Advisory Committee on the Microbiological Safety of Food

Annual Report 2009

Advises the Food Standards Agency on the
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Contents

The Advisory Committee on the Microbiological Safety of Food (ACMSF) was established in 1990 to provide the Government with independent expert advice on the microbiological safety of food.

The Committee's terms of reference are:-

to assess the risk to humans from microorganisms which are used, or occur, in or on food, and to advise the Food Standards Agency (FSA) on any matters relating to the microbiological safety of food.

The various issues addressed by the Committee since its inception are detailed in this and previous Annual Reports[1-17] and in a series of subject-specific reports.[18-33]

Foreword

1. I am pleased to present the 2009 Annual Report of the Advisory Committee on the Microbiological Safety of Food (ACMSF).

2. The Committee's major output in 2009 was the completion of its work on the increased incidence of listeriosis in the UK. This ACMSF report considered four hypotheses to try to establish the reasons for the change in epidemiology in the over 60s age group. Consideration was given to whether the rise in cases of listeriosis in compromised people over 60 years of age was an artefact associated with improved case recognition, whether the pathogen, *L. monocytogenes,* had become more virulent and 'new' strains were better able to cause bacteraemia, whether the population predominantly affected by the recent increase had become more susceptible to infection with *listeria* and finally, whether levels of exposure had increased. This work was carried out within a risk framework to assess hazard characterisation, identification and exposure. Aspects of risk management were also considered including legislative limits, food industry controls and consumer advice.

3. The recommendations in the report include Pan-European surveillance, epidemiological and microbiological investigations to investigate the increase in listeriosis in different Member States and to ascertain whether there are common generic or risk factors occurring in the UK and other countries. Studies to develop screening methods for *L. monocytogenes* isolates to investigate differences in virulence and differences between isolates from different patient groups and time periods were also recommended. The report also suggested that general consumer food safety advice should be developed and communicated to over 60s, (including those in vulnerable groups), as well as to those involved in their care and preparation of their food and provide medical advice about the risks of listeriosis to these groups.

4. The FSA was also advised to refer the Report to its Social Science Research Committee (SSRC) so that they could consider the food behaviour, storage and handling practices of elderly people in the home. In response to this request the SSRC shared the outcome of their investigation with us. We welcomed their report highlighting the significance of establishing a baseline in order to be able to measure any changes that might have contributed to the rise in listeriosis. We supported cross-disciplinary research to establish baseline data using evaluative methods linked to the Agency's ongoing Food Issues Survey so as to better understand people's food safety knowledge and behaviour in the home.

5. Another issue relating to risks to human health discussed by the Committee concerned campylobacteriosis. The Committee examined the factors that might have contributed to changes in the age-specific rates of human *Campylobacter* infection in England and Wales. Taking into account the Health Protection Agency's findings that identified risks associated with some health conditions, such as those that require taking acid suppression medication, in addition to food safety practices in the home and whether or not the person lived alone, the Committee concluded that there was sufficient concern that this information should be brought to the attention of the relevant medicines regulatory agency.

6. One of the recommendations from the ACMSF's second Salmonella in eggs report highlighted work to develop and enhance the Department of Health's *Salmonella* in eggs model. In March, we considered the FSA's *Salmonella* in eggs risk assessment model. We endorsed the work the FSA had done and suggested that it should be shared widely amongst industry stakeholders.

7. The FSA briefed the Committee on the findings of the Public Inquiry into the 2005 *E.coli* O157 outbreak in South Wales and its response to these findings. We were asked to consider what role we could play in advising the Agency on its response to the Report, in particular its recommendation regarding "supershedders". Following a review of the latest information on this subject, we concluded that as transmission was not solely through food there was a need for cross government working on the management of *E.coli* O157. We requested for clarification on the definition of "supershedder" and highlighted that the cost effectiveness and benefit of interventions should be investigated including the possibility of developing vaccines. It was also important to acknowledge that other strains of VTEC must not be ignored.

8. The FSA provided an update on their response to the Committee's recommendations in the botulism in sheep and goats report. The FSA, in conjunction with the Department for Environment, Food and Rural Affairs (Defra), Veterinary Laboratories Agency, (VLA) and Department of Agriculture and Rural Development Northern Ireland (DARD NI), developed a communication strategy to inform stakeholders of the change in the FSA's advice on the management of outbreaks of suspected botulism in sheep and goats. The Committee requested annual updates on outbreaks of botulism in cattle, sheep and goats and the toxin types involved.

9. Defra briefed the Committee on the results on the survey of *Mycobacterium avium* subspecies *paratuberculosis* (MAP), the cause of Johne's disease, in the UK dairy herd. The Committee considered the risk to human health from MAP in cows' milk in 2000, agreed that the risk was neither proven nor disproven and did not recommend any change in the advice regarding the consumption of cows' milk. The cause of Crohn's disease remains unknown. The Committee requested more data and clarification on the testing methods used before any further judgement could be made.

10. On food surveillance, we considered the FSA's UK-wide *Campylobacter* and *Salmonella* in retail chicken survey. The FSA highlighted that *Campylobacter* was currently the most common bacterial cause of foodborne illness in the UK. It was revealed that a significant proportion of fresh chicken in the UK was contaminated with *Campylobacter.* It was unfortunate that the results from this survey could not be compared with previous studies due to differences in data recording. We advised that in future surveys it was important to consider consistency in methodology. We agreed that while *Campylobacter* contamination in food remained high it was right that the FSA continues to give this work priority.

11. At our December 2009 meeting we received a presentation from Professor Colin Blakemore, Chair of the FSA's General Advisory Committee on Science (a committee on which I sit as an ex-officio member). He provided an overview of the role and work of the Committee and discussed the importance of ensuring a flow of information back and forth between Committees which perform risks assessments and the sponsoring departments that are responsible for risk management.

12. During the year the Committee has also considered the way in which it interacts with the public in terms of being open and accessible. Consideration has been given to the Committee's subgroups and the way in which information should be presented from these groups to ensure openness. We discussed a paper presented by the secretariat which outlined options for future subgroup meetings and agreed to move to more openness for subgroups but acknowledged more consideration was required in terms of the practicalities of dealing with pre-published information and ideas in their formative stage.

13. Looking to the future, the Committee will continue to consider the risks posed by *Campylobacter, E.coli, Listeria, Salmonella* and *Toxoplasma* in food, revisit our previous work on foodborne viral infections and investigate further the microbiological safety of ready to eat foods.

14. I am indebted to the members of the Committee and its Working and *Ad Hoc* Groups, without whom the ACMSF would not operate effectively, and to the many other individuals and organisations who have helped the Committee with its work. I am also extremely grateful for the support of the Secretariat, whose efforts in ensuring the efficient and effective conduct of Committee business is invaluable.

Professor Sarah O'Brien
Chair

Introduction

1. This is the eighteenth Annual Report of the Advisory Committee on the Microbiological Safety of Food and covers the calendar year 2009.

Chapter 1: Administrative Matters

Membership

Appointments

2. Appointments to the ACMSF are made by the Food Standards Agency (FSA), after consultation with United Kingdom Health Ministers (i.e. the "Appropriate Authorities") in compliance with Paragraph 3(1) of Schedule 2 to the Food Standards Act 1999. The Agency has resolved that appointments to the ACMSF should be made in accordance with Nolan Principles[34], the guidance issued by the Office of the Commissioner for Public Appointments (OCPA)[35] and the Government Office for Science Code of Practice for Scientific Advisory Committees[36]. The FSA is not bound to follow OCPA guidance, as this applies only to appointments made by Ministers. However, although ACMSF appointments are not made by Ministers, the Agency has decided that it would nevertheless be right to comply with OCPA guidance.

Periods of appointment

3. To ensure continuity, appointments to the ACMSF are staggered (usually for periods of 2, 3 or 4 years) so that only a small proportion of Members require to be appointed, re-appointed or retire each year.

Spread of expertise

4. A wide spectrum of skills and expertise is available to the ACMSF through its Members. They are currently drawn from commercial catering, environmental health, food microbiology, food processing, food research, food retailing, human epidemiology, medical microbiology, public health medicine, veterinary medicine, and virology. The Committee also has one consumer Member.

5. Members are appointed on an individual basis, for their personal expertise and experience, not to represent a particular interest group.

Re-appointments in 2009

6. The periods of appointments of 5 members – Professor Tom Humphrey, Mr Alec Kyriakides, Dr Rick Holliman, Dr Sally Millership and Mrs Jenny Morris – expired on 31 March 2009. Professor Humphrey and Mr Kyriakides were re-appointed for a further 2 years running from 1 April

2009 until 31 March 2011. Dr Holliman was re-appointed for a further 4 years running from 1 April 2009 until 31 March 2013. Dr Millership and Mrs Morris were re-appointed for a further 3 years running from 1 April 2009 until 31 March 2012.

Retirements in 2009

7. Professor Mike Gasson retired from the Committee on 31 March 2009 after completing 8 years service. Mr Robert Rees resigned from the Committee in March 2009 after 4 years service.

8. The Chair expressed her gratitude to Professor Gasson and Mr Rees for their contribution to the work of the ACMSF and wished them well for the future.

Secretariat changes in 2009

9. In April 2009 Dr Lucy Foster stepped down as ACMSF Administrative Secretary after 5 years' service. She moved to the Department of the Environment, Food and Rural Affairs. Mr Robert Martin served as interim Administrative Secretary until August 2009 when Ms Geraldine Hoad was appointed Administrative Secretary. Dr Darren Cutts also joined the Secretariat.

10. The Chair expressed her gratitude to Dr Foster for her excellent contribution to the work of the Committee. Members also expressed their thanks and good wishes to Dr Foster.

Committee and Group meetings

11. The full Committee met 3 times in 2009 - on 26 March, 24 September and 3 December. All three meetings were chaired by Professor Sarah O'Brien. All full Committee meetings were open to members of the public.

12. The *Ad Hoc* Group on Vulnerable Groups (Chair: Professor Tom Humphrey) met twice. In March 2009 the Group considered the comments received in response to the public consultation on its report on the increased incidence of listeriosis in the UK and the findings of the Social Science Research Committee's (SSRC) study of food storage and handling practices of the over 60s in the home. ACMSF approved the publication of the report on increased incidence of listeriosis in the UK together with the response to the consultation comments. In December the Group considered a position paper that reviewed the current situation on toxoplasmosis in the UK (*Toxoplasma gondii*:Epidemiology Review).

13. The Working Group on Surveillance (Chair: Professor Humphrey) met three times. They considered FSA's UK wide surveys of Campylobacter and Salmonella contamination of raw chicken at retail sale and the microbiological contamination of fresh red meats on retail sale. The *Campylobacter* and *Salmonella* in retail chicken survey report was

published on the FSA website in October. As a result of this survey the Group agreed to draft a commentary paper on the methods used for the surveillance of *Campylobacter* in poultry.

Current membership and Declarations of Interests

14. Full details of the membership of the Committee and its Working and *Ad Hoc* Groups are given in Annex I. A Register of Members' Interests is at Annex II. In addition to the interests notified to the Secretariat and recorded at Annex II, Members are required to declare any direct commercial interest in matters under discussion at each meeting, in accordance with the ACMSF's Code of Practice[37]. Declarations made are recorded in the minutes of each meeting.

Personal liability

15. In 1999, the Secretary of State for Health undertook to indemnify ACMSF Members against all liability in respect of any action or claim brought against them individually or collectively by reason of the performance of their duties as Members (Annual Report 1999[8] paragraph 6 and Annex III). In 2002, the Secretariat asked the FSA to review this undertaking, given the fact that, since 2000, the ACMSF had reported to the FSA where previously it had reported to UK Health Ministers. In March 2004 the Food Standards Agency gave a new undertaking of indemnification in its name, which superseded the earlier undertaking given by the Secretary of State (see Annex IV of 2004 Annual Report[13]).

Openness

Improving public access

16. The ACMSF is committed to opening its work to greater public scrutiny. The agendas, minutes and papers (subject to rare exceptions on grounds of commercial or other sensitivity) for the Committee's quarterly meetings are publicly available and are posted on the FSA website at:

http://acmsf.food.gov.uk/

17. The Committee also has an e-mail address:

acmsf@foodstandards.gsi.gov.uk

18. In accordance with the Freedom of Information Act 2000, ACMSF has adopted the model publication scheme which sets out information about the Committee's publications and policies.

Open meetings

19. Following the recommendations flowing from the FSA's Review of Scientific Committees[38], the ACMSF decided that from 2003 onwards all of its quarterly meetings should be held in public.

20. All of the 2009 Committee meetings were held in Aviation House, the FSA's London Headquarters.

21. All of these open meetings follow a common format. Time is set aside following the day's business for members of the public and others present to make statements and to ask questions about the ACMSF's work. The names of participants, the organisations they represent, and details of any statements made, questions asked and the Committee's response, are recorded in the minutes of the meeting.

Work of the other advisory committees and cross-membership

22. The Secretariat provided Members with regular reports of the work of other Scientific Advisory Committees advising the FSA. Mrs Rosie Glazebrook ACMSF consumer representative is a member of the Advisory Committees on Carcinogenicity (COC) and Mutagenicity (COM). The ACMSF Chair (Professor Sarah O'Brien) is a member of the General Advisory Committee on Science (GACS) and the National Expert Panel on New and Emerging Infections (NEPNEI).

Chapter 2: The Committee's Work in 2009

Campylobacter

C*ampylobacter* in the elderly

23. In March the Health Protection Agency (HPA) briefed the Committee on changes in the age-specific incidence of *Campylobacter* infection in the over 60s age group in England and Wales[39]. In 2008 they had briefed the cross government Epidemiology of Foodborne Infection Group (EFIG) on this subject which subsequently referred the issue to the ACMSF for further consideration.

24. The HPA reported that there were 12 species of *Campylobacter*. Infection resulted from either direct or indirect contact with animals and there was a low infective dose for illness. The organism caused acute enteritis, with approximately 10% of cases requiring hospital admission. The Committee were informed that there were various sequelae reported including up to a quarter of patients developing irritable bowel syndrome. In the period 1993 to 2006 there were 45 deaths from *Campylobacter* infection.

25. Graphs were presented showing the incidence of campylobacteriosis in England and Wales since the late 1970s when the role of *Campylobacter* in gastrointestinal disease had been discovered. The HPA explained that as the reasons for a decline in incidence between 2000 and 2004 and a subsequent increase from 2005 to 2007 were unknown a study had been set up to investigate this further. In addition, it was highlighted that it was too early to confirm whether the increase in cases had continued in 2008 as not all the data were available.

26. The HPA concluded that there had been a dramatic change in the age-specific incidence of human campylobacteriosis in England and Wales with older people being at greatest risk of infection.

27. In its deliberations Members asked whether:

    - The study revealed any differences in cases in rural and urban areas? The HPA confirmed that the catchment areas for the laboratories involved in the study were not coterminous with Local Authority areas and post code data were not available.

    - The HPA were aware of similar increases in campylobacteriosis reported in other European countries? The HPA indicated that they were not aware of similar increases from their contacts in Europe. However, they would investigate this further before carrying out a next phase of enhanced surveillance.

- There was a pathogenic dose of the bacteria? It was highlighted that some work had been done in Holland in the 1980s which showed that dose response appeared to be exponential rather than linear. A Member explained that the model of infective dose was based on probability distribution function and it appeared that some people could be infected by exposure to one single cell.

- It would be possible to do to any subgroup analyses from the case control study? Members were informed that available subgroup analyses showed recruitment amongst elderly people had been better than those in other age groups. The HPA agreed to present Members with a further analysis of data sets from the case control study to generate further hypotheses on factors that might have contributed to changes in the age-specific rates of human *Campylobacter* infection in England.

28. As the FSA's 2009 Food Safety Week was focussing on the over 60s, the need to include general advice on *Campylobacter* was raised The FSA commented that messages such as the 4 C's (cleaning, cooking, chilling and cross-contamination) were targeted at reducing foodborne disease in general. The FSA agreed to reflect on the findings that had been presented as part of the work to develop Food Safety Week and consider including *Campylobacter* as well as *Listeria*.

29. In September the HPA presented to the Committee the sub-set analysis of the national case control study of *Campylobacter* infection in England[40]. The case-control study had taken place between 1 April 2005 and 30 June 2006 involving 5 Health Protection Units in England. These re-analysed data formed the basis of the presentation on the changing age pattern of campylobacteriosis in England and Wales that the HPA provided the Committee in March.

30. The HPA reiterated that since 2000 there had been a change in the age structure of cases of campylobacteriosis with a reduction in those aged 0-9 years, a rise in cases aged 20-59 years, and an even greater rise in those aged 60 years and over. They confirmed that these changes were independent of gender, season or geography.

31. The HPA reported that, following analysis of the data from the case control study, various risk factors were identified. These related to health factors which for example involved taking acid suppression medication, food safety practices in the home, and whether or not the person lived alone.

32. In its deliberations Members asked whether:

- The numbers of people excluded from the study because of travel abroad was available? The HPA confirmed that the data on foreign travel had not been included in the original study

- It was possible to present the absolute risk associated with acid suppressing medication rather than the odds of illness? The HPA confirmed that the original study design did not make this possible.

- The data were sufficiently robust to identify changes in mortality? The HPA confirmed that this had not been possible as campylobacteriosis was rarely recorded as the primary cause of death, especially where there was co-morbidity.

33. As the study indicated that cases that had been prescribed acid suppression medication appeared to be at higher risk of infection, the Members discussed whether the Medicines and Healthcare products Regulatory Agency (MHRA) should be made aware of these findings. While acknowledging that the findings were based upon a hypothesis-generating study the Committee agreed that there was sufficient concern that the results may need to be brought to the attention of elderly people and that the findings of the study be shared with the MHRA.

***Campylobacter* Workshop**

34. Ms Liz Redmond (FSA) provided feedback on a joint FSA/Defra/BBSRC *Campylobacter* workshop that had taken place in October. It was noted that the meeting, which focused on *Campylobacter* in poultry, included stakeholders including producers, meat industry and retailers. Research needs and priorities, the need for a vaccine-based control method and the need for joined up funding were issues identified at the meeting. Ms Redmond reported that the Biotechnology and Biological Sciences Research Council (BBSRC) would compile the output from the workshop which would be provided to the ACMSF at a future meeting. The Committee noted that it was important to maintain the impetus of the workshop to ensure timely commissioning of research. Ms Redmond responded that a meeting to discuss the way forward was due to take place in December 2009.

Botulism in sheep and goats

35. In March Members were informed that following the publication of the ACMSF's report on botulism in sheep and goats, the FSA was in the process of implementing the recommendations highlighted in this report[41].

36. The FSA reminded Members that following a change in advice on management of suspected botulism in cattle in 2006, the *Ad Hoc* Group on Botulism in Cattle was reconvened in 2007 (renamed *Ad Hoc* Group on Botulism in Sheep and Goats) to consider the potential risk to human health from the food chain arising from botulism in sheep and goats. In particular, the Group was asked to consider the risk in relation to spreading poultry litter on agricultural land.

37. Based on a thorough review of the scientific literature the Group's report [32] concluded that the current voluntary restrictions on meat and milk from clinically affected animals appeared to be appropriate, and such foods should continue to be withheld from the food chain.

38. The Group also concluded that voluntary restrictions applied to unaffected animals were probably over-precautionary based on current scientific evidence. One explanation was that the botulinum toxin types identified in animals have rarely been associated with disease in humans. The Group's draft report and recommendations underwent public consultation and no objections were raised.

39. The FSA indicated that they would implement the recommended change to its advice, and would no longer request voluntary restrictions for healthy sheep and goats from farms where cases of botulism were suspected. However, this would need to be reviewed if evidence emerged that the botulinum toxin types that affect humans were causing outbreaks in sheep or goats. The FSA explained that a communications strategy was being developed to disseminate the change in advice in April 2009. Articles would be published in the Veterinary Record, the VLA newsletter, and on the FSA's website. The farming press would also be alerted to the change in advice. A link would be provided to Defra guidelines regarding the use of poultry litter.

40. The Committee welcomed the FSA's work and requested regular updates on outbreaks of botulism in cattle, sheep and goats and the toxin types involved. The FSA agreed to provide this information annually.

Listeria

Report on Listeria in the elderly

41. The *Ad Hoc* Group on Vulnerable Groups finalised their report on the increased incidence of listeriosis in the UK and presented it to the ACMSF in March[42].

42. At their September 2008 meeting Members agreed that the *Ad Hoc* Group's report should undergo public consultation. The consultation period ended in February 2009 and the *Ad Hoc* Group considered the responses received.

43. Prof Humphrey drew Members' attention to the key proposals on which the consultation had been based and attached a table showing the comments received and the *Ad Hoc* Group's responses. Many responses to the consultation were positive.

44. The report's recommendations included:

- Pan-European surveillance, epidemiological and microbiological investigations to investigate the increase in listeriosis in different Member States and to ascertain whether there are common generic or risk factors occurring in the UK and other countries. Studies to develop screening methods for *L. monocytogenes* isolates were also recommended to investigate differences in virulence and differences between isolates from different patient groups and time periods;

- Investigating whether the management of underlying conditions in the over 60s has contributed to the rise in listeriosis. Retrospective studies should be conducted to identify which underlying conditions are most associated with listeriosis in this age group;

- Estimating the amount of under-reporting (ascertainment ratio) for human listeriosis;

- Collecting data on underlying co-morbidities and drug management for cases of human listeriosis;

- Enhancing UK infection surveillance to incorporate data on denominator populations and numbers of medical investigations undertaken (including blood cultures);

- Investigating the frequency of specific genes or gene polymorphisms associated with difference in the pathogenicity of *L. monocytogenes in vitro*;

- Maintaining targeted active surveillance for *Listeria* spp. in foods to inform control of this organism. Such surveys should examine a wide

range of foods (shopping basket surveys) and account for food purchases at catering and retail outlets;

- Investigating food consumption patterns of the over 60s (including vulnerable groups) to inform approaches to risk management. Behavioural studies were recommended on food handling, hygiene and storage behaviour in the home by this age group to inform understanding of potential factors contributing to the increasing the risk of listeriosis;

- Developing general consumer food safety advice for the over 60s (including those in vulnerable groups), as well as for those who prepare and provide their food and those who provide medical advice about the risks of listeriosis to these groups. Studies should be carried out to evaluate the impact of such advice on these groups. The FSA was also advised to refer this Report to its expert Social Science Research Committee (SSRC) to consider the food behaviour, storage and handling practices of elderly people in the home;

- Reiterating the importance of temperature and shelf life control in any future advice to industry and enforcement authorities and including hygiene/cleaning and formulation of food in preventing contamination or limiting the growth of *L. monocytogenes* in foods. The FSA should also work with the food industry to ensure that formulations including salt levels of specific products are not changed without considering the impact of these changes on microbiological safety;

- Reviewing the need for consistent advice on durability instructions such as 'Use by' dates on some perishable foods (chilled ready to eat foods) sold loose since this was found to be variable.

45. Members considered that:

- There appeared to be a lack of consistency surrounding the definition of the group that was at risk i.e over 60s or over 65s; healthy or immuno-compromised people? The *Ad Hoc* Group explained that there were no standard definitions of “the elderly” or “vulnerable” but that the report had been concerned with vulnerable people over the age of 60. The report was amended to make the definitions clearer.

- The similarity in the increase in campylobacteriosis in the elderly should be referenced in the *Listeria* report.

- Although Members asked the *Ad Hoc* Group to expand on some of their responses to provide greater clarification, they approved the consultation responses for publication on the FSA website and recommended the report for submission to the FSA Chair for approval and final publication. The report was published in September 2009.

SSRC Report on Listeria in the over 60s

46. The ACMSF *Ad Hoc* Group on Vulnerable Group's report on increased incidence of listeriosis in the UK was published in September 2009[43].

47. One recommendation was that the report to be referred to the FSA's SSRC to consider the food behaviour, storage and handling practices of elderly people in the home. The SSRC set up a working group on *Listeria* to produce an advice paper for the FSA, with support from the *Ad Hoc* Group on Vulnerable Groups.

48. The SSRC agreed to investigate possible social science explanations for the increase in listeriosis in the elderly such as what older people eat, how they store food and prepare it. A preliminary literature search was carried out and interviews with relevant experts undertaken. The review of literature had shown that across the areas of food and ageing, lifestyle changes and food safety practices, research was fragmented and limited, particularly with respect to those over 60.

49. The SSRC outlined a number of options for further work that could be considered. These included a more comprehensive literature review and/or conducting primary research. The latter could include a specially designed survey linked to the FSA's new Food Issues Survey (FIS) to provide baseline data on the range of food safety knowledge and practices in elderly people. Members agreed that, in the absence of historical information, it would be important to establish a baseline in order to be able to measure any changes that might have contributed to the rise in listeriosis and/or campylobacteriosis in the future. Several Members stressed the need to focus on people's actual behaviour in the way they handled food, rather than their opinions on what they thought they should be doing. Members recognised the importance of obtaining information in relation to sub-groups within those over 60 and that it was likely to be valuable in considering factors for listeriosis and campylobacteriosis among this age-group. However they also acknowledged the difficulty in obtaining information from elderly people who were ill.

50. Members welcomed the report and highlighted that there was support for cross-disciplinary research (rather than a further literature search) to establish baseline data using evaluative methods linked to the FIS in order to better understand people's food safety knowledge and behaviour in the home.

Salmonella in eggs risk assessment

51. The Committee was informed that one of the recommendations from the ACMSF's second *Salmonella* in eggs report (published in 2001) was for the FSA to further develop and enhance the Department of Health's *Salmonella* in eggs risk assessment model developed in 1999/2000 to support the ACMSF in its work in this area. The Committee recommended that more empirical data were required to support the further development

of such a model. Since 2001 more information has become available particularly on *Salmonella* in laying flocks, prevalence of *Salmonella* contamination in UK and non UK eggs. The FSA had used some of this data to populate and develop the model further as well as running a workshop with experts to obtain their opinion to help bridge key data gaps. The Committee was briefed on the key features of the model[44].

52. The FSA reported that using information from several FSA egg surveys a quantitative risk assessment model had been produced which could be used to inform risk management decision making. It was explained that the model used Monte Carlo simulation to model uncertainty. The FSA outlined the stages of the model which estimated the prevalence of *Salmonella* contamination at the production, retail, preparation and cooking stages by compounding probabilities of cross contamination at each stage. The outputs were the probability of contamination of eggs at point of sale and at point of consumption in an egg based meal.

53. Members discussed whether the model reflected current practice in catering establishments regarding use of eggs (e.g. pooling) and the kinds of dishes prepared. The FSA agreed to produce an annexe to the paper containing further detail for ACMSF Members to comment on. Members commented that the model asked the right questions and encouraged the FSA to share further details of the model with the Committee. On the issue of enumeration, Members were reminded when they previously considered this model it decided not to look at dose/response because sufficient data were not available.

54. The Committee endorsed the work the FSA had done and suggested that it should be peer reviewed and shared widely amongst industry stakeholders.

E.coli

E. coli Inquiry

55. At the March ACMSF meeting the Committee agreed to consider the findings of the Public Inquiry into the *E.coli* O157 outbreak in South Wales in 2005 and the FSA's response[45].

56. In September 2009, the FSA briefed Members on the findings of the Public Inquiry and outlined the FSA's response to these findings. The FSA explained that although the report of the Public Inquiry into the *E. coli* O157 outbreak in South Wales in 2005 was primarily concerned with risk management issues, the ACMSF had indicated they should discuss the findings to consider if there was a role for the Committee in advising the FSA. The Public Inquiry report had been discussed by the FSA Board and a Food Hygiene Delivery (FHD) Programme had been set up in response. A summary of the projects which formed the basis of this Programme was provided in paper ACM/955[45] as well as a list of the recommendations from the Public Inquiry report. The FSA invited Members to comment on the Public Inquiry report, and the FSA's response. In particular, the FSA asked whether Members thought the Committee had any contribution to make on risk assessment in relation to recommendation 24 of the Public Inquiry report which related to identification of "supershedder" cattle.

57. A Member questioned whether being able to identify "supershedders" on-farm would be the most cost-effective intervention for *E. coli* control in the food chain as that there was evidence from the US that indicated control was most effective in the abattoir. The impact of any on-farm activity would need to be assessed, especially if not applied across all herds. The Defra assessor commented that Defra was sponsoring research in this area. A meeting of the Pathogenic *E. coli* Network (PEN) had taken place in November 2009, and a summary of the key outputs from that meeting along with information on current research and risk assessments on *E. coli* O157 would be useful for Members to consider a future meeting.

58. The Committee pointed out that due to the large number of deficiencies in food hygiene practice involved in the Wales outbreak there was a need for good risk management in order to discover the small number of food businesses where good hygiene practices were either not understood or were not being carried out. ACMSF stressed the need for businesses to have a good system of procurement in place which should include careful checking of suppliers. The FSA confirmed one of the FHD Programme projects included advice about procurement.

59. Members commented on the difficulty of identifying clusters in an outbreak and that some were probably being missed. Members also highlighted

that the report showed the need for robust microbiological typing as an important factor in identifying outbreaks.

E.coli O157: Defra and FSA research with relevance to Supershedders

60. Following the FSA's request to the ACMSF (September 2009 meeting) to advise on the public enquiry recommendation that "supershedders" should be explored as a mechanism for spreading *E. coli* O157, the Committee suggested that a review be undertaken to examine the latest information available. Dr Chris Low (Scottish Agricultural College) was invited to present a review of recent research[46].

61. It was noted that *E.coli* O157 was not just a foodborne risk but also an environmental risk. A brief description of *E.coli* pathotypes was provided highlighting that Vero cytotoxigenic *E.coli* (VTEC) O157 produces verotoxin (VT) which was detectable using Vero cells. Scotland was noted as having a higher rate of *E.coli* O157 infection in humans than the rest of the UK with 200 to 250 cases per year from both outbreaks and sporadic cases. Sporadic cases accounted for approximately 20% of all cases. Regional differences were also observed. In a 2004 survey the Grampian area was shown to have the highest rate of culture and serum positives at almost 1 in 10,000 of the population.

62. Dr Low added that a Scottish Executive Environment and Rural Affairs Department (SEERAD) prevalence study of *E.coli* O157 based on 925 Scottish farms had shown that 23% of farms and 8% of cattle were positive. A follow-up study by IPRAVE on 481 farms provided similar results with comparable numbers of positive farms. However, it was noted that a longitudinal study had shown that individual farms commonly changed their status between positive and negative. The IPRAVE study additionally showed that 89.7% of the isolates were VT2 positive while 8.9% were positive for both VT1 and VT2. All isolates were positive for intimin.

63. *E.coli* O157 was shown to have a preference for attaching itself to the terminal portion of the rectum. After ingestion of *E.coli* O157, colonisation of the terminal rectal occurred after 3 days. Colonisation also occurred on direct application of *E.coli* O157 to the terminal rectum. Cattle with *E.coli* colonisation in the rectum were associated with a longer duration of shedding and a high level of faecal excretion, so-called "supershedders". However, it was noted that the status of "supershedders" was transient. It was found that the protein Tir, an intimin receptor, was active in the binding of *E.coli* to the host cells and the removal of Tir led to reduced shedding in cattle.

64. Supporting the "supershedder" model, prevalence studies had revealed that observed surveillance results did not fit those predicted by modelling based on chance events. This showed that infection was not random

since chance events would have led to fewer negative farms. Remodelling the data assuming the presence of animals with high transmission rates (supershedders) led to accurate fitting of the observed data. In addition, the modelling suggested that 4% of cattle had a 50 times higher transmission rate than the average, with shedding periods of approximately 18 days. Importantly, the number of infections that would occur from a single "supershedder" 'R_0' was 1.9. Therefore "supershedders" were said to be responsible for the continued infection of herds. However, it was noted that reducing shedding to below 10^4 cfu/g would bring the R_0 value below 1 and therefore lead to the eventual eradication of infection.

65. Members noted the following in discussion:

- In response to a question on immune responses to *E.coli* O157 and the possibility of vaccinating cattle to reduce the incidence of infection Dr Low stated that there are experimental vaccines but these are not used on cattle herds. However, the vaccines did appear to reduce the likelihood of infection and the amount of infectivity.
- MHC sequencing to determine any association with the immune system had not been done.
- To mitigate infectivity it was important to prioritise infection routes when looking at interventions, particularly as environmental routes appeared to be the main cause.
- When investigating the length of time *E.coli* remains in the soil and the type of soil matrix Dr Low added that rather than soil, it is believed that in the Grampian region the main route of infection was through private water supplies.
- There was a focus on VTEC O157 while other pathotypes were not investigated for their impact although it was acknowledged that approximately 99% of all cases in Scotland were *E.coli* O157.

66. The Committee concluded that:

- There was a need for cross government working on the management of *E.coli* O157 as transmission was not solely through food.
- More work was also required on the definition of "supershedder".
- The cost effectiveness and benefit of interventions should be investigated and in particular more information on vaccines was required.
- It was important to remember that other strains of VTEC must not be excluded.

Surveillance

Campylobacter and *Salmonella* in retail chicken survey

67. The FSA briefed Members on the findings UK-wide survey of *Campylobacter* and *Salmonella* in chicken[47]. This survey was commissioned to determine *Campylobacter* and *Salmonella* prevalence on fresh chicken at retail. It was highlighted that *Campylobacter* was currently the most common bacterial cause of foodborne illness in the UK. In 2005 the FSA's strategic plan had contained a target to reduce the prevalence (assumed to be 70%) of *Campylobacter* in chicken at retail by half by 2010. The survey performed between May 2007 and September 2008 was designed to measure progress towards this target.

68. It was noted that for *Campylobacter*, the prevalence results were based on a combination of presence/absence data and enumeration data. The prevalence of *Campylobacter* in chicken was found to be 65.2% for 927 samples taken at retail and 76.1% for 416 samples of whole UK-origin chicken. *Campylobacter jejuni* accounted for 52.9% of isolates and *Campylobacter coli* 47.1%. The prevalence of *Campylobacter* was higher in chilled chicken (47.6%) than frozen (13.6%) with lower levels also observed in the frozen chicken. *Campylobacter* prevalence was also found to be higher in free-range and organic flocks than for housed birds. Unfortunately due to the change in approach used to determine prevalence in this survey, it was impossible to compare these data directly with an earlier 2005 study.

69. The prevalence of *Salmonella* was 6.6% which was similar to the 2001 figure of 5.7%. Thirty different serotypes were isolated during the survey. All isolates of *Salmonella* Java *PT Colindale* were found to be multi-drug resistant, the first time this had been observed in the UK. *Salmonella* prevalence was 5.7% in UK-origin chicken and 11.3% in non-UK chicken. Prevalence was higher in frozen chicken (11.7%) than in chilled chicken (5.9%). It was concluded that a significant proportion of fresh chicken in the UK was contaminated with *Campylobacter* and addressing this risk remained a priority for the FSA.

70. Members asked whether the country of origin of the chickens was known and if it was more likely that *Campylobacter* was from the UK or overseas. The FSA responded that 50% of the *Salmonella* Java *PT Colindale* isolates were from non-UK samples. However, analysis of contamination origin was not investigated. It was noted that it was unfortunate that results could not be compared with previous surveys. It was emphasised that consistency in methodology should be considered for the next survey. ACMSF agreed that while *Campylobacter* contamination remains high it was right that the FSA continues to give this work priority.

UK-wide survey of the prevalence of Johne's disease in UK dairy herds

71. In 2000 the Committee considered the risk to human health from *Mycobacterium avium* subspecies *paratuberculosis* (MAP) in cows' milk. ACMSF concluded that the risk to human health was neither proven nor disproven and did not recommend any change in the advice regarding the consumption of cows' milk. Miss Lesley Larkin (Defra) briefed Members on a survey of MAP, the cause of Johne's disease, in the UK dairy herd.

72. It was reported that MAP infection occurs most frequently in calves although the disease may not be manifest for many years. Cattle may also be infectious before they show signs of disease with some never showing clinical signs. There is currently no effective treatment for infected animals. The survey estimated the UK wide prevalence of MAP infected dairy herds using randomly selected herds, geographically stratified to reflect general distribution of dairy herds, in the 4 countries of the UK. In total there were 136 herds in the study and 13,691 samples were collected. These included blood, faeces, environmental and bulked milk. Although samples were generally representative of UK herds they were weighted more towards farms with a previous history of Johne's disease as these were more likely to participate in the study.

73. ELISA results showed that for the 136 herds tested a total of 86 (65.4%) had one or more animal seropositive for MAP. Out of 13,691 samples, 340 (2.5%) were found to be seropositive. Liquid culture results showed that from 13,691 faecal samples (combined into 2,791 pools) 36 (26.5%) herds had one or more positive pool. From the 804 environmental samples collected, 25 (18.4%) herds were found to have positive samples. Only herds with positive pooled faecal samples had positive environmental samples. Four PCR methods were used to analyse 135 bulk milk samples for MAP resulting in the identification of 40 (29.6%) herds with positive samples. Culture tests, HEYM, Middlebrook and BACTEC were negative for all bulk milk samples.

74. Due to the different tests applied to samples and the different sample matrices (individual, pooled and bulked) a model was developed to combine and assess the overall prevalence while taking account of sampling, sensitivity and specificity. The model assumed that one true positive implied the herd was positive and that all tests would need to be negative for herd to be considered negative. The model also used "prior" sensitivity and specificity estimates to feed into Bayesian probabilistic estimates which were then updated depending on the output of the model. The prevalence of UK dairy herds infected with MAP was estimated to be 34.7% (95% CI 27.6% - 42.5%). The full report on the surveillance of Johne's Disease was published on the Defra website[48] on the 30th November 2009.

75. In its deliberations Members highlighted:

- The discrepancies between the ELISA, PCR and culture results. There was particular concern about lack of growth in bulk milk samples. It was acknowledged that has not been investigated further.

- Difficulties in providing a more thorough assessment as a paper had not submitted for review. It was emphasised that this would have been useful particularly in light of the depth and intricacies of the model. The Defra assessor explained that the report had just been published and a judgment had been made that it was better to present the item to ACMSF in December, rather than defer the discussion until spring 2010.

- More information was required for the Committee to determine the validity of the model. However, it was acknowledged that this model only provided a prevalence estimate and not a full risk assessment. The use of sensitivity and specificity estimates in the model was questioned as it was not clear how these were derived. There was concern that if these were incorrect then the number of false positives and negatives would not be known. In response Miss Larkin stated that the model used “prior” sensitivity and specificity estimates based on data from literature. This was fed into the model which then produced UK specificity and sensitivity results. Sensitivity analysis was also performed using the model to examine the impact of different levels of test sensitivity and specificity.

76. The Committee concluded that the cause of Crohn’s disease remains unknown and that the Committee needed to see more data and clarification on the testing methods used. A summary paper describing clearly the sampling methods and computer model was requested.

UK Food Surveillance Database

77. In September the FSA briefed the Committee on its work on developing a UK-wide food surveillance database, the UK Food Surveillance System (UKFSS)[49] .

78. Mr Taylor, Project Manager for the UKFSS, reported that the database brought together details and results of formal food sampling and testing by UK local authorities, port health authorities and Public Analyst laboratories. The benefits of the database were highlighted, such as the enhancement of communication with the laboratory service in relation to the analysis of official control samples. It also provides the FSA with sample data in a standardised format. The data do not include details of premises from which samples are taken, which remain with the local authority. On the rollout of the database across the UK it was noted that in Scotland it was being used routinely by 29 out of 32 councils and all partner labs with 14,000 samples submitted annually; in Northern Ireland it was used by 26 Local Authorities with 15,000 samples submitted annually; in England and Wales, where the rollout was on a larger scale, it was being used by 34 Local Authorities. A programme of training for Local Authority and FSA staff was underway.

79. Dr Gravett (FSA) informed the Committee how the data were being used, for example, by the Scottish Food Enforcement Liaison Committee who would be publishing a report using data from microbiological sampling in Scotland.

80. Work on the UKFSS was ongoing with HPA and NPHS being included in future phases as much of the microbiological testing in England and Wales was undertaken by these bodies.

81. A Member commented on the difficulties academic researchers often have in obtaining access to such databases. Dr Gravett replied that one of the project boards was looking at issues of access to data. There was also concern that people would try to make links between the data and specific Local Authorities. It was noted that the Pesticides Safety Directorate had used some of the data.

Epidemiology of Foodborne Infections Group

82. The FSA updated the Committee on the outcome of the Epidemiology of Foodborne Infection Group (EFIG) meetings that took place in 2009.

83. In March Members were briefed on the outcome of the March EFIG meeting[50]. Trends in human data were outlined which showed that *Salmonella* had declined in the UK, and in particular in England, in 2008. The decrease was mostly in *Salmonella* Enteritidis PT4. *Listeria*

monocytogenes had increased in the early 2000s and, despite levelling off in the last 4-5 years, levels were still approximately double those seen in the late 1990s. VTEC O157 levels were similar to those in the 1990s. There was a downward trend in *Campylobacter* between 2000 and 2004 but recently there had been a rise. The trends in animal data showed *Salmonella* had also decreased in most species. There had been an increase in chickens and pigs but this was linked to more testing under National Control Plans.

84. Members received a summary of the findings from the CLASSP poultry survey and compared these with the results of the 2001 FSA survey and HPA/NPHSW surveys of *Campylobacter* in chicken. *Salmonella* had been detected at a low level in these surveys and that results were comparable with each other and with the recently completed FSA survey of *Campylobacter* and *Salmonella* in chicken on retail sale in the UK. However, there were differences in the *Campylobacter* results between HPA and NPHS surveys and the recent FSA poultry meat survey.

85. A Member sought a view from FSA on the proposed Zoonoses Regulation that required an absence of *Salmonella* in 25g in raw poultry since there was a discrepancy with the requirements of National Control Plans. There were concerns that although the industry had made great strides in reducing levels of contamination, the regulation could lead to many recalls. The FSA's responded that this issue had been highlighted when the criterion had been established and it was being reviewed by the Commission Working Group.

86. In December, Members were provided with an overview of the November EFIG meeting[51]. Key items were the January 2009 to June 2009 figures for *Salmonella* in livestock which were very similar to the same period last year. In the same period the incidents of *Salmonella* in chickens fell by 54%. This was attributed to a fall in *S.* Enteritidis and *S.* Typhimurium. These figures excluded isolates from vaccine strains. *Salmonella* 4,5,12:i was reported in UK pigs for the first time and further work was being done to characterise this strain. In humans there was a continued downward trend in non-typhoidal salmonellas from January 2009 to September 2009, attributed to further reductions in *S.*Enteritidis. Both *L. monocytogenes* and VTEC O157 reports in humans were relatively constant over the last 4-5 years although in 2009 there had been a slight increase compared with the same period in 2008 for both organisms, particularly in pregnancy associated cases of listeriosis. *Campylobacter* infections continued to show an upward trend with three outbreaks reported in England and Wales associated with chicken liver pâté.

87. Members raised concern regarding the reporting of data, in particular *Salmonella* incidents. The importance of recording denominator data was emphasised so that the significance of any changes could be measured and interpreted. In many instances only positives were reported and no record of the total number tests undertaken.

Codex Food Hygiene meeting

88. The FSA updated the Committee on the outcomes of two meetings of the Codex Committee on Food Hygiene (CCFH). In March, Members received a summary of the main outcomes of the 40th session of the CCFH, held in December 2008[52]. This update included the discussions on completing work on two texts (microbiological criteria for powdered follow-up formula and formulae for special medical purposes for young children, and microbiological criteria for *Listeria monocytogenes* in ready-to-eat foods) and agreement about two new pieces of work (elaboration of a Code of Hygienic Practice for the Control of Viruses in Food, and Annexes to the Draft code of Hygienic Practice for Pathogenic *Vibrio* species in Seafood).

89. In December, the FSA provided the Committee with a brief summary of the 41st CCFH meeting[53]. Key points included the submission of documents on Risk Analysis Principles and Procedures Applied by CCFH, leafy green vegetables and *Vibro* spp. in seafood, to the Codex Alimentarius Commission for adoption. Progress was reported on the development of Guidelines for the Control of *Campylobacter* and *Salmonella* in chicken meat, although issues with divergent opinions regarding the inclusion of chemical decontamination methods were highlighted. CCFH discussed progress with work on foodborne viruses and safety considerations regarding a proposed draft standard for smoked fish, smoked flavoured and smoke-dried fish with respect to *Clostridium botulinum*. CCFH also agreed to take forward new items of work including the revision of the Principles for the Establishment and Application of Microbiological Criteria for Foods and revision of the Code of Hygiene Practice for Natural Mineral Waters. In summer 2010 the Food and Agriculture Organization plan to launch a web based risk management tool which will support the implementation of the Codex guidelines for the control of *Campylobacter* and *Salmonella* in chicken meat.

General Papers

Report from the ACMSF Chair

90. Professor O'Brien reported on the General Advisory Committee on Science (GACS) meetings she attended. Members were informed that:

- GACS was involved in various activities including developing a co-ordinated approach by the scientific advisory committees to horizon scanning. A workshop on this subject took place in June 2009.
- GACS considered the FSA's next Science and Evidence Strategy which was developed in parallel with the FSA's new Strategic plan for 2010-15.

- GACS agreed a revised set of performance indicators for the FSA's science focussing on the quality of questions posed, research carried out and how outputs of research have been used.
- GACS would consider ways to establish a community of experts and progress on developing the Agency's Science and Evidence Strategy.

Work of General Advisory Committee on Science

91. In December Professor Colin Blakemore, Chair of the FSA's GACS presented an overview of the role and work of the Committee[54]. GACS provides advice and acts as an independent challenge to the FSA's Chief Scientist and Board on the Agency's governance and use of science. It also aids in the development and use of science based evidence throughout the Agency. The Committee comprises the nine Chairs who represent the FSA's independent scientific advisory committees (SACs) plus six directly elected members.

92. Examining the way in which the Agency uses scientific based evidence, GACS found there to be good practice in terms of the FSA's commitment to science and the use of this evidence to inform policy. The Agency's approach to openness and the Agency's use of expert Committees was also commended. However, the Agency needed to ensure that thorough scientific evaluation of the impact of policies was performed. Better clarity on the relationship between risk assessment and risk management was also required with improved communication and interaction between SACs and a wider network of experts. Further, to achieve this there was a need for engagement and improved interaction between science and policy. There was concern that the distinct separation between scientific risk assessment and policy risk management drawn up after the Philips Report created artificial boundaries. It was also considered important that as policies change in light of risk assessments, such information is fed back to committees in case the science has to be re-assessed. GACS has set up a working group on risk assessment and risk management to examine how governance and good practice have worked.

93. Prof Blakemore highlighted the importance of horizon scanning (HS) in ensuring that the Agency was in a good position to achieve its strategic objectives. As part of this it was noted that GACS had held a HS workshop in June 2009 to discuss the implications of trends in food production. In addition, GACS was looking into ways of developing and including expertise to augment the knowledge already in place on the SACs. This work helps GACS input into the approach, priorities and principles of the Agency's scientific evidence base and strategy.

94. Prof Blakemore asked Members for their views on how the role of SACs could be improved including better lines of communication. It was noted that one of the members of ACMSF had attended the recent meeting organised by the FSA and Government Office for Science for lay

members of SACs and this had provided a useful means of dialogue. Members highlighted the need for more interaction between Committees, for example where social science issues needed to be included in risk assessments. Members agreed that following a risk assessment there needed to be an iterative process to ensure that the Committee was informed about evidence that might impact on their assessments and advice to the Agency. Similarly, although ACMSF does not make risk management decisions, the Committee should be aware of management options which may also impact on advice.

Openness

95. At the September 2006 meeting Members discussed the Committee's approach to openness. The Members considered that the public access to the Committee's work at that time was acceptable and were keen for the Committee to remain as open as possible. Members explored holding *Ad Hoc* and Working Group meetings in open session and requested a paper for discussion on this issue.

96. Members were reminded that the ACMSF had previously considered "openness" and the way in which the Committee operates with particular attention given to subgroups. Mr Martin (FSA) outlined options for future subgroup meetings for the Committee to discuss[55]. Mr Martin stated that the original discussion on openness stemmed from a FSA review of Scientific Committees which recommended that Committees should conduct as much of their business in open session as possible. Further, the FSA Board supported this position but added clear criteria must be in place should it be felt items must be held in reserved business.

97. Opening the discussion Members welcomed the move to more openness and stated that the proposed outline provided enough flexibility for the subgroups in terms of how data is handled. However, they raised concern about the application of the Freedom of Information (FOI) Act on data which stakeholders may request to be kept confidential. It was noted that it would be difficult for the Agency to agree that documents would be kept confidential due to the interpretation of the FOI Act and what is in the public interest. A clear definition and protocol would be required to provide stakeholders assurances that confidentially would not be challenged under the FOI Act. Members asked whether the FSA had consulted those who would submit sensitive information whether they would be happy to work to these conditions. Mr Martin responded stating that there had not been a consultation as this was a provisional document seeking views of the Committee. However, each item submitted by stakeholders would be reviewed on a case by case basis in terms of FOI issues. Members added that subcommittees from other advisory bodies should be consulted to see how they deal with FOI issues. SEAC was highlighted as a Committee with good practice in this area.

Freedom of Information

98. In July 2009, the Information Commissioner published a decision concerning a complaint against the FSA on a Freedom of Information request relating to the FSA's decision not to disclose information (under exemptions of the Act) provided in confidence to the ACMSF *Ad Hoc* Group on the Safe Cooking of Burgers'. Although the decision agreed that the information was confidential, the Information Commissioner ruled against the FSA and instructed the FSA to disclose the information.

99. The FSA has disclosed the information (a single Powerpoint slide) to the person who requested it and published the full presentation on its website to enable the slide to be seen in its proper context.

SAC Review and Self Appraisal

100. In 2009, Members assessed the performance of the Committee against the SAC Good Practice Guidance and carried out a self appraisal of their individual contribution to the work of the Committee, in accordance with Cabinet Office 'Making and Managing Public Appointments' guidance. The Committee concluded the work of the Committee conformed closely to the requirements of the FSA's Good Practice Guidelines.

Information papers

101. The ACMSF is routinely provided with information papers on topics which the Secretariat considers may be of interest to Members. This affords them the opportunity to identify particular issues for discussion at future meetings. Among the documents provided for information during 2009 were:

- EFSA Trends and Sources (ACM/942)
- EFSA BIOHAZ Panel Opinion on *Salmonella* in table eggs (ACM/943)
- Board paper – publication of minutes (ACM/944)
- Board paper on food safety (ACM/945)
- LACORS/HPA Co-ordinated Food Liaison Group Studies (ACM/946)
- Update on outbreak of *E. coli* O157 in South Wales and subsequent developments (ACM/947)
- Reports from the Microbiological Safety of Food Funders Group (ACM/948)

- EFSA Opinion on the Potential Risks Arising from Nanoscience and Nanotechnologies on Food and Feed (ACM/949)
- Items of possible interest from the literature (ACM/950)
- EFSA Newsletters (ACM/951)
- LACORS/HPA Co-ordinated Food Liaison Group surveys (ACM/957)
- Update from other Scientific Advisory Committees (ACM/958)
- Managing farm manures for food safety guidance (ACM/959)
- Antimicrobial resistance and the food chain ACM/960
- Waste and Resources Action Programme: Risk assessments on the use of source segregated composts in agriculture (ACM/961)
- Items of possible interest from the literature (ACM/962)
- Update from other Scientific Advisory Committees (ACM/970)
- EFSA reports on harmonised monitoring (ACM/971)
- Egg advice to caterers (ACM/972)
- FSAS *Campylobacter* research dissemination June 2009 (ACM/973)
- Items of possible interest from the literature (ACM974)

Chapter 3: A Forward Look

Future work programme

102. The Committee will keep itself informed of developing trends in relation to foodborne disease through its links with the Food Standards Agency and the Health Protection Agency,. A continuing task will be to respond promptly with advice on the food safety implications of any issues, which may from time to time be referred to the Committee by the FSA.

103. Work will continue by the Ad Hoc Group on Vulnerable Groups on behalf of the Committee to consider the risks to humans posed by *Toxoplasma* in the food chain.

104. The Committee will revisit its previous work on foodborne viral infections.

105. The Committee, through its standing Surveillance Working Group, will continue to provide advice as required in connection with the Government's microbiological food surveillance programme and any other surveillance relevant to foodborne disease. The Group will report specifically on surveys of microbiological contamination of fresh red meats on retail sale and *Listeria* in cooked sliced cold meats and pâtés.

106. The Committee will also revisit the issue of microbiological safety of ready to eat foods.

107. The Working Group on emerging pathogens will continue to keep a watching brief on developments concerning the risks to human health from CTX-M extended-spectrum beta-lactamase (ESBL) producing *E. coli* in the food chain.

108. The Committee will continue to keep abreast of Government horizon scanning activities and initiatives, and their potential impact on the ACMSF's future work programme.

Annex I: Terms of Reference and Membership of the Advisory Committee on the Microbiological Safety of Food, its Working Groups and its *Ad Hoc* Groups

Terms of reference

ACMSF
To assess the risk to humans from microorganisms which are used or occur in or on food and to advise the Food Standards Agency on any matters relating to the microbiological safety of food.

Surveillance Working Group
To facilitate the provision of ACMSF advice to government in connection with its microbiological food surveillance programme and other surveillance relevant to foodborne disease, particularly in relation to the design, methodology, sampling and statistical aspects; and to report back regularly to the ACMSF.

Avian Influenza Working Group
To review the ACMSF's 2003 risk assessment on avian influenza including to carry out a detailed review of import measures required for poultry meat and eggs, and to keep a watching brief on developments.

Newly Emerging Pathogens Working Group
To assemble information on the current situation on this topic in order to decide whether there is a potential problems in relation to the microbiological safety of food; and to recommend to the ACMSF whether the Committee needs to undertake further action.

Ad Hoc Group on Vulnerable Groups
To examine the potential risks to vulnerable groups including the elderly in relation to the microbiological safety of food by:
- considering factors that make people vulnerable in order to define vulnerable groups in relation to foodborne disease;
- identifying key hazards for key vulnerable groups for review;
- assessing the impact of changing patterns of food consumption and behaviour on risks to these groups;
- assessing/reviewing the value/adequacy of current advice and controls and whether it is appropriate;
- advising the ACMSF on the need for changes in advice/recommendations on vulnerable groups and identifying gaps/research needs.

Membership Tables

		ACMSF	Surveillance Working Group	Avian Influenza Working Group
Chairman				
Professor S J O'Brien	Professor of Health Sciences & Epidemiology, School of Translational Medicine, University of Manchester	✓	✓	
Members				
Mr J Bassett	Team Leader – Microbiological Safety, Unilever Safety & Environmental Assurance Centre	✓		
Dr D W G Brown[1]	Director, Virus Reference Department, HPA Centre for Infections, 61 Colindale Avenue, London NW9 5HT	✓		✓
Mrs V Buller	Catering Adviser. School Food Consultant Service Improvement Consultant	✓		
Professor J Coia	Consultant Microbiologist, NHS Greater Glasgow and Clyde	✓	✓	
Professor M J Gasson[2]	Deputy Director (Science), Institute of Food Research	✓	✓	✓

[1] Dr Brown chairs the Avian Influenza Working Group
[2] Appointment ended 31 March 2009

		ACMSF	Surveillance Working Group	Avian Influenza Working Group
Mrs Rosie Glazebrook	Consumer representative	✓		
Dr R E Holliman	Consultant and Reader in Clinical Microbiology, St George's Hospital, London	✓		
Professor T J Humphrey[3]	Professor of Veterinary Zoonotic Bacteriology, University of Bristol	✓	✓	
Professor P R Hunter	Professor of Health Protection, University of East Anglia	✓		
Mr A Kyriakides	Head of Product Quality, Safety & Supplier Performance, Sainsbury's Supermarkets	✓	✓	
Mr P McMullin	Senior Veterinarian & Managing Director, Poultry Health Services	✓		✓
Dr S Millership	Consultant in Communicable Disease Control, Essex Health Protection Unit and Consultant in Microbiology, Princess Alexandra Hospital, Harlow	✓		

[3] Professor Humphrey chairs the Surveillance Working Group

		ACMSF	Surveillance Working Group	Avian Influenza Working Group
Mrs J Morris	Principal Policy Officer (Food), Chartered Institute of Environmental Health	✓		
Mr R Rees[4]	Chef and Food Consultant	✓		✓
Professor P H Williams	Professor of Microbiology, Dept. of Genetics, University of Leicester	✓		
Co-opted Members				
Dr D Alexander	Veterinary Laboratories Agency			✓
Dr C Bell	Consultant		✓	
Dr I Brown	Head of Avian Virology, Veterinary Laboratories Agency			✓
Dr A Hay	Director, World Influenza Centre, National Institute for Medical Research			✓
Dr N Phin	Respiratory Diseases Department, Health Protection Agency			✓
Dr J Wood	National Institute for Biological Standards and Control			✓

[4] Resigned March 2009

		ACMSF	Surveillance Working Group	Avian Influenza Working Group
Assessors				
Mr S Wyllie	Department for Environment, Food and Rural Affairs	✓		✓
Dr J Hilton	Food Standards Agency	✓		✓
Dr S Neill	Agri-Food Institute and Biosciences Institute, Northern Ireland	✓		
Dr J McElhiney	Food Standards Agency (Scotland)	✓		
Mr S Wearne	Food Standards Agency (Wales)	✓		
Secretariat				
Administrative Secretary Dr L Foster	Food Standards Agency	✓	✓	✓
Scientific Secretary Dr P E Cook	Food Standards Agency	✓		
Administrative Secretariat				
Mr A Adeoye	Food Standards Agency	✓	✓	✓
Miss S Butler	Food Standards Agency	✓	✓	✓
Scientific Secretariat				
Dr C-H Chan	Food Standards Agency		✓	

		Working Group on Newly-emerging Pathogens	*Ad Hoc* Group on Vulnerable Groups
Members			
Mr J Bassett			✓
Dr D W G Brown		✓	
Professor J Coia			✓
Professor T J Humphrey[5]			✓
Professor P R Hunter[6]		✓	✓
Dr R Holliman		✓	✓
Mr A Kyriakides		✓	✓
Mr P McMullin			
Mrs J Morris			✓
Professor S J O'Brien		✓	
Professor P H Williams[7]			
Co-opted Members			
Professor P Hawkey	University of Birmingham	✓	
Dr D Livermore	HPA	✓	
Mr C Teale	VLA	✓	
Professor K Kerr	Consultant Microbiologist		✓
Dr J McLauchlin	HPA		✓
Ms C Roberts	Social scientist, University of Oxford		✓

[5] Professor Humphrey chairs the *Ad Hoc* Group on Vulnerable Groups
[6] Professor Hunter chairs the *Ad Hoc* Group on Newly Emerging Pathogens
[7] Professor Williams chairs the *Ad Hoc* Group on Botulism in Cattle, Sheep and Goats

		Working Group on Newly-emerging Pathogens	*Ad Hoc* Group on Vulnerable Groups
Assessors			
Dr J Hilton	Food Standards Agency		✓
Mr S Wyllie	Department for Environment, Food and Rural Affairs	✓	✓
Dr S Kennedy	Agri-Food Institute and Biosciences Institute, Northern Ireland		
Secretariat			
Administrative Secretary			
Dr L Foster		✓	✓
Administrative Secretariat			
Mr A Adeoye		✓	✓
Miss S Butler		✓	✓
Scientific Secretariat			
Ms G O'Neill		✓	
Dr J Aish			✓
Miss L Knowles			✓

Annex II : Advisory Committee on the Microbiological Safety of Food Register of Members' Interests

Member	Personal interests		Non-personal interests	
	Name of company	**Nature of interest**	**Name of company**	**Nature of interest**
Professor S J O'Brien	None		Various	Research funding in collaboration with industrial partners FSA funded research
Mr J Bassett	Unilever plc	Employee		
Dr D W G Brown	None		Various	HPA industry-funded research and laboratory investigations
Mrs V Buller	Local Authorities and Schools Association for Public Service Excellence	Consultancy and interim project management. Associate Consultant	Food Standards Agency School Food Trust	Evaluation of Local Authority Food & Hygiene applications and other education related projects. Consultancy
Professor J Coia	None Tesco UK	Ad Hoc medico-legal work on infection related matters Consultancy work	Various	Funding for research projects
Mrs R Glazebrook	None		None	
Dr R E Holliman	Various	Medical Legal work on toxoplasmosis and hospital acquired infection	None	

Member	**Personal interests**		**Non-personal interests**	
	Name of company	**Nature of interest**	**Name of company**	**Nature of interest**
Professor T J Humphrey	British Egg Industry Council MacDonalds Ltd	*Ad hoc* consultancy work *Ad hoc* consultancy work	Various	Funding for research projects
Professor P R Hunter	Suez International Paris Institute for Public Health & Water Research	Chair of Science Advisory Committee Chair of Board of Directors Medical/Legal advice regarding Travel Health	Chambre Syndicale des Eaux Minérales, Paris	Study of Antibiotic Resistance in Food & Water in France
Mr A Kyriakides	J Sainsbury plc Sainsbury's Supermarkets Ltd Campden BRI	Shareholder Employee Member of Council & Executive	None	
Mr P McMullin	Poultry Health Services (PHS) Ltd	Employee and shareholder	Various through PHS Ltd	Consultancy, Veterinary care, Laboratory services
Dr S Millership	None		None	
Mrs J Morris	Chartered Institute of Environmental Health Whitbread plc	Employee and Member Shareholder	None	
Professor P H Williams	None		None	
Surveillance Working Group				
Dr C Bell	The United Kingdom Association of Microbiologists – Accreditation Marks & Spencer plc	Convenor Shareholder	Companies in the food manufacturing and retailing sectors Food Standards Agency	Consultant in Microbiology Programme Adviser for B11 VTEC research project

Member	Personal interests		Non-personal interests	
	Name of company	**Nature of interest**	**Name of company**	**Nature of interest**
Avian Influenza Working Group				
Dr D Alexander	None		None	
Dr I Brown	Veterinary Laboratories Agency	Director of International Reference Laboratory for AI	None	None
Dr A Hay	None		None	
Dr N Phin	None		None	
Dr J Wood	None		None	
Newly-Emerging Pathogens Working Group				
Professor P Hawkey				
Dr D Livermore	GlaxoSmithKline, Dechra, Pfizer, Merck, AstraZeneca, Monsanto, Tate & Lyle, within diversified portfolio GlaxoSmithKline, Eco Animal Health, Sainsbury's, M&S, ABF, Tate & Lyle within diversified portfolio Health Protection Agency Intervet	Shareholder, EPA for shareholder Employee Ad hoc advisor on ESBLs	Merck, Wyeth, Oxoid, Cerexa, Protez	Grants or contract research
Mr C Teale	Marks & Spencer plc J Sainsbury plc	Shareholder		

	Personal interests		Non-personal interests	
	Name of company	**Nature of interest**	**Name of company**	**Nature of interest**
***Ad Hoc* Group on Vulnerable Groups**				
Professor K Kerr	None		None	
Dr J McLauchlin	Health Protection Agency Various	Employee *Ad Hoc* Consultancy Work	Various	Funding for research projects
Ms C Roberts	None		Food Standards Agency	Microbiological Safety Division Social Science Adviser

Glossary of Terms

Botulinum toxin: A poison produced by a type of bacteria called *Clostridium botulinum*.

Bacteraemia: Presence of bacteria in the bloodstream.

Campylobacter: Commonest reported bacterial cause of infectious intestinal disease in England and Wales. Two species account for the majority of infections: *C. jejuni* and *C. coli*. Illness is characterized by severe diarrhoea and abdominal pain.

Crohn's disease: Is a chronic inflammation of part of the intestine in humans. The cause is not known and many possible causes have been suggested including diet (high sugar, low fibre), immune mechanisms and possible microbiological and environmental factors.

Co-morbidity: In medicine, co-morbidity describes the presence or effect of one or more diseases in an individual patient in addition to the primary disease.

Escherichia coli O157*:* A particularly virulent type of *Escherichia coli* bacteria that can cause severe illness

Immunocompromised: Used to describe someone who has an impaired immune system – usually due to treatment or underlying illness.

Intimin: is an attaching and effacing protein that is a virulence factor of EPEC and EHEC *E. coli* strains. With other virulence factors it is responsible for enteropathogenic and enterohaemorrhagic diarrhoea.

Johne‘s disease: Is an infectious wasting condition of cattle and other ruminants caused by Mycobacterium avium subspecies paratuberculosis (commonly known as Map). It is genetically related to the organism that causes tuberculosis, but does not itself cause tuberculosis in either humans or animals.

Isolate: Substances that have been separated, or isolated, from their original source. A pure bacterial specimen obtained by microbial culture.

Listeriosis: A rare but potentially life-threatening disease caused by *Listeria monocytogenes* infection. Healthy adults are likely to experience only mild infection, causing flu-like symptoms or gastroenteritis. However, *L. monocytogenes* infection can occasionally lead to severe blood poisoning (septicaemia) or meningitis.

Listeria monocytogenes: Gram-positive pathogenic bacteria that can cause listeriosis in humans.

Listeria spp: Ubiquitous bacteria widely distributed in the environment. Among the seven species of *Listeria*, only *Listeria monocytogenes* is commonly pathogenic for humans. It can cause serious infections such as meningitis or septicaemia in newborns, immunocompromised patients, and the elderly or lead to abortion.

Mycobacterium avium subspecies *paratuberculosis* (MAP) is an obligate pathogenic bacterium. Along with the term MAP it is often abbreviated to *M. paratuberculosis or M. avium* sub. *paratuberculosis.*

Pathogen: An infectious microorganism, bacteria, virus or other agent that can cause disease by infection.

Pathogenicity is the ability of a pathogen to produce an infectious disease in an organism.

Salmonella: A genus of gram negative bacteria which can cause salmonellosis in humans. Specific types of *Salmonella* are normally given a name, for example *Salmonella* Typhimurium has full name Salmonella enterica serovar Typhimurium.

Strain: Population within a species or sub-species distinguished by sub-typing.

Supershedders: Individuals that over a period of time yield many more infectious organisms of a particular type than that expected in the same host species.

Toxin: a poison, often a protein produced by some plants, certain animals and pathogenic bacteria, which is highly toxic for other living organisms.

Toxoplasma gondii: a species of parasitic protozoa in the genus *Toxoplasma*.

Typing: Method used to distinguish between closely related micro-organisms.

Virulence: The capacity of a microorganism to cause disease.

VTEC: Verocytotoxin producing *Escherichia coli* that characteristically produce powerful toxins that kill a variety of cell types, including Vero cells on which their effects were first demonstrated.

Glossary of Abbreviations

ACMSF: Advisory Committee for the Microbiological Safety of Food

BBSRC: Biotechnology and Biological Sciences Research Council

COC: Committee on Carcinogenicity
COM: Committee on Mutagenicity

CLASSP: Co-ordinated Local Authority Sentinel Surveillance of Pathogens

CCFH: Codex Committee on Food Hygiene

Defra: Department for Environment Food and Rural Affairs

DARD NI: Department of Agriculture and Rural Development Northern Ireland

EFIG: Epidemiology of Foodborne Infections Group

EFSA: European Food safety Authority

ELISA: Enzyme-Linked Immunosorbent Assay

ESBL: Extended-Spectrum-beta-lactamase

FIS: Food Issues Survey

FOI: Freedom of Information

FHD: Food Hygiene Delivery Programme

FSA: Food Standards Agency

GACS: General Advisory Committee on Science

HPA: Health Protection Agency

IPRAVE: International Partnership Research Award in Veterinary Epidemiology

MAP: *Mycobacterium avium* subspecies *paratuberculosis*

MHC: Major histocompatibility complex

MHRA: Medicines and Healthcare products Regulatory Agency

NPHS: Public Health Wales Health Protection Division

NPHSW: National Public Health Service for Wales

OCPA: Office of the Commissioner for Public Appointments

PCR: Plymerase chain reaction

PEN: Pathogenic *E.coli* Network

SEAC: Spongiform Encephalopathy Advisory Committee

SEERAD: Scottish Executive and Rural Affairs Department

SSRC: Social Science Research Committee

UKFSS: United Kingdom Food Surveillance Database

VLA: Veterinary Laboratories Agency

VT: Verotoxin

VTEC O157: Verocytotoxigenic *Escherischia coli* O157

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