

# BIOSECURITY

A "MUST" FOR THE ENTIRE HOG PRODUCTION INDUSTRY

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The microbes that cause swine diseases have a regrettable ability to travel from place to place, with consequences that can be serious. A hog production operation that is the scene of a new disease outbreak, for example, may sustain heavy losses in terms of its production and earnings. If a foreign disease is introduced into the country, the entire livestock sector (producers, feed mills, slaughterhouses, shippers, etc.) and even other socio-economic sectors are likely to be affected. We need only recall the terrible consequences of the epidemic of hog cholera in the Netherlands in 1997 or the epidemic of foot-and-mouth disease in Great Britain in 2001!

# WHY HAVE BIOSECURITY?

It is absolutely essential, a "must" for the entire industry, to adopt measures that will effectively prevent new diseases from striking hog production operations or from gaining a foothold in the country. In the case of domestic diseases, primary responsibility lies with industry stakeholders, beginning with hog producers and all those whose occupations require them to go from farm to farm on a regular basis (veterinarians, technicians, shippers, etc.). In the case of foreign diseases, governments, and the Canadian Food Inspection Agency (CFIA) in particular, bear the important responsibility of protecting our borders.

The table below shows some examples of major domestic and foreign diseases.

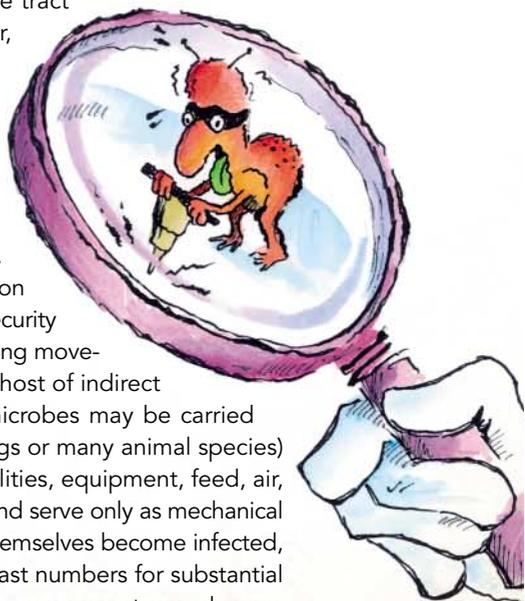
## Some examples of domestic and foreign swine diseases

| <b>Domestic diseases</b><br>(diseases that are present in Canada) | <b>Foreign diseases</b><br>(diseases that are not present in Canada) |
|---|--|
| PRRS  | FOOT-AND-MOUTH DISEASE   |
| SWINE INFLUENZA (FLU)   | VESICULAR DISEASE  |
| TGE   | HOG CHOLERA  |
| PLEUROPNEUMONIA   | AFRICAN SWINE FEVER  |
| SALMONELLOSIS   | PSEUDORABIES   |

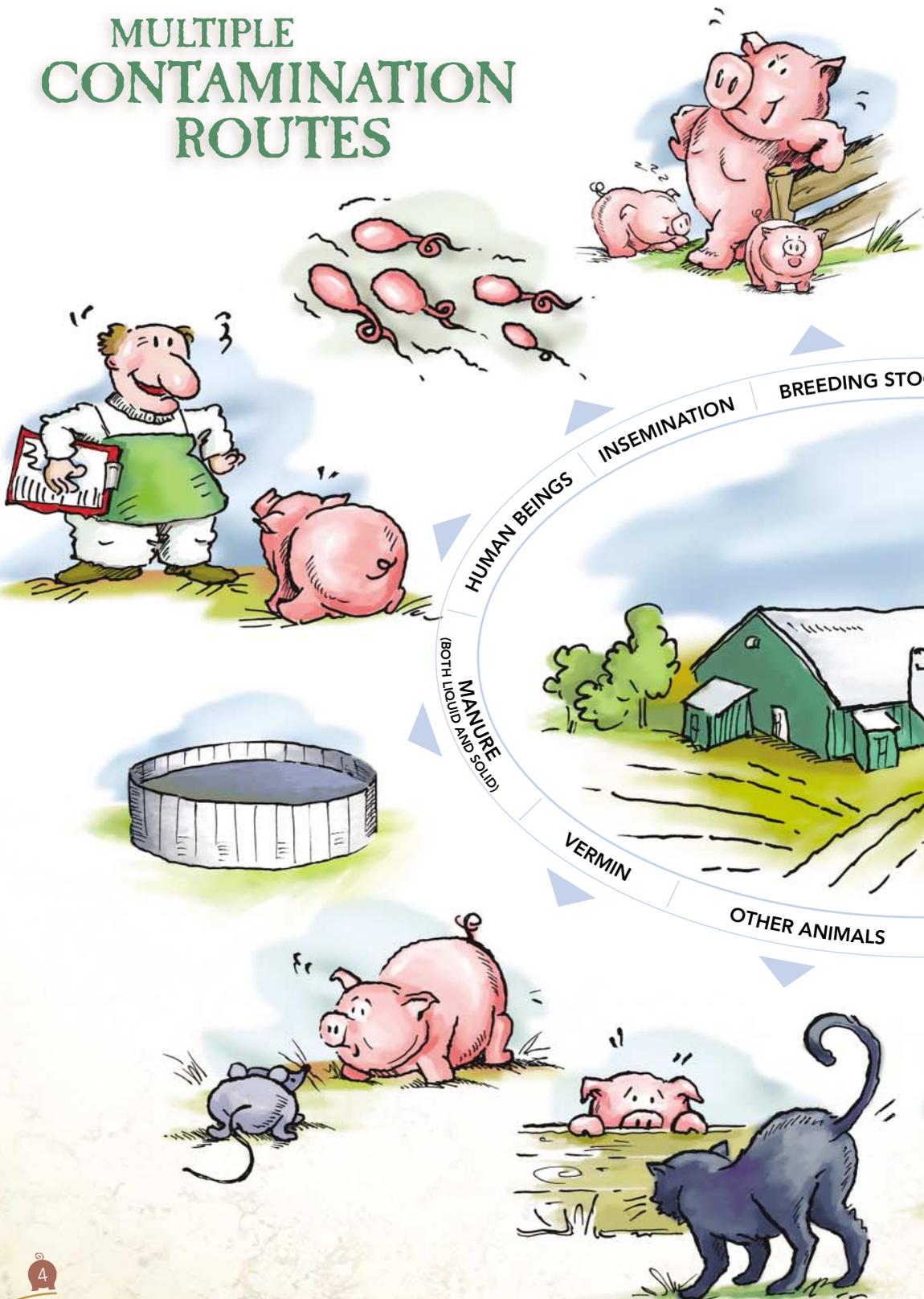
# HOW ARE DISEASES TRANSMITTED?

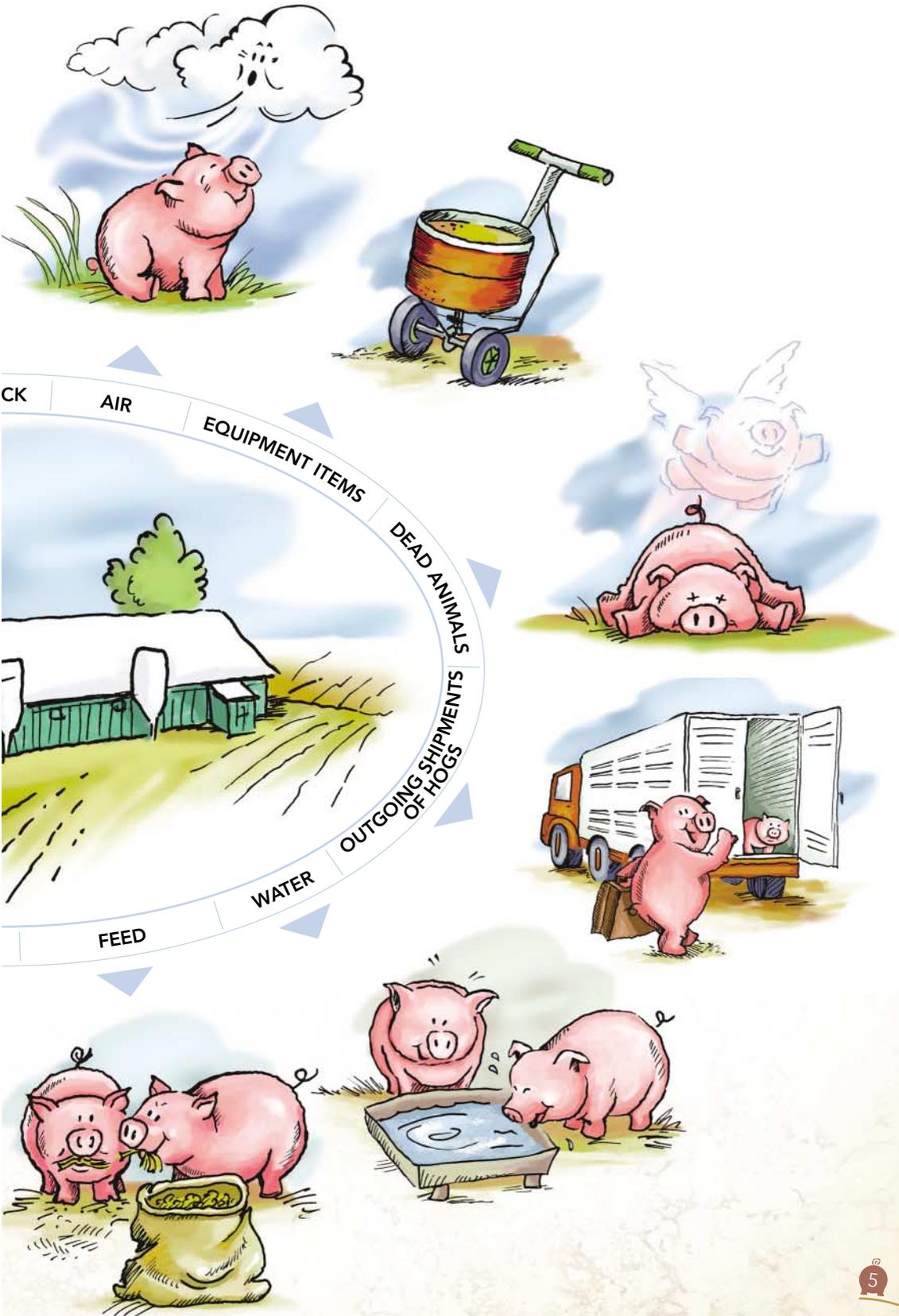
The prevention of infectious diseases confronts the hog production industry with a formidable challenge. This is because infection-causing agents (prions, viruses, bacteria and parasites) can be transmitted in a great variety of ways, some of them extremely insidious. Infected animals excrete different microbes via different routes. As a rule, microbes that live in an animal's respiratory tract are airborne, while those that live in the digestive tract are passed in manure. Some microbes, however, may also be found in semen, saliva, nasal discharge, urine, milk, vaginal discharge, meat and so on, where they may survive for days or even weeks.

Infected animals, regardless of whether they are clinically diseased or simply healthy carriers, represent the most serious microbe transmission hazard (direct transmission). It follows that biosecurity programs should assign top priority to controlling movements of livestock. Unfortunately, there are a host of indirect transmission modes as well. For example, microbes may be carried by various living vectors (such as human beings or many animal species) or on inanimate objects (such as vehicles, facilities, equipment, feed, air, semen, drugs, etc.). Inanimate vectors of this kind serve only as mechanical carrying devices, whereas living vectors may themselves become infected, allowing microbes to multiply and spread in vast numbers for substantial periods of time. Consequently, vectors of this type represent a much more serious hazard than mechanical ones.



# MULTIPLE CONTAMINATION ROUTES





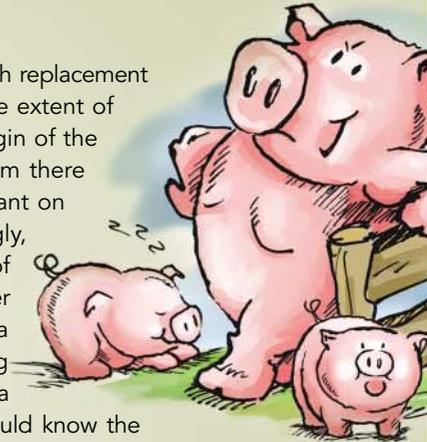


# AS A PRACTICAL MATTER, WHAT CAN BE DONE?

This document presents a brief summary of the main disease-transmission hazards with which a hog production operation is likely to be confronted, and suggests some general biosecurity principles that may be useful in dealing with them. These hazards are ranked in an approximate order of importance.

## Incoming pigs

This aspect has mainly to do with replacement breeding stock and piglets. The extent of the hazard depends on the origin of the new animals, how many of them there are and the procedures attendant on incoming shipments. Accordingly, as a first principle, the number of incoming animals and the number of sources should be kept to a minimum (ideally, all incoming animals should originate from a single source). An operator should know the



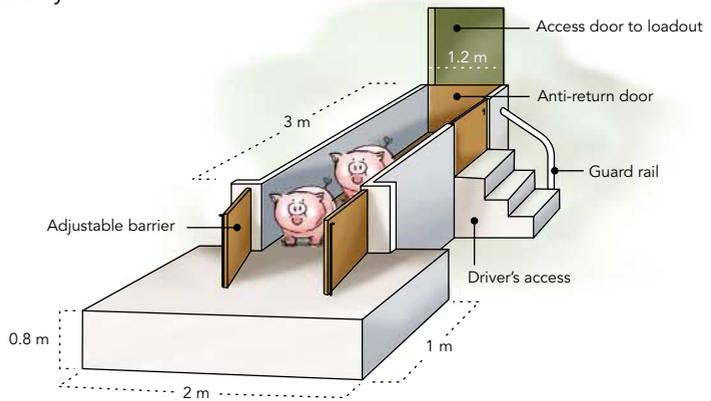
supplier well. Needless to say, the supplier's own operation should be free of the microbes that the purchaser is seeking to guard against. Suppliers should be able to document the health status of their animals by means of complete health follow-up records. If the supplier has a number of production sites, information about the incoming animals' site and herd of origin must be available. The supplier's operation should be characterized by first-rate biosecurity, and the supplier should also be in a position to ensure that adequate biosecurity measures are applied when his animals are delivered. Operators should always consult their veterinarian about a choice of supplier, and the veterinarian in question should meet regularly with the supplier's veterinarian.

In the case of breeding stock, once the animals have been delivered, they should be quarantined in a building that is isolated from the operation's main hog barn. The building used to quarantine the new arrivals should be equipped with its own facilities, and animals kept there should be cared for after the operator has finished work in the main pig barn, so that there is no need for the operator to return there afterwards. The newly arrived animals should be closely observed for any signs of disease. At the end of the period of quarantine, it is advisable to check them to ensure that they are free from latent infections (e.g. serological tests for PRRS, etc.). Lastly, the newly arrived pigs should not be put in with the others until the supplier has been consulted and has confirmed that the herd of origin has not experienced any health problems since the delivery of the hogs in question.



## Outgoing shipments of hogs

Drivers and vehicles used to transport hogs or piglets constitute a major hazard. Vehicles containing hogs should never approach buildings. The same applies to empty vehicles that are not clean. A driver should never enter a hog barn, and an operator should never approach a truck. Every hog barn should be equipped with a loadout, to facilitate the task of moving the hogs while the waiting truck is kept some distance away. The loadout should feature a system designed to prevent hogs from getting back into the barn, and it should be cleaned and disinfected after use. A transit area that serves as a buffer zone between the hog barn and the loadout is another useful facility.



## Location of operation

The location of a hog production operation in relation to places where hogs or other animals are brought together in substantial numbers (other operations, slaughterhouses, auction sales, etc.) or routes along which they are moved (i.e. roads) is a major consideration regarding the danger of microbial contamination. Such microbes as *Mycoplasma hyopneumoniae*, the influenza virus, the PRRS virus, the foot-and-mouth virus and others are readily transmissible to animals in the vicinity. The main factors that should be taken into account are the number, size, proximity and type of livestock operations located within a radius of approximately 3 km. The ambient air is a major contagion medium. In regions where hog farms are densely concentrated, unfortunately, there is not much that can be done about this hazard. In France, some insemination centres and breeding farms are equipped with air filtration systems. This appears to be an effective method, but it is very costly. Other contagion vectors include birds, insects, vehicles, human beings, etc. Fortunately, these vectors are more readily controllable (see below).



## Employees and visitors

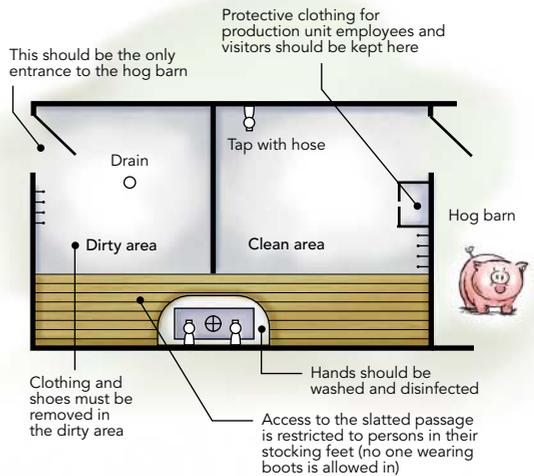
With modern means of transportation, human beings can carry microbes over considerable distances in a very short time. In most instances, the human being serves merely as a mechanical vector. For some microbes, however, such as salmonella or the influenza virus, human beings may also act as biological vectors. Consequently, it is essential to exercise strict control over entry by humans, whether employees or visitors, into the hog barn, regardless of whether they have access to the animals.

Only persons with a good reason to enter the barn should be allowed in. There should be only one door leading into the barn, and it should be kept locked at all times, with an electric bell to enable visitors to signal their arrival. There should be a communication system that allows visitors and persons inside the barn to speak to each other, and it should be possible to unlock the entrance door automatically. Visitors should be clearly informed about the biosecurity rules that they are required to observe, and they should be asked to sign a register indicating when they were last in contact with hogs.

The entrance should be equipped with a Danish-style series of chambers or a shower. Schematically, this means an initial area where visitors remove their clothing and shoes, a second area, equipped with a washbasin or shower, where visitors wash their hands or their entire bodies, and a third area where they put on clothing and footwear supplied by the farm (see diagram).

The question of whether it is essential to observe a "waiting period", i.e. a period of time with no direct or indirect contact with hogs (or other animals at risk) is still controversial. Persons who must visit hog production operations on a regular basis should organize their time so that they visit the healthiest operations early in the day or week. It is especially important to avoid visiting other operations after visiting one where a highly contagious disease such as TGE is currently raging.

## Danish hog barn entryway



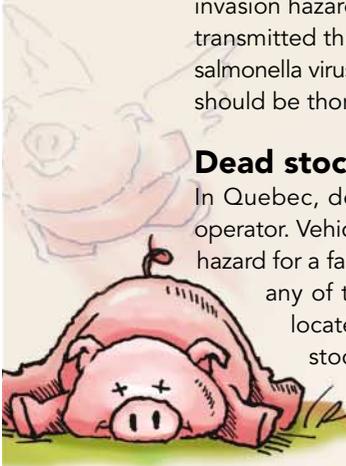
## Introduction of machinery and equipment

Machinery and equipment, especially machinery and equipment that have been in use on other farms, represent a real microbe invasion hazard, especially regarding microbes that can be transmitted through manure (such as the TGE virus or salmonella viruses). Accordingly, all used machinery and equipment should be thoroughly disinfected before being brought into a hog barn.



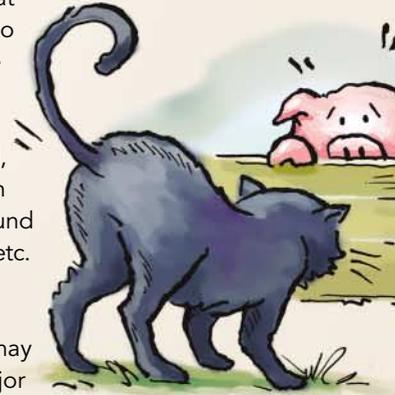
## Dead stock disposal

In Quebec, dead animals are usually picked up by a rendering plant operator. Vehicles used for this purpose constitute a major contamination hazard for a farm's immediate surroundings. They should never approach any of the farm's buildings. A dead stock holding bin should be located a considerable distance away from the hog barn. Dead stock should be handled at the end of the day, and clothing and boots worn and equipment used in handling carcasses should subsequently not be used in the hog barn.



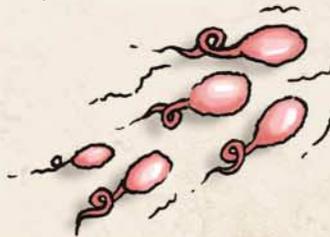
## Other animals

There are a number of animal species, both wild and domestic, that may serve as mechanical or biological vectors for various microbial pathogens that affect swine. Accordingly, it is important to ensure that dogs, cats and the like are kept out of the hog barn, and to ensure that other species are not present in its immediate vicinity (a poultry farm, for example, should not be located nearby). An effective bird and rodent control program should be in effect : buildings should be carefully maintained, all openings blocked off with grating, there should be an apron of crushed stone around all buildings, the area around silos should be kept clean, traps or baits should be set out, etc.



## Artificial insemination

There are a number of microbes, especially viruses, that may be transmitted by artificial insemination. One that is a major source of concern in Quebec at the present time is the virus that causes PRRS. Accordingly, it is essential to obtain semen exclusively from sources (a. i. centres) that can be relied upon to provide a disease-free product, especially with respect to the PRRS virus.





## Disposal of liquid and solid manure

There are various microbes that can survive for several days, or even several months, in liquid or solid manure (e.g. salmonella and *Brachyspira hyodysenteriae*). Manure-spreading equipment may be a contributing factor in contaminating the area around the hog barn. It is advisable not to use equipment that has been used on other farms, unless it has first been washed and disinfected. Even though the extent of the aerial contamination hazard resulting from the spreading of liquid manure has not yet been ascertained, it is advisable not to spread liquid manure near buildings.



## Feed

Raw materials, supplements and complete feed may contain microbial pathogens (such as salmonella). In Quebec, feed is not generally regarded as being a significant source of these microbes. However, it is advisable to obtain feed from suppliers certified for Good Manufacturing Practices (GMP) or Hazard Analysis and Critical Control Points (HACCP) purposes. It is also important to store feed in a place where it will be sheltered from the droppings of birds, rodents and other animals. In addition, delivery vehicles and their drivers should not be allowed to come too near the buildings, where possible.



Another important point is that table or restaurant scraps containing animal products such as meat or milk should never be fed to hogs, as scraps of that kind constitute a potential source of entry for foreign diseases such as foot-and-mouth or swine fevers. Indeed, CFIA has prohibited the use of table or restaurant scraps as feed for swine.

## Bedding

Bedding is a potential source of some types of microbes (such as salmonella and mycobacteria). It is advisable to use only bedding that has been kept in a place where it has been sheltered from the droppings of birds, rodents and other animals.

## Water

As a rule, water does not represent a major hazard as regards the transmission of microbial pathogens that affect swine. However, it is advisable to check the bacteriological quality of the animals' drinking water from time to time and if necessary to disinfect it or turn to a different source of supply.



## Drugs

"Live" vaccines may contain germs with some residual pathogenicity. In exceptional cases, they may even be contaminated with undesirable pathogens. It is advisable to use only vaccines that have been recommended by the practising veterinarian.

# CONCLUSION

Many diseases of swine may have major socio-economic repercussions. It is essential to take appropriate measures to prevent the spread of disease. All hog production sector stakeholders must bear their share of responsibility for this task. In particular, all producers should develop a biosecurity program adapted to their particular farms by working in cooperation with their veterinarian. It is important for all persons involved on the farm be closely associated with this effort, and for them to have a clear understanding of the reasons for the proposed measures and to realize why they are important. The program should be reviewed periodically and its implementation checked on a regular basis. Even the best biosecurity program can be effective only if it is rigorously implemented. Biosecurity will not change the world, but it can be very profitable!

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## REFERENCES

- Canadian Food Inspection Agency.** Farm Biosecurity, A Common Sense Guide. <http://inspection.gc.ca/english/animal/health/fad/biosecure.shtml>
- Boutin, R., Broes, A. 2001.** La biosécurité à la ferme : un « must » pour tous les élevages. Colloque sur la production porcine, pp. 58-81.
- Corrigan, R. M. 2002.** Overview of rodent control for commercial pork operation. Swine health and epidemiology report. Special biosecurity issue. p. 8. <http://animalagriculture.org/swine/29981%20NIAA%20Swine%20Healthbio.pdf>
- Dee, S. A. 1999.** An overview of methods for measuring the impact of sanitation procedures for swine transport vehicles. Swine Health fact Sheet. Vol. 1, no2. <http://www.porkscience.org/documents/Other/transport sanitation.pdf>
- Dewey C., Friendship R.** Health status as a risk factor: A systems and Unit Perspective. <http://www.gov.mb.ca/agriculture/livestock/pork/swine/bab11s15.html>
- Moore C. 1992.** Biosecurity and minimal disease herds. Veterinary Clinics of North America: Food animal practice. 8 (3), 461-474.
- Morrison, B. 2002.** Biosecurity is like insurance – I want as little as I need. Western Hog Journal. p. 30-37.
- Muirhaed M.R., Alexander J.L.T. 1997.** Understanding disease. In Managing pig health and the treatment of disease. 5M Enterprises Ltd. 1<sup>ère</sup> éd. p. 31-42.
- National Biosecurity Resource Center for Animal Health Emergencies.** <http://www.biosecuritycenter.org/nbrctoc.htm>
- National Pork Board and American Association of Swine Veterinarians.** Biosecurity Guide For Pork Producers. <http://www.porkscience.org/documents/Other/final%20biosecurity%20book.pdf>
- Thompson Robert. 2002.** Transportation cleaning and disinfecting. Swine health and epidemiology report. Special biosecurity issue. p. 10. <http://animalagriculture.org/swine/29981%20NIAA%20Swine%20Healthbio.pdf>
- USDA's Centers for Epidemiology and Animal Health. 2002.** Potential for international travelers to transmit foreign animal disease. Swine health and epidemiology report. Special biosecurity issue. p. 6. <http://animalagriculture.org/swine/29981%20NIAA%20Swine%20Healthbio.pdf>



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