

**SECOND PROGRESS REPORT ON STRATEGY FOR THE CONTROL OF  
*MYCOBACTERIUM AVIUM* SUBSPECIES *PARATUBERCULOSIS* (MAP) IN  
COWS' MILK**

**Executive Summary**

1. In May 2002, the Agency's strategy for the precautionary control of MAP in cows' milk, developed in consultation with Defra, the industry and other stakeholders, was presented to the Board.
2. Board members were informed of progress to implement the strategy in May 2003 (paper note 03/05/01). This information paper provides an update on developments since then. **No action** is required.

**Primary Production Division**

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## **SECOND PROGRESS REPORT ON STRATEGY FOR THE CONTROL OF *MYCOBACTERIUM AVIUM* SUBSPECIES *PARATUBERCULOSIS* (MAP) IN COWS' MILK**

### **Issue**

1. To provide an update on developments to implement the strategy for the control of MAP in cows' milk.

### **Background**

2. MAP is a bacterium that occurs naturally in the environment throughout the world. It has been known for many years to be the cause of Johne's disease (a chronic gastrointestinal infection) in cattle, sheep, goats and other ruminants. Crohn's disease is a chronic inflammatory bowel disease of humans that can be severe, prolonged and debilitating. The cause of the disease is unknown, although one suggestion which has received a lot of attention is a link with MAP. In 2000, the Advisory Committee on the Microbiological Safety of Food (ACMSF) considered evidence that MAP was present in pasteurised milk. The Committee noted that the then current balance of scientific opinion neither proved nor disproved the link between MAP and Crohn's disease and advised that there was no need at that time for anyone to change their dietary habits. However given the different views on possible links to human illness, which were not likely to be resolved in the near future, the Committee recommended that the Agency should convene a group of stakeholders to consider all aspects of control of this organism.
3. The Agency used the output from the following stakeholder workshop in May 2001 to draw up a strategy with the aim of reducing the likelihood of consumers being exposed to MAP when consuming milk. In setting this objective, the Agency put to one side the question of whether or not MAP is the cause of Crohn's disease. It was thought that it would take some years for this question to be resolved, but the Agency believed that precautionary action to reduce human exposure to MAP should be put in place sooner rather than later, and should not wait for the link to be proved or disproved. The draft strategy was presented to the Board in December 2001 and then submitted for public

consultation. In the light of comments received, a revised strategy was presented to Members for information in May 2002<sup>1</sup> (Paper 02/05/02). The strategy proposed control measures at 3 key stages in milk production and processing: (i) in cattle; (ii) during milking; and (iii) after milking, including pasteurisation.

4. The actions aim to:

1. reduce or eliminate the carriage and shedding of MAP by dairy cattle;
2. reduce contamination of milk with MAP during the milking process;
3. make sure that pasteurisation is carried out effectively;
4. identify more effective ways of treating milk in order to eliminate MAP.

5. Implementation of the strategy is shared by Defra and the Agency. Defra is responsible for measures to reduce prevalence of MAP in dairy herds (aim 1), while the Agency leads on aims 2, 3 and 4 which relate to consumer health protection.

6. The strategy includes an action plan, with target dates for completing short term (by May 2003), medium term (by May 2008) and long term (after May 2008) actions. The Board was informed of progress against the action plan in May 2003<sup>2</sup> (paper 03/05/01). Progress since then against each of the points is summarised in the Annex.

### **Progress to date**

7. Work has been carried out on all four strands of the strategy. The issues are complex, and a single measure that could be quickly applied to control MAP in milk has not been identified. It is therefore envisaged that a combination of measures is needed to achieve control. While research has identified some milking hygiene and milk processing measures that could help, indications are that reduction of MAP in dairy herds is likely to have the greatest impact on MAP contamination of milk. With this in mind the Agency continues to work together with all interests, and with Defra in particular, to identify effective control measures.

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<sup>1</sup> <http://www.food.gov.uk/multimedia/pdfs/papernote02-05-02.pdf>

<sup>2</sup> [http://www.food.gov.uk/multimedia/pdfs/map\\_strategy.pdf](http://www.food.gov.uk/multimedia/pdfs/map_strategy.pdf)

## **MAP and Crohn's disease – latest developments**

8. Published research into a possible link between MAP and Crohn's disease remains inconclusive. However, a number of research projects have recently been completed.
9. A clinical trial aimed at determining whether antimycobacterial therapy has a long-term benefit for patients with Crohn's disease was carried out in Australia. The results have yet to be published, although they were reported to a meeting of the British Gastroenterology Society in March 2005. The results showed that treatment with antimycobacterial drugs provided evidence of short-term benefits but there was no evidence of a cure. The researchers claimed that the study provided evidence against the "continuing" role of MAP infection in Crohn's disease.
10. In 2003, the Health Protection Agency (HPA) completed a Defra funded study to investigate whether MAP can survive within water distribution. MAP was not isolated from any of the sites tested in this study.
11. An ecological study was carried out in cattle to compare the incidence of Johne's disease with admission rates for patients newly diagnosed with Crohn's disease. This unpublished study found no correlation between Johne's disease incidence in cattle during 1992 to 1993 and from 2000 to 2002 with patients admitted due to severe Crohn's disease in 2000 to 2002. The researchers concluded that the findings do not support a causal role for MAP in the aetiology of Crohn's disease.
12. The report of a case control study commissioned by Defra and the Drinking Water Inspectorate (DWI) on the possible role of MAP in the aetiology of Crohn's disease was published in July 2005. The study examined whether the consumption of drinking water, pasteurised milk and dairy products is associated with a risk of developing Crohn's disease. The results do not provide any evidence of an increased risk of Crohn's disease from the consumption of drinking water, including bottled water, pasteurised milk or dairy products. However, a statistical association<sup>3</sup> was recorded between eating meat and developing the disease in the response to one of a variety of supplementary questions asked. The authors suggest a possible link with animal protein consumption - a finding that has been noted in other, earlier work. They have

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<sup>3</sup> Statistical associations by themselves do not necessarily imply cause and effect.

stressed that the finding should be treated with caution and could be a statistical anomaly because the primary aim of the study was not to investigate meat consumption and Crohn's disease.

13. The ACMSF considered the DWI report in September 2005 and considered the study had been well designed and conducted and that the data analysis was thorough. The results did not point to a causal role for MAP in Crohn's disease and Members concluded that the findings of the report did not suggest a need to change current FSA advice on consumption of meat<sup>4</sup>. However, the Committee requested that the FSA consider further the survival of MAP in solid foods and possible options for research in this area are being assessed. The ACMSF was not in a position to comment on a possible association between total animal protein and Crohn's disease. The Committee requested that the FSA seek an opinion on this matter from the Scientific Advisory Committee on Nutrition (SACN) and this is under consideration by the Secretariat.
  
14. In February 2006, the results of a study on Crohn's disease carried out by University College London were published in The Lancet. The study aimed to test the hypothesis that Crohn's disease is a form of immunodeficiency caused by impaired innate immunity. Tests were carried out on people with Crohn's disease and a control group of people without Crohn's disease. In the Crohn's patients it was demonstrated that the immune response was poor. White blood cells, called neutrophils, produced by the body to heal damage in the bowel were produced in far fewer numbers in Crohn's patients compared to controls. In addition, when bacteria were injected under the skin the inflammatory response, in terms of an increased blood flow to the site, was abnormally low compared to controls. The researchers concluded that in Crohn's disease, a constitutionally weak immune response leads to delayed or incomplete removal of bacteria and other bowel contents. These can then breach the mucosal barrier of the bowel wall resulting in chronic inflammation. Current treatments aimed at controlling Crohn's disease are immunosuppressive and may accentuate the underlying immunodeficiency. The researchers hope to investigate whether drugs which increase blood flow would be effective in aiding the healing or prevention of lesions in Crohn's disease.
  
15. The Department of Health (DH) set up an ad-hoc working group to consider the research needed to establish whether or not there is a causative link between

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<sup>4</sup> Meat may be eaten as part of a balanced and varied diet and is a good source of iron, zinc, B vitamins and protein. However due to its high saturated fat content, it should be eaten in moderation. Further information about eating and cooking meat can be found at [www.eatwell.gov.uk](http://www.eatwell.gov.uk)

MAP and Crohn's disease. The working group reported its findings to the National Expert Panel on New and Emerging Infections in June 2005. The Panel concluded that given the many factors in addition to MAP that would be needed to be taken into account when undertaking any research into the causes of Crohn's disease, this should be a matter for the Medical Research Council to take forward. This was discussed by the Advisory Committee on Dangerous Pathogens in January 2006 and it was agreed to refer the issue to the Medical Research Council. The next steps in this process are being pursued with DH officials.

### **Conclusion**

16. The Agency is not aware of any developments to suggest that its current advice on the drinking of milk<sup>5</sup> needs updating at this time. The Agency and DH, together with their expert committees, continue to keep evidence on the possible link between MAP and Crohn's disease under review.

17. Work to deliver the strategy will continue but may be subject to review in the light of new developments as the strategy is intended to be an evolving document.

### **Board Action Required**

18. The paper is for information only. No action is required.

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<sup>5</sup> Advice can be found on <http://www.eatwell.gov.uk/healthydiet/nutritionessentials/milkanddairy/>

**PROGRESS AGAINST THE ACTION PLAN****AIM 1: TO REDUCE OR ELIMINATE THE CARRIAGE AND SHEDDING OF MAP BY DAIRY CATTLE**

- **To assess and validate current methods for detecting MAP infection in cattle (short term).**
- **Conduct a survey of MAP infection in the UK dairy herd (medium term).**

**Underway:** In January 2006, a study commenced to develop an integrated strategy to determine both the current extent of MAP infection in the UK dairy herd and provide mechanisms for on-going surveillance to assess the effectiveness of any implemented control strategy. The study, being undertaken by Veterinary Laboratories Agency and funded by Defra, SEERAD and DARDNI, aims:

- to determine the herd-level prevalence of Johne's disease in the UK dairy herd;
- to examine the effect of current management practices and herd localisation on variation in this prevalence;
- to assess direct sampling of bulked faeces as a method for on-going monitoring of Johne's Disease;
- to establish the genetic diversity of MAP in the UK;
- and to validate a liquid culture system for pooled faeces as a rapid high throughput diagnostic tool for MAP.

A sample size of 150 herds (leading to an anticipated minimum of 100 herds) will be used. Testing will be carried out on blood, faeces and milk and the study design has been modified slightly to take account of information presented at the recent international meeting on Johne's disease in Copenhagen. The study is due to complete in late 2007.

- **To produce guidance for farmers on the control of MAP infection, which could be included in farm assurance or herd health schemes (short term)**

**Completed:** Defra guidance for the dairy industry on Johne's disease in dairy herds, produced with input from the Agency and DH as well as the devolved administrations and the dairy industry, was launched at the Dairy Event at the National Agricultural Centre (NAC) at Stoneleigh in September 2004. Copies of the leaflet on the guidance have been issued to dairy farmers throughout the UK. More detailed guidance notes were sent to local veterinary inspectors, animal health offices, regional veterinary laboratories, private veterinary practices and stakeholders throughout the UK as well as libraries at veterinary and agricultural universities. The guidance documents can be downloaded from:

[www.defra.gov.uk/animalh/diseases/other/johnes.htm](http://www.defra.gov.uk/animalh/diseases/other/johnes.htm)

In September 2005, a joint industry-Government initiative, supported by Defra, was launched aimed at raising the awareness of Johne's disease in beef cattle and methods for its control. The initiative includes an explanatory leaflet for farmers, a comprehensive information pack for use by veterinary practices for use at client meetings and a poster campaign in auction markets and farmer meetings over the winter. This guidance is to be 'hosted' on the British Cattle Veterinary Association website and a link to the Defra website will be available.

- **Development of a better vaccine against MAP for use in cattle (long term)**

The Product License for the live vaccine produced by the Veterinary Laboratory Agency (VLA) expired on the 29th October 2005. A limited supply is available from existing stocks and once this has been used up an inactivated vaccine from Spain will be imported. Vaccination does not completely prevent infection but, if linked to management practices to reduce transmission, it may be expected to reduce the amount of disease occurring in infected herds and the level of contamination of the environment. However, the imported vaccine may interfere with the interpretation of the tuberculin test. Defra leads on this issue and continues to review developments in this area.

## **AIM 2: TO REDUCE CONTAMINATION OF MILK WITH MAP DURING THE MILKING PROCESS**

- **To conduct research into teat cleaning practices and publish advice (short term)**

**Completed:** The Agency commissioned the University of Wolverhampton and Harper Adam University College to investigate the efficacy of common teat cleaning practices at dairy farms in England and Wales. This work found that some of the teat cleaning routines tested were more effective than others but that the effectiveness of any particular approach was influenced by how it was applied. The researchers presented the findings at the Dairy Event and at the British Mastitis conference in 2004. The research report has been placed in the Agency library and the results and conclusions were used to update guidance to be issued shortly by the Dairy Hygiene Inspectorate to all dairy farmers in England and Wales. The guidance highlights the importance of effective pre-milking teat cleaning of all cows, not just those which are visibly dirty, and describes the most effective methods.

- **Review current advice on hygiene practices during milking with a view to issuing consolidated guidance (medium term)**
- **Review ways of disseminating advice on hygiene practices during milking so as to optimise future delivery (medium term)**

**Completed:** A guidance booklet for farmers on milk hygiene on the dairy farm was produced in collaboration with the Dairy Hygiene Inspectorate and was sent to all dairy farmers in England and Wales in 2004. In addition, guidance and advice on compliance with the hygiene legislation is provided during inspections. The booklet was also issued to DARD Inspectors in Northern Ireland. A revised guidance booklet reflecting the new EU hygiene legislation will shortly be sent to all dairy farmers in England and Wales. Similar guidance will also be distributed to dairy farmers in Scotland and Northern Ireland.

- **Set up a consultative group to bring together those responsible for Defra's Johne's disease control strategy, the industry and other major stakeholders (short term)**

**Actioned:** A network has been set up by the Agency to update a wide range of stakeholders on developments relating to the implementation of the strategy and to provide a means for them to contribute to these activities. Since developing the strategy, there have been no particular issues on which it has been necessary to seek comments from the network. This progress report will be sent to them for information.

### **AIM 3: MAKE SURE THAT PASTEURISATION IS CARRIED OUT EFFECTIVELY**

- **Recommend that dairies maintain their current pasteurisation procedures until the outcome of research on the pasteurisation conditions required to eliminate MAP is known (short term)**

**Actioned:** The appropriateness of this advice was reviewed in 2005 in the light of the findings from the LINK project highlighted under Aim 4 (see below). The Agency has considered the project results and considers that its current advice on the drinking of milk does not need updating.

- **Produce pasteurisation guidance for dairies (to be aimed particularly at small dairies and on-farm pasteurisers) (medium term)**

**Underway:** The new EU food hygiene legislation (Regulation (EC) No 852/2004) provides for the development of national guides to good hygiene practice and the application of HACCP principles. Dairy UK<sup>6</sup> have begun to develop a national Industry Guide to Good Hygiene Practice for the dairy sector, including the primary production requirements of Regulation (EC) 853/2004 pertinent to raw milk and dairy products. The guide is expected to be completed by the end of 2006 and will be subsequently assessed and, if satisfactory, granted recognition by the FSA. Dairy UK will also shortly be publishing a revised version of their Code of Practice on High Temperature Short Time Pasteurisation. This will be expected to address the issue of controlling the pasteurisation process.

The Agency is giving consideration to whether the initiative developed to help specialist cheesemakers implement effective food safety management procedures could be adapted to deliver improved food safety management among on-farm pasteurisers.

- **Implement measures to improve inspection and enforcement (particularly in relation to on-farm pasteurisers) (medium term)**

**Ongoing:** Initial work to review current arrangements has been undertaken as part of the Foodborne Disease Strategy. The need for further work on this will be considered in the light of future developments, such as the outcome of the post

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<sup>6</sup> Dairy UK represents dairy processors, farming representatives, co-ops and bottle milk buyers.

Hampton review on reorganisation of regulatory inspections and enforcement, including establishment of the Animal Health Themed Agency of which the Dairy Hygiene Inspectorate is expected to become a part.

- **Repeat 1999/2000 FSA survey of MAP in raw and pasteurised cows' milk (long term)**

The long term value of a repeat study will need to be reviewed in the light of developments since May 2002, when the Strategy was first presented (see para 16 of the main paper).

#### **AIM 4: TO IDENTIFY MORE EFFECTIVE WAYS OF TREATING MILK IN ORDER TO ELIMINATE MAP**

- **To conduct research to find effective ways of treating milk to eliminate MAP**

**Actioned:** The LINK project to investigate the efficiency of various pasteurisation time/temperature conditions in combination with homogenisation processes on the inactivation of MAP in milk has been completed. Two scientific papers to disseminate the research findings were published in 2005. The first paper reported that in 96.7% of samples MAP was completely inactivated by HTST (high temperature/short time) pasteurisation, either alone or in combination with homogenisation. Where MAP colony counts were found (ie in the remaining 3.3%) the estimated  $\log_{10}$  reduction by heat treatment, with or without homogenisation was 4.0 – 5.6. HTST pasteurisation achieved a greater than 5  $\log_{10}$  reduction in MAP numbers in most processing runs.

The second paper reported that there is potential for removal of MAP from milk by centrifugation or microfiltration. In laboratory experiments, both were shown to be capable of removing 95-99% of MAP from milk. FSA is considering the results with a view to possible further research.