

What's the Game Plan for Swine in Case of a Foreign Animal Disease Outbreak?

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■ Introduction

Which are the foreign animal diseases of swine of most concern?

- Foot-and-mouth disease (FMD)
- Swine vesicular disease (SVD)
- Vesicular stomatitis (VS)
- Hog cholera (HC)
- African swine fever (ASF)
- Pseudorabies (PR)

The objective will be to eradicate any outbreak by preventing transmission of the infectious agent by:

- Slaughter of infected animals and their contacts
- Pre-emptive slaughter of high risk herds
- Quarantine of suspect (lower risk) premises
- Control of animal movement (local or national)
- Strict bio-security (disinfection of people, vehicles, premises)
- Tracing the origin of outbreak
- Tracing where agent may already have spread
- Surveillance for new outbreaks
- Control of potentially contaminated animal products, e.g. semen
- Wildlife and vector control
- Zoning or regionalization of the country
- Vaccination ??

Some of the key characteristics and specific issues associated with potentially damaging infectious diseases will be discussed in relation to Foot and Mouth Disease.

■ **Foot-and-Mouth Disease**

Method of Spread

- Movement of infected animals
- Infected animal products e.g. meat, milk, semen
- Contaminated people, vehicles, equipment, (animals ?)
- Aerosol
- Persistently infected cattle, sheep, goats (not pigs)

Susceptible Animals

- All ruminant animals including deer, bison, camelids
- Pigs
- Rats can also be infected

Incubation Period

- In pigs can be as short as 18 hours, and up to 11 days

Causal Agent

- A virus with an RNA genome, allowing high mutation rate
- 7 distinct serotypes (no cross protection between them)
- Many strains within each serotype
- Easily killed when pH below 6 or above 10
- The most infectious animal disease agent known

Clinical Signs (pigs)

- Fever
- Depressed appetite
- Reluctant to move, severe lameness on hard surfaces
- Blisters (vesicles) appear on snout, tongue, coronary band, teats

- Vesicles quickly rupture leaving raw areas (ulcers)
- Ulcers may appear over hocks and elbows (pigs kept on hard surfaces such as concrete)
- Sudden death of young piglets without appearance of vesicles

■ **Procedures in the Event of an FMD Outbreak (summarized from CFIA FMD strategy document)**

Slaughter

Clinically affected pigs on positive FMD infected premises will have slaughter priority to eliminate virus multiplication. All known exposed susceptible livestock will also be ordered destroyed. Positive animals are targeted to be killed within 24 hours and other exposed susceptible animals within 48 hours. In most circumstances all susceptible animals on a positive FMD infected premise will be slaughtered.

Quarantine and Movement Controls

FMD is highly contagious and spread can only be prevented by rapid slaughter of affected animals and strict movement control measures. All epidemiologically linked premises must be quarantined as suspect FMD infected premises and subject to strict movement controls. A CONTROL AREA will be declared to facilitate zoning within the infected zone for movement control purposes as well as to define Disease Free zones within Canada, outside the infected zone.

Pre-emptive Slaughter

There is no treatment for FMD. Pre-emptive slaughter is defined as the killing of susceptible animal species in herds on premises which have been exposed to infection by direct animal-to-animal contact, or by indirect contact of a kind likely to cause transmission of FMD virus.

Tracing and Surveillance

Tracing investigations include those epidemiologically linked to the positive FMD infected premise. Movement of animals from the positive FMD infected premise (trace out) since the estimated introduction of FMD as well as movement of animals onto (trace in) for a critical period prior to the estimated first case must be investigated. Priority will be given to animal movements, but movements of people and vehicles, particularly veterinarians, feed trucks, milk tankers will be urgently investigated. Immediate surveillance for additional

outbreaks is required in order to define the appropriate CONTROL AREA. All premises within a 3 Km radius of an outbreak must be individually identified, inventoried and placed in quarantine. Prior to the declaration of a CONTROL AREA with its area movement restrictions, all premises within 5 km of an infected premise may be individually quarantined (under Health of Animals Act, 1990).

Vaccination

Canada may employ selective vaccination of susceptible species against FMD in the face of an outbreak, in designated vaccination zones as a temporary measure. It is likely that only cattle would be vaccinated, and these would be permanently identified with an ear tag, subjected to movement restrictions and targeted for early slaughter. In the event that the control measures proved ineffective, wide scale (blanket) vaccination of susceptible species could be employed.

Treatment of Animal Products and By-Products

FMD virus may survive in fresh meat and meat products and semen. The utilization of pigmeat and other pig products from an infected zone would depend on a risk assessment, but it would be possible to process meat from tested FMD-negative animals by cooking and thereby inactivating any possible contaminating virus.

Decontamination

Sunlight has little effect on the FMD virus, but it is susceptible to drying. It can survive up to 200 days in the soil, sacking or straw, depending on the climate; 35 days on cardboard, wood or metal contaminated with blood; 398 days on fat contaminated wood; up to 2 weeks on wool; 4 weeks on cow hair; 14 days in dry manure (8 days in moist manure); up to 42 days at 12 to 22 C in liquid manure and 21 days in wash water from pens - all assuming at neutral pH. The virus can survive indefinitely in frozen semen or frozen meat products. Buildings on positive FMD premises as well as vehicles and equipment must be thoroughly cleaned and disinfected. Organic matter may neutralize disinfectants so cleaning is critical. If disinfection cannot be achieved effectively and quickly, then contaminated materials, equipment and buildings should be destroyed. Animal fluids and excreta should be destroyed by disinfection and burial or incineration. Suitable disinfectants and viral inactivants include citric acid (0.2%), acetic acid (2%), sodium carbonate (4%), sodium or calcium hypochlorite (3%), sodium hydroxide (2%), formalin (8%) and Virkon (2%) - ensure that they are used at the recommended concentrations and sufficient contact time.

Wildlife and Vector Control

Wild deer and wild or feral pigs are susceptible to FMD infection. It is not known whether the deer population in North America is sufficiently dense or susceptible to maintain FMD when the disease has been eliminated from domestic stock. It is unlikely that deer could effectively be destroyed in an infected zone, and reliance would be placed on preventing contact between domestic and wild animals by preventing outside feeding and housing susceptible domestic animals. It is theoretically possible that birds, dogs and other non susceptible species could mechanically carry FMD virus from an infected to an uninfected farm, but no evidence for this is available. Biting flies do not carry infection. Vermin control would take place on infected premises.

Zoning/Regionalization

Using internationally accepted guidelines it should be possible to establish "free" and "infected" zones within Canada, which would allow trade to continue from the free zones. The establishment of free zones will depend on good surveillance and the prevention of infected animals, animal products or contaminated people, vehicles and other material from entering from the infected zone.

Action on a Declared Infected Premise

All infected and susceptible in-contact animals must be killed with minimum delay, allowing for the veterinary inspector to examine the infected animals in order to assess how long they had been infected. Arrangements for animal valuation and carcass disposal must also be made.

Restrictions at the Declared Infected Premise

The objective would be to prevent any further spread from a positive FMD infected premise. Upon declaration of infected status (quarantine), the veterinary inspector will:

- Conduct a census of all susceptible animals, the number in each category, those dead, infected or liable to be infected or contaminated, plus assess the likely duration of the infection.
- Inventory all stocks of milk, meat, carcasses, hides and skins, wool, semen, embryos, ova, slurry, manure as well as animal feed and bedding.
- Impose movement restrictions on all ruminant species (cattle, sheep, goats etc), swine, and other susceptible animals which have arrived on or left the premises, and arrange for them to be isolated into buildings where possible.

- Require the establishment of appropriate means of disinfection at entrances and exits of buildings and security at the entrance of the premise itself.
- Assign an inspector (if available) to ensure biosecurity at the gate of the infected premise.
- Order dogs, cats and other non-susceptible species to be confined.
- Include poultry and horses in the quarantine, but these may move under license to slaughter at a federally inspected abattoir or to premises where there are no susceptible animals.
- Advise owners of adjacent premises to keep susceptible animals away from the perimeter of the declared infected premise.
- Vehicles and equipment must be cleaned and disinfected prior to leaving a declared infected premise.
- People must wear clean clothes and not visit other premises with susceptible animals.
- Effluent should be prevented from draining onto roads, pastures or into watercourses.
- Implement vermin control, feral animal control or wildlife control measures if warranted.
- Trace milk and/or milk products of susceptible animals collected during the period of probable introduction of FMD to confirmed diagnosis and either destroy or treat in such a way to ensure FMD virus destruction.
- Trace semen, ova and embryos collected from susceptible species during the period of probable introduction to confirmed diagnosis and destroy under official supervision.
- Conspicuous signage indicating the presence of FMD must be posted at the farm entrance(s), along with biosecurity provisions including facilities for the cleaning and decontamination of eradication staff and footwear of residents not in contact with livestock.

Re-stocking after an FMD Outbreak

Positive FMD infected premises will be left vacant for a minimum of 21 days after cleaning and disinfection. If a full cleaning and disinfection is not possible due to the conditions of the premise, re-stocking may not be possible for up to 12 months. Where re-stocking is carried out prior to the end of an outbreak, it can only take place provided FMD has not been confirmed within 10 Km of the premise within the previous 14 days. Prior to animals leaving the re-stocked premise, it may be required that blood samples are taken to ensure that the animals have not been exposed to any remaining FMD virus.

Vaccination

Canada is a member of the North American FMD Vaccine Bank, through which vaccine could be made rapidly available, should the decision to use vaccine be taken. The use of vaccine would be considered when:

- Outbreaks are in areas of high FMD susceptible animal density, with inadequate resources for slaughter or disposal or there was a high potential risk for rapid aerosol spread.
- A high potency vaccine available against the outbreak strain.
- An approved test available to distinguish vaccinated from infected animals.
- High public concern regarding large scale slaughter of animals.
- Concern over animal welfare issues.
- Other control options not effective.

Re-establish Disease Free Status

Canada can re-apply for FMD free status, which would allow the resumption of normal trade 3 months after the last case of FMD, when all affected animals are slaughtered (stamping out) and surveillance has shown that the country is free of FMD virus. If vaccine was used to control the outbreak, free status can be established 3 months after the slaughter of all the vaccinated animals. If the vaccinated animals are not all slaughtered, Canada can re-apply for FMD free status 6 months after the last case of FMD, or the last use of vaccination, but then only after extensive testing of all vaccinated animals to show that they are not still harbouring the virus - this really only applies to ruminant animals that may become persistently infected. There can, therefore, be considerable economic consequences following the use of vaccine, as this will delay the re-establishment of a live animal and animal product export trade.