities (which include but are not limited to event facilities and race tracks).

Section3: Farm Specific Biosecurity Plan

3.1 Developing a farm or facility biosecurity plan.

Developing a farm or facility biosecurity plan is a straight forward task and involves achieving the right balance between **disease** risk and prevention. Following a structured process will ensure the biosecurity plan is practical and tailored to manage the horse custodian's level of risk.

Before starting, it is helpful to have knowledge of horse diseases, how they are transmitted and methods of protecting your horse from disease. Some of this is covered in **Annex 2**. Additional

information and resources are included in the biosecurity guide that accompanies the standard. Work with your farm or facility veterinarian and industry experts on developing a plan.

3.2 Biosecurity: a cycle of activities.

The implementation of biosecurity principles on a farm or facility can be viewed as a cycle of activities which includes: assessing the biosecurity risks, developing a plan that addresses the risks, implementing biosecurity measures and procedures, monitoring and gathering disease and **pest** information, and reassessing the risks and responses on an on-going basis to ensure continuous improvement. **Figure 2** provides a visual representation of the cycle of biosecurity activities.

Cycle of Biosecurity Activities

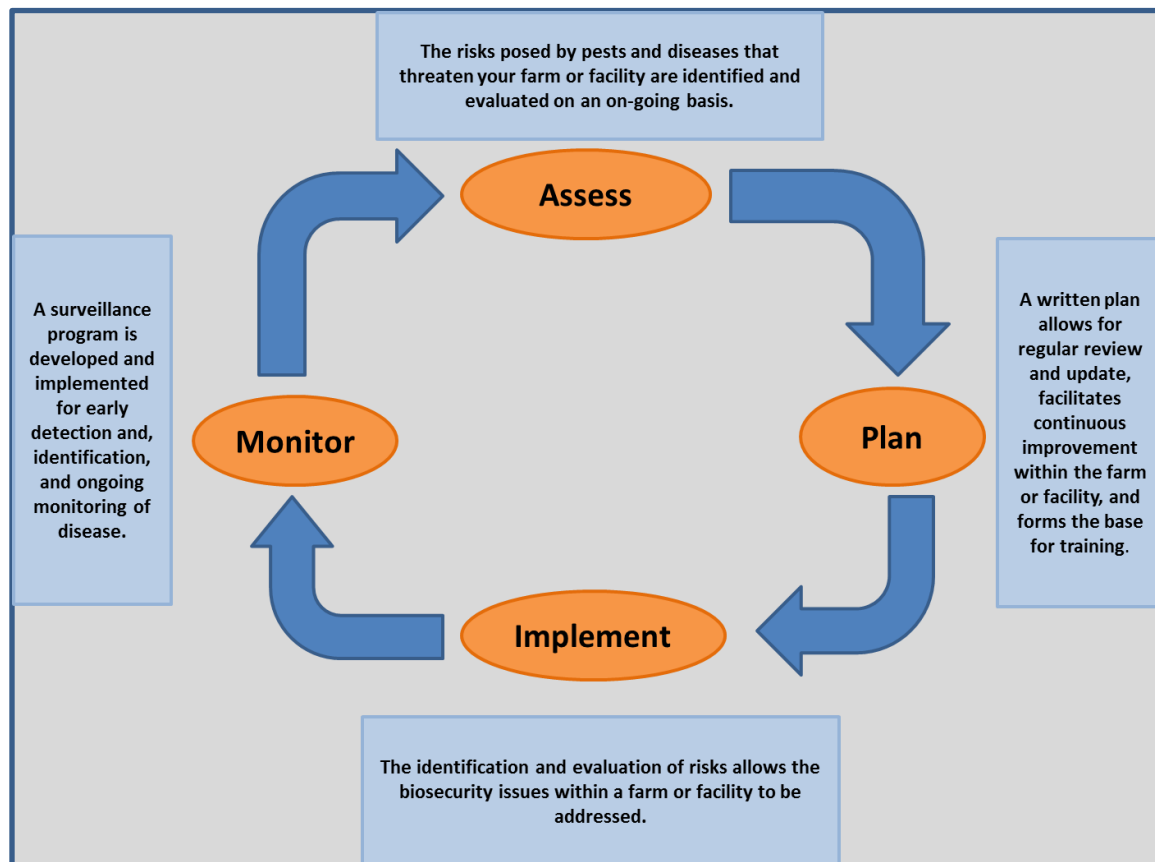


Figure 2: Cycle of Biosecurity Activities *Assess: The risks posed by the introduction of pests and diseases that threaten horse health on your farm or facility are identified and evaluated in consideration of the seven components of a biosecurity plan. The identification and evaluation of risks will allow for current biosecurity issues within a farm or facility to be addressed.*

Plan and Implement: A written on-farm or facility biosecurity plan is highly recommended, regardless of the size or type of facility. A written plan allows for regular review and update, facilitates continuous improvement within the operation, and forms the base for training.

Monitor and reassess: It is important that the design, effectiveness and implementation of a biosecurity plan be assessed not only on a routine basis but also when changes in farm practices or biosecurity issues

occur. Production practices should be reviewed frequently to ensure that implemented measures are effective in relation to pest and disease prevention and control.

Step 1: Identify the risks – the diseases of concern and how they are transmitted

Diseases present in the local horse population are of primary importance. Risks to horse health would include:

- diseases that have previously occurred or are currently occurring on the farm and facility;
- diseases on neighboring premises and premises of horses that visit the property; and
- pathogens that can be transmitted by humans, equipment, pets, and other animals.

Owners or custodians travelling with their horses should also consider disease risks from geographic areas they travel to.

Step 2: Prepare a diagram of the farm or facility

A farm diagram is a useful tool to visualize the potential for horses to come into contact with sources of disease from other animals, people and equipment. It is particularly valuable for identifying traffic flows and the locations of horse housing and communal storage areas. Create a diagram of the premises and identify:

- entrances to the property, parking areas, laneways and pathways;
- housing areas for horses (resident, visiting, new and ill), outbuildings, paddocks, turnouts, and pastures;
- arenas and staging areas;
- traffic flows for people, horses and equipment;
- storage areas for feed, bedding and manure;
- equipment and machine storage areas;
- other areas on the site where people, horses, and equipment may come into contact.

Review the diagram and create a list of the biosecurity concerns.

Step 3: Review management practices and complete self-assessment tool

Most horse care and management practices pose a risk for introducing and spreading disease whether it is daily feeding or less frequent service calls. The biosecurity risks increase at a facility when there are additional people, horses and increased movements. Consider the following questions and create a written list of horse care and management activities.

- what are your daily horse care and management practices and how might they introduce and spread pathogens?;
- what other practices and activities that occur on the farm or facility could pose a risk? This could include travel to events and visits of non-resident horses to the site; feed deliveries or manure collection for offsite disposal.

Complete the biosecurity self-assessment tool using the information and biosecurity concerns identified in Step 2 and the management practices identified above. An example of the self-assessment tool is

attached to guide the process in **Annex 3**. It is organized based on the seven components of a biosecurity plan.

When completed, review the self-assessment and identify areas where biosecurity practices are being effectively managed and those where improvements can be made.

Step 4: Identify biosecurity goals and best practices

From the review of the self-assessment tool and farm or facility diagram, identify the biosecurity challenges and risks. Using the biosecurity standard and guide, identify biosecurity goals and best practices that can be implemented to address the biosecurity gaps. Discuss the strategies with your veterinarian and other sources of biosecurity expertise (provincial government livestock and extension specialists, industry associations, and universities) as necessary.

Step 5: Develop an implementation strategy

While all biosecurity risks need to be addressed, some will be more critical than others. Prioritize the biosecurity tasks and establish a timeline for their completion.

Step 6: Review the effectiveness of the biosecurity plan and continuous improvement

The effectiveness of the biosecurity plan is measured by the adoption of its biosecurity practices, their integration into daily routines and the impact to the health status of horses on the property. When necessary, improvements to the biosecurity plan are designed and implemented.

- assess the applicability and effectiveness of the biosecurity practices by reviewing key health performance indicators contained in the herd health records (**see section 5.0**) during and following implementation of the biosecurity plan and as changes to the plan are made;
- discuss the biosecurity plan with your veterinarian and other advisors and adjust as necessary;
- meet with family, staff, boarders and anyone with open access to the farm or facility at least twice yearly and following the implementation of a new practice to discuss the feasibility and effectiveness of each of the practices in your biosecurity plan; and
- review education and training sessions to identify improvements that can be made.

Section 4: Principles of Infection Prevention and Control Programs

Infectious **diseases** in horses result from a complex interaction of three factors referred to as the disease triad:

- a horse that is **susceptible** to disease (the host);
- a pathogen such a bacterium, virus, fungus or parasite capable of causing disease (the agent);
- an opportunity for the host and agent to come into contact (the environment).

The Disease Triad

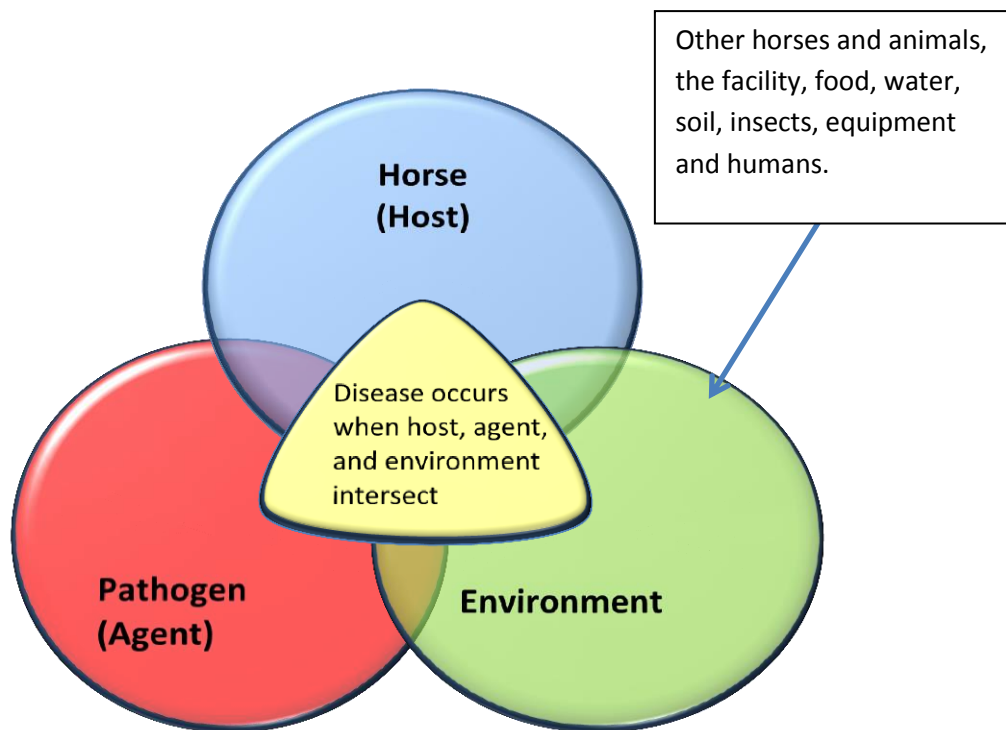


Figure 3: The Disease Triad illustrates the relationship between a horse (the host), a pathogen (the agent), and the environment; it demonstrates that disease results from the interaction of a susceptible horse, a pathogen, and an environment favorable for disease development. On the other hand, horse diseases can be prevented through the manipulation or elimination of any one of these three components.

When discussing infection prevention, it is helpful to understand the distinction between infection and disease. **Infection** is the result of a pathogen invading and reproducing in a susceptible host. Infection may lead to disease if there is a change from the normal function (for example damage to or a change in function of tissues and organs).

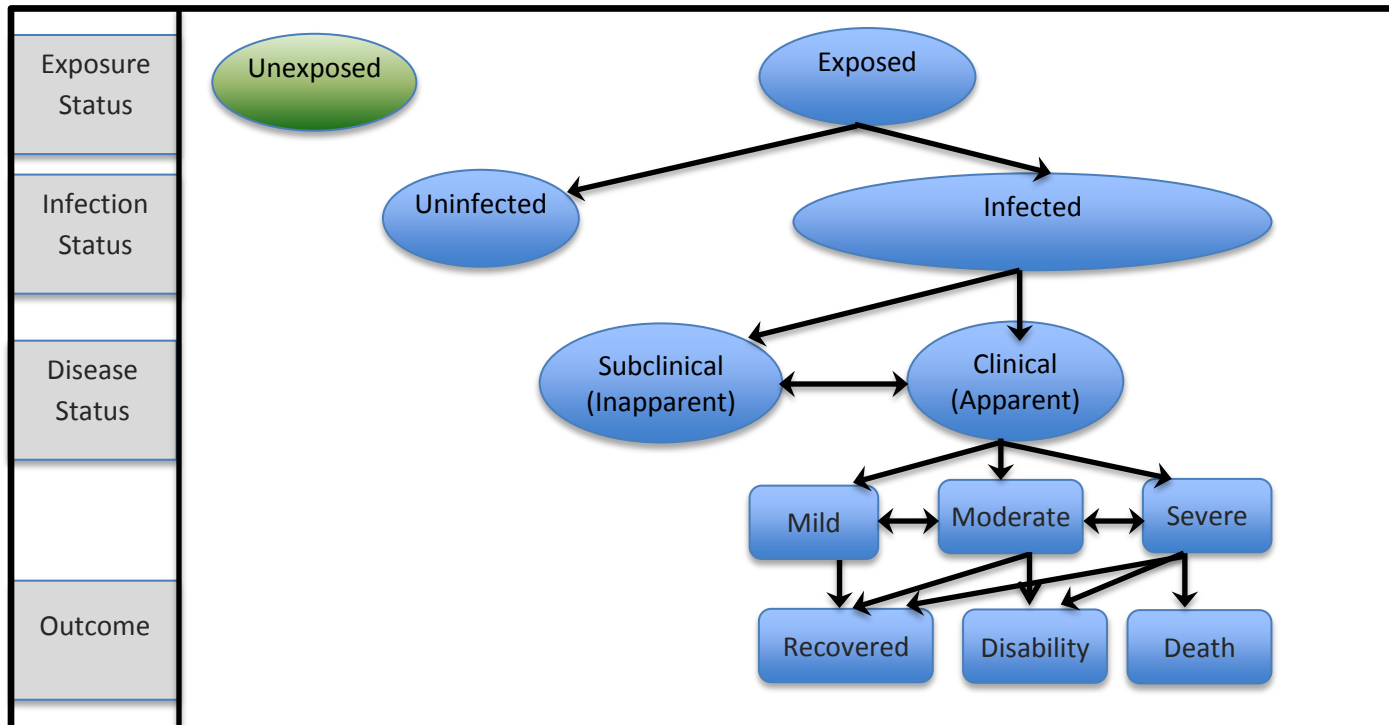
There are many host, agent and environmental variables that influence whether a horse will become diseased. Infection prevention and control programs rely on approaches that target these factors, however, the ability to manipulate the agent is limited.

Three broad approaches to infection, prevention and control include:

- **decrease exposure of horses to pathogens:** this is the most important approach; if an animal and pathogen do not come into contact, infection and disease will not occur. On the other hand, horses do not become ill every time they are exposed to pathogens. There must be a sufficient number of viable organisms (an infectious dose) that can bypass the horses' defense systems and then multiply to cause disease. Many of the biosecurity practices focus on reducing exposure including: separating healthy horses from horses that are ill or of unknown health, not sharing horse equipment and tack, eliminating contact between individuals or groups over fences and stalls and cleaning and disinfecting housing areas for horses on a routine schedule and before use by a different horse.
- **decrease susceptibility of horses to disease:** There are factors that can be managed to decrease susceptibility to disease including: providing proper nutrition, managing underlying disease, reducing stress, controlling environmental conditions (for example: temperature and humidity, providing proper dental care, a good parasite control program, vector control program, managing pain, and proper use of antibiotics and other medications). There are other factors that affect a horses' susceptibility to disease that cannot be influenced to a significant degree: age, sex, genetics, and pregnancy.
- **increase resistance to disease:** vaccination is the primary method used to improve resistance to certain infectious diseases. Vaccines need to be given and stored according to the label directions in order to be effective. Many vaccines require two or more doses to be effective; booster vaccinations to maintain protection are often required on a yearly or more frequent basis.

In addition to these three broad approaches to infection prevention and control, it is important to develop written biosecurity procedures and maintain accurate records of health management practices.

Status and Spectrum of Disease Outcomes



Modified after diagram from John M Gay DVM PHD Washington State University

Figure 4: The Status and Spectrum of Disease Outcomes illustrates the status and outcome of an individual horse or a group of horses following disease exposure. When an individual horse or group of horses are exposed to a pathogen, many factors (for example: genetics, age, health status, and the type of pathogen) influence the outcome of the exposure. Healthy horses with a robust immune system may not become infected following exposure, others sub-clinically infected, and some horses may become clinically ill and never fully recover. In a group of horses, the diagram represents the various stages and outcomes of exposure to a pathogen that can be encountered at any one period of time. There is a gradient between horses at different stages as some are only recently exposed, others are clinically ill and some already recovered. After exposure some animals may continue to harbour the pathogen even if they have recovered from disease (for example: *streptococcus equi* or equine herpes virus-1).

4.1 Sources of pathogens

- Healthy horses (clinically normal carriers)
- Diseased horses
- Other domestic animals including pets
- Humans
- Food, water, and soil
- Equipment and other items (**fomites**)
- Housing areas and immediate surroundings
- Wildlife
- **Pests** (insects, spiders, ticks, rodents, birds and other animals that pose a nuisance to horses)

4.2 Methods of transmission

Pathogens can be transmitted by a number of routes; however, not all pathogens are transmitted by all routes. Pathogen characteristics, such as the ability to survive in the environment, can affect the mode of transmission.

Direct Transmission

Pathogens are often transmitted between animals through close physical contact.

- a) **Direct contact** – pathogens are transmitted through close physical contact between a susceptible animal and an infected animal, their bodily fluids or tissues. Depending on the pathogen, contact with skin, blood, saliva, respiratory fluids, urine, semen, fecal material and milk may transmit the pathogen. In addition to the obvious modes of contact between individuals and groups, nose to nose contact over fences should always be considered.

Indirect Transmission

Some pathogens can be transmitted through an intermediate that has been contaminated and or infected. This may be an inanimate object (a bridle, dirty clothing, contaminated feed and/or water) or a live animal (insect, rodent).

- a) **Indirect contact** – transmission of pathogens by contact with people (for example: contaminated clothing, footwear, and/or hands), or with an inanimate object (fomite) through the shared use of equipment (for example: contaminated vehicles, trailers, water buckets, and blankets). Pathogen transmission can occur over short distances (between animals on the same premises) and long distances (following travel to events and venues). Indirect contact with contaminated surfaces (dirty stalls and pens previously occupied by infected horses) can result in the transmission of pathogens. Pathogens transmitted by this route must be able to survive in the environment for the time required to come into contact with a susceptible horse.
- b) **Ingestion** – transmission by consuming feed and water contaminated by pathogens. The source of the contamination can include manure, urine, nasal discharge, and grass contaminated with parasite larvae.
- c) **Aerosol transmission within a droplet** – pathogens are transmitted short distances from an infected to a susceptible animal by large fluid droplets generated by coughing, sneezing snorting and whinnying. Inhalation of these droplets can result in disease transmission.
- d) **Airborne** – transmission by very small particles. This can occur when contaminated materials are disturbed and very small particles may become airborne.
- e) **Vectors (living organisms)** – transmission by a living organism (for example: people, animals, insects and ticks) infected with or contaminated by pathogens. In some instances, the insect

vector is required for the development or multiplication of the pathogen prior to the pathogen being infective in the horse.

- f) **Other** - For example: Transmission through re-use of contaminated equipment such as; **needles**, syringes, artificial vaginas, insemination tubes, and dentistry equipment.

4.3 General concepts of infection prevention

A) Decrease exposure

- i) **a) Separation of new arrivals** – separate new horses and horses returning to a herd (for example: following a period off the property and exposed to other horses) until their health status is determined and/or specific preventive measures are applied (for example: deworming and vaccination).

- b) Identification of and separation of potentially higher risk horses** – identify horses that are a higher risk for harbouring and transmitting pathogens and manage appropriately (separate and treat) to minimize the risk. This includes horses that are: visibly ill (clinical infection), infected but not showing signs of illness (subclinical infection), known to have been exposed to ill horses, and those that have recently recovered from illness. Horses that are clinically ill require separation from other horses and managed with additional biosecurity measures.

- c) Separation of susceptible horses** – separate horses that are more susceptible (young, pregnant, senior) to infection from other horses.

- ii) **Cleaning and disinfection (for example: barns, stalls, alleyways, and trailers)** – perform routine cleaning and disinfection to reduce the number of pathogens that are present. Ideally, all pathogens should be destroyed and removed by cleaning and disinfection; however, this can be difficult to achieve. Therefore, the goal is to reduce the pathogen level below that which is required to cause infection.

- iii) **Hand hygiene** – perform hand washing, use hand sanitizers, and when necessary gloves to minimize pathogen spread.

- iv) **Personal protective equipment** – change clothing and use protective outerwear (boots, coveralls and gloves) to provide a barrier to the transmission of pathogens. Personal protective equipment can be used to protect horse and / or human health.

- v) **Access control** – manage access to the property and horses to limit exposure.

- vi) **Traffic flow** – manage opportunities for direct and indirect contact between horses, people, equipment, vehicles and other materials.

vii) **Pest management** – minimize pests by: decreasing attractants (cleaning up spilled food and preventing pooling water), controlling access and locations for establishing populations (using window and door screens in barns and removing unnecessary equipment and debris), and actively controlling pests through traps, bait and insecticides or pesticides when necessary.

viii) **Pasture management** – manage pastures to minimize the accumulation and transmission of pathogens and parasites among horses.

a) **Decrease susceptibility**

i) **Good general management** (*see Section 4: Decreased susceptibility*).

b) **Increase resistance**

i) **Vaccination programs** – vaccinate horses against diseases using a risk based approach in consultation with your veterinarian.

Record keeping of health and management practices

Good record keeping and written protocols provide the ability to instruct staff on appropriate protocols and improves consistency in horse management. Written records provide the ability to evaluate, verify and make adjustments to the biosecurity program over time. Important records include:

- i) Vaccination
- ii) Parasite control program (deworming)
- iii) Health records
- iv) Arrivals/departures
- v) Contact groups (for example pasture or paddock turnout groups)
- vi) Cleaning and disinfection protocols
- vii) Protocols for dealing with ill or potentially infectious horses

Section 5: Preventative Horse Health Management Program

Goal: There is a horse health management program implemented at the farm or facility that details daily care, **disease** prevention, and control practices. Every horse on the farm or facility is in compliance with the program to optimize disease prevention in a **commingling** environment.

Description: An implemented and well documented preventative health management program encourages participation at stables and events; “promotes credibility of horse industry level responsibility,” supports awareness of horse health and welfare; and will mitigate “perception-based” liability. It is important to realize that just as important as your own horses’ health is the health of other horses.

5.1 Communication

Goal: The identification or suspicion of horse illness is promptly communicated to maintain the health and welfare of other horses within a barn or facility, event or other facility where horses are kept. The staff and all the personnel are fully informed of the program and its importance.

Description:

Prompt communication of reliable information upon the suspicion or diagnosis of an infectious disease is important in:

- ensuring horse owners, **custodians** and participants at the farm or facility understand what biosecurity measures are being taken and what they need to implement;
- advising neighbouring horse farms and facilities of the disease risk; and
- minimizing anxiety, panic, and overreaction of horse owners and the public.

Best Practices:

- Develop a written and signed contract¹ between the custodian of the farm or facility and the horse owner or specified agent² that facilitates an agreement to implement the following:
 - o to align the preventative care of the horse with the farm or facility requirements;
 - o to share all information regarding a health event that could affect other horses on the property;
- develop a communication strategy tailored to the facility;
- identify an individual that will be the point source of contact for owners and custodians to whom they will provide horse health information;
- inform the designated individual promptly when a horse is suspected to be ill. If a different custodian provides for the daily care and observation of horse health, give him or her permission to communicate the health concerns;
- identify a spokesperson in advance and communicate with all stakeholders that this person will be responsible for any information that is formally shared; and
- identify who is “doing what”; the roles and responsibilities:

¹ The terms of the contract are often established by the custodian of the farm or facility and presented to the horse owner or specified agent.

² An individual that has legal authority for the care of the horses and can provide consent to share information about the horse.

- o Establish and define the protocols for the disease situation, how are they different from the routine biosecurity measures and who and how is staff being informed. Ensures the current staff has been trained on the **standard operating procedures** (SOPs) for managing disease.

5.2 Horse (herd) health management program

Goal: To achieve and maintain a consistent high level of health for all the horses within a farm or facility, develop, implement and maintain a horse health management program.

Description: A preventative health program is only effective if all horse owners or custodians comply with the program to establish and maintain horse health. This also applies to horses that are temporarily at the facility including: horses that are visiting, onsite for a short-term event, or only using the facility as a rest stop while in transit. In facilities where horses are commingled and have been exposed to various environments (for example: shows, events, and other housing facilities) and potentially diseases, it is important that the basic health status of the horse be determined and a consistent approach to health management be implemented to ensure the potential risk to resident horses and new arrivals is minimized.

Best Practices:

- develop and document the farm or facility health management program in consultation with owners, custodians, veterinarians and other sources of biosecurity expertise (provincial government livestock and extension specialists, industry associations and universities)
 - o elements of a horse (herd) health program include:
 - premises identification and individual horse identification;
 - vaccination requirements prior to entry and protocols post entry;
 - disease testing requirements;
 - parasite control program (deworming: type of product, timing, testing³);
 - observation and monitoring procedures for horse health;
 - identification of ill health and response procedures;
 - hoof care (including: farrier area scheduling and cleaning; emergency contact info for farrier).

5.3 Monitoring and maintaining animal health

Goal: To promptly identify disease; to minimize potential spread to other horses; and to manage the well-being of the ill horse.

Description: Horses are routinely observed (on a daily basis) to ensure their continued good health and welfare. Increased observation is required when horses are at a greater risk for exposure to disease such as commingling at a show, event, track, following travel and on returning from any of these activities and on the introduction of a new horse to the herd.

³ Testing may be required or performed if it is part of the management program or at a specific request to rule out parasitic overload in horses that may appear unhealthy or a “poor doer”. Testing may also be used to validate the parasite control program and identify high shedders and potential resistance to the type of anti-parasite medication used.

Best Practices:

- maintain up to date records of management practices (for example: vaccinations and horse arrivals, departures, and contact groups);
- routinely observe and monitor horse health and welfare. As a minimum, observation should occur on a daily basis. Increase the frequency of observation and monitoring when horses travel to and return from events, shows, tracks and other activities where commingling occurs;
- observation and monitoring of horses includes but is not limited to identifying changes in:
 - o movement
 - o appetite
 - o food and water transit (defecation and urination)
 - o mood or disposition appearance
 - o temperature, pulse and respiration
- establish criteria for identifying an ill horse. These criteria are “trigger points” for taking additional action;
- know the normal range for horse vital signs. For an adult horse at rest:
 - o temperature: 37.0-38.5°C (99.5- 100.3° f)⁴;
 - o heart rate: 28-44 beats per minute;
 - o respiratory rate: 10-14 breaths per minute.

If there are health concerns, consult a veterinarian. The best practice to minimize suffering of the horse and protect other horses from potential disease, is to ensure there is the capacity for an immediate response.

5.4 Disease response and emergency protocols

Goal: To protect the health and welfare of horses develop and implement disease response and emergency protocols. All emergency protocols should include biosecurity considerations. In a disease response the welfare of the ill horse(s) is protected and measures are implemented to minimize the potential disease risk to other horses. For non-disease emergencies such as flooding and fire, the health and welfare of all the horses is protected during evacuation, transport and housing in an alternative facility.

Description: An emergency response may be required for disease and non-disease related situations. In both circumstances it is important to have response protocols developed and custodians trained prior to the event. The suspicion or identification of disease at a large facility, particularly a horse show or race track, can result in unnecessary panic, horse movements and other actions that increase disease risks to individual horses and the industry. Events that impact the safety of horses at the facility such as fire, lightning damage and flood may result in the need to evacuate the horses. Evacuation requires pre-planning for transportation and options for alternative facilities.

Best Practices:

⁴ For other ages and donkeys – see The National Farm Animal Care Council Code of Practice For the Care and Handling of Equine; 2013.

Roles and responsibilities

- For both disease and non-disease emergencies, ensure protocols, roles and responsibilities, emergency contact numbers and facility identification (geographic location) are visibly available.

Animal and premises identification

- All horses at all facilities must be readily identifiable by all custodians. Horse identification (for example: name and accompanying identification, brand, microchip ID, tattoo), charts, and owner or individual responsible information is posted on stables, stalls, and paddocks.

Disease response

- Disease response principles for all facilities and situations are similar; the principles can be applied to one horse in a small facility or to many horses at a large event that are suspected of being ill.
- Processes following the suspicion or identification of disease in an horse at a farm or facility:
 - o **Notification** – notify the owner or person that is authorized to act on the owners behalf.
 - o **Separation** – separate the horses of concern from other horses. Depending on the facility size and configuration, this may include physical separation and / or procedural measures to create separation. Move the horses to a designated area where contact with other horses cannot occur. Treat the suspect horse(s) as though diseased and use dedicated equipment to perform routine care such as feeding, watering and manure removal. Restrict access to only those individuals necessary for their care. Require people coming into contact with these horse(s) to use dedicated clothing and to clean and **disinfect** their footwear, hands and all equipment prior to contact with other horses.
 - o **Obtain tentative diagnosis** – consult a veterinarian to determine if the horse is infected with a contagious disease and what it might be. If a veterinarian is not immediately available to attend the property, request advice from the veterinarian on enhanced biosecurity measures and disease monitoring procedures. The nature of the confirmed disease will direct the level of communication and measures of enhanced biosecurity that will be expected to minimize the spread of the disease (Annex 2).
 - o **Activate disease response team and implement the communication strategy** – for large facilities and events, a team of individuals with different backgrounds and expertise is useful for managing the situation.
Designate a spokesperson to communicate the information. For any contagious disease of concern, notification to government officials (if indicated), the horse industry and the general public may need to occur.
 - o **Identify other potentially exposed horses** – while obtaining a tentative diagnosis, determine which other horses may have been exposed. Focus on those that may have had **direct contact** (nose to nose) or indirect contact (for example: shared equipment, adjacent stall, shared water, and contact with other participants). In general, horses with direct contact are high risk animals, horses with indirect contact are medium risk animals and horses with no known direct or indirect contact can be considered low risk animals for infection and transmission of disease pathogens. Knowledge of the disease is important to identify potentially high risk horses.
 - o **Restrict movement** –temporarily restrict movements of ill, suspect and exposed horses, along with their handlers, until a veterinarian has made a tentative diagnosis and a response plan is implemented. In many situations, a veterinarian will be able to narrow down the possible cause of the disease by obtaining a thorough history from the owner, a review of associated horse health records, and a physical exam of the horse. Restrict movement of other animals on the farm or facility.

- o **Implement enhanced biosecurity measures and modify movement restrictions**– with guidance from the veterinarian, implement additional biosecurity measures as necessary and modify movement restrictions on site. Depending on the circumstances, low and medium risk horses can continue to compete; however, direct and indirect exposure should be minimized.
- o **Monitor horses** - observe ill and exposed horses for changes in health status and comfort as per veterinary instruction.
- o **Release horses** – brief all participants leaving the event about the disease and the need to monitor their horses for signs of illness. If feasible, manage ill horses on site until the infection has cleared. Alternatively, ill and medium risk horses can be managed at their home premises if they can be separated, monitored, and treated as appropriate until their health status is determined. The length of time the horses must be separated will vary and will depend on the pathogen(s) involved. Low risk horses should return home to minimize the possibility of disease transmission; however, transport to other venues may be feasible if they disclose their attendance at an event with an infectious disease.

Non-Disease Response Action Plan (for example: flood, fire, natural disaster)

- Develop an evacuation, transport and alternative facilities plan to protect the health and welfare of horses while considering biosecurity continuity. The evacuation protocols should minimize chaos and optimize the timely removal of horses in a systematic process that includes continuity of identity. Establish and pre-arrange an emergency transport plan and housing in an alternative facility for short and longer term emergencies;
- Designate custodians to specific tasks. For example a person designated to manage transportation, manage the systematic removal of horses and ensure identification is available for each horse during transport and subsequent placement at the alternative facilities;
- The preservation of life is the primary objective. Once the threat has been mitigated, if biosecurity protocols have been compromised then perform a situation assessment and implement appropriate biosecurity measures.

Section 6: New Horses, Returning Horses, Visiting Horses, Movement and Transportation

Goal: Movement of horses is done in a manner that minimizes the risk of introduction and spread of pathogens.

Description: New horses can pose a significant risk for the introduction of pathogens to the resident herd. Establishing the health status of the horse and ensuring there is sufficient space and staff to perform routine care is necessary prior to acquiring the horse.

6.1 New horses (purchase consideration), new arrivals, and returning horses

Goal: Determine the health status of new horses and align the health status with the resident herd. Separate and implement measures for newly arriving and returning horses to protect the health of other horses.

Description: New horses pose a risk for the introduction of *disease* to horses on the property. This can be complicated by horses that are sub-clinically infected; they appear healthy yet are carrying a pathogen. Measures can be taken to reduce this risk (for example: testing for diseases and veterinary health exams prior to arrival), however, some infected horses will not be identified depending on the tests used and the stage of infection. Therefore, it is important to separate new arrivals from the other horses for a period of time to ensure they do not pose a health risk.

Although the risk is most often lower, returning horses may pose a risk for introducing and transmitting pathogens depending on their potential exposure while off the farm or facility. It is important to recognize that a returning horse may be similar to the new arrivals; therefore, this risk based decision will require an assessment of length of time away, knowledge of risk associated with the activities and locations of the horse prior to and on return to the farm or facility of origin.

Best Practices:

- obtain proof that the horse has a recent⁵ negative test for equine infectious anemia (swamp fever) and of the vaccination and deworming history. Consider requesting additional information to complete the horse health profile: the health records detailing past illnesses, treatments, veterinary exams and travel history;
- ensure horses can be individually identified: records of distinct and unique markings can be of assistance;
- when purchasing multiple horses, purchase from as few sources as possible to minimize exposure to disease. When this is not feasible as at yearling sales, more emphasis will need to be placed on biosecurity during transport and at the home location;
- when purchasing multiple horses, consider managing them as groups or cohorts based on similar risk profiles. Possible groupings might include previous ownership, health status, age, and type of use;

⁵ A recent test would be in the previous 6 month. If the horse has been exposed to horses or in location where EIA is present within the period of 6 months since the last test, a more recent test may be warranted.

- consider that semen and embryos can be a source of pathogens. Stallions and donor mares should be free of venereal diseases and acceptable veterinary methods used for collection, processing and storage of semen and embryos;
- recognize that breeding centers can pose a risk to the health of stallions, mares, semen, and embryos through horse to horse contact during live cover breeding and from contaminated equipment. Appropriate attention to hygiene is necessary to minimize transmission of pathogens during these processes and contamination following the collection and storage of embryos and semen;
- when purchasing horses at sales or auction barns, be aware of the historical health status of the facility (for example: endemic strangles);
- separate new arrivals from the resident horses on the farm for a period of time sufficient to determine their freedom from disease. There are a number of factors that influence the length of the separation period - consult your veterinarian to identify an appropriate time. The separation period normally recommended exceeds (is longer than) the time frame for clinical signs to develop following exposure to the diseases of concern. Health management practices including vaccination and deworming protocols and travel history of new horses are important in determining potential diseases risks. Proof of vaccination and negative test results should be obtained;
- some suggested time frames for separation are:
 - o 5 to 7 days for horses of known high health status which includes no known recent contact with ill horses, a thorough medical history and a recent veterinary exam with negative results;
 - o 14 days for horses of a similar health status and similar facility or farm health management program;
 - o 21 – 28 days for horses with unknown health status or arriving from facilities where the horse health management program is unknown or components of the health program are absent.

Negative test results for key diseases, a thorough medical history, and recent veterinary exam with negative results may shorten the separation time.

- ensure new horses have a negative test result for equine infectious anemia and for other appropriate diseases [for example: *Streptococcus equi* (Strangles)] prior to entry to the facility. When this is not feasible, perform these tests while the horse remains separated from other horses;
- vaccination:
 - o perform a risk assessment with the veterinarian to identify vaccination requirements;
 - vaccination does not provide immediate protection from disease and many vaccines require two or more doses over a period of three to four weeks. Horses that have not been properly vaccinated against a specific pathogen can be vaccinated prior to entry to the farm or facility. When this is not feasible, these procedures may also be performed while horses are separated on farm or facility;

- o veterinarians should administer vaccines, however, where this is not possible ensure vaccines are given as per label instructions;
 - o rabies vaccines must be administered by a licensed veterinarian;
 - o vaccines should only be obtained from reputable sources and handled to ensure that the cold chain (storing of vaccines at proper temperatures) has been maintained;
 - o keep records of vaccination (date administered, vaccine type and manufacturer's specific identification such as lot number); and
 - o report any adverse effects that occur.
- implement a parasite control program as determined with your veterinarian to minimize exposure to and accumulation of parasites on the property. Deworming of the new horse should ideally be determined by a fecal egg count to determine the animal's worm burden so that the horse can be treated as appropriate; Fecal egg count reduction (FECR) testing should be considered to evaluate response to deworming and detect drug resistance;
 - ensure farm or facility managers obtain a certificate of veterinary examination completed within 5-7 days prior to entry to the facility to determine the health status of the horse and the biosecurity procedures that are appropriate (for example: vaccination and disease testing where possible; this may not be feasible at a sales auction);
 - separate horses using physical and/ or procedural barriers to prevent direct or **indirect contact** between the new animals and resident horses. Dedicate equipment or clean and **disinfect** equipment for separated horses. Restrict access and control movements in the area horses are separated;
 - monitor new horses daily for any change in their health including daily body temperature assessments and record these findings in a log book; and
 - immediately separate and have a veterinarian examine any horse suspected of having a contagious disease such as diarrhea, respiratory disease or a fever of unknown origin.

6.2 Visiting horses

Goal: Decrease the risk of disease transmission from horses visiting the farm or facility for a short period of time (for example: lessons, training, day events, recreational riding).

Description: Visiting horses that do not share the same health status of the resident herd may pose the same risks of new arrivals at a farm or facility, if permitted to **commingle**. Visiting horses that will be housed on the farm or facility require the same biosecurity considerations as new horses.

Best Practices:

- establish health status criteria, that aligns with the health management program at the farm or facility for visiting horses;
- establish criteria for equipment (for example: trailer, tack, grooming equipment, feed and water buckets). This may include the following: cleaning and disinfecting the trailer prior to arrival, parking in a designated area, bringing clean and disinfected buckets to water and feed visiting horses (for cleaning and disinfection of equipment see section 8.3);
- be aware and require validation of health status;

- ensure paddock and stall areas are available that allow for separation of the visiting horse(s) from the resident herd;
- do not allow horses to have direct contact during activities; and
- at facilities that have all or a large percentage of the population coming and going such as with racehorses at training facilities, separating horses may not be practical or accommodated with the facility design. In these situations, horses should be separated from resident horses that never leave the premises (for example: school horses or retirees) or from young horses such as yearlings and broodmares. Racehorses should be stalled together and separately from yearlings and two-year olds in training (treat as peer groups).

6.3 Movement within the farm or facility

Goal: Horse movements within a farm or facility are managed to reduce exposure from higher-risk horses⁶ to horses with lower disease resistance.

Best Practices:

- house horses of similar risk groups (health status, use, and age) together and limit cross contact between personnel, equipment and exposure to common environments (paddocks, pastures);
- house mares and foals separately from the remainder of the herd;
- maintain the physical separation of sick, new, returning, and visiting horses from the resident herd.

Horses that play together should stay together.

6.4 Attendance at events⁷

Goal: Minimize risks for disease transmission from horses and equipment (buckets and tack) taken to and returning from events.

Description: Commingling of horses at events pose a significant risk for disease transmission. Participants and event organizers share responsibility in minimizing the risks and have complimentary roles.

6.4.1 Responsibility of the *Custodian*

Best Practices:

- ensure horses are healthy and properly vaccinated prior to attending;
- manage horses from the same barn or farm as a group and stall together at the event;
- minimize contact between riders, grooms, trainers and coaches with horses that are not their own;

⁶Factors that could place a horse into a higher risk category include: unknown health status, previous exposure to horses or areas of known disease, no vaccination history, not on a deworming program, a history of disease and exhibiting signs of disease. Custodians should consult their veterinarian.

⁷ See glossary for the expanded definition of separation.

- dedicate equipment to your horses and prevent sharing amongst horses. This includes but is not limited to: blankets, feed tubs, water buckets, tack, grooming supplies, and stable cleaning equipment;
- ensure supplies, such as hand sanitizer, soap, brushes and disinfectant for cleaning are provided or brought to the event and the assigned stalls cleaned if necessary;
- check with the event organizer or racetrack to determine what methods are used to clean and disinfect the stall or paddock area between use by different horses (see Section 8.2 and 8.3; Annex 5);
- monitor the health including body temperature of the horse daily while at the event. Report any abnormalities to the event organizer (and veterinarian; event designated or other). Keep the event organizer informed of any changes to the in condition;
- avoid any form of direct (for example: nose-to-nose) contact between horses; and
- do not submerge the end of a common use water hose into a water bucket.

6.4.2 Responsibility of the Event Organizer

Best Practices:

- it is the responsibility of the event organizer to establish health requirements for entry [for example: risk-based testing may be required prior to entry to the grounds depending on the local disease alerts (for example: EIA, strangles and EHV-1)];
- restrict spectator access to the stabling area or to the trailer area;
- ensure stalls are cleaned and disinfected prior to arrival and between each horse;
- ensure stall areas have complete barriers between horses;
- provide a specified stall and area for ill or suspect horses;
- ensure wash stalls are cleaned and disinfected frequently and ideally, between horses;
- provide approved sharps containers in adequate numbers;
- provide hand sanitizers or hand wash stations in the stabling area; and
- have established provisions for veterinary services (for example: on-call or on-site)

An Industry Best Practice is to require the person with legal authority for the care of the horse to sign an agreement that requires informing the event organizer of a health issue that is potentially infectious. The event organizer, with veterinary guidance, will implement the biosecurity protocol that has been developed.

6.5 Transportation

Goal: Horses are transported in a way to minimize exposure to or dissemination of disease.

Best Practices:

- ensure horse transport complies with all applicable legislation including the requirements in the Health of Animals Act⁸ and Regulations⁹ and the Code of Practice for the Care and Handling of Equines¹⁰;
- transport only your horses or at least only those for which you know the management and health status;
- a horse that shows signs of infectious disease should only be transported to a facility where it will receive proper care and should not be transported with healthy horses. Clean and disinfect hauling vehicle before it leaves the care facility;
- minimize social stress when transporting horses on the same trailer;
- avoid mixing young horses when shipping (for example: yearlings mixed together from different farms or with young racehorses);
- tie your horse to your own trailer to minimize exposure to pathogens from other trailers; and
- after transporting horses, clean to remove all organic material and disinfect the hauling vehicle.

⁸ <http://laws-lois.justice.gc.ca/eng/acts/H-3.3/>

⁹ http://laws-lois.justice.gc.ca/eng/regulations/C.R.C.,_c._296/

¹⁰ <https://www.nfacc.ca/codes-of-practice/equine>

Section 7: Access Management

Goal: Management and control of farm or facility access and identified risk areas limits *disease* introduction and spread on-site and enables the implementation of biosecurity practices.

Description: *Access management* refers to the use of physical and/or procedural barriers to reduce the transmission of pathogens onto, within and between horse farms and facilities by people, horses, equipment, materials and vehicles.

Essentials of access management include:

- Identifying pathways for disease transmission
- Interrupting or blocking pathways of disease transmission
- Controlling unwanted or unnecessary access to a farm, facility and horses
- Managing the movement of people, horses and equipment on site
- Employing biosecurity measures to reduce the risk of exposure to and spread of disease should an outbreak occur.

Consideration given to proper access management in the early implementation of biosecurity plans provides an improved capability to respond should disease occur.

7.1 Movement onto and within Farms and Facilities (Zones)

Goal: Establish and identify biosecure zones, controlled access points, and pathways to control access to the premises, barns and horses and to minimize pathogen transmission between animals, people, vehicles and equipment.

Description: Biosecure zones simply allow the separation and protection of horses and areas used for their care from sources of pathogens by mapping out and then controlling movements of people, animals, equipment and materials through zones. It starts with dividing a facility into management areas and identifying access points (controlled access points) to each area. Management areas might include the site as whole, an individual barn, arenas and other locations including wash stalls and feed rooms. Controlled access points should be equipped with the necessary materials and supplies to implement biosecurity procedures.

The design of zones and applicable biosecurity requirements should reflect the specific disease risks and the management goals of the equine owner, custodian or facility manager. Properly established **biosecurity zones** facilitate day-to-day activities without the unnecessary interruption associated with application of dissimilar biosecurity procedures. In many countries, including Canada, zones, for the purpose of controlling movement and biosecurity management, are called either **controlled access zones** or **restricted access zones** based on the risk of activities carried out within them.

1) A **controlled access zone** is the first zone a person or animal enters on a farm or facility. The **controlled access zone** is a buffer area that contains facilities indirectly involved in caring for horses, and areas farm personnel access like laneways, equipment and storage sheds, and riding arenas. It usually

excludes the house and office space of the farm owner or manager. **Controlled access zones** may include pastures and barns that horses are not actively using. A **controlled access zone** has its own specific biosecurity protocol and encompasses the **restricted access zones**.

2) A **restricted access zone** is innermost and represents areas where horses commonly reside. These zones include pens, barns, pasture, isolation and quarantine areas. The layout and management practices of individual farms determine whether manure storage and other production facilities directly involved in animal production should be included within **restricted access zones**.

It is important to remember that equine owners and custodians may decide to use a single zone to manage biosecurity on a farm, depending on its complexity and risk factors that exist.



Figure 5: Zoning on a Horse Facility: A simple horse facility demonstrating the concept of two **biosecurity zones**. The controlled access zone (yellow fence) establishes a boundary between everything outside the facility and areas of the property indirectly involved in horse care. Restricted access zones (areas bounded in red) require stricter biosecurity and limit access to horses. Controlled access points (purple gates) and signage assist in managing and directing traffic flow. Parking for visitors is established outside the CAZ and a separate driveway and parking area is established for the property owner's house.



Figure 6: Zoning on a Horse Facility

An alternate view of the horse facility depicted in figure 5. Clockwise from the upper left: Pastured horses are separated from other horses on the property and traffic flow minimizes interaction with resident horses. Covered manure storage is located at the back periphery of the property with a dedicated access gate allowing easy access and removal without significant entry into the property. The arena and resident horse barns are restricted access zones. Hard surface pathways facilitate movement around the property and completely surround the barn which is a high traffic area.

In the upper right hand corner, a restricted access zone surrounds a small barn (stable) and paddock area established for the care of ill or suspect horses. Separate feed, water, equipment and tack are stored here and dedicated for the care and maintenance of horses. Two day turn-out paddocks (also restricted access zones) allow separation of peer group horses. Feed and bedding are stored in the small barn adjacent to them.

Best Practices:

- review farm or facility layout to determine what biosecurity risks exist with current horse stabling locations from contact with other horses, visitors, animals, equipment and storage areas on the premises;
- establish controlled access zones and restricted access zones and, when necessary, establish segregation areas for new introductions, for horses returning from off farm events, and areas for treatment of sick horses;
- post biosecurity signage to guide and direct custodians and visitors;
- minimize unnecessary access by limiting the number of entrances (access points);
- establish and identify pathways to reduce the risk of disease spread by separating the movement of:
 - o sick or potentially sick horses from resident horses;
 - o visiting and participant horses from resident horses;
 - o potentially contaminated materials (e.g. manure, used bedding and mortality) from clean materials such as feed and new bedding;
 - o visitor traffic and vehicles from farm or facility personnel.
- maintain the pathways clean and free of potential sources of disease (for example: manure and debris);
- ensure the necessary biosecurity equipment (hand sanitizer, disinfectant, water etc.) are provided at designated access points.

Best Practices: Large events facilities

- apply farm or facility zoning “best practices” to the degree possible;
- establish separate entrances and parking areas for participants and visitors;
- ensure resident horses, if present, are housed and exercised separately from visiting participant horses or if this is not possible ensure resident horses are required to be held to the same health status as competition horses;
- ensure housing prevents nose- to-nose (direct) contact between horses;
- stable horses in groups (cohorts) to create distinct management units with their own wash stalls, feed and equipment storage;
- establish a segregation area for sick horses that is physically separated from the housing and exercise areas used by resident and participant horses.

7.2 Procedures for moving between zones

Goal: Establish requirements and implement procedures to manage the entry and movement of people, horses, equipment and vehicles.

Description: To achieve the benefits zones can provide depends on controlling access to the zone(s) and the application of appropriate biosecurity measures when people, horses, equipment and vehicles cross zone boundaries.

People, particularly those that have had contact with livestock or other livestock premises, and horses,

primarily those that are of an unknown or lower health status, that enter the farm or facility pose a risk for the introduction of disease. Additionally, pathogens that may be present in manure, respiratory fluids, urine and blood, can contaminate equipment and vehicles and transmit disease when they come into contact with horses.

The biosecurity measures required for people, equipment and horses moving across zones can be viewed as a gradient occurring at different levels based on risk. As the risk of the introduction and transmission of pathogens increases, the degree of biosecurity measures required increases.

Larger boarding stables and event venues pose an increased risk for disease transmission due to:

- Increased numbers of horses
- **Commingling** of horses with different health management backgrounds
- More frequent movement of people, horses and equipment and the associated stress of transport

Day-to-day access management in large facilities is more difficult to accomplish, increasing the importance of vaccination programs, prescribed health standards for attendance, and monitoring the health of horses in attendance.

Planning biosecurity for larger events entails:

- restricting unnecessary access of visitors;
- ensuring those attending events understand what biosecurity precautions are in place and procedures to be followed during entry and exit;
- assigning responsibility to an appropriately trained individual to oversee that biosecurity measures are understood and followed;
- monitoring travel and health records as needed;
- directing traffic as required;
- having implementable and effective response plans should disease occur.

Best Practices – People access:

- train personnel on farm or facility biosecurity procedures;
- limit non-essential traffic on the site and restrict unnecessary access to horses;
- prevent visitor access if they have had recent contact (< 48 hours) with horses suspected or known to be infected with a contagious disease;
- prevent visitor access if they have recently returned (< 5 days) from a foreign country where contact with horses or livestock has occurred;
- restrict access to the segregation areas to only those personnel necessary for their care;
- plan ahead for visitors by informing them of the farm or facility biosecurity procedures in advance of their arrival;
- use a visitor log to document visitor access. Visitor logs can assist with disease control and response activities when necessary.

Best Practices – Access within large facilities

- restrict access to horse management units to only those horses and participants assigned to them;
- provide site maps with stall assignments and biosecurity requirements to participants prior to the event and post maps at the participant entrance;
- communicate cleaning and **disinfection** requirements to participants;
- require equipment and tools to have been cleaned and disinfected prior to entry;
- provide each participant with a designated area, separated from other competitors, to store equipment and materials for their horses;
- provide dedicated equipment for segregation areas, clearly identify it belongs there, and prevent removal from this location.

Best Practices -Sanitation (people, equipment, tack)

- employ hand washing or the use of a hand sanitizer, combined with barrier protection (protective outer clothing or clothing changes) to reduce disease transmission by people;
- dedicate equipment and tack to each horse (halter, lead rope, brushes, rags, water and feed buckets, hay nets, fly masks etc.);
- clean and disinfect shared equipment between horses;
- dedicate equipment to each horse in separation areas and equipment for dirty tasks (manure disposal);
- only allow equipment, tools, and vehicles that have been brought onto the site to enter a control area if it is necessary;
- ensure visitor vehicles are visibly clean prior to entry to the premises and CAZ. Request that tires are spray washed if the vehicle is coming from a location where equine disease has been identified;
- ensure service equipment tools and vehicles have been cleaned and disinfected prior to entry.

Section 8 Facility Management

Goal: Promote horse health by providing a clean, well maintained, low stress, safe environment that minimizes biosecurity risks.

Description:

Facility management includes but is not limited to any structures that may house or shelter horses, paddocks, pastures, equipment, bedding, feed and manure storage areas as well as riding arenas, race tracks and show areas. The implementation of proactive biosecurity in all aspects of facility management is important to the health and well-being of horses.

8.1 Interior and perimeter fencing

Goal: Interior and perimeter fencing is used to safely contain horses and facilitate management of horses on the property.

Description: Fencing serves a number of purposes essential to maintaining the health and welfare of horses including: Safe containment, separation of peer groups and horses of different health status, protection from predators and identification of property boundaries. Fence design, construction and placement must align with the intended use.

Best practices:

Fence design, construction and placement

- enclose the property with a clearly visible perimeter fence capable of preventing the escape of horses;
- routinely inspect the integrity of fences and gates and repair to prevent indiscriminate **commingling**;
- ensure there is adequate space (at least 10 feet) between fenced paddocks and/or pastures areas to prevent contact between horses (Annex 4: diagram facility layout); and
- use gates and signage to restrict access to the property and areas within the facility.

8.2 Facility cleaning and disinfection, ventilation and wash stalls

Goal: Optimize ventilation in horse housing areas, effective cleaning and **disinfection** of the facility, and management of the wash stall area.

Description: The design and layout of horse facilities affects the ability to manage **disease**. Maintaining buildings and surfaces in good condition allows effective cleaning and disinfection reducing the accumulation of pathogens. Good ventilation is important to manage airflow and relative humidity. Ventilation is necessary to provide frequent air exchange and the even distribution of fresh air, to remove moisture and irritants (such as ammonia and particulates), and regulate temperature. This is an important consideration for the respiratory health of a horse. It is recognized that many pre-existing facilities were not designed with a primary focus to enable good biosecurity practices. In these situations it is important to develop specific biosecurity procedures to mitigate risk that may be associated with the limitations of the design and facility layout (see Annex 5.0: Cleaning and Disinfection).

Best practices:

- manage and monitor ventilation to ensure there is a supply of fresh air and that humidity, airborne particulates and temperature promote horse health;
- minimize the use of interior stalls where air flow is reduced;
- work with the existing design and layout to enable horses to be separated and moved from locations within the facility without contact with other horses;
- ensure surfaces that horses will come into **direct contact** with are in good repair (for example;. not pitted and cracked);
- ensure wash stalls are well drained, cleaned and disinfected according to use. Should not be drained into areas where horses are housed or pastured.
- establish cleaning and disinfection protocols and a schedule for cleaning and disinfecting the facility (for example: barns, paddocks, stables, water troughs, feed and water buckets) equipment and vehicles;
- clean and disinfect following illness in horses; focus efforts on housing areas occupied by ill horses and common use areas with which ill horses have had contact;
- avoid sharing tack and equipment between horses and when necessary clean and disinfect between horses;
- clean and disinfect trailers, stalls and paddocks between horses.

8.3 Cleaning and disinfection of facilities and equipment

Goal: Cleaning and disinfection is conducted prior to and after use, as well as in the routine maintenance of equipment and facilities.

Description: Day-to-day cleaning and disinfection is required to reduce ongoing risk of disease transmission on the farm. Equipment and tools that are used to move feed or manure, or to maintain the facility around the herd, particularly those used for separated or ill horses, require specialized cleaning and disinfection practices. It is important that facilities and equipment are cleaned and disinfected when there is an outbreak of disease or a suspected case of disease in the herd.

Best Practices:

- a cleaning and disinfection plan should be in place for environmental surfaces and equipment;
- cleaning must precede disinfection because disinfectants are typically ineffective in the presence of organic material (for example: manure, bedding, and dirt);
- power washing can spread pathogens and should be avoided;
- effective disinfection requires the use of a disinfectant that can kill the relevant pathogens, is used at the appropriate concentration, and for the appropriate contact time;
- disinfectants are chemicals with variable risks to handlers, horses and environmental surfaces; and

Thoroughly cleaning surfaces removes the majority of pathogens and is the most important step. Only apply disinfectants to clean surfaces and follow the manufacturer's label directions.

8.4 Property management

Goal: Maintain the property to provide a healthy and safe environment for horses. Minimize *pest* and parasite populations; manage pet activities, and exposure to wildlife through an integrated pest management and wildlife control plan.

Description: Properly storing equipment, feed and manure, as well as keeping the facility and surrounding area free of debris is important for the health and safety of horses. Unobstructed areas enable cleaning and minimize the potential risk of injury to horses. It is also an important element of pest and wildlife control. Pests and wildlife are opportunistic. Discarded waste, spilled feed or objects present opportunities for a meal or establishing a home. Pests, domestic pets, feral animals, livestock, parasites, and wildlife can cause or transmit disease and cause physical irritation and injury to horses. It is important to initiate primary methods of pest and wildlife control by reducing sources of habitat and attractants prior to initiating secondary measures such as insecticides and pesticides.

Best Practices:

- initiate primary methods of pest control by reducing sources and habitat of insects and pests by eliminating pooling water, open garbage, and the accumulation of manure;
- keep vegetation mowed short and compost or contain manure;
- remove attractants for pets, pests, wildlife and other domestic animals by securely storing feed and promptly cleaning up feed spills;
- remove hiding and nesting areas for pests and wildlife by clearing debris from pastures and paddocks and unnecessary equipment and materials from stables and barns. Store tack and horse equipment off the ground to allow cleaning of tack rooms;
- as necessary, treat horses and / or the premises with repellants and insecticides on a seasonal basis and according to manufacturer's recommendations. Consult a pest specialist (exterminator) if required with significant infestations;
- install live traps for rodents and monitor their activity. Use rodent bait stations and traps only after careful consideration and with caution as they pose a threat to pets, wildlife and children;
- screen windows and doors, seal openings to barns and facilities, and move horses inside during high risk times (for example: dusk to dawn) during the vector season;
- minimize contacts with pets, other livestock and wildlife which can act as potential disease vectors.

8.5 Feed, water, and bedding

Goal: Obtain good quality feed, water, and bedding and protect them from contamination.

Description: Good quality feed, water, and bedding are important to horse health. The source, processing, transport and storage of feed, water and bedding are important considerations to minimize exposure to pathogens. The nutritional (feed) requirements for a horse should be determined in consultation with a veterinarian. Water sources include: private well, public water source, a river, pond or lake. Where necessary water should be tested and treated to ensure quality and minimize the risk of contamination and exposure to pathogens. Public suppliers are responsible for ensuring the quality of commercial water.

Best Practices:

Feed:

- obtain and provide high quality feed from a known source – either a commercial feed mill with a quality assurance program or from a supplier that has protocols to ensure raw materials are harvested, stored, and transported to mitigate contamination;
- store concentrates and roughage in a manner that prevents contamination by water, pests and manure. Storing feed in a separate building from the horses can minimize rodent activity in and around horses;
- dispose of feed that is contaminated by manure, urine, pests, or is of substandard quality;
- use feed in a manner which rotates oldest to newest.

Water¹¹:

- identify the source of the water and evaluate for quality and palatability;
- where possible prevent access to natural surface water sources;
- test water quality at least annually to ensure it meets standards for livestock consumption¹²
- communal (shared) water sources can be a source of transmission of pathogens. Where horses are comingling at temporary location (event, show), provide water to all horses individually, preventing the sharing of water buckets or the use of common water troughs;
- avoid submerging common use water hoses into water buckets.

Ideally horses should have their own water buckets; they should not be shared between risk and peer groups (for example: new horses and horses with suspected illness).

Bedding:

- store fresh bedding in a manner that prevents contamination by water, pests and manure;
- provide a consistent source of dry absorbable bedding which is removed and replaced when soiled and on a regular schedule with a stall cleaning routine;
- remove bedding and clean and disinfect stalls prior to placing a different horse in the stall. It is particularly important to ensure that the stall has been disinfected if it was occupied by an ill horse.

8.6 Manure management

Goal: Manure is regularly removed, stored and disposed of in a manner that minimize contact with the herd and prevents contamination of feed and water sources.

Description: Manure is a source of potential pathogens. Potential pathogens can remain infectious for long periods of time in the environment and the routine removal of manure will reduce environmental contamination. *Manure storage and disposal methods must comply with federal, provincial, and municipal government regulations.*

¹¹ References: Water Quality and Horse Keeping Facilities (June 2003), Ministry of Agriculture, Food and Rural Affairs: Fact Sheet- water requirement of livestock and FAO corporate document repository: Water quality for agriculture section 6)

¹² http://www.agriculture.gov.sk.ca/Livestock_Water_Quality_Guide

Best Practices:

- remove manure from horse stalls, paddocks and pastures on a regular schedule to minimize accumulation. Daily collection and removal is recommended in stalls and paddocks. Weekly and biweekly collection from paddocks and pasture can reduce the accumulation of parasites;
- dedicate tools and equipment used for manure handling to this activity. Designate equipment for areas where horses are separated from other horses. If equipment cannot be dedicated to manure removal activity or designated to specific areas, clean and disinfect the equipment between activities or areas;
- ensure manure storage capacity is sufficient for the size of the facility;
- design and locate manure storage areas to prevent contact with the herd, contamination of feed and water supplies and access by pests;
- separate the manure storage area for resident horses from that of high risk horses;
- compost the manure to inactivate pathogens (including parasites) if manure is to be used as fertilizer in horse pastures (or other susceptible species);
- wash or sanitize hands and clean and disinfect footwear after handling manure.

8.7 Garbage management

Goal: Garbage is regularly removed and managed to minimize transmission of pathogens. Garbage, medical waste and sharps disposal methods comply with federal, provincial, and municipal government regulations.

Best Practices:

- store household and stable garbage in closed containers and dispose of regularly;
- contain medical waste and sharps in separate approved sharps container and dispose of according to local regulations.

8.8 Dead stock management

Goal: Dead stock is managed and disposed of to minimize the transmission of pathogens and contamination of the environment.

Description: The method of carcass disposal and storage complies with municipal bylaws and provincial regulations. Depending on the region, acceptable methods of disposal may include burial, composting, cremation, rendering, natural means and landfill.

Particular care should be taken in disposing of horses euthanized by chemical solutions as they pose a significant risk, the chemicals are toxic to pets, other animals, wildlife, humans, and the environment. Horse carcasses can be a source of pathogens, some of which survive for considerable amounts of time in the carcass. Some bacterial, fungal, and parasitic agents can replicate and increase in numbers in and on a carcass. Pests and wildlife with access to these carcasses can spread disease pathogens across the property to neighbouring facilities and to wildlife. Disposal by natural means and burial is not permitted in all provinces, check with your provincial authority.

Best Practices:

- determine the cause of death, if not obvious, to try to rule-out contagious or infectious sources;

- if removal of the carcass, cleaning and where feasible, disinfection of the area (for example: a stall or pen) is not immediately possible, ensure the carcass is in a location that prevents access by pets, pests, wildlife, other livestock, and other horses;
- ensure carcass holding areas prevent access by pets, pests and scavengers and where carcasses are picked up by a disposal service, the location minimizes entry to horse housing areas;
- dedicate equipment or clean and disinfect equipment used for the collection and disposal of carcasses.

8.9 Pasture management

Goal: Manage pastures to minimize the accumulation and dispersal of pathogens.

Description: Overstocking on pastures can contribute to overgrazing, dusty pasture conditions and the accumulation of pathogens which can affect horse health.

Best practices:

- prevent overstocking;
- require all horses to participate in a parasite control program;
- rotate pastures to minimize over grazing and to assist in reducing parasite burdens. If rotation is not possible, consider an all-weather paddock for horses to allow pasture grass to regrow, protect saturated ground and manage the amount of green grass the horses are eating;
- rotate horses and other non-susceptible livestock¹³ in the same pasture that consume about the same amount during the height of parasite exposure (summer months);
- only spread thoroughly composted manure on fields used for grazing; this allows the heat of composting to inactivate eggs and larvae present in the manure.

¹³ There are some parasites that cross species (for example: Giardia, Cryptosporidium, lungworms from donkeys)

Section 9: Biosecurity Awareness, Education and Training

Goal: All people attending a farm or facility or coming into contact with the horses are aware of, knowledgeable about and comply with current biosecurity practices. *Standard Operating Procedures (SOPs)* for biosecurity protocols are developed and reviewed at least annually.

9.1 Leadership and Biosecurity Awareness

Goal: *Custodians* take responsibility for ensuring the biosecurity practices are established and communicated to everyone attending a farm or facility or coming into contact with horses.

Description:

Custodians of horses and farms or facilities are ultimately responsible in ensuring the health and well-being of their horses including establishing and communicating biosecurity protocols. On farms or facilities where horses from multiple owners *commingle*, there is increased risk of the introduction and spread of pathogens.

Best Practices:

- custodians take responsibility for establishing and communicating biosecurity requirements;
- designate a key person to be responsible for organizing, communicating and administering the biosecurity program;
- maintain a contact list of owners, custodians, clients, farm, veterinarian, and facility workers to facilitate distribution of biosecurity materials;
- ensure horse owners and custodians take responsibility for people accessing the property on their behalf. They should provide confirmation that these individuals are aware of the biosecurity protocols and received the necessary training and education to comply with the requirements;
- maintain a copy of the biosecurity protocols in a centralized location that is accessible to all potential users;
- provide signage applicable to good biosecurity protocols.

9.2 Education and training

Goal: All custodians and /or horse owners, their family members, clients and farm or facility workers are educated, trained and regularly updated on the biosecurity risks, protocols and results. Service providers and visitors are advised and provided an orientation on biosecurity protocols.

Description:

Successful biosecurity relies on people understanding the importance, purpose and their role in the farm/facility biosecurity program and adopting the practices as part of their routine. Some individuals (owners, custodians, clients and workers) will require knowledge and training in facility specific biosecurity practices and a written biosecurity plan is fundamental in providing this. Additional knowledge on horse health, *diseases* and regulatory requirements is important and should be obtained from sources of valid and reliable information. Opportunities for education and training should be identified.

Education and training in biosecurity includes knowledge of:

- biosecurity principles, risks, procedures and the importance of biosecurity;

- horses and their diseases at a basic level;
- horse facilities and management best practices;
- procedures for monitoring horse health, including the recognition of ill health, and of when to initiate reporting of observations;
- procedures and habits that prevent the spread of pathogens while performing regular duties;
- procedures for prevention of disease transmission for visitors, clients, and service providers;
- biosecurity requirements and procedures for specific activities (for example: breeding and new horse entry);
- current provincial and federal regulations governing or regulating equine infectious diseases;
- key contacts for health and emergency related concerns including the designated and back-up veterinarians;
- record keeping systems to be used in facilities including health records, reports and visitor log;
- biosecurity signage that guides and directs custodians and visitors on biosecurity practices.

Biosecurity training may be delivered by:

- in-house staff orientation training sessions or meetings
- on-the-job training by working under direct supervision
- self-study
- attending courses and seminars face-to-face or online

Best Practices:

- appoint a key person to lead this process of developing and reviewing Standard Operating Procedures (SOPs);
- integrate the SOPs into all training and orientation;
- include your veterinarian in the development or review of your SOPs to make them applicable for risks;
- develop (and translate if applicable) resource material that will effectively illustrate biosecurity protocols as part of a training and updating program (for example: a facility handbook, posters and other factsheets/resources) for staff, clients and visitors;
- identify critical signage needed and specified locations for all educational materials and signage;
- designate a key person to be responsible for organizing and educating custodians and visitors and to administer the program;
- ensure staff training is provided at least annually and when there are changes to the biosecurity program;
- train staff on measures relevant to their job functions and that reflect the current risks. For example: a new disease outbreak, change in horse population/function, and increased traveling;
- maintain records of all staff training;
- ask potential new staff about their training, experience and approach to biosecurity with horses. Those who understand and appreciate the seriousness and potential risks respecting the spread of infectious diseases will be an asset to your facility;

- provide opportunities for staff to discuss biosecurity issues with the designated administrator, manager or owner of the facility and among themselves. Encourage staff to discuss concerns and challenges with implementation of the biosecurity plan and provide support. Have a quick means by which any change in health status of a horse is communicated to the appropriate person;
- hold “team meetings” to review protocols every time a biosecurity risk is identified, and also an “after-the-incident” review with all staff;
- train all staff and volunteers to understand and conduct a horse health check assessment and record the results in the log book along with any concerns and follow-up.

Effective, ongoing communication is a critical component of a biosecurity plan and helps to handle concerns early and quickly. Changes in procedures or risks need to be communicated effectively to all participants. Feedback to staff is critical to developing good techniques.

Section 10: New Facility Location, Design and Layout

Goal: Good planning and assessment of your facility from a biosecurity perspective can help reduce the risk of the spread of *disease* or introduction of disease to your facility. A diagram of the farm layout can be helpful to assess the high and low risk areas, including the traffic flow, visitor areas, manure management and fencing needs for pathways as well as prevailing winds and water run-off.

Description:

Biosecurity principles should be included when designing or re-designing the physical environment. Often small changes may be implemented that can have a positive impact. The following section identifies priority areas for assessment, including: geography, topography, facility layout, traffic flow and design of the facility.

10.1 Geography

The overall geography of the area and of the facility should be assessed from the point of view of reducing the spread of disease and minimizing its introduction to the facility.

Best Practices:

- construct NEW facilities a sufficient distance from other equine facilities, event complexes and livestock facilities to minimize the airborne transmission of microbial diseases;
- acquire knowledge of surrounding industries prior to building a facility to minimize the impact from potential sources of contamination and hazards (biological, chemical, physical);
- determine the proximity to equine veterinary clinics, hospitals, event, and competition locations to minimize transport stress and to minimize exposure to other farms; and
- obtain information of regional diseases and the mode of transmission.

10.2 Topography

Best Practices:

- select a location that is slightly elevated, provides adequate drainage, suitable ground cover for pasture and a base for stables;
- determine if there are areas where standing water can accumulate or assess ways to minimize this risk;
- be aware of run-off from spring thaw and heavy rains to avoid flooding barns, pastures, and areas surrounding the facilities;
- be aware that the paddocks or turn out areas that run through wooded areas may contain tick species that may harbour pathogens such as *Borrelia burgdorferi* (the cause of Lyme disease);
- assess the area to ensure there is sufficient space for manure storage and / or composting. Placement needs to allow separation from the barn and feed storage but still be accessible for daily cleaning out of manure, soiled bedding and feed as well as consideration for access by vehicles and large equipment for removal of manure and / or compost.

10.3 Layout

Best Practices:

- locate the manure storage area to prevent discharge or run off into horse housing areas, ditches, water sources, and surface water reservoirs such as creeks, ponds, rivers and lakes;

- ensure all access points to the barn are secure and visible;
- minimize possible nose-to-nose contact over fences (for example: double fencing, see annex 4: layout), particularly in high-risk zones;
- ensure the farm or facility layout is designed to allow for the separation of peer and risk groups;
- horse loading and unloading areas should be located in an area to best minimize vehicle traffic onsite.

10.4 Traffic flow

Best practices:

- assess pathways for the movement of vehicles, supplies and horses and if possible the layout designed to avoid contact with other horses. Designated (and signed) parking areas for suppliers, veterinarians, farm workers, and visitors can help to keep areas separated and reduce spread of disease;
- consult first responders to ensure facility design is suitable for access in emergency situations;
- control access to your farm by visitors, horses and pets;
- post highly visible biosecurity signage;
- ensure that the service providers (for example: utility providers, feed deliveries, veterinarians, and farriers) have dedicated places to park that are in low-traffic areas;
- maintain the separation of horses and people involved in different horse disciplines (for example: facilities that run riding schools should keep foot traffic away from show horses.);
- house horses belonging to one trainer together; and
- park trailers in designated areas.

10.5 Design of a new physical structures or renovation to an existing physical structure

There are many types of structures that are currently being used to house horses including structures that previously housed other species (for example: renovated cow barns). The structure needs to be assessed from the position of equine biosecurity, as the needs of other species may be very different than those required for horses. The following are best practices in the design of a new facility or renovating an existing structure to support the implementation of biosecurity:

- when repairing or enlarging the facility, select building materials that are smooth, non-porous, durable and easy to clean and **disinfect** (for example: metal, sealed concrete and some plastics). Materials must be able to withstand kicks from horses without shattering or splintering;
- ensure there are a sufficient number of taps and sinks for cleaning and hand washing and adequate below surface drainage to remove waste water and storm water.

Annex 1: Development of the standard and acknowledgements

Development of the standard

The standard was developed through a partnership of Equine Canada and the Canadian Food Inspection Agency (CFIA), in collaboration with Agriculture and Agri-Food Canada (AAFC). An advisory committee representing a broad cross-section of the industry comprised of equine owners, subject matter experts, provincial government officials, representatives from regional and sector-specific equine industry organizations, academics, and the public sector, provided invaluable guidance throughout the process.

Prior to beginning work on the standard, an assessment was conducted to determine the size and scope of the equine industry, the biosecurity risks and challenges and the interest and ability of the industry to participate in the development of a national biosecurity standard. A detailed literature review of biosecurity practices and programs in Canada and internationally was conducted.

Equine Biosecurity Advisory Committee Members

Representative	Organization
Bill des Barres	Alberta Equestrian Federation and Horse Welfare Alliance of Canada
Dr. Adam Chambers	Ontario Racing Commission
Dr. Alison Moore	Ontario Ministry of Food, Agriculture and Rural Affairs
Dre Chantal Proulx	Ministère de l'Agriculture, des Pêcheries et de l'Alimentation du Québec
Dr. David Paton	Equine Private Practitioner (British Columbia)
Dr. Darrell Dalton	Alberta Veterinary Medical Association
Dorothy Willows	Horse Industry Association of Alberta
Dr. Daniel Schwartz	Canadian Food Inspection Agency
Gayle Ecker	Equine Guelph, University of Guelph
Isabelle Breton	Filière Cheval du Québec
Jack De Wit	Equine Canada
Kathryn Tonita	Saskatchewan Ministry of Agriculture
Les Burwash	Alberta Agriculture and Rural Development
Dr. Mary Bell	Equine Canada and Equine Private Practitioner
Dr. Patricia Pentney	Canadian Food Inspection Agency
Renée Lévesque	Fédération équestre du Québec
Dr. Ron Clarke	Former Equine Private Practitioner (Alberta)
Dr. Ross A. McKague	Equine Private Practitioner (Manitoba), Canadian Horse Racing Industry
Sandra Conrad	Equine Canada (Atlantic Representative) and Nova Scotia Equestrian Federation
Dr. Scott Weese	Ontario Veterinary College
Dr. Susan Raymond (alternate for Gayle Ecker)	Equine Guelph, University of Guelph
Virginie Rochet	Sector Specialist, Agriculture and Agri-Food Canada
Dr. Wayne Burwash	Equine Private Practitioner (Alberta)

Annex 2: Diseases of Equines

Selected Equine Diseases: The following table provides a list of important equine **diseases** that are a potential risk to the health of the Canadian equine herd. Many of the disease pathogens are already present in Canada, while others pose a risk through the importation of horses, semen, embryos, contaminated equipment or through international travel to equestrian events. *This is not a complete list and does not include internal parasites.*

Key for Type: B (bacteria), F (fungi), P (parasite), V (viral)

Disease		Type	Horses can infect people*	Route of transmission						Comment
Name	Pathogen			Direct (contact)	Indirect (fomite)	Aerosol/ airborne	Vector	Ingestion	Other	
Anthrax	<i>Bacillus anthracis</i>	B	Yes	X	X	X		X		
Aspergillosis	<i>Aspergillus</i> spp	F	No	X	X	X				
Botulism	<i>Clostridium botulinum</i>	B	No					X		
Brucellosis	<i>Brucella</i> spp	B	Yes	X	X			X	Reproductive	
<i>Clostridium difficile</i> infection	<i>Clostridium difficile</i>	B	Maybe					X		
Coccidioidomycosis	<i>Coccidioides immitis</i> and <i>C. posadasii</i>	F	Y						Contact with soil. Not horse-to-horse	
Contagious Equine Metritis (CEM)	<i>Taylorella equigenitalis</i>	B	No						Reproductive	Not currently present in Canada
Coronavirus	Equine coronavirus	V	No					X		
Cryptococcosis	<i>Cryptococcus neoformans</i> , <i>C. gattii</i>	F	No						Environmental. Not horse-to-horse.	
Cryptosporidiosis	<i>Cryptosporidium parvum</i>	P	Yes					X		
Dourine	<i>Trypanosoma equiperdum</i>	P	No						Reproductive	Not Currently Identified in Canada

Annex 2: Diseases of Equines

Disease		Type	Horses can infect people*	Route of transmission						
Name	Pathogen			Direct (contact)	Indirect (fomite)	Aerosol/ airborne	Vector	Ingestion	Other	Comment
EEE	Eastern equine encephalomyelitis virus	V	No				Mosquitoes			
Equine granulocytic anaplasmosis	<i>Anaplasma phagocytophilum</i>	B					<i>Ixodes</i> ticks			
Equine herpesvirus type 1 abortion	Equine herpesvirus type 1 (EHV-1)	V	No	X	X	X		X		
Equine herpesvirus type 1 neurological disease (myeloencephalopathy)	EHV-1	V	No	X	X	X		X		
Equine herpesvirus type IV	EHV-4	V	No	X	X	X				
Equine infectious anemia	Equine infectious anemia virus	V	No				Biting flies		Cross-contamination of blood. Aerosolized blood.	
Equine protozoal myeloencephalitis (EPM)	<i>Sarcocystis neurona</i>	P	No			X				Associated with exposure to feces from opossums and some the other small mammals
Equine viral arteritis (EVA)	Equine viral arteritis virus	V	No	X		X			Reproductive	
Influenza	Equine influenza virus	V	No	X	X	X				
Glanders	<i>Burkholderia mallei</i>	B	Yes	X	X			X		
Leptospirosis	<i>Leptospira interrogans</i>	B	Maybe	X				X		Contaminated water major source
Lice (pediculosis)	<i>Haematopinus asini</i> , <i>Bovicola</i>	P	No	X	X					

Annex 2: Diseases of Equines

Disease			Horses can infect people*	Route of transmission						
Name	Pathogen	Type		Direct (contact)	Indirect (fomite)	Aerosol/ airborne	Vector	Ingestion	Other	Comment
	<i>equi</i>									
Lyme disease	<i>Borrelia burgdorferi</i>	B	No				Ticks (<i>Ixodes</i> spp)			
Mange	<i>Chorioptes equi</i> , <i>Sarcoptes scabiei</i> , <i>Demodex equi</i>	P	Yes for <i>Sarcoptes</i>	X	X					
MRSA	Methicillin-resistant <i>Staphylococcus aureus</i>	B	Yes	X	X					
Piroplasmosis	<i>Babesia caballi</i> , <i>Theileria equi</i>	P	No				Certain ticks		Blood	
Potomac Horse Fever	<i>Neorickettsia risticii</i>	B	No				Carried in May flies		Ingestion. Mainly from surface water	
Rain scald/rain rot	<i>Dermatophilus congolensis</i>	B	No	X	X					
Ringworm	<i>Trichophyton equinum</i> , <i>Microsporum canis</i>	F	Yes	X	X					
Rhinovirus	Equine rhinovirus	V	No	X		X				
<i>Rhodococcus equi</i> pneumonia	<i>Rhodococcus equi</i>	B	No					X		
Salmonellosis	<i>Salmonella</i> sp	B	Yes					X		
Strangles	<i>Streptococcus equi</i>	B	No	X	X					
Venezuelan Equine Encephalitis (VEE)	Venezuelan Equine Encephalitis Virus	V	Yes				Mosquitoes			Not Currently Identified in Canada
Vesicular stomatitis	Vesicular stomatitis virus	V	No	X			Insects. Mainly sandflies and black			Not Currently identified in Canada

Annex 2: Diseases of Equines

Disease		Type	Horses can infect people*				Route of transmission			Comment
Name	Pathogen			Direct (contact)	Indirect (fomite)	Aerosol/ airborne	Vector	Ingestion	Other	
							flies.			
Western equine encephalitis (WEE)	Western equine encephalitis virus	V	No				Mosquitoes			
West Nile encephalitis	West Nile virus	V	No				Mosquitoes			

Annex 3: Self-Evaluation Check list for Risk Assessment

Annex 3: Equine Farm or facility Level Biosecurity Self-Assessment Tool

The objective of the self-assessment is to identify areas of risk and identify appropriate biosecurity actions to develop your site specific biosecurity plan.

*For the purpose of this self-assessment, separation is defined as using physical barriers to prevent **direct contact** between horses. Separation is a management tool to minimize the risk of introduction and spread of **disease**. Other terminology such as **isolation** and **quarantine** is commonly used for specific purposes of separation (see separation in the glossary for additional information on other terminology).*

Components of a Biosecurity Plan	
1. Information and Intelligence Gathering	
1a) Owner, Farm or facility identification and other important contact information	Name: Location (Physical and GIS): Contact person: Emergency contact (people and numbers): Veterinarian: Farrier: Police: Fire; Ambulance: Other:
1b) Identified resources and communication networks to adjust your biosecurity plan and training protocols to potential risks in your area and region.	
2. Monitoring and Maintaining Animal Health Response (standard Reference: Section 5.0)	

Annex 3: Self-Evaluation Check list for Risk Assessment

Biosecurity Activities	yes	No	Sometimes	If no, identify biosecurity action points that could be implemented on your farm or facility that would minimize the risk or concern
2a) All resident horses. Do you...				
have a veterinarian that is familiar with your farm or facility and the herd health practices?				
have an agreement in place for horses under the care of individuals other than the owner, that provides for immediate response in the event of potential welfare impacts or disease?				
have a preventative health program in place for resident horses?				
align new horses to the farm or facility preventative health program either prior to arrival or separate until measures have been implemented?				
monitor and inspect horses daily for signs of illness?				
separate horses with consideration to age, health status, use and social well-being?				
have established (and written) disease response and emergency protocols?; have staff and personnel been trained?				
maintain health records of horse treatments?				
obtain a veterinary diagnosis for horses that appear to have died from disease or an unknown cause?				
2b) Managing sick or ill horses. Do you...				
have a separate stall and/or paddock				

Annex 3: Self-Evaluation Check list for Risk Assessment

for sick horses that prevents contact with other horses?				
work with healthy horses before attending to sick?				
wear gloves and protective clothing when handling sick horses?				
wash your hands after handling sick horses (<i>and disinfect footwear if boot covers are not available</i>)?				
use designated or dedicated equipment for treating and for cleaning areas?				
clean and disinfect equipment used to manage sick horses and the areas affected?				
3. New Herd Additions, Returning and Visiting Horses (standard Reference: Section 6.0)				
Biosecurity Activities Do you...	Yes	No	Sometimes	If no, identify biosecurity action points that could be implemented on your farm or facility that would minimize the risk or concern
require validation of the health status of a horse prior to accepting arrival at the farm or facility? (<i>this includes a review of health records to ensure deworming and vaccination status are consistent with the resident herd</i>).				
have a procedure and written agreement to align the health status of horses prior to arrival if their health status is not consistent with the resident herd? (<i>For example: vaccinate as indicated or align to the facility management de-worming program</i>).				
have a separate stall and/or paddock that prevents contact with resident horses for new arrivals, returning and visiting horses? Or are there other				

Annex 3: Self-Evaluation Check list for Risk Assessment

protocols that prevent contact with resident horses?				
separate new additions or returning horses from the resident herd upon arrival?				
require the equipment for visiting horses (tack, grooming, feed and water buckets) to be designated to an individual horse, and be cleaned and disinfected prior to arrival at your farm or facility?				
validate the health status and keep horses visiting for short term activities (not housed overnight) separate from the resident herd at all times?				
provide permission to organizers when participating at events to mitigate risks that may occur by your horse or others if disease is identified?				
clean and disinfect trailers prior to use?				
4. Access Management (<i>standard Reference: Section 7.0</i>)				
Biosecurity Activities Do you...	yes	No	Sometimes	If no, identify biosecurity action points that could be implemented on your farm or facility that would minimize the risk or concern
have established criteria that must be met to permit access to your farm or facility? (This includes criteria for equipment, horses, vehicles and people).				
have visible signage that identifies access and biosecurity considerations?				
restrict the access of visitors and visiting horses to only those areas that are required for their activities with				

Annex 3: Self-Evaluation Check list for Risk Assessment

biosecurity considerations? <i>(For example their access is limited to only the areas that are necessary).</i>				
require all people wash and sanitize their hands before and after contact with horses?				
limit access to the farm to essential movement of people, equipment, vehicles, inputs, and horses?				
have access points that are secured or monitored to assist with compliance to biosecurity protocols?				
have a perimeter fence encloses the farm or facility to keep resident horses secured and other animals out?				
ensure fences and gates are maintained to prevent unplanned commingling of your horses with those from another operation?				
have a clearly identified parking area that is separate from the controlled access area?				
5. Facility Management <i>(standard reference: Section 8.0)</i>				
Biosecurity Activities Do you...	Yes	No	Sometimes	If no, identify biosecurity action points that could be implemented on your farm or facility that would minimize the risk or concern
have a visitor log that is available to record visitors on the farm and are all visitors required to sign in?				
have a location (station) for hand washing with hand sanitizer, paper towels, and signage indicating recommended procedures for bio-safety?				

Annex 3: Self-Evaluation Check list for Risk Assessment

clean and disinfect stalls regularly and between horses?				
clean and disinfect wash stalls frequently in accordance with use and always following a horse with any skin disease?				
designate or dedicate equipment for specified activities (for example: dedicate shovels for manure handling from resident healthy horses)?				
designate or have specific equipment to be used only for each individual horse? <i>(if not, do you clean and disinfect equipment between horses)?</i>				
have an established pest and parasite control program in place?;and do you manage the movements of pets and minimize exposure of horses to wildlife?				
test and treat water if indicated?				
clean and disinfect water distribution equipment regularly (weekly), between different horses, and if water concerns have been identified?				
source feed and bedding from reputable providers with verifiable quality assurance programs in place?				
6. Biosecurity Awareness, Education and Training (standard reference: Section 9.0)				
Biosecurity Activities Do you...	Yes	No	Sometimes	If no, identify biosecurity activities that could be implemented on your farm or facility that would minimize the risk or concern
develop biosecurity standard operating procedures with input from your veterinarian and are they specific for your farm or facility?				

Annex 3: Self-Evaluation Check list for Risk Assessment

have a designated trained person to review and update the biosecurity standard operating procedures?				
have a training program for staff and all personnel that is based on the farm or facility biosecurity standard operating procedures?				
provide the training program to all staff, and is it reviewed, and updated as required?				
have all training and procedures documented and posted for easy reference by staff and personnel?				
7. New Facility Location, Design and Layout (<i>standard Reference: Section 10</i>)				
Biosecurity Activities Do you...	Yes	No	Sometimes	If no, identify biosecurity activities that could be implemented on your farm or facility that would minimize the risk or concern
engage a diversity of expertise in the development of the design?				
consider the effects of local and regional geography in the evaluation of biosecurity implementation?				
consider the topography of the development site in the evaluation of biosecurity implementation?				
base (consider) the layout of the facility on the implementation of biosecurity to facilitate separation and manage the traffic flow of people, equipment, horses, and inputs?				

Annex 4: Examples of facility layout and pasture/paddock separations

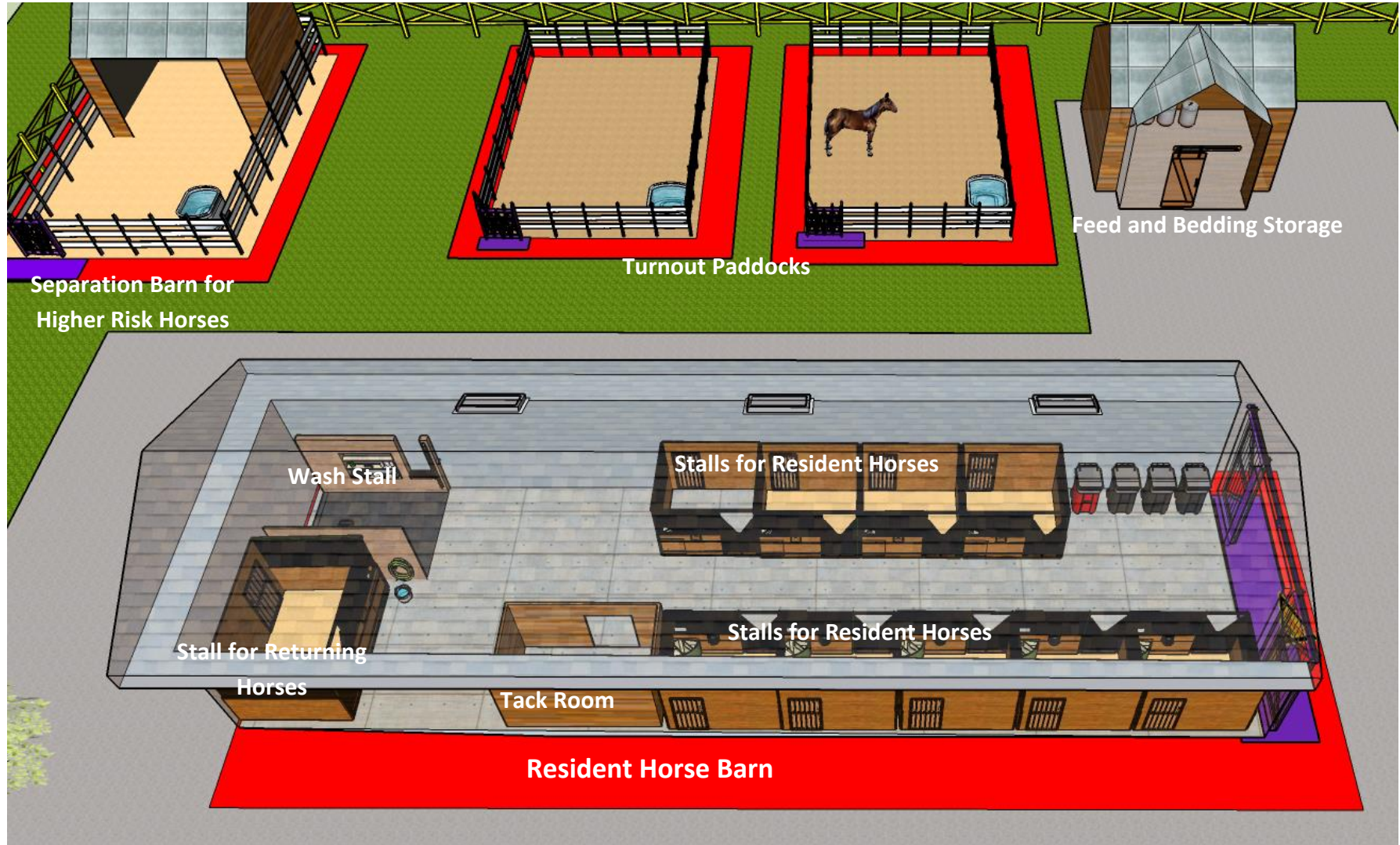


Figure 7: Separation of paddock and stabling areas for horses of different health status or peer groups assists in minimizing pathogen transmission and facilities management of horses on the farm or facility. The resident horse barn, turnout paddocks and separation barn are all restricted access zones accessible through controlled access points (gates). The two day turnout paddocks are fully fenced and separated by more than 10 feet which prevents **direct contact** between horses

Annex 4: Examples of facility layout and pasture/paddock separations

and each is supplied with their own watering trough. New and returning horses can be separated in a stall at the end of the barn and a turnout paddock set aside for their use.

*Ill horses require the highest level of biosecurity and, ideally, should be physically separated from other horses on the property (Separation Barn). Restrict entry to only those people necessary for the care of these horses and require hand washing before and after entry. Dedicate coveralls and footwear specifically for this barn or clean and **disinfect** boots on entry and exit. Dedicate and label all tack and equipment (buckets, rakes, shovels etc.) and ensure none of it is removed and used with other horses. If a separate location is not available, a stall that is isolated from other horses within the resident horse barn can be used, however, the shared air space and close proximity to other horses can result in the inadvertent transmission of pathogens by airborne routes and other indirect methods of contact.*

Annex 5: Properties of disinfectants appropriate for routine cleaning and disinfection of environmental surfaces and equipment

Selected Disinfectants: This is a short list of selected disinfectants suitable for routine cleaning and *disinfection* of environmental surfaces and equipment.

Active agent	Product examples	Contact time	Advantages	Disadvantages	Comments
Hypochlorite	Bleach. 1:10-1:50 dilution of household bleach with clean water	10 min	<ul style="list-style-type: none"> - Broad spectrum effective against most resistant organisms (enveloped viruses, bacterial spores, dermatophytes). - Readily available. - Cost effective. 	<ul style="list-style-type: none"> - Corrosive for some surfaces. - Poor stability when exposed to light. - Poorly active in the presence of organic debris (for example: dirt and manure). - Can bleach coloured fabrics. 	<ul style="list-style-type: none"> - Good for various environmental surfaces. - Efficacy decreases with increasing pH, decreasing temperature, presence of ammonia and nitrogen. - Reserve high concentration (1:10) for specific circumstances with resistant microorganisms. - 1:32-1:50 more commonly used. - Never mix with other chemicals as this can result in the production of harmful vapors. - Change diluted solutions daily. - Do not store in clear containers.
Potassium peroxymonosulfate	Virkon Trifectant	10 min	<ul style="list-style-type: none"> - Broad spectrum, with activity against enveloped viruses and bacterial spores. - Active in the presence of moderate organic debris. 	<ul style="list-style-type: none"> - Corrosive, especially with metal surfaces. 	<ul style="list-style-type: none"> - Commonly used routine disinfectant. - Care must be taken when handling concentrated products. - Consider rinsing metal and concrete surfaces after required contact time.
Accelerated hydrogen peroxide	Accel Peroxigard	5 - 10 min	<ul style="list-style-type: none"> - Broad spectrum, with activity against enveloped viruses, bacterial spores and ringworm. - Good activity in moderate organic debris. - Low toxicity. - Biodegradable. - Does not appear to be corrosive, unlike other oxidizing agents. 	<ul style="list-style-type: none"> - More expensive than other options. 	<ul style="list-style-type: none"> - Excellent choice for environmental disinfection.
Quaternary ammoniums	Various	10-30 min	<ul style="list-style-type: none"> - Low cost. - Low toxicity. - Stable under storage. - Good against gram 	<ul style="list-style-type: none"> - Limited impact on non- enveloped viruses, bacterial spores, ringworm. 	<ul style="list-style-type: none"> - Common environmental disinfectant, but spectrum may be suboptimal for some situations.

Annex 5: Properties of disinfectants appropriate for routine cleaning and disinfection of environmental surfaces and equipment

Active agent	Product examples	Contact time	Advantages	Disadvantages	Comments
			negative and many gram positive bacteria, and enveloped viruses.	- Inhibited by organic debris	
Phenolics	Various	10 min	- Good activity in organic debris.	- Limited activity against non-enveloped viruses and bacterial spores. - Can be irritating to skin and mucous membranes. Potentially toxic to other species (e.g. cats, pigs)	- Not recommended because of toxicity, spectrum and lack of significant advantages over better options. Potentially toxic.
Alcohol, povidone iodine, chlorhexidine, acids					- Not recommended because of activity in the environment or spectrum.

Product selection and use

Disinfectants are regulated by Health Canada for safety, efficacy and quality when used according to the label directions. However, efficacy is determined under controlled laboratory conditions and if using disinfectants in a farm environment, they must be used according to the manufacturer's recommendations and considerations given to increased organic load and environmental conditions. Disinfectants are only effective when applied to clean, dry surfaces and their effectiveness is affected by many factors including temperature, pH of the water, presence of other chemicals, concentration and contact time.