MINUTES OF THE EIGHTY-EIGHTH MEETING OF THE ADVISORY COMMITTEE ON THE MICROBIOLOGICAL SAFETY OF FOOD HELD ON 30 JUNE 2016 AT 1.00 PM IN AVAITION HOUSE, 125 KINGSWAY WAY, LONDON WC2B 6NH

Present

Chair: Professor Sarah O'Brien

Members: Dr Gary Barker
Dr Roy Betts
Prof John Coia
Prof Rick Holliman
Prof Miren Iturriza-Gómara
Mr Alec Kyriakides
Prof Peter McClure
Prof David McDowell
Dr Sally Millership
Mrs Jenny Morris
Mr David Nuttall
Dr Dan Tucker
Mrs Joy Dobbs (*ex officio*)

Departmental representative: Mr Steve Wyllie (Defra)

Secretariat: Dr Paul Cook (Scientific Secretary)
Dr Manisha Upadhyay
Mr Adekunle Adeoye
Ms Sarah Butler

Presenters: Dr Muna Anjum
Mr Darren Holland
Mr Abdul Khaled
Mr Milen Georgiev
Dr Javier Guitian

Members of the public: see Annex 1.

1. Chair's introduction

1.1 The Chair welcomed Members of the Committee and observers to the 88th meeting of the ACMSF. She welcomed Dr Muna Anjum from the Animal and Plant Health Agency (APHA) who would be introducing agenda item 8, Darren Holland and Abdul Khaled, Food Standards Agency, Operational Research Unit who would be

presenting a paper under agenda item 9 and Milen Georgiev (Food Standards Agency, Veterinary Advisor) and Javier Guitian (Royal Veterinary College) who would be presenting agenda item 10.

2. Apologies for absence

2.1 Apologies for absence were received from Dr Bob Adak.

3. Declaration of interests

3.1 The following declarations of interests were made:
Prof John Coia: provided consultancy advice to Tesco. Dr Roy Betts: his employer, Campden BRI, had members who produce and distribute eggs and had undertaken work on cooking temperatures for burgers. Prof David McDowell: provided consultancy advice on several of the subjects to be discussed. Mr Alec Kyriakides: provided advice to Sainsburys, on a variety of issues, in particular on eggs.

4. Minutes of the 87th meeting

4.1 Apart from correcting the name "Barry" to "Gary" in paragraph 15.5, Members approved the minutes of the 87th meeting as an accurate record and agreed that they should be posted on the ACMSF website.

5. Matters arising

5.1 Dr Manisha Upadhyay introduced paper ACM/1218 which provided a summary of actions on matters arising from previous meetings. The following action had been taken.

5.2 The minutes of the 86th meeting had been placed on the website. Action points 6.2, 7.11 and 8.15 from the 87th meeting minutes would be considered under agenda items 6, 8 and 9 respectively.

5.3 Action 9.3 (Food safety risk of recycled manure solids (RMS) used as bedding for dairy cattle). At the January 2016 meeting it had been proposed that the Committee establish a group to evaluate the findings of the further research carried out by Quality Milk Management services (overseen by the Agricultural and Horticultural Development Board) on the food safety risk of RMS used as bedding for dairy cattle. Two members provided an update on their review of the research report. It was highlighted that from a food safety perspective, the report provided a valuable evaluation of the microbiological hazards presented by RMS compared to other bedding types. The most important means by which RMS might present a food borne hazard was via milk. The study did not find any associations between RMS use and an increased risk of milk contamination with zoonotic pathogens and mandatory pasteurization would effectively control bacterial hazards. It was noted that the report authors included a disclaimer concerning the outputs of the work,

thereby limiting the basis on which meaningful recommendations could be developed. Future studies based on longer term use of RMS may shed light on any implications for the epidemiology of pathogens of public health concern and AMR. There was therefore a need to keep a watching brief on this aspect and it was suggested that registration and self-reporting of suspected adverse events (including animal and human disease) to APHA would be advantageous. It was also considered that an important area for future research would be assessing the impact of maintaining the RMS in a closed cycle, through continuous recycling within a farm, as this may have consequences for the epidemiology of pathogens of public health importance and AMR.

5.4 The Committee accepted the recommendation from the two members that there was no need for an ACMSF subgroup to be set up to look at this issue further. It was agreed that the two members' comments on the study report be formally passed to the FSA. The Defra departmental representative confirmed that Defra's current position on RMS is to allow its use only under a set of prescribed controlled conditions. Members noted that RMS is used specifically for dairy cattle (cubicle housing bedding for dairy farms only).

Action: ACMSF's comments to be formally communicated to the FSA

5.5 Action 11.8 (Changes to plant protection product MRLs: potential impact on food safety). At the January 2016 meeting the Committee's attention was drawn to the issue of changes to maximum residue levels for quaternary ammonium compounds, chlorate and biocidal actives used as disinfectants/sanitisers. Members agreed that this was an important subject that needed further investigation with input from other Scientific Advisory Committees (Committee on Toxicity and the Expert Committee on Pesticides Residues). The Committee was informed that the FSA's Food Policy Division was reconsidering this subject and how best to involve ACMSF and other SACs on the hygiene and toxicological issues relating to these changes.

5.6 Action from the 81st meeting regarding the risk assessment of *M. bovis* was still work in progress within the FSA.

5.7 In addition to these matters arising Dr Upadhyay informed Members that the FSA had that day published guidance on listeriosis for health care and social care organisations.

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

6.1 The Chair reminded members that the draft report of the *Ad Hoc* Group had been presented at the January 2016 meeting and since then it had gone out for

public consultation. Prof John Coia, Chair of the *Ad Hoc* Group on Eggs, presented a revised version of the Group's report and a table of comments from the consultation with the *Ad Hoc* Group's responses to the points raised.

6.2 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.

6.3 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.

6.4 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.

6.5 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.

Action: Secretariat to forward approved report to the FSA Chief Scientific Adviser

6.6 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.

Action: Secretariat to publish on the FSA website the approved table to the consultation

7. Zika virus – Draft risk assessment in relation to the food chain

7.1 The Chair invited Dr Manisha Upadhyay to present paper ACM/1220: Zika virus – Draft risk assessment in relation to the food chain. 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.

7.2 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.

7.3 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.

7.4 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.

7.5 Members commented that the draft risk assessment provided a good review of the situation relating to ZIKV and the food chain.

7.6 Members 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.

7.7 It was observed that the risk assessment solely focussed on exposure through the ingestion route. It was pointed out that risk of exposure should be broadened to other routes that may be linked to food, such as handling of food or insect infestation.

7.8 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) such as unpasteurised soft cheese produced in Brazil.

7.9 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.

7.10 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 and the question of how many sets of uncertainties that are medium would the Committee allow before it is recognised that the uncertainty is bigger was raised. It was acknowledged that uncertainties are difficult to add up.

7.11 It was underlined that the risk assessment should explicitly state the uncertainty relating to ZIKV being able to establish another host and uncertainty on whether it is possible to have transmission by ingestion in humans.

7.12 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 acknowledged that outcomes from ongoing studies could rapidly change views and opinions on the impact of ZIKV.

7.13 It was highlighted that the hazard characterization section of the risk assessment should take into account risk of when adults of reproductive age get infected as the consequences of infection would vary in a naïve population compared to a population where the disease is endemic.

7.14 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 if food is heat processed does this have any effect on the overall risk because of the process the food has gone through (is the risk dependent on cooking and proper handling)?

7.15 A member that agreed with the principle of the risk assessment that the risk was negligible disagreed with the interpretation that accompanied it that cases were rare and that this subject did not merit further consideration. He argued that although cases were rare, issues relating to ZIKV merited further consideration.

7.16 The Chair summed up by reiterating some of the points made by members which include 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.

Action: Secretariat and Newly Emerging Pathogens subgroup

7.17 The Defra Departmental representative accepted the uncertainties in the risk assessment however underlined that from 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.

8. Studying the gut microbiome in food animals

8.1 Following the discussion the Committee had at its January 2016 meeting on the outcome of the workshop on the human gut microbiome members highlighted that the workshop did not cover the microbiome in food animals. The Defra departmental representative undertook to liaise with APHA with a view of getting an appropriate expert to brief the Committee on this area. The Chair invited Dr Muna Anjum to give a presentation on APHA's work on animal microbiome (studying the gut microbiome in food animals). Dr Anjum gave an overview on the gut microflora which included the following:

- The gut microflora it 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.

8.2 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.

8.3 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.

8.4 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.

9. FSA's work in relation to rare burgers

9.1 The Chair reminded members that at the January meeting they had been updated on the discussions at the FSA Board on rare burgers and noted that the Board would be discussing the topic again in July. She invited Mr Darren Holland and Mr Abdul Khaled from the FSA's Analytics Unit to present the first of 2 papers.

a) Modelling interventions (ACM/1222a)

9.2 Firstly Darren Holland presented the 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.

9.3 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 using 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:

9.4 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.

9.5 In practice there were inconsistencies in applying any intervention due to differences in abattoir procedures and handling practices by individual operators, and recontamination of the carcase once it had received the treatment(s). Concerns were expressed about treating carcases almost as a ready-to-eat food given the way *E. coli* persisted in slaughterhouses and could appear and disappear on carcases 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.

9.6 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 carcases.

9.7 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.

9.8 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 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.

9.9 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)

9.10 Dr Paul Cook presented the second paper 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^{o}C for 2 minutes or equivalent), the impact of cooking conditions, different bacterial hazards, burger formulation and reliance on core temperatures below 60^{o}C. The paper provided estimated times for core temperatures from 55-80^{o}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).

9.11 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.

9.12 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.

9.13 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**.**

10. *Toxoplasma* EU funded work

10.1 The Chair invited Milen Georgiev (FSA) and Javier Guitian (Royal Veterinary College) to present this item.

10.2 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.

10.3 Javier Guitian presented some of the findings of this EFSA project focussing on those that were particularly relevant to the UK.

10.4 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.

10.5 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.

10.6 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.

10.7 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.

10.8 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.

10.9 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.

10.10 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.

10.11 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.

10.12 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.

10.13 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.

11. Epidemiology of Foodborne Infections Group (EFIG)

11.1 The Chair invited Dr Paul Cook to present paper ACM/1224 which summarised the main items from the EFIG meeting which took place on 7 June 2016. This included trends in animal and human data for the 2015, *Clostridium perfringens*- foodborne outbreaks reported 2005 – 2015, an update on the National Control Programmes for *Salmonella* in chickens and turkeys for 2015 and updates on the *Campylobacter* retail survey and food surveillance.

11.2 Dr Cook reported that provisional data between January and December 2015, there were 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.

11.3 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%).

11.4 Other issues EFIG considered at their meeting include: *Clostridium perfringens* – foodborne outbreaks reported 2005 to 2015, the FSA's *Campylobacter* retail survey, a presentation on a research project from University of Liverpool concerning fully integrated, real-time detection, diagnosis and control of community diarrhoeal disease clusters and outbreaks, update on activities relating to antimicrobial resistance and food surveillance activities of PHE and Food Standards Scotland.

11.5 From the human data presented a member noted that the number of human Campylobacteriosis cases appears now to be dropping compared to previous presentations that had been provided to the Committee.

12. Committee subgroups

Ad Hoc Group on *Campylobacter*

12.1 Prof O'Brien informed members that the above group had their 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. Future meetings for the group are scheduled for 5 July and 29 September 2016. The group is working towards producing a draft version of their report early in 2017.

Antimicrobial Resistance Working Group

12.2 Prof McDowell updated members that the activities of the above group. Members were informed that the Working Group last met on 16 February 2016 and had a meeting scheduled for 15 July 2016. The issues they considered in February include: 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), activities relating to colistin resistance in the food chain, media story on: fluorquinolones in poultry production, LA results from MRSA in retail meats, use of Recycled Manure Solids as bedding for dairy cattle, update on the activities of the Defra Antimicrobial Resistance Coordination and the EFSA/ECDC report: Antimicrobial Resistance in zoonotic bacteria.

12.3 Prof McDowell confirmed that at the meeting planned for 15 July 2016 the issues the group will consider include: EU activities in relation to colistin, FSA Board Paper on AMR and the work of the EU RONAFA Working Group (Reduction of Need of Antimicrobials in Food Producing Animals).

Surveillance Working Group

12.4 Prof Coia updated the Committee on the group's involvement with the FSA's Campylobacter retail survey (update on survey can be found on ACM/1229). Members were informed that because the FSA had decided to suspend the retail survey during the second quarter 2016 (April to June 2016) and together with contractors from PHE evaluate an alternative sample (e.g. a carcase rinse or back-skin sample) in terms of suitability (i.e. a sample that will allow robust comparisons for the long term future), the Working Group was asked to comment on the proposal for the laboratory trial work to be carried out by PHE in the remaining quarters of the year to assess new sampling methodology. He confirmed that the group provided the FSA with detailed comments.

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

12.5 Dr Barker updated the Committee 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, SSRC, COT and GACS and is working iteratively with the FSA to develop a fit-for-purpose framework. A representative from NICE has been co-opted on to the Group.

12.5 Members were informed that the Working Group held its first workshop in March 2016 and a second workshop on 30 June.

- Discussions to date 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 will receive an update on the work at its 13 July meeting.

13. Dates of future meetings

13.1 The Chair asked members to note that the next meeting would be held on 20 October, and on 26 January, 29 June and 19 October 2017.

14. Any other business

14.1 There were no substantive items of other business but members made the following comments on information paper (ACM/1230) on vacuum and modified atmosphere packed chilled foods with respect to non-proteolytic *Clostridium botulinum.* The first was to query a statement in the guidance document that "If *C. botulinum* shows any evidence of growth in the product during the challenge test, the maximum shelf-life applied should be 10 days." It was pointed out that usually challenge tests were used to assess growth to a level that would be considered unsafe, and in the case of *C. botulinum*, to a level that was capable of producing toxin. Another comment was that on page 7 of the guidance document it implied that oxygen could be used in conjunction with other things to prevent toxin formation. It was not clear what was being referred to here as the member was not aware of other technologies that could be used for this purpose.

Action: The above comments would be passed to the FSA

15. Public Questions and Answers

15.1 The Chair invited members of the public to make any comments or ask questions about the risk assessment work of the Committee. Mr Mark Williams of the British Egg Industry Council commented in response to the discussion on eggs. He said that the extrapolation of the data on the potential risk from the number of eggs eaten per day was based on a survey from 2004, since when the industry had moved on in terms of practice, improved vaccines, and the levels of infection now found in laying flocks. He also pointed out that work done by the then PHLS had shown that even if a hen or flock is positive for *Salmonella* it doesn't mean that it will produce positive eggs.

15.2 Ms Jo Head commented on the discussion on burgers. She was concerned that the papers seemed to suggest that various slaughter hygiene practices did not

contribute very much and she felt that this could be rephrased. She also said it could be helpful to investigate minced meat production for burgers at home, including which part of the body the meat came from (e.g. hind-quarter, fore-quarter, trim) and carcase chilling.

15.3 The Chair thanked members of the public for the important points they had raised and closed the meeting.

Annex 1

Members of the public attending as observers

Alison Aitchison	Morrisons
Fiona Brookes	2 Sisters Food Group
Catherine Cockcroft	Eurofins
Amanda Cryer	British Egg Information Service
Linda Gordon	safefood
Jo Head	SGS Ashby Ltd
Marianne James	Food Standards Scotland
Peter Littleton	Klenzan Ltd
Gary McMahon	Moy Park
Rick Pendrous	Food Manufacture magazine
Karen Sims	Waitrose
Mark Williams	British Egg Industry Council
Elizabeth Williamson	Sainsburys