Alternative Control Strategies with Uncertain Trade Barriers for Foot-and-Mouth Disease in Feedlot Operations

Amy D. Hagerman  
USDA-APHIS-VS-STAS-CEAH  
Epidemiologic & Economic Modeling  
Fort Collins, CO 80526  
Email: amy.d.hagerman@aphis.usda.gov

Amy H. Delgado  
USDA-APHIS-VS-STAS-CEAH  
Epidemiologic & Economic Modeling  
Fort Collins, CO 80526  
Email: amy.h.delgado@aphis.usda.gov

Melissa Schoenbaum  
USDA-APHIS-VS-STAS-CEAH  
Epidemiologic & Economic Modeling  
Fort Collins, CO 80526  
Email: melissa.schoenbaum@aphis.usda.gov

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BACKGROUND

The depopulation and disposal of large numbers of cattle poses difficult challenges for environmental management and resource requirements. Although the morbidity rate for FMD is high, the mortality rate in adult animals is low, meaning that many animals will recover following infection.

Alternative methods are needed for minimizing disease spread while allowing high value fed beef cattle to reach their intended purpose.

OBJECTIVES

We informed FMD response strategy planning with an aim to enhance cattle industry business continuity in the aftermath of FMD. This was accomplished as follows:

- We examined the epidemic consequences of allowing FMD infected feedlot cattle to recover on site and move to controlled slaughter.
- We estimated the levels of trade sanctions that could be tolerated under different levels of risk aversion in order to gain the benefits of controlled slaughter.

APPROACH

Part 1: Epidemiologic Modeling:

- North American Animal Disease Simulation Model (NAADSM) version 3.2.19
- The animal population covered Arkansas, Colorado, Kansas, Louisiana, New Mexico, Ohio, and Texas.
- 12 types of farms, including 5 different sizes of feedlots.

Part 2: National, quarterly partial equilibrium model

- Simulates the effect of supply shocks from NAADSM, domestic demand shocks, and trade shocks (Paarlberg et al. 2008).
- 33 livestock categories and 11 final products (7 animal products and 4 grains) as well as intermediate input demand.

Business Continuity: describes the processes and procedures an organization puts in place to ensure that essential functions can continue during and after a disaster.

REFERENCES


RESULTS

- Outbreak characteristics (1000 runs)
- Outbreak characteristics (1000 runs)

CONCLUSIONS

- Epidemic modeling suggests that alternative control strategies for feedlots do not increase the severity of an outbreak, assuming adequate biosecurity. Feedlots will need strong biosecurity in order to allow for feed delivery and routine animal care.
- Alternative control strategies may increase the odds of a longer outbreak duration by 1 week or more.
- Under the baseline scenario, for the 95th percentile outbreak, it would take 19,000 man hours to depopulate, dispose of animal carcasses, and disinfect the feedlot. The alternatives using controlled slaughter would require less man power for response, assuming markets can be identified for the meat, but require a large number of trucks and slaughter capacity.
- Economic modeling results suggest that alternative control strategies for feedlots do not significantly increase or decrease producer welfare losses over the course of 12 quarters.
- Larger than normal supplies of cattle entering the supply chain due to controlled slaughter would exacerbate steer price declines since depopulation’s effect on supply helps offset trade losses.
- The results in this May 2015 draft of the poster represent preliminary results that will be updated prior to the 2015 AAEA meetings.

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For more information:
amy.d.hagerman@aphis.usda.gov or amy.h.delgado@aphis.usda.gov