

Veterinary epidemiology in disease-control policy-making: the 2001 UK foot-and-mouth disease outbreak

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Foot-and-mouth disease (FMD) was endemic in the UK until the middle of the 20th century, the last epidemic occurring in 1967-1968. This was followed by a long-inter-epidemic period until 2001, when a major epidemic of the Pan-Asia O strain occurred in Great Britain, involving

2 026 outbreaks. The epidemic originated on a pig farm, infection probably occurring through the consumption of improperly-treated, illegally-imported pig meat. Substantial dissemination of infection, initially via sheep marketing, already had occurred before the index case was identified and movement restrictions consequently imposed. This posed a major challenge to the Government's Veterinary Service, which had reduced in size since the 1967-1968 epidemic, and most of whose staff had no experience of control of the disease.

Initially, traditional control procedures (movement restriction; slaughter of susceptible species on infected premises [IPs]; animal tracing; and veterinary assessment of dangerous-contact premises [DCs] with subsequent slaughter of susceptible species, if deemed prudent) was undertaken, following tried-and-tested procedures. However, these were supplemented by two novel strategies: 1. slaughter of sheep within a three-kilometre radius of IPs in some regions, and 2. automatic 'pre-emptive' culling of susceptible animals on premises contiguous to IPs, the latter strategy being justified by mathematical models.

Extensive post-epidemic serological surveillance found only a small number of seropositive animals in very few flocks, suggesting that FMD may self-limit in extensively-farmed sheep populations. The models that supported the contiguous-cull policy were flawed, being based on data from dissimilar epidemics; using inaccurate background animal-demographic data; and containing improbable biological assumptions about parameters of infection and virus emission in infected herds and flocks.

More than 6 500 000 animals were slaughtered to control the epidemic.