CHOICES
The magazine of food, farm, and resource issues
2nd Quarter 2005 • 20(2)
A publication of the American Agricultural Economics Association

The Response to BSE in the United States

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Since the emergence of bovine spongiform encephalopathy (BSE) in the United Kingdom in the late 1980s, the United States has implemented various measures to prevent the disease from entering the country, to prevent its spread if discovered here, and to safeguard human health. Regulatory actions included import restrictions, a ban on certain ruminant tissues in ruminant feed, and a surveillance program. Additional measures, aimed at reassuring domestic and foreign consumers about the safety of US beef, were implemented following the December 23, 2003 announcement that a dairy cow in Washington State had tested positive for BSE. In the sections that follow, we discuss the US response to BSE under three broad categories—trade policy, food and feed restrictions, and surveillance. Our analysis focuses on the costs associated with various regulatory actions and less so on potential benefits that are more difficult to quantify.

Trade Policy

Following the announcement of the first US case, 53 countries, including major markets such as Japan, Mexico, South Korea, and Canada, banned imports of US cattle and beef products. This came as no surprise—automatic border closure following such announcements had become standard procedure. The United States itself blocked imports of Canadian beef and cattle following the announcement of the first Canadian case in May 2003.

Border closure in response to a very low BSE incidence in an exporting country is not endorsed by the World Organization for Animal Health (OIE), particularly when control measures are in place. Moreover, although the United States itself had not adhered to OIE guidance on trade, the United States Department of Agriculture (USDA) did initiate regulations to allow imports from countries, specifically Canada, that presented a "minimal risk" of introducing BSE. This minimal risk region (MRR) rule that would reopen the border to imports of Canadian cattle less than 30 months old was to become effective March 7, 2005. However, in response to a motion filed by the Ranchers-Cattlemen Action Legal Fund (R-CALF), a federal court in Montana granted a preliminary injunction blocking the measure. A hearing to determine whether a permanent injunction should be granted is scheduled for July 27, 2005.

The controversy surrounding the reopening of the Canadian border illustrates the potential gains and losses from any change in trade policy. Although R-CALF may indeed be concerned about the human health risk from Canadian cattle (though some might doubt it), it is clear that US cattle producers, particularly those in the northwestern US, would lose from import competition in the short run. Marsh, Brester, and Smith (2005) estimate that Canadian imports would reduce US feeder cattle prices by $4.57/cwt. However, in the long run, if adequate cattle supplies are not available locally to keep US packing plants in the region open, producers in the Northwest will lose local cattle markets. Similarly, US producers are losing from the current restrictions on US exports. In 2003, beef exports were valued at $3.95 billion and accounted for 9.6% of US commercial production. Although some important markets, including Mexico and Canada, did partially reopen during 2004, exports for the year were 82% below 2003. Coffey, Mintert, Fox, Schroeder, and Valentin (2005), in an analysis performed for the Kansas Department of Agriculture, suggest that US beef industry losses from export restrictions during 2004 ranged from $3.2 billion to $4.7 billion.

The question we might ask here is whether these trade disruptions and associated welfare losses could have been avoided. Caswell and Sparling (in press) emphasize the importance of an internationally coordinated response to managing risks from diseases such as BSE, and Caswell (in press) argues that the potential trade impacts of BSE discovery were not sufficiently weighted in the BSE risk management process. Thus, if MRR legislation had been enacted prior to the recent discoveries of BSE outside of

Europe, we may never have banned imports of Japanese beef when they discovered their first case in September 2001, nor vice versa. Of course, with the benefit of hindsight, it is easy to point out what might have been. Nevertheless, both Canada and the United States had been warned by the European Union in July 2000 that they were at risk for discovering the disease (Scientific Steering Committee, 2000).

Surveillance

In 2003, the USDA tested approximately 20,000 cattle for BSE. Countries in which the disease is established have more intensive surveillance—for example, the EU has tested around 8 million head per year since 2001 (Fox & Peterson, 2004). Following the Washington State case, the USDA announced a one-year enhanced surveillance program. The objective was to test as many cattle as possible from high-risk categories—those exhibiting signs of central nervous system disorders, nonambulatory cattle, and those that die on farms—in addition to a random sample of healthy older animals. In various news releases, the USDA stated that a sample size of 268,000 animals would allow for the detection of BSE at a rate of one positive in 10 million adult cattle with a 99% confidence level. That claim, however, is based on the assumption that all cases occur in the targeted high-risk group and that the incidence in nontargeted categories is zero. As of April 2005, 314,000 cattle had been tested under the new protocol with no positive cases identified. Table 1 provides an excerpt from the test results.

The surveillance program has been a source of controversy in areas related to testing protocol, announcement of inconclusive results, and an incident in Texas in May 2004 in which an animal exhibiting central nervous system symptoms was not tested for the disease. Inconclusive (or false positive) test results are expected with the Bio-Rad rapid screening test used by USDA. The false positive rate is variously estimated at between one in 50,000 to as little as one in 300,000 tests. Thus far, the USDA has announced three inconclusive results—two in June 2004 and one in November 2004—all of which, upon confirmatory testing using immunohistochemistry (IHC), were found to be negative. The initial announcements of inconclusive cases were controversial and led the Animal and Plant Health Inspection Service (APHIS) to revise their announcement procedure—delaying announcement until a sample produced two inconclusive results with the rapid test. Concern about potential market disruption due to false positives is one reason cited by opponents of wider scale or voluntary testing. For example, following the announcement of the third inconclusive test result on the morning of November 18, 2004, most live cattle futures contracts opened around $2/cwt lower than the previous day's close, and many moved limit down that day. Very light sales in the cash market in the following days were likely the short-run cash market reaction to the news.

At the same time, there has been speculation that the USDA deliberately chose a test with a relatively high rate of inconclusive results as a means of desensitizing markets to the possible discovery of true positive cases (Mitchell, 2004). Also controversial is the USDA's choice of IHC as their "gold standard" test. In February 2005, Consumers Union called on the USDA to retest inconclusive samples using the Western Blot test, which, they argued, was more sensitive and more objective. According to the Consumers Union, the Western Blot test is used as the confirmatory test in Japan and Europe and had been used previously by the USDA to confirm the December 2003 Washington State case. (See Pruisner, 2004, for more information on BSE testing.)

The future of the surveillance program has not yet been decided. Industry officials have called for it to be scaled back. Not surprisingly, some consumer advocacy groups favor wider scale testing. For example, a March 16, 2005 editorial in *The New York Times* proposed that "the only responsible way to resume international trade in beef is to ensure the health of the cattle. And the only way to do that is to test the cattle—all of them, if need be."

In what turned out to be a particularly thorny issue for the USDA, in July 2004 the agency denied an application by a small Kansas beef processor, Creekstone Farms, for permission to voluntarily test slaughter cattle in an attempt to regain access to the Japanese export market. The beef industry is sharply divided on the issue of voluntary testing. Proponents tend to view it in terms of a marketing decision with expected benefits outweighing costs, at least in the short run. Indeed, our analysis for the Kansas Department of Agriculture (Coffey et al., 2005) suggests a potential net benefit ranging from $27.50 to $48.50 per head (before fixed costs) if voluntary testing restored full access to the Japanese and South Korean markets. Opponents argue that BSE testing is unnecessary and costly, that it sets a dangerous precedent in terms of acquiescing to an unreasonable customer demand, and that it is not scientifically valid and provides no risk-

reduction benefit to consumers. Large US meat processor stances regarding BSE testing suggest that the investments and logistics of large-scale testing, in addition to the potential impact on demand of a positive case, are such that it is a losing proposition for bigger firms—perhaps in particular for those diversified either internationally or across meat products. For a single small firm, on the other hand—especially one more heavily reliant on export sales to high-quality foreign markets than the major packers—the situation is different. If voluntary testing provided export market access, it could produce substantial monopoly-type benefits in the short run. Creekstone officials have stated that their increased revenue from regaining access to the Japanese market would far exceed the testing cost of $20 or less per head. Thus, for Creekstone, the private incentive to pursue testing was fairly clear. It is worth noting however, that this scenario would produce no benefit for producers, because increased demand from a single small firm would have a negligible impact on cattle prices. However, if testing did provide market access, more firms would be attracted to testing, and domestic cattle prices would increase.

Finally, regarding the current surveillance effort, it is not yet clear how successful the USDA has been in its efforts to sample the targeted high-risk groups. The APHIS website provides no breakdown of samples by animal categories (Table 1), in contrast to the UK, where detailed breakdowns for various risk categories in the active surveillance programs are provided (Table 2). Clearly, no one associated with the US beef industry wants to find this disease. However, the perception that officials may have latitude in terms of sample selection, rumors about animals not sampled, and allegations by at least one former USDA employee about the mishandling of potentially positive test samples, does not help engender confidence among foreign buyers or policy decision makers. Critics have commented that Germany did not begin to find BSE until it allowed private testing. If the disease is truly not present in the US herd, then the industry has little to fear from allowing expanded private testing. However, what are the odds that the surveillance program in place during 2003 managed to detect the only BSE-infected cow in a herd of 100 million?

Table 1. Excerpts from the USDA's BSE test results report.

Date	Negative	Inconclusive	Inconclusive result	Positive	Total
Week 45 (4/4/05–4/10/05)	9,138	0	—	0	9,138
Week 44 (3/28/05–4/3/05)	10,663	0	—	0	10,663
Week 25 (11/15/04–11/21/04)	7,900	1	Negative	0	7,901

Note. Data from USDA Animal and Plant Health Inspection Service (2005).

Table 2. Excerpts from the UK BSE test results report—2005.

Ongoing surveys (cattle)	Tested	Results pending	BSE not confirmed	BSE confirmed
Fallen stock	18,574	3	18,558	13
Casualties on farm	30,825	11	30,788	26
Casualties at OTMS abattoirs	3,165	0	3,164	1
24–30 month casualty cattle at fresh meat abattoirs	211	0	211	0
Over thirty months (OTM) scheme—random animals (born before August 1996) (before feed ban)	2420	0	2417	3
OTM scheme—animals born after July 1997	28,613	0	28,613	0
Animals sampled as 96/97 cohort (excluding fallen stock, casualties, etc.)	26,726	0	26,726	0
Birth cohorts of BSE cases	380	0	380	0
BSE offspring	43	0	43	0
Animals slaughtered for human consumption: OTM (beef assurance scheme)	22	0	22	0

Note. Data from Defra UK (2005).

Food and Feed Restrictions

In January 2004, the Food Safety Inspection Service (FSIS) banned nonambulatory animals and certain tissues designated as specified risk material (SRM) from the human food supply. The new regulations require firms to age animals using postmortem dentition, to deal with nonambulatory animals, and to segregate SRM material. Using data from a survey of meat processors, Coffey et al. (2005) estimated the

additional labor costs of these tasks at approximately $0.45 per head of plant capacity.

As currently defined, SRM includes the brain, skull, eyes, trigeminal ganglia, dorsal root ganglia, spinal cord, and vertebral column from cattle 30 months of age and older, and the tonsils and the distal ileum of all cattle. In order to ensure complete removal of the distal ileum, the rules required that the entire small intestine be disposed of as inedible. The small intestine rule has been the most controversial aspect of the SRM regulation because for some firms it was a valuable by-product, particularly in some export markets. Coffey et al. (2005) estimated that on average, firms that previously sold small intestines were losing from $3.23 to $4.13 per head because of the rule. Other products condemned as a result of BSE regulations include bone-in cuts from over-thirty-month (OTM) animals that contain vertebral column (i.e., T-bone steaks) and product obtained from advanced meat recovery (AMR) using OTM vertebral columns. Coffey et al. (2005) estimated that restrictions on bone-in cuts and AMR reduce per-head revenues by approximately $8.50 and $9.36, respectively, on affected OTM animals, while the ban on nonambulatory (downer) cattle resulted in an aggregate loss of approximately $63 million.

On February 2, 2004, a panel of experts (the International Review Team or IRT) commissioned by the USDA provided recommendations for future actions for managing BSE risk. With regard to feed regulations, the IRT recommended that (a) unless aggressive surveillance showed BSE risk to be minimal, SRM should include the brains and spinal cords of all animals over 12 months and the entire intestine of all animals; (b) SRM should be excluded from all animal feed including pet food; and (c) all meat and bone meal (MBM), including avian, be excluded from ruminant feed. Earlier, on January 26, the Food and Drug Administration (FDA) announced plans to strengthen the ruminant feed ban that had been in place since 1997. In particular, the FDA said it would eliminate exemptions for bovine blood and plate waste and ban the feeding of poultry litter. In July 2004, the FDA published an Advance Notice of Proposed Rulemaking (ANPR) with an invitation to comment on several aspects of the ruminant feed ban, including the recommendations of the IRT. The comment period for this notice ended on September 13, 2004, but as of April 2005, the FDA had not implemented any of its proposed actions, and the exemptions for plate waste and bovine blood products in the 1997 feed ban remained in place.

Additional restrictions on SRM or ruminant feed would hurt the cattle sector by eliminating markets for certain products or increasing feed costs. Ruminant blood meal, for example, is widely used in cattle feed, particularly for dairy cows and in milk replacement rations for calves. When FDA announced plans to eliminate the blood exemption, the values of ruminant and porcine blood meal, which had been similar, diverged. During 2004, ruminant blood meal traded at an average discount of $250 per ton compared to the porcine product. Coffey et al. (2005) estimated that if the blood exemption were eliminated, the value of ruminant blood meal would fall by an additional $225 per ton, resulting in a combined loss of approximately $1.43 for an average steer. Similarly, the cost of banning currently defined SRM from all animal feed was estimated at $2.16 per head, and if the SRM definition were extended (as recommended by the IRT), the cost would be $6.77 per head.

If additional cases of BSE are found in the United States, it seems likely that some of the changes proposed by the FDA will become law. The benefits of implementing those measures are more difficult to quantify than their costs. The Harvard/Tuskegee risk analysis (Cohen et al., 2001) estimated that a ban on SRM in both human and animal feed would reduce the predicted number of BSE cases (in the event it is present) by 80% and the potential human exposure by 95%. However, the baseline level of exposure is so low that further reductions appear to have minimal value. As testing technologies develop and testing costs fall, it may be more efficient to test animals for the disease instead of condemning their products. Testing, even at current prices, appears preferable to a total ban on feeding any ruminant derived proteins to animals—a measure currently in place in the EU and Japan. Coffey et al. (2005) estimated the cost of such a ban at $14.00 per head in lost revenue plus $4.50 per head in additional feed costs. However, for reasons that are not clear to us, the testing option is not currently applied to nonambulatory animals—even in cases in which an animal sustains an injury in transport.

Conclusions

Although the US response to BSE can be critiqued in some areas, the overall response appears to be far more efficient than, for example, that of Japan, which removed all cattle over 30 months from the food chain, instituted universal BSE testing, and banned meat and bone meal for all

uses. US policy makers appear to have considered the costs and benefits of various approaches and recognized that the risk to human health is extremely low.

How low is the risk? In the United Kingdom, the human version of BSE has claimed around 150 victims. However, they have had more than 180,000 BSE infected cows, most of which were found before the connection to human disease was recognized. Estimates of the total number of animals infected in the United Kingdom run to as high as two million. Had Canadian and US authorities taken no precautions to eliminate SRM tissues from food, four Canadian BSE cases might have led to 0.004 human cases in the next 10–15 years. The human health risk from BSE is probably far lower than the risk of choking on a toothbrush. Thus, to suggest, as did Judge Richard Cebull in granting the injunction blocking imports of Canadian cattle, that BSE poses a "genuine risk of death for US customers" is a complete distortion of the concept of what is really risky.

Beef, like any other food, is not and never can be 100% risk free. However, today's salient risk is not mad cow disease. Instead, it is the more familiar bacterial pathogens like *Salmonella* and *E. coli,* the incidences of which have dropped significantly in recent years. By refusing to implement drastic measures in response to a virtually nonexistent threat, policy makers may foster a more rational perception of the risk associated with the disease. Not permitting voluntary testing of young animals, because it provides no useful information for consumers, could well be viewed as part of that strategy. The wider impact of such a measured response may be one of enhancing the overall stability of food demand and making it less responsive to food scares that occur from time to time.

For More Information

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