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
• 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
FDA, Industry Work to Bolster Mad Cow Safeguards

By Marc Kaufman
Washington Post Staff Writer

In Texas, more than 1,000 cattle being fattened for slaughter were immediately quarantined after federal officials discovered the animals had been inadequately fed the kind of bone meal believed to have spread mad cow disease throughout Europe.

In New York City, health officials became alarmed after learning that Minute Maid juices were being sold in stores even though the German-made candy had been banned in Poland because it was made with gelatin that included modified beef parts.

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

In each case, federal authorities eventually concluded there was no danger. But the incidents show how mad cow disease, the lethal brain disease that has caused panic over beef in Europe, is casting a shadow in the United States.

FDA: Texas Cows Not a Threat

By Laura Neugard
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
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 Stofko said Wednesday that they did have certification for the candy's U.S. food safety regulations.

"There should be no problem with this," he said.

New York City officials warned Wednesday that one of its ingredients may contain beef gelatin, which is similar to the food additive used in the British product.

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

• 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.
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 Encephalopothy (TSE) Committee

The safety of the blood supply is one priority. The Red Cross and the independent step to ensure blood safety in the United Kingdom based on the then

The current deferral is for people who lived in the United Kingdom (England, Northern Ireland, Scotland, and Wales) between 1980 and 1996. The United States includes France as well as all of Western Europe. The Transmissible Spongiform Encephalopathy (TSE) committee should review exposure period between 1980 to the

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 to mad cow disease in Europe, the United States is seeking a moratorium on blood donations from the United Kingdom, the City area.

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, both organizations put for their own "compromise" restrictions, which they said would provide the best balance between supply and protection.

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 4/24/2001 b)

Related Articles

New York Health Commissioner Favors Blood Restrictions (June 28, 2001)

Curbs on Blood Threaten Stocks for New York Region (June 27, 2001)

Blood Supplies Critically Short in N.Y. Region (June 25, 2001)

CDC
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.
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

- **Deaths**: The number of deaths is represented by the gray bars on the bar chart. The x-axis is labeled with age groups ranging from 0-4 to >=85, and the y-axis represents the number of deaths.

- **Death rates**: The red line on the chart represents the death rates per 1,000,000 persons. The y-axis on the right side of the chart indicates Deaths per 1,000,000 persons, ranging from 0 to 6.

The chart shows a significant increase in both the number of deaths and death rates as age increases, peaking in the 70-74 age group and then decreasing for older age groups.
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>
</tr>
</thead>
<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>
</tr>
</tbody>
</table>

*Information available at www.cjdsurveillance.com
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Patients possibly given brain disease
July 11, 2001 Posted: 12:31 PM EDT (1631 GMT)

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
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></th>
<th>Case 1</th>
<th>Case 2</th>
<th>Case 3</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Year of death</strong></td>
<td>1997</td>
<td>1999</td>
<td>2000</td>
</tr>
<tr>
<td><strong>Age at death</strong></td>
<td>28</td>
<td>30</td>
<td>28</td>
</tr>
<tr>
<td><strong>Sex</strong></td>
<td>Female</td>
<td>Male</td>
<td>Male</td>
</tr>
<tr>
<td><strong>Presentation</strong></td>
<td>Abnormal mental status, unsteady gait</td>
<td>Cognitive difficulties</td>
<td>Memory loss, behavioral change, confusion</td>
</tr>
<tr>
<td><strong>Illness duration</strong></td>
<td>4 mos</td>
<td>10 mos</td>
<td>15 mos</td>
</tr>
<tr>
<td><strong>EEG</strong></td>
<td>Not classic</td>
<td>No abnormality</td>
<td>Not classic</td>
</tr>
</tbody>
</table>
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.

<table>
<thead>
<tr>
<th></th>
<th>BSE/vCJD</th>
<th>CWD/CJD in the 3 Patients</th>
</tr>
</thead>
<tbody>
<tr>
<td>Increasing incidence of young cases</td>
<td>Definite</td>
<td>Not definite</td>
</tr>
<tr>
<td>Distinctive neuropathology</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Phenotypic homogeneity</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>PrP-res different from classic forms</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Definite food consumption from endemic/epidemic areas</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Polymorphism at codon 129</td>
<td>Met/Met</td>
<td>Heterogeneous</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.
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.