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FSIS Docket Clerk
U.S. Department of Agriculture
Food Safety and Inspection Service
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03-025IF
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Linda A. Detwiler

RE: DEPARTMENT OF AGRICULTURE
Food Safety and Inspection Service

9 CFR Parts 301, 309, 310, 311, 313, 318, 319 and 320

Prohibition of the Use of Specified Risk Materials for Human Food and Requirements for the Disposition of Non-Ambulatory Disabled Cattle; Meat Produced by Advanced Meat/Bone Separation Machinery and Meat Recovery (AMR) Systems; Prohibition of the Use of Certain Stunning Devices Used To Immobilize Cattle During Slaughter; Bovine Spongiform Encephalopathy (BSE) Surveillance Program

The USDA is to be commended for taking the much needed actions outlined in the interim final rules. Current evidence indicates that the risk to humans from BSE is extremely low. However, these actions are essential for the further protection of public health in the United States as the detection of the Canadian case of BSE in May 2003, provided evidence that the BSE agent had indeed been introduced into the North American cattle production system. USDA must continue to monitor new scientific findings as well as other world events and adjust the regulations accordingly.

Docket Number 01-033IF: Prohibition of the Use of Certain Stunning Devices Used To Immobilize Cattle During Slaughter

I am in full support of the prohibition of all devices which may cause the release of brain macro-emboli into the circulatory system of stunned cattle. Given there has been consistent evidence that stunning methods utilizing air-injection have resulted in the circulation of macro-emboli from Central Nervous System (CNS) tissue, USDA should make this interim final rule permanent. (Garland, et al, 1996; personal observation)

Docket Number 03-025IF: Prohibition of the Use of Specified Risk Materials for Human Food and Requirements for the Disposition of Nonambulatory Disabled Cattle

Specified Risk Materials (SRMs)

I am in full support of the interim final rule which prohibits SRMs from being included in food for human consumption. In addition to the list of tissues published in this rule, I am requesting that additional tissues be added to the list. These would include the dura ("sheath") covering the spinal cord and the entire intestine (from pylorus to rectum). The scientific justification is provided below. These SRMs should also be prohibited from **ANY** FDA regulated food or product intended for human consumption, including but not limited to flavorings, extracts, etc.

Evidence from the United Kingdom indicates that BSE is the most likely cause of the vCJD (Will et al., 1996). The UK's Spongiform Encephalopathy Advisory Committee (SEAC) concluded that although there was no direct scientific evidence of a link between BSE and vCJD, based on current data and in the absence of any credible alternative, the most likely explanation at that time was that the cases were linked to exposure to BSE before the introduction of control measures, in particular, the specified bovine offal (SBO) ban in 1989. Given that it has been postulated that one of the most likely routes of exposure is through the consumption of meat contaminated with infected CNS tissue (Will, 1999), SRM bans are one of the most important measures for the protection of human health.

The list of tissues to be considered by USDA as SRM includes those bovine tissues where actual infectivity has been identified (based on the research outlined below) or tissues which have a close association to the infected tissues.

A study was conducted to examine the pathogenesis of BSE in cattle, i.e. the replication (tissue distribution) of the agent during the incubation period. This study first identified the agent via mouse bioassay in the distal ileum of the experimentally infected calves. It is thought that the agent may be associated with the lymphoid tissue of the intestines. The calves were four months of age at the time of oral dosing. First isolation of the agent in the distal ileum was made at six months after challenge. Subsequent isolations from the distal ileum were made at ten, 14 and 18 months after dosing. (Wells et. al., 1994) This study has also identified infectivity in spinal cord, brain, dorsal root ganglia, and trigeminal ganglia beginning at 32 months post challenge. (Wells, et. al. 1998). The study was repeated using calves as the bioassay model. Results of the calf bioassay study are very similar to the mouse bioassays. However, this study has also identified apparently low levels of infectivity in tonsil (Update of the Opinion on TSE Infectivity Distribution in Ruminant Tissues adopted by the EU Scientific Steering Committee on November 7-9, 2002). Lymphoid tissue of the 3rd eyelid from naturally infected cattle has also demonstrated a low level of infectivity (Presentation by Danny Matthews, UK VLA at the TAFS Workshop, Washington, DC; April 6, 2004). The calf bioassay study is still in progress.

It should be pointed out that the data on the distribution of BSE infectivity in the bovine was derived primarily from 2 studies, one of which has not been completed. The studies conducted are very logistically challenging and expensive. Not every tissue could undergo bioassay. Some tissues were assumed to have a risk due to a close association or the identification of PrPres and are considered as SRM. Such is the case with dura and the remaining sections of intestine.

Dura

Dura was harvested but not tested in the pathogenesis study. Its close association with the brain and spinal cord and the documented evidence of its role in the human to human transmission of

Creutzfeldt-Jakob Disease (CJD) has prompted scientists to designate bovine dura as a high risk tissue.

Dura may become separated from the vertebral column during the fabrication process allowing the possibility that it be included in ground beef products or contaminate surfaces where deboning occurs. I recommend that USDA amend the definition of SRM to include dura and that it be removed along with spinal cord on the kill floor.

Intestine

The scenario described above is essentially true for the intestine. Infectivity was readily detectable in the distal ileum of cattle infected with BSE. While certain additional sections of the intestine were tested with no infectivity identified, not every section of the intestine was included in the bioassays. Positive immunostaining for PrPres was identified along the length of the intestine providing evidence for the entire intestine to be considered as SRM per EU regulations. (personal communication Danny Matthews, UK, VLA). The International Advisory Committee appointed by Secretary Veneman also recommended that the SRM ban in the US be amended to the entire intestine from duodenum to rectum. I recommend that the USDA adjust the definition of SRM to include the entire intestine from duodenum to rectum.

The removal of SRMs to protect public health is also supported by the WHO and the Harvard Risk Assessment.

The World Health Organization (WHO) has issued the following recommendations for countries with BSE or those where a known exposure exists:

"No part or product of any animal which has shown signs of a TSE should enter any food chain (human or animal). In particular:

- All countries must ensure the killing and safe disposal of all parts or products of such animals so that TSE infectivity cannot enter any food chain.

- Countries should not permit tissues that are likely to contain the BSE agent to enter any food chain (human or animal)

citation:
Report of a WHO Consultation on Public Health Issues related to Human and Animal Transmissible Spongiform Encephalopathies WHO/EMC/DIS 96.147 Geneva 2-3 April 1996

The Harvard Study also made recommendations similar to the WHO, "Our evaluation of potential risk mitigation actions highlights potential measures to further reduce the already low likelihood that BSE could spread to cattle or contaminate human food if it were to arise..... Implementation of a UK-style ban on specified risk material (*e.g.*, spinal cords, brains, vertebral columns) from both human food and animal feed reduces the predicted number of BSE cases in cattle by 80% and the potential human exposure by 95%."

Cross contamination between SRMs and edible tissue can add risk to products intended for human consumption. Therefore, USDA, FSIS is urged to assure that each slaughterplant which processes cattle have systems in place which prevent cross contamination between edible tissue and SRMs. This should include separate equipment, such as knives, blades, etc where appropriate and utilize effective (for TSE agents) disinfection procedures for equipment used to

handle SRMs.

The Update of the Opinion on TSE Infectivity Distribution in Ruminant Tissues adopted by the EU Scientific Steering Committee on November 7-9, 2002 provides some guidelines to avoid cross contamination. Under separate cover I have submitted a CD of practices used throughout Europe and in some plants in the United States. The CD also includes effective disinfection methods that are recommended by the WHO. These practices assist in the reduction of cross contamination.

Nonambulatory Disabled Cattle

As appropriately described in the interim final rule, nonambulatory disabled cattle constitute the majority of the BSE high risk population. I agree that they should be prohibited from being included in the supply of food for human consumption. I also agree with the definition as written in the Interim Final Rule. I urge the USDA to not alter this definition and to continue to prohibit for human food any bovine which cannot walk to the "knock box" regardless of reason.

Downers accounted for over half of the detected BSE cases in both the EU and Switzerland in 2003. In Switzerland 21 cases of BSE were confirmed. Two were from normal slaughter, eleven were from the fallen stock and emergency slaughter (equivalent to US downers) and eight were clinical BSE suspects (ref . http://www.bvet.admin.ch/0_navigation-e/0_index-intern.html) In the European Union (January - September 2003) a total of 947 cases were confirmed. Of these confirmed cases 189 (20%) were from normal slaughter, 525 (55.4%) were from the fallen stock/emergency slaughter (US Downers) and 233 (24.6%) were clinical BSE suspects (ref http://europa.eu.int/comm/food/food/biosafety/bse/annual_reps_en.htm).

The previous system of clinical examination of the nonambulatory bovine was not adequate for determining a disposition regarding BSE. This was clearly illustrated by the two native cases of BSE in North America. Both cases of BSE (May and December) were observed by veterinarians prior to slaughter. Neither was specifically set aside as a BSE clinical suspect. The Washington State case was passed for human consumption because she was determined to have a calving injury (which apparently masked signs of BSE or other neurological disease) and the May 2003 case detected in Canada was slaughtered in January and went to rendering. The testing of this cow was completed in May.

Neurological, metabolic or other diseases which affect coordination and other aspects of gait often predispose an animal to injuries such as broken limbs or soft tissue damage. If the animal is then down because of a broken leg, or torn ligament, the injury may be the prominent or sole presenting sign. Without a complete diagnostic work up and history of disease progression the true underlying cause of the nonambulatory condition may be impossible to ascertain.

I have listed the clinical signs of BSE below. This is the list provided on the UK's DEFRA website. In reviewing the list, the vast majority of signs would be difficult if not impossible to observe once an animal is down.

http://www.defra.gov.uk/animalh/bse/bse-science/level-4-bse.html#symptoms

- The clinical symptoms of BSE are varied. Most cattle with BSE show a gradual development of symptoms over a period of several weeks or even months, although some can deteriorate very rapidly. Only a small proportion of affected cattle show what would be considered typical "mad cow" signs. Most suspects show several (but not all) of the following symptoms if they are observed closely enough:
- apprehensiveness
- nervousness
- reluctance to cross concrete, turn corners, enter yards, go through doorways or permit milking
- occasional aggression directed at other cattle or humans
- manic kicking when milked
- head shyness, with head held low
- high stepping gait, particularly hind legs
- difficulties in rising
- tremors
- loss of condition, weight or milk yield

In addition, per the list, difficulty in rising is a clinical sign of BSE. Eventually cattle with BSE progress and become recumbent. Per the interim rule testing is not absolute and cannot guarantee absence of infectivity. In fact in at most countries beef from tested animals cannot be labeled as BSE free.

I do suggest that this regulation not prohibit any individual or family from using one of their own nonambulatory animals for personal consumption. This can be done at their risk through custom slaughter.

Docket Number 03-038IF: Meat Produced by Advanced Meat/Bone Separation Machinery

and Meat Recovery (AMR) Systems and Docket Number 03-025IF: Prohibition of the Use of Specified Risk Materials for Human Food

The restrictions on AMR are the most important regulations put into place by the USDA. I fully support all of the prohibitions placed on the production of meat from AMR systems. I also urge that for the reasons outlined in the SRM section above, dura be prohibited from being included in AMR product.

In the original Harvard risk assessment completed in 2001 as well as the update in 2003, in the US system it was illustrated that AMR could deliver more ID50s for potential human consumption than the direct consumption of brain and spinal cord together.

The 2001 Harvard risk assessment's base case scenario found that out of 1000 simulation runs the mean number of ID50s (infectious doses) available for human consumption would be 35. Almost 11 ID50s (10.9) would be derived from brain and spinal cord. **Twenty (more than half) are derived from AMR products.** (Harvard Risk Assessment, 2001 Section 3.1.2.7 - 3.1.2.9; Appendix 3A Base Case).

Statistics from the Harvard Risk Assessment (2003) showing ID50s from brain and spinal cord vs. AMR product:

Worse case scenario

	Mean	5th percentile	95th percentile
Total ID50s available for humans -	6000	2000	12,000
*ID50s from brain -	770	5.2	2000
ID50s from spinal cord -	280	2	760
ID50s from AMR -	2900	960	5600

Best case scenario

Total ID50s available for humans -	10	0	36
*ID50s from brain -	1.6	0	0
ID50s from spinal cord -	.69	0	0
ID50s from AMR -	3.7	0	10

*Additional tissues included but not listed here.

I also agree that Mechanically Separated Product should be completely prohibited for human consumption.

Surveillance

The proposed increased surveillance program announced by USDA APHIS is essential. In order to estimate the amount of BSE in the US national herd it is imperative that as many of the high risk population be tested as possible. This is also true for Canada. Without this surveillance the US will not be able to monitor the effects of past and present control efforts. It is important for

the industry, academia and government to work together to achieve this goal. We need to know if there is any regionality to cases, what ages are affected and if the current feed ban has failed.

Animal Feed

Epidemiological evidence in Europe and results from the attack rate study indicate that it does not take much exposure to transmit BSE to cattle. Recent results from the attack rate study, which is still in progress, has found that .001 gr of raw infected brain can transmit BSE (1 cow out of 15) through the oral route. The role of cross contamination was under estimated throughout Europe. Experience in other countries has also shown that human error especially at the farm level is difficult to control. It is imperative that the feed ban be effective. There are a number of actions which still need to be taken by the FDA to prevent any potential recycling of the BSE agent in the US cattle population. The FDA is urged to act immediately and put these measures in place.

Per the 2001 Harvard risk assessment, "Our evaluation of potential risk mitigation actions highlights potential measures to further reduce the already low likelihood that BSE could spread to cattle or contaminate human food if it were to arise. **Prohibiting the rendering of animals that die on the farm, possibly of BSE, removes a great deal of potential contamination in the animal feed chain and reduces average predicted cases of BSE following introduction of ten infected cattle by 77%. Implementation of a UK-style ban on specified risk material (*e.g.*, spinal cords, brains, vertebral columns) from both human food and animal feed reduces the predicted number of BSE cases in cattle by 80% and the potential human exposure by 95%."**

Thank you for the opportunity to comment on these rules.

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