ADVISORY COMMITTEE ON THE MICROBIOLOGICAL SAFETY OF FOOD

POSSIBLE HEALTH RISKS TO CONSUMERS OF MEAT FROM CATTLE WITH EVIDENCE OF *MYCOBACTERIUM BOVIS* INFECTION

Purpose

1. This paper discusses the results from a Food Standards Agency (FSA)-funded study to investigate whether *Mycobacterium bovis* is present in the edible tissues of salvaged carcasses from cattle which have reacted positively to the tuberculin test. Members views are sought on how these results impact on the ACMSF's assessment of possible health risks to consumers of eating meat from *M. bovis*-positive cattle.

Background

2. In September 2000, the ACMSF was asked by the FSA to review the possible human health risks associated with the consumption of meat from cattle with evidence of *Mycobacterium bovis* infection, including animals with no *post mortem* evidence of disease which had reacted positively or inconclusively to the tuberculin test. The Committee was also asked to advise on the adequacy of current control measures.

3. A Working Group, under the Chairmanship of Professor Mac Johnston, was set up to take matters forward. The Group met 3 times, and reported back to the ACMSF, in 2001. The ACMSF endorsed the Working Group's report and adopted it as a Report of the full Committee. It was published in January 2002.[1]

Disease in animals with no gross pathology

4. As part of its work, the Group considered what proportion of animals slaughtered as reactors or dangerous contacts and showing no gross pathology at *post mortem* were likely to turn out to be *M. bovis*-positive.

5. Based on SVS data available to the Working Group, around 8% of animals showing no visible lesions (NVL) at *post mortem* gave an *M. bovis*-positive culture result. The Working Group therefore concluded that it would be prudent to assume that 10% of carcasses with NVL at *post mortem* meat inspection would be *M. bovis*-positive.

FSA survey

6. The Working Group noted that the FSA intended to commission a study to investigate whether *M. bovis* was present in the edible tissues of

[1] Advisory Committee on the Microbiological Safety of Food. Report on *Mycobacterium bovis*. A review of the possible health risks to consumers of meat from cattle with evidence of *Mycobacterium bovis* infection. Food Standards Agency 2002. FSA/0400/2002.

salvaged carcasses from cattle which had reacted positively to the tuberculin test or showed evidence of *M. bovis* infection at *post mortem* meat inspection.

7. A summary of key results from the FSA-funded study is at Annex A. The main findings are that :-

- 19 of 110 animals (17%) with NVL yielded viable *M. bovis* from lymph glands either in the edible carcass and offal (3), the inedible offal (14), or both (2);

- thus, 5 of 110 animals (4.5%) with NVL yielded viable *M. bovis* from carcass or edible offal lymph glands;

- 1 of 25 animals (4%) with a single visible lesion (VL) and 1 of 18 animals (5.5%) with 2 or more VL also yielded viable *M. bovis* from carcass or edible offal lymph glands.

8. The FSA's research also investigated the use of PCR for detecting *M. bovis* from samples of lymph nodes, thus obviating the need for the lengthy (up to 12 weeks) culture procedure. This work is not yet complete as the results are still to be validated. Anything of interest to emerge will be passed to the ACMSF in due course.

Impact of the FSA survey results on ACMSF risk assessment

9. The ACMSF Working Group assessed the risk, if any, to human health from eating meat from *M. bovis*-infected cattle as very low. Because the Group assessed the risk on the basis of the human *M. bovis* TB data, not meat inspection data, (see Annex B), the conclusions the Group drew may not be affected by the results of the FSA study. The conclusion would then remain that the risk, if any, to human health through the meat exposure pathway is very low.

10. Proposals to allow cattle over 30 months old into the food chain, and the increasing incidence of bovine TB, will increase the number of animals slaughtered for human consumption that have been exposed to *M. bovis*. This may result in an increase in *M. bovis*-contaminated meat and hence the level of human exposure. Thus, the risk in future might be greater than the present level that has been judged to result in few, if any, cases of human disease.

Risk management options and need for surveillance

11. The ACMSF Report made a number of recommendations designed to improve hygiene procedures in slaughterhouses, and bring UK meat inspection requirements fully into line with EU legislation. These were accepted by the FSA.

12. In addition, two risk management options were put to the FSA as a means of reducing the very small potential risk still further. First, it was suggested that meat from reactor cattle with visible lesions or from cattle found to have localised tuberculous lesions on routine *post mortem* inspection should no longer be permitted to be sold as fresh meat but should instead be required to be heat treated and go for manufacture.

13. A second option proposed for consideration was that carcasses from reactor cattle with NVL should be required to be held in cold storage pending receipt of culture results. Those carcasses microbiologically-confirmed as *M. bovis*-positive would be either partially or wholly condemned.

14. The FSA noted that the heat treatment option was currently under consideration by the European Commission and thus decided to await the outcome of deliberations in Brussels. Those deliberations concluded that a decision on heat treatment should await a risk assessment being made by the European Food Safety Authority. The cold storage option was regarded as disproportionate to the degree of risk involved.

15. The confirmation of viable bacteria in about 21% of cattle with NVL or single lesions, and in edible tissues of just under 5% of such cattle, may justify advising the FSA to review its decision on the heat treatment option (including heat treatment of meat from animals with NVL) and the proportionality of the cold storage option put forward by the ACMSF. The justification for this would be that, while most of the meat concerned has not been shown to be unsafe (and thorough cooking would provide an additional consumer safeguard), it is inappropriate for consumers to be exposed to such meat given the evidence that some meat from reactor cattle is likely to be infected with *M. bovis*.

16. The ACMSF Report also drew attention to the fact that, in response to the increase in tuberculosis in cattle, the Public Health Laboratory Service (PHLS) had undertaken enhanced surveillance of *M. bovis* disease in humans retrospectively for cases in England and Wales between 1993 and 1997. The Report recommended that the FSA should, through contact with the PHLS (now the Health Protection Agency) and the Department of Health, ensure that this enhanced level of surveillance is maintained, and provide support for a long-term analytical study based on the enhanced surveillance. It was also recommended that the Agency should be alerted to any significant emerging trends which might indicate that eating meat from animals infected with *M. bovis* constitutes a health risk. This continues to be extremely important.

Action now required of ACMSF members

17. Members are invited to agree that :-

- the results of the FSA-funded study do not alter the outcome of the ACMSF risk assessment;

- however, fresh attention should be drawn to the Report's recommendations about maintaining enhanced surveillance, supporting a long-term analytical study, and alerting the FSA to any significant indications that eating meat from *M. bovis*-infected cattle constitutes a health risk; and

- the ACMSF should also recommend to the FSA that the Agency reviews its decision on the heat treatment option (including the possibility of heat treating meat from reactor cattle with NVL) and the proportionality of the cold storage option in the light of the study results at Annex A.

Secretariat
September 2003

ANNEX A

RESULTS FROM FSA-FUNDED STUDY

Table 1 : Total composition of animals tested[a]

Animals with no visible lesions (NVL)[b]	Animals with visible lesions[b]
110	**43**

Table 2 : Results for animals with no visible lesions (NVL)[a]

Component	No. of animals
Animals tested[b]	**110**
Animals culture-positive for carcass/edible offal	**5[c]**
Animals culture-positive for head and respiratory tract	**16[c]**
Total culture-positive NVL animals	**19**

Table 3 : Animals with visible lesions (VL)[a]

Component	No. of animals
Animals tested[b]	**43**
Of which :-	
with single lesion	25
with 2 lesions	14
with 3 lesions	4
Animals culture-positive for carcass/edible offal	**2[d]**
Of which :-	
Animals exhibiting single lesion	1
Animals exhibiting 2 or more lesions	1
Animals culture-positive for head and respiratory tract	**18[d]**
Of which :-	
Animals exhibiting single lesion	8
Animals exhibiting 2 or more lesions	8

(a) Based on State Veterinary Service/Meat Hygiene Service on-site observations.
(b) Based on Health and Safety Laboratory, Sheffield (HSL) data. HSL were contractors for some of this work.
(c) 2 animals with NVL were culture-positive for both head/respiratory tract and carcass/edible offal regions.
(d) 2 animals with VL were culture-positive for both head/respiratory tract and carcass/edible offal regions.

ANNEX B

ACMSF ESTIMATE OF RISK

1. The ACMSF *M. bovis* Working Group took as the starting point for its assessment of risk the human tuberculosis figures. The data showed that there were around 3,500 microbiologically-confirmed cases of human TB a year. Between 1-1.5% of these were accounted for by *M. bovis*. Thus, it was estimated that there were about **50 microbiologically-confirmed** human *M. bovis* TB cases a year. However, only half of human TB cases were microbiologically–confirmed. The Working Group therefore thought it prudent to assume that 1.5% of those **not** microbiologically-confirmed would also turn out to be *M. bovis* TB.

2. On that basis, the Working Group concluded that around **100 human TB cases a year could be due to *M. bovis***.

3. The Working Group next assessed the proportion of those 100 cases which might be foodborne. There was evidence that cases ascribed to reactivation were likely to have been first acquired many years ago when human *M. bovis* infections were more common; and that disease in the young was more likely to reflect recent infection. Available data showed that around 12% of human TB cases over the period 1993-2000 were reported in people <35 years of age. Assuming that all these cases were foodborne, **it was estimated that there could possibly be up to 12 new foodborne cases of human *M. bovis* TB each year**.

4. The Working Group thought it prudent, for safety reasons, to make the more pessimistic assumption that 25% of human *M. bovis* TB cases each year were foodborne, thus increasing the estimate to **24**.

5. On the basis of this estimate of up to 24 possible new foodborne human *M. bovis* TB cases a year, the Working Group concluded that the potential human health risk, if any, through the meat exposure pathway was very small.