Advisory Committee on the Microbiological Safety of Food

Annual Report 2008

Advises the Food Standards Agency on the
Microbiological Safety of Food

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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[1-16] and in a series of subject-specific reports.[17-30]

Foreword

1. I am pleased to present the 2008 Annual Report of the Advisory Committee on the Microbiological Safety of Food (ACMSF).

2. In March 2008 the ACMSF completed its work on the review of the risks to human health from CTX-M extended-spectrum beta-lactamase (ESBL) producing *E. coli* in the food chain. The Committee's Working Group on Newly-Emerging Pathogens considered the issues surrounding and evidence available regarding CTX-M ESBL-producing *E. coli* in relation to disease in people, their occurrence in animals and food and the possibility of humans becoming colonised with the organism via food. They considered transmission pathways in their widest context and also explored whether a holistic approach to this problem would be worthwhile. The key conclusions from the Group were that a cross governmental approach to consideration of ESBLs was required. The Group also concluded that surveillance needed to be undertaken across a variety of sectors and should not be restricted to isolated surveillance of food commodities. A holistic approach was needed to investigate ESBLs and the Group recommended that Antimicrobial Resistance and Healthcare Associated Infection Committee (ARHAI) were best placed to take this forward. There was insufficient evidence to assess the associated risk of ESBL transmission from food to humans and animals. The Committee requested that the Working Group keep a watching brief on this issue.

3. In July 2008 the Committee concluded its work to consider the potential risk to human health from food chain issues linked to botulism or suspected botulism in sheep and goats. The *Ad Hoc* Group on Botulism in Cattle, Sheep and Goats considered information on the prevalence and reported outbreaks or incidents of suspected botulism in sheep and goats in the UK and other countries. It examined differences in animal husbandry practices, feeding habits and meat and milk production between the two species and in comparison with cattle. The likelihood of active botulinum toxin being present in meat and milk was explored, and risk factors associated with the consumption of meat and milk (including raw milk and milk products) from sheep and goats, milk dilution factors, and composting and disposal of poultry litter were examined. The Group also reviewed the susceptibility of humans to the botulinum toxin types C and D that are most frequently associated with botulism in animals. The key recommendations were that, in the absence of

other signs, there should be no requirement to restrict sales of meat or milk from clinically healthy sheep or goats from farms where there have been clinically suspected cases of botulism in sheep and goats. There should be no requirement to restrict the slaughter of healthy sheep and goats from herds where cases of confirmed or suspected botulism have occurred. UK agriculture departments should reinforce their advice to farmers involved in the production, storage and spreading of poultry litter on measures for the prevention of on-farm botulism. UK veterinary authorities should continue to encourage sheep and goat farmers to report suspected cases of botulism.

4. In September 2008 the Committee approved for public consultation the *Ad Hoc* Group on Vulnerable Groups Report on the increasing trend in the number of cases of listeriosis in the UK. This ACMSF report considered four hypotheses to try to explain the change in epidemiology in the over 60s age group. These were that the rise in cases of listeriosis in people over 60 years of age was an artefact associated with improved case recognition; the pathogen, *Listeria monocytogenes*, has become more virulent and 'new' strains are better able to cause bacteraemia; the population predominantly affected by the recent increase has become more susceptible to infection with *Listeria;* and levels of exposure have 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.

5. The Food Standards Agency (FSA) sought our view on its recommendations to amend its 2001 advice to consumers to wash ready to eat (RTE) bagged salads before consumption. We supported the recommendations that the FSA's consumer advice to wash pre-washed ready to eat bagged salads was no longer appropriate and that the FSA should consider revising this advice to remove the recommendation to wash these products.

6. Following the consideration of the microbiological safety of ready-to-eat bagged salads, ACMSF requested an update from the Health Protection Agency (HPA) on the microbiological status of ready to eat foods. The HPA presented an overview of the public health issues arising from the microbiological contamination of ready to eat fresh produce. We noted that the data presented showed that a fairly low percentage of outbreaks were linked to salad vegetables. We highlighted the need for a partnership approach to outbreak investigations and that the HPA consider developing a lay guide on outbreak investigation statistics. We agreed that routine molecular typing was helpful in rapidly resolving outbreaks and that under-ascertainment of norovirus infections might be greater than suggested by the available data. We also considered that it was important not to be blinded by biological plausibility when investigating outbreaks. The Committee requested that HPA provide an update on the microbiological status of RTE foods at a future meeting.

7. In 2008 the FSA updated the Committee on its study of infectious intestinal disease and the problems associated with attributing causes of foodborne illness. The FSA also updated the Committee on the outcome of its review on its research programme on foodborne diseases.

8. The Committee was briefed on the approaches to food safety risk assessment and on the international approaches to risk assessment.

9. On surveillance, the FSA briefed Members on the outcome of its survey of contamination of retail smoked fish. This survey was commissioned to collect information on the prevalence of *Listeria* contamination at retail. We highlighted that smoked fish could not be assumed to be a low-risk product purely on the basis that it was rarely associated with outbreaks. Members cautioned that the survey was not designed to inform advice to the public and that it would be premature for any new advice to target specific foods. As the processing of smoked fish and the incidence of *Listeria monocytogenes* were not believed to have changed markedly over the years it was considered possible that the handling and storage of smoked fish may be an important factor in relation to the microbiological safety risks. The Committee welcomed the report and commented that any FSA advice should focus on good storage and handling practices. We suggested to the FSA should revisit its *Listeria* advice when other FSA surveys on *Listeria* are published.

10. The Committee's drive to be publicly accessible has continued in 2008. All of our quarterly meetings continue to be open to the public with a public question and answer session featuring at the end of each agenda. Aside from meetings, we are also accessible via our e-mail address and web pages.

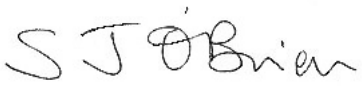
11. In 2008 ACMSF adopted the model publication scheme as recommended by the Information Commissioner's Office (ICO). Every public authority subject to the Freedom of Information Act 2000 (FOI) is required to adopt and maintain a publication scheme. The ACMSF information guide offers the kinds of information the ICO expect scientific advisory committees to provide in order to meet their commitments under the model publication scheme.

12. We also reviewed our work against the FSA's scientific governance principles for presenting scientific advice. Members agreed that the work of the Committee conformed closely to the requirements of FSA's Good Practice Guidelines, but that an external audit might be appropriate.

13. Looking to the future, the Committee will continue to monitor closely developments on the increase in listeriosis and will publish the outcome of the work of its *Ad Hoc* Group on Vulnerable Groups. We will also report on the

outcome of work to assess the potential risk to human health from botulism in sheep and goats. We will consider the risks posed by *Toxoplasma* in food and revisit our previous work on foodborne viral infections, *Salmonella* in eggs risk assessment model and microbiological safety of ready to eat foods. In addition, we will consider the outcome of the *E. coli* O157 in South Wales Inquiry.

14. I am indebted to the members of the Committee and its Working and *Ad Hoc* Groups without whose efforts 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 seventeenth Annual Report of the Advisory Committee on the Microbiological Safety of Food (ACMSF). It covers the calendar year 2008.

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[31], the guidance issued by the Office of the Commissioner for Public Appointments (OCPA)[32] and the Government Office for Science Code of Practice for Scientific Advisory Committees[33]. 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 proportion of Members falls 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 1 consumer Member.

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

Appointments in 2008

6. One Member was appointed to the ACMSF during 2008: Mrs Rosie Glazebrook[34]. Mrs Glazebrook provides the Committee with expertise from a consumer perspective. Her period of appointment runs from 1 April 2008 until 31 March 2011.

Retirements in 2008

7. Ms Sue Davies and Ms Eva Lewis retired from the Committee on 31 March 2008 after completing 7 and 10 years service respectively.

8. The Chair expressed her gratitude to Ms Davies and Ms Lewis for their contribution to the work of the ACMSF and wished them well for the future.

Committee and Group meetings

9. The full Committee met 3 times in 2008 - on 11 March, 5 June and 25 September. The March meeting was chaired by ACMSF Deputy Chair Professor Peter Williams and the June and September meetings were chaired by Professor Sarah O'Brien. All three meetings were open to members of the public.

10. The *Ad Hoc* Group on Botulism in Cattle, Sheep and Goats (Chair: Professor Williams) met once in 2008. The Group presented its draft final report to the Committee at the June 2008 meeting and the Committee agreed to issue the report for public consultation. The consultation on this report took place between July and October. The Group considered the comments received in response to the public consultation via correspondence. The *Ad Hoc* Group on Vulnerable Groups (Chair: Professor Tom Humphrey) met three times. The Group presented its draft final report to the Committee at the September 2008 meeting and the Committee agreed to issue the report for public consultation.

11. The Working Group on Surveillance (Chair: Professor Humphrey) met once to consider the FSA's survey of *Listeria* in smoked fish on retail sale. This survey was published on the FSA website in September.

12. Dr Richard Holliman, Member of the Newly-Emerging Pathogens Working Group, presented its report on the risks to human health from CTX-M extended-spectrum beta-lactamase (ESBL) producing *E. coli* in the food chain to the Committee in March 2008. The key conclusions from the Group were that a holistic approach was required to the consideration of ESBLs; based on current information there was no epidemiological evidence to support the view that food was a major risk factor for ESBLs; and that the Group should keep a watching brief on developments.

Current membership and Declarations of Interests

13. 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[35]. Declarations made are recorded in the minutes of each meeting.

Personal liability

14. 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 Food Standards Agency 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

15. 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:

acmsf.food.gov.uk

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

acmsf@foodstandards.gsi.gov.uk

17. 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

18. Following the recommendations flowing from the FSA's Review of Scientific Committees,[36] the ACMSF decided that, from 2003 onwards, all of its quarterly meetings should be held in public.

19. All of the 2008 Committee meetings were held in Aviation House, the Food Standards Agency's London Headquarters.

20. 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 concerned.

Work of the other advisory committees and cross-membership

21. Professor Gasson continued to serve as a member of the Advisory Committee on Novel Foods and Processes (ACNFP), thereby providing a first-hand link between the 2 committees. Mrs Glazebrook is a member of the Advisory Committees on Carcinogenicity and Mutagenicity of Chemicals in Food, Consumer products and the Environment (COC, COM). ACMSF Chair (Professor Sarah O'Brien) is a member of the General Advisory Committee on Science (GACS). Mr John Bassett was a member of the Spongiform Encephalopathy Advisory Committee (SEAC) until January 2008.

Chapter 2 :
The Committee's Work in 2008

Listeria

22. The *Ad Hoc* Group on Vulnerable Groups presented its draft final report to the Committee in 2008 on its work to examine the increased incidence of listeriosis in the UK. This report was issued in response to the ACMSF's request to the *Ad Hoc* Group to consider the change in epidemiology of human *Listeria monocytogenes* predominantly associated with the over 60s age group. In June Professor Humphrey presented the Group's interim report[37]. He informed the Committee that the Group had based its deliberations around 4 hypotheses. These were that:

- The rise in case of listeriosis in compromised people over 60 years of age is an artefact associated with improved case recognition;
- The pathogen, *L. monocytogenes*, has become more virulent and 'new' strains are better able to cause bacteraemia;
- The population predominantly affected by the increase has become susceptible to infection with *Listeria*; and
- Levels of exposure have increased.

23. Professor Humphrey's paper summarised the evidence considered by the Group which was within a framework covering areas around hazard identification and characterisation, exposure assessment and some aspects of risk management. The Group considered that the change in the epidemiology of *Listeria monocytogenes* was unlikely to be artefactual. There was also no evidence to support a change in virulence of the organism. However it was noted that the necessary virulence surveillance methodology was not available to test this hypothesis. Similarly evidence was lacking to suggest that the susceptibility of the population group affected by the increase had changed. Lastly, the Group had identified that there was insufficient evidence to fully assess exposure to the organism. Information on food consumption and storage in the home for the over 60s age group was lacking. However, *Listeria* was known to occur in ready to eat foods, and in comparison with two decades ago, the level and frequency of contamination was lower. These low levels were more difficult to detect.

23. The Committee discussed food surveys at point of sale and queried whether more surveillance work could be carried out (possibly by EHOs) in the home. Members considered that more information was also needed on

consumer perception and domestic food hygiene practices. Results from a domestic fridge survey considered by the *Ad Hoc* Group had shown that fridges were often held at higher temperatures than those recommended by manufacturers to control the growth of food pathogens. It was also noted that the impact of recent trends in keeping food in the fridge for longer could also have an effect on growth of the organism. Members discussed information on food purchase patterns in the over 65s considered by the *Ad Hoc* Group, highlighting that these data appeared to relate to well individuals only. More information was needed on the food purchase and storage behaviour patterns of unwell individuals within this age group in the home, as the reported increase in listeriosis related to both well individuals and those suffering from an underlying condition.

24. Members discussed the hypotheses presented by the *Ad Hoc* Group. These were welcomed. It was acknowledged that in relation to the change in virulence of the bacterium, consideration also needed to be given to whether the susceptibility of individuals to the organism had also changed.

25. Members concluded that the Committee supported the approach being taken by the *Ad Hoc* Group to address this issue. In December 2007 ACMSF had highlighted several areas where information was lacking in relation to food hygiene practices in the domestic setting and food behaviour and purchase patterns of the frail elderly.

26. In September in the absence of Professor Humphrey, Dr Holliman presented the *Ad Hoc* Group's draft final report to the Committee[38]. He reminded the Committee that the Group was set up following the HPA notification to ACMSF of a change in the epidemiology of human *Listeria monocytogenes* infection in England and Wales. The Group considered four hypotheses (as outlined above) to examine the cause of the rise in listeriosis within a framework of hazard identification and characterisation.

27. The Group concluded that:

Hypothesis 1

(i) From the available evidence, it was unlikely that the reported rise in listeriosis in the over 60s age group was an artefact. Whilst there had been some changes in medical practice and an increase in population, this was not sufficient to explain the change in epidemiology. The increase in reported cases of listeriosis was restricted to those patients with CNS infection. Similar rises were not observed in isolations from other body sites or associated with other foodborne pathogens. Hypothesis 1 was rejected.

Hypothesis 2

(ii) This age group were considered to be more susceptible to underlying conditions and treatment, and in theory, more susceptible to infection. However the overall increase in population ages 60 years or over was not considered to be a strong factor in terms of impacting on the rise in cases of listeriosis in this age group. Due to the lack of data available the hypothesis was not proven. The Group identified the need for targeted and focussed case-control studies to gather more information.

Hypothesis 3

(iii) There was no convincing information available to demonstrate that the virulence of strains of *Listeria monocytogenes* had changed. Molecular studies were needed to examine virulence factors to determine whether the change in epidemiology was linked to the virulence of the organism.

Hypothesis 4

(iv) Despite the availability of general information on *Listeria*, there was a paucity of data relating to the over 60s age-group. Information on the behaviour of this age group in the home was lacking. Studies in the home were needed to examine how this age group bought, stored and selected food. Industry also needed to consider the impact of changes in shelf-life and preservative use on the survival and growth of *Listeria* during food storage.

28. The Group also examined risk management issues linked to *Listeria*. They concluded that:

- There was a need for health education aimed at the over 60s and for the development of information and advice about *Listeria* focussing on this age Group. This should be to at least the same extent as the available information currently aimed at pregnant women;
- Advice to industry on use of HACCP, temperature and shelf-life controls, hygiene and cleaning and food preservation needed to be reinforced.

29. Dr Holliman thanked the members of the Group and those organisations who provided information to support the Group's deliberations. Members welcomed the report noting that it was drafted in a consumer-friendly format. The Committee acknowledged that the *Ad Hoc* Group had already provided the FSA with views to inform the development of recently

revised advice on *Listeria monocytogenes* aimed at vulnerable groups including the over 60s. Some Committee Members cautioned that, in relation to members of the population with underlying conditions, not all drugs within one class would exert the same effect. A closer look was needed to examine the effects of individual drugs within one class. The *Ad Hoc* Group confirmed that due to the lack of available data, it was not possible to examine this issue. Therefore the report recommended that carefully designed studies were carried out to explore this further.

30. The Committee endorsed the recommendations in the Report and recommended that the report be subjected to public consultation prior to final publication. Some Members suggested that the Secretariat send the report to relevant medical Committees as part of the consultation process to seek their views on the proposed studies.

Botulism in sheep and goats

31. The *Ad Hoc* Group on botulism in sheep and goats finalised their report in March and the Chair of the Group (Professor Williams) presented the report to ACMSF in June[39]. Professor Williams reminded Members that in 2006 the ACMSF published its report on botulism in cattle. In this report ACMSF recommended that it was no longer necessary to restrict meat and milk from healthy cattle from farms where cases of botulism were suspected. In 2007 the Committee reconvened the *Ad Hoc* Group on botulism in cattle to consider the potential risk to human health from botulism or suspected botulism in sheep and goats via the food chain. The Committee was informed that the Group met on three occasions (twice in 2007 and once in 2008) and recommended that there was also no need to restrict milk and meat from healthy animals on farms where cases of botulism were suspected. The reasons supporting this recommendation were that:

- The toxin types C and D associated with sheep and goats were not associated with the disease in humans. However monitoring of toxin types in these animals was recommended in case these toxin types were subject to change;
- The onset of disease in sheep and goats was very rapid. Therefore the likelihood of affected animals entering the food chain was low as any signs of disease would be picked up at an early stage;
- The toxin in meat was not present to a form rendering it capable of causing disease in other animals and humans;
- There were no cases (as far as the Group were aware) of suckling lambs acquiring the disease. Similarly there were no reports of suckling calves becoming affected by the disease;
- Botulinum in sheep was rare in the UK. Only 14 outbreaks in sheep had occurred since 1997. There was only one case reported in goats;

- In all the reported botulism in sheep outbreaks, poultry litter was identified as the suspected source of the disease;
- Advice on the production and disposal of poultry litter should be reiterated to reduce the risk of occurrence of this condition in ruminants.

32. In discussing the geographic evidence for cases of botulism, Members noted that most of the cases occurred on the western side of the UK, as farming practices were more likely to store and use poultry litter on or close to grazing land in these regions (as there is more grazing and less arable).

33. The Committee adopted the report and agreed that it should be published for public consultation. The consultation period took place between 29 July and 20 October 2008.

CTX-M ESBL-producing *E.coli*

34. In March the Working Group on emerging pathogens presented its report on CTX-M Extended-Spectrum beta-lactamase (ESBL) producing *E.coli*[40]. The Group was charged by ACMSF to assess the risk to human health from ESBL producing *E.coli* in the food chain. The Committee was informed that ESBLs had been of concern in human medicine for some time due to the enzymes ability to confer on bacteria the ability to resist a wide range of beta-lactam antibiotics, which resulted in difficulties in treating infections in animals and humans. The Group were asked to consider:

- Evidence to suggest food was the primary source of ESBL-producing *E.coli*;
- Frequency of these organisms in food and humans;
- Whether human food transmission could be cyclical;
- Whether *E.coli* should remain the focus of surveillance for ESBLs; and
- The validity of a holistic approach.

35. Dr Holliman (member of the Working Group) summarised issues considered by the Group. These included routes of transmission via food, person-to-person, animals to humans and by direct contamination. Organisms similar to those identified in human isolates had been identified on a cattle farm in Wales. However molecular studies had shown that organisms identified in these animals were not identical to those found in humans. He also summarised evidence considered by the Group to establish the role that food might play in transmission of ESBL producing *E.coli* noting a small survey of raw chicken where these organisms had been found. The Group were of the view that cooking would minimise any risk of transmission, and that correct handling was also important in minimising disease via cross contamination. However based on current evidence there was insufficient data available to suggest that

food was a significant source of ESBL transmission. There was also insufficient data available to comment on likely cyclical transmission from animals to humans and vice versa. Both the Defra Antimicrobial Resistance Coordination Group and the Antimicrobial Resistance and Healthcare Associated Infection Committee (ARHAI) were considering ESBLs. The Group considered that a cross governmental approach to consideration of ESBLs was required. The Group also concluded that surveillance needed to be undertaken across a variety of sectors and should not be restricted to isolated surveillance of food commodities. A holistic approach was needed to investigate ESBLs and the Group considered that ARHAI were best placed to take forward this issue. There was insufficient evidence to assess the associated risk of ESBL transmission from food to humans and animals.

36. Members discussed the role of surveillance to increase understanding of ESBL transmission. Dr Holliman explained that the Working Group considered that parallel structured animal, human and food surveillance was needed to build up a holistic view as molecular transmission data was inadequate at present.

37. The Committee endorsed the work of the Working Group and requested that the Working Group keep a watching brief on this issue. The FSA assessor (Dr Hilton) agreed to keep ACMSF up to date with developments at ARHAI.

Microbiological Safety of ready to eat salads

38. In March the FSA briefed the Committee on microbiological safety of ready to eat salads[41]. Members were informed that since 2001 the Agency had advised consumers to wash ready to eat bagged salads before consumption. This followed an outbreak of *Salmonella* Newport where bagged salad was identified as the source. The FSA had recently reviewed this advice as the industry had introduced further controls to reduce hazards and risks associated with fresh produce; moreover, research had shown that washing could not guarantee the removal of any pathogens that might be present on the product. The FSA explained that it had been unable to find any evidence to suggest that re-washing ready to eat salads by consumers would increase public health protection. Therefore the FSA sought the Committee's view on its recommendation to amend its consumer advice so that it no longer included a recommendation to re-wash ready to eat salads.

39. In the ensuing discussion the Committee considered that:

- Research based on inoculated samples of ready to eat salads had shown that industry controls achieved a 1-2 log reduction in contamination and that there was no evidence to suggest that additional washing by the consumer would provide any additional benefit in reducing contamination further. Responsibility for controls on these products should be placed on industry not the consumer;

- Outbreak data presented in the paper indicated that outbreaks associated with ready to eat bagged salads were rare, although it was noted that there had been a number of recent occasions where pre-washed salad had been withdrawn from the market due to *Salmonella* contamination;
- Clear labelling was needed to allow the consumer to distinguish between ready to eat and ready to wash leafy salads;
- The presence of a low level of residual pathogens after washing could be a risk factor for vulnerable groups, particularly where a time lapse existed between purchase and consumption. Members acknowledged that although the NHS advised pregnant women to wash salads, this advice was probably linked to risk factors associated with toxoplasma and consumption of home grown salads;
- With regard to industry controls, bagged salads contained leaves originating from a variety of countries. Members were informed that, for the majority of manufacturers and retailers, overseas products for the UK market met similar standards to those produced in the UK;
- Paragraph 7 of paper ACM/891 should be expanded to provide the evidence for the experimental data.

40. The Committee endorsed the Agency's recommendation that its consumer advice to wash pre-washed ready to eat bagged salads was no longer appropriate and that the Agency should consider revising this advice to remove the recommendation to wash these products. The Committee also requested that the FSA amend paper ACM/891 to include the experimental detail supporting the quoted research. In addition, the Committee proposed that the HPA present an update on the microbiological status of ready to eat foods at a future meeting.

Microbiological status of ready to eat foods

41. The Health Protection Agency (HPA) briefed the Committee on the microbiological status of ready to eat foods[42]. HPA presented an overview of public health issues arising from the microbiological contamination of ready to eat (RTE) fresh produce. They outlined outbreaks and incidents covering listeriosis linked to sandwiches from hospitals, kitchen hygiene (cross contamination and infected food handlers) and geographically dispersed outbreaks attributable to RTE fruit and vegetables during production, processing and distribution. The total number of reported outbreaks linked to RTE fresh produce from 1992-2007 were reviewed and the key stages involved in investigating these outbreaks were outlined.

42. In the ensuing discussion Members considered that:

- Interaction of pathogens with plant material was important;
- Molecular techniques including routine molecular typing of *Salmonella* isolates, such as that carried out in Scotland, was helpful in investigating outbreaks;
- Partnership working between the food industry, enforcement authorities and Government Agencies was key to the successful trace-back of outbreaks. Members emphasised the need for engagement between industry and these authorities and commented that it was also important to work with statisticians to ensure statistical outputs were understood by all parties involved in the outbreak;
- Most foodborne outbreaks were linked to contamination occurring in the kitchen. A substantial proportion of these outbreaks were due to transmission of noroviruses via infected food handlers. However it was recognised that, due to under-reporting of cases, it was difficult to ascertain exact figures;
- Bacteria and viruses were difficult to control. For some outbreaks (e.g. *Salmonella* Senftenberg contaminated fresh basil) use of tight control measures throughout the production process did not prevent the outbreak occurring;
- Use of trawling questionnaires in outbreaks to gather exposure information provided limited evidence linking outbreaks back to the contamination source as these documents were time-consuming to complete.

43. The Committee discussed the presented outbreaks linked to listeriosis in sandwiches and the microbiological risks associated with sandwiches contracted in or made on site. Members commented that it was important to work with both hospital caterers and suppliers of hospital sandwiches to promote food hygiene messages.

44. ACMSF thanked the HPA for the presentation. Members noted that the data had shown that a fairly low percentage of outbreaks were linked to salad vegetables. The Committee concluded by highlighting the need for a partnership approach to outbreak investigations and suggested that HPA consider developing a lay guide on outbreak investigation statistics. ACMSF also noted that routine molecular typing was helpful in rapidly resolving outbreaks and that under-ascertainment of norovirus infections might be greater than suggested by the available data. Members also considered that it was important not to be blinded by biological plausibility when investigating outbreaks. Lastly, the Committee requested that HPA provide an update on the microbiological status of RTE foods at a future meeting.

Infectious Intestinal Disease Study

45. In June the Committee was briefed on the FSA's study of infectious intestinal disease (IID)[43]. The FSA outlined the background to the original study of IID, the problems associated with attributing causes of foodborne illness and the rationale behind the Agency's decision to fund a second IID study. In order to reflect on recent trends in foodborne disease and measure future progress to reduce foodborne illness further, work was needed to evaluate whether or not the relationship between disease burden in the community and official statistics had changed. Since the original IID had taken place, national surveillance systems had undergone structural changes which might have altered that relationship. The budget, scope, case definition and planned approach for the new 4-year study were summarised. The study was being undertaken by the University of Manchester in collaboration with the HPA, Medical Research Council General Practice Research Framework, London School of Hygiene and Tropical Medicine, University of East Anglia, University of Nottingham, Communicable Disease Surveillance Centre Northern Ireland, National Public Health Service for Wales, Health Protection Scotland and NHS Direct/NHS24. The FSA also summarised the work undertaken in the pilot study for the project. The FSA reviewed problems and limitations identified by the pilot and briefed the Committee on outcomes and project findings to date.

46. Members discussed GP recruitment for the study noting that the GP practices involved in the study might not be representative (as they volunteered), and emphasised that it was important to obtain representative population data. Using other sources of patient information including the THIN database, GP research databases and school absence records were suggested as alternative approaches. However, the importance of undertaking a prospective microbiologically confirmed study was emphasised. For example, work could not be not undertaken with Local Authorities to assess school absence records as it was not possible to follow-up these cases.

47. The quality assurance measures applied to the study were discussed. Members sought reassurance that the study was robust. The Committee was informed that the study protocol followed the FSA guidance procedures on research procurement. An Executive Committee for the project met quarterly to monitor the work and assess progress against defined deliverables. Some Members commented on the impact of potential biases occurring in the study. For example, only those patients who were severely ill with food poisoning visited the GP. Therefore mild cases would not be picked up or included in the data set. However it was pointed out that the cohort study component of IID2 would detect these milder cases.

48. Members reviewed the selection and recruitment of participants via the telephone survey. It was noted that for the pilot, only one person per

household was selected based on the occupant with the next forthcoming birthday. In the main study selection would be by rank (determined by age) within the household. It was found that the pilot dataset was too small to assess whether there were telephone survey biases associated with language problems attributed to some ethnic groups. Members commented that higher rates of disease tended to be reported in telephone surveys compared to cohort studies.

49. The Committee discussed the retention and archiving of samples from the study in relation to opportunities for linked work on gut microflora. It was noted that for IID2, stool samples would only be retained for the life of the project. Extracted DNA and RNA would be archived and maintained beyond the end of the project and research organisations would be able to submit proposals to access the nucleic acid archives. Members also noted that the project team was trying to calibrate the molecular microbiology methods used to establish causative agents of infection.

50. The Committee welcomed this well-planned and structured study and requested to receive an interim update on the work of the project prior to its completion in 2010.

B14 Foodborne Diseases Research Programme

51. In September the FSA briefed the Committee on the outcome of a review of the FSA's research programme on foodborne diseases. The background to the programme was outlined which was developed to support the 2001 Foodborne Disease Strategy and was linked to the FSA's target to reduce foodborne disease by 20% by 2006. The aim of the research review was to evaluate the achievements of the research programme against its ROAME. An independent panel of experts assessed 18 research projects carried out under the research programme against set criteria including scientific quality, value for money and policy relevance. Key outputs arising from the review included feed-back on how the FSA set and commissioned its research priorities. Future areas highlighted for investigation included *Campylobacter* and host factors impacting on disease causation. The proceedings from the review were expected to be published at the end of the year.

52. In the ensuing discussion, Members welcomed further work on *Campylobacter* highlighting that there was very little published information available on the survival of this organism in food.

Probabilistic risk assessment

53. The Veterinary Laboratory Agency and the FSA briefed the Committee on approaches to food safety risk assessment. The VLA provided an overview of the quantitative risk assessment process which included application of

model pathways, identification and collection of data, data sources and requirements, modelling approaches along the pathway, and probabilistic approaches to assessing risk. Roles of outputs and advantages and disadvantages of probabilistic risk assessment modelling were also summarised.

54. The FSA outlined international approaches to risk assessment. At Codex *Enterobacter sakazakii* in infant formula had formed the driver for the development of a web-based approach to international risk assessment. EFSA had also considered approaches to EU risk assessment. Members were reminded that the ACMSF's second report on *Salmonella* in eggs contained estimates of risk, and indicated that since publication of this report the FSA had developed a probabilistic risk assessment model for *Salmonella* in eggs. This work would be brought to ACMSF for consideration at a future meeting as the modelling was currently being subjected to peer-review.

Survey of Listeria in retail smoked fish

55. The FSA briefed the Members on the outcome of its survey of *Listeria* contamination of ready to eat smoked fish[44]. This survey was commissioned to collect information on the prevalence of *Listeria* contamination at retail. The FSA outlined the types of fish cuts sampled at retail, the sampling plan and methodology used in the survey. Of the 3222 samples tested, 378 samples overall were found to contain *Listeria* spp. giving a weighted prevalence of 10.5%. Of these *L. monocytogenes* was detected in 302 samples with a weighted prevalence of 8.3%. Of these samples 99.3% were satisfactory according to the Microbiological Criteria Regulations. Of the 1344 samples of cold smoked fish tested, 282 (20.5%) contained *Listeria* spp. and 236 (17.4%) contained *L. monocytogenes* all of which were present below the 100cfu/g limit in the Regulations. Of the 1878 hot smoked fish samples tested, 96 (5.2%) contained *Listeria* spp. and 66 (3.4%) contained *L. monocytogenes*. Three of these samples were in breach of the legal limit (>100 cfu/g) for *L.monocytogenes*. The Agency took appropriate action as soon as the results for these samples were reported and the affected products were recalled. No *Salmonella* was detected in any of the samples tested. Variations were found in retail storage temperatures ranging from -14°C to 13.3°C.

56. Members commented that it was reassuring that so few samples were found to be in breach of the Regulations, although 17% samples were found to contain *Listeria monocytogenes*, which highlighted the need for consumers to practice good food hygiene in the home. The variation in retail refrigeration cabinets was discussed. The FSA confirmed that a logistical regression was carried out to examine the effect of storage temperature on prevalence of *Listeria monocytogenes*. The results indicated that shelf-life did not appear to be an influencing factor on growth in this survey. Members acknowledged that

it was difficult to correlate temperature data as the fridge temperature was not a reliable indicator of the temperature of the product. The reported correlation between the detection of Enterobacteriaceae and detection of *Listeria* was discussed. One possible explanation for the correlation between detection of these organisms and *Listeria* spp. may have been due to the presence of faeces in the fish prior to evisceration.

57. The Committee welcomed the use of power calculations and a logical approach to defining sample size. The FSA confirmed that the confidence limits for prevalence of *Listeria* in hot smoked and cold smoked fish were small. Details were presented in the full report[45].

58. Members discussed microbiological safety controls for smoked fish products and commented that it was unlikely that fish processing practices had changed since the survey was undertaken in 2006. Cold smoked fish was not subjected to heat processing to destroy potential contamination. Therefore controls depended on hygienic handling. Hot smoked fish was subjected to a pasteurisation process. Thus any contamination in hot-smoked fish was likely to occur at the post-pasteurisation stage.

59. Members considered whether the FSA's advice on *Listeria* in ready to eat foods for vulnerable groups needed to be revised in light of the survey findings. The Committee concluded that one could not assume smoked fish was a low-risk product purely on the basis that it was rarely associated with outbreaks. Members cautioned that the survey was not designed to inform advice to the public and that it would be premature for any new advice to target specific foods. As the processing of smoked fish and the incidence of *Listeria monocytogenes* were not believed to have changed markedly over the years it was considered possible that the handling and storage of smoked fish may be an important factor in relation to the microbiological safety risks.

60. The Committee welcomed the report and commented that any FSA advice should focus on good storage and handling practices. It was suggested the ACMSF should revisit the FSA's *Listeria* advice when more information from other surveys emerged.

Epidemiology of Foodborne Infections Group

61. The FSA briefed the Committee on the deliberations of the Epidemiology of Foodborne Infections Group. The human data covering the period January to December 2007 was reviewed. Members were informed that *Salmonella* reports were fairly stable, showing a decrease in 2007 compared to 2006 for *Salmonella* Enteritidis PT4 and *Salmonella* Typhimurium. Reports of different non-PT4 *Salmonella* Enteritidis phage types were showing increases in 2007 noting that these were geographically specific. HPA were planning to review trends in different phage types of *Salmonella* Enteritidis. An increase in

incidence of *Salmonella* Anatum had been reported in Scotland and the North East which was being investigated. There was a reported increase in *Campylobacter* in 2007 and levels were now higher than those reported in 2001. HPA presented a paper reporting an increased incidence of *Campylobacter* in the elderly since 2004 with a very sharp increase between 2006 and 2007. A number of possible explanations might account for the increase since 2004, including travel and increased usage of proton pump inhibitors. However, these were unlikely to explain the sharp increase in 2007. A recent paper to the FSA Board outlined progress towards delivering the Agency's *Campylobacter* target. *Listeria* reports indicated a further increase in listeriosis in 2007, with twice the number of reported cases compared to reported data for 1990. Levels of *E. coli* O157 decreased in 2007, following an increase in 2005/6. Overall VTEC figures had not varied significantly since 2000. In Scotland levels of *E. coli* O157 were almost three times higher than for the rest of the UK. Work was in progress to examine how VTEC outbreaks were investigated across the UK.

62. Reports of cases of *Salmonella* in animals for 2007 were generally one third lower than in 2006. This may have been due to a decrease in submissions. There was a reported increase in *Salmonella* in layer flocks and pigs possibly as a result of monitoring changes due to implementation of the *Salmonella* National Control Plan. A few cases of *Salmonella* Hadar were also reported. A VTEC outbreak associated with two farms was investigated. No *E. coli* O157 were found in the cattle but 4% of affected cattle had other types of VTEC, mainly VTEC O26. VLA had also investigated *Cryptosporidium* in pigs as a high rate of shedding of oocysts had been reported. The genotype that was found proved not to be one judged likely to cause human disease.

General Papers

Good Practice Guidance

63. Dr Foster briefed Members on a requirement for ACMSF to publish its self-assessment of its compliance with the FSA's Good Practice Guidance for Scientific Advisory Committees[46] which was published in July 2007. She outlined the background to this requirement, and reminded Members that the Committee first commented on the Good Practice Guidance in September 2006. Dr Foster reported that, in preparing paper ACM/911, Members were asked to review their assessment of ACMSF's performance against the 27 key principles set out in the Guidance. Paragraph 7 of the paper summarised their views.

64. In the ensuing discussion, Members suggested that the Committee would benefit from an external assessment of its performance against the Guidance. In addition, in the spirit of openness and transparency, *ad hoc* Groups should consider broadening their requests for scientific evidence to

include a call for data from interested parties. The Committee recognised that it was difficult to shorten the work of *ad hoc* Groups but suggested that the Secretariat might consider reducing the information that it collated and provided to these groups to focus on key evidence which related more closely to the Groups' terms of reference.

65. The Committee requested that the Secretariat include these views and a summary of the ACMSF's assessment outlined in paper ACM/911 in the ACMSF's 2007 Annual Report. The Committee also agreed to revisit how it would address some of the issues it had raised at the December 2007 meeting.

SAC Review and Self Appraisal

66. In 2008, Members assessed the performance of the Committee against the Scientific Advisory Committee (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.

Freedom of Information

67. During 2008 the ACMSF received further requests for information from the Information Commissioner seeking clarification on how the freedom of information requests regarding its work on safe cooking of burgers were handled. The Secretariat responded to these requests and the Information Commissioner's Decision Notice is pending.

Model Publication Scheme

68. The ACMSF adopted the model Publication Scheme as recommended by the Information Commissioner's Office (ICO). Every public authority subject to the Freedom of Information Act 2000 (FOIA) is required to adopt and maintain a publication scheme. A publication scheme is a commitment to routinely and proactively provide information to the public.

69. The FOIA requires the ACMSF to:

- adopt and maintain a scheme which relates to the publication of information by the authority and to have that scheme approved by the Information Commissioner;
- publish information in accordance with that scheme;
- review the scheme from time to time.

70. The publication scheme specifies:

- the classes of information which the public authority publishes (or intends to publish;)
- the manner in which information in each class is, (or is intended to be), published;
- whether the material is (or is intended to be) available free of charge or on payment of a fee.

71. The ACMSF information guide offers the kinds of information the ICO expect scientific advisory committees to provide in order to meet their commitments under the model publication scheme unless:

- they do not hold the information;
- the information is exempt under one of the Freedom of Information (FOI) exemptions or Environmental Information Regulations (EIR) exceptions, or its release is prohibited under another statute;
- the information is archived, out-of-date or otherwise inaccessible; or
- it would be impractical or resource-intensive to prepare the material for routine release.

72. ACMSF information guide can be accessed via **acmsf.food.gov.uk/infoguide/**

Information papers

73. 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 2008 were:

- Update on outbreak of *E. coli* O157 in South Wales and subsequent developments (ACM/894)
- Cabinet Office Report on Food and Food Policy in the UK (ACM/895)
- Food Safety Board paper (ACM/896)
- Board paper on the strategic target for the reduction of *Campylobacter* in chicken (ACM/897)
- Food Hygiene Christmas Campaign evaluation (ACM/898)
- MSFFG *Campylobacter* paper (ACM/899)
- Health effects of climate change: DH/HPA Report (ACM/900)
- EFSA: Definition and description of emerging risks (ACM/901)

- EFSA opinion: A quantitative microbiological risk assessment on *Salmonella* in meat (ACM/902)
- EFSA Community Summary Report on Trends and Sources 2006 (ACM/903)
- CDC Foodnet News: Shiga Toxin-Producing *Escherichia coli* (ACM/904)
- Foodborne Disease Strategy (FDS) evaluation workshop (ACM/905)
- Items of possible interest from the literature (ACM/906)
- LACORS/HPA EU study on the microbiological examination of dried spices and herbs (ACM/913)
- LACORS/HPA Pilot Study: Assessment of the microbiological safety of ready-to-eat nuts (ACM/914)
- Revised ACMSF Code of Practice (ACM/915)
- EFSA Opinion on four substances used to decontaminate poultry carcasses (ACM/916)
- Update on outbreak of *E. coli* O157 in South Wales and subsequent developments (ACM/917)
- WHO/FAO/OIE Expert Meeting on Critically Important Antimicrobials (ACM/918)
- Pen portraits (ACM/919)
- Items of possible interest from the literature (ACM/920)
- LACORS/HPA EU shopping basket study on RTE foods with a focus on *L. monocytogenes* (ACM/926)
- Update on outbreak of *E. coli* O157 in South Wales and subsequent developments (ACM/927)
- EFSA Annual Report 2007 (ACM/928)
- ACMSF Annual Report 2007 (ACM/929)
- Food Handlers Guidance (ACM/930)
- US Outbreak – *Salmonella* Saint Paul (ACM/931)
- Items of possible interest from the literature (ACM/932)
- Human *Listeria monocytogenes* infections in Europe (ACM/933)

Chapter 3: A Forward Look

Future work programme

74. The Committee will keep itself informed, through its close links with the Food Standards Agency and the Health Protection Agency, of developing trends in relation to foodborne disease. 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. The Committee will publish the outcome of the public consultation on its draft report on the increased incidence of listeriosis in the UK. The Committee intend to further examine the potential risks to vulnerable groups in relation to the microbiological safety of food more widely and to assess the impact of changing patterns of food consumption and behaviour on risks to these groups.

75. The Committee will publish the outcome of the public consultation on its draft report to assess the potential risk to human health from botulism in sheep and goats.

76. The Committee through its *Ad Hoc* Group on Vulnerable Groups will consider the risks posed by *Toxoplasma* in food in more detail.

77. The Working Group on emerging pathogens will 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.

78. 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 specifically report on *Salmonella* and *Campylobacter* in retail chicken and *Listeria* in cooked sliced cold meats and pâtés.

79. The Working Group on avian influenza will continue to keep a watching brief on developments.

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

81. The Committee will revisit its previous work on *Salmonella* in eggs risk assessment model.

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

83. The Committee will discuss the outcome of the *E. coli* O157 in South Wales Inquiry.

84. The Committee will continue to keep itself informed of Government horizon scanning activities and initiatives, and their potential impact on the ACMSF's future work programme. The Committee has highlighted agriculture and food production as a topic for consideration at its next horizon scanning round.

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 Botulism in Cattle, Sheep and Goats*

To consider the potential human health risk associated with botulism or suspected botulism in cattle, sheep and goats, particularly in relation to the spreading of poultry litter on agricultural land. To report back with recommendations to the ACMSF.

* The *Ad Hoc* Group on Botulism in Cattle was reconvened in May 2007 at the request of the FSA to assess the risk to the food chain from botulism in sheep and goats.

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	Microbiological risk assessor, 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 and Service Improvement Consultant	✔		
Professor J Coia	Consultant Microbiologist, NHS Greater Glasgow and Clyde	✔		

[1] Dr Brown chairs the Avian Influenza Working Group

		ACMSF	Surveillance Working Group	Avian Influenza Working Group
Ms S Davies MBE [2]	Chief Policy Adviser, Which?	✔		
Professor M J Gasson	Deputy Director (Science), Institute of Food Research	✔	✔	✔
Mrs Rosie Glazebrook [3]	Consumer representative	✔		
Dr R E Holliman	Consultant and Reader in Clinical Microbiology, St George's Hospital, London	✔		
Professor T J Humphrey [4]	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	✔	✔	
Ms E Lewis [5]	Computer consultant Consumer representative	✔		
Mr P McMullin	Senior Veterinarian & Managing Director, Poultry Health Services	✔		✔

2 Appointment ended 31 March 2008

3 Mrs Glazebrook was appointed from 1 April 2008

4 Professor Humphrey chairs the Surveillance Working Group

5 Appointment ended 31 March 2008

		ACMSF	Surveillance Working Group	Avian Influenza Working Group
Dr S Millership	Consultant in Communicable Disease Control, Essex Health Protection Unit and Consultant in Microbiology, Princess Alexandra Hospital, Harlow	✓		
Mrs J Morris	Food Safety Policy Officer, Chartered Institute of Environmental Health	✓		
Mr R Rees	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			✓

		ACMSF	Surveillance Working Group	Avian Influenza Working Group
Dr N Phin	Respiratory Diseases Department, Health Protection Agency			✔
Dr J Wood	National Institute for Biological Standards and Control			✔
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)	✔		

		ACMSF	Surveillance Working Group	Avian Influenza Working Group
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	✔	✔	✔
Mr S Rahman	Food Standards Agency			
Scientific Secretariat				
Dr C-H Chan	Food Standards Agency		✔	
Miss J Higgins	Food Standards Agency			✔
Dr S Rollinson	Food Standards Agency			✔

	Workin Group on newly-emerging Pathogens	*Ad Hoc* Group on:	
		Botulism in Cattle, Sheep and Goats	Vulnerable Groups
Members			
Mr J Bassett		✔	✔
Dr D W G Brown	✔		
Professor J Coia			✔
Ms S Davies MBE			✔
Professor T J Humphrey [6]			✔
Professor P R Hunter [7]	✔		✔
Dr R Holliman	✔		✔
Mr A Kyriakides	✔	✔	✔
Ms E Lewis		✔	
Mr P McMullin		✔	
Mrs J Morris			✔
Professor S J O'Brien	✔		
Professor P H Williams [8]		✔	

6 Professor Humphrey chairs the *Ad Hoc* Group on Vulnerable Groups

7 Professor Hunter chairs the *Ad Hoc* Group on Newly Emerging Pathogens

8 Professor Williams chairs the *Ad Hoc* Group on Botulism in Cattle, Sheep and Goats

		Workin Group on newly-emerging Pathogens	*Ad Hoc* Group on:	
			Botulism in Cattle, Sheep and Goats	Vulnerable Groups
Co-opted Members				
Professor P Hawkey	University of Birmingham	✔		
Dr D Livermore	HPA	✔		
Mr C Teale	VLA	✔		
Dr M Brett	Consultant (retired from HPA)		✔	
Mr P Roger	Sheep Veterinary Society		✔	
Professor K Kerr	Consultant Microbiologist			✔
Dr J McLauchlin	HPA			✔
Ms C Roberts	Social scientist, University of Oxford			✔
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		✔	

	Workin Group on newly-emerging Pathogens	*Ad Hoc* Group on:	
		Botulism in Cattle, Sheep and Goats	Vulnerable Groups
Secretariat			
Administrative Secretary			
Dr L Foster	✓	✓	✓
Administrative Secretariat			
Mr A Adeoye	✓	✓	✓
Miss S Butler	✓	✓	✓
Scientific Secretariat			
Ms Gael 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	Various	*Ad Hoc* medico-legal work on infection related matters	Various	Funding for research projects
Ms S Davies MBE	Which? (formerly the Consumers' Association) [9]	Employee	None	
Professor M J Gasson	Novacta	Shareholder	Various	IFR Food Safety Science Division industry-funded research projects
Mrs R Glazebrook	None		None	
Dr R E Holliman	Various	Medical Legal work on *toxoplasmosis* and hospital acquired infection	None	

9 Ms Davies has additionally declared shares held by her father in Marks & Spencer.

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* consutancy work *Ad Hoc* consutancy 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	
Ms E Lewis	None		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	Emplyee and Member Shareholder	None	
Mr R Rees MBE	None		None	
Professor P H Williams	None		None	

Member	Personal interests		Non-personal interests	
	Name of company	Nature of interest	Name of company	Nature of interest
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
Avian Influenza Working Group				
Dr Dennis 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				
Prof P Hawkey	None		None	

Member	Personal interests		Non-personal interests	
	Name of company	Nature of interest	Name of company	Nature of interest
Dr D Livermore	GlaxoSmithKline, Dechra, Pfizer, Schering Plough, AstraZeneca, 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		
***Ad Hoc* Group on Botulism in Cattle, Sheep and Goats**				
Dr M Brett	None		None	
Mr P Roger	Various	Indepentent Sheep Consultant	None	
***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

Artefactual: Likely to be due to a confounding issue, for example an effect that is likely to be due to improved reporting rather than a true feature.

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.

Cryptosporidium: Cryptosporidium is a protozoan parasite (a tiny organism) that causes an infection called cryptosporidiosis affecting people and cattle. The most common symptom is watery diarrhoea, which can range from mild to severe.

DNA: Deoxyribonucleic acid, the genetic material of humans, bacteria, some viruses, etc. It is a polymer of nucleotides connected by sugars.

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

Enterobacteriaceae: Large family of bacteria, including many of the more familiar pathogens, such as *Salmonella* and *Escherichia coli*. Genetic studies place them among the Proteobacteria and they are given their own order (Enterobacteriales), though this is sometimes taken to include some related environmental samples.

Enterobacter sakazakii: Gram-negative bacteria which can cause serious illness in vulnerable infants under twelve months, but particularly less than two months. This species of bacteria has recently been renamed *Chronobacter* spp.

Gut microflora: The population of microorganisms that is naturally present in the digestive tract.

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.

Noroviruses: Group of viruses that are the most common cause of gastroenteritis (stomach bugs) in England and Wales. In the past, noroviruses have also been called 'winter vomiting viruses', 'small round structured viruses' or 'Norwalk-like viruses'.

Oocysts: Thick-walled spore phase of certain protists (sporozoans), such as *Cryptosporidium* and *Toxoplasma.* This state can survive for lengthy periods outside a host and is very resistant.

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

Phage type: A system of sub-classifying certain species of bacteria according to whether they are susceptible to infection by panels of different viruses that infect bacteria ("bacteriophages", which literally means "bacteria-eaters").

Proton pump inhibitors: Type of drug used to reduce acid production by the stomach.

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.

RNA: Ribonucleic acid, a nucleic acid consisting of ribonucleotides each of which contains one of the bases adenine, guanine, cytosine or uracil or, in some RNAs, a modified form of one of these bases.

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

ACNFP:	Advisory Committee on Novel Foods and Processes
ARHAI:	Antimicrobial Resistance and Healthcare Associated Infection Committee
COC:	Committees on Carcinogenicity and Mutagenicity of Chemicals in Food, Consumer Products and the Environment (COC)
Defra:	Department for Environment Food and Rural Affairs
DNA:	Deoxyribonucleic acid
EFIG:	Epidemiology of Foodborne Infections Group
EHO:	Environmental Health Officer
ESBL:	Extended-Spectrum beta-lactamase
FOI:	Freedom of Information
FSA:	Food Standards Agency
GACS:	General Advisory Committee on Science
HACCP:	Hazard Analysis and Critical Control Points
HPA:	Health Protection Agency
ICO:	Information Commissioners Office
IID:	Infectious intestinal disease
OCPA:	Office of the Commissioner for Public Appointments
PT:	Phage type
RNA:	Ribonucleic acid
ROAME:	Rational Objective, Appraisal Monitoring and Evaluation
RTE:	Ready to eat
SEAC:	Spongiform Encephalopathy Advisory Committee
THIN:	The Health Improvement Network
VLA:	Veterinary Laboratories Agency
VTEC:	Verocytotoxigenic *Escherischia coli*

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