

PUBLIC HEALTH

Foot-and-mouth disease in animals and humans

The foot-and-mouth disease that afflicts young children and the foot-and-mouth disease that is currently infecting cattle and sheep in Europe share 3 things: a colloquial name, the same family of viruses and a characteristic distribution of vesicles. The human disease is also known as hand, foot and mouth disease, while the cloven-hoofed animal version is also called hoof-and-mouth disease.

The viruses that cause these diseases belong to the Picornaviridae family.^{1,2} Both diseases produce painful blisters in the mouth and on the feet, but in other respects they are not related and should not be confused with one another.

The human disease: Vesicular stomatitis with exanthem, or hand, foot and mouth disease, is a common enteroviral infection transmitted primarily by the oral-fecal route and typically affects children aged 10 and under. It is prevalent worldwide and is highly infectious, often with attack rates close to 100%. Young children are the most frequent shedders of enteroviruses and are usually the index cases in family outbreaks.² After an incubation period of 4 to 6 days, most patients present with fever, anorexia and malaise, followed quickly by a sore throat and tender vesicles on the buccal mucosa, sides of the tongue and on the palms, fingers and soles. Treatment is supportive, with pain management and fluid intake being the primary treatment objectives. The disease tends to be self-limiting, with the lesions usually resolving within a week. Most cases are caused by group A coxsackievirus, type 16.² Infection with enterovirus 71, a less common cause of hand, foot and mouth disease, can result in viral meningitis, encephalitis or poliomyelitis-like paralysis.³ Preventive measures include washing hands after defecation and before handling food or caring for children. This human disease is not transmissible to animals.⁴

The animal disease: Animal foot-and-mouth disease is a highly infectious illness caused by the genus Aphthovirus.

There are 7 serotypes. It is endemic in parts of Asia, Africa, the Middle East and South America,¹ with sporadic outbreaks occurring in disease-free areas. Outbreak control depends on rapid diagnosis and rigid restriction of nonessential movement both into and out of affected farms and the surrounding countryside. The last outbreak in Canada occurred in 1952.⁵

The virus can be spread both directly and indirectly. It is readily airborne and is also spread by the movement of animals, people and vehicles. Blisters develop a few days after infection. Malaise, lameness and secondary bacterial infections soon follow. The most serious effects are seen in dairy cattle, with the resulting economic disaster from declining milk yields, abortion and sterility. Rarely, the infection crosses to humans and produces a mild viremia, with blistering. The last reported human case in Great Britain occurred in 1966.⁶

For a country to be considered "FMD-free" by international regulators, it must have an effective system of animal surveillance and disease reporting. The occurrence of even a single case of foot-and-mouth disease in a previously disease-free country results in an immediate ban on export trade.

An animal vaccine is available, but because current serologic tests cannot distinguish between infected and vaccinated animals, FMD-free countries will not import vaccinated animals. In 1991 all European countries implemented a policy of nonvaccination in order to increase export opportunities.¹ This decision is coming under critical scrutiny in light of the disastrous outbreak there.

The European outbreak of foot-and-mouth disease does not present a direct health risk to humans, although the economic consequences are enormous. The density and scale of current livestock production and transportation systems clearly contributed to the enormity and rapidity of the outbreak. The British outbreak serves as a red flag, since it highlights our reliance on mass food production and distribution, which make us vulnerable to outbreaks of



Mountie places quarantine warning during Canada's last outbreak in 1952.

foodborne diseases. The CDC, which estimates that about 78 million Americans experience a foodborne illness each year,⁷ has issued a primer on the diagnosis and management of foodborne illnesses.⁷ — *Erica Weir, CMAJ*

References

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