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Advisory Committee on Dangerous Pathogens

BSE
(Bovine spongiform encephalopathy)
Background and general occupational guidance

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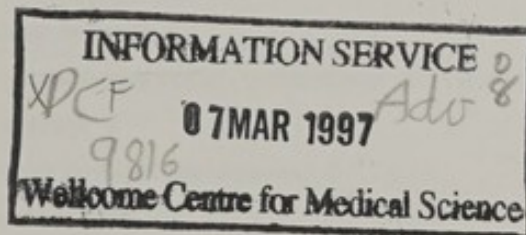
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Advisory Committee on Dangerous Pathogens



BSE **(Bovine spongiform encephalopathy)** **Background and general occupational guidance**

HSE BOOKS

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This guidance is prepared in consultation with HSE, by the Advisory Committee on Dangerous Pathogens, which was appointed by the Health and Safety Commission as part of its formal advisory structure and by Health Ministers. The guidance represents what is considered to be good practice by members of the Committee. It has been agreed by the Commission and Health Ministers. Following the guidance is not compulsory and you are free to take other action but if you do follow it you will normally be doing enough to comply with the law. Health and safety inspectors seek to secure compliance with the law and may refer to this guidance as illustrating good practice.

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ABBREVIATIONS

BSE	bovine spongiform encephalopathy
CJD	Creutzfeldt-Jakob disease
MBM	meat and bone meal
SBM	specified bovine material(s)
SBO	specified bovine offals
TSE	transmissible spongiform encephalopathy(ies)

FOREWORD

The recent announcement of ten cases of a previously unrecognised form of Creutzfeldt-Jakob disease (CJD) raised new concerns about the possibility of transmission of bovine spongiform encephalopathy (BSE) to humans. While there is no compelling evidence of this, we consider it wise for those exposed to potential sources of contamination involving the BSE agent to take precautions to reduce exposure.

Active national surveillance of all cases of CJD has been conducted since 1992 and includes consideration of possible links with each person's occupation. Guidance for a number of occupations in which exposure to the BSE agent might occur through contact with affected animals or their organs and tissues has been in place since 1990 (see the Annex).

This new more general guidance, which has been agreed by the Health and Safety Commission and Health and Agriculture Ministers, is based on the most up-to-date knowledge and if it is followed then it is considered that workers will have a negligible risk of being exposed to BSE. Its main purpose is to provide information about BSE and to re-emphasise the need to use the precautionary protective measures that are judged to be generally appropriate.

People responsible for health and safety matters in the various workplaces where there is contact with material that may be contaminated with the BSE agent, especially those newly involved in disposal operations, will find this guidance helpful in developing local codes of practice for the safe conduct of the work. In addition, the separate sector-specific guidance publications, which provide more detailed information, are being revised to reflect the principles incorporated in this document. They will be reissued as soon as possible.

This guidance may be updated as new information becomes available.

Advisory Committee on Dangerous Pathogens

June 1996

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THE ADVISORY COMMITTEE ON DANGEROUS PATHOGENS

The Advisory Committee on Dangerous Pathogens (ACDP) consists of experts in various branches of microbiology and infectious diseases and representatives of employees and employers. The chairman of the Committee is an independent scientist.

The terms of reference of the ACDP are:

to advise the Health and Safety Commission, the Health and Safety Executive and Health and Agriculture Ministers, as required, on all aspects of hazards and risks to workers and others from exposure to pathogens.

BACKGROUND

About BSE and related diseases

1 BSE is a fatal neurological disease of cattle that was first described in the United Kingdom in 1986. It is one of a number of similar diseases known as transmissible spongiform encephalopathies - or TSE. These occur in humans and in various animal species. Scrapie is the form seen in sheep and goats.

2 In humans, the principal TSE is Creutzfeldt-Jakob disease (CJD) which was first described in the 1920s. CJD occurs at the rate of about one case per million of the population each year in virtually all countries and generally affects people in later life.

3 In March 1996, recognition of a previously unrecognised form of CJD was reported in ten people of unusually young age for this condition. These cases, whose average age was 27.5 years, presented over a two-year period. The cause of these cases is not known but the possibility has been raised that they are linked to exposure to BSE. However, this cannot be confirmed on present evidence. If BSE does cause disease in humans, it would be likely to resemble CJD.

The cause of BSE

4 The emergence of BSE is considered most likely to be due to the feeding of cattle with dietary supplements containing meat and bone meal (MBM) prepared from, among other things, offals of sheep infected with scrapie but not showing signs of disease. Another possibility is that BSE has occurred naturally, but rarely, in cattle and was passed on through feeding MBM derived from cattle*. Changes before 1986 in the methods of production of MBM would have allowed transmission to occur through feed from either source.

5 Although all the TSE can be transmitted under certain conditions (eg by injection), no conventional infectious agent like a virus or a bacterium has so far been identified in any of them. One possibility is that the TSE agents are some form of transmissible protein or 'prion' which might be an altered form of a protein occurring naturally in the brain. Research into the nature of the TSE agents is being actively pursued.

6 A singular feature of all the TSE, whatever their origin, is the remarkable resistance of the agents concerned to heat and to chemical disinfectants. Extremely high temperatures are required to inactivate them.

Occupational risk

7 None of the TSE spreads like colds or flu. For example, close contact with a person with CJD has never been shown to result in transmission of the disease as happens with some other diseases. In the case of scrapie in sheep, there is natural spread of the infection within the flock but there is no evidence that this happens with BSE in cattle. This may be linked to the way in which the infection spreads through the animal's body.

* All forms of mammalian meat and bone meal are now banned as feed material for all farmed animals including pigs, horses, poultry and fish.

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8 There is still great uncertainty as to whether there is any link between BSE and human disease and there is no evidence of any risk to those in occupations in which exposure to the BSE agent may occur.

9 The recent cases of the new form of CJD (see paragraph 3) have no discernible association with occupational exposure. Similarly, four cases of the well-recognised sporadic form of CJD in cattle farmers in the United Kingdom are matched by reports of CJD in dairy farmers in other countries where little or no BSE has been seen. But, as BSE is apparently a new phenomenon, it is prudent to continue to take precautions where there is a risk of exposure.

10 Various sector-specific guidance publications on precautionary measures for farmers, vets, abattoir workers, laboratory workers and others have been issued since 1990 and are being updated. These are listed in the Annex.

**Possible routes
of transmission**

11 If BSE is transmissible to humans in the occupational setting, the most likely routes are through infected 'specified bovine materials' (SBM) contaminating wounds and open lesions on the skin, splashing mucous membranes (eyes and mouth) or exceptionally by swallowing. The SBM are the tissues and organs which, from experimental evidence, are most likely to contain the BSE agent if animals are infected (see paragraph 17).

12 On present evidence, and having considered all likely routes of transmission, the ACDP is of the opinion that the TSE, including BSE, are unlikely to be transmitted by the inhalation of infectious airborne particles. However, we recommend that appropriate precautions are taken as a safeguard. These are detailed below.

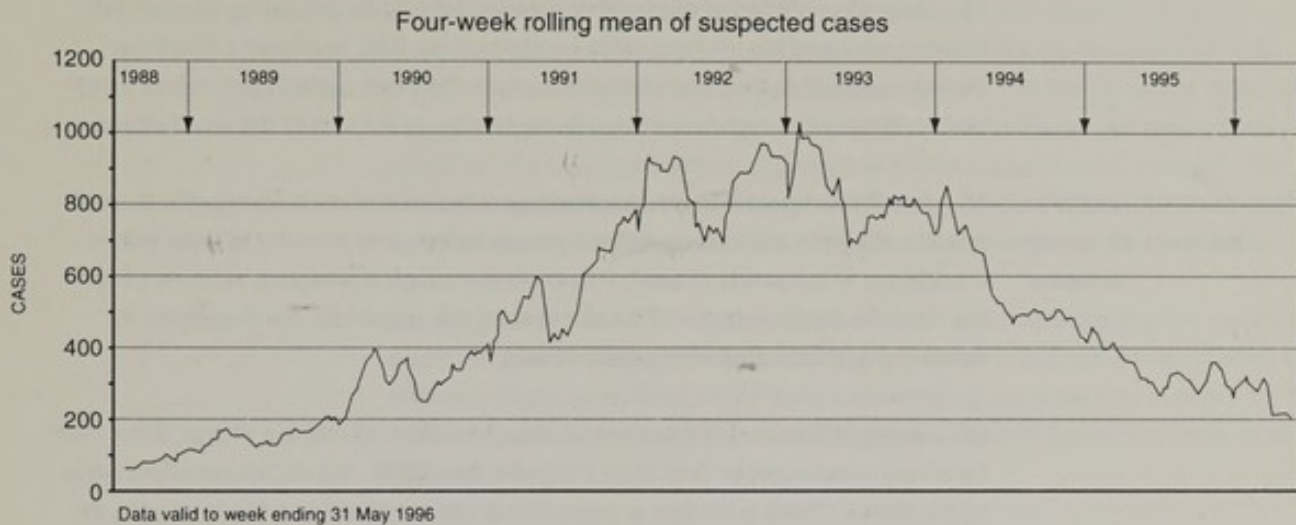
**Measures for
eradicating BSE in
animals and reducing
the risk to humans**

Disposal of cattle with BSE

13 In the ten years since 1986, when BSE was first recognised, a total of just over 160 000 cattle in the United Kingdom have been found to have the disease. Small numbers of cases have also been seen in a few other countries, for example about 220 in Switzerland, 124 in the Republic of Ireland, 36 in Portugal and 20 in France. Other European countries have reported much lower numbers.

14 The cattle population of the British Isles is around 12 million head so the number affected by BSE over the last ten years has been only a very small proportion of the whole herd. Since 1992/93, when the number of new cases reached their peak, notifications have fallen by about 70% which indicates that BSE in the cattle population of this country is in sharp decline. (See Figure 1.)

Figure 1 Notifications of BSE 1988 to May 1996



15 All animals suspected of having BSE are destroyed. The carcasses are incinerated at specially designated sites and the ashes disposed of. Regulations now in force are designed to prevent meat and offals from BSE suspects from entering the food chains of humans or animals. This stringent procedure and a number of other measures have been taken to reduce the potential risk to humans and to limit the spread of the disease among animals.

Specified bovine materials

16 Among the other precautionary measures taken by the Government since 1988 to stem the BSE epidemic and to minimise any risk to humans and animals, is the requirement in law to remove from *all* cattle slaughtered for human consumption, specified bovine materials or SBM (formerly specified bovine offals)*.

17 The SBM currently comprise the whole head, including the eyes but excluding the tongue (the brain is the organ most likely to be affected), the spinal cord, the intestines, spleen, thymus gland and tonsils. While no BSE infectivity has been found in the spleen, thymus and tonsils, these organs are removed as a precaution. All SBM is stained with dye at the slaughterhouse and disposed of by rendering (see paragraph 37), followed by incineration or land-filling.

* See Specified Bovine Materials (No 2) Order 1996

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Other bovine organs

18 Laboratory testing of many other organs and tissues (including muscle, liver, kidneys, milk and blood) from cattle known to have BSE has been carried out. However, infectivity has been detected only in the brain, spinal cord, retina (eye) and, in the case of experimentally-infected cattle, in the wall of the small intestine.

New control measures
- the 'over 30 month
scheme'

19 The Government has decided to prevent the sale of meat from cattle over 30 months of age to reduce any risk to humans further and in order to raise public confidence in the safety of beef. This is done through a slaughter scheme called the 'over 30 month scheme'. The carcasses of these animals are destroyed by rendering and incineration to prevent fraud.

20 Among the animals presented for slaughter after 30 months of age, there may be a very small number (less than 1%) who have BSE but do not yet show signs of the illness. There is no test at present that can be applied on the farm or in the slaughterhouse to show which animals are affected and thereby allow more selectivity in culling stock.

PRECAUTIONS AT WORK

21 As with any health and safety at work issue, a formal assessment is necessary to reveal where hazards might lie and to evaluate the potential risks involved in each operation. Through this assessment, it is then possible to select suitable control measures. In assessing what protective measures are necessary, consideration must be given to all groups of workers who may be involved. The various stages of animal husbandry, slaughtering, carcass dressing, handling of SBM, rendering and disposal of the products of rendering must be considered.

22 Engineering controls will be needed in some circumstances (eg for ventilation and dust control) but the most basic safeguard for all is to avoid contamination of cuts and mucous membranes by using safe working practices and maintaining the highest possible standards of personal hygiene and workplace cleanliness in all aspects of work.

23 The precautions in Table 1 are generally applicable wherever there is a risk of exposure to potentially infected material. These control measures will also reduce the risk from other infections that may be present in cattle. Some other more specific recommendations follow.

Table 1 Basic precautions

- Adhere to safe working practices and take extra care to avoid or minimise the use of tools and equipment likely to cause cuts, abrasions or puncture wounds.
- Where use of such equipment is unavoidable, wear suitable protective clothing, for example chainmail gloves when using knives in the abattoir.
- Cover existing cuts, abrasions and skin lesions on exposed skin with waterproof dressings.
- If cuts or puncture wounds occur, encourage the wound to bleed, then wash thoroughly with soap and water and cover with a waterproof dressing.
- Use face protection (chiefly for eyes and mouth) if there is a risk of splashing, for example a visor or fixed screen.
- If splashed in the eyes or face, wash with running water.
- Take steps to avoid the generation of aerosols and dusts.
- Wash hands and exposed skin before eating, drinking, smoking, taking any medication, using the telephone, or going to the toilet.
- Wash down contaminated areas and equipment regularly with hot water and detergent.
- Wash protective clothing thoroughly after use and store separately from other clothing; alternatively, use disposable clothing.

Where exposure may
occur - occupational
groups involved

24 Those who may be exposed to BSE include farmers, veterinary surgeons, hauliers, slaughterhouse workers, renderers, incinerator operators, maintenance engineers (eg in abattoirs, rendering plants, incinerators) and land-fill site workers where rendered material is disposed of. Other groups of workers will be involved where greaves or meat and bone meal are to be stored. There is no evidence that the hides from cattle sent for tanning present any risk.

Live animals

25 Because of the nature of the disease, BSE-affected animals are more likely to present a physical risk to handlers as their behaviour will change^{4,6}. There is no evidence of transmission of BSE from live cattle to humans in normal animal husbandry practices including veterinary interventions. Nevertheless, good hygiene practices (see Table 1) should always be observed when in contact with all farm stock in case any transmissible infections, for example, cryptosporidiosis, Salmonella, leptospirosis (*L. hardjo*), are present in the animals. Gloves should be worn for all internal examinations and all potentially contaminated equipment, such as hypodermic needles, should be disposed of safely.

26 These precautions apply equally to other species that may succumb to BSE including exotic animals in zoos⁵.

Slaughter and carcase-dressing

27 General guidance on the precautions appropriate for abattoirs has been issued².

28 The tissues that present the highest potential risk are the brain and spinal cord. Therefore, we recommend that non-penetrative methods of stunning cattle should be employed to prevent the release of brain tissue leading to contamination of personnel and the working environment. We are aware, however, that the use of percussion stunners in old cows and mature bulls cannot be recommended because a satisfactory stunning is not always achieved.

29 If the captive bolt has to be used, it should be handled with care. Gloves should be worn and arrangements made to protect the operator from splashing (eg by use of a visor or a fixed screen). Captive bolts should be thoroughly cleaned with a disposable paper towel which should be disposed of into an SBM bin and subsequently treated as an SBM and stained.

30 We also recommend that the practice of pithing should be discontinued if this can be achieved without compromising the safety of slaughterhouse workers. This is to minimise further contamination of operatives, equipment and the working environment by brain tissue. Alternatively, it may be possible to use

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a disposable pithing rod or other device to be left in place. This would avoid the need to remove the rod, which may be contaminated, after pithing each animal. More detailed guidance on abattoir practices for controlling exposure to SBM is contained in a publication from the Meat Hygiene Service¹⁴.

31 Where carcases are destined for total disposal, any unnecessary exposure of the spinal cord should be avoided. We recommend acceleration of the development of alternative dressing techniques to prevent such exposure, for example by dividing carcases on both sides of the spinal column so as to leave the column intact. If dividing the spine is unavoidable, consideration should be given to ways in which those using saws to do this can be adequately protected against exposure to fragments of spinal cord and cerebro-spinal fluid. Direct contact with the spinal fluid draining from the carcase during and after removal of the head should be avoided.

32 While the BSE agent has not been detected in organs and tissues other than the brain, spinal cord, eye and small intestine, it is prudent to handle all tissues with care to avoid splashing and other forms of personal contamination. Face protection, head cover, apron and gloves should be worn.

Disposal of SBM

33 Special arrangements are in force for handling and transporting SBM from cattle for disposal. The material is stained blue to distinguish it from other products. High standards of cleanliness should be maintained by all those coming into contact with SBM including, for example, hauliers during loading and unloading the material at abattoirs and rendering plants.

34 Personal contamination by splashing should be avoided during disposal operations by using waterproof protective clothing including gloves and face-shield when, for example, hosing out a vehicle after delivery of SBM or at the site where it is received or when carrying out maintenance work on plant. Protective clothing should be removed before entering the cab of a vehicle or doing other work and before taking meal breaks etc. Protective clothing should be kept apart from other clothing and cleaned by washing thoroughly and regularly.

35 Chemical disinfection of containers, vehicles, working surfaces, floors etc exposed to contamination by SBM is not practicable due to the resistance of TSE agents to routine methods of disinfection. Thorough cleaning by dilution with large volumes of hot water and detergent is recommended. Low pressure hoses should be used to minimise splashing. Particles of solid material falling onto the floor or hosed out of storage bays or hoppers etc should be trapped by a sieve or filter to prevent them entering drainage systems and sent for rendering as SBM.

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Carcase meat and other offals

36 Meat, edible offals and blood are unlikely to present a risk from BSE. However, the usual standards of occupational and personal hygiene should be maintained and these will protect against the possibility of exposure to other infectious agents that may be present.

Rendering, storage and disposal of greaves and tallow

37 Rendering involves heating meat and offals at high temperatures for a prolonged period. Should there be BSE infectivity in material undergoing rendering, it may not be totally eliminated using current practices but would be substantially reduced.

38 The end products of rendering are water (given off as steam), solid material (so-called 'greaves') and the fat fraction known as tallow. From experimental studies, there is good evidence that tallow from the rendering process is not contaminated with BSE and therefore no special precautions are required when handling it.

39 In the past, the greaves were dried and then finely ground to a meal (meat and bone meal or MBM) for use as an agricultural fertiliser or as a feed-supplement for farm animals. These practices have now ceased. All MBM is being disposed of other than that from non-SBM tissues from animals not over 30 months of age which may be used for horticultural purposes.

40 Steps should be taken to minimise the generation of dust and particles from dealing with greaves. Grinding of greaves derived from or including SBM should be avoided unless conditions can be controlled. Where the material is stored loose or where bags have broken while awaiting disposal, precautions will be necessary to minimise or avoid exposure of staff to any dusty material that may be present. Standard dust control measures, including local exhaust ventilation or other engineering controls, should be used as for any other dust exposure in the workplace. These measures will be necessary where this material has to be transported, stored and finally reduced in size to make it fit for incineration or is land-filled.

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Table 2 Summary of recommendations

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| <ul style="list-style-type: none">• Use the protective measures in Table 1 routinely.• Use non-penetrative methods of stunning cattle if possible.• Discontinue pithing.• Use visors or face shields where there is a risk of splashing.• Avoid the use of reciprocating saws if the carcase has to be split through the spine.• Use chainmail gloves and forearm protection to prevent cuts from sharp equipment.• Use low pressure hoses to clean SBM-contaminated areas.• Control exposure to dusts arising from greaves by use of engineering controls and/or standard personal protection measures.• Finally, for carcases destined for disposal, we recommend acceleration of the development of alternative dressing techniques to avoid exposure of the spinal cord. |
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ANNEX: OTHER RELEVANT GUIDANCE

- 1 *BSE and carcase disposal* Pocket card 1990 IND(G)85L HSE Books
- 2 *BSE - Bovine spongiform encephalopathy* January 1996 Meat Trades Joint Working Party and Health and Safety Executive - Guidance Note 05
- 3 *Standard conditions for storage and incineration of BSE carcasses* Rev November 1993 MAFF*
- 4 *Guidance for veterinary surgeons handling known or suspect cases of BSE* January 1990, reprinted August 1994 MAFF*
- 5 *Spongiform encephalopathies in zoo animals: Guidance notes* 24 August 1990 MAFF*
- 6 *Bovine spongiform encephalopathy (BSE): Advisory notes for farmers* 1990 MAFF*
- 7 *Zoonoses in agriculture: preventing the spread of disease to livestock handlers* AIS 2 1989 HSE Books
- 8 *Categorisation of pathogens according to hazard and categories of containment* Advisory Committee on Dangerous Pathogens 1990 Health and Safety Commission and Department of Health HMSO ISBN 011 885564 6
- 9 *Zoonoses and bovine spongiform encephalopathy: Guidance for the knacker (including at hunt kennels and maggot farms) and rendering industries* Health and Safety Executive, Field Operations Division - OC 543/1 - June 1992 (Addressed to: Factory & Agricultural Inspectors, EMAS Professional Staff and FCG Specialist Inspectors (Occupational Hygiene))
- 10 *Some of the health and safety aspects of maggot-bait breeding* Health and Safety Executive Information document HSE 400/9
- 11 *Precautions for work with the human and animal transmissible spongiform encephalopathies* Advisory Committee on Dangerous Pathogens September 1994 Health and Safety Commission and Department of Health HMSO ISBN 0 11 321805 2
- 12 *Categorisation of biological agents according to hazard and categories of containment* Advisory Committee on Dangerous Pathogens 1995 Health and Safety Commission and Department of Health HSE Books ISBN 0 7176 1038 1
- 13 *Use of bovine eyes in research: Bovine spongiform encephalopathy* Health and Safety Executive February 1996 (Available free from the Health Directorate B1, Health and Safety Executive, Room 703, Rose Court, 2 Southwark Bridge, London SE1 9HS)
- 14 *Specified bovine material (SBM) controls in GB slaughterhouses* 1996 Meat Hygiene Service

*Items with a reference to MAFF (Ministry of Agriculture, Fisheries and Food) may be obtained from MAFF, AH (BSE) 1A, Government Buildings, Hook Rise South, Tolworth, Surbiton, Surrey KT6 7NF.

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