RECENT TREND OF BSE IN FRANCE

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Analysing the pattern of the Bovine Spongiform Encephalopathy (BSE) epidemic in France is crucial both for risk analysis and the assessment of control measure efficacy.

Two modelling studies of BSE in France (Donnelly 2002, Supervie & Costagliola 2004) showed, if not the same expected number of total BSE cases, at least the same overall pattern of the annual incidence of infection. Both models showed two distinct peaks of the epidemic. The first one concerned the cohorts of animals born in 89 and the second one concerned the cohorts of animals born in 94 and 95. According to the same models, large numbers of bovines belonging to birth cohorts prior to 1989 could have been infected, whose related BSE cases remained completely unnoticed.

From mid 2000 until July 2001, the surveillance system underwent several changes. In addition to the MRS, a pilot active surveillance program was implemented on cattle at risk (dead on farm, euthanasied or emergency slaughtered) from mid 2000. Systematic screening was extended to all cattle over thirty months of age entering the food chain in January 2001, to all cattle at risk (as defined above) in June 2001, and to all cattle older than 24 months entering the food chain in July 2001. The active surveillance system showed that many BSE cases were not detected or reported by the clinical surveillance system. Before the surveillance of all adult cattle entering the food chain was implemented, the trend of the epidemic was difficult to analyse without the use of sophisticated models because of underreporting

It has been done since then by comparing successive birth cohorts using logistic regression models adjusted for the type of animals (classified in dairy, beef cattle, mixed or unknown) and for the region. Such analyses are made on two separate categories of the cattle population: at risk animals from western France (Bretagne, Basse Normandie and Pays de la Loire regions) tested during the 2nd semester of 2000, 2001 and 2002 (Morignat and others 2004) and cattle in metropolitan France entering the food chain and tested in 2001 and 2002 (La Bonnardière and others 2003). The pattern of the risk of contamination is roughly the same for both populations (Fig 1). It is consistent with the results of the modelling studies: an increasing risk for animals born prior to 1994 and 1995, and a decrease for the following ones. The beginning of this decrease matches with the implementation of the control measures of July 1996, i.e. the ban of specified risk material and cadavers in animal foodstuffs. Since most animals are assumed to be contaminated between the ages of six and eighteen months, this decrease could be imputed, at least partly, to this control measure.

In spite of this dramatic decrease, 76 BSE cases born after this measure have been detected so far whose origin of contamination remains unknown. An epidemiological analysis of these cases is running in order to raise hypotheses of contamination: vertical transmission, consumption of contaminated MBM, due to late or incomplete application of the measures of 1996, consumption of potential other risk materials still allowed as certain animal fats or bicalcic phosphates made from bones and exposure to imported products.

Besides, the mandatory screening of all adult cattle permitted to analyse the geographical risk of BSE (Abrial and others 2004). This was done from the geographical location of the farms in which BSE positive animals detected from July 2001 to July 2003 were raised during their 1st year of life. Born After the Ban (BAB) cases (i.e born between January 1991 and June 1996) and superBAB cases (i.e born between June 1996 and December 2000) were differentiated. Relative risk of BSE in each geographical area was computed in comparison to the national average during the same period of time taking into account the different cattle systems (dairy, beef) and the structural neighbourhood of the geographical areas. France was divided into 1,264 hexagons of 23 square km. The analysis was based on a probabilistic model describing the number of observed cases in each hexagon and the model was fitted thanks to a Monte Carlo simulation. The results (Fig 2) showed a significant spatial heterogeneity for the risk of BSE contamination (at the 1% level), for BAB cases (36 % of the hexagons) and for SuperBAB (19 % of the hexagons). Comparison of the distribution of the risk shows that areas with a higher risk for BAB and superBAB cases were roughly the same, which argues rather for common sources of contamination than for new sources of contamination. However, the origin of SuperBAB cases has to be formally evidenced. Moreover, the future trend of the BSE epidemic in France will have to be monitored precisely in order to evaluate the efficiency of the meat and bone meal ban implemented in November 2000.

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Figure 1: Summary graph of the risk of BSE in France in the successive birth cohorts

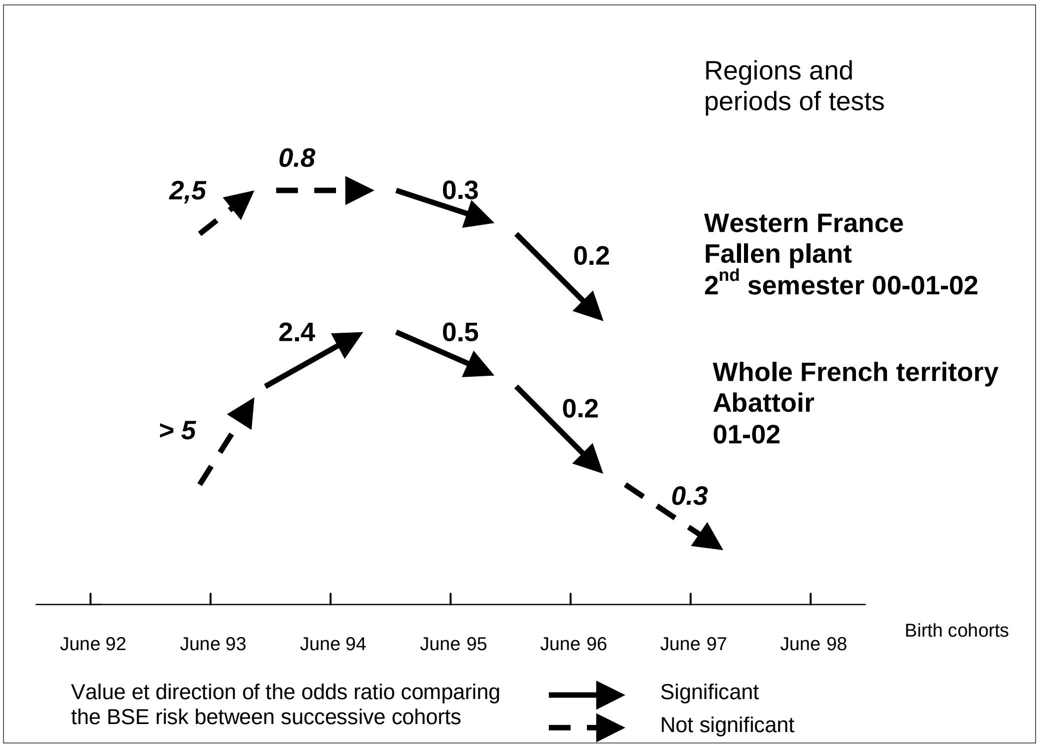

Figure 2: Areas with a relative risk of contamination of BSE (RRC) significantly greater than the national average (p<0.01), for BAB cases (36 % of the hexagons) and superBAB cases(19% of the hexagons