



## ***USCENTCOM FACT SHEET***

# **Bovine Spongiform Encephalopathy (BSE) or “Mad Cow Disease” and Creutzfeldt-Jakob Disease**

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The following information will help you to become familiar with the epidemiology, symptomatology, and risk minimization of exposure to Bovine Spongiform Encephalopathy and Creutzfeldt-Jakob Disease.

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### ***WHAT IS BSE?***

BSE is a slowly progressing degenerative brain disease of cattle. The disease is fatal for cattle within weeks to months from onset of clinical signs. BSE is one of a family of diseases called Transmissible Spongiform Encephalopathies (TSE) characterized by spongy degeneration of the brain. This group of diseases infects several different species of animals including humans (see Table 1). BSE was first diagnosed in cattle in the United Kingdom in 1986. Since that time, the disease has been confirmed in Belgium, Denmark, France, Germany, Ireland, Luxembourg, Liechtenstein, the Netherlands, Portugal, Spain and Switzerland. There have been no cases of BSE found in the United States.

Table 1. Transmissible Spongiform Encephalopathies in Different Species

<b>Species</b>	<b>Disease</b>
Cattle	Bovine Spongiform Encephalopathy
Sheep	Scrapie
Elk, Deer	Chronic Wasting Disease
Mink	Transmissible Spongiform Encephalopathy in mink
Cats	Feline Spongiform Encephalopathy
Humans	Creutzfeldt-Jacob Disease (classic and new variant)

### ***WHAT CAUSES BSE?***

BSE is associated with a transmissible agent. This agent affects the brain and spinal cord of cattle and lesions are characterized by sponge-like changes visible with an ordinary microscope.

The exact nature of the BSE agent is unknown but 2 theories are being researched. The first is the prion theory, where the agent is composed largely, if not entirely, of a protein, referred to as a prion. The second theory argues that the agent is virus-like and possesses nucleic acids, which carry genetic information. Although strong evidence collected over the past decade supports the prion theory, the ability of the BSE agent to form multiple strains is more easily explained by a virus-like agent.

The agent is highly stable, resistant to freezing temperatures, resistant to drying and cooking at normal temperatures such as those used in pasteurization and sterilization.

### ***HOW IS BSE TRANSMITTED?***

In the cattle industry it has been common practice to use the by-products of rendering, ground and processed into a product called meat and bone meal (MBM). This MBM was then combined with other ingredients and processed into feed for cattle and sheep. Changes in this feed processing in the United Kingdom in the early 1980s were thought to have contributed to the emergence of BSE.

Ingestion seems to be the most common form of transmission. There have been cases of transmission in-utero from cow to calf. About 1% of calves born to cows with BSE will die of BSE. Injection of tissues from infected animals into the

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brain of experimental animals has produced the disease. The World Health Organization has categorized some bovine tissues of infected cattle as having a higher level of infectivity. (See table 2)

For classic, sporadic Creutzfeldt-Jacob Disease (CJD) the infectious agent has been transmitted from human to human through grafts of human meningeal tissues, corneal transplants and natural human growth hormone injections.

Table 2. Categories of Infectivity in Bovine Tissues and Body Fluids\*

<b>Category I</b>	High Infectivity	Brain, spinal cord, eye
<b>Category II</b>	Medium Infectivity	Spleen, abdominal organs, glands
<b>Category III</b>	Low Infectivity	Nerves, thymus, bone marrow, liver, lung, pancreas
<b>Category IV</b>	No detectable Infectivity	Milk, skeletal muscle, heart, blood, serum, kidney, thyroid, reproductive organs, hair, skin and saliva

\*Source: World Health Organization Consultation on Emerging and Other Communicable Diseases, March 1997

## ***WHY IS BSE IMPORTANT?***

In 1996, a new form of human disease called variant Creutzfeldt-Jacob Disease (vCJD) was diagnosed in a group of people in the UK, and subsequently in France and Ireland. The agent identified as the cause of this new disease appears very similar to the BSE agent. The consumption of meat products from cattle infected with BSE has been implicated as a potential risk factor in the development of vCJD. The incubation period is uncertain, but thought to be from 10 to 20 years.

Although the risk of adverse health effects is small, the exact mechanism for infection and the effect of repeated exposures to BSE contaminated beef is unknown.

## ***WHAT IS MY RISK OF EXPOSURE TO THE AGENT THAT CAUSES BSE?***

Public health control measures have been recommended by the World Health Organization to prevent potentially BSE-infected tissues from entering the human food chain. The most stringent of these control measures have been applied in the United Kingdom and appear to be highly effective. In addition, strict bans on the use of cattle protein for cattle feed, have been recommended throughout Europe. BSE has not been found in the United States, thus meat procured from the US is considered to be free of BSE. US military dining facilities, commissaries, BX/PX/NEX facilities and MWR activities are directed to sell only beef and beef products procured from US approved sources.

According to the Centers for Disease Control and Prevention, the current risk of acquiring vCJD from eating beef (muscle meat) and beef products produced from cattle in Europe appears to be extremely small (perhaps fewer than 1 case per 10 billion servings), if it exists at all. However, to reduce this possible risk, travelers to Europe and CENTCOM may wish to consider either 1) avoiding such beef and beef products altogether or 2) selecting beef or beef products, such as solid pieces of muscle meat (instead of beef products such as burgers and sausages). Milk, milk products, poultry and pork are not believed to pose any risk for transmitting the BSE agent.

For more information please refer to the Food Safety Fact Sheet or go to:

1. Bovine Spongiform Encephalopathy. USDA, Animal Plant Health Inspection Service, APHIS Web. [www.aphis.usda.gov](http://www.aphis.usda.gov)
2. Emerging and Other Communicable Diseases (EMC) World Health Organization Consultation Report, March 1997.
3. WHO Fact Sheet #180 and #11, [www.who.int](http://www.who.int)
4. Centers for Disease Control and Prevention. National Center for Infectious Diseases, Travelers Health Website. [www.cdc.gov/travel.madcow](http://www.cdc.gov/travel.madcow)