

Risk Assessment for the Transmission of Foot-and-Mouth Disease via the Transport of Raw Milk Into, Within, and Outside of a Control Area during an Outbreak (Baseline)

Executive Summary

In the event of a foot-and-mouth disease (FMD) outbreak in the United States, local, State, and federal authorities will implement a foreign animal disease emergency response, including restricting movement of animals and animal products. During such an outbreak, managed movement requests—including those for raw milk movement—must be supported by risk assessments that demonstrate the risk of FMD virus (FMDv) spread associated with the movements are acceptable. Proactive risk assessments are performed prior to outbreaks to improve the timeliness of emergency response and movement permitting decisions. This risk assessment is a part of the Secure Milk Supply (SMS) plan that has been developed to support continuity of markets in the dairy industry in the event of an outbreak.

This document is a proactive assessment of the risk that the movement of raw milk from a Grade “A” dairy cattle farm to processing into, within, and outside of a control area during an FMD outbreak in the United States will result in infection of susceptible animals on other premises. This risk assessment is a joint effort between the University of Minnesota, Center for Animal Health and Food Safety, and the USDA. The baseline risk assessment considers standard practices for production of Grade “A” milk in the United States and serves as a framework for: 1) evaluation of current production practices; 2) evaluation of mitigation measures; and 3) supporting decision making during implementation of a managed movement system. At the time of writing this risk assessment, there are no specific mitigation measures that will be uniformly applied within the U.S. dairy industry during an FMD outbreak, which will allow for managed movement of animals, milk, or other products.

This assessment evaluates the pathways and risk of FMDv spread associated with: 1) movement of raw milk from dairy farms producing Grade “A” milk to processing, and 2) activities associated with the movement of raw milk from farm to processing. The pathway analysis addressed how FMDv contaminated materials (raw milk and environmental media) could contaminate the hauler, tanker, and equipment while on an infected but undetected farm, leave the farm through the transport of raw milk and result in entry and deposition of FMDv contaminated materials on a susceptible farm. Current standard industry practices were considered as well as relevant current industry regulations stipulated by the PMO and States.

An on-farm disease spread model was designed and implemented and the outputs coupled with a stochastic model to estimate the quantity of virus that may be produced in milk by dairy cattle in the early stages of an outbreak, when cattle are infected and shedding virus, but have not been detected (preclinically infected). The model indicates that over 60 percent of the herd will be infectious (preclinical and clinical) by the time disease is detected on day 5 to 6 post-infection. The virus titer in both raw milk and environmental media at the time of disease detection will pose a significant risk to cattle via inhalation routes of exposure.

Key Results

The key results of this assessment are summarized below. The estimated likelihood of:

- bioaerosols emanating from a tanker and spreading infectious virus through milk collection and transport activities is estimated as low to very low.
- hauler and truck cab contamination by spilled milk at an infected but undetected farm is moderate to high.
- external tanker, storage compartments, and transfer hose contamination by spilled milk at an infected but undetected farm is moderate to high.
- virus present in milk residues left within the tanker, that has not received CIP, will result in release of virus on an uninfected farm is negligible to low.
- that viable virus will remain in the tanker after undergoing the CIP process and result in release of virus on an uninfected farm is negligible.
- direct release of virus via milk spillage from the transfer hose on an uninfected farm is moderate to high.
- direct release of virus from spilled milk contamination of the external tanker surfaces or hauler's clothing, boots, or hands is moderate to high.
- accidental milk spillage resulting in cross-contamination of a person, vehicle, or farm from travel on common roadways or other stops is low.
- the hauler and cab being contaminated by environmental media is moderate to high.
- external tanker contamination (including storage compartments and transfer hose) by environmental media is moderate to high.
- direct release of environmental media contamination from external surfaces of the tanker and hauler's clothing, boots, and hands on an uninfected farm is moderate to high.
- cross-contamination of people, vehicles, or farms via deposition of environmental media on common roads and other surfaces from external contamination of the tanker and hauler is moderate to high.

Conclusion

The risk that the movement of raw milk from a Grade "A" dairy cattle farm to processing into, within, and outside of a control area during an FMD outbreak in the United States will result in infection of susceptible animals on other premises is moderate to high. This is based on the estimated concentrations of virus in contaminated milk and environmental media that markedly exceed the minimum infectious doses for inhalation exposure in cattle, and the pathway evaluations which indicated moderate to high likelihood for transferring infectious virus via tanker activities and milk movement.

For Complete Proactive Risk Assessment Document:

<http://conservancy.umn.edu/handle/11299/176193>