

ADVISORY COMMITTEE ON THE MICROBIOLOGICAL SAFETY OF FOOD

INFORMATION PAPER

Strategic target for the reduction of *Campylobacter* in chicken

A paper informing the FSA Board on progress with delivery of the strategic target for the reduction of *Campylobacter* in chicken is attached for information.

**Secretariat
March 2008**

STRATEGIC TARGET FOR THE REDUCTION OF *CAMPYLOBACTER* IN CHICKEN**Executive Summary**

1. This paper informs the Board of progress with delivery of 2005/2010 Strategy Plan target 1 relating to implementation of the strategy for reducing *Campylobacter* in chicken by 50% by 2010, and the reasons why its current management information system (MIS) status is red.
2. Although early data from the FSA chicken retail survey indicates that we are possibly on track to meet our target, a survey of UK poultry flocks suggests that carriage rates in flocks are very high. We therefore consider that there is a risk that the Agency's target will not be met by 2010.
3. There is nothing to suggest that the approach to date has been inappropriate; the strategy is evidence based and has full support from stakeholders. However, in the light of preliminary results from the flock survey, the *Campylobacter* strategy may need further development. A critical review of on-farm interventions will provide the evidence base for the next phase of the strategy; this will be carried out by a team with international expertise in *Campylobacter*, which will submit its report to the Agency in autumn 2008.
4. There is little more that can be done at this stage as the surveillance data is preliminary and outputs from the research projects are essential in determining the most appropriate course of action.
5. The Board is asked to:
 - **note** the current MIS status of this target and the action being taken to identify additional on-farm interventions; and
 - **agree** the approach being taken.

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STRATEGIC TARGET FOR THE REDUCTION OF *CAMPYLOBACTER* IN CHICKEN**Issue**

1. This target has been given a red management information system (MIS) status because, whilst early results from a chicken retail survey suggest that we are possibly on course to meet the target, a flock survey is currently showing a very high prevalence, which may put this at risk.

Strategic Aims

2. A strategic target was set in 2005 to work with industry to achieve a 50% reduction in the incidence of UK produced chicken testing positive for *Campylobacter* by 2010. This target contributes to the overall aim of reducing foodborne disease.

Background

3. *Campylobacter* is the most common bacterial cause of foodborne illness in the UK and is therefore one of the key organisms the Agency is tackling in order to reduce levels of foodborne disease. In terms of disease burden, the risk matrix approach ranks *Campylobacter* the highest pathogen in terms of total number of cases¹, hospitalisations² and cost of illness³. It is accepted that there are a number of routes by which humans are exposed to *Campylobacter*, however, there is strong evidence that the most significant is the presence of this organism on chicken. A review of available prevalence data set the *Campylobacter* baseline in UK chicken meat at 70%. The current survey of retail chicken meat, which started May 2007, is monitoring our progress towards the target.

Current strategy to reduce *Campylobacter*

4. The Agency's strategy to reduce *Campylobacter* is a multi-pronged approach with the following initiatives (see Annex 1 for details):
 - On-farm - from 2003 the main focus of the strategy has been a campaign to improve biosecurity on the broiler farm;
 - Slaughterhouse - procedures based on HACCP principles; and
 - Food hygiene - in commercial and domestic kitchens through the Food Hygiene Campaign.

¹ Estimated as 295,500 in 2005, Annual Report of the Chief Scientist 2006/07

² Estimated as 13,930 in 2005, Annual Report of the Chief Scientist 2006/07

³ Board Paper PRO 06/10/01

International perspective

5. According to the Report of the European Food Safety Authority (EFSA) on trends and sources of zoonoses in the Community in 2005⁴ a total of 194,695 cases of campylobacteriosis in humans was reported in 22 Member States. The report stated that broiler meat is considered the most common source of infection. Up to 66.4% positive samples in broiler meat were reported. In broiler flocks, 0.2 to 86% of the reported samples were positive. Given the high number of human cases and the importance of broilers and broiler meat as a source of infection, the Commission has requested an EU survey on the prevalence of *Campylobacter* in broilers and broiler meat to consider the need, feasibility, cost and benefit of Community-wide control measures. The Agency is actively participating in these discussions. The EU baseline survey of *Campylobacter* started January 2008 (2007/516/EC) and is likely to report in September 2009.
6. The CODEX Committee on Food Hygiene has agreed to the development of guidelines for the control of *Campylobacter* and *Salmonella* in broiler chicken. The guidelines will consider risk based controls with the possible development of a web based risk assessment model. The guidelines are likely to be adopted by 2010.

Independent Scientific Advice – the ACMSF view

7. The Agency's view that *Campylobacter* control is a practical proposition in housed broilers was supported by the Advisory Committee on the Microbiological Safety of Food (ACMSF). The Committee advised that rigorous application of biosecurity measures combined with high standards of stockmanship and attention to good flock health can make a significant impact in reducing levels of *Campylobacter* in housed broiler flocks (ACMSF 2005 *Campylobacter* report⁵). This view was also supported by visits to Denmark and Norway to consider control strategies other countries were putting in place.

Current Position

Evidence relating to the impact of the *Campylobacter* strategy

- **Foodborne Disease Strategy (FDS)** – Over the 5-year period of the first Strategic Plan the number of UK laboratory reports of *Campylobacter* (for UK acquired cases) decreased by almost 19% compared with the baseline set in 2000 (41,659 in 2005 compared with 51,166, Board Paper PRO 06/10/01). Following a significant reduction in reported cases in 2003, recent trends indicate that the number of cases each year has plateaued with a slight increase in the number of laboratory reported cases for 2006 (provisional figure of 42,226).

⁴ The EFSA Journal (2006) 94

⁵ Advisory Committee on the Microbiological Safety of Food (ACMSF) Report on *Campylobacter* – 2005 <http://www.food.gov.uk/multimedia/pdfs/acmsfcampylobacter.pdf>

- **Food Hygiene Campaign (FHC)** - The Agency is considering the impact of specific interventions, such as the timing and target audience of TV advertisements, in raised awareness of cross contamination and the reduction of *Campylobacter* cases around the time of the spring/summer peak for *Campylobacter*. Raised awareness of cross contamination (Phase 3 of the Food Hygiene Campaign) was followed by a short term reduction in the number of cases of *Campylobacter* in humans (see Annex 1).
- **Flock prevalence** - There was some indication that *Campylobacter* levels in flocks were falling prior to the UK flock survey (started January 2007). Researchers were finding it more difficult to find positive flocks to work on, particularly during the winter months, and data for individual companies involved in research projects were also showing downward trends. This situation is now reversed and project plans have had to be revised to take account of the high numbers of positive flocks. Preliminary data from the UK flock prevalence study indicate a high level of *Campylobacter* contamination⁶.
- **FSA chicken retail survey** - Preliminary data indicate a reduction in *Campylobacter* levels. If this trend continues we are possibly on track to meet our target, but we need to be cautious about this because of the range of results obtained in the first chicken meat survey.

Obtaining the evidence base for new interventions

8. Progress of the work programme was reviewed last year and the focus shifted to providing the Agency with the information it needed to respond to the results of the chicken retail survey. A new research project will provide a critical review of all on-farm interventions for *Campylobacter*, including strategies introduced in other countries and potential controls such as vaccination, phage treatment and competitive exclusion. Other projects will look at water treatment as an intervention, and a review of available risk assessment models for *Campylobacter* in poultry. Ongoing projects are looking at *Campylobacter* control in slaughterhouses and will provide information to underpin HACCP based controls (see Annex 2 for details).

Stakeholder views

9. The *Campylobacter* strategy went out to full public consultation in 2003. The strategy was evidence based (i.e. situation reports showed biosecurity on farm could be improved) and had full support from stakeholders.
10. The Agency has worked in partnership with stakeholders to develop and implement the strategy. The formal contact is through the Consultative Group on *Campylobacter* and *Salmonella* in Chickens (CGCSC) and the Meat Hygiene Policy

⁶ The data from the UK flock survey (OZ0613) is confidential until reported by Defra/FSA by summer 2010. The UK flock survey data will inform the EU baseline survey of *Campylobacter* (2007/516/EC) which is likely to report September 2009.

Forum White Meat Working Group but we have also worked with individual poultry companies to deliver the biosecurity campaign and some companies are involved in our research projects. Stakeholders also receive updates on research outputs through seminars, workshops and other meetings with researchers.

11. We reviewed the current progress of our strategy with stakeholders at the Consultative Group meeting (30 October 2007). They continue to support our approach and did not identify any major issues that are not being addressed.

Risk Implications

12. This issue has come to the Board at a formal meeting as the MIS status for the work stream has become RED; there is a risk to the Agency's target for the reduction of *Campylobacter* in chicken being met.
13. *Campylobacter* reduction is an important Agency target which may not be achieved by 2010. Although there has been a reduction in contamination level in chicken at retail, given the current high prevalence in flocks there is a risk to the Agency's target. We are gathering the evidence for new interventions to try and accelerate the rate of reduction, and will consider with stakeholders the likelihood of their succeeding.
14. The FDS achieved a reduction in UK acquired campylobacteriosis of almost 19% compared with 2000; we may therefore be able to continue to achieve reductions in campylobacteriosis even if the reduction in contamination levels in chicken is slower than we anticipated. Reduction of *Campylobacter* in chicken remains a key area if foodborne illness is to be reduced still further.

Resource Implications

15. Findings of the review of on-farm interventions are likely to lead to additional strategic work and budget implications.

Way Forward

16. As our survey data is preliminary we do not have all the information we need to react at this stage. It is therefore recommended to the Board that we wait until the FSA chicken retail survey and new research projects are complete (September 2008 for the critical review of interventions) before identifying the future direction of the strategy. This has the full support of stakeholders. We plan to publish the chicken retail survey and issue our response by December 2008 with a revised strategy issued by April 2009.

17. The Board is asked to:

- **note** the current MIS status of this target and the action being taken to identify additional on-farm interventions; and
- **agree** the approach being taken.

CURRENT STRATEGY TO REDUCE *CAMPYLOBACTER*

Biosecurity Campaign

1. The *Campylobacter* strategy has focussed particularly on on-farm initiatives as evidence suggested that effective measures are available to reduce *Campylobacter* in broiler chickens. A reduction in *Campylobacter* levels at primary production should lead to a subsequent reduction in the levels of *Campylobacter* entering the food chain. From 2003 the main focus of the *Campylobacter* strategy has been a campaign to improve biosecurity on the broiler farm. Research identified key biosecurity messages which were important in controlling *Salmonella* and animal diseases such as Avian Influenza (AI), and these provided the foundation for *Campylobacter* control. Poultry farmers and catchers throughout the UK have been reminded of the key biosecurity measures to keep disease out of their farms, using leaflets, posters and training seminars:
 - Phase 1 of the campaign involved direct mailing of a poster and leaflet to farmers highlighting these main biosecurity messages. Phase 2 involved face-to-face communication of these messages at poultry growers meetings and at regional seminars organised by the Agency. This phase of the campaign reached over 600 farmers, a significant part of the UK poultry farming community. Over half of the farmers attending the seminars had seen the leaflet and poster issued in the first phase of the campaign, and the majority were happy to display the poster in a prominent position on the farm.
 - An evaluation of phase 2 showed that the seminars were very successful in meeting the key objectives of reinforcing biosecurity messages to farmers. Feedback supported the Agency's view that thinning was a particular risk for the spread of *Campylobacter* and other diseases such as AI and that the biosecurity messages should be promoted to poultry catching teams. The biosecurity campaign was therefore extended to poultry catching teams and this third phase of the campaign was undertaken as a joint initiative with the Department for Environment Food and Rural Affairs.
 - Between September 2006 and January 2007, 53 company-specific training seminars were held for poultry catching teams in England and Wales to raise awareness of the practices needed to keep out disease and protect the health of the catchers during thinning. Around 500 catchers attended these seminars, estimated at approximately 90% of the English/Welsh catching industry. The training is currently taking place in Scotland and N. Ireland and will be completed by March 2008.
2. The campaign to date has been very successful in reminding farmers and catchers of the key biosecurity measures that they need to take to keep out disease and harmful foodborne bacteria. The next steps for the Agency will be to consider any

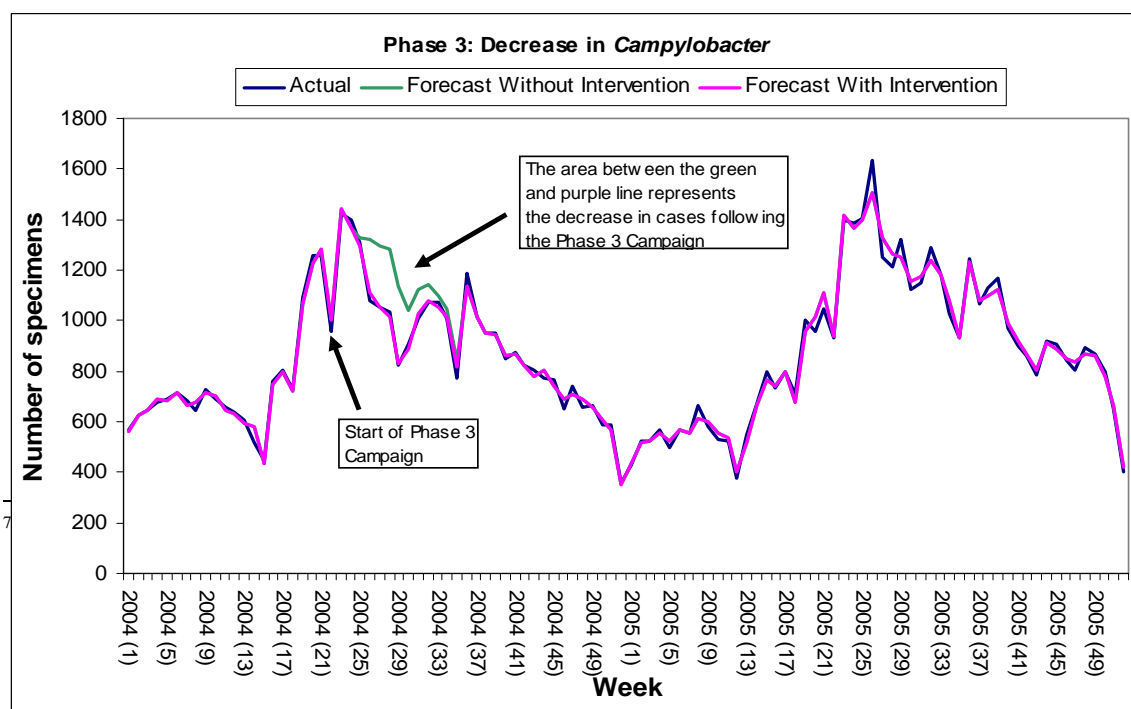
gaps in the campaign and to support the industry in maintaining and building on the training provided to date.

Slaughterhouse

- The EU Food Hygiene Regulations⁷ require all slaughterhouses to have procedures based on HACCP principles. *Campylobacter* is the main hazard identified in poultry processing and although current practices cannot prevent carcasses being contaminated when positive birds are processed, improved hygienic practices can control the number of *Campylobacter* on contaminated carcasses. The Agency has worked with the poultry industry and the Meat Hygiene Service to develop the Meat Industry Guide which details the importance of efficient evisceration and crate cleaning.

Food Hygiene Campaign

- The Agency's efforts to reduce *Campylobacter* in chicken through action being taken at the early stages of the chain, both on-farm and at the slaughterhouse, complements other initiatives being taken in the commercial and domestic food handling settings e.g. the Food Hygiene Campaign (FHC) and the promotion of HACCP in the catering and food manufacturing sectors.
- Phases 3 and 4 of the FHC (June 2004 and July 2005) were timed to coincide with the peak incidence of *Campylobacter* in humans and aimed to promote an increase in awareness of cross-contamination in the home. Seasonal "reminder" advertising campaigns such as the Christmas eating campaigns (including cooking turkey thoroughly) and the summer eating and barbecue cooking campaign have also targeted *Campylobacter*, as the biggest contributor of foodborne disease.
- The Agency is considering the impact of such interventions; the graph below shows how raised awareness of cross contamination (Phase 3 of the FHC) was followed by a reduction in the number of cases of *Campylobacter* in humans, although the level of decrease was short term.



OBTAINING THE EVIDENCE BASE FOR NEW INTERVENTIONS

A Critical Review of On-farm Interventions - Current activity

1. We are commissioning a six-month review to produce recommendations for further action in developing a new phase of the strategy for reducing *Campylobacter* in chicken and for prioritising research in this area. The review will be jointly funded with Defra and we are aiming to start March 2008.
2. Evidence from several countries, including Denmark, the Netherlands, Norway, Sweden and the UK, suggests that although best practice biosecurity measures can help to delay the onset of *Campylobacter* colonization, prevention cannot be guaranteed. We are considering what measures could be used to enhance protection of broiler flocks as biosecurity alone is unlikely to control *Campylobacter* consistently.
3. The review will be a cost benefit analysis of all on-farm interventions and strategies (both biosecurity and non-biosecurity interventions e.g. vaccination, bacteriophage therapy, competitive exclusion, etc.), taking account of the practicality of operating the intervention and the applicability to the UK situation. The interventions will be assessed against a measured reduction in *Campylobacter* contamination levels in chicken at retail.
4. The critical review will produce recommendations for further action on current and potential interventions, relative to the *Campylobacter* strategy. It will assist the Agency in prioritising its research and provide the evidence base for the next phase of the *Campylobacter* strategy.

Water Treatment as an Intervention to Reduce *Campylobacter*

5. As part of our research investigating best practice to minimise infection with *Campylobacter* when flocks are thinned (partially depopulated) we have considered possible interventions and treatment of bird drinking water⁸ appeared to be significantly correlated with a reduction in *Campylobacter*. We are therefore commissioning an investigation of approaches to treat water and water delivery systems in relation to *Campylobacter* reduction in poultry flocks. We are aiming to start the project March 2008.

Risk Assessment Modelling of Interventions

6. We are commissioning an initial feasibility study to inform our view on further development of the most appropriate risk assessment model in support of the

⁸ The research collected data on whether the drinking water for birds was treated or not, and whether it was treated with chlorine dioxide, hydrogen peroxide, iodine, or some other treatment

strategy and how to proceed with updating the chosen model with recent data. We are aiming to start the project May 2008.

7. The on-farm and slaughterhouse interventions that form part of our strategy need to be viewed in context and the development of suitable models will help in assessing their potential impact, while allowing the Agency to focus its research on the appropriate part(s) of the food chain. A number of *Campylobacter* risk assessment models have been developed in recent years including the UK quantitative risk assessment farm-to-consumption model produced by the VLA, and the CARMA model produced in the Netherlands.
8. The feasibility study will review the structure and modelling approaches used in the UK, taking into account more recent work in Europe, and the published literature. The study is expected to produce recommendations for a way forward in further developing a risk assessment model to enable an estimation of the effectiveness of interventions on levels of *Campylobacter* in chicken.

Interventions at the Slaughterhouse

9. Completed research resulted in draft guidelines on best practice for cleaning poultry transport crates which have been communicated to the industry in the meat industry guide. The recommendation to improve the water used in the washing phase of the cleaning process is currently being implemented in a partnership project with industry using filtration to achieve the objective. The results of the project including a cost benefit analysis will be available in 2009.
10. Research has been undertaken to identify practical approaches to decontamination in the slaughterhouse and is continuing to more specifically determine *Campylobacter* contamination pathways and propose intervention measures which, bearing in mind the difficulties with on farm control, may be a practicable and cost effective solution to reducing consumer risk when combined with farm biosecurity.

Detail

11. To meet the target there is a need to tackle *Campylobacter* contamination of chicken both at the farm and the abattoir. The ACMSF's second report on *Campylobacter* stated that rigorous application of biosecurity measures and improving hygiene at slaughter can have a significant impact in reducing levels of *Campylobacter* in housed broiler flocks. The Agency has worked with stakeholders and poultry companies to deliver practical advice on improving biosecurity on farms and effort is particularly focused on partial depopulation (thinning) practices. In support, work to develop guidance on best practice for cleaning of poultry transport crates has been undertaken and is currently being implemented in a partnership project with industry. Modifications to an existing crate washer to improve the filtration of the wash water are currently nearing completion.

Campylobacter contamination levels on cleaned crates will be collected from the plant prior to and post modification and compared to a control.

12. FSA funded research has been published looking at end of the line, physical decontamination methods; steam (100°C, 12s), hot water (80°C, 20s) and rapid freezing were tested and found to give up to ca. 2 log reductions in counts. Follow-up trials undertaken at a commercial processing plant using a hot water treatment (80°C, 20s) prior to chilling decreased *Campylobacter* numbers by ca. 1 log (sampled after chilling) with little effect on carcass appearance. These findings have been communicated to the industry via the British Poultry Council and were presented at a workshop on measuring slaughterhouse hygiene and other agency strategic targets relating to meat hygiene held in March 2007.
13. Preliminary work from ongoing research has shown that the slaughter of *Campylobacter* positive flocks may not contribute significantly to the transfer of *Campylobacter* to negative flocks processed later in the day. Instead the numbers of *Campylobacter* on the final carcass are thought to depend upon the *Campylobacter* status of that particular flock being slaughtered, i.e. the numbers of *Campylobacter* in the caeca and on the feathers. A direct relationship between the number of *Campylobacter* positive neck skins and the number of *Campylobacter* per gram of caecal contents from the same flock was observed, which is in agreement with other published studies. These findings support the use of physical interventions such as steam or hot water washes on carcasses from flocks that have high numbers of *Campylobacter* in their caeca.
14. FSA funded research looking at the contamination of poultry carcasses via the airborne route has been published. The conclusions were that the main contamination of carcass surfaces occurred during plucking and that the airborne route later in the process was insignificant.