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Estimation of the airborne–spread of Foot–and–Mouth–Disease (FMD)-Virus

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As far as the dispersion of infectious diseases and epidemics is concerned, it is a matter of fact that such diseases cause enormous economic losses. Efficient control strategies in employment of modern epidemiological methods are contributions to minimise those losses. In this lecture a method to estimate the airborne-spread of viruses is introduced. It is part of a new decision-support tool for the National Veterinary Service that is directly responsible for executing FMD control measures.

The following data have been used: Geographical coordinates of farms, numbers of the animals and species, respectively. Assuming that the number of infected animals is known, the emission rate of FMD virus can be calculated for each farm. To estimate the airborne-spread of FMD virus, a Gaussian dispersion model has been implemented. For this Gaussian model meteorological parameters, such as wind speed and direction, temperature, relative humidity or atmospheric stability are considered. The result is the spatial and temporal distribution of the Infectious Doses in units of TCID50. Due to the knowledge of the Minimum Infectious Doses (MID) it is possible to estimate the species dependent risk of infection.