

Foot and Mouth Disease (FMD)

Disease Profile

FMD is widely distributed with only Northern Europe, North America and Australia/New Zealand being completely free while many developing countries in Asia, the Middle East and in Africa, in particular, have significant problems with endemic FMD. Positive progress with eradication has continued in South America, the last known focus of infection having been in Venezuela with limited spread to neighboring Colombia. OIE and FAO have launched a global initiative to support regional and national control.

FMD is an important animal disease with a considerable impact on livelihoods and trade for many developing countries with endemic infection as well as major trade implications when outbreaks occur in a previously free region. The economic impact is significant and prolonged for countries or regions with endemic FMD while **epidemics are extremely costly** in terms of disease control, proving freedom from infection and trade implications.

Risk

FMD is **closely associated with poverty** and is widespread in many developing countries. The pressures for movements of people and products brought about by political instability and continuing globalisation enhance risks for international spread of the disease. Therefore, it is of utmost importance to bring FMD under control in these settings, taking into account the wildlife situation, as the reduction of infectious virus in these areas will provide a significant reduction in the risk of introduction of FMD virus to FMD free areas

What do we have?

Diagnostics for FMD are available from a small number of commercial suppliers. Some reagents can be obtained from OIE/FAO Reference Laboratories or are produced for local use in National or Regional Laboratories. The main commercial tests include serology ELISA kits for non-structural protein testing and for structural antibodies of some serotypes. New commercialised tests for detection and serotyping of virus have become available from the National and OIE Reference Laboratory for FMD in Brescia, Italy.

Vaccines: Current, killed vaccines are quite efficient, provided that they are applied before exposure to live virus, that the vaccine strain has been carefully selected to match the outbreak strain, that sufficient amount of intact antigen is included in the vaccine and that the vaccine is of good quality. Disadvantages of the current vaccines include the dangers inherent in their large-scale production from virulent virus, the necessary provision of a cold chain and the short duration of protection elicited. Not all strains of FMD virus are covered fully by the limited number of vaccine strains commercially available and new variants emerge periodically. In the USA, adenovirus vectored vaccines have become commercially available for some serotypes with a reduced risk for FMD virus escape during production or from incomplete inactivation. Another promising line of research is the development of recombinant empty capsids which may have enhanced stability and could be produced without the need to handle live FMD virus.

Pharmaceuticals: There may be some potential for the use of antivirals in FMD control but there would be considerable challenges in both developing and licensing such products.

What do we need?

- Faster diagnostics and sensitive pen side tests along with the development of more effective and specific tests for differentiating between antibodies due to infection and vaccination.
- Sufficient panels for test validation across all serotypes and species.
- Knowledge about virus transmission and persistence in vaccinated populations and reliability of tests to differentiate vaccinated from infected animals.
- Support for fundamental immunology and for animal studies.
- Knowledge on circulating isolates in endemic regions for selecting the vaccine antigens in endemic settings.
- Better serological predictors of protection afforded by vaccination.

Read the full chapter [here](#).