Mad Cow Disease: Agriculture Issues

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Summary

Mad cow disease causes brain degeneration and death in cattle, It has been linked to the deaths of nearly 100 people in Great Britain who consumed meat from infected animals. BSE (bovine spongiform encephalopathy) has not been found in the United States since federal and state agencies began surveillance in 1989. The cattle industry is the largest sector of U.S. agriculture (beef and dairy production were valued at $3 1 billion in 1999), and if BSE were found in U. S. cattle, losses to the sector from declining meat sales and exports, and from mandatory herd depopulation, could severely harm the economic health of US. agriculture as a whole. This report describes: (1) Europe's measures to stop the spread of the disease; (2) actions that U.S. Department of Agriculture (USDA) regulatory agencies are taking to control the known sources of risk; and, (3) the emergency response plan that USDA would implement if a case of BSE were confirmed. The report will be updated as events warrant.

What is mad cow disease (BSE)?

Bovine spongiform encephalopathy (BSE), widely referred to as mad cow disease, is a degenerative disease affecting the nervous system in cattle. The disease was first found in Great Britain in 1986. The infective agent is not completely known, but evidence suggests that a "proteinaccous infectious particle" or 'prion' is the causal agent. Prions are fairly new to science, and their importance was not recognized until the early 1980's. To date, there is no treatment or vaccine to prevent the disease. BSE is believed to be transmitted when proteins from an infected animal are fed to cattle. Transmission between animals has not been observed, but there is some evidence of mother-to-calf infection through gestation. Most BSE-like diseases have incubation periods that span years or even decades (average incubation for BSE symptoms is 2 to 8 years). All affected animals die.

Has BSE been found in the United States?

BSE has not been found in the United States. Since federal and state agencies began surveillance in 1989, all evidence shows that U. S. cattle and beef supplies are free of BSE. At the same time, most specialists agree that scientific uncertainties about the disease's cause and transmission warrant precautionary actions aimed at confirming the continued absence of BSE and preventing the importation of livestock or animal protein products that could carry the disease.

Other BSE-like animal diseases (collectively known as transmissible spongiform encephalopathies or TSEs) are present in the United States, including scrapie in sheep, and chronic wasting disease of deer and elk. A rare human TSE disease, the Creutzfeldt-Jakob disease (CJD) has long been known to occur in the United States, where it normally strikes about I in every million people each year. In Europe, a new variant of CJD (nvCJD) has affected close to 100 people since 1986, and most experts believe that this is a human form of B SE that is transmitted to humans who consume meat or products from B SE-infected cattle. *1*

What is at stake for U.S. agriculture?

Cattle production is the single largest segment of U.S. agriculture. With a herd of over 50 million animals, the value of beef and dairy surpassed $31 billion ($19.4 and $12.3 billion, respectively), or about 40% of total U.S. agricultural production in 1999. At the consumer retail level, beef sales have started to rebound from a steady 20-year decline that has seen per capita beef consumption cut in half from its 1980 levels. In 1999, consumer sales posted a record $52 billion, with mean yearly consumption of 69.6 pounds per person. Exports also represent a sizable portion of U.S. agricultural output. For example, the United States sold $2.7 billion in beef to trading partners in 1999. Four countries currently buy 95% of U.S. beef exports. Japan is the principal buyer ($1.4 billion), followed by Mexico ($454 million), Korea ($331 million), and Canada ($273 million).

A comparison with the European livestock industry experience shows one possible scenario for what is at stake. In the EU, the beef industry took two major hits from their BSE crisis: (1) a 20-30% decline in domestic beef sales due to negative long-term effects on consumers' confidence, and (2) losses in international trade in cattle, beef, and feed. U.S. agriculture leaders express the concern that if BSE were to appear in the United States, the economic and physical integrity of U.S. beef industry would be severely harmed, at least temporarily.

What is the state of the science on BSE?

Scientists know that the BSE agent is smaller than viruses. It is also highly resistant to treatments that normally kill viruses or bacteria (i.e., heat, ultraviolet light, radiation, and antimicrobials). Further, the agent cannot be detected in animals until symptoms appear because it does not cause inflammation or a detectable immune response in the host.

Currently, scientists from USDA's Agricultural Research Service and Animal and Plant Health Inspection Service (APHIS) *2* are working at the National Animal Disease Center (NADC) in Ames, Iowa, to develop tests to diagnose TSE (BSE-like) diseases before onset of symptoms. NADC is also collaborating with states, international organizations, and U.S. universities to study TSE transmission mechanisms between animal species and to discover natural infection routes of other TSEs present in the United States, such as scrapie in sheep, and chronic wasting disease on ranch-farmed elk. Research specifically on BSE is conducted only in countries where the disease exists.

What are the sources of risk to U.S. agriculture?

BSE could appear in the United States in three ways - through imports of infected cattle, imports of BSE-contaminated feed, or through spontaneous mutation of an indigenous TSE-causing agent into a BSE-causing agent (this is what scientists suspect happened in England). Various federal agencies are taking the following steps to address these sources of risk.

Importation of infected cattle. In 1989, APHIS imposed an import ban for live ruminants (cows, sheep, and goats) from countries with BSE infections. Inl99l,APHIS expanded the prohibition to include meat and meat products from B SE-infected countries. Finally, in 1997, APHIS prohibited the importation of live ruminants and most ruminant products from all of Europe.

APHIS began a domestic BSE surveillance program in 1990. Initial efforts included locating 496 head of cattle that were imported from the United Kingdom (U.K.) between 1981 and 1989. APHIS officials state that most of the animals were found and so far none have shown symptoms of BSE. Since 1990, APHIS has examined brains taken from more than 11,000 cattle with suspicious clinical symptoms, but has not found evidence of BSE. USDA's meat inspection agency, the Food Safety and Inspection Service (FSIS), does not permit animals showing suspicious neurological symptoms to be slaughtered for human consumption, and sends the brains of such animals to APHIS for testing.

Imported cattle feed. As mentioned above, in 1991 USDA banned the importation of ruminant meat and bone meal, offal, fat, serum, and glands from U.K., France, Switzerland, Ireland and Oman. USDA's decision was based on early evidence coming from the U.K. indicating that feed containing protein from BSE-infected animals was the most likely source of contagion. In 1997, as the disease spread through Europe, the ban was extended to all ruminant meat and bone meal products coming from the continent. Later, in December 2000, evidence in Europe of cross-contamination between feeds containing cattle protein and feeds containing non-ruminant protein (e.g. from hogs or horses), led USDA to ban imports of all rendered animal protein products from Europe as well as any other products that may have come in contact with such products.

According USDA's Foreign Agricultural Service (FAS), between 1989 and 1997 (i.e., before the European Union banned export of feed containing animal products) the United States imported 9,500 metric tons of cattle and livestock feed from Europe (including 366 MT from Great Britain). This represents a tiny fraction of U.S. feed imports (less that 1/2of I%)- however, little is known of the risk potential posed by these shipments. USDA is attempting to trace the origin and composition of the shipments to determine if the feed contained ruminant protein. Press reports coming from Europe recently have spotlighted feed exports from Great Britain as the principal culprit in the expanding BSE epidemic in that continent. *3*

Domestic cattle feed. Scientists speculate that BSE could also appear in the United States if feed containing rendered protein from TSE-infected sheep were fed to cattle.*4* Research suggests that this is how BSE emerged in Great Britain. Researchers maintain that the potential for this to occur in the United States has historically been less than in Europe - first, because the volume of sheep protein in cattle feed is considerably lower due to a far smaller sheep industry, and second, because unlike Great Britain, the prevalence of sheep scrapie (another TSE) in the United States has been very low.

The potential for BSE to occur as a mutation of sheep scrapie led the Food and Drug Administration (FDA), which regulates animal feed ingredients, to ban the feeding of virtually all mammalian proteins to ruminants in 1997. The only exceptions are blood and blood products; gelatin; inspected, processed, and cooked meat products for human consumption (such as restaurant plate waste); milk products; and products containing pork and equine proteins only. The rule took effect in August 1997 but full implementation has been difficult. In a recent report, the FDA found that 20% of licensed feed mills did not properly label their feeds to say they contain animal protein, and that 41% of non-licensed feed mills failed to provide proper warning labels (based on 9,947 compliance inspections conducted between 1999 and 2000). The FDA also found that rendering plants fared about the same, with 70% to 80% compliance for procedures that prevent feeds with animal by-products from getting mixed with non-animal-containing feeds. In response, the feed industry has set itself a goal of 100% compliance,*5* but a recent case at a Texas feed mill illustrates the difficulty of achieving that goal. In January 2000, 1,222 cattle were quarantined when it was found that animal proteins had inadvertently been mixed in their feed. The feed company agreed to buy the cattle and to keep them off the market.

How has Europe dealt with the BSE crisis?

Since the BSE epidemic began in Great Britain in 1986, Europe's cattle and meat industries have undergone a significant increase in regulation. Animal protein feed bans, quarantines, surveillance, increased testing, herd renewal, and selective cull measures are now in effect in many EU nations. In Great Britain, where the BSE epidemic has reached 179,000 confirmed cases in cattle since 1986, these measures appear to be resulting in a steady decrease in the number of infected cattle from the 1992 peak. One program, put in action following the 1996 U.K. beef and cattle ban by the EU, is the so called "Over Thirty Month Slaughter" scheme (OTMS). Under this plan, which bans the sale of meat from cattle aged over 30 months old, the U.K. has destroyed over 4.5 million animals, at a cost of $4 billion.*6* Similar EU programs (which include feed bans, mandatory animal testing and tracing, and OTMS) could go into effect in Germany, Italy and Spain. Germany, for instance, expects to destroy about 400,000 cattle under a "purchase for destruction" program. The EU foresees buying and incinerating up to 2 million cattle by the end of June 2001, at an estimated cost of $1 billion.

What if a case of BSE occurs in the United States?

In 1998, APHIS published a response plan that would go into effect immediately if a case of BSE were confirmed in the United States. The plan calls for the Secretary of Agriculture to declare an extraordinary emergency (under authority contained in 21 USC § 13 4a) if laboratory tests were to confirm a BSE diagnosis. This emergency declaration also authorizes the USDA to transfer the necessary funding to begin eradication, tracing and quarantine operations (7USC §147b). The USDA plan also calls for owners to receive indemnity payments for destroyed animals using Commodity Credit Corporation (CCC) funds as authorized by law.

Potential Issues in Congress

According to APHIS officials, if BSE were to occur in the United States, the mechanisms exist to respond immediately to a crisis using existing appropriated funds and emergency CCC funds. Depending upon the length and severity of the crisis, additional appropriations might be necessary. However, APHIS officials point out a need for additional authorities to deal with a potential BSE outbreak in the United States. They argue that new authorities are needed to preempt state laws for livestock inspections in interstate commerce, and to carry out measures (e.g., drawing of blood and testing of animals) to detect diseased animals at slaughterhouses, stockyards, and other points of concentration. These new authorities were sought in H.R. 4801, which was introduced in the 106th Congress, referred to the Agriculture and Judiciary Committees, but saw no action before the end of the 2nd session. *7*

Current appropriations (FY2001) for animal health monitoring and surveillance operations are $85 million (P.L. 106-387) and APHIS estimates that $0.5 million will be spent for BSE surveillance, education, development of improved testing methods, and research in collaboration with ARS and FSIS. Congress also appropriated $3 million for detection and eradication of TSEs (e.g., scrapie) in FY2001. This represents a slight increase from FY2000 but is significantly below the Clinton Administration's request of $8 million.

Table I - Key regulatory actions taken by the EU and the United States since 1986.

Year	European Union	United States
1986	Mad cow disease first reported in England.	
1987	Key epidemiological causal links for BSE established.	
1988	Use of ruminant material or products to feed cattle banned in U.K. (SI/1988/1039). BSE become a notifiable disease in U.K.	
1989	EU banned the import of U.K. cattle. (89/469/EC). U.K. banned use of beef offals for feed or human consumption. (SI/1989/2326)	USDA banned importation of ruminants from the U.K. (Announcement by theSecretary).
1990	EU required compulsory notification of BSE. (90/134/EC).	U.S. starts BSE surveillance program (Announcement by the Secretary)
1991		U.S. banned importation of animal products and byproducts from the U.K. and other countries (56 FR 63865).
1992	EU banned import of bovine embryos from U.K.(92/290/EC).	
1994	EU banned use of mammalian tissue orbyproducts for feeding ruminants.(94/381/EC).	
1997	EU placed restrictions on trade in mammalian animal wastes and feeds. (97/735/EC).	U. S. established ban on the use of mammalian protein to feed ruminants (62 FR 30935) U.S. banned importation of live ruminants and ruminant byproducts from all Europe and other countries (63 FR 406)
2000	EU placed restrictions in the use of all animal proteins in animal feed.(01/9/EC).	U.S. prohibits imports of rendered mammalian protein and feed from Europe. (Announcement by the Secretary).

Footnotes:

1. For information on food safety and nvCJD see: *http://www.cdc.gov/ncidod/diseases/cjd/cjd.htm* (Centers for Disease Control and Prevention); and CRS Report 96-641 (Archived) *"Mad Cow Disease or bovine spongiform encephalopathy: Scientific and Regulatory Issues"* by Judy A. Johnson and Donna U. Vogt.

2. APHIS is the USDA agency that is responsible for administering the laws and regulations designed to prevent the importation and spread of animal diseases.

3. Steve Stecklow. "Hazardous Trade: Britain's feed exports extended the risks of 'Mad Cow' disease". *Wall Street Journal*. January 23, 2001.

4. In July 2000, USDA moved to seize and destroy two flocks of sheep in Vermont after tests showed that they were infected with scraple. These sheep had been imported from Belgium in 1996. The U.S. District Court gave USDA the go ahead on February 2001, but the decision is under appeal. Scrapie is fatal to the sheep but poses no known threat to humans.

5. January 29, 2001. Joint statement by the National Cattlemen's Beef Association, the American Feed Industry Association, the American Meat Institute, and ten other industry groups regardmig efforts to prevent BSE in the United States.

6. Farmers are reimbursed for cattle at market value. One unintended consequence of OTMS has been an accumulation of over 460,000 metric tons of Meat and Bone Meal (MBM) and 209,000 tons of tallow waiting in warehouses to be disposed of as hazardous wastes.

7. H.R.4801 sought to consolidate and modernize authorities of the Secretary to restrict the importation and interstate movement of animals for reasons of pest or disease control.

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