

Opinion on: Monitoring some important aspects of the evolution of the Epidemic of BSE in Great-Britain

Update providing an epidemiological commentary on BSE projections for Great Britain (GB) and on surveillance, as well as on the occurrence of "Born After the Real Ban - BARB" cases adopted by the SSC at its meeting of 7-8 December 2000

OPINION

Regular monitoring of the evolution of the BSE epidemic in Great Britain is part of the mandate of the Scientific Steering Committee. A first detailed opinion was adopted on 27-28 May 1999.

It concluded that the current and expected evolution of number of BSE cases in the UK (1999-2004) are in line with all models and stated that the tail of the epidemic would not necessarily present a constant decline, certainly not when small numbers are involved. The current (1999) numbers of BSE cases were considered to be in line with the scientific expectations.

This opinion was confirmed in the SSC's opinion of 28-29 October 1999 on *The Scientific Grounds of the Advice of 30 September 1999 of the French Food Safety Agency (the Agence Française de Sécurité Sanitaire des Aliments, AFSSA), to the French Government on the Draft Decree amending the Decree of 28 October 1998 establishing specific measures applicable to certain products of bovine origin exported from the United Kingdom.*

The present opinion provides a further updated answer to the following questions:

Question 1: *How does the SSC assess the current and now-expected (2000 - 2002) evolution of the number of BSE cases (epidemic) in GB? Is the current number of cases in line with current scientific expectations? Is the current number of GB's BSE cases in line with previous scientific expectations?*

In addition, and also in the light of the recent discovery of a first BSE case born after the so-called "real feed ban of 1 August 1996" (BARB), the SSC addressed the following questions:

Question 2: *Have BSE cases fallen off at a similar rate in Scotland, England and Wales?*

Question 3: *How can the monitoring of projections be improved?*

Question 4: *How should BSE cases born after 1 August 1996 be investigated?*

Question 5: *What purposes does PrP(res) surveillance in sentinel groups of slaughtered bovines serve in GB and in EU?*

The answers to these questions were adopted by the Scientific Steering Committee on the basis of an evaluation report prepared out by the TSE/BSE *ad hoc* Group. This report is available separately on the same internet site.

Question 1: *Is the current number of cases in line with current scientific expectations? How does the SSC assess the current and now-expected (2000 - 2002) evolution of the number of BSE cases (epidemic) in GB? Is the current number of GB's BSE cases in line with previous scientific expectations?*

The SSC considers that current numbers of BSE cases in the Great Britain are in line thus far with the most recent scientific projections.

Current projections are over a limited time-horizon, such as two to three years ahead, and uncertainty intervals are

correspondingly narrower. Using BSE case data to mid October 1999 and revised survivorship models, updated BSE projections by year of onset were produced for Great Britain which take strategic culling into account and assume a 10% risk that born up to 6 months before BSE onset in the dam would eventually develop BSE ¹. As a result, from 1998, the updated central projections run considerably higher than those of Anderson *et al* (1996) and Ferguson *et al* (1997). For example, Donnelly *et al* (April, 2000) calculate 2580 (2390 - 2800) onsets for 1999. For 2000, they project 1750 (1520 - 2210) BSE onsets and 870 (730 - 1290) in 2001. Wilesmith's projections by year of restriction are for 1110 (880 - 1340) subsequently confirmed as BSE restrictions in 2000 and 470 (320 - 615) in 2001. Both central projections currently envisage that BSE cases - whether onsets or restrictions - will halve between 2000 and 2001, but with crude worst-case scenarios for the decrease being 15% [(1520 - 1290)/1520] and 30% [(880 - 615)/880] respectively.

The SSC notes however that the current number of GB's BSE cases are not anymore in line with the earliest model predictions for BSE onsets made in 1996 and 1997 when central projections were highest if horizontal transmission was assumed in addition to feed-based exposure, and lowest when maternal transmission was added to feed-based exposure. But, experimental evidence for horizontal transmission is scant. Projections which assumed only feed-based exposure were therefore regarded as conservatively high, also because targeted culling would further decrease future BSE cases. Also, there is inevitable uncertainty in extrapolating the estimated feed risk profile to the period three to four years prior to the latest BSE case data available for analysis because only about 7% of BSE cases occur within 3 years of exposure; and feed-based exposures can occur during the first year of life, or later. Finally, assumptions underlying certain of the original projections, such as that GB's feed risk fell to negligible levels by mid 1994, have not been confirmed by the subsequent data. For example, Anderson *et al* (1996) and Ferguson *et al* (1997) projected for 1999, respectively: 680 (390 - 5910) and 640 (530 - 770) BSE onsets, compared with the 2176 BSE onsets in 1999 confirmed by 1 July 2000.

Question 2: Have BSE cases fallen off at a similar rate in Scotland, England and Wales?

The SSC concludes that BSE cases have not fallen off at a similar rate in Scotland, England and Wales. Bovine exposure to BSE-contaminated non-ruminant rations may have been implicated in this geographical heterogeneity, but other explanations are not ruled out.

Question 3: How can the monitoring of projections be improved?

The SSC considers that first of all a distinction needs to be made the date of BSE onset, date of restriction of a BSE suspect, and the date of BSE confirmation.

It is further important when monitoring BSE projections for GB that out-turn and projection are tabulated on the precise basis that has been used for calculating the projections. The SSC recommends that projection teams should adapt their programming to provide an uncertainty range for the rate of decline of BSE cases (if necessary, on a transformed scale).

Finally, special attention should be paid by modellers to the transmission dynamics of BSE in GB's Born After the (1988) Ban, so-called BABs, for three reasons: diagnostic awareness, extended database with information on BSE status of the dam, and because minority transmission routes command greater attention against a reduced feed-risk background.

Question 4: How should BSE cases born after 1 August 1996 be investigated?

Investigations of BSE cases born after 1 August 1996, so-called BARBs, should follow an agreed protocol. A special BARB-controls database should be defined to facilitate investigation of feed-based exposure, maternal or other transmission.

Investigation of feed-based-exposure means recording the suppliers of feed for cattle or other species to all farms at which the BARB was located from birth to onset. For each such farm, a record should be reconstructed, if possible, of feed quantities and numbers of other species on farm at the same time as the BARB was located there.

Investigation of maternal transmission requires the identifier(s), disposal/survival status (e.g as fallen stock, emergency slaughter, OTMS or routine slaughter for human consumption) and BSE status of the BARB's dam. The dam's calving

history should include the identifier(s), disposal/ survival status and BSE status of calves born to it in the calving seasons before and after birth of BARB.

BARBs born more than 24 months before BSE onset in the dam are less likely to have been infected "maternally"². BARBs born more than 24 months before BSE onset in the dam are therefore of particular interest because they either challenge our understanding of maternal transmission, or were not maternally-infected. BARBs whose dam was known to have survived for 7.5 years without developing BSE are also of particular interest because a non-maternal transmission route should be considered.

Ideally, surviving dams of BARBs (and controls) and their calves born in the calving seasons before and after birth of the BARB should be bought in and kept on ministry farms so that their definitive BSE status can be established.

Investigation of veterinary transmission ideally requires a record of any invasive procedure(s) and the identity of the veterinary practitioner/other person providing them.

Question 5: What purposes does PrP(res) surveillance in sentinel groups of slaughtered bovines serve in GB and in EU?

PrP(res) surveillance of a pseudo-random sample of bovines aged 5+ years in GB's OTMS scheme was introduced as a check on GB's BSE surveillance. The same rate of decline in clinical BSE cases and in OTMS test-positive bovines assures against diversion of proximal BSE cases into the OTMS scheme to avoid their formal diagnosis.

PrP(res) surveillance in the EU sentinel groups of fallen and emergency slaughter stock quantifies otherwise missed late disease in BSE-infected animals that were morbid or otherwise distressed. It is also an insurance against diversion of BSE cases into these sentinel groups to avoid reporting.

PrP(res) surveillance of a scientifically-based sample of EU routinely slaughtered bovines aged 5 - 7 years, for which birth cohort and age at slaughter are established, checks on BSE diagnostic acumen, by comparing the number of BSE diagnosed and surveillance- test-positive bovines at proximal ages.

¹ This assumption reflects an area of uncertainty, as the average value of about 10% is based on statistical grounds, not on experimental evidence of maternal transmission. In this context the SSC wishes to refer to the opinion of September 1997 of the former Multidisciplinary Scientific Committee (MDSC) on Maternal Transmission, in which the wording "maternal risk enhancement" is used. The latter wording is considered to better reflect the uncertainty and may cover mechanisms other than direct maternal transmission.

² See also Footnote N° 1.