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Investigation of airborne foot-and-mouth disease virus transmission during low-wind conditions in the early phase of the UK 2001 epidemic

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Abstract. Foot-and-mouth disease (FMD) is a highly contagious viral disease of cloven-hoofed domesticated and wild animals. The highly contagious nature of FMD is a reflection of the wide range of host species, the enormous quantities of virus liberated by infected animals, the range of excretions and secretions which can be infectious, the stability of the virus in the environment, the multiplicity of routes of infection and the very small doses of the virus that can initiate infection.

One of the mechanisms of spread is the carriage of droplets and droplet nuclei exhaled in the breath of infected animals. Such spread can be rapid and extensive, and it is known in certain circumstances to have transmitted disease over a distance of several hundred kilometres.

During the 2001 FMD epidemic in the United Kingdom (UK), atmospheric dispersion models were applied in real time in order to assess the potential for atmospheric dispersion of the disease. The operational value of such modelling is primarily to identify premises which may have been exposed so that the human resources for surveillance and disease control purposes are employed most effectively.

The paper describes the combined modelling techniques and presents the results obtained of detailed analyses performed during the early stages of the UK 2001 epidemic.

This paper investigates the potential for disease spread in relation to two outbreaks (Burnside Farm, Heddon-on-the-Wall and Prestwick Hall Farm, Ponteland, Northumberland). A separate paper (Gloster et al., 2002) provides a more detailed analysis of the airborne disease transmission in the vicinity of Burnside Farm.

The combined results are consistent with airborne transmission of disease to livestock in the Heddon-on-the-Wall area. Local topography may have played a significant role in influencing the pattern of disease spread.

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