

Bovine Spongiform Encephalopathy

(BSE; Mad Cow Disease)

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■ What is BSE?

Bovine spongiform encephalopathy (BSE) is a disease condition in cattle which is thought to have originated in Great Britain. It occurs in cattle between 2 and 8 years old and is always fatal. The most plausible cause of the disease is a prion, a “selfreplicating” protein, rather than a bacterium or virus. BSE causes a portion of the brain to become spongelike. Brain, central nervous system tissue, and the distal ileum (portion of the small intestine) can carry the infective agent, and measures have been taken to exclude those parts known to carry the infective agent from the food and feed supply.

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BSE is similar to other transmissible spongiform encephalopathies (TSEs) present in man and animals. In animals, the TSEs include scrapie (sheep and goats), chronic wasting disease (deer and elk), transmissible mink encephalopathy (mink), and feline spongiform encephalopathy (felines). In humans, CreutzfeldtJakob disease (CJD), variantCJD (vCJD), GerstmannSträusslerScheinker syndrome (GSS), fatal familial insomnia (FFI), and Kuru are all transmissible spongiform encephalopathies.

BSE it thought to be linked to vCJD. Pathological similarities exist between the two conditions, which has lead scientists to speculate that the two conditions are related.

■ How is BSE spread?

There is still much debate in the scientific community regarding how BSE is spread. At the present time, BSE is thought to be spread in tissue from the central nervous system (brain, spinal cord) as well as distal ileum, some of which can be present in meat and bone meal. BSE is not spread by animal-to-animal contact. In other words, an animal infected with BSE cannot infect another animal with which it is penned or pastured. Little is known regarding the minimum amount of prion material that can cause an infection.

■ Where does BSE occur?

BSE was first observed in Great Britain in April 1985 and was officially diagnosed in 1986. By June 1990, some 14,000 cases were confirmed (out of an estimated population of 10 million cattle) in Great Britain.

Since 1986, more than 185,000 cases of BSE have been confirmed in Great Britain. The epidemic peaked in 1992-93 at almost 1,000 new cases per week. Control measures have since reduced incidence of the disease, and currently fewer than 100 new cases are reported per week.

■ What is the status of BSE in North America?

In May 2003, BSE was diagnosed in a cow in central Alberta. This was the first native-born case of BSE reported on the North American continent.

On Dec. 23, 2003, the U.S. Department of Agriculture (USDA) announced that a Holstein cow in Washington had been diagnosed with BSE. The subsequent epidemiological investigation revealed that the cow originated in Canada.

Since 1989, the U.S. has prohibited importation of ruminants and most ruminant products from countries affected by BSE. A total of 496 cattle were imported from the United Kingdom and Ireland between Jan. 1, 1981, and July 1989. None of these animals remain alive. The animals that could be identified and located in 1989 were put under quarantine and monitored by USDA Animal and Plant Health Inspection Service (APHIS) personnel. The animals were allowed to die of natural causes or were euthanized. None of the identified animals entered the food or rendering system.

The APHIS has also conducted a traceback effort to locate each of the cattle imported from BSE-affected countries between 1980 and the implementation of the importation ban in 1989. No evidence of BSE has been found in any of these animals.

As a precautionary measure, the Food and Drug Administration (FDA) implemented a ruminant-to-ruminant feeding ban for meat and bone meal in

December 1997. Following the announcement of the case of BSE in Washington, FDA announced additional measures to further safeguard the feed supplies for cattle in the United States.

Also in December 1997, APHIS banned importation of live ruminants and most ruminant products from other European countries.

Since May 1990, the United States has had an aggressive surveillance program to ensure timely detection and response in the unlikely event that BSE is ever detected in the U.S. The surveillance program is based on sampling brains of cattle with suspicious neurologic symptoms. Based on the current understanding of BSE, the U.S. must sample 224 brains from cattle with suspicious neurological signs per year to detect an occurrence of 100 cases of BSE per 1,000,000 head of cattle. In 2003, USDA tested over 20,000 animals for BSE. It expects surveillance efforts to increase in 2004 in response to the BSE case in Washington. Regularly updated numbers of bovine brain samples tested as part of the nationwide BSE surveillance program are available on the World Wide Web at: www.aphis.usda.gov/lpa/issues/bse/bse-surveillance.html.

■ What should livestock producers do?

Livestock producers who feed ruminant animals must comply with the following requirements under the law:

- Maintain copies of all invoices for all feeds received that contain animal protein.
- Maintain copies of labeling for all feeds containing animal protein by-products.
- Make copies of invoices and labeling available for FDA inspection and copying.
- Maintain records for a minimum of one year.
- Producers who mix feed for both cattle and nonruminant animals (such as hogs and poultry) and use prohibited material in the nonruminant feed must use a completely separate mixer for the cattle feed.

- Producers who do not mix their own feed but purchase feed for both cattle and nonruminants must take steps to make sure that any prohibited material intended for nonruminant animals is not accidentally fed to cattle.

More information regarding feeding regulations can be found on the following Web site:

Food and Drug Administration:
www.fda.gov/com/index/bse/bsetoc.html

Several major meat packers have announced that they will now require cattle producers to certify that they do not include ruminant meat and bone meal in cattle feed.

■ What feeds have been banned by FDA?

The following feeds cannot be fed to ruminant animal:

- Ruminant meat and bone meal.
- Blood meal and blood by-products
- Inspected meat products cooked and offered for human consumption and further heat processed including plate waste and food casings
- Poultry litter (because of the possibility of spilled poultry feed which may contain ruminant meat and bone meal)

■ What rendered products are cleared for feeding to ruminant animals?

- Feather meal
- Porcine meat and bone meal
- Equine meat and bone meal
- Gelatin
- Poultry by-product meal
- Tallows, fats, oils, grease, amino acids, dicalcium phosphate

■ Should consumers be concerned about eating beef?

Media reports about the human form of “mad cow disease,” v-CJD, in Europe may cause fear among consumers in the U.S. The risk of acquiring v-CJD from eating beef in the U.S. is extremely low due to the safeguards in place. To date, there has been one probable case of v-CJD identified in a U.S. resident; however, this person had lived in the United Kingdom for an extended period of time before emigrating to the U.S.

More than 99 percent of v-CJD cases from 1986 to 2000 have been linked to the United Kingdom. Despite these statistics, even in the United Kingdom, the risk is considered very low, at perhaps one case per 10 billion servings of beef.

Control measures put in place have reduced the incidence of new cases. According to the Centers for Disease Control and Prevention (CDC), Americans traveling to Europe can further reduce their risk of contracting the disease by choosing whole muscle cuts of beef (eg. roasts, steaks) instead of ground meat (eg. hamburgers, sausage). This would reduce the chances of consuming a product possibly contaminated with tissues containing the prion. Another option for travelers is to avoid eating European beef altogether.

Suggested Resources for Further Information . . .

NDSU Extension BSE Frequently Asked Questions
www.ext.nodak.edu/extpubs/ansci/beef/bsefaq.pdf

NCBA's BSE Web Site
www.bseinfo.org

USDA/APHIS Veterinary Services
www.aphis.usda.gov/lpa/issues/bse/bse.html

Centers for Disease Control and Prevention
www.cdc.gov/ncidod/diseases/cjd/cjd.htm

Food and Drug Administration
www.fda.gov/cvm/index/bse/bsetoc.html

Council for Agricultural Science and Technology
www.castscience.org/cast/src/cast_top.htm

United Kingdom Ministry of Agriculture Fisheries and Food
www.defra.gov.uk/animalh/bse/index.html

For more information about food safety, contact your local county office of the NDSU Extension Service or visit the Web site
www.ag.ndsu.nodak.edu/food.htm

For more information on this and other topics, see: www.ag.ndsu.nodak.edu



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