

**Advisory Committee on the Microbiological  
Safety of Food**

**Annual Report 2016**

**Advises the Food Standards Agency on the  
Microbiological Safety of Food**

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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<sup>1-24</sup> and in a series of subject-specific reports.<sup>25-44</sup>

## Foreword



1. I am pleased to present this report which summarises the work of the ACMSF during 2016. The Committee provides expert advice to Government on questions relating to microbiological issues and food. I hope you will find this report and the information it contains useful in finding out about the work of ACMSF in 2016.
2. Details of membership, agenda and minutes are published on the ACMSF webpage (<https://acmsf.food.gov.uk/>). During 2016, the Committee had three meetings, its active subgroups had eight meetings and a number of activities were carried out via teleconference and correspondence.
3. In June, following a period of public consultation, we approved the publication of the *Ad Hoc* Group on Eggs report “An update on the microbiological risk from shell eggs and their products.” In preparing this publication, the Group considered all the circumstances that had changed since the Committee’s last report on eggs in 2001. The report concluded there had been a major reduction in the microbiological risk from *Salmonella* in UK hen shell eggs since the 2001 ACMSF report. This was especially the case for eggs produced under the Lion Code quality assurance scheme.
4. We considered the risks posed to consumers by Zika virus imported in food from Zika-endemic countries as reviewed in a risk assessment produced by the FSA). Our deliberations highlighted the need to consider all possible routes by which food could cause a problem, such as mosquito-infestation of food or subcutaneous exposure, risks associated from bodily secretions, potential risk from bush meat and the need to re-examine the description of risk in relation to uncertainty. We asked the FSA to work with the emerging pathogens subgroup to produce a revised risk assessment.
5. Other risk assessments considered during 2016 included the *Mycobacterium avium* subspecies *paratuberculosis* (MAP) – draft risk assessment in relation to food. We noted that the issue of MAP and the food chain has been considered by the Committee on a number of occasions, and agreed that, based on the available evidence, a causative link between MAP and Crohn’s disease had not yet been established. We agreed that, as the link between MAP and Crohn’s

disease has not been proven, our assessment on this subject remains unchanged.

6. At our January and June meetings we received updates on work the FSA was undertaking following the FSA Board's decision on the serving of rare burgers, in the wider context of a scheme for dealing with risky foods. During the June update the committee provided advice on key technical issues such as time/temperatures for reduction in Shiga toxin producing *Escherichia coli* (STEC) and modelling the impact of interventions to reduce STEC and other pathogens in the burger production chain. The Committee concluded that the updates and information provided insufficient evidence to warrant changing our previous recommendation, i.e. cooking at 70°C for 2 minutes or equivalent, to achieve a reduction of at least 6 log reduction in *E. coli* O157.
7. The Committee received an update on the issue of food safety risk of the use of recycled manure solids as bedding for dairy cattle. This update related to discussions in January 2015, where we raised a number of significant concerns about this practice, mainly regarding lack of relevant data). Following discussion, two members of ACMSF were asked to consider and report on further research that had been carried out by Quality Milk Management Services Ltd, overseen by AHDB. We subsequently accepted their recommendation that there was no need to set up an ACMSF subgroup to look at this issue and agreed that their comments on the study report should be formally passed to the FSA.
8. We were alerted (in October 2015) to changes in maximum residue levels (MRLs) for two quaternary ammonium compounds (QACs), chlorate and biocidal actives which are used as disinfectants/sanitiser in the food industry. In January we were provided with further information on this issue. Following consideration it was agreed that this was an important subject which should be investigated further, drawing on expertise from other Scientific Advisory Committees.
9. Other issues/updates we considered in 2016 include:
  - Briefing from Public Health England on the issue STEC associated with food in England; surveillance, trends in outbreaks, recent developments and use of whole genome sequencing
  - Response to the Committee's report on foodborne viruses and the food chain
  - *Toxoplasma* EU funded work
  - Output from the Microbiome meeting
  - Presentation on gut microbiome in food animals
  - Horizon Scanning (update on the horizon scanning workshop held in Manchester in January 2015)
  - Epidemiology of Foodborne Infections Group (update on the 2016 activities)

10. Looking to the future, the Committee set up a subgroup to produce a comprehensive update of the previous ACMSF *Campylobacter* report (2005), targeted for publication in 2017. We will continue to closely monitor food related developments regarding antimicrobial resistance (AMR) and the food chain via the working group on AMR. The Committee will require regular updates from the Working Group, which will be made available on the FSA website.

11. I should like to thank Members of the Committee and its Working and *Ad Hoc* Groups, without whom the ACMSF would not operate effectively, as well as the many other individuals and organisations that have helped the Committee in our work in 2016.

Professor David McDowell  
Deputy Chair

## **Introduction**

1. This is the twenty-fifth Annual Report of the Advisory Committee on the Microbiological Safety of Food and covers the calendar year 2016.



# **Chapter 1: Administrative Matters**

## **Membership**

### **Appointments**

2. Appointments to the ACMSF are made by the 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<sup>45</sup>, the guidance issued by the Office of the Commissioner for Public Appointments (OCPA)<sup>46</sup> and the Government Office for Science Code of Practice for Scientific Advisory Committees<sup>47</sup>. The FSA is not bound to follow OCPA guidance, as ACMSF appointments do not come within the remit of the Commissioner for Appointments and the guidance 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 as best practice.

### **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 2016**

6. A triennial review of the FSA’s Scientific Advisory Committees was carried out between September 2015 and March 2016. This meant that the appointment process for the Committee had to be paused. As a consequence, the following members: Professor Rick Holliman, Dr Sally Millership and Mrs Jenny Morris whose periods of appointment expired

on 31 March 2016 and were not eligible for reappointment had their terms extended for eight months (from 1 April 2016 to 30 November 2016).

## **Resignation**

7. In March the Committee's consumer representative Mrs Rosie Glazebrook resigned from the Committee to take up an appointment on the FSA Board.

## **Committee and Sub-Group meetings**

8. The full Committee had a microbiome workshop on 28 January and met in session three times in 2016 - on 29 January, 30 June and 20 October. All the meetings were chaired by Professor Sarah O'Brien and were open to members of the public.
9. The Working Group on Antimicrobial Resistance (Chair: Professor David McDowell) met four times in 2016. Outlines of the meetings are at paragraph 182.
10. The *Ad Hoc* Group on *Campylobacter* (Chair: Professor Sarah O'Brien) met four times in 2016. Outlines of meetings are at paragraphs 183 and 184.
11. The *Ad Hoc* Group on Eggs (Chair: Professor John Coia) had two teleconferences in 2016 which were used to finalise their draft report before the public consultation and revise the report post public consultation.
12. The Surveillance Working Group through correspondence provided advice on the FSA's survey of *Campylobacter* on fresh chicken bought at retail outlets (see paragraph 185).
13. The Emerging Pathogens Working Group (Chair: Professor Rick Holliman) had a teleconference which was used to consider the issue of Zika virus in the food chain.

## **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 III. A Register of Members' Interests is at Annex IV. In addition to the interests notified to the Secretariat and recorded at Annex IV, 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 (Annex V). 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<sup>8</sup> 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<sup>14</sup>).

## **Openness**

### **Improving public access**

16. The ACMSF is committed to opening up its work to greater public scrutiny. The agendas, minutes and papers (subject to rare exceptions on grounds of commercial or other sensitivity) for the full Committee's meetings are publicly available and are posted on the ACMSF website. Also, on the Committee's website are summaries of meetings of the Working and *Ad Hoc* groups. ACMSF's website can be found at:

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

17. The Committee also has an e-mail address:  
[acmsf@foodstandards.gsi.gov.uk](mailto: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<sup>48</sup>, the ACMSF decided that from 2003 onwards all of its full Committee meetings should be held in public.
20. Two of the 2016 Committee meetings were held in Aviation House, the FSA's London Headquarters. The January meeting which was preceded by a microbiome workshop was held in Norwich.
21. All the 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 in 2016. Mrs Rosie Glazebrook (ACMSF consumer representative who resigned from the Committee in March 2016) was a member of the Advisory Committees on Carcinogenicity (COC) and Mutagenicity (COM) and a member the FSA Consumer Advisory panel. The ACMSF Chair (Professor Sarah O'Brien) was a member of the General Advisory Committee on Science until March 2016 when the Committee was replaced by the FSA's newly established Science Council. She serves on the National Expert Panel on New and Emerging Infections (NEPNEI). Professor David McDowell and Dr Gary Barker are members of the Cross-SAC Working Group on the framework for foods that present an increased risk per serving. Mrs Joy Dobbs Deputy Chair of the Social Science Research Committee is an Ex-Officio on ACMSF. Professor Stephen Forsythe member of the Advisory Committee on Animal feedingstuff is a member of the ACMSF Working group on Antimicrobial Resistance.

## Chapter 2: The Committee's Work in 2016

### ACMSF's assessment of risk associated with the consumption of shell eggs

23. In January the Chair of the *Ad Hoc* Group on Eggs, Prof John Coia, presented the Group's report "An update on the microbiological risk from shell eggs and their products" <sup>49</sup>. The Group had considered all the circumstances that had changed since the ACMSF's last report on eggs in 2001. Prof Coia summarised the key findings of the report which were that there has been a major reduction in the microbiological risk from *Salmonella* in hen shell eggs, especially with regard to those produced under the Lion Code scheme. The Group also considered that the risk from non-UK eggs had also reduced, but not to the same extent. Accordingly, the group suggested that the risk level for UK hen shell eggs produced under the Lion code, or produced under demonstrably-equivalent comprehensive schemes, could be regarded as 'very low', whilst for other shell eggs the risk level should be considered as 'low'.
24. The Group had concluded that the FSA should consider amending its advice so that eggs in the 'very low' risk category could be eaten raw or lightly cooked by consumers including to those in vulnerable groups. Prof Coia said that whilst the majority of the group had considered that the advice could similarly be amended for eggs used in the catering sector, including hospitals and care homes, unanimous agreement had not been reached on this point due to concern about whether there would be any change to the level of risk from pooled eggs in part reflecting the possibility that cross-contamination could occur. However, Prof Coia, reminded Members that the ACMSF is concerned with risk assessment and it will be for others to decide on the risk management strategies that may arise from the Group's conclusions. For eggs in the 'low' risk category, and for non-hen eggs, the Group had agreed that the existing FSA advice should remain.
25. Members were invited to comment on the report and to agree that it should go for public consultation once finalised. Member of the *Ad Hoc* Group paid tribute to the co-opted Members of the Group who had provided their expertise and their time with significant contributions to the report. Another Member of the Group commented that it was important from a consumer perspective that the glossary was comprehensive and that it should be made clear how consumers could recognise what was meant by equivalent comprehensive schemes.
26. One Member acknowledged that the prevalence of *Salmonella* in eggs had dropped and that there were better controls in place than formerly, and whilst agreeing with the Group's assessment of risk in eggs, queried whether it followed that other ready-to-eat products such as chocolate or berries could be said to be safe to eat even if the food might contain

*Salmonella* at a similar very low prevalence. In answering this, Prof Coia said that, based on the prevalence data, if someone were to eat an uncooked egg every day, they would have to continue for tens of years before being exposed to *Salmonella*. The Group had considered that on the basis of proportionality eggs could not be singled out compared to other foods, such as undercooked burgers. He also added that there was a need to continue to monitor the situation with regard to *Salmonella* in eggs on an ongoing basis to ensure that the considerable progress that had been made by industry was maintained. It was agreed that the consequences of advice relating to pathogens in ready-to-eat foods could be discussed further outside of this meeting.

27. Members agreed that there would be a challenge in communicating the risk based on the report's recommendations because of the different levels of risk identified for different types of eggs, and the need to explain this to consumers and to the catering industry and other issues such as whether there were implications for "best before" dates.
28. The point was made that the public would need to be able to reliably identify what was a Lion or non-Lion egg, and that this would need to be properly validated and enforced. It was also pointed out that the consumer has no way of knowing whether eggs used in catering were Lion eggs or not and this message would need to be communicated to caterers.
29. Members discussed the issue of pooling of eggs and agreed that there was nothing wrong with the process *per se*. Although the risk of contamination could be increased because of the way the pooled eggs were handled, the same could be said of any mixture of ambient stable product which would not therefore be regarded as unsafe. A Member of the Group explained that breakdown of the egg yolk membrane was the critical factor in allowing the internal contamination of an individual egg to increase, given the right/temperature.
30. The Defra representative commented that the National Control Programme provided ongoing surveillance and protection for the public at farm level.
31. The final comment on the report was to express concern over severely immuno-compromised patients in hospital, and that it should be made clear that any change in advice did not apply to these patients who would continue to need a special diet.
32. In conclusion, the Chair confirmed that Members were in agreement that the report should go out for a period of 12-week public consultation. In summing up the discussion she acknowledged that the risk assessment contained in the report was quite clear, but given some of the issues discussed, it was anticipated that most of the comments arising from the consultation would be about risk management and risk communication. At the end of the consultation the Group would reconvene to consider

and respond to the comments raised. Members of the *Ad Hoc* Group were congratulated on producing a comprehensive and authoritative report within a short timescale.

33. In June following the public consultation carried out on the above report Prof John Coia presented a revised version of the Group's report<sup>50</sup> and a table of comments from the consultation with the *Ad Hoc* Group's responses to the points raised.
34. Prof Coia reminded members that the group had concluded there had been a major reduction in the microbiological risk from *Salmonella* in UK hen shell eggs since the 2001 ACMSF report. This was especially the case for eggs produced under the Lion Code quality assurance scheme. The risk from non-UK eggs had also been reduced, but not to the same extent. Accordingly, the group suggested that the risk level for UK hen shell eggs produced under the Lion Code, or under demonstrably-equivalent comprehensive schemes, should be considered to be 'VERY LOW', whilst for other shell eggs the risk level should be considered 'LOW'. The only point where unanimous agreement had not been reached related to risk/uncertainty around eggs used in the catering and non-domestic environments.
35. Following the consultation, the Group had reconvened to review the responses. Prof Coia said that the Group were still of the opinion that the risk level for UK hen shell eggs produced under the Lion Code, or under demonstrably-equivalent comprehensive schemes, should be 'VERY LOW' and could be served raw or lightly cooked to all groups in society, including those that are more vulnerable to infection, although this recommendation did not apply when non-Lion Code (or equivalent) or imported eggs were used. Following the consultation comments, the Group agreed to explicitly state that there is a low degree of uncertainty associated with this assessment. The group still viewed that the risk for other shell eggs should be considered 'LOW'. However, taking account of the consultation responses and the unresolved point of contention within the group, relating to eggs used in the non-domestic environment being served raw or lightly cooked, including to vulnerable groups, the Group considered it was necessary to more clearly highlight potential concerns relating to the non-domestic environment. The Group highlighted that those involved with risk management may wish to take this increased uncertainty into account when considering the implications of these recommendations within non-domestic settings. Members were asked for their comments on the revised report.
36. A member raised a point about the level of exposure for individuals to contaminated eggs and whether that could be described as very low, the main concern being whether the "very low" level of risk from *Salmonella* in eggs was setting a precedent for a similar level of *Salmonella* in other ready-to-eat foods. Members of the Group confirmed that they were comfortable that "very low" was a proportionate level of risk for eggs compared to a range of other foodstuffs as, although the number of

people exposed to that risk was large, epidemiological data did not show that this equated to the risk of disease, which was influenced by a variety of factors such as dose and susceptibility of individuals to clinical infection.

37. The Chair commented that as far as the extrapolation of very low risk to other foods was concerned this needed to be approached on a case-by-case basis. A member also pointed out that the report was a risk assessment and that advice on whether to cook or not cook eggs was for risk managers to decide. The Committee approved the Report to go forward to the FSA Chief Scientific Adviser before final publication. The *Ad Hoc* Group and Secretariat were thanked for their work in producing the Report.
38. It was noted that four organisations had responded to the consultation and the *Ad Hoc* Group responded to the comments. The table of responses was approved for publishing on the FSA website.

### **Zika virus – Draft risk assessment in relation to the food chain**

39. In June the Committee was asked to consider the issue of Zika virus in the food chain. Dr Manisha Upadhyay presented a draft risk assessment<sup>51</sup> for the Committee to consider. Members were informed that following the recent outbreaks of Zika virus (ZIKV) disease globally, and ongoing reports of Zika virus transmission, a UK risk assessment was formulated by the cross-Government Human and Animal Risk Surveillance Group (HAIRS) who considered mosquito-borne and other routes of transmission of the virus and the risk to the UK population. Dr Upadhyay reported that as the above risk assessment did not cover foodborne transmission and given that the UK imports a significant quantity of meat from Zika-endemic Latin American countries, the FSA felt it was prudent to assess the level of risk of ZIKV disease via the food chain from meat imported from such countries.
40. Members were informed that the key uncertainties were highlighted in the exposure assessment which reviewed the transmission of ZIKV in humans, animals and via food. The exposure assessment section drew the Committee's attention to the fact that organisations such as the World Health Organisation (WHO), Centers for Disease Control and Prevention (CDC) and the European Food Safety Authority (EFSA) have not reported any incidents relating to foodborne transmission of this virus. It also pointed out that the ACMSF *Ad Hoc* on Foodborne Viral Infections did not raise the issue of ZIKV in its report published in 2015. Dr Upadhyay acknowledged that limited information on foodborne transmission in the literature influenced the uncertainties that have been identified in the risk assessment.
41. Dr Upadhyay explained that taking into account the components of the assessment and considering the uncertainties that were highlighted, the



risk of ZIKV infection via the food chain (from food imported to the UK from ZIKV endemic countries) is likely to be **negligible with a medium level of uncertainty**. Members' attention was drawn to the three key uncertainties that were identified in the assessment: Very limited information relating to the ability of *Aedes aegypti* to infect animals other than non-human primates with ZIKV, non-human primates are the only known reservoir for ZIKV at present, a lack of information relating to the role of infected food handlers in transmission generally or via fresh produce from endemic countries, and a lack of information relating to the detection of ZIKV in faeces.

42. The Committee were asked to:
  - To comment on the draft risk assessment; and
  - To advise whether it is in agreement with the Agency's conclusion that the health risk related to Zika virus via the food chain is **negligible**, with a medium level of uncertainty.
43. Members commented that the draft risk assessment provided a good review of the situation relating to ZIKV and the food chain. However, they were not convinced with the results of a reference made to an old study carried out in Indonesia in the 1970s (a survey for arboviral antibodies in sera of humans and animals in Lombok, Republic of Indonesia) cited by WHO to show that a range of animals including cows, goats and ducks can be infected with ZIKV. It was underlined that the results of the haemagglutination inhibition, and neutralization tests on the human and animal sera were not compelling.
44. It was observed that the risk assessment solely focussed on exposure through the ingestion route and recommendation was made that risk of exposure should be broadened to other routes that may be linked to food, such as handling of food or insect infestation.
45. A member highlighted the need for more detailed studies to be carried on ZIKV transmission as reference was made to recent papers that revealed that the virus can survive in mammalian saliva, urine and milk. It was suggested that if the virus can be recovered from human saliva and breast milk it is technically plausible that it can be recovered from bovine materials (saliva and milk).
46. The issue of the virus present in monkeys in relation to the large quantities of bush meat that are prevented from entering the UK was flagged. The FSA's attention was drawn to paragraph 11 and 22 of the risk assessment where there appears to be a contradiction on the issue of infection by the oral route.
47. It was noted that the risk assessment has tried to shape a complex situation into a one-dimensional scale issue in its evaluation and risk classification. The Committee were uneasy on how the three medium

uncertainties in paper ACM/1220 Annex A were combined. It was pointed out that the document identified three sources of uncertainty that are medium, posing the question as to how many sets of medium uncertainties would be necessary to trigger a change in the overall level of uncertainty level. It was acknowledged that it is difficult to collate uncertainties.

48. It was underlined that the risk assessment should explicitly state the uncertainty relating to ZIKV being able to become established in another host and uncertainty on whether it is possible to have transmission by ingestion in humans.
49. The Committee recognised that the Olympic Games in Brazil has generated the current level of interest on ZIKV and agreed that a watching brief should be kept on the findings of ongoing studies. It was agreed that outcomes from ongoing studies could rapidly change views and opinions on the impact of ZIKV.
50. It was highlighted that the hazard characterization section of the risk assessment should take into account the risk of infection among adults of reproductive age, as the consequences of infection would vary in a naïve population compared to a population where the disease is endemic.
51. The following points of concern were made: from available information it is not clear if the food consumed can be contaminated with ZIKV (findings from the 1970s indicates there was a possibility of contamination), if food is contaminated and an individual eats it, could this result in infection and does heat processing of food have any effect on the overall risk (is the risk dependent on cooking and proper handling)?
52. A member agreed with the outcome of the risk assessment that the risk was negligible, but disagreed with the accompanying interpretation that, as cases were rare, this subject did not merit further consideration. He argued that although cases were rare, issues relating to ZIKV merited further consideration.
53. The Chair summed up by reiterating some of the points made by members which included the need to consider all possible routes by which food could cause a problem, such as mosquito-infestation of food or subcutaneous exposure, risk associated from bodily secretions, potential risk from bush meat and the need to re-examine the description of risk in relation to uncertainty. The Chair recommended that Dr Upadhyay work with the emerging pathogens subgroup on a second draft for the Committee to consider at the October meeting. A revised risk assessment was considered and agreed by group via teleconference.

54. The Defra Departmental representative accepted the uncertainties in the risk assessment but underlined that despite the significant quantity of meat imported into the UK from Zika endemic Latin American countries, there are no known cases of foodborne transmission in the UK. He added that Zika is not endemic in Europe.

### ***Mycobacterium avium* subspecies *paratuberculosis* (MAP) – DRAFT risk assessment in relation to food**

55. In June Dr Manisha Upadhyay presented the Committee with the *Mycobacterium avium* subspecies *paratuberculosis* (MAP) – draft risk assessment in relation to food<sup>52</sup> for comments). Members were reminded that the issue of MAP and the food chain has been considered by the Committee on a number of occasions (initially considered in 2001 and subsequently reviewed between 2003 and 2015), and that, based on the available evidence, had agreed that a causative link between MAP and Crohn’s disease had not yet been established.
56. Dr Upadhyay highlighted that the FSA felt it was timely to revisit the issue of MAP with a particular focus on trying to establish the level of risk via food. She explained that the draft risk assessment concluded that, based on current evidence, it had not been possible to establish a level of risk for MAP infection via food, and that there was a high degree of uncertainty associated with the assessment. It was reported that paper ACM/1233 had followed the standard risk assessment format which includes: Hazard Identification (identifying the risk associated from food sources and picking out the most obvious “contenders”), Exposure Assessment (looking at transmission in animals, transmission to humans via food and transmission via drinking water), Hazard Characterisation (considering all the risk associated with human diseases and infectious dose) and Risk Characterisation.
57. Members were informed that transmission via milk and milk products (transmission via food) formed a significant part of the risk assessment. This section highlighted some milk surveys such as Botsaris *et al.*, (2015) that demonstrated that viable MAP could be detected in powdered infant formula (PIF). The paper described the results of a small survey which showed that a phage-PCR assay detected viable MAP in 13% (4/32) of PIF samples. Culture based methods detected viable MAP in 9% (3/32) of PIF samples, all of which were also phage-PCR positive. Direct PCR detected MAP DNA in 22% (7/32) of PIF samples. The presence of such viable MAP in PIF indicates that MAP has either survived PIF production processes, or that PIF has been (re)contaminated post-production.
58. The risk characterisation section discussed the factors that were considered in evaluating the risk of MAP infection via the food chain.

59. Dr Upadhyay concluded that, in view of the lack of certainty around whether MAP is a causative agent of Crohn's disease and other diseases in humans, and the apparent lack of information relating to possible infectious dose, it was currently not possible to assign a risk level for MAP infection via food.
60. The Committee was asked to:
- Comment on the risk assessment and
  - Advise whether it was in agreement with the Agency's conclusion that an accurate level of risk to human health via food could not be assigned at present and that there was a high degree of uncertainty associated with the assessment.
61. Members welcomed the draft risk assessment as a good review of the situation relating to MAP and the food chain.
62. A member drew attention to how heat resistance was addressed in the risk assessment, highlighting that it would be useful to include data on heat resistance in relation to MAP and pasteurised milk. The assessment provided information relating to MAP survival characteristics during pasteurisation and prevalence in UK retail milk. The reference provided on viable MAP detected in powdered infant formula was noted. It was mentioned that studies have reported spore production in MAP, and that such relevant studies should be included these in the risk assessment.
63. Members discussed the levels of "Uncertainty" assigned to the risk assessment pointing out that it is expedient to be specific (in terms of having a quantitative measure of the degree of uncertainty) when assigning uncertainty. It was suggested that there were various classifications that could be used to describe uncertainty.
64. Members discussed possible linkage(s) between MAP and Crohn's disease, pointing out that almost every gastro-intestinal pathogen has been linked to this disease. It was suggested it was possible that Crohn's disease was not a microbiological food issue but a clinical genetic condition.
65. A member referring to the last time the Committee considered this subject, noting that the current risk assessment did not contain any new evidence to inform a change of opinion.
66. Defra representative queried the data presented in paragraph 59 (ACM/1233), asked if the comment on high prevalence of MAP in dairy cattle in the UK related to herd prevalence, or to animal prevalence. Dr Upadhyay indicated that the comment referred to herd prevalence, and agreed to include clarification on this point.

67. In concluding their deliberation members did not see the need to carry out further work on the risk assessment. The Committee agreed that as the link between MAP and Crohn's disease has not been proven during these discussions, their assessment on this subject remains unchanged.

## **FSA's work in relation to Rare Burgers**

68. At the October 2015 ACMSF meeting Steve Wearne, FSA Director of Policy, updated the Committee on the FSA's Board's decision on the serving of rare burgers in the wider context of the approach to dealing with risky foods. At the January plenary meeting Dr Paul Cook was invited to brief members on the work the Agency was undertaking following the FSA Board's September 2015 decision. Dr Cook reported that the key purpose of his paper (ACM 1204)<sup>53</sup> was to keep ACMSF updated on developments in this area and seek the committee's input on key technical issues such as time/temperatures for reduction in Shiga toxin producing *Escherichia coli* (STEC) and modelling the impact of interventions to reduce STEC and other pathogens in the burger production chain.
69. Members were informed that within the FSA a formal project team was co-ordinating implementation of the Board's decision. Dr Cook outlined the project's objectives. He reported that the FSA Board will receive a further update on the project at their July 2016 meeting after which the Agency plan to issue further comprehensive guidance to the industry and local authority regulators in autumn 2016. The FSA expect to address the following areas over the next six months:
- Guidance for industry, local authorities and consumers,
  - Assessing the impact of interventions (Development of statistical modelling to evaluate the effectiveness of interventions both individually and collectively throughout the food chain)
  - Epidemiology of foodborne pathogens (Establishment of measurable triggers for foodborne pathogens to enable the Board to reconsider its position if necessary, supported by ongoing enhanced surveillance of STEC and other relevant pathogens)
70. The committee's views and assistance were sought on two areas: time/temperatures for achieving a 4-log reduction in STEC and modelling the impact of interventions along the burger production chain.
71. The following comments were made by members in the ensuing discussions.
72. Members welcomed the risk assessment. However, it was observed that it was difficult to understand as it did not reflect real world practice. It was felt that risk assessments should reflect real world practice so as to

make them relevant and robust in considering or measuring risks for risk management purposes.

73. Members highlighted that Food Business Operators and Local Authorities (food law enforcers) value guidance that is simple to apply based on practical risk assessment. The FSA was urged to work on the principle of producing a risk assessment based on what is practical rather than on what is scientifically possible.
74. On figures provided in the risk assessment in relation to the approximate time and temperature combinations required to achieve a 6 log reduction, attention was drawn to the figure used for the size/weight of a standard (2.5 cm thick, 113g) and gourmet burger (5 cm thick, 227g). Members felt that this thickness was disproportionate for burgers to achieve the indicated time temperature combinations. The likelihood of burgers being served with the above weight was questioned and the issue of where the figures were derived from was raised. Also, it was noted that information relating to time/temperatures for achieving log reduction appears to have been inadequately presented, to the extent that the results could be wrongly interpreted.
75. Members remarked that the modelling used was difficult to follow and it would take a lot of explanation to effectively convey the message in the document. It was highlighted that the risk assessment had no contribution from uncertainty and variability which are important parameters to consider. It was noted that in terms of analysing heat processes in a complex product such as minced meat, important aspects of uncertainty relating to heat transfer coefficient and z values should be considered.
76. Members stated that discussing issues around the 4-log reduction process did not mean they support the FSA's proposed approach as outlined in the risk assessment. It was underlined that clarity was needed on the role of source reduction in relation to 4 and 6 log reduction processes.
77. Members felt the information in the model would be of limited value to caterers and enforcement bodies who require clear advice that would enable them to make decisions on whether a cooked burger has gone through the correct process. It was underlined that the model was based on burgers cooked at set temperatures within carefully controlled time periods and turned at carefully controlled intervals, which may not be accurately applied in a catering environment.
78. It was recognised that it would be difficult to communicate the time temperature combinations in the risk assessment to caterers, as some of the examples provided to achieve 4 and 6-log reduction would be deemed to be impracticable.

79. Concerning the cumulative approach, it was noted that there are systems in some third countries such as the United States (approved by the FDA) where it is used for STEC/log reduction so as to ensure that good quality meat is available in the supply chain and there is no evidence of public health risk because of this approach. It was agreed that attention should be paid to measures in the food chain that can contribute to reducing risk, as the more contamination that could be reduced at source, the better.
80. Reference was made to comments made by Steve Wearne at October 2015 ACMSF meeting when he said that many of the large burger chains that serve rare burgers use treated meat (washed with lactic acid and imported from the United States) to help decontaminate their meat. It was noted, if the use of treated meat was widespread, it was to be welcomed, as it could significantly reduce the risk.
81. The danger of using science to avoid the obvious was underlined. It was pointed out that although a risk assessment could be developed that would deliver a cumulative effect of 4 to 6 log reduction, it was possible to have the middle of the burger remaining uncooked, exposing consumers to an unsafe product. Members agreed that they were yet to be persuaded to move away from the current advice of applying 70 degrees for 2 minutes or equivalent throughout every part of the burger. There was discussion on the benefits of using a meat thermometer to check the core temperature of meat while cooking.
82. In summing up the Chair noted that the risk assessment was very hard to understand, impractical and open to misinterpretation. She could not see how it could translate into practical advice. She underlined the point made by a member that the risk assessment ignored important factors such as uncertainty and variability which were not covered in the modelling exercise. She pointed out that although there may be a log reduction achieved through source reduction (drawing from the experience in the United States), the Committee was not convinced with the log reduction case as presented in the risk assessment.
83. The Chair stated that as the information in risk assessment was based on a desk top modelling exercise, it would be useful to validate this using a microbiological experiment so as to have a clearer picture of the risks that may be associated with this approach.
84. In order to take forward this FSA Board's decision concerning the serving of rare burgers, three Committee members (Gary Barker, Roy Betts, David McDowell) agreed to assist the Agency in further work to define the time temperature combinations for achieving a 4-log reduction in STEC and in modelling the impact of interventions along the burger production chain.
85. The Chair reminded members that at the January meeting they were updated on the discussions at the FSA Board on rare burgers and noted

that the Board would be discussing the topic again in July 2016. Following the above-mentioned ACMSF meeting three members of the Committee (Prof David McDowell, Dr Gary Barker and Dr Roy Betts) via three teleconferences provided advice on the Agency's approach and analysis concerning the serving of rare burgers. She invited Mr Darren Holland and Mr Abdul Khaled from the FSA's Analytics Unit to present the first of 2 papers<sup>54</sup>.

#### **a) Modelling interventions (ACM/1222a)**

86. Darren Holland presented a paper on modelling the impact of potential interventions to reduce the risk of *E. coli* O157 infection from consuming rare burgers. After consulting scientific research papers, FSA funded research and expert knowledge in the FSA and Food Standards Scotland, 38 possible interventions had been identified, four of which were then considered in further detail for modelling. The final modelling focussed on the most promising two interventions for application in the abattoir: the use of lactic acid, and steam pasteurisation.
87. The paper set out the relative risk of *E. coli* O157 infection from different burger sizes and cooking preferences (rare, medium or well-done) based on a risk assessment model previously developed by APHA. Comments were invited from members on the approach taken and the findings presented in the paper. The following points were made:
88. There were many uncertainties involved in the cooking of burgers (including that it was not possible to say accurately what the thermal conductivity of ground beef was), and there was also huge variability in size and thickness. The fact that burgers were not always completely flat meant that different parts cooked at different rates (doming and cupping). It was pointed out that after large outbreaks of illness associated with burgers in the 1990s, both these factors had been reduced by achieving much greater uniformity in terms of size of burger and introducing complex schemes in the way they were handled.
89. In practice there were inconsistencies in applying any intervention due to differences in abattoir procedures and handling practices by individual operators, and possible recontamination of the post treatment carcass. Concerns were expressed about treating carcasses almost as a ready-to-eat food given the way *E. coli* persisted in slaughterhouses and could "appear" and "disappear" on carcasses as they moved along the line. Although it was theoretically possible to achieve the results shown by the modelling, in reality, the most reliable way to achieve safety was by cooking.
90. It was important not to dismiss some of the interventions that had been ruled out for modelling because they nevertheless contributed to the overall reduction of contamination of carcasses.



91. It was noted that the model showed that thicker burgers were less risky than standards ones, which was counterintuitive. It was explained that this was because in order to achieve a particular internal temperature the outside would need to be “overcooked” in a thicker burger. In reality, a judgement had to be made by the person doing the cooking about what customers were expecting a rare burger to look like, i.e. brown on the outside but still pink in the middle.
92. A member warned against over-reliance on modelling which did not reflect the real-world situation. The Chair supported this view and pointed out there was an inference in paragraph 8 (paper ACM/1222a) that the risk from burgers was not significant and therefore that the controls currently in place were working. She reiterated the public health paradox that success in public health was defined by things that don't happen, and that she would be very wary about changing current practices.
93. In summing up this part of the discussion the Chair said that members were content that the data presented were mathematically sound and that, under ideal conditions, the use of the interventions might deliver a 6-log reduction in *E.coli* O157. However, doubts had been expressed about how the results could be translated into practical measures that could be used by risk managers.

**b) Time temperatures for cooking burgers (ACM/1222b)**

94. Dr Paul Cook presented the second paper<sup>54</sup> which considered the time/temperature combinations for achieving a 4-log reduction in *E. coli* O157 and other bacterial hazards in burgers. The paper reviewed the history of the current advice (6 log reduction and the recommended 70°C for 2 minutes or equivalent), the impact of cooking conditions, different bacterial hazards, burger formulation and reliance on core temperatures below 60°C. The paper provided estimated times for core temperatures from 55-80°C for a 4-log reduction in *E. coli* O157 using different z values and using different sources of data (a study by APHA/RIVM, the ACMSF burgers report from 2007, and the long standing ACMSF recommended times/temperatures).
95. A member commented that the paper seems to be based on a definition that cooking achieves a core temperature for a set period of time, but in reality, people cook based on the appearance of the surface of the burger. The only way to be certain of the centre would be to use a probe.
96. Members agreed with the suggestion of using a z value of 6 for temperatures below 70°C and a z value of 7.4 for temperatures above 70°C. Use of a z value of 6°C had been a longstanding suggestion from the committee. It was noted that the holding times at different temperatures based on the ACMSF recommendations were appreciably

longer than those based on other data. It was recognised that the ACMSF recommendations accounted for a large proportion of the variability in thermal death of *E. coli* O157 as observed in previous studies. Members were uneasy about cooking below a temperature of 60°C because the holding times were very long and there was likely to be greater variation between strains, environmental conditions and food types etc. There was also a view that recommended time/temperatures should not extend more than 10°C from the reference temperature of 70°C.

97. Members concluded that there was nothing in the 2 presentations that would lead them to change their previous recommendation of cooking at 70°C for 2 minutes or equivalent which is the current advice to deliver at least a 6-log reduction in *E. coli* O157.

### **Shiga toxin producing *Escherichia coli* associated with food in England; surveillance, trends in outbreaks, recent developments and use of WGS**

98. Mr Richard Elson (Head of Risk Assessment and Response, Gastrointestinal Infections, National Infection Service, Public Health England) briefed the Committee on the issue Shiga toxin producing *Escherichia coli* (STEC) associated with food in England; surveillance, trends in outbreaks, recent developments and use of whole genome sequencing (WGS)<sup>55</sup>. He reported that since 1983 there has been routine laboratory based surveillance on STEC and this was succeeded by the National Enhanced STEC Surveillance System introduced by PHE in 2009. This system collects standardised microbiological, demographic, clinical and exposure data that are then collated with reference microbiology results. These data are used to improve outbreak detection and explain the epidemiology of STEC in England. Members were informed that as a complement to traditional phenotypic typing methods, multi locus variable number tandem repeat analysis and WGS have been used for routine surveillance and cluster detection since 2012 and 2015 respectively.
99. Mr Elson outlined the history of STEC O157 cases in England and Wales between 1989 and 2012 and mentioned the decline of PT2 and PT49 over that time period. These two phage types account for most of the infections between 1989 and 2012. He highlighted the increase in the cases of PT 21, PT 28 and PT 8. He pointed out that the current information on non-O157 cases was not as complete as for O157 cases but this should change as more diagnostic laboratories are now using PCR assays. It was explained that with the introduction of WGS in 2015 it is possible to see the trends particularly the recent emergence of predominant UK lineages. Members noted that the common ancestor of the current circulating diversity of STEC O157 was estimated to be about 175 years ago.

100. On burden of morbidity it was revealed that incidence is highest in children aged 1-4 years and incidence is higher amongst females than males. The risk profile in England revealed that rates of infection are higher in people living in rural areas than in urban areas. Rural cases report higher levels of exposure to private water supplies, open fresh water, livestock or their faeces. Urban cases are more likely to report visiting a farm. Rural cases are more likely to report living on or working at a farm or having access via family members. Non-O157 STEC strains were associated with higher hospitalization/HUS rates than O157 STEC strains (but are under ascertained). In addition, higher incidence of STEC infections is associated with higher cattle density, higher ratios of cattle to people and higher minimum temperature (i.e. in line with the pattern of incidence observed in the United States, Canada and some EU Member States). Spatial distribution of cases showed higher incidences in the South West and North of England.
101. There were 335 reported outbreaks between 1983 and 2012. Notable foodborne outbreaks in the last five years include the large STEC O157 outbreak in England and Wales, associated with exposure to raw vegetables (12), two outbreaks associated with the consumption of watercress (11), the first outbreak associated with raw drinking milk in over a decade (2) and a large national outbreak of STEC O157 PT 34 associated with mixed salad leaves distributed through the wholesale catering market.
102. Members attention was drawn to the exposure exceedance alerts system which PHE has developed with the FSA. This will use enhanced surveillance data to identify unusual increases in reported exposures, particularly in relation to foods which may provide early indication of the presence of a contaminated food or ingredient within the human food chain. Potential cases that could be picked up include exposure to rare burgers and unpasteurized milk.
103. The following comments and questions were raised by members in the ensuing discussions:
104. A member was unclear why PHE had given the presentation and questioned why it was provided. Mr Elson explained that the update highlighted the decline in foodborne outbreaks in relation to STEC and demonstrated the effect of the interventions directed towards the food chain. The ACMSF Chair also pointed out that as fresh produce can be contaminated by STEC and other foodborne pathogens an update on this topic was relevant to the work of the Committee.
105. PHE was questioned why its focus was on O157 while the emphasis of other developed countries is on "STEC - The Big Six". PHE shared why their attention had been solely on O157 over the years. It was explained that as the use WGS has been adopted together with PCR testing they were in the process of revising their surveillance guidelines in relation STEC which will cover non-O157 and O157.

106. PHE was asked if it was confident that their surveillance regime would be able to keep pace with the increase in significance of the Big Six, bearing in mind the attention this wider group of STECs was receiving in other countries. PHE confirmed that regional laboratories (particularly those in the South East of England) that have introduced PCR testing now have a good handle on non-O157. Wider coverage will improve as this detection method is embraced by other frontline laboratories, along with an improved typing data library to support risk assessment and better understanding of the disease burden.
107. Members discussed diagnostics and testing in detail, along with the effect of the introduction of new diagnostic methods (such as WGS) and how in the short term this could reduce uncertainty in risk assessment, particularly in the interpretation of results to inform immediate public health actions.
108. A member questioned if there has been a significant increase in the number of STEC cases over the years and if these increases are associated with specific food groups. PHE commented that the majority of STEC cases have been due to outbreaks and there has been no significant change in the number of laboratory confirmed cases. It was clarified that the number of cases in 2015 was low compared to previous years.
109. Regarding a question of whether petting farms had an increased frequency of outbreaks, PHE commented that although the number of these attractions has increased over the years (to around 200 petting farms in England alone), the very clear guidelines on the need for good hand hygiene when visiting farms have increased the awareness of STEC infections. It was also noted that, following the Godstone incident, Government and Industry had taken extensive steps to make these attractions safer in terms of STEC exposure, which has more than compensated for the overall increase in numbers of petting farms. PHE acknowledged that they have not specifically investigated potential links between increased exposure (i.e. more petting farms), and number of cases of STEC infection.
110. The Defra representative highlighted that in the event of any unusual outbreak, APHA archives were available for Public Health Agencies to check if there was a history of particular strains in the UK livestock population. It was added that APHA, like PHE, is seeking to expand the range of STEC they can detect during routine surveillance.
111. Members discussed the issue of intervention measures concerning outbreaks (attributed to STEC and other organisms) linked to fresh produce (leafy greens and potato and leeks).
112. As the Committee recently revisited the issue of raw drinking milk (RDM) members noted with interest how a small outbreak linked to RDM was

detected using WGS. In terms of this emerging/re-emerging risk in the food chain it was agreed that there should be a watching brief on RDM. Members recognized the value of WGS in the rapid identification and characterization of organisms, and its use in the investigation of outbreaks.

113. Members agreed that the presentation provided an up to date picture of trends in the human population and noted that an ongoing study jointly funded by FSA and Food Standards Scotland is looking at animal reservoir in relation VTEC/STEC. It was mentioned that the Epidemiology of Foodborne Infections Group is scheduled to be briefed on this study at its June 2017 meeting.
114. Members welcomed the opportunity to discuss the trends in STEC surveillance over the years. The Committee concluded their discussion by stating that they rely heavily on PHE's surveillance data in carrying out its risk assessment responsibilities and would not want the changes in the national infection service to jeopardize this support in any way.

### **Food safety risk of recycled manure solids used as bedding for dairy cattle**

115. The FSA (Narriman Looch) via paper ACM/1205 updated the Committee on the issue of food safety risk of recycled manure solids used as bedding for dairy cattle<sup>56</sup>. The subject had been discussed in January 2015 when a number of comments were made which had been passed to the relevant authorities including the Agricultural and Horticultural Development Board (AHDB). Ms Looch reminded Members that when the Committee had discussed the risks of recycled manure solids (RMS) as bedding for dairy cattle a number of significant concerns had been raised, mainly regarding lack of relevant data. Annex 1 of ACM/1205 summarised further research that had been carried out since last year by Quality Milk Management Services Ltd and overseen by AHDB. The paper suggested that the ACMSF might wish to establish a working group to evaluate the research findings and provide recommendations for consideration at the June ACMSF meeting.
116. The following comments were made by Members:
  - The statement "The study demonstrated that the mandatory conditions and best practice measure put in place at the start of the study were appropriate risk mitigation measures" was difficult to reconcile with many of the subsequent bullet points which pointed out a number of limitations. Some of the best practice recommendations had previously been highlighted as quite impractical, such as excluding manure from cattle being given antibiotic treatment, and excluding animals showing signs of VTEC as they would not show any clinical signs.

- The data gaps which were identified as being really important had not been resolved.
  - A limited group of organisms had been included in the research and there was no mention of viruses.
  - The bullet that stated “Caution should be applied when drawing conclusions from the data” should be the first bullet point.
117. In conclusion the Chair said it was hard to decide about setting up a Group before knowing what there was to review. Dr Dan Tucker and Prof Miren Iturriza-Gómara offered to work with Narriman Looch to review what was available before deciding on how to proceed and whether anything would be ready by the June meeting.
118. The aforementioned members considered further research that had been carried out for Quality Milk Management Services Ltd. The Committee accepted their recommendation that there was no need for an ACMSF subgroup to be set up to look at this issue. It was agreed that their comments on the study report be formally passed to the FSA.

### **Changes to plant protection product MRLs: potential impact on food safety**

119. At the October 2015 meeting Members had been alerted to changes to maximum residue levels (MRLs) for two quaternary ammonium compounds (QACs), chlorate and biocidal actives which are used as disinfectants/sanitiser in the food industry. At the January plenary meeting via paper ACM/1207 Adekunle Adeoye provided members with further information on this issue<sup>57</sup>.
120. Mr Adeoye outlined the main issues. The first was that the new maximum residue levels now in place for QACs are set at much lower levels than would be considered necessary for food safety purposes. Both food industry and the FSA are concerned that food businesses, concerned about possible breaches of the new MRLs, could change their existing disinfection procedures to methods that are less effective.
121. Secondly, the use of chlorate has now been banned and a default limit of 0.01mg/kg applies to all foods. However, because chlorate occurs as an impurity in chlorine-based disinfectants and is also a by-product of water treatment, there are many potential sources of chlorate in food and there have been numerous exceedances of the default MRL. Revised MRLs for chlorate are under discussion at the EU Standing Committee, but there are concerns on the impact of microbiological safety of food if less effective products start to be used. Chlorate will be discussed at the February meeting of the residues section of the Standing Committee (SCoPAFF) with the earliest possible date for a vote on new MRLs in April.

122. The third issue to bring to Members' attention was that the use of biocidal active substances is under review and new MRLs are to be established under the Biocidal Products Regulations. The FSA is concerned these may be set without sufficient regard to the need to maintain microbiological safety. The EU Commission hopes to reach agreement with Competent Authorities in March 2016 on an interim procedure to be followed to establish the MRLs.

123. Mr Adeoye highlighted a number of questions posed to the committee in the paper and asked for comments on the suggestion that a working group be set up to include wider expertise from the Committee on Toxicity (COT) and the Expert Committee on Pesticide Residues (PRiF) to enable a full discussion to take place.

124. Members commented as follows:

- from talking to the food industry it was clear that there was a great deal of concern about this issue, as it may be costly to move from QACs to alternative products. As the paper mentions, due to the large chilled food manufacturing sector, the UK seemed to be disproportionately affected by the changes.
- Changes that were justified with regard to pesticides had had unintended consequences in the food industry where products are used for disinfection.
- Rinsing off any excess substances was not an option in a chilled food environment where there was a need to minimise the presence of water.
- The current situation could provide an opportunity for reinforcing the use of disinfectants in an appropriate, risk-based way.
- Any further work would need a good scoping process as the issues presented an enormous risk assessment task with many hazards and risks that are linked together.

125. In summing up, the Chair said there was agreement that this was an important subject and there was support for investigating it further but there was a need to include expertise from other Scientific Advisory Committees. It was acknowledged that it was potentially a huge task there was a need for careful scoping. Mr Kyriakides, Prof McClure, Dr Barker, Dr Betts and Mrs Morris agreed to be part of a group to scope out how this work could be taken forward.

## **Foodborne Viral Infections**

126. Dr Paul Cook updated the Committee on the response to the ACMSF's report on foodborne viruses and the food chain<sup>58</sup>. The Committee had received an initial response at the June 2015 meeting and the current paper provided a further update, mainly on filling some of the research gaps identified by the committee. However, Dr Cook stressed that the

report had covered a wide range of areas, some of which touched on risk management, and several related to other Government Departments, so it was still “work in progress”. Members had received an embargoed copy of the report of a joint FSA/EFSA workshop on viruses held in February 2016 which, Dr Cook was able to report, had now been published.

127. He highlighted the following areas of work detailed in the paper.

- A large project led by the University of Liverpool was focusing on Norovirus attribution which includes trying to measure infectivity through a capsid integrity assay and detection of infectious virus in oysters and fresh produce, including raspberries and leafy salads at retail.
- A critical review of approaches to assessing the infectivity of Hepatitis E virus had been published recently. This review considered options for cell culture techniques that could be explored further to see if a method could be found that could be applied to foods such as pork and shellfish.
- On detection methods, the FSA was contributing to a research programme with NERC on environmental microbiology and human health which was relevant to several of the ACMSF report’s recommendations.
- An EU baseline survey to quantify Norovirus titres in live oysters is planned to run from November 2016 to December 2018. This surveillance would not include Hepatitis E virus although it might be possible to test samples retrospectively if a suitable method could be found.
- A study had been carried out to evaluate the effectiveness of standard UK shellfish depuration practices in reducing Norovirus in oysters and to explore the potential for novel approaches to significantly improve the effectiveness of depuration processes. There were also a number of ongoing projects in relation to the effectiveness of sewage treatment.
- The Social Science Research Council had considered public perceptions of viruses and food and there was a suggestion that a working group be set up to take this further.
- The report of the FSA/EFSA workshop was available on the EFSA website. A summary was provided in ACM/1234. The workshop, attended by some ACMSF members, was held in February and had brought together a wide range of experts to discuss the 3 foodborne viruses of concern: Norovirus, Hepatitis A and Hepatitis E. Participants took part in an expert elicitation exercise and ranking of priorities. These included the need for means of measuring infectivity, especially in foodstuffs, and an improved understanding of how detection relates to public health risk, e.g. with respect to Norovirus. Establishing the burden of Hepatitis E virus in the human population in Europe was also seen as important.



128. Dr Cook concluded by saying that the FSA was continuing to work with other Government Departments to consider the recommendations of the ACMSF report.
129. Members commented that it was very useful to have this update on positive action in some areas, but that it would also be useful to know of any recommendations on which the FSA were not intending to take action, and the reasons for this. Dr Cook acknowledged that there would be some recommendations in terms of risk management which were not within FSA's remit, or were not being taken forward at present. The Chair said that it would be useful to have an update on action from other Government Departments.
130. David Alexander, from the FSA's Food Policy Division, came to the table and commented that the current financial climate would have a bearing on how many of the recommendations the FSA would be able to take forward and there will need to be careful prioritisation taking into account such things as the EFSA risk ranking in terms of research. There were still some unanswered key questions that were holding back risk management actions, e.g. accurate discrimination between infectious/non-infectious virus particles in food matrices. Future work would need to be aligned to appropriate over-arching FSA work programmes, including the new Foodborne Disease Strategy (still under development) and wider FSA's overall strategy. Mr Alexander assured members that the FSA would continue to work with other bodies, notably Defra, on issues affecting shellfish and shellfish waters. However, he warned that, realistically, the Agency would not be able to devote resources to every area, but would try to influence developments through others.
131. The Chair thanked Mr Alexander for injecting a note of realism into the discussion, but reflected that whilst recognising the constraints, food safety was likely to be the area most likely to cause the Agency problems.

### ***Toxoplasma* EU funded work**

132. At the June meeting the Committee was briefed on the *Toxoplasma* EU funded work<sup>59</sup>. Milen Georgiev (FSA) and Javier Guitian (Royal Veterinary College) presented the item. Milen Georgiev reminded members that toxoplasmosis had been ranked as posing the highest disease burden among foodborne pathogens in the Netherlands and in the USA. The ACMSF had published a risk profile in relation to *Toxoplasma* in the food chain in 2012 to review the evidence on toxoplasmosis in humans and animals and food in the UK. Subsequently the FSA had joined an EFSA consortium of 12 organisations working on a project (FS517004) to address some of the data gaps previously identified in the ACMSF's report.

133. Javier Guitian presented some of the findings of this EFSA project focussing on those that were particularly relevant to the UK.
134. On the relationship between serology and the presence of viable cysts in meat, 2 pieces of work had been undertaken: an extensive literature review (available on the EFSA website: GP/EFSA/BIOHAZ/2013/01) and a series of multi-country studies. The UK was part of a multi-country study on slaughtered cattle which compared the results of serological and molecular methods. The results confirmed that in pigs, sheep and poultry serological tests could be used as an indicator for the potential presence of infective cysts in meat, but that in cattle diagnostic tests for detecting *T. gondii* DNA or viable cysts should be used instead.
135. Another part of the project, based on a study by the Moredun Research Institute, was to investigate predilection sites in cattle. The tissues of animals that had been experimentally infected were tested by mouse bioassay and semi-automated magnetic capture probe-based DNA extraction and real-time PCR (MC-PCR), but no clear predilection sites were found, as viable *T. gondii* and DNA were present in various tissues and meat cuts.
136. A third aspect was a study to generate information on the level of infection in UK cattle. For this a survey was carried out of 305 cattle, slaughtered for human consumption. Samples of diaphragm were taken and tested using molecular methods. 1.8% of the samples had cysts or DNA of *T. gondii*, suggesting that there was a low level of infection in the cattle population, with no clear geographic pattern of positive animals.
137. A study of the level of infection and risk factors for infection in UK pigs had also been undertaken, using serology. 2071 batches of pigs from 131 farms were sampled and 3.6% were found to be seropositive. Using a modelling tool it was estimated that the likely proportion of farms (batches) that were sending 100% seronegative pigs to slaughter was 90%, with 11.5% of batches having at least one positive pig. The study also found that the positive pigs clustered in batches indicating that infection is largely driven by farm-level factors and can be mitigated by farm-level measures.
138. Dr Guitian outlined work undertaken on a *Toxoplasma* risk assessment model using the information now available, but stressed that huge knowledge gaps still remain. In conclusion, he proposed three possible areas for further action: promotion through industry of primary production practices that minimize risk of on-farm exposure; implementation of serological monitoring of the level of infection in pigs raised in the UK and entering the food chain; and ascertainment of the role of meat consumption as a risk factor for human infection, possibly by analysis of PHE surveillance data or case-control studies. Milen Georgiev asked for

members' views on these proposed further activities and any other areas that needed to be addressed.

139. A member suggested that evidence based studies on farms were preferable to questionnaires to understand better the risk factors for infection in pigs, such as the presence of rodents, tail biting, and cannibalism.
140. A member mentioned a dose/response model to predict human infection by *T. gondii* from meat consumption based on surveillance data from the US that had been published recently.
141. A member commented that most serological assays for *T. gondii* were developed for humans rather than for animals, but that there may be scope for optimizing serological assays for food animals rather than discarding them, because there were also disadvantages in using molecular tests, including the small volume of tissue you can put into a sample, which can only be applied to a discrete area.
142. Members agreed with the first two proposals for further activities but did not support ascertainment of the role of meat consumption as a risk factor for human infection by conducting analysis of surveillance data or undertaking case-control studies. A better approach might be to use proteomics to undertake very detailed analysis of the immune response in a food animal to detect where the source of infection might be. It was noted that assays are being developed to discover at what particular life-cycle stage infection occurs in humans and it might be possible to apply this approach to animals as well.
143. A question was raised as to whether the origin of infection in the UK is coming from UK or imported pigs. A member said that in parts of South America the virulence of local strains seems to be greater than the virulence of strains acquired in Europe and certain strains seem to result in different sorts of disease in humans although it is not known if this is acquired through food or other routes.

## **Output from the Microbiome meeting**

144. The Chair reported on the outcome of the workshop on the human gut microbiome that was held on 28 January 2016 when the Committee received the following presentations:
  - Overview of microbiome research: priorities, challenges and opportunities
  - Impact of diet on the microbiome in early life and lifelong wellbeing
  - The microbiome in later life, foodborne pathogens and the implications on health

- Understanding the role of food in the transmission of viruses and the impact of the virome
- Leap-frogging technology to understand the relationships between foodborne pathogens and their surrounding microbial communities

145. The key points raised following the presentations included:

- Members recognised that some of the information communicated might support risk assessment in the medium term but from a qualitative rather than a quantitative viewpoint.
- Members noted that changes were likely to occur in the diagnosis of human infection and in the testing carried out on foods and these will impact on public health surveillance.
- It was noted that the presentations did not cover what was happening in terms of the microbiome of food animals. The Defra Departmental representative agreed to liaise with APHA for information on any research they may be carrying out on the microbiome in animals.

146. Members agreed this was fast moving field which the Committee should keep a close eye on.

## **Studying the gut microbiome in food animals**

147. Following the discussion the Committee had at the January plenary meeting on the outcome of the workshop on the human gut microbiome the members agreed that it would be useful to consider information on microbiome in food animals (Defra departmental representative arranged for an expert from the Animal and Plant Health Agency to brief the Committee on this area). At the June meeting Dr Muna Anjum gave a presentation on APHA's work on animal microbiome (studying the gut microbiome in food animals) <sup>60</sup>. Dr Anjum gave an overview on the gut microflora which included the following:

- The gut microflora is a complex community of microorganisms that live in the digestive tract, with the gut microbiota having the largest numbers of bacteria and greatest diversity of species
- Health and nutritional status of animals is interlinked with the gastrointestinal microflora
- The gut microflora is thought to be relatively unstable and can easily be disturbed by various factors such as pathogen challenges, resulting in disease
- Disease outbreaks can impact on animal welfare, productivity, poor digestion, poor nutrient absorption.

148. Members were informed how metagenomics is used to study the gut including microbial diversity and the genes present. The presentation focussed on the study of the pig gut microbiome (how does the gut microbiome change in response to infections in pigs?) and poultry gut microbiome (how does a bacterial pathogen carrying AMR affect the gut microbiota in chickens?). It was highlighted that as the future cost of performing metagenomics decreases the method could be utilised routinely for diagnosis of infectious agents directly from faeces, especially for fastidious organisms such as *Brachyspira* which grow slowly using traditional microbiology.
149. The Committee asked whether APHA was considering studying *Campylobacter*. APHA confirmed that the *in vitro* gut model they have developed would be suitable to carry out such a study but they had no funding at present to be able to do this.
150. It was acknowledged that there are fluctuations in the microbiota from when an animal is born until it acquires long-term stability and this prompted discussion on the ages of the pigs and the chickens that were used in APHA's study. Responding to members' queries on the application of the *in vitro* gut model APHA confirmed that it could be useful in studying the various stages of organisms in the gut to help in knowing how infections develop and could be valuable in selectively targeting specific organisms when using antibiotics.

## Horizon Scanning

151. Mr Adeoye used paper ACM/1235<sup>61</sup> to provide a reminder of the horizon scanning workshop held in Manchester in January 2015. The outcome of the discussions was a list of microbiological themes and topics which were then ranked in terms of strategic priority and urgency. These were: genomics; changes in the food system; societal changes; climate change; and antimicrobial resistance in the food chain. Other topics that had been considered as important included *Campylobacter*, understanding the impact of the Committee's work, and the use of their advice in risk management. The Committee had also recognised that demographic change in terms of the challenges of an increasingly elderly population was another area likely to become important in the future. Members had also suggested that the Newly Emerging Pathogens Working Group could have a wider role to play in horizon scanning.
152. Although genomics had been ranked first for the Committee's attention it was 10 years since the ACMSF's report on *Campylobacter* had been published and tackling *Campylobacter* in chicken was a strategic priority for the FSA. It had therefore been agreed that in the first instance a subgroup should be set up to revisit this issue. Subsequently the *Ad Hoc* Group on *Campylobacter* had been formed in November 2015 and had been busy since then, reviewing the FSA's *Campylobacter* research

programme, and holding its first 3 meetings to work on an update of the 2005 report.

153. Mr Adeoye invited Members to address 4 questions: to comment on the outcomes of the workshop, to indicate whether they wished to add any further topics to those already identified, to comment on the ranking of topics, and whether they wished to involve other relevant Scientific Advisory Committees in future horizon scanning workshops to help identify cross-cutting issues. The following comments were made:

- The topic of genomics was extremely wide, but the relevance to ACMSF was on the challenges to the microbial risk assessment process, for example, using whole genome sequencing prior to an outbreak, and in defining the mode of action from a foodborne pathogen to a disease.
- Instead of focussing on genomics and WGS, the first topic could be widened to include omics technologies in order to understand what they can tell us.
- On the topic of “Changes in the food system” post-Brexit, there were likely to be changes in food imports and exports, and the impact of such changes may need to be borne in mind. There could also be an impact on our surveillance systems, many of which are integrated within wider European Union activities. In addition, control and intervention measures which are currently based on EU approaches would need to be maintained in some other form. There was agreement that as both the timing and nature of Brexit is as yet unclear the Committee should wait for advice from the FSA before starting any work in this area.
- Food waste and recycling of food waste was raised as another upcoming issue. If there was misuse of food in its transportation there could be concerns about how much flexibility there is with the durability labelling of food and what “use by” really means.
- Changes in the food system need not necessarily involve new products, but may involve deliberate changes, or loss of controls, in existing food preparation practices e.g. (under) cooking of burgers, and the cessation of access to/use of QAC sanitizers. There might be some overlap here with the cross-SAC working group on risky foods.
- The Committee had raised industry concerns about the use of biocides with the removal of some currently effective agents. It was noted that on the workplan the proposed establishment of a group to review this issue had been put on hold. Dr Cook informed members that the secretariat were waiting for a steer from FSA colleagues on what progress had been made in Brussels before taking this forward.

154. There was support for the workshop approach to horizon scanning that had been employed in Manchester, perhaps every 2-3 years. In the intervening years the outputs could be reviewed and action taken on the topics that had been prioritised.
155. In conclusion, the Chair asked for volunteers to take forward the top two topics that still appeared to be most relevant. Dr Gary Barker agreed to lead a group to look at challenges to microbial risk assessment, with Mr Alec Kyriakides, Prof Peter McClure and Dr Bob Adak. Changing controls/risks would be led by Dr Roy Betts, with Mr David Nuttall, Prof Miren Iturriza Gomara and Dr Dan Tucker.

## **Epidemiology of Foodborne Infections Group**

156. The Committee was briefed (by Dr Paul Cook EFIG Chair) on the activities of the Epidemiology of Foodborne Infections Group (EFIG) in 2016<sup>62&63</sup>. This covered updates on: animal and human infections data, food surveillance activities and studies related to foodborne infections.

### **Animal data *Salmonella* update**

157. Annual *Salmonella* data (provisional data) January and December 2015 revealed 1,067 reports of *Salmonella* from livestock species (not subject to *Salmonella* National Control Plans), which is 5% fewer than during January - December 2014 (1,127 reports) and 9% fewer than the same period of 2013 (1,168 reports). The top serovars in cattle, sheep, pigs and ducks in 2015 were Dublin, 61:k:1,5, (7), Typhimurium and Indiana respectively. Between January and March 2016, there were 217 reports of *Salmonella* from livestock, which is 5% fewer than the same period of 2015 (231 reports) and 13% fewer than the same period of 2014 (248 reports). The decline since 2015 is largely attributable to a decrease in *Salmonella* reports from ducks (38 vs. 65 incidents) and pigs (29 vs. 39 incidents). The top serovars in cattle, sheep, pigs and ducks in the first 3 months of 2016 were Dublin, Montevideo, 4,5,12:i:- and Indiana respectively.

### **National Control Programmes for *Salmonella* in chickens in the UK**

158. A report was provided on the 2015 *Salmonella* National Control Programmes (NCP) for chickens and turkeys.
159. Broilers – there were 50 flocks positive for *S. Enteritidis* in 2015 compared with none in 2014, one report of *S. Typhimurium*, the same as 2014 and one of *S. 4,12:i:-* compared with none in 2014. There were no flocks positive for *S. 4,5,12:i* compared with 8 in 2014. The estimated prevalence of regulated serovars for 2015 was 0.14% (0.02% in 2014), with the increase being due to a hatchery-derived broiler outbreak although still within the EU target of <1%. The hatchery incident involved *S. Enteritidis* PT21 (fully sensitive) and this accounted for the

majority of the reports involving broilers and a low number of occupationally affected humans and foodborne cases. Eggs were imported to the hatchery from several countries, and despite concerted efforts, the definitive source of the infection has not been established.

160. Breeders – No adult breeding flocks were positive for regulated *Salmonella* serovars (*S. Enteritidis*, *S. Typhimurium* (including monophasic strains), *S. Hadar*, *S. Infantis* or *S. Virchow*) in 2015. The EU prevalence target is <1% for regulated serovars. The estimated prevalence of all *Salmonella* spp. in adult breeding flocks in 2015 was 0.44%.
161. Layers – There was one flock positive for a regulated serovar (*S. 4,12:i:-*) in 2015, giving an estimated prevalence of 0.03%. The EU target is <2%. The estimated prevalence of all *Salmonella* spp. in adult flocks of laying hens within the NCP in 2015 was 0.60%
162. Turkey breeders – No adult breeding flocks tested positive for regulated *Salmonella* serovars (*S. Enteritidis*, *S. Typhimurium* (including monophasic strains), *S. Hadar*, *S. Infantis* or *S. Virchow*) in 2015. The EU target is <1%. The estimated prevalence for all *Salmonella* serovars was 2.04%.
163. Turkey fatteners - One turkey fattening flock was positive for *S. Enteritidis* and eight turkey fattening flocks were positive for the monophasic strain of *S. Typhimurium S. 4,5,12:i:-* in 2015, giving an estimated prevalence for the regulated serovars of 0.34% (EU target <1%). The prevalence of turkey fattening flocks positive for all *Salmonella* serovars increased substantially in 2015 to 10.2%, which exceeded levels seen in 2013 (8.8%) and 2014 (3.7%). This was largely due to a substantial increase in the number of flocks positive for *S. Derby*.

#### **Human infections data**

164. Trends in laboratory reports in 2015 revealed:
  - 9492 reports of non-typhoidal *Salmonella*, an increase on the 8078 reported in 2014. An increase in the reporting rate was seen in all constituent countries and was due partly to increases in reports of *S. Enteritidis* and *S. Typhimurium*
  - Reporting rate for *Campylobacter* has decreased in the UK from 109.2 per 100,000 population in 2014 to 97.7 per 100,000 in 2015. The rate of reported *Campylobacter* infections in England has decreased to the lowest rate reported since 2008, and remains below the rate observed in Wales and Scotland. Northern Ireland continues to report rates lower than the rest of the United Kingdom. Wales is the only country to have reported a higher rate in 2015.



Rates of reported infection in Scotland remain similar to that reported in recent years.

- The number of *Listeria monocytogenes* infections in the UK has remained stable since the overall decline that was seen from 2010, however small numbers limit meaningful trend interpretation.
- VTEC O157 incidence decreased between 2014 and 2015, with the largest decrease being detected in Scotland. In addition, there have been notably fewer VTEC outbreaks over the past year; the reasons for this lower level of activity are unclear.
- In 2015, 49 foodborne outbreaks were reported to eFOSS in England and Wales and to Health Protection Scotland. There were no reported foodborne outbreaks in Northern Ireland in 2015.
- For the first time, *Clostridium perfringens* was the most frequently implicated or suspected causative agent in reported foodborne outbreaks in 2015 (14/49, 29%), followed by *Salmonella* (12/49, 24%). The majority of foodborne outbreaks in 2015 occurred in the food service sector (24/49, 49%), followed by institutional/residential (7/49, 14%). Of the food service sector outbreaks, half occurred at restaurants, pubs and takeaways (12/49, 24%).

### ***Clostridium perfringens* – foodborne outbreaks reported 2005 to 2015**

165. From 2005 to 2015, there were 76 foodborne outbreaks attributed to *Clostridium perfringens* reported to eFOSS. In these outbreaks, 2189 people were affected and of these, there were 387 laboratory confirmed cases, 11 hospitalisations and four deaths. Most outbreaks were reported from the North East of England (28). No national outbreaks were reported. The majority of *Clostridium perfringens* foodborne outbreaks occurred in the food service sector (39/76, 51%), followed by institutional/residential (28/76, 37%), and other foodborne settings (5/76, 7%) settings. Of the food service sector outbreaks, almost half occurred at restaurants and takeaways. A food vehicle was identified in 88% (67/76) of outbreaks with red meat and poultry meat the most frequently identified food vehicles.

166. Factors that contributed to the outbreaks that were reported include: inadequate heat treatment/cooking was the most commonly reported factor (37/76, 49%) in the outbreaks followed by storage too long/too warm (32/76, 42%), inadequate chilling (17/76, 22%), cross contamination (11/76, 14%), other factors (9/76, 12%), poor hand washing facilities (4/76, 5%), infected food handler (3/76, 4%) and poor personal hygiene (3/76, 3%).

## Update on STEC

167. PHE gave a presentation on STEC O157 surveillance, response and research. In reviewing data over the past 25-30 years it was noted that infections went up in 1990s but dropped in subsequent years due to various activities aimed at controlling these organisms; currently there were about 800 cases a year with increases tending to be due to occasional large outbreaks. During this time the predominant phage type in cases had shifted from PT2 in the 1990s to PT21/28 and PT8. There had also been a shift in the mode of transmission in outbreaks 61% of outbreaks from 1992 to 2000 being foodborne whereas from 2001 to 2013 it was 32%. The burden of morbidity of STEC O157 in England in Wales was highest in children under 10 years of age and particularly those aged 1 to 4.
168. Enhanced surveillance for STEC was introduced in 2009 and analysis of this data supports the findings of previous epidemiological studies in England. It was noted that rates of infection are higher in:
- People living in rural areas compared to urban areas
  - Rural cases report higher levels of exposure to private water supplies, open fresh water, livestock or their faeces
  - Urban cases are more likely to report visiting a farm, rural cases more likely to report living on or working at a farm or having access via family members.
  - Non-O157 STEC strains were associated with higher hospitalization and HUS rates than STEC O157 strains but are under ascertained. Work is underway to improve detection of these strains at local laboratories using PCR.
  - STEC incidence associated with higher cattle density, higher ratio of cattle to people and higher minimum temperature.
169. It was highlighted that the enhanced surveillance data could be used to identify hotspots where there are high rates of infections and their alignment with other factors such as cattle locations, urban areas and regional signals for particular strains of STEC.
170. It was also highlighted that STEC enhanced surveillance could be valuable in monitoring cases of STEC in the light of the recent FSA Board decision on the serving of rare burgers. Enhanced surveillance could provide data on food and non-food exposures and could be useful in detecting patterns alongside the monitoring of rare burger consumption trends.
171. Whole Genome Sequencing (WGS) had made it possible to link cases more accurately which was particularly helpful in outbreak detection and investigation. In the light of these developments and the availability of enhanced surveillance EFIG agreed that it would be timely to consider data on non O157 STEC. However, it was agreed that appropriate caveats would need to be attached to any data provided as there was

variation in laboratory detection methods and which laboratories were actively looking for non-O157 STEC.

### **Stock take of whole genome sequencing**

172. PHE Gastrointestinal Bacteria Reference Unit (Kathie Grant) provided an update on PHE's WGS activities. She reported that the move to WGS has provided a single one step method for identification and typing and provides a wealth of additional information. This includes: reduced time and costs, potential for rapid global comparability, improved resolution for strain discrimination, able to provide phylogenetic information, improved cluster detection, ability to rapidly screen large number of isolates for virulence genes including AMR genes. This information leads to an improved understanding of GI pathogens and outbreaks.
173. Members were provided with an overview of the WGS workflow including how *Salmonella* serotypes are derived from MLST data. Single Nucleotide Polymorphism (SNP) analysis is used to detect clusters and outbreaks and examples where SNP analysis had been used successfully for outbreak investigation included an International outbreak of *Salmonella* Enteritidis PT14b in the summer 2014 linked to eggs from Germany and a *Salmonella* Enteritidis PT8 cluster in September 2015. Although WGS had initially focused on *Salmonella*, since June 2015 it had been applied to STEC isolates in parallel with conventional methods and had proved valuable in investigating a number of outbreaks. WGS had been used for all *Campylobacter* isolates received by the reference laboratory since January 2015. PHE are part of an EFSA funded project to sequence 1000 *Listeria* isolates from the EU baseline survey from 2010-11 and EU clinical isolates from the same year.
174. Following the recent report of a plasmid-encoded colistin resistance gene (*mcr-1*) in *E.coli* from pigs, raw meat and human infections in China PHE were able to rapidly screen their archive of thousands of genomes for the *mcr-1* gene. This demonstrated the power of WGS for rapid screening for antimicrobial resistance genes.
175. In conclusion, the group were informed that WGS is being used to deliver reference microbiology for GI pathogens in real time – *Salmonella*, *E. coli*, *Shigella*, *Campylobacter* and with *Listeria monocytogenes* from March 2016. WGS is producing the highest degree of resolution for typing plus phylogenetic information thereby enabling:
  - Real time monitoring of clusters, of virulence and AMR of all strains
  - Detecting more outbreaks – smaller outbreak, geographically spread, over longer time frame
  - Accurate and robust outbreak definition – finds cases and rules out unrelated cases from an outbreak – refines outbreak investigation
  - Increased case ascertainment and indication of location/source of infection

176. On PHE's assertion regarding what WGS was delivering, a member raised caution about the significance being attributed to WGS as a diagnostic tool. He explained that WGS is good in picking up relatedness in outbreaks but in the human diagnostic world clinicians were adopting multiplex PCR. It was underlined that multiplex PCR was likely to increase the scope of organisms that are detected in human samples. This method may have an impact on the trend data the Committee and the FSA consider.

## Food Surveillance

177. The FSA presented the quarter 1-3 results of the **year 2 survey investigating the prevalence and levels of *Campylobacter* contamination on fresh whole chilled chickens and their packaging** (sampling began in July 2015). The survey aims to examine more than 4,000 samples of whole chickens bought from UK retail outlets and smaller independent stores and butchers. A member commented on progress being made in reducing levels of this organism which did not seem to be reflected in the human data. Referring to the human infection data (see para 164) a member noted that the number of human Campylobacteriosis cases appears to be dropping compared to previous presentations that had been provided to the Committee.
178. The reconfiguration of PHE FW&E Microbiology Services for England was noted. From April 2016 PHE will be reconfiguring the Microbiology Services onto three sites by retaining PHE FW&E laboratories in London, Porton and York and distributing the work previously sent to the Preston and Birmingham laboratories to the closest alternative site. It was explained that the chosen option delivers the required revenue savings with no change in Local Authority allocation and level of support for Official Control. There will also be appropriate response to outbreaks or public health incidents. Food Survey reports published or submitted for peer review since last EFIG meeting was provided to the group.
179. **Food Standard Scotland provided an update on its co-ordinated Food Sampling Programme for 2016/17.** It was noted that funds would be made available to Scottish local authorities (co-ordinated through liaison groups) for sampling and surveillance of food. This programme aims to provide a co-ordinated, risk-based approach for sampling, and covers both imported and UK-produced food, where relevant. Samples will be taken between July 2016 and March 2017, though consideration will be given to the availability of products and seasonal influences. All results of samples will then be uploaded to the UK Food Surveillance System by 31 May 2017.

## Triennial Review

180. In March the FSA published a review of its six SACs which was carried out to ensure the FSA continues to get the best independent expert scientific advice to support its work. The findings of the review have been accepted by the FSA Board and the cabinet Office.

181. The review concluded:

- The FSA should follow similar models in other Government departments with external Chief Scientific Advisers, and replace the GACS (established in 2007 to provide independent advice and challenge to FSA's then internal Chief Scientist) with a Science Council.
- The advisory risk assessment functions of the ACNFP and the ACAF should move to a new committee within the framework of a wider remit on innovation in the food chain, to be established by December 2017.
- The functions performed by the ACMSF and COT are still required and they should be retained as advisory Non-Departmental Public Bodies.
- The SSRC should be an expert committee of FSA, focusing on providing strategic support, scientific advice and challenge which will inform the FSA in delivery of its strategic objectives and help it understand its impact, reflecting the priorities in the new FSA Strategic Plan.
- All the FSA's SACs, including the new Committee on Innovation in the Food Chain and the new FSA Science Council, should to meet the established high standards of independence, openness and transparency, including holding open meetings and publishing papers, minutes and reports.
- A number of areas of good practice were also identified by the review, and a further four recommendations are made about how to improve the efficiency and impact of the future SACs work and to ensure they continue to meet the highest standards of governance

## ACMSF Working and Ad Hoc Groups

### Antimicrobial Resistance Working Group

182. The Antimicrobial Resistance (AMR) Working Group met four times in 2016. The key issues they considered include:

- FSA's assessment of the current level of risk and uncertainty associated with the finding of the *mcr-1* gene for colistin resistance in *Salmonella* Typhimurium var Copenhagen and *E. coli* in UK pigs via three questions.
  - The public health significance and level of risk associated with the finding of the *mcr-1* colistin resistance gene in UK pigs.

Whilst supporting the FSA's current risk assessment, the group agreed that the finding of the *mcr-1* colistin resistance gene in UK pigs was an undesirable development and posed an increased risk to those who would need colistin for treatment. The subgroup highlighted the need for wider discussion concerning the use of colistin in the light of the recent findings. It was noted that European Medicines Agency are expected to meet soon to discuss the issue of colistin in the food chain.

- What further work might be needed regarding the risk associated with the food chain.

The subgroup welcomed what was being done by Public Health England and Animal and Plant Health Agency in going through their archives to screen isolates and genomes for the *mcr-1* gene. They were also supportive of the FSA including screening of *E. coli* from retail chicken meat for the *mcr-1* gene. This work began in January 2016 as an add on to the surveillance of retail meat as part of EU antimicrobial resistance monitoring. The FSA was encouraged to liaise with other Member States (MSs) to see how they are dealing with the issue of colistin resistance as it was highlighted that little colistin is used in the UK compared to other MSs. The subgroup also suggested that consideration could be given to undertaking a survey on the use of colistin in pigs in the UK with the aim of identifying relevant reservoirs of the *mcr-1* gene.

- Potential interventions and their impact on the risk associated with the food chain.

The group agreed that the current risk assessment also makes reference to well established food hygiene advice in helping to control microbiological risks. Members recognised the importance of good hygiene practices in reducing microbiological risks through the food chain including during meat production and in the handling and

cooking of meat in the kitchen. The FSA was encouraged to reinforce current advice for slaughterhouses and kitchen practices etc. Livestock keepers' and their veterinarians' attention is drawn to the European Commission's recently published guidelines on prudent use of antimicrobials (Guidelines for the prudent use of antimicrobials in veterinary medicine (2015/C 299/04). Specifically, pig producers and their veterinarians are encouraged to adhere to the Pig Veterinary Society's prescribing guidelines.

- UK and EU activities relating to colistin resistance in the food chain
- The FSA's risk assessment on Livestock Associated Meticillin-Resistant (LA-MRSA) *Staphylococcus aureus* in the food chain (revised draft risk assessment was presented to the group following the completion of the PHE's North West survey on LA-MRSA in raw retail meat)
- LA results from MRSA in retail meats
- Media story on: fluorquinolones in poultry production
- Use of Recycled Manure Solids as bedding for dairy cattle
- Activities of the Defra Antimicrobial Resistance Coordination
- EFSA/ECDC report: Antimicrobial Resistance in zoonotic bacteria.
- FSA Board Paper on AMR
- Work of the EU Working Group on the Reduction of the need to use antimicrobials in animal husbandry
- FSA systematic literature review to increase the understanding of the role of food production, processing and consumption in the development and spread of AMR
- FSA's draft priorities for antimicrobial resistance surveillance in the food chain (the paper is to aid the FSA in defining its surveillance strategy on AMR)
- Role of whole genome sequencing for AMR surveillance
- Danish paper on LA-MRSA and possible implications for risk assessment (evidence for human adaptation and foodborne transmission of LA-MRSA)
- FSA's proposal to establish a short-term task and finish group on AMR

### **Ad Hoc Group on *Campylobacter***

183. The Ad Hoc Group on *Campylobacter* (chaired by Prof Sarah O'Brien) met four times in 2016. The Committee decided to set up group at the June 2015 ACMSF meeting following the update members received on the FSA's *Campylobacter* retail survey. ACMSF agreed to establish an Ad Hoc Group as it is about 10 years since the Committee issued its report on *Campylobacter*. It was also noted that *Campylobacter* in chicken is a key strategic priority for the FSA. Members of the Group participated at the FSA *Campylobacter* Workshop that was held between 8 and 10 March 2016.
184. The group had its first meeting on 6 May 2016 where they agreed their terms of reference. They also used the meeting to discuss the structure of the report they intend to produce (some of the key areas the report will cover include: *Campylobacter* biology and tools for detection, *Campylobacter* genetics and genomics, Human epidemiology and transmission routes, Risk in the food chain: primary production, Attitude to risk: consumers and farmers and Motivations and barriers to change). The group's membership include: Professors David McDowell, Peter McClure, Tom Humphrey, Martin Maiden and Noel McCarthy; Messrs Alec Kyriakides and David Nuttall, Dr Dan Tucker, Mrs Joy Dobbs and Mrs Ann Williams.

### **Surveillance Working Group**

185. The Surveillance Working Group provides advice as required on the FSA's microbiological food surveillance programme and any other surveillance relevant to foodborne disease. As the FSA suspended sampling on its survey of *Campylobacter* on fresh chicken bought at retail outlets during the second quarter 2016 (April to June 2016) the group was asked to comment on the proposed laboratory trial work carried out by PHE (survey contractor) in the remaining quarters of the year to assess new sampling methodology and the subsequent revised methodology.

### **Emerging pathogens Working Group**

186. The Emerging Pathogens Working Group (Chaired by Professor Rick Holliman) at the June plenary meeting were asked to consider the queries that were raised on the Zika virus in relation to the food chain risk assessment. These were considered via a teleconference.

### **Cross-SAC Working Group on the framework for foods that present an increased risk per serving**

187. The Committee was updated on the work of the above group set up in February 2016 to advise the FSA through advice to the FSA's Chief Scientific Adviser and Director of Policy, on a framework for the assessment of foods which may present an increased likelihood of harm.



The Working Group has representatives from ACMSF, Social science Research Committee, Committee on Toxicity and General Advisory Committee on Science and is working iteratively with the FSA to develop a fit-for-purpose framework. A representative from the National Institute for Health and care Excellence (NICE) has been co-opted on to the Group.

188. Members were informed that the Working Group held its first workshop in March and a second workshop on 30 June 2016.
- Their discussions have helped to reinforce the clarity and expected utility of the framework and its overall coherence. They have also helped identify some over-arching principles and features of a revised approach.
  - The FSA Board received an update on the work at its 13 July 2016 meeting.

### **Outcome and Impact of ACMSF advice**

189. Feedback on the outcome of ACMSF recommendations are provided to the Committee through matters arising papers, information papers and oral updates at meetings. In 2016 the Committee considered a range of issues which may have an impact on risk management.
190. In June the *Ad hoc* Working Group on eggs produced its report on the microbiological safety of eggs (*an update on the microbiological risk from shell eggs and their products*). The group was asked to assess the current level of microbiological risk to consumers (including vulnerable groups) from raw or lightly cooked shell eggs and their products, and specifically to assess how the risk with respect to *Salmonella* has changed since the last ACMSF report on this subject in 2001.
191. The Group concluded that with respect to hen shell eggs, whilst a range of micro-organisms could potentially contaminate the shell surface and possibly the egg contents, the only group of organisms of significant importance in respect of contents contamination is *Salmonella*. This latter risk is generally limited to a subset of these bacteria, principally *Salmonella* Enteritidis. It was the strong view of the group that there has been a major reduction in the microbiological risk from *Salmonella* in UK hen shell eggs since the 2001 ACMSF report. This is especially the case for those eggs produced under the Lion Code quality assurance scheme, which comprises a suite of measures including: vaccination for *Salmonella* Enteritidis and Typhimurium, a cool chain from farm to retail outlets, enhanced testing for *Salmonella*, improved farm hygiene, effective rodent control, independent auditing, date stamping on each individual egg and traceability. The risk from non-UK eggs has also been reduced, but not to the same extent.

192. The Group recommended that the FSA should consider amending its advice on eggs in the light of the above.
193. The Committee was asked to assess the risk to consumers from Zika virus via food imported from Zika-endemic countries. Comments made by the Committee and its emerging pathogen subgroup were taken into account in agreeing the overall risk from ZIKV to UK consumers.
194. The Committee was asked to revisit the assessment of the risk of *Mycobacterium avium* subspecies paratuberculosis (MAP) – risk assessment in relation to food. The issue of MAP in relation to the food chain has been considered by the Committee on previous occasions and based on the available evidence ACMSF members had agreed that a causative link between MAP and Crohn's disease had not yet been established. ACMSF remarked that the revised risk assessment did not contain new evidence to inform a change of opinion.
195. The Committee gave its views on the food safety implications of the use of recycled manure solids used as bedding for dairy cattle. ACMSF responded to the findings of study report carried out to address the queries raised by the Committee when they considered this subject in January 2015. ACMSF's views were taken into account by the FSA in formulating its position on this practice.
196. Public Health England briefed the Committee on the issue of Shiga toxin producing *E. coli* (STEC) associated with food in England; surveillance, trends in outbreaks, recent developments and the use of whole genome sequencing. Comments made by the Committee were considered to inform the ongoing surveillance activities.
197. ACMSF's Surveillance Working Group provides advice as on the FSA's microbiological food surveillance programme and any other surveillance relevant to foodborne disease. Following the suspension of sampling on the FSA survey's *Campylobacter* on fresh chicken bought at retail outlets during the second quarter 2016 (April to June 2016) the group was asked to comment on the proposed laboratory trial work carried out by PHE (survey contractor) in the remaining quarters of the year to assess new sampling methodology and the subsequent revised methodology. Advice provided on the survey report together with comments on the ongoing survey were considered by the FSA.
198. The Committee's AMR Working Group whose remit is to assess the risks to humans from foodborne transmission of antimicrobial-resistant microorganisms and provide advice to the FSA considered a range of issues brought to them by the Agency in 2016. Subgroup's comments were taken into account on a range of issues brought to the members to consider such as:
  - UK and EU activities relating to colistin resistance in the food chain

- The FSA's risk assessment on Livestock Associated Meticillin-Resistant (LA-MRSA) *Staphylococcus aureus* in the food chain (revised draft risk assessment was presented to the group following the completion of the PHE's North West survey on LA-MRSA in raw retail meat)
- LA results from MRSA in retail meats
- Media story on: fluorquinolones in poultry production
- Use of Recycled Manure Solids as bedding for dairy cattle
- Activities of the Defra Antimicrobial Resistance Coordination
- EFSA/ECDC report: Antimicrobial Resistance in zoonotic bacteria.
- Work of the EU Working Group on the Reduction of the need to use antimicrobials in animal husbandry
- FSA systematic literature review to increase the understanding of the role of food production, processing and consumption in the development and spread of AMR
- FSA's draft priorities for antimicrobial resistance surveillance in the food chain (the paper is to aid the FSA in defining its surveillance strategy on AMR)

## **ACMSF Involvement in Incidents and Outbreaks**

199. In February the FSA sought the Committee's views on a microbiological risk assessment relating to a *Salmonella* Dublin incident. The ACMSF Chair and a small group of Members commented on the risk assessment report as comments were required urgently and investigations were ongoing.

## Information papers

200. 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 2016 were:

| NO. OF PAPER | NAME OF PAPER   | MEETING NUMBER   | DATE OF MEETING |
|--------------|---|------------------|-----------------|
| ACM/1209     | Public Health risks associated with Enteroaggregative <i>Escherichia coli</i> (EAEC) as a food-borne pathogen | 87 <sup>th</sup> | 29 January 2016 |
| ACM/1210     | Report of the 47 <sup>th</sup> Codex Committee on Food Hygiene  | 87 <sup>th</sup> | 29 January 2016 |
| ACM/1211     | ACMSF Workplan  | 87 <sup>th</sup> | 29 January 2016 |
| ACM/1212     | Heat treatment of bivalve molluscs  | 87 <sup>th</sup> | 29 January 2016 |
| ACM/1213     | Campylobacter and Listeria infections in the EU   | 87 <sup>th</sup> | 29 January 2016 |
| ACM/1214     | WHO estimates Update from other of foodborne disease  | 87 <sup>th</sup> | 29 January 2016 |
| ACM/1215     | Update from other Scientific Advisory Committees  | 87 <sup>th</sup> | 29 January 2016 |

|          |   |                  |                 |
|----------|---|------------------|-----------------|
| ACM/1216 | Items of interest from the literature   | 87 <sup>th</sup> | 29 January 2016 |
| ACM/1217 | <i>Campylobacter</i> Retail Survey  | 87 <sup>th</sup> | 29 January 2016 |
| ACM/1226 | ACMSF Work plan   | 88 <sup>th</sup> | 30 June 2016    |
| ACM/1227 | Update from other Scientific Advisory Committees  | 88 <sup>th</sup> | 30 June 2016    |
| ACM/1228 | Items of interest from the literature   | 88 <sup>th</sup> | 30 June 2016    |
| ACM/1229 | <i>Campylobacter</i> Retail Survey  | 88 <sup>th</sup> | 30 June 2016    |
| ACM/1230 | Review of the FSA guidance on the safety and shelf-life of vacuum and modified atmosphere packed chilled foods with respect to non-proteolytic <i>Clostridium botulinum</i> | 88 <sup>th</sup> | 30 June 2016    |
| ACM/1237 | ACMSF Work plan   | 89 <sup>th</sup> | 20 October 2016 |
| ACM/1238 | Update from other Scientific Advisory Committees  | 89 <sup>th</sup> | 20 October 2016 |
| ACM/1239 | Items of interest from literature   | 89 <sup>th</sup> | 20 October 2016 |
| ACM/1240 | Chief Scientific Adviser's Report on Antimicrobial Resistance   | 89 <sup>th</sup> | 20 October 2016 |

## Chapter 3: A Forward Look

### Future work programme

201. The Committee will keep itself informed of developing trends in relation to foodborne disease through its close links with the FSA, Food Standards Scotland and Public Health England. We will continue to respond promptly with advice on the food safety implications of issues referred to the Committee by the FSA.
202. The *Ad Hoc* Group on *Campylobacter* setup to evaluate the outcomes to date from the second report on *Campylobacter* (published in March 2005) is working towards producing a report in 2017 that will advise the FSA in its strategy for reducing foodborne illness in relation to *Campylobacter*.
203. The Committee through its Working Group on Antimicrobial Resistance will continue to assess the risks to humans from foodborne transmission of antimicrobial-resistant microorganisms and provide advice to the FSA.
204. The Committee, through its standing Surveillance Working Group, will continue to provide advice as required on the Government's microbiological food surveillance programme and any other surveillance relevant to foodborne disease.
205. The Working Group on emerging pathogens will keep a watching brief on developments concerning the risks to human health from newly emerging or re-emerging pathogens through food chain exposure pathways.
206. Details of the Committee's work plan for 2016/17 can be found at Annex II.

## Papers Considered by ACMSF in 2016

| NO. OF PAPER | NAME OF PAPER   | MEETING NUMBER   | DATE OF MEETING |
|--------------|---|------------------|-----------------|
| ACM/1202     | Matters arising   | 87 <sup>th</sup> | 29 January 2016 |
| ACM/1203     | ACMSF's assessment of risk associated with the consumption of shell eggs                                      | 87 <sup>th</sup> | 29 January 2016 |
| ACM/1204     | FSA's work in relation to Rare Burgers  | 87 <sup>th</sup> | 29 January 2016 |
| ACM/1205     | Food safety risk of recycled manure solids used as bedding for dairy cattle                                   | 87 <sup>th</sup> | 29 January 2016 |
| ACM/1206     | Epidemiology of Foodborne Infections Group  | 87 <sup>th</sup> | 29 January 2016 |
| ACM/1207     | Changes to plant protection product MRLs: potential impact on food safety                                     | 87 <sup>th</sup> | 29 January 2016 |
| ACM/1208     | Dates of future meetings  | 87 <sup>th</sup> | 29 January 2016 |
| ACM/1209     | Public health risks associated with Enteroaggregative <i>Escherichia coli</i> (EAEC) as a food-borne pathogen | 87 <sup>th</sup> | 29 January 2016 |
| ACM/1210     | Report of the 47 <sup>th</sup> Codex Committee on Food Hygiene  | 87 <sup>th</sup> | 29 January 2016 |

|          |  |                  |                 |
|----------|--|------------------|-----------------|
| ACM/1211 | ACMSF Work plan  | 87 <sup>th</sup> | 29 January 2016 |
| ACM/1212 | Heat treatment of bivalve molluscs                                       | 87 <sup>th</sup> | 29 January 2016 |
| ACM/1213 | <i>Campylobacter</i> and Listeria infections in the EU                   | 87 <sup>th</sup> | 29 January 2016 |
| ACM/1214 | WHO estimates of foodborne disease                                       | 87 <sup>th</sup> | 29 January 2016 |
| ACM/1215 | Update from other Scientific Advisory Committees                         | 87 <sup>th</sup> | 29 January 2016 |
| ACM/1216 | Items of interest from the literature                                    | 87 <sup>th</sup> | 29 January 2016 |
| ACM/1217 | <i>Campylobacter Retail Survey</i>                                       | 87 <sup>th</sup> | 29 January 2016 |
| ACM/1218 | Matters arising  | 88 <sup>th</sup> | 30 June 2016    |
| ACM/1219 | ACMSF's assessment of risk associated with the consumption of shell eggs | 88 <sup>th</sup> | 30 June 2016    |
| ACM/1220 | Zika virus: Draft risk assessment related to exposure via the food chain | 88 <sup>th</sup> | 30 June 2016    |
| ACM/1221 | APHA work relating to Food animal microbiome                             | 88 <sup>th</sup> | 30 June 2016    |
| ACM/1222 | FSA's work in relation to Rare Burgers                                   | 88 <sup>th</sup> | 30 June 2016    |
| ACM/1223 | Toxoplasma EU funded work  | 88 <sup>th</sup> | 30 June 2016    |
| ACM/1224 | Epidemiology of Foodborne Infections Group                               | 88 <sup>th</sup> | 30 June 2016    |



|          |   |                  |                 |
|----------|---|------------------|-----------------|
| ACM/1225 | Dates of future meetings  | 88 <sup>th</sup> | 30 June 2016    |
| ACM/1226 | ACMSF Work plan   | 88 <sup>th</sup> | 30 June 2016    |
| ACM/1227 | Update from other Scientific Advisory Committees  | 88 <sup>th</sup> | 30 June 2016    |
| ACM/1228 | Items of interest from the literature   | 88 <sup>th</sup> | 30 June 2016    |
| ACM/1229 | <i>Campylobacter</i> Retail Survey  | 88 <sup>th</sup> | 30 June 2016    |
| ACM/1230 | Review of the FSA guidance on the safety and shelf-life of vacuum and modified atmosphere packed chilled foods with respect to non-proteolytic <i>Clostridium botulinum</i> | 88 <sup>th</sup> | 30 June 2016    |
| ACM/1231 | Matters arising   | 89 <sup>th</sup> | 20 October 2016 |
| ACM/1232 | VTEC associated with the food chain   | 89 <sup>th</sup> | 20 October 2016 |
| ACM/1233 | <i>Mycobacterium avium</i> subspecies paratuberculosis – draft risk assessment related to exposure via the food chain   | 89 <sup>th</sup> | 20 October 2016 |
| ACM/1234 | Foodborne Viral Infections (initial response to the ACMSF virus report)   | 89 <sup>th</sup> | 20 October 2016 |
| ACM/1235 | Horizon scanning  | 89 <sup>th</sup> | 20 October 2016 |
| ACM/1236 | Dates of future meetings  | 89 <sup>th</sup> | 20 October 2016 |

|          |   |                  |                 |
|----------|---|------------------|-----------------|
| ACM/1237 | ACMSF Work plan   | 89 <sup>th</sup> | 20 October 2016 |
| ACM/1238 | Update from other Scientific Advisory Committees              | 89 <sup>th</sup> | 20 October 2016 |
| ACM/1239 | Items of interest from the literature                         | 89 <sup>th</sup> | 20 October 2016 |
| ACM/1240 | Chief Scientific Adviser's Report on Antimicrobial Resistance | 89 <sup>th</sup> | 20 October 2016 |

**ACMSF Forward Work Plan 2016/17**

Last reviewed October 2016

This work plan shows the main areas of ACMSF's work over the next 12 to 18 months. It should be noted that the Committee must maintain the flexibility to consider urgent issues that arise unpredicted and discussions scheduled in the work programme may therefore be deferred.

**ACMSF Terms of reference**

To assess the risk to humans of 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.

|   | Topic  | Progress   | Expected Output   |
|---|--|--|---|
| 1 | <p><b>Horizon scanning</b></p> <p>The Committee will be asked to revisit the outcome of the January 2015 horizon scanning workshop for members to reassess the identified emerging microbiological issues of concern and ranked issues in terms of strategic priority and urgency.</p> | <p>Outcomes from workshop were considered at the June 2015 ACMSF meeting. Members agreed to set up groups on: <i>Campylobacter</i> and Genomics. These were ranked as the priority areas that needed immediate attention. Ad Hoc Group on <i>Campylobacter</i> was set up in November 2015. The group has had three meetings between May and September 2016. They are working towards producing a report by Spring 2017.</p> | <p><b><i>Campylobacter</i></b>: ACMSF's update on the Second <i>Campylobacter</i> report published in 2005 and an assessment of progress made (by the FSA) in addressing the Committee's recommendations in the 2005 <i>Campylobacter</i> report.</p> <p><b>Genomics</b>: ACMSF assessment of the effect of the genomics revolution on outbreak investigations.</p> |

|   | Topic  | Progress   | Expected Output   |
|---|--|--|---|
| 2 | <b>Eggs</b>  | <p>In January 2015 the ACMSF set up an Ad Hoc Group on Eggs to establish the current level of risk to consumers including vulnerable groups from eating raw or lightly cooked shell eggs or their products to determine whether the current FSA advice remains applicable.</p> <p>The subgroup's final report was approved for publication at the plenary meeting held in June 2016.</p> | ACMSF's assessment of the risks that may be associated with consumption of shell eggs and an indication whether these risks have changed since the ACMSF's 2001 report. |
| 3 | <b>Newly Emerging Pathogens</b><br><br>The Newly Emerging Pathogens Working Group provides advice on the significance and risks from newly emerging or re-emerging pathogens through food chain exposure pathways.                               | Continuous.  | The Committee to draw the FSA's attention to any risks to human health from newly emerging pathogens via food.  |
| 4 | <b>Microbiological Surveillance of food</b><br><br>The Surveillance Working Group provides advice as required in connection with the FSA's microbiological food surveillance programme and any other surveillance relevant to foodborne disease. | Working group activities are continuous.<br><br>Committee to consider the findings of the FSA's (Year 2) microbiological survey of <i>Campylobacter</i> contamination in fresh whole UK produced chilled chickens at retail sale when results are available.   | Surveillance Working Group/Committee comments on survey protocols and survey results for consideration by FSA in their microbiological food surveillance activities.    |

|   | Topic  | Progress   | Expected Output  |
|---|--|--|--|
| 5 | <p><b>Developing trends in relation to foodborne disease</b></p> <p>The Committee receives updates on research, surveys, investigations, meetings and conferences of interest.</p>   | <p>As issues arise</p> <p>EFIG<sup>1</sup> update will be provided at the June 2016 and January 2017 meetings.</p> | <p>ACMSF provides comments on the updates it receives for the FSA's consideration.</p>               |
| 6 | <p><b>International and EU developments on the microbiological safety of food</b></p> <p>The Committee is updated on issues of relevance and significant developments at an EU and international level on microbiological food safety, such as EFSA opinions and Codex Committee on Food Hygiene meetings.</p> | <p>As issues arise.</p>  | <p>ACMSF to note updates and provide comments if desired.</p>  |
| 7 | <p><b>Microbiological Incidents and outbreaks</b></p> <p>The views of the Committee will be sought where necessary and updates provided on outbreaks of significance.</p>  | <p>As issues arise.</p>  | <p>ACMSF assessment of the risks in relation to significant microbiological outbreaks/incidents.</p> |

<sup>1</sup> Epidemiology of Foodborne Infections Group

|    | Topic  | Progress  | Expected Output  |
|----|--|---|--|
| 8  | <p><b>Antimicrobial resistance</b></p> <p>ACMSF published a report on microbial antibiotic resistance in relation to food safety in 1999. Progress on the Committee's recommendations was reviewed in 2005 and 2007.</p> | <p>The Committee were updated on developments and emerging issues in relation to antimicrobial resistance in January 2013 and agreed to set up a Working Group to consider antimicrobial resistance and food chain issues in more detail. The subgroup has four meetings planned for 2016. Summaries of discussions and recommendations are provided at plenary meetings.</p> | <p>ACMSF assessment of the key risks to the food chain which may have consequences for human health and identification of key research or surveillance gaps in relation to the food chain.</p> |
| 9  | <p><b><i>Mycobacterium bovis</i> and possible health risks associated with meat</b></p>  | <p>The Committee will be asked to review the risk level classification associated with the consumption of meat from animals with evidence of <i>M. bovis</i> infection. Committee to use the <i>M.bovis</i> and raw milk risk assessment framework. Uncertainties are to be highlighted before risk classification is considered.</p>   | <p>ACMSF assessment of risk to human health in relation to the consumption of meat from animals with evidence of <i>M.bovis</i> infection.</p>   |
| 10 | <p><b>Social science research relating to microbiological food safety risks</b></p>  | <p>The Committee will receive updates on the findings of social science research which may have a bearing on the assessment of microbiological food safety risks.</p>   | <p>ACMSF to note updates and provide comments if desired.</p>  |

|    | Topic  | Progress   | Expected Output  |
|----|--|--|--|
| 11 | <b>FSA Board's New Approach in relation to Rare Burgers</b>                            | The Committee will be updated on work the FSA is undertaking following the FSA Board's decision on rare burgers.   | Committee to be kept informed of progress and to contribute to the work where appropriate.                           |
| 12 | <b>Changes to plant protection product MRLs: potential impact on food safety</b>       | Members were alerted to this issue of changes to maximum residue levels (MRLs) for two quaternary ammonium compounds (QACs), chlorate and biocidal actives which are used as disinfectants/sanitiser in the food industry at the October 2015 and January 2016 meetings. The Committee agreed to the FSA's suggestion to setup a cross SAC working group to facilitate a full discussion to take place. Establishment of a group is on hold. | ACMSF to consider the evidence in this area with respect to impacts on food safety and to provide advice to the FSA. |
| 13 | <b>Zika virus</b>  | A revised draft risk assessment will be presented to the Committee in January 2017 on the risk to consumers from Zika virus via food imported from Zika-endemic countries.   | The Agency is looking for endorsement of this assessment and the overall risk via the food chain from the Committee. |
| 14 | <b>Systematic review to increase the understanding of the role of food production,</b> | Study expected to be published in November 2016.   | ACMSF to comment on systematic review findings.  |

|    | Topic   | Progress   | Expected Output  |
|----|---|--|--|
|    | <b>processing and consumption in the development and spread of antimicrobial resistance</b>   |  |  |
| 15 | <b>Risk assessment outputs</b>  | Committee to revisit its approach to how it expresses risk assessment outputs.   | Improved consistency and clarity in framing risk assessment outputs.   |
| 16 | <b>Foodborne Viral Infections (Initial response to the ACMSF virus report)</b>  | The Ad Hoc Group on Foodborne Viral Infections report was published in March 2015. Committee to be updated on the ongoing response to their report (An update on viruses in the food chain) at the October 2016 meeting. | Update on progress being made on the report's recommendations.   |
| 17 | <b>VTEC associated with the food chain</b>  | Public Health England will update the Committee on VTEC associated with food (surveillance, trends in outbreaks, recent developments and use of WGS).  | ACMSF to note updates and provide comments if desired.   |
| 18 | <b><i>Mycobacterium avium</i> subspecies <i>paratuberculosis</i> – Draft risk assessment related to exposure via the food chain</b> | A risk assessment will be presented to the Committee in October 2016 on the risk to consumers from <i>Mycobacterium avium</i> subspecies <i>paratuberculosis</i> via the food chain.                                     | The Agency is looking for endorsement of this assessment and the overall risk via the food chain from the Committee. |



## Annex III

### **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.

##### Newly Emerging Pathogens Working Group

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

##### Antimicrobial Resistance Working Group

- To brief ACMSF on developments in relation to antimicrobial resistance and the food chain and identify evidence that will assist the group in assessing the risks.
- To review key documents and identify the risks for the UK food chain and relevant aspects of the feed chain in relation to antimicrobial resistance which may have consequences for human health.
- To comment on progress in understanding the issue of antimicrobial-resistant microorganisms and the food chain since the ACMSF produced its report in 1999 and subsequent reviews in 2005 and 2007, including the relevance of any outstanding recommendations.
- To highlight key research or surveillance gaps in relation to antimicrobial-resistant microorganisms and the food/feed chain and identify those which are considered a priority.

Ad Hoc Group on Eggs

- To assess the current level of microbiological risk to consumers (including vulnerable groups) from raw or lightly cooked shell eggs and their products.
- To assess how the risk with respect to *Salmonella* has changed since the last ACMSF report on this subject in 2001.

Ad Hoc Group on *Campylobacter*

To assess the actions that have taken place since the publication of the Second *Campylobacter* Report and make proposals to advise the FSA in evolving its strategy for reducing the incidence and risk of foodborne *Campylobacter* infection in humans.

## Membership Tables

|                               |  | <b>ACMSF</b> | Surveillance Working Group | Newly Emerging Pathogens Working Group | <i>Ad Hoc</i> Group on Eggs | AMR Working Group | Ad Hoc Group on <i>Campylobacter</i> |
|-------------------------------|--|--------------|----------------------------|--|-----------------------------|-------------------|--------------------------------------|
| <b>Chair</b>                  |  |              |                            |  |                             |                   |                                      |
| Professor S J O'Brien         | Professor of Infection Epidemiology and Zoonoses, University of Liverpool, Institute of Infection and Global Health, National centre for Zoonosis Research | ✓            | ✓                          | ✓                                      |                             |                   | ✓                                    |
| <b>Members</b>                |  |              |                            |  |                             |                   |                                      |
| Dr G Adak                     | Head of Gastrointestinal Infection Surveillance, Department of Gastrointestinal, Emerging & Zoonotic Infections, Health Protection Services Colindale      | ✓            | ✓                          |  |                             |                   |                                      |
| Dr G Barker                   | Senior Research Scientist, Institute of Food Research, Norwich   | ✓            |                            | ✓                                      | ✓                           |                   |                                      |
| Dr R Betts                    | Head of Food Microbiology, Campden BRI   | ✓            | ✓                          |  |                             |                   |                                      |
| Professor J Coia <sup>2</sup> | Consultant Microbiologist, NHS Greater Glasgow and Clyde   | ✓            | ✓                          |  | ✓                           | ✓                 |                                      |

<sup>2</sup> Chair of Surveillance Working Group and *Ad Hoc* Group on Eggs

|                                       |  | <b>ACMSF</b> | Surveillance Working Group | Newly Emerging Pathogens Working Group | <i>Ad Hoc</i> Group on Eggs | AMR Working Group | Ad Hoc Group on <i>Campylobacter</i> |
|---------------------------------------|--|--------------|----------------------------|--|-----------------------------|-------------------|--------------------------------------|
| Mrs J Dobbs <sup>3</sup>              | Member of the Social Science Research Committee  | ✓            |                            |  |                             |                   | ✓                                    |
| Mrs R Glazebrook <sup>4</sup>         | Consumer representative  | ✓            |                            |  | ✓                           | ✓                 | ✓                                    |
| Professor R E Holliman <sup>5,6</sup> | PHE Lead Public Health Microbiologist for London. Professor of Public Health Micro-biology, St George's, University of London. Consultant in Clinical Microbiology, at St George's, Barts & the Royal London Hospitals | ✓            |                            | ✓                                      |                             | ✓                 |                                      |
| Professor M Iturriza-Gómara           | Professor of Virology, University of Liverpool   | ✓            |                            | ✓                                      |                             |                   |                                      |
| Mr A Kyriakides                       | Head of Product Quality, Safety and Supplier Performance, Sainsburys   | ✓            | ✓                          | ✓                                      |                             |                   | ✓                                    |

<sup>3</sup> *Ex officio* appointment (Member of Social Science Research Committee)

<sup>4</sup> Resigned at the end of March 2016

<sup>5</sup> Chair of Newly Emerging Pathogens Group

<sup>6</sup> Dr Holliman's appointment ended on 30 November 2016

|                              |  | <b>ACMSF</b> | Surveillance Working Group | Newly Emerging Pathogens Working Group | <i>Ad Hoc</i> Group on Eggs | AMR Working Group | Ad Hoc Group on <i>Campylobacter</i> |
|------------------------------|--|--------------|----------------------------|--|-----------------------------|-------------------|--------------------------------------|
| Professor P McClure          | Microbiologist and Microbiology Department Manager, Mondelez International R&D Ltd   | ✓            | ✓                          |  |                             |                   | ✓                                    |
| Professor D McDowell         | Professor of Food Studies University of Ulster   | ✓            | ✓                          | ✓                                      | ✓                           | ✓                 | ✓                                    |
| Dr S Millership <sup>7</sup> | Consultant in Communicable Disease Control, Essex Health Protection Unit and Consultant in Microbiology, Princess Alexandra Hospital, Harlow | ✓            |                            |  |                             |                   |                                      |
| Mrs J Morris <sup>8</sup>    | Principal Policy Officer (Food), Chartered Institute of Environmental Health   | ✓            |                            |  |                             |                   |                                      |
| Mr D Nuttall                 | Catering Manager Harper Adams University College   | ✓            |                            |  | ✓                           |                   | ✓                                    |
| Dr D Tucker                  | Senior Lecturer in Veterinary Public Health/pig medicine, University of Cambridge  | ✓            |                            | ✓                                      |                             |                   | ✓                                    |

<sup>7</sup> Dr Millership's appointment ended on 30 November 2016

<sup>8</sup> Mrs Morris's appointment ended on 30 November 2016

Advisory Committee on the Microbiological Safety of Food: Annual Report 2016

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|                         |  | <b>ACMSF</b> | Surveillance Working Group | Newly Emerging Pathogens Working Group | <i>Ad Hoc</i> Group on Eggs | AMR Working Group | Ad Hoc Group on <i>Campylobacter</i> |
|-------------------------|--|--------------|----------------------------|--|-----------------------------|-------------------|--------------------------------------|
| <b>Co-opted Members</b> |  |              |                            |  |                             |                   |                                      |
| Dr R Davies             | Veterinary Advisor and <i>Salmonella</i> Consultant, Animal and Plant Health Authority |              |                            |  | ✓                           |                   |                                      |
| Prof T Humphrey         | Professor of Bacteriology and Food Safety, University of Swansea                       |              |                            |  | ✓                           |                   | ✓                                    |
| Mr C Lane               | Public Health England  |              |                            |  | ✓                           |                   |                                      |
| Ms L Larkin             | Veterinary Adviser, Animal and Plant Health Authority                                  |              |                            |  | ✓                           |                   |                                      |
| Prof S Forsythe         | Member of Advisory Committee on Animal Feedingstuffs (ACAF)                            |              |                            |  |                             | ✓                 |                                      |
| Mr C Teale              | Animal Health and Veterinary Laboratories Agency                                       |              |                            |  |                             | ✓                 |                                      |
| Prof J Threlfall        | Formerly Health Protection Agency  |              |                            |  |                             | ✓                 |                                      |
| Prof Norval Strachan    | University of Aberdeen   |              |                            |  |                             |                   | ✓                                    |
| Prof Noel McCarthy      | University of Warwick  |              |                            |  |                             |                   | ✓                                    |
| Prof Martin Maiden      | University of Oxford   |              |                            |  |                             |                   | ✓                                    |
| Mrs Ann Williams        | Consumer representative  |              |                            |  |                             |                   | ✓                                    |

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|                                     |  | <b>ACMSF</b> | Surveillance Working Group | Newly Emerging Pathogens Working Group | <i>Ad Hoc</i> Group on Eggs | AMR Working Group | Ad Hoc Group on <i>Campylobacter</i> |
|-------------------------------------|--|--------------|----------------------------|--|-----------------------------|-------------------|--------------------------------------|
| <b>Departmental Representatives</b> |  |              |                            |  |                             |                   |                                      |
| Dr Susanne Boyd                     | Food Standards Agency (Northern Ireland)           | ✓            |                            |  |                             |                   |                                      |
| Ms N Looch                          | Food Standards Agency                              |              |                            |  | ✓                           |                   |                                      |
| Dr S Wellstead                      | Department of Health                               |              |                            |  |                             | ✓                 |                                      |
| Mr S Wyllie                         | Department for Environment, Food and Rural Affairs | ✓            |                            | ✓                                      |                             | ✓                 | ✓                                    |
| <b>Scientific Secretaries</b>       |  |              |                            |  |                             |                   |                                      |
| Dr P Cook                           | Food Standards Agency                              | ✓            |                            |  |                             | ✓                 |                                      |
| Dr M Upadhyay                       | Food Standards Agency                              | ✓            | ✓                          | ✓                                      | ✓                           |                   | ✓                                    |
| Ms K Thomas                         | Food Standards Agency                              |              |                            |  |                             | ✓                 |                                      |
| <b>Administrative Secretariat</b>   |  |              |                            |  |                             |                   |                                      |
| Mr A Adeoye                         | Food Standards Agency                              | ✓            | ✓                          | ✓                                      | ✓                           | ✓                 | ✓                                    |
| Ms S Butler                         | Food Standards Agency                              | ✓            | ✓                          | ✓                                      | ✓                           | ✓                 | ✓                                    |

## **Annex IV**

### **Advisory Committee on the Microbiological Safety of Food Register of Members' Interests**



| <b>Member</b>               | <i>Personal interests</i>                                  |   | <i>Non-personal interests</i>   |   |
|-----------------------------|--|---|---|---|
|                             | <b>Name of company</b>                                     | <b>Nature of interest</b>   | <b>Name of company</b>  | <b>Nature of interest</b>   |
| Professor S J O'Brien       | None   |   | Various   | Research funding in collaboration with industrial partners<br>FSA funded research |
| Dr G Adak                   | None   |   | None  |   |
| Dr G Barker                 | None   |   | Various   | Research Funding in collaboration with industrial partners                        |
| Dr R Betts                  | Campden Group Services                                     | Employee  | A range of food producers/providers and associated service industries | Work for Campden BRI's members  |
| Professor J Coia            | Tesco UK   | Ad Hoc medico-legal work on infection related matters<br>Consultancy work | Various   | Funding for research projects   |
| Mrs J Dobbs                 | None   |   | None  |   |
| Mrs R Glazebrook            | None   |   | None  |   |
| Professor R E Holliman      | Public Health England<br>St George's, University of London | Employee<br><br>Employee  | None  |   |
| Professor M Iturriza-Gómara | None   |   | Various   | Research grants from pharmaceutical industry (vaccine related work)               |

| <b>Member</b>        | <i>Personal interests</i>   |   | <i>Non-personal interests</i>               |  |
|----------------------|---|---|---|--|
|                      | <b>Name of company</b>  | <b>Nature of interest</b>   | <b>Name of company</b>                      | <b>Nature of interest</b>  |
| Mr A Kyriakides      | Sainsbury's Supermarkets Ltd  | Employee  | Campden BRI                                 | Chairman   |
| Professor P McClure  | Mondelēz UK R&D Ltd<br><br>Unilever<br><br>Woodhead Publishing and Elsevier | Employee (Europe Manager)<br><br>Shareholder<br><br>Royalties for book chapters |   |  |
| Professor D McDowell | University of Ulster  | Emeritus Professor  | Various                                     | Research funding in collaboration with industrial partners           |
| Dr S Millership      | None  |   | None  |  |
| Mrs J Morris         | Chartered Institute of Environmental Health<br>Whitbread plc                | Employee and Member<br><br>Shareholder  | None  |  |
| Mr D Nuttall         | Harper Adams University College   | Catering Manager  | None  |  |
| Dr D Tucker          | University of Cambridge<br><br>Pembroke College, Cambridge                  | Employee<br><br>Fellow and trustee  | Zoetis Animal Health and Ceva Animal Health | Research funding to support pig clinical residency training programs |

|  |  |   |  |  |
|--|--|---|--|--|
|  | Genus plc<br><br>WJW Tucker and sons)<br><br>BP Amoco and Genus plc) and membership of<br><br>Royal College of Veterinary Surgeons and European College of Pig Health Management | Consultancy<br><br>Farming partnership<br><br>Shareholder<br><br>Member |  |  |
|--|--|---|--|--|

| <b>Member</b>                                 | <i>Personal interests</i>                 |                              | <i>Non-personal interests</i>   |   |
|---|---|------------------------------|---|---|
|   | <b>Name of company</b>                    | <b>Nature of interest</b>    | <b>Name of company</b>  | <b>Nature of interest</b>                               |
| <b>Ad Hoc Group on Eggs</b>                   |   |                              |   |   |
| Dr R Davies                                   |   |                              | British Egg Industry Council and individual egg producers<br><br>European Food Safety Authority | Adviser<br><br>Member of Working Group on hatching eggs |
| Prof T Humphrey                               | British Egg Industry Council<br>McDonalds | Consultant<br><br>Consultant |   |   |
| Ms Lesley Larkin                              | None                                      |                              | None  |   |
| <b>Antimicrobial Resistance Working Group</b> |   |                              |   |   |
| Professor S Forsythe                          | None                                      |                              | None  |   |
| Mr C Teale                                    | None                                      |                              | None  |   |
| Prof J Threlfall                              | None                                      |                              | None  |   |

## Annex V

### CODE OF PRACTICE FOR MEMBERS OF THE ADVISORY COMMITTEE ON THE MICROBIOLOGICAL SAFETY OF FOOD

#### Public service values

The members of the Advisory Committee on the Microbiological Safety of Food must at all times

- observe the highest standards of **impartiality, integrity and objectivity** in relation to the advice they provide and the management of this Committee;
- be accountable, through the Food Standards Agency (the Agency) and, ultimately, Ministers, to Parliament and the public for the Committee's activities and for the standard of advice it provides.

The Ministers of the sponsoring department (the Agency) are answerable to Parliament for the policies and performance of this Committee, including the policy framework within which it operates.

#### Standards in public life

All Committee members must:

- follow the Seven Principles of Public Life set out by the Committee on Standards in Public Life (Appendix 1);
- comply with this Code, and ensure they understand their duties, rights and responsibilities, and that they are familiar with the functions and role of this Committee and any relevant statements of Government policy. If necessary, members should consider undertaking relevant training to assist them in carrying out their role;
- not misuse information gained in the course of their public service for personal gain or for political purpose, nor seek to use the opportunity of public service to promote their private interests or those of connected persons, firms, businesses or other organizations; and
- not hold any paid or high-profile unpaid posts in a political party, and not engage in specific political activities on matters directly affecting the work of this Committee. When engaging in other political activities, Committee members should be conscious of their public role and exercise proper discretion. These restrictions do not apply to MPs (in those cases where MPs are eligible to be appointed), to local councillors, or to Peers in relation to their conduct in the House of Lords.

## **Role of Committee members**

Members have collective responsibility for the operation of this Committee. They must:

- engage fully in collective consideration of the issues, taking account of the full range of relevant factors, including any guidance issued by the Agency;
- ensure that they adhere to the Agency's Code of Practice on Openness (including prompt responses to public requests for information); agree an Annual Report; and, where practicable and appropriate, provide suitable opportunities to open up the work of the Committee to public scrutiny;
- follow Agency guidelines on divulging any information provided to the Committee in confidence;
- ensure that an appropriate response is provided to complaints and other correspondence, if necessary with reference to the Agency; and
- ensure that the Committee does not exceed its powers or functions.

Individual members should inform the Chair (or the Secretariat on his behalf) if they are invited to speak in public in their capacity as a Committee member.

Communications between the Committee and the Agency will generally be through the Chair except where the Committee has agreed that an individual member should act on its behalf. Nevertheless, any member has the right of access to the Chair of the Agency on any matter which he or she believes raises important issues relating to his or her duties as a Committee member. In such cases, the agreement of the rest of the Committee should normally be sought.

Individual members can be removed from office by the Chair of the Agency if, in the view of the Chair of the Agency, they fail to carry out the duties of office or are otherwise unable or unfit to carry out those duties.

## **The role of the Chair**

The Chair has particular responsibility for providing effective leadership on the issues above. In addition, the Chair is responsible for:

- ensuring that the Committee meets at appropriate intervals, and that the minutes of meetings and any reports to the Agency accurately record the decisions taken and, where appropriate, the views of individual members;

- representing the views of the Committee to the general public, notifying and, where appropriate, consulting the Agency, in advance where possible; and
- ensuring that new members are briefed on appointment (and their training needs considered), and providing an assessment of their performance, on request, when members are considered for re-appointment to the Committee or for appointment to the board of some other public body.

## **DEPARTMENTAL ASSESSORS AND THE SECRETARIAT**

### **Departmental assessors**

Meetings of the ACMSF and its Groups are attended by Departmental Assessors. The Assessors are currently nominated by, and are drawn from, those with relevant policy interests and responsibilities in the Food Standards Agency (including FSA Northern Ireland and Wales), and the Department for Environment, Food and Rural Affairs. Assessors are not members of the ACMSF and do not participate in Committee business in the manner of members. The role of the Assessors includes sharing with the secretariat the responsibility of ensuring that information is not unnecessarily withheld from the Committee. Assessors should make the Committee aware of the existence of any information that has been withheld from the Committee on the basis that it is exempt from disclosure under Freedom of Information legislation unless that legislation provides a basis for not doing so. Assessors keep their parent Departments informed about the Committee's work and act as a conduit for the exchange of information; advising the Committee on relevant policy developments and the implications of ACMSF proposals; informing ACMSF work through the provision of information; and being informed by the Committee on matters of mutual interest. Assessors are charged with ensuring that their parent Departments is promptly informed of any matters which may require a response from Government.

### **The Secretariat**

The primary function of the Secretariat is to facilitate the business of the Committee. This includes supporting the Committee by arranging its meetings, assembling and analysing information, and recording conclusions. An important task is ensuring that proceedings of the Committee are properly documented and recorded. The Secretariat is also a source of advice and guidance to members on procedures and processes.

The ACMSF Secretariat is drawn from staff of the Food Standards Agency. However, it is the responsibility of the Secretariat to be an impartial and disinterested reporter and at all times to respect the Committee's independent role. The Secretariat is required to guard against introducing

bias during the preparation of papers, during meetings, or in the reporting of the Committee's deliberations.

### **Handling conflicts of interest**

The purpose of these provisions is to avoid any danger of Committee members being influenced, or appearing to be influenced, by their private interests in the exercise of their public duties. All members should declare any personal or business interest which may, or may be *perceived* (by a reasonable member of the public) to, influence their judgement. A guide to the types of interest which should be declared is at Appendix 2.

#### (i) Declaration of Interests to the Secretariat

Members of the Committee should inform the Secretariat in writing of their current **personal** and **non-personal** interests (or those of close family members\* and of people living in the same household), when they are appointed, including the principal position(s) held. Only the name of the company and the nature of the interest are required; the amount of any salary etc need not be disclosed. Members are asked to inform the Secretariat at any time of any change of their **personal** interests and will be invited to complete a declaration form once a year. It is sufficient if changes in **non-personal** interests are reported in the annual declaration form following the change. (Non-personal interests involving less than £1,000 from a particular company in the previous year need not be declared to the Secretariat).

The register of interests should be kept up-to-date and be open to the public.

#### (ii) Declaration of Interests and Participation at Meetings

Members of the Committee are required to declare any direct commercial interests, or those of close family members,\* and of people living in the same household, in matters under discussion at each meeting. Members should not participate in the discussion or determination of matters in which they have an interest, and should normally withdraw from the meeting (even if held in public) if:-

- their interest is direct and pecuniary; or
- their interest is covered in specific guidance issued by the ACMSF or the Agency which requires them not to participate in, and/or to withdraw from, the meeting.

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\* Close family members include personal partners, parents, children, brothers, sisters and the personal partners of any of these.



### **Personal liability of Committee members**

A Committee member may be personally liable if he or she makes a fraudulent or negligent statement which results in a loss to a third party; or may commit a breach of confidence under common law or a criminal offence under insider dealing legislation, if he or she misuses information gained through their position. However, the Government has indicated that individual members who have acted honestly, reasonably, in good faith and without negligence will not have to meet out of their own personal resources any personal civil liability which is incurred in execution or purported execution of their Committee functions.

## Appendix 1

### THE SEVEN PRINCIPLES OF PUBLIC LIFE

#### **Selflessness**

Holders of public office should take decisions solely in terms of the public interest. They should not do so in order to gain financial or other material benefits for themselves, their family, or their friends.

#### **Integrity**

Holders of public office should not place themselves under any financial or other obligation to outside individuals or organisations that might influence them in the performance of their official duties.

#### **Objectivity**

In carrying out public business, including making public appointments, awarding contracts, or recommending individuals for rewards and benefits, holders of public office should make choices on merit.

#### **Accountability**

Holders of public office are accountable for their decisions and actions to the public and must submit themselves to whatever scrutiny is appropriate to their office.

#### **Openness**

Holders of public office should be as open as possible about all the decisions and actions that they take. They should give reasons for their decisions and restrict information only when the wider public interest clearly demands.

#### **Honesty**

Holders of public office have a duty to declare any private interests relating to their public duties and to take steps to resolve any conflicts arising in a way that protects the public interests.

#### **Leadership**

Holders of public office should promote and support these principles by leadership and example.

## Appendix 2

### DIFFERENT TYPES OF INTEREST

The following is intended as a guide to the kinds of interest which should be declared. Where members are uncertain as to whether an interest should be declared, they should seek guidance from the Secretariat or, where it may concern a particular product which is to be considered at a meeting, from the Chair at that meeting. **If members have interests not specified in these notes, but which they believe could be regarded as influencing their advice, they should declare them.** However, neither the members nor the Secretariat are under any obligation to search out links of which they might *reasonably* not be aware - for example, either through not being aware of all the interests of family members, or of not being aware of links between one company and another.

#### Personal Interests

A personal interest involves the member personally. The main examples are:

- **Consultancies:** any consultancy, directorship, position in or work for the industry, which attracts regular or occasional payments in cash or kind;
- **Fee-Paid Work:** any work commissioned by industry for which the member is paid in cash or kind;
- **Shareholdings:** any shareholding or other beneficial interest in shares of industry. This does not include shareholdings through unit trusts or similar arrangements where the member has no influence on financial management;
- **Membership or Affiliation** to clubs or organisations with interests relevant to the work of the Committee.

#### Non-Personal Interests

A non-personal interest involves payment which benefits a department for which a member is responsible, but is not received by the member personally. The main examples are:

- **Fellowships:** the holding of a fellowship endowed by the industry;
- **Support by Industry:** any payment, other support or sponsorship by industry which does not convey any pecuniary or material benefit to a member personally, but which does benefit their position or department e.g.
  - (i) a grant from a company for the running of a unit or department for which a member is responsible;

(ii) a grant or fellowship or other payment to sponsor a post or a member of staff in the unit for which a member is responsible (this does not include financial assistance to students);

(iii) the commissioning of research or other work by, or advice from, staff who work in a unit for which a member is responsible.

Members are under no obligation to seek out knowledge of work done for, or on behalf of, industry by departments for which they are responsible if they would not normally expect to be informed. Where members are responsible for organisations which receive funds from a large number of companies involved in that industry, the Secretariat can agree with them a summary of non-personal interests rather than draw up a long list of companies.

- **Trusteeships:** any investment in industry held by a charity for which a member is a trustee.

Where a member is a trustee of a charity with investments in industry, the Secretariat can agree with the member a general declaration to cover this interest rather than draw up a detailed portfolio.

## DEFINITIONS

For the purpose of the Advisory Committee on the Microbiological Safety of Food, 'industry' means:

- Companies, partnerships or individuals who are involved with the production, manufacture, packaging, sale, advertising, or supply of food or food processes, subject to the Food Safety Act 1990;
- Trade associations representing companies involved with such products;
- Companies, partnerships or individuals who are directly concerned with research, development or marketing of a food product which is being considered by the Committee

In this Code, 'the Secretariat' means the Secretariat of the Advisory Committee on the Microbiological Safety of Food.

## GOOD PRACTICE GUIDELINES FOR THE INDEPENDENT SCIENTIFIC ADVISORY COMMITTEES

### PREAMBLE

*Guidelines 2000: Scientific Advice and Policy Making*<sup>9</sup> set out the basic principles which government departments should follow in assembling and using scientific advice, thus:

- think ahead, identifying the issues where scientific advice is needed at an early stage;
- get a wide range of advice from the best sources, particularly where there is scientific uncertainty; and
- publish the scientific advice they receive and all the relevant papers.

The *Code of Practice for Scientific Advisory Committees*<sup>10</sup> (revised in December 2007) provided more detailed guidance specifically focused on the operation of scientific advisory committees (SACs). The Agency subsequently commissioned a *Report on the Review of Scientific Committees*<sup>11</sup> to ensure that the operation of its various advisory committees was consistent with the remit and values of the Agency, as well as the Code of Practice.

The Food Standards Agency's Board has adopted a **Science Checklist** (Board paper: FSA 06/02/07) to make explicit the points to be considered in the preparation of papers dealing with science-based issues which are either assembled by the Executive or which draw on advice from the Scientific Advisory Committees.

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<sup>9</sup> Guidelines on Scientific Analysis in Policy Making, OST, October 2005. Guidelines 2000: Scientific advice and policy-making. OST July 2000

<sup>10</sup> Code of Practice for Scientific Advisory Committees, OST December 2001

<sup>11</sup> Report on the Review of Scientific Committees, FSA, March 2002

The Board welcomed a proposal from the Chairs of the independent SACs to draw up Good Practice Guidelines based on, and complementing, the Science Checklist.

## THE GOOD PRACTICE GUIDELINES

These Guidelines have been developed by 9 advisory committees:

Advisory Committee on Animal Feedingstuffs<sup>12</sup>  
Advisory Committee on Microbiological Safety of Foods  
Advisory Committee on Novel Foods and Processes  
Advisory Committee on Research  
Committee on Carcinogenicity of Chemicals in Food, Consumer Products and the Environment<sup>13</sup>  
Committee on Mutagenicity of Chemicals in Food, Consumer Products and the Environment<sup>14</sup>  
Committee on Toxicity of Chemicals in Food, Consumer Products and the Environment<sup>15</sup>  
Scientific Advisory Committee on Nutrition<sup>16</sup>  
Spongiform Encephalopathy Advisory Committee<sup>17</sup>

These committees share important characteristics. They:

- are independent;
- work in an open and transparent way; and
- are concerned with risk assessment not risk management.

The Guidelines relate primarily to the risk assessment process since this is the committees' purpose. However, the Agency may wish on occasion to ask the independent scientific advisory committees whether a particular risk management option is consistent with their risk assessment.

Twenty seven principles of good practice have been developed. However, the different committees have different duties and discharge those duties in

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<sup>12</sup> FSA Secretariat

<sup>13</sup> Joint FSA/HPA Secretariat, HPA lead

<sup>14</sup> Joint FSA/HPA Secretariat, HPA lead

<sup>15</sup> Joint FSA/HPA, FSA lead

<sup>16</sup> Joint FSA/DH Secretariat

<sup>17</sup> Joint Defra/FSA/DH Secretariat

different ways. Therefore, not all of the principles set out below will be applicable to all of the committees, all of the time.

This list of principles will be reconsidered by each committee annually as part of the preparation of its Annual report, and will be attached as an Annex to it.

## Principles

### **Defining the issue**

1. The FSA will ensure that the issue to be addressed is clearly defined and takes account of stakeholder expectations. The committee Chair will refer back to the Agency if discussion suggests that a re-definition is necessary.

### **Seeking input**

2. The Secretariat will ensure that stakeholders are consulted at appropriate points in the committee's considerations and, wherever possible, SAC discussions should be held in public.
3. The scope of literature searches made on behalf of the committee will be clearly set out.
4. Steps will be taken to ensure that all available and relevant scientific evidence is rigorously considered by the committee, including consulting external/additional scientific experts who may know of relevant unpublished or pre-publication data.
5. Data from stakeholders will be considered and weighted according to quality by the committee.
6. Consideration by the secretariat and the Chair will be given to whether expertise in other disciplines will be needed.
7. Consideration will be given by the Secretariat or by the committee to whether other scientific advisory committees need to be consulted.



## **Validation**

8. Study design, methods of measurement and the way that analysis of data has been carried out will be assessed by the committee.
9. If qualitative data have been used, they will be assessed by the committee in accordance with the principles of good practice, e.g. set out in guidance from the Government's Chief Social Researcher<sup>18</sup>.
10. Formal statistical analyses will be included wherever possible. To support this, each committee will have access to advice on quantitative analysis and modelling as needed.
11. When considering what evidence needs to be collected for assessment, the following points will be considered:
  - the potential for the need for different data for different parts of the UK or the relevance to the UK situation for any data originating outside the UK; and
  - whether stakeholders can provide unpublished data.
12. The list of references will make it clear which references have either not been subject to peer review or where evaluation by the committee itself has conducted the peer review.

## **Uncertainty**

13. When reporting outcomes, committees will make explicit the level and type of uncertainty (both limitations on the quality of the available data and lack of knowledge) associated with their advice.
14. Any assumptions made by the committee will be clearly spelled out, and, in reviews, previous assumptions will be challenged.

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<sup>18</sup> There is of guidance issued under the auspices of the Government's Social Research Unit and the Chief Social Researcher's Office (Quality in Qualitative Evaluation: A Framework for assessing research evidence. August 2003. [www.strategy.gov.uk/downloads/su/qual/downloads/qqe-rep.pdf](http://www.strategy.gov.uk/downloads/su/qual/downloads/qqe-rep.pdf) and The Magenta Book. [www.gsr.gov.uk/professional\\_guidance/magenta\\_book/guidance.asp](http://www.gsr.gov.uk/professional_guidance/magenta_book/guidance.asp)).

15. Data gaps will be identified and their impact on uncertainty assessed by the committee.

16. An indication will be given by the committee about whether the database is changing or static.

### **Drawing conclusions**

17. The committee will be broad-minded, acknowledging where conflicting views exist and considering whether alternative hypotheses fit the same evidence.

18. Where both risks and benefits have been considered, the committee will address each with the same rigour.

19. Committee decisions will include an explanation of where differences of opinion have arisen during discussions, specifically where there are unresolved issues and why conclusions have been reached.

20. The committee's interpretation of results, recommended actions or advice will be consistent with the quantitative and/or qualitative evidence and the degree of uncertainty associated with it.

21. Committees will make recommendations about general issues that may have relevance for other committees.

### **Communicating committees' conclusions**

22. Conclusions will be expressed by the committee in clear, simple terms and use the minimum caveats consistent with accuracy.

23. It will be made clear by the committee where assessments have been based on the work of other bodies and where the committee has started afresh, and there will be a clear statement of how the current conclusions compare with previous assessments.

24. The conclusions will be supported by a statement about their robustness and the extent to which judgement has had to be used.
25. As standard practice, the committee secretariat will publish a full set of references (including the data used as the basis for risk assessment and other committee opinions) at as early a stage as possible to support openness and transparency of decision-making. Where this is not possible, reasons will be clearly set out, explained and a commitment made to future publication wherever possible.
26. The amount of material withheld by the committee or FSA as being confidential will be kept to a minimum. Where it is not possible to release material, the reasons will be clearly set out, explained and a commitment made to future publication wherever possible.
27. Where proposals or papers being considered by the Board rest on scientific evidence, the Chair of the relevant scientific advisory committee (or a nominated expert member) will be invited to the table at Open Board meetings to provide this assurance and to answer Members' questions on the science. To maintain appropriate separation of risk assessment and risk management processes, the role of the Chairs will be limited to providing an independent view on how their committee's advice has been reflected in the relevant policy proposals. The Chairs may also, where appropriate, be invited to provide factual briefing to Board members about particular issues within their committees' remits, in advance of discussion at open Board meetings.

## Glossary of Terms

*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.

*Clostridium perfringens*:

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.

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

*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.

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

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

VTEC: Vero cytotoxin-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 on the Microbiological Safety of Food

APHA: Animal and Plant Health Agency

AMR: Antimicrobial Resistance

COC: Committee on Carcinogenicity

COM: Committee on Mutagenicity

Defra: Department for Environment Food and Rural Affairs

EFIG: Epidemiology of Foodborne Infections Group

EFSA: European Food Safety Authority

FOI: Freedom of Information

FSA: Food Standards Agency

LA-MRSA: Livestock-associated Meticillin Resistant *Staphylococcus aureus*

OCPA: Office of the Commissioner for Public Appointments

SSRC: Social Science Research Committee

STEC: Shiga toxin-producing *Escherichia coli*

VTEC O157: Vero cytotoxin-producing *Escherichia coli* O157

WGS: Whole genome sequencing

## References

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