

# Assessing of the efficiency of different control strategies against Foot-and-mouth disease in Switzerland using a dynamic simulation model

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## Schlüsselwörter

FMD, InterSpread Plus, control strategies, depopulation, vaccination, resource capacity

## Problemstellung und Zielsetzung

The last FMD outbreak in the UK showed that the introduction of FMD poses a permanent threat to countries free from the disease despite of preventive measures. This introduction is also challenged in Switzerland given the intensive tourism and trade with FMD countries. – As was observed during the UK epidemic in 2001, there is a rather wide range of possible measures that can be applied to eradicate FMD. Besides the depopulation of infected holdings (IPs), the culling both of contiguous (CPs) and contact (CPs) herds can be implemented. In addition, the vaccination of susceptible animals may be considered.

The objective of this project is to assess the impact of depopulation of infected premises as well as epidemiologically linked holdings and neighbouring farms. Furthermore, the effect of both ring and mass vaccination in combination with culling of IPs only and additional pre-emptive culling of DCs and CPs is to be considered. On the basis of the output of the different scenarios recommendations in respect of control measures can be derived and eventually implemented in case of emergency.

## Material und Methoden

To achieve this goal, a computer simulation tool called InterSpread Plus was used to model the spread of FMD in different outbreak scenarios.

## Ergebnisse und Bedeutung

This work presents for the first time quantitative estimates for the epidemiological effects of control strategies, the duration of the time span between virus introduction and detection of the first case, and the capacity of the depopulation resource on the course of the simulated FMD epidemics in Switzerland. – Detection of disease within 14 days instead of 21 days was able to reduce the mean duration of the epidemic by half. Consequently, the mean size of the epidemic was reduced by a factor of 8.2 and the mean number of slaughtered animals decreased, as well. The evaluation of the effect of unlimited depopulation resources showed that the resource capacity is a very sensitive parameter. In densely populated livestock areas, the eradication of FMD with limited resources provided evidence that the application of the measures lined out in the current Swiss legislation were not sufficient. Instead, protective ring vaccination – as vaccination to live – proved to be the most effective control strategy in terms of size and duration of the epidemic as well as the number of animals culled. – Although this computer simulation model is a useful tool for comparing the influence of different control strategies on the course of the simulated FMD epidemics in peace times, the results have to be treated with caution: the epidemiological data on the virus and disease related parameters are specific for a certain viral strain.

## Publikationen, Poster und Präsentationen

- Bachmann, I. (2004) Assessing of the efficiency of different control strategies against Foot-and-mouth disease in Switzerland using a dynamic simulation model. Doctoral thesis, Veterinärmed. Fakultät, Universität Bern.
- Bachmann, I. (2004) Evaluation of the impact of different control strategies against FMD in Switzerland – a simulation approach. Poster Session at SVEPM 2004 Annual Conference, Martigny/Switzerland, March 04
- Bachmann, I. (2005) Assessing effectiveness of control strategies against foot and mouth disease in Switzerland using a dynamic simulation model. Oral presentation, SVEPM 2005 Annual Conference, Inverness, Scotland

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