



## Foot and mouth disease risk assessment in Mongolia—Local expertise to support national policy



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### ABSTRACT

To address weaknesses in the current foot and mouth disease (FMD) control system and to inform the formulation of a national control strategy, Mongolia conducted two separate risk assessments, one for the Eastern region which in the past has seen re-current introductions of infection, and one for the Western region, where freedom from disease had been demonstrated over several years until FMD was re-introduced in 2013. The risk assessment was conducted in three stages: first local experts developed entry, exposure and consequence pathways during separate workshops in both regions, then data was collected, compiled and analysed, and finally, during a second workshop local experts provided risk estimations for both regions and identified recommendations for risk management. Risk estimates for each pathway were individually recorded, which ensured that views of all experts were equally represented in the risk estimation and which allowed assessing possible impact of different factors related to the background of participating local experts on risk estimates. Entry risk pathways with highest risk estimates were related to livestock movements and in the consequence assessment due to direct contacts. Uncertainty, for which disagreement between participants acted as a proxy, was high in entry pathways and in the assessment of effectiveness of control measures.

The risk assessment was conducted with local experts who had no previous risk assessment experience. Through their involvement in the whole process however, they assumed a high level of ownership and despite lively discussions for some risk pathways, a high level of agreement was achieved and credible results were communicated to decision makers. Especially valuable were the derived recommendations. Through the risk assessment the local experts gained a thorough understanding of the FMD risk which resulted in sensible and realistic recommendations, which, if implemented, can lead to a sustainable strengthening of the Mongolian capacities to prevent, control and eradicate FMD. The process was underlined by extensive field data collection, which helped to address important data gaps and therefore to improve quality and reliability of findings. The Mongolian veterinary authority was very committed to the risk assessment and several recommendations have already been integrated in the revision of the national FMD strategy.

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## 1. Introduction

Foot and mouth disease (FMD) is a highly infectious viral disease causing huge economic impact in affected areas worldwide (Knight-Jones and Rushton, 2013). Costs are mainly associated to control efforts, direct losses in productivity in infected animals and resulting trade restrictions (James and Rushton, 2002). In areas where FMD is not endemic, FMD prevention is therefore a cost-effective method to secure or maintain international trade potential and to avoid economic losses due to control costs and reduced livestock productivity. Indeed FMD is an important trade barrier as FMD-free countries aim to protect their status through rigorous import regulations (Rweyemamu and Astudillo, 2002; Paton et al., 2009).

Mongolia is a large country with a nomadic livestock production system with a large FMD susceptible population consisting of around 20 mio sheep, 19 mio goats, 3 mio cattle and very few pigs (National Statistical Office of Mongolia, 2013). Given the importance of the livestock sector, Mongolia has made great efforts to control FMD. Nevertheless, virus introduction remains a constant threat because in both neighbouring countries, Russia and China, outbreaks have been reported regularly over the last years (OIE World Organisation for Animal Health, 2014). From 2000 to 2010 eight outbreaks occurred in Mongolia, mainly in the Eastern part of the country, but the disease never seemed to have become endemic. No outbreaks were reported from December 2010 until summer 2013. Since a major outbreak in 2010 in the Eastern part of the country, semi-annual vaccination with a purified vaccine combined with annual semi-monitoring for non-structural protein has been in place in this region. These monitoring activities provided evidence against on-going spread, and thus confirmed the hypothesis that FMD is not endemic in Mongolia. However, the sheer length of the borders hampers effective border control, facilitating new introductions. In the Western part of the country, freedom from infection was demonstrated thanks to continued risk-based surveillance following OIE guidelines until FMD occurred in summer 2013. This outbreak was contained within two months with movement control, modified stamping out and emergency vaccination. In the Eastern part of the country outbreaks also occurred more recently: a single site outbreak in September 2013 was contained within a few weeks, and a more extensive outbreak lasted from January to March 2014 and affected districts of four different provinces. Typing of FMD virus strains involved in these recent outbreaks attributed each of them to a new introduction into Mongolia rather than to continuous spread (Anon., 2014). These findings are in line with experiences made elsewhere which showed that outbreaks tend not to re-emerge in populations where appropriate emergency vaccination had been applied (Sutmoller et al., 2003). Further the relatively low livestock densities favour control if movement control can be adequately implemented. A study following the 2010 outbreak confirmed lack of evidence of high transmission rates between herds, but given long distance spread, the need to better understand the role of gazelles, livestock, animal product and fomite movements was highlighted (McFadden et al., 2014).

In 2012, the Mongolian veterinary authority embarked on a process to achieve sustainable strengthening of its capacities to prevent, control and eradicate FMD, a process which has been supported by the Animal Health project of the Swiss Agency for Development and Cooperation. In a first step, the veterinary authority developed a national FMD strategy, which called for the implementation of risk assessment to gain better understanding of the mechanisms for introduction and spread of FMD in Mongolia. Aims of the risk assessment were to identify strengths and weaknesses of the existing system and to provide recommendations to the veterinary authority about where to focus its limited resources in order to achieve the biggest positive impact on FMD prevention, control and eradication. In addition to using findings as a tool to inform policy makers, the risk assessments were also used as an opportunity to build local capacity. Therefore, strong involvement of veterinarians with local knowledge, who in the past had been involved in FMD control activities, was essential in the definition of the risk pathways, data collection, risk estimation and in formulation of the recommendations. To account for the different epidemiological situations, two separate qualitative risk assessments focusing on the Western and the Eastern region were conducted.

Data availability and data quality on herd networks and presence of FMD risk factors in Mongolia is poor, which leads to high uncertainties in risk assessments. In data scarce environments, such as often encountered in developing countries, qualitative risk assessments proved more useful and reliable than quantitative approaches (Heim et al., 2006; Dufour et al., 2011; Wieland et al., 2011).

This paper presents a method of implementation of a risk assessment to inform policy-making in the context of a developing country with poor data availability and data quality.

## 2. Material and methods

### 2.1. Risk assessment

The risk assessment was conducted following the guidelines of the World Organisation for Animal Health (OIE) and distinguished entry, exposure and consequence assessment (OIE World Organisation for Animal Health, 2012).

The group of risk assessors consisted of 30 participants which were official veterinarians at province and district level, private veterinarians, border inspectors, and provincial laboratory staff from the Eastern and Western region. The authors acted as facilitators in the risk assessment workshops, and coordinated data collection and analysis. They were however not involved in the risk estimation.

During separate workshops held in the Eastern and Western region in April/May 2013, risk pathways were developed. For the entry assessment, the various pathways through which FMD virus could cross the Mongolian border were outlined and key events for each pathway were identified. The pathways for the exposure assessment described how FMD virus could get in contact with susceptible livestock or wildlife once introduced into Mongolia. This was followed by assessing the probability of infection of the first herd. Finally, for the consequence assessment, pathways

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