

# Technical Bulletin

## Foot-and-Mouth Disease

Foot-and-Mouth Disease (FMD) is a highly contagious viral infection which affects cattle, swine and other ruminants causing painful lesions in and around the mouth, as well as the feet. FMD is not normally fatal for adult animals, but in young animals the fatality rate rises. An FMD outbreak causes considerable economic loss because the infection makes eating and moving difficult and painful, so considerable weight loss occurs. It generally takes some months for recovery, and the animals who do recover may be very debilitated and suffer from lameness, abortion, chronic inflammation of the udder, etc.

FMD was found as early as 350 B.C. There are many known serotypes as well as numerous subtypes which makes it very difficult to maintain a vaccine supply that will accurately match an outbreak strain.

Few countries in the world have not been affected by FMD. The last known incidence in the United States was in 1929, but there were series outbreaks in 2001 which affected US trading partners. A FMD outbreak will have an extremely negative impact not only on livestock, but their commodities as well since during outbreaks imports and exports are severely curtailed. Should an outbreak occur in the US, losses to the industry could be 10 - 20% .

Following is an excerpt from an interagency Report to Congress on preventing FMD which lists the ways FMD could enter the US:

- Contraband (prohibited meat products carried by passengers/in cargo containers/sent by mail/courier, black market)
- Illegal transshipments (products from other than stated point of origin)
- Garbage (small boats/private planes)
- Edible animal products (fresh, frozen, chilled meat/dairy products)
- Garbage (commercial ships/planes)
- Illegal human movements from foreign countries (illegal immigrants)

- Other animal-related products (straw, hay, packing material, crop movements, feed, farm equipment, shipping containers)
- Legal human movements (civilian) from foreign countries
- Live animals (zoo, breeding livestock)
- Animal germplasm
- Inedible animal products (fertilizer, vaccines and other biologics, cosmetics, etc.)

This same report also contains results from a study conducted from 1969 to 1993 showing that imported livestock, animal vaccines, escapes of virus from production facilities along with meat and garbage contamination accounted for 69% of FMD outbreaks. Generally, animal movement outbreaks were attributed to livestock crossing into neighboring areas. In this regard the US has a definite advantage since both of its neighbors — Canada and Mexico — are FMD-free. FMD-free status is maintained by monitoring for FMD and being aware of where and how outbreaks occur. Regulation, inspection, interception and surveillance also play an important part in this mission.

When thinking about controlling FMD and, if necessary, eradication, the following are important points to consider:

- FMD is fast moving; it takes only hours to cause infection.
- The virus can survive for several weeks on equipment, clothing, and for 28 hours in nasal passages.
- Humans can spread the disease if they come into contact with the virus.
- It can be killed by heat, disinfection and pH adjustment.

The Department of Agriculture's Animal Plant Health Inspection Service (APHIS) is responsible for US FMD monitoring/surveillance efforts. APHIS maintains teams of federal, state and university personnel which respond to foreign animal disease outbreaks throughout the world. These teams are trained to recognize these various diseases and to take the steps necessary to control an outbreak. A trained APHIS team member is within four driving hours away from any area of the continental US should they be needed.

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As a serum supplier, one of SAFC Biosciences' major concerns is serum safety. We strive to assist our customers in managing the risk of serum use, and when assessing risk, there are several factors to consider. The first is country of origin; this means that sourcing from an area with minimal risk of FMD is important. Additionally, FMD does not cross the placenta, so using Fetal Bovine Serum reduces risk. Another significant consideration is how serum processing equipment is cleaned, as the FMD virus is inactivated when subjected to pH levels below 6.5 or above 11. Finally, as reported in a USDA article, gamma irradiation at 25 - 35 kGy inactivates 4.7 logs of FMD, so irradiation is an additional consideration in viral reduction.

For more information about this subject or other SAFC Biosciences' products and services, please call our Technical Services department.

## References

1. "Animal Disease Risk Assessment, Prevention, and Control Act of 2001 (PL107-9) Final Report", January 2003. A Report to Congress on FMD Prevention, see [www.aphis.usda.gov](http://www.aphis.usda.gov).
2. "Appendices to PL 107-9 Interagency Working Group Final Report, Appendix 6, The Economic Consequences of Bovine Spongiform Encephalopathy and Foot-and-Mouth Disease Outbreaks in the United States", USDA Economic Research Service, Kenneth H. Matthews, Jr., and Janet Perry.
4. FMDInfo.org, Food-and-Mouth Disease: Information, New Resources, [www.fmdinfo.org/aboutfmd.aspx](http://www.fmdinfo.org/aboutfmd.aspx), Copyright 2005 Cattlemen's Beef Board and National Cattlemens' Beef Association.

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