

Foot and mouth disease in Scotland: improving preparedness and outbreak responses

Internationally recognised research work to improve contingency for the management of foot and mouth disease outbreaks has impacted on policy to help future-proof farming communities in Scotland and beyond.

Foot and mouth disease (FMD) is a highly infectious, notifiable viral disease that affects cloven-hoofed animals such as cattle, sheep and pigs. Outbreaks of FMD have significant economic, socio-economic, animal and human welfare consequences.

During the FMD outbreak in the UK in 2001, an estimated £3 billion was lost through the collapse of rural economies and tourism, due to lack of access to countryside for disease control purposes. Preparedness for future outbreaks is predicted to lead to substantial reductions in economic losses if the countryside can remain open for low-risk activities.

Professor George Gunn, and others at SRUC, are part of a multi-partner, multi-disciplinary research consortium that has been looking at FMD contingency planning. The research is funded by the Scottish Government's Centre of Expertise on Animal Disease Outbreaks, which has been known as Epidemiology, Population health and Infectious disease Control (EPIC) since 2006.

Veterinary risk assessments unveiled

In 2012, this research generated veterinary risk assessments (VRAs) to identify potential issues with specific animal movements during an outbreak. Movements to slaughterhouses, between Scottish islands, and for the purposes of collecting fallen stock were shown to present a low level of risk outside specific disease control zones.

FMD controls that restrict movements meant that animals could not be moved between fields when they had to cross roads or be moved to slaughterhouses. This meant during the 2001



outbreak that approximately one third of the six million animals culled were slaughtered for welfare reasons. The VRAs have provided a framework to ensure continued high standards of animal welfare during an outbreak.

The team also developed qualitative VRAs to look at the risks of 12 different recreational activities requiring access to the countryside, including walking, cycling, fishing, stalking deer and shooting birds, during an FMD outbreak. This helped to determine whether countryside closures were proportional to the risk.

The findings indicated that for most activities the likelihood of causing new outbreaks of FMD was 'medium' (occurs regularly) in the Protection Zone – a minimum radius of 3km, or more if necessary, from the infected premises. The likelihood was 'low' (rare but could occur) in the Surveillance Zone – a minimum radius of 10km from the infected premises – and 'very low' (very rare but cannot be excluded) in the Restriction Zone, which was defined as outside the Protection Zone and extending as far as

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necessary to prevent disease spread, if risk reduction measures were in place.

Higher-risk activities such as hunting, shooting, stalking, and equestrian events, particularly in locations at greatest risk were deemed to increase the risk of FMD spread.

Impact on government legislation: rural access policy

The VRAs developed were the first to provide a scientifically rigorous evidence base to refine FMD contingency planning and outbreak preparedness anywhere. The Scottish Government's Animal Health and Welfare Division (AHWD) used this evidence to underpin a change in rural access policy so that the countryside could remain open for business, with restrictions remaining only in the 'Protection Zone'.

This policy change resulted in a legislative amendment to the Land Reform (Scotland) Act (modification in December 2013) to allow closure of specific paths during an outbreak.

Research into vaccination in FMD control

The use of vaccination in FMD control is a potentially valuable tool, but its implementation remains a contentious issue.

EPIC's economic analyses, which incorporated restrictions on national and international markets and limitations in vaccine supply chains, indicated that maintaining a stock of 200,000 doses – sufficient to vaccinate 12% of the Scottish cattle population – would maximise the epidemiological and economic benefits of vaccination strategies without having to vaccinate the whole animal population. This would save an average of £49 million in direct and indirect costs compared with a scenario where no vaccination is used.



Since 2018, research has been used to inform plans on vaccine stocks after Brexit if the UK can no longer access the European vaccine bank. This knowledge could save an average of £490 million in direct and indirect costs in severe outbreaks if vaccination is implemented optimally and spare up to 950,000 animals from being culled.

Impact on FMD contingency planning

EPIC's VRAs, which are reviewed and updated every two years, have been incorporated into the UK's FMD contingency planning since they were signed off by the Outbreak Readiness Board and Animal Disease Policy Group in early 2013. Since then, EPIC's research has been key to overall UK decision-making for FMD outbreak preparedness and used as models for disease preparedness in all 27 EU countries, as well as Australia.

This is an edited version of an impact case study, which formed part of a joint submission with the University of Edinburgh to REF2021.