Britain: Report highlights BSE danger from infected sheep

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The risk to humans developing variant Creutzfeldt-Jakob Disease (vCJD) could be far greater if the brain-wasting disease Bovine Spongiform Encephalopathy (BSE) has entered the sheep population. This was the conclusion of a study published in the British science magazine *Nature* on January 10.

The study was carried out by researchers working in the infectious diseases department of Imperial College London led by Professor Neil Ferguson.

BSE in cattle, also known as "mad cow disease", is believed to have been spread by the practice of feeding cows the rendered remains of slaughtered cattle and other livestock. Until legislation banned the practice, sheep were also fed the same material.

Since it began in the late 1980s, the BSE epidemic has infected nearly 180,000 cattle. At its height in 1992 over 36,000 cattle had the disease. Numbers have now declined with around 700 cases last year.

Variant Creutzfeldt-Jakob Disease—the human form of BSE—is transmitted by eating infected meat or other animal products. Since 1995, 104 mainly young people have died of the disease, with nine more people currently diagnosed as suffering from this terminal and incurable condition. The eventual number of people who could be affected is still an unknown, because of the extremely long incubation period for the disease. There also remains the possibility of a second wave of infection via human-to-human transmission as a result of surgical procedures. Since the infective agent, the BSE prion, is extremely difficult to destroy, the usual sterilisation methods used on surgical instruments do not eradicate it.

The researchers at Imperial College considered three possible scenarios if BSE has passed into the national sheep flock. The worst possible case considered the effect of BSE spreading both within and between sheep flocks. The study's median scenario projected the spread only within a flock, while the best-case scenario investigated what would happen if it spread neither between nor within flocks. Sophisticated mathematical models were devised to predict the possible effects on the human population.

In the worst case, the study predicts that 150,000 people could die as a result of eating infected sheep meat. This figure is three times higher than the worse case scenario of human deaths from vCJD contracted from eating contaminated beef.

It has not yet been shown whether sheep have in fact contracted the disease. The report is based on the assumption that BSE has passed from cattle to sheep and has been spreading from sheep to sheep. Many scientists think that such a cross over from cattle, and its subsequent spread within sheep, is a possibility. Professor Neil Ferguson said, "In some ways I'd be surprised if BSE wasn't found in sheep."

One difficulty detecting BSE in sheep is that sheep are also subject to a brain-wasting disease known as scrapie. This has been in the sheep population for 200 years and is considered harmless to humans. Currently there is no test to distinguish between BSE and scrapie in sheep.

Studies have shown that BSE in sheep behaves differently to the disease in cattle. It infects a wider range of sheep tissues at an earlier age. There are fears that BSE in sheep could mimic scrapie, which passes easily by horizontal infection from sheep to sheep.

Under current legislation, the ban on sheep offal is not as extensive as that on cattle offal, some of the most infective material. With sheep under 12 months old, only the spleen has to be removed before the carcass can enter the human food chain. For sheep older than one year, the skull, brain, eyes, tonsils and spinal chord

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are banned, but not the lymph nodes or intestines (as in cattle).

Professor Ferguson said, “The current risk from sheep could be greater than that from cattle, due to the more intensive controls in place to protect human health from exposure to infected cattle, as compared with sheep.”

In a newspaper article in August last year, former government advisor Dr Richard Kimberlin warned of the potential danger from BSE-infected sheep: “We now know that several tissues from BSE-infected sheep, including lymph nodes, pose a greater risk than the same tissues from infected cattle”.

The Imperial College team says that banning all internal sheep organs from the human food chain would reduce the health risk by 90 percent.

Frances Hall, secretary of the Human BSE Foundation, said, “If it is in sheep, people could have been eating contaminated meat for years.” Frances, whose son Peter died from vCJD in 1996, added, “It’s very sad to think more families might be having to go through the same nightmare we’ve gone through needlessly”.

The Department for the Environment, Food and Rural Affairs (Defra) has begun a programme to screen sheep. Professor Tim Lang of Thames Valley University, who had written widely on food safety, is concerned about the suitability of Defra to conduct such a study. “One of the many things this sorry saga has taught us is that we couldn’t trust public health controls to be run by a ministry in charge of production.”

A previous government study set up to estimate BSE infection in sheep brains had to be abandoned last year. It was discovered that poor laboratory techniques meant the samples being studied were possibly either cow brains or sheep brains that had been contaminated with cow brains.

Following the BSE epidemic in Britain, the Labour government set up the Food Standards Agency (FSA). In October last year it issued an update report on the risk of BSE in sheep that stated, “If BSE were found to be present in sheep, the current SRM [Specified Risk Material, i.e. offal, spinal cord, etc.] controls would not be adequate to eliminate the risk of infected sheep meat form entering the food chain. It has been shown that it is impossible to remove all infectivity from a sheep.”

The FSA, which had commissioned the Imperial College report, issued an equivocal and defensive statement in response. It read, “We do not know whether BSE entered the sheep flock in the past and, if it did, whether it is in sheep today. Given this uncertainty, the agency has been proactive in examining whether further precautionary measures may be appropriate in addition to those currently in place.”

Although now at a much reduced level, the risk of BSE from cattle has not yet been eliminated. The FSA announced last week that the meat of a calf born to a BSE infected cow had entered the human food chain. The incident is reported to have occurred in Wales last November.

According to reports, a farmer had sold the calf to an abattoir. Normally, offspring of BSE-infected cattle would be culled and the carcass destroyed. Among the measures to combat BSE, a cattle “passport” system has been introduced, and this should have prevented the calf from being sent to the abattoir and its meat sold.

The FSA said a backlog on culling infected animals had built up because of the demands placed on the veterinary service by the foot and mouth epidemic, which was only declared officially over on January 15. Pressure on vets and other officials had led to a build up of suspect animals.

Defra published a report on November 2001 noting the continuing danger from BSE. “Despite the measures taken to control the current outbreak of foot-and-mouth disease in the UK, the controls for restricting, slaughtering and testing BSE suspects continue albeit at a lower level due to the need to redeploy resources,” the report said.

The FSA has called on the government to tighten up procedures to ensure that the offspring of BSE-infected cattle do not enter the food chain. Debby Reynolds veterinary director of the FSA said, “This is a regrettable incident” adding “We want to see the cull of offspring of BSE animals backlog cleared as a priority.”

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