Impact of the BSE/vCJD Outbreak:
U.S. Concerns for TSEs
Confirmed BSE Cases by Month and Year of Restriction, Great Britain, June 1988-June 2001

Number of Cases

Month and Year


BSE defined
Ruminant Feed ban
Specified bovine offal ban for all animals
BSE Impacts

- Transmission of the agent among cattle and to other animals.
- Transmission to humans causing vCJD predominantly among young patients.
- Invariably fatal nature of the diseases with no effective therapy.
- Economic impacts of BSE
  - During September 2001-January 2002, the farming and food industries in Japan reportedly lost $1.5 billion because of BSE.
**U.S. Concerns Related to TSEs**

- Concerns related to possible introduction of BSE into the United States.

- Concerns related to possible occurrence of vCJD and/or its possible secondary spread via blood and blood products.

- Concerns related to CJD infection control issues and the possible zoonotic transmission of animal TSEs prevalent in the United States.
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The Slow, Deadly Spread of Mad Cow Disease
How It Could Become an Epidemic
Moving to Keep the Beef Out of Disease’s Shadow

FDA, Industry Work to Bolster Mad Cow Safeguards

By Marc Kaufman
Washington Post Staff Writer

In Texas, more than 1,000 cattle were found to be infected with bovine spongiform encephalopathy (BSE), also known as “mad cow disease,” which has caused panic across Europe, is causing a shadow in the United States.

The European epidemic has been made worse—and more politically damaging—by mishandled official statements that create public confusion. Although American officials are taking the opposite approach, explaining that an isolated case of mad cow disease may show up someday in U.S. cattle, they say that this is a rare event.

In New York City, health officials became alarmed after learning that some beef cheeses were being sold in stores even though they had been banned in Poland, because they were made with gelatin that included meat from the infected cattle.

And in Oklahoma, a captive herd of 140 elk was segregated from other animals after several were found to have died from “chronic wasting disease,” which is closely related to mad cow disease.

In each case, federal officials eventually concluded there was no danger, but the incidents raise concerns about how mad cow disease, the fatal brain disease that has caused panic across Europe, is creating a shadow in the United States.

FDA: Texas Cows Not a Threat

By Laura Neergaard
AP Medical Writer
Tuesday, Jan. 30, 2001; 6:25 p.m. EST

WASHINGTON — About 1,200 Texas cattle ate animal feed containing ingredients banned as a precaution against mad cow disease but not enough to threaten the food supply, government investigators concluded Tuesday.

The cattle have been quarantined at a Texas feed lot since last week as the Food and Drug Administration investigated whether a Purina Mills Inc. plant violated a federal ban on feeding beef byproducts to other cows.

Mad cow disease, also known as bovine spongiform encephalopathy or BSE, has not been found in U.S. cattle. But cows can catch the illness by eating feed made from the parts of infected cows or certain other animals. The animal feed ban is a precaution to keep BSE from spreading should a U.S. cow ever become infected.

Trying To Keep “Mad Cow Disease” Out Of U.S. Herds

By Linda Bonn
FDA: Candy With Beef Gelatin Safe

The Associated Press
Tuesday, Jan. 30, 2001; 9:09 p.m. EST

NEW YORK — A candy sold in New York city after it was pulled from store shelves in Poland in scare over mad cow disease is safe, the U.S. Food and Drug Administration said.

FDA spokesman Brad Stoner said Monday that the American manufacturer of the Mamba candy had assured the agency that they did have certificated and inspected their U.S. food safety regulations.

“There should be no problem in America,” Stoner said.

New York City officials were more cautious, saying they had no reports of any problems with the candy or its ingredients.

NEWS RELEASE

COMMERCE COMMITTEE DEMOCRATS
Congressman John D. Dingell, Ranking Member

For Immediate Release
February 1, 2001
Contact: Laura Sheehan
202-225-3641

Dingell and Waxman Question FDA’s Knowledge of Dietary Supplements Containing BSE

Washington, D.C. — Congressmen John D. Dingell, Ranking Member of the Committee on Energy and Commerce, and Henry Waxman, Ranking Member of the Committee on Government Reform, in a recent letter to the Food and Drug Administration (FDA) questioned the safety and nature of dietary supplements currently sold and marketed in the United States which may contain bovine spongiform encephalopathy (BSE).

“Dietary supplements, unlike prescription drugs or vaccines, require no pre-market approval and no post-market surveillance. This makes it more difficult for the FDA to adequately oversee what products are being sold, where the products and the products’ ingredients originate, and which products may contain potentially dangerous materials,” the Congressmen wrote.
federal actions do not sufficiently ensure that all BSE-infected animals or products are kept out...
Private sector effects

Farmers
- Decreased market prices and output
- Increased costs of slaughtering and disposing of animals
- Increased costs of cattle feed
- Increased prices and output for substitute meat products (e.g., poultry, pork, and fish)

Meat industries
- Lost markets and increased disposal costs for beef packers
- Lost markets for beef processors
- Gained markets for other substitute meat industries

Feed manufacturers
- Lost raw materials
- Increased costs of raw materials (may pass on to farmers)

Renderers
- Lost markets
- Lost raw materials

Retailers and wholesalers
- Lost beef sales to downstream wholesalers and retailers
- Lost business for restaurants specializing in beef products
- Increased wholesale prices of substitute meat products

Other related industries
- Lost markets for cattle auction and transportation industries
- Possible increased costs of raw materials for pharmaceuticals, cosmetics, tannery and leather goods, and other related industries
- Lost markets and/or increased costs for manufacturers of products that contain beef extracts and broths
- Possible gained business for quality control/inspection services industries

Final consumption sector effects
- Increased costs of imported beef products
- Increased costs of substitute meat products
- Increased costs of products from related industries
- Decreased costs of domestic beef and beef products

Public sector effects
- Increased costs to subsidize certain livestock-related industries
- Increased costs for additional inspection and surveillance for BSE
- Increased costs for research on BSE and vCJD

Trade sector effects
- Decreased exports of live cattle and beef in the short run
- Possible lost markets for beef exports in the long run
- Increased beef imports

*Beef packers slaughter cattle and other animals and package carcasses and large cuts for further processing.*
USDA’s BSE Surveillance

- The BSE surveillance consists of testing:
  - Adult cattle displaying evidence of neurological disease presenting:
    - On-farm (field CNS cases), veterinary hospitals, veterinary diagnostic laboratory, public health laboratories, at slaughter (CNS condemns).
    - “Downer cows” (nonambulatory adult cattle).
    - Adult cattle which die on-farm.
Total Bovine Brain Submissions for BSE Surveillance, United States, May 10, 1990 thru Feb 28, 2002

Total = 22,912

No evidence of BSE detected

Source: USDA, APHIS, NVSL
BSE Preventive Measures

- Since 1989, the USDA has restricted the importation of live cattle and certain cattle products from the United Kingdom.

- This restriction was later expanded to prohibit importation from all European countries and recently from Japan.

- In 1997, the Food and Drug Administration prohibited the use of most mammalian protein in the manufacture of ruminant feed.
Harvard BSE Risk Assessment

- The United States is highly resistant to introduction of BSE.
  - Most effective preventive measures included ban on importation of live cattle and ruminant meat and bone meal from the United Kingdom since 1989 and all of Europe since 1997, and the ruminant feed ban.
  - BSE is extremely unlikely to become established in the United States even if it were inadvertently introduced.
U.S. Concerns Related to TSEs

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Possible U.S. Occurrence of vCJD

- Primary source of exposure of the U.S. population to the BSE/vCJD agent:
  - During visits to BSE-endemic areas.
  - Consumption or use of imported products containing BSE-contaminated cattle parts.
  - Possible secondary person-to-person spread of the vCJD agent.
Blood Donor Deferral

American Red Cross

American Red Cross Position Statement to the Transmissible Spongiform Encephalopathy (TSE) Committee

The safety of the blood supply is our top priority. The Red Cross and the American Red Cross are independent national organizations in the United States that are responsible for ensuring blood safety.

The current deferral is for people who lived in a country with periodic TSE cases, including France, the United Kingdom, and Scotland. The deferral is not required for anyone who was age 16 or older at the time of exposure to TSE. The exposure period is defined as the time between 1980 and 1996.

U.S. Urges Use of Blood From Military

By RAYMOND HERNANDEZ

WASHINGTON, July 5 — As it moves to restrict blood donations from people who might have been exposed tomad cow disease in Europe, the United States is urging the United Kingdom to consider implementing similar restrictions.

The United Kingdom has been under pressure to adopt similar restrictions, particularly in the Greater London area, where medical officials believe the disease could spread to the general population.

FDA Advisory Committee tightens restrictions on blood donation

Red Cross, America's Blood Centers fear tighter restrictions will continue to deplete supply

A Food and Drug Administration (FDA) advisory committee voted June 28 to further tighten the criteria for deferring blood donors who have lived in Europe. The vote reflected concerns that variant Creutzfeldt-Jakob disease (vCJD), the human form of Bovine Spongiform Encephalopathy (BSE), or "mad cow" disease, might be spread through blood transfusions.

Although the tighter restrictions are intended to protect America's blood supply, donation organizations such as the Red Cross and America's Blood Centers fear excessive restrictions would further exacerbate the shortage of blood in the U.S. During the meeting, blood banks weighed the morbidity and mortality of patients who need blood transfusions.

Current FDA guidelines, implemented by all U.S. blood centers in 1999, prevent blood donations from people who have spent more than six months in Great Britain, considered the hub of BSE activity, between 1980 and 1996. vCJD is believed to be transmitted to humans from infected cattle. (see Washington Fax 4/24/2001b)
Blood Donor Deferral Policy

• In 1999, FDA instituted a policy to defer blood donors who spent a cumulative ≥6 months period in the United Kingdom during 1980-1996.

• Because of the emergence of BSE and vCJD in other European countries, FDA recently expanded the blood donor deferral policy.
  - UK policy tightened from cumulative ≥6 months to ≥3 months.
  - Excludes donors who spent ≥5 years in other European countries, and persons who lived on US military bases in Europe.
Blood Donor Deferral Policy

- The donor deferral policy is intended to minimize the risk of vCJD transmission, not totally eliminate the risk.

- The length of time spent in Europe was selected to maximize the benefit of the deferral policy with minimum adverse impact on blood availability.

- The donor deferral criteria were estimated to result in a 90% reduction in total person-days of risk-weighted exposure to the vCJD agent.
Blood Donor Deferral Policy

• The risk of vCJD transmission via blood and blood products is considered theoretical because:
  • No transmission of the vCJD agent by human blood or plasma has been reported.
  • Study of recipients of blood products from vCJD donors has not demonstrated infectivity.
Why the Concern About Bloodborne Transmission?

- The vCJD agent is readily detectable in lymphoreticular tissues.
- Presumed route of BSE transmission through ingestion implies possible blood phase – prionemia.
- Transmission of the BSE agent via transfusion during the incubation period in an experimental sheep model has been reported.
- Variant CJD is a new fatal disease with very long incubation period.
CJD/vCJD Surveillance

• In 1996, CDC enhanced surveillance to monitor CJD and the possible occurrence of vCJD.
  
  • Periodic review of the national multiple cause-of-death data.
  
  • Follow up investigation of CJD decedents < 55 years of age in collaboration with state and local health departments.
  
  • Supporting the establishment of the National Prion Disease Pathology Surveillance Center in collaboration with the American Association of Neuropathologists.
Age-Adjusted and Age-Specific CJD Death Rates, United States, 1979-1999
CJD Deaths and Death Rates by Age-Group, United States, 1979-1999
Percent Distribution of U.K. vCJD and U.S. Sporadic CJD Cases by Age Group at Death, 1995-2001

- nvCJD* (n=87)
- U.S. CJD** (n=1,358)

*Data as of May 1, 2001
**Non-iatrogenic cases, 1995-1999
## Cases Received and Diagnosed by the National Prion Disease Pathology Surveillance Center*

<table>
<thead>
<tr>
<th>Year</th>
<th>Referrals</th>
<th>Prion disease</th>
<th>Prion disease (total)</th>
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<tbody>
<tr>
<td></td>
<td></td>
<td>Sporadic</td>
<td>Familial</td>
</tr>
<tr>
<td>1997</td>
<td>104</td>
<td>54</td>
<td>6</td>
</tr>
<tr>
<td>1998</td>
<td>94</td>
<td>44</td>
<td>6</td>
</tr>
<tr>
<td>1999</td>
<td>114</td>
<td>65</td>
<td>9</td>
</tr>
<tr>
<td>2000</td>
<td>169</td>
<td>97</td>
<td>12</td>
</tr>
<tr>
<td>2001</td>
<td>244</td>
<td>136</td>
<td>16</td>
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*Information available at www.cjdsurveillance.com*
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CHICAGO, Illinois (AP) — Fourteen patients at two hospitals may have been exposed to a rare and deadly brain disease through tainted surgical instruments, according to an alert issued Tuesday to hospitals nationwide.

The patients at both hospitals, Exempla St. Joseph in Denver, Colorado, and Tulane University Hospital and Clinic in New Orleans, Louisiana, underwent surgery in which instruments were used that had been previously used on people later diagnosed with Creutzfeldt-Jakob disease.

Neither case involved the form of the ailment that may be related to mad cow disease, according to the Joint Commission on Accreditation of Healthcare Organizations.

The nonprofit group sent the alert to the nearly 5,000 hospitals nationwide that it monitors and accredits.

Because normal sterilization techniques don't kill the organism that causes the disease, the commission said all surgical instruments used in neurosurgery when a diagnosis
Chronic Wasting Disease Endemic Areas, United States

- Wyoming
- Colorado
Chronic Wasting Disease Endemic Areas, United States

- North Platte River
- Laramie River
- South Platte River
- Laramie
- Wheatland
- Cheyenne
- Fort Collins
- Estes Park
- Fort Morgan
- Denver

Locations in the map:
- Wyoming
- Colorado
- Nebraska
States Where CWD has Recently been Identified Among Free-Ranging Deer or Elk

- South Dakota
- Nebraska
- Wisconsin
## Clinical Characteristics of the 3 Unusually Young CJD Patients with Venison Consumption

<table>
<thead>
<tr>
<th>Case</th>
<th>Year of death</th>
<th>Age at death</th>
<th>Sex</th>
<th>Presentation</th>
<th>Illness duration</th>
<th>EEG</th>
</tr>
</thead>
<tbody>
<tr>
<td>Case 1</td>
<td>1997</td>
<td>28</td>
<td>Female</td>
<td>Abnormal mental status, unsteady gait</td>
<td>4 mos</td>
<td>Not classic</td>
</tr>
<tr>
<td>Case 2</td>
<td>1999</td>
<td>30</td>
<td>Male</td>
<td>Cognitive difficulties</td>
<td>10 mos</td>
<td>No abnormality</td>
</tr>
<tr>
<td>Case 3</td>
<td>2000</td>
<td>28</td>
<td>Male</td>
<td>Memory loss, behavioral change, confusion</td>
<td>15 mos</td>
<td>Not classic</td>
</tr>
<tr>
<td>Comparison of Key Evidence Supporting a Causal Link Between BSE and vCJD to that of CWD and 3 Unusually Young CJD Cases in the United States.</td>
<td></td>
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<tr>
<td>---------------------------------------------------------------</td>
<td></td>
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<tr>
<td><strong>Increasing incidence of young cases</strong></td>
<td><strong>BSE/vCJD</strong></td>
<td><strong>CWD/CJD in the 3 Patients</strong></td>
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<tr>
<td>Distinctive neuropathology</td>
<td>Yes</td>
<td>No</td>
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<tr>
<td>Phenotypic homogeneity</td>
<td>Yes</td>
<td>No</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>PrP-res different from classic forms</td>
<td>Yes</td>
<td>No</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Definite food consumption from endemic/epidemic areas</td>
<td>Yes</td>
<td>No</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Polymorphism at codon 129</td>
<td>Met/Met</td>
<td>Heterogeneous</td>
<td></td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>
Case Investigation Summary

• The occurrence of three unusually young CJD patients suggested a possible relationship with CWD.

• Our investigation found no conclusive evidence for a causal link between CWD and CJD in the patients.

• Continued surveillance remains critical to monitor the possible transmission of CWD to humans.
Additional Case Investigations

- Investigated a 25-year-old patient who consumed venison originating from Southeastern Wyoming.
  - He was later shown to have GSS 102 mutation with valine at codon 129 in the mutant allele of the prion protein gene.

- Investigated two patients (26 and 28 years of age) who lived in adjacent counties and had illness onset within several months of each other.
  - Although venison consumption was reported for the 28-year-old patient at ~1.5 years of age, this history was questionable; the immunohistochemical analysis was consistent with GSS.
  - No venison consumption history was reported for the 26-year-old patient.
Summary

Continued surveillance is critical to monitor the possible occurrence of BSE and vCJD in the United States as well as monitor the risk, if any, of CWD transmission to humans.