



Projected Economic Impacts of a Foot and Mouth Disease (FMD) Outbreak in Tennessee

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Background

- Foot and Mouth Disease (FMD) is a highly contagious virus in hoofed animals (for example, beef and dairy cattle).
- Animals have a sudden rise in temperature, followed by blisters in the mouth and other areas of tender skin, including the skin around the hooves. The animal can become lame, consumes less feed, and, in young animals, death may occur.
- The U.S. has not had a case since 1929. However, the incidence of FMD in Europe has heightened concerns for U.S. herds.
- Costs arise from control and eradication and closure of markets to these products. Any outbreak would result in a national halt of exports for one year.
- It is U.S. policy to destroy infected and exposed animals. Vaccination is not considered a viable option at the current time.

If FMD were to occur in Tennessee, the effects on the livestock industry could be devastating. The value of industry output would decline due to animals that had to be destroyed. Industry output value would also be lost due to a poor market for animals not destroyed. In addition, animal disposal costs would be incurred for animals destroyed. Estimates are that animal disposal costs are around \$.10 per pound of mortality (University of Nebraska). These costs include use of earth-moving equipment and labor. In addition to industry output losses and disposal costs, a decline in tourism would likely occur. The British Tourist Authority has estimated a 10% annual loss in tourism due to FMD. Tourists may be deterred by quarantine measures and fears of spreading the disease to U.S. herds. Other costs include the costs of enforcing the quarantine.

Measuring the Economic Impacts

- The economic effects of a potential FMD outbreak under various scenarios are explored. Depopulation rate scenarios examined are 50%, 25%, and 10%. A 10% decline in tourism is also assumed.
- Using TN-AIM (an IMPLAN based input-output model for the Tennessee economy), industry output of the sectors for dairy farm products, ranch fed cattle, range fed cattle, and hogs are decreased by 50%, 25%, and 10% to simulate depopulation.
- Because the market for the remaining animals would be stagnant during the period of the quarantine of six months (a projected 30% price

The **TN-AIM** IMPLAN based model describes the transfer of money between industries and institutions and contains both market-based and non-market financial flows, such as inter-institutional transfers. When total sales of a particular industry sector are expected to change, three types of impacts economy wide are measured: Direct, Indirect and Induced effects.

- **Direct effects**-the immediate effects associated with the change in the final demand for a particular industry.
- **Indirect effects**-secondary effects or production changes in backward-linked industries caused when inputs needs change due to the impact of directly affected industry.
- **Induced effects**-response by all local industries caused by increased expenditures of new household income and inter-institutional transfers generated from the direct and indirect effects of the change in final demand for a specific industry.
- **Total effects=direct + indirect + induced**

decline), the balance of industry output in these sectors after depopulation is decreased by 50% *.30 or 15%.

- The number of animals disposed of is multiplied by average weight and the disposal costs per pound (\$.10) to arrive at a total cost of disposal. These costs are then allocated across the relevant sectors. Quarantine costs are those of maintaining quarantine checkpoints, including labor and disinfectant. The Commodity Credit Corporation has funds (\$10 million) to compensate for certain costs associated with the quarantine.¹ These are accounted for in the analysis.
- In addition, the sectors representing those where tourists expend money are impacted by a 10% decline. These sectors include hotels and lodging places (18.4% of total expenditures), eating and drinking establishments (31.5%), service stations (14.3%), amusement and recreation services (10.8%), local interurban passenger transit (12.8%), and general merchandise stores (12.2%) (Tourism Development).

Results

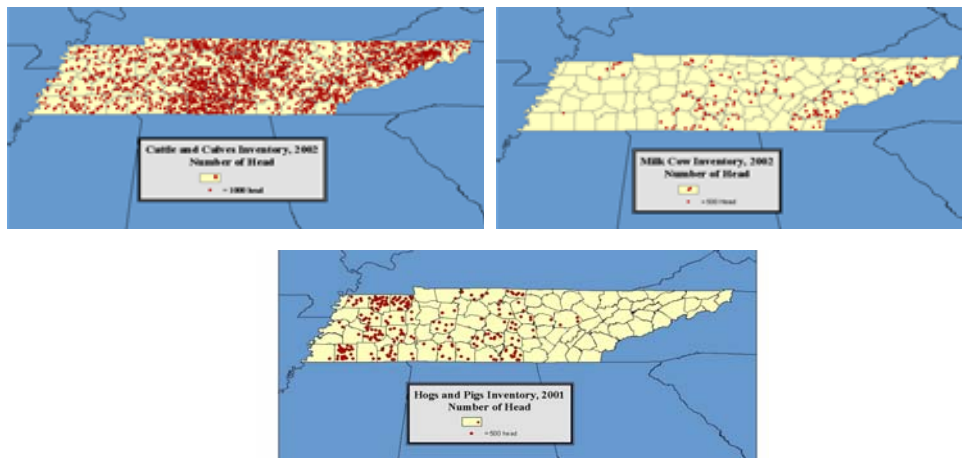
With a 10% outbreak, the projected direct impacts are estimated at \$136 million in losses to industry output and over 6,000 jobs lost. When the direct effects are combined with effects from decreased purchases from supplying industries and service providers and effects from fewer expenditures with income losses, the total economic losses are estimated at \$275.1 million in industry output and 9,403 jobs. As can be seen, these effects multiply with larger outbreaks. Under a 50% outbreak, the direct losses expand to \$357.5 million in industry output and 16,853 jobs, while the total economic losses expand to \$649.9 million in industry output and 25,364 jobs.

Projected Statewide Economic Impacts of FMD Outbreaks of Varying Severity.

	Total Industry Output		Employment	
	Direct Effects	Total Effects	Direct Effects	Total Effects
10% Outbreak	-\$136.0 million	\$-275.1 million	-6,007	-9,403
25% Outbreak	-\$219.1 million	\$-433.8 million	-10,074	-15,388
50% Outbreak	-\$357.5 million	\$-694.9 million	-16,853	-25,364

Areas of Impact

As shown in the maps below, cattle and calves inventory exist throughout Tennessee. However, middle Tennessee and upper East Tennessee are inventory centers.² Dairy cattle inventories occur primarily in Middle and East Tennessee. Hogs and pigs inventories exist primarily in West and Middle Tennessee. The impacts of FMD on the livestock sector would likely be greatest in Middle Tennessee.



¹ The USDA has the authority to pay up to 100% of the expenses of the purchase, destruction, and disposition of animals and materials required to be destroyed.

² For example, if the following Middle Tennessee counties were impacted, this would represent about 18% of the state's beef cattle herd: Bedford, Giles, Lincoln, Marshall, Maury, Moore, Rutherford, and Williamson.