In December 1984 a UK farmer called a veterinary surgeon to look at a cow that was behaving unusually. Seven weeks later the cow died. Early in 1985 more cows from the same herd developed similar clinical signs. In November 1986 bovine spongiform encephalitis (BSE) was first identified as a new disease, later reported in the veterinary press as a novel progressive spongiform encephalopathy. Later still the causal agent of BSE was recognized as an abnormal prion protein. Since the outset the story of BSE has been beset by problems.

Problems with control of bovine spongiform encephalitis (BSE)

Multiple delays

Although there are some examples of prompt reaction to developments, the unfolding BSE story has been characterized by consistent and sometimes considerable delays in investigation of the new disease, in providing advice to both government Ministers and to the public and in implementing effective control measures (Table 1).

Nine months after the first cow was reported to the veterinary surgeon specimens taken from it were referred to the Central Veterinary Laboratory for specialist opinion. A week later a diagnosis of spongiform encephalopathy was made but it was another 10 months before the existence of a new disease was accepted. Failure to acknowledge quickly the public health significance of this new disease meant that it was 7 months before Agriculture Ministers were advised and 9 more months passed before the news was given to the Department of Health.1,2

Seven months after a causal relationship was first demonstrated epidemiologically1 the use of meat and bone meal (MBM) in ruminant feedstuffs was banned. Restrictions on the use of MBM were extended gradually but it was almost 9 years before the ban was made fully effective by extending it to cover all farm animals. It was another 3 months before old stocks of feedstuffs manufactured before the ban were withdrawn.

The UK government allowed more than 2 years to pass before setting up a committee to advise on research into the cause of BSE and its mode of spread. Although that committee produced
a report after only 3 months it was another 6 months before the government responded, citing the availability of research funding to justify the delay. In other words it was over 3 years after BSE had been accepted as a new disease before government sponsored research really took off.

Soon after the notification to the Department of Health, but 18 months after recognition of the new disease, the first scientific working party was established. It was a further 2 years before a dedicated Spongiform Encephalopathy Advisory Committee (SEAC) was established. Advice on the epidemiological method necessary to study the possibilities of transmission was not provided for SEAC until 10 months after its establishment. Although the Department of Health sponsored surveillance of Creutzfeldt-Jakob disease (CJD) in 1990, it was 1997, 18 months after acceptance of new variant Creutzfeldt-Jakob disease (vCJD) as a new form of human spongiform encephalopathy, that SEAC set up a subgroup to consider its epidemiology.

The UK government allowed more than 10 years to elapse after recognition of the new disease before formal efforts were made to integrate the work of all the agencies concerned with the control of BSE.

In the future there might be occasions when, to avoid unnecessary delay, scientists make public their misgivings about aspects of the management of similar problems.

Conflict
There has been conflict between public health, commerce and politics throughout. Government ministers have said their priorities were to protect both public health and the UK farming industry simultaneously. They have tried to serve two masters and failed both. The principal organizations in conflict have been those representing food producers and food consumers, the worst example being the internal conflict of interest in the Ministry of Agriculture itself. It has been accused of favouring the producers at the expense of consumers and has forfeited both media and public respect.

There have been conflicts between orthodox scientific understanding and those who have espoused unorthodox possibilities. There are still conflicts between the various theories of causation of BSE. Initially it was believed that scrapie had crossed from sheep to cattle. Despite the apparent contradiction, conventional wisdom said that humans were safe because transmissible spongiform encephalopathies (TSE), of which BSE is one example, did not cross species barriers. Later, in an analogy with Kuru, it was recognized that recycling of cattle products through the MBM rendering process meant that cattle had been turned into cannibals so that the infecting prions might have come originally from cattle and been concentrated before being fed to other cattle.

At an early stage those who said that there might be a risk to human health were dismissed as only speculating. Now there is an acknowledged risk that BSE might have spread to humans, in the form of vCJD. It is alleged that it might have spread through the use of vaccines containing bovine material rather than by eating infected meat.

Poor advice to the public
Early advice to the public was aimed at avoiding public panic and protecting the UK beef industry. Television viewers saw a government minister trying to feed a beefburger to one of his small children. The media quoted ministers’ repeated reassurances that British beef was perfectly safe to eat. Ministers were too fond of making scientific pronouncements for which they lacked the expertise.

Scientists were prone to putting a political slant on their pronouncements. Some have conceded that in 1988 their advice that risks to the public were remote was motivated by a wish to prevent panic and the possible failure of the public vaccination programme. In fact risks were significant.

Now there are many sources of advice, especially on the world wide web. Some, including those set up by government departments, are authoritative. Some, established in the early 1990s, have not been updated and still offer outdated information. Others are notable for their outlandish views, for example that BSE is the result of either political or medical imperialist conspiracy.

Inappropriate action
Inappropriate action can be divided into the incompetent and the deceitful. The failure to recall animal feed containing MBM until some 3 months after its use had been banned can be classed as incompetent. Continued use of MBM in that 3-month period can be viewed as either incompetent or deceitful. The slaughter of animals with symptoms for inclusion in the human food chain, as practised in some European countries, must be classed as deceitful.

The consequences of bovine spongiform encephalopathy
It is interesting to take stock 13 years after BSE was formally recognized as a new disease (Table 2).

The UK beef industry, previously worth £520 million per annum in exports alone, has effectively been destroyed. Despite the European Union export embargo having been lifted some countries still refuse to accept British beef.

Although direct evidence of a link between BSE and vCJD has yet to be confirmed it is still regarded as the most plausible explanation. Therefore up to 47 deaths of young people are attributable to BSE.

| Table 2 | Consequences of the bovine spongiform encephalopathy (BSE) experience |
|-----------------------------------------------|
| 1. | An industry has been destroyed |
| 2. | Young people have been harmed |
| 3. | Experts are mistrusted |
| 4. | Government is disbelieved |
| 5. | Public Health protection has been undermined |
| 6. | Anarchy has been promoted |
Speaking of the public the new president of the European Commission is cited as saying, 'they no longer trust their governments or the scientists.' The BSE Inquiry, established in the UK in 1997, has provoked defensive reactions from some of the scientists.

It has become fashionable for governments to talk about Public Health. Unfortunately blatant commercial protectionism, in the form of one country resisting the products of another, has been allowed to masquerade as public health protection thereby undermining the concept.

The brief experience with public knowledge about genetically modified foods has amply reinforced the fact that confidence in expert and government statements has been lost. Instead of believing government announcements that genetically modified foods are safe and that properly controlled experiments are being undertaken, a mixture of anarchy and sales resistance has taken over. Experimental crops have been destroyed by direct anarchic action and public attitudes have made food retailers and supermarkets withdraw genetically modified foods from sale.

Conclusion

The lessons of the BSE epidemic—have they been learned?

The lessons from the BSE experience in the UK are clear and simple (Table 3). They are universally applicable in all countries experiencing this and other new diseases, but the learning has been patchy at best.

In the UK all farmed animals, including fish, have been protected from eating mammalian MBM since June 1996. The same is not true everywhere. Quite recently mammalian MBM has still been reaching cattle in Europe, sometimes illegally labelled. In Belgium the use of contaminated animal fat in poultry meal has given rise to a dioxin scandal.

A year ago it was estimated that 2–300 animals infected with BSE still reached the human food chain in the UK annually. In the rest of Europe an unquantifiable number of infected cattle reach the human food chain, often because animals with central nervous system symptoms are sent for slaughter before diagnosis.

In the UK a Food Standards Agency is being established to separate the responsibilities for producers and consumers currently held by the Ministry of Agriculture, Fisheries and Food (MAFF). To the extent that a proportion of the new Agency's staff is likely to be drawn from MAFF it remains to be seen if the culture will change. Other countries have their own arrangements for safeguarding the public but infected food still gets through the net. Eventually the EU might have its own food standards organization but the task of co-ordinating policies across Europe against a background of commercial conflict between states will not be easy.

Many countries have long established public health surveillance systems. The EU has agreed on a communicable diseases surveillance and control system which might eventually be connected to a global network. In the meantime the challenge will be to link existing human, microbiological and veterinary surveillance systems, both within and between states, so that relevant results in each system are readily accessible to the others. In this respect it should be recalled that the World Health Organization (WHO) has a part to play.

After a slow start relevant research is now under way but experts must be more prepared to respond to questions with, 'I don't know' until their research produces convincing answers. It will be a difficult discipline to maintain in the competitive world of research and in face of media pressure but they will not create panic by being truthful and could even regain the confidence of the public. Similarly, politicians would be wise to acknowledge ignorance on occasions. This would require their education to a degree that ensured both understanding of epidemiological principles and insight into the effects of their pronouncements on the public.

Given the acknowledged loss of public confidence it might be expected that politicians would be more circumspect in their comments than they were at the start of the BSE epidemic. Yet as recently as September 1999 the UK Secretary of State for the Environment tried once again to serve the two masters of public health and commerce. In a BBC broadcast he said that there is no risk to human health or the environment from genetically modified oil seed rape. Having given this absolute reassurance he later contradicted himself by speaking of the need for research in order to learn the impact on the environment. Will they never learn?

Acknowledgement

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References


Table 3 Lessons from the bovine spongiform encephalopathy (BSE) experience

| 1. Allow farm animals to eat their natural food |
| 2. Keep diseased animals out of the human food chain |
| 3. Separate the responsibilities for commerce and public health |
| 4. Establish public health surveillance and disease registers |
| 5. Promote timely research |
| 6. Tell the truth |


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