ACMSF Report 2021

Forward

In this guide

In this guide

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ACMSF Annual Report

Advises the Food Standards Agency on the Microbiological Safety of Food

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 Reports1-28 and in a series of subject-specific reports.

Foreword

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"

It gives me pleasure to present a report of the ACMSF's activities in 2021. This report summarises the work of the full Committee and its subgroups for calendar year 2021. Details of meeting agendas, minutes and papers presented at plenary meetings are available on ACMSF's webpage.

In 2021, the Committee established a subgroup to consider the risk posed by botulinum toxin-producing Clostridia in food. It is expected that the group will deliver its report in 2023.

As requested by the FSA, we provided advice on the following areas:

- Botulism in cattle, sheep and goats

- Framework on tackling foodborne disease
- Food and You 2 – Wave 1
- *Campylobacter* source attribution study
- ACMSF's horizon scanning output report

ACMSF was updated on the activities of the Epidemiology of Foodborne Infections Group. EFIG brings together human, food and veterinary epidemiological and microbiological information that can be investigated and discussed at UK and country level.

At the request of the FSA, ACMSF subgroups provided advice on the following areas: shortage of gaseous carbon dioxide used in packaging of food, including the impacts on microbiological safety (Clostridia in food), risk-based considerations associated with consumption of human placenta (Newly Emerging Pathogens) and survey reports in relation antimicrobial resistance (AMR) in the food chain (Surveillance and Antimicrobial Resistance). In addition, the AMR Working Group approved the FSA's risk assessments on mcr-positive E. coli containing mcr gene variants in retail chicken meat and on colistin resistant E. coli carrying the mcr-1 and mcr-3 genes in fresh retail turkey meat purchased in the UK. This group also reviewed the FSA's future surveillance of AMR in retail foods.

Looking ahead, particularly with the uncertainties in the food supply chain, we will endeavour to continue to respond promptly with advice on the food safety implications on issues referred to the Committee by the FSA.

I should like to thank members of the Committee and its subgroups (including co-opted members), without whom the ACMSF would not have operated effectively in 2021.

Professor Bill Keevil

Chair

ACMSF Report 2021

Executive Summary - 2021

In this guide

In this guide

Executive Summary

In April 2021, we agreed to establish a subgroup to consider the risk posed by botulinum toxin-producing Clostridia in food. The group is working towards delivering its report by early 2023. During the year, at the request of the FSA, the group provided advice on the significance of a shortage of gaseous carbon dioxide used in packaging of food, including the impacts on microbiological safety, and setting shelf life.

We considered the FSA's systematic literature review, together with the issue of whether the recommendations in the ACMSF reports on botulism in cattle, sheep and goats need revisiting (particularly whether the advice on voluntary restrictions to cattle, sheep and goats, and the potential risk to human health, is still supported). The literature review was signed-off and we agreed that information in the document continues to support the safety recommendations contained in the 2006 and 2009 ACMSF reports on botulism in cattle, sheep and goats.

The FSA asked us to comment on the approach it used concerning its framework to tackle foodborne disease. Following discussion, we endorsed the framework highlighting that it was an informed approach of managing microbiological hazards. We provided comments for the FSA to employ in strengthening the framework.

We received a progress report on the Committee's horizon scanning workshop held in June 2020 where we identified emerging issues around a series of specific

questions and agreed a prioritised list of recommendations that could be seen to have the greatest impact on reducing foodborne illness. We provided additional comments on the update for the FSA to consider.

We were provided with the findings of Wave 1 from the FSA's Food and You 2 Survey. We found the presentation useful and gave our support for the next wave and identified issues for the FSA to consider.

The Newly Emerging Pathogens Working Group revisited the opinion it provided to the FSA on risk-based considerations associated with consumption of human placenta. The revised opinion has provided clarification on some of the terms used in the earlier published opinion and is user-friendly for the FSA in providing advice on the issue of consumption of human placenta. The group also advised the FSA on the Agency's microbiological hazard identification process for Prohibited and Restricted goods (minced meat and meat preparations).

Other subgroups that provided expert advice to the FSA on a number of issues include the groups on Surveillance and Antimicrobial Resistance (AMR), both of which considered survey reports. The AMR Working Group considered and approved the FSA's risk assessment on mcr-positive E. coli containing mcr gene variants (which carries a gene that confers resistance to colistin, an important 'last-resort' antibiotic) in retail chicken meat and risk assessment on colistin resistant E. coli carrying the mcr-1 and mcr-3 genes in fresh retail turkey meat purchased in the UK. This group also reviewed the FSA's future surveillance of AMR in retail foods and progress made by the FSA in addressing high priority recommendations in the ACMSF AMR task and finished report.

ACMSF Report 2021

Introduction -2021

In this guide

In this guide

Introduction

1. This is the thirtieth Annual Report of the ACMSF and covers the calendar year 2021. The aim of this report is to provide a brief background to the Committees' decisions. Those seeking further information on a particular subject can obtain details from the discussion papers and minutes, available from the Committee's website or ACMSF Secretariat.

2. The various issues addressed by the Committee since its inception are detailed in this and previous Annual Reports and in a series of subject-specific reports.

3. ACMSF is committed to opening up its work to public scrutiny. The agendas, minutes, and papers (subject to rare exceptions on grounds of commercial or other sensitivity) of 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.

4. In common with other independent advisory committees, Committee members are required to follow a Code of Conduct which also gives guidance on how commercial interests should be declared. Members are required to declare any commercial interests on appointment and, again during meetings if a topic arises in which they have an interest. If a member declares a specific interest in a topic under discussion, and it is considered to be a conflict of interest, he or she may, at the Chairman's discretion be allowed to take part in the discussion but is excluded from decision-making. The Committee's Code of Conduct is available here and the Good Practice Agreement for Scientific Advisory Committees can be found on the FSA's website.

The Committee's work in 2021

In this guide

In this guide

The Committee's work in 2021

Proposed working group on botulinum toxin-producing *Clostridia* and vacuum packaging and associated processes

5. In April 2021, ACMSF considered and accepted the FSA's proposal for a subgroup to be setup to discuss the risk assessment issues that are relevant for inclusion in a review of chilled and ambient vacuum-packaged (VP) and modified-atmosphere-packaged (MAP) foods. This was in response to the publication of the ACMSF report on non-proteolytic *Clostridium botulinum* and VP/MAP foods (published in January 2020) and the discussion the Committee had in October 2020 on the report's conclusions and recommendations particularly the areas identified for review in the report.

6. A group was setup as requested and had their first meeting in June 2021. The group was named Ad Hoc Group on toxin-producing Clostridia in food. The full Committee received an update on the group's activities at the October 2021 plenary meeting. The group's agreed terms of reference are:

- Review the risk posed by botulinum toxin- producing *Clostridia* in foods stored at ≤8°C that support growth or toxin production

- A preliminary assessment of the risk posed by botulinum toxin-producing *Clostridia* in food designed to be stored at ambient temperature that support growth or toxin production

- Where appropriate consider other risk related evidence relevant to toxin-producing *Clostridia* during the lifetime of the group

7. Members welcomed the group's revised terms of reference.

8. The group was commended for the rapid advice it provided the FSA on the concern the food industry had on the issue of shortage of gaseous carbon dioxide used in packaging of food. The advice focussed on the use of CO2 atmospheres to restrict the growth of aerobic spoilage bacteria, and to slow the growth of many moulds and yeasts (and other post process contamination that causes food spoilage), in large sectors of fresh and cooked foods.

Literature review on botulism in cattle, sheep and goats: 2006 to 2021

9. The Committee at the October 2019 plenary meeting considered a systematic literature review on botulism in cattle, sheep and goats produced by the FSA's Microbiological Risk Assessment Team. Risk managers in the FSA, asked the Microbiological Risk Assessment team to revisit this topic to identify any new information since the Committee's 2006 and 2009 reports. The resulting literature reviews were presented to the committee at the October 2019 plenary meeting (ACM/1311) and their comments were reflected in a revised paper ACM/1352, which members considered at the April 2021 plenary meeting. Members made additional comments on paper (ACM/1352) and a revised paper (ACM/1367 together with its Annex[1]) was presented to the Committee at the October 2021 plenary meeting. The revised literature review (ACM/1367 Annex 1) was approved subject to a number of corrections that were highlighted.

10. Paper ACM/1367 underlined that there have been a few recent papers published on the transmission of botulism from animals to food. It was noted that ACM/1367 continues to support the safety recommendations contained in the 2006 and 2009 and ACMSF report.

[1] Available from the secretariat

Update on recommendations from the ACMSF Botulism in Cattle, Sheep and Goats reports

11. The Committee asked for this update to be provided following their consideration of the literature review on Botulism in Cattle, Sheep and Goats at the April 2021 plenary meeting. Following discussion, the committee asked the secretariat to convey the following points to the Animal and Plant Health Agency (meeting minutes para 7.9 refers):

- Recommendation 8.7 (Samples collected during clinical investigations should be archived to assist with the development of further assay systems). Members felt that Animal and Plant Health Agency's (APHA) response "samples are collected from clinical investigation as they do not get many cases in a year and the samples are only kept for a very limited time and so there is no archive of samples" was unacceptable. As the committee recommended samples to be archived, if this is not possible, there should be reasons explaining why this is not done.
- On the issue of guidance (recommendations 8.10 and 8.11 refers), it was observed that the majority of the available information is on archived websites. It was pointed out that if the FSA is taking responsibility for this subject there should be a place on the FSA website which informs stakeholders where to go if they want advice on botulism. It was felt guidance/messages on the use and disposal of poultry litter and messages to broiler farmers with respect to biosecurity (recommendations 8.10 and 8.11) should be in prominent locations on the appropriate government departments' websites for easy access for interested parties.
- Response to recommendation 8.15 was queried. This response stated that there is little evidence of other toxins causing botulism in the UK and there is a watching brief on botulism. The committee asked how the current regime that doesn't require reporting works in practice. It was felt that if an outbreak occurs it doesn't look like identification of toxin happens automatically if there's a reasonable assumption that it's caused by poultry litter, in which case how much evidence is being collected on the other types of toxin that are causing botulism? The monitoring system was flagged to be deficient in terms of not following up some of the small number of outbreaks that are reported.

Campylobacter source attribution (Oxford study)

12. Professors Noel McCarthy and Martin Maiden gave a presentation (in closed session) on the above study (Enhanced molecular surveillance of *Campylobacter* in Sentinel Sites in the UK). This FSA funded project was launched in 2015 to investigate human *Campylobacter* infections in rural and urban populations and provide a model which could link *Campylobacter* strains to principal food and animal sources, thus mapping the sources of human infection. Data was also sought to aid evaluation of the effectiveness of interventions to tackle *Campylobacter* in the food chain.

13. The principal aim of this study was to estimate the contributions of the main sources of human *Campylobacter* infection and to identify any changes in this over time. An extension to the project, in 2018, focussed on antimicrobial resistance (AMR) in study isolates and older archived isolates. The aim of this additional work was to analyse the emergence of AMR that is now present among human *Campylobacter* isolates and to describe and compare AMR in recent food animal isolates.

14. The study report is available on the FSA website.

Food Standard Agency's Foodborne Disease Policy Framework

15. The FSA's Foodborne Disease Policy Framework was presented to the committee in closed session. The committee was informed that the new foodborne disease policy framework sets out in one place all of the Foodborne Disease Control team's policy priorities and approach to foodborne disease control. Previously, a key focus of the Foodborne Disease Control team has been on *Campylobacter* which meant a lot of resource was focused on this pathogen. It was noted that the direction of the framework will be overseen by the Foodborne Disease Policy Framework steering group, which is chaired by foodborne disease policy team and comprises a wide membership across the FSA, FSS and FSA Northern Ireland.

16. The Committee was asked to comment if the approach used in the framework is an appropriate way to tackle foodborne disease and the proposed draft foodborne disease model.

17. Members discussed and commented on the framework (see paragraph 42).

Epidemiology of Foodborne Infections Group

18. The Committee received two updates on the activities of the Epidemiology of Foodborne Infections Group in 2021. EFIG met in January and June 2021.

19. The update ACMSF received in April 2021 was a summary of trends in animal and human infection, *Salmonella* National Control Programme (NCP) results from 2019 and 2020 (January – September 2020) and a summary of foodborne outbreaks in 2020. A caveat attached to the update pointed out that 2020 was an abnormal reporting year due to various aspects with respect to the Covid-19 pandemic. The Committee made a number of comments on the update which include:

- The need to revise the format used to present EFIG updates. It was felt that the report should bring out key messages/issues the committee should be providing advice on. A request was also made for a summary of the updates.
- The need to clearly understand the data in the time series covered in the report as this is a period of significant change in consumer behaviour in relation to food.

20. The Committee noted that the secretariat was working with UKHSA and APHA to respond to the specific queries that have been raised on the human and animal infections data that members are requesting for change in the way they are presented. April 2021 meeting minutes refers.

21. The update ACMSF received in October covered three areas:

- Update on the outcome of the 9 June 2021 EFIG meeting
- Response to comments made by members on EFIG reports
- UKHSA's presentation on the Use of Whole Genome Sequencing (WGS) for gastrointestinal pathogen routine surveillance and outbreak detection and investigation (the talk covered the following areas: How UKHSA delivers its role, Detecting and characterising outbreaks with WGS, WGS capabilities, Challenges and opportunities with integration of WGS into routine surveillance, Focus in future, Summary and experience to date)

22. Committee's discussion on the above is available in the meeting minutes. Paragraph 8.3 highlights the members' comments on the outcome of the June 2021 meeting (comments on the summary of trends in animal and human

infection and summary of foodborne outbreaks). At paragraph 8.5 is the committee's remarks to the response provided by EFIG secretariat on the Committee's queries on EFIG reports. Although ACMSF broadly welcomed the secretariat's response, a number of suggestions were made which include:

- The need to include simple statistical analysis of data to EFIG reports as it was highlighted that this enables interpretation of results with less difficulty.
- Having short summaries at the front of the report highlighting the points in the report that are of note to EFIG for ACMSF to see.
- Having links to the incident reports or references within the EFIG report that would lead to how issues have been tackled. The committee would then be able to follow progress on particular incidents or outbreaks.

23. Members' comments on the UKHSA's presentation on the use of WGS for gastrointestinal pathogen routine surveillance and outbreak detection and investigation are at paragraph 8.7 of the meeting minutes. The committee acknowledged that the presentation was excellent as it clearly explained the advantages of WGS, together with its limitations, and what is needed to fully exploit these techniques both within the country and at the international level. It was noted that to understand how pathogens mutate or arise in other countries will require each country to share their data.

Food and You 2 – Wave 1

24. The Committee was presented with findings from Food and You 2 waves one and two. Wave 1 of Food and You 2 fieldwork was conducted by Ipsos MORI and took place between July and October 2020. The total achieved sample size was 9,319 (5,140 in England, 2,100 in Wales and 2,079 in Northern Ireland), with a response rate of 30%. Wave 2 of Food and You 2 fieldwork was conducted by Ipsos MORI and took place between November 2020 and January 2021. The total achieved sample size was 5,900 (2,968 in England, 1,366 in Wales and 1,566 in Northern Ireland), a response rate of 28%.

25. The presentation covered the following areas: Research background, Waves 1 and 2 findings and how are the findings used.

26. Key findings on food safety covered:

- Cleanliness
- Cooking and reheating food
- Chilling and defrosting food

- Cross-contamination

27. Members noted how the survey findings are used such as helping the FSA monitor progress against the FSA strategic outcomes and support the FSA's annual and quarterly reporting, including the joint FSA and FSS report on Food Standards, informing policy decision making, and identifying key or emerging issues where further research may be required (e.g., further analysis on ethnic minorities and food insecurity) and Inform content of public awareness campaigns.

28. The committee discussed the survey findings and had comments for the FSA to consider (paragraph 9.6 of the meeting minutes refers).

29.The survey report is available on the FSA's website.

Update on Horizon Scanning Workshop

30.The Committee received a progress report in closed session at the April plenary meeting in relation to their 2020 horizon scanning workshop. The Committee made a number of recommendations and requests for information at the workshop that included an update of Covid-19 related issues, an update on post-EU transition issues, the UK-EU Trade and co-operation agreement, cleaning and disinfection and the FSA's comments on the issue of *Salmonella* Enteritidis and Lion code eggs.

31. Members appreciated the update highlighting that it was a good review that accurately captured the committee's discussion at the workshop.

ACMSF Report 2021

Papers the committee considered in 2021

In this guide

In this guide

Papers the committee considered in 2021

PAPER NUMBER	NAME OF PAPER	MEETING NUMBER	DATE OF MEETING
ACM/1350	Matters arising	98th	19 April 2021
ACM/1351	Proposed working group on botulinum toxin-producing Clostridia and vacuum packaging and associated processes	98th	19 April 2021
ACM/1352	Literature review on botulism in cattle, sheep and goats: 2006 to 2021	98th	19 April 2021

ACM/1353	Epidemiology of Foodborne Infections Group	98th	19 April 2021
ACM/1354	Dates of future meetings	98th	19 April 2021
ACM/1355	Update on horizon scanning workshop (Reserved Business)	98th	19 April 2021
ACM/1356	FS 101013 *Campylobacter* source attribution (Oxford study) (Reserved Business)	98th	19 April 2021
ACM/1357	ACMSF Work Plan	98th	19 April 2021
ACM/1358	Update from other committees	98th	19 April 2021
ACM/1359	Items of interest from the literature	98th	19 April 2021
ACM/1360	Food and You 2 – Wave 1	98th	19 April 2021
ACM/1361	Risk-based considerations associated with consumption of human placenta	98th	19 April 2021

ACM/1362	*Salmonella* contamination and its control in animal production	98th	19 April 2021
ACM/1363	Control of *Salmonella* and pathogenic *E.coli* contamination of animal feed using alternatives to formaldehyde-based treatments	98th	19 April 2021
ACM/1364	An observational and educational study package on the epidemiology and control of *Salmonella* in broiler production	98th	19 April 2021
ACM/1365	Matters arising	99th	21 October 2021
ACM/1366	Update on the activities of the subgroup on toxin-producing Clostridia in food	99th	21 October 2021
ACM/1367	Revised systematic literature review on botulism in cattle, goats and sheep	99th	21 October 2021
ACM/1368	Update on recommendations from the ACMSF Botulism in Cattle, Sheep and Goats reports	99th	21 October 2021
ACM/1369	Update on EFIG activities	99th	21 October 2021

ACM/1370	EFIG updates for ACMSF	99th	21 October 2021
ACM/1371	Food and You 2 – Wave 1	99th	21 October 2021
ACM/1372	Dates of future meetings	99th	21 October 2021
ACM/1373	Foodborne Disease Policy Framework (Reserved Business)	99th	21 October 2021
ACM/1374	ACMSF Work plan	99th	21 October 2021
ACM/1375	Update from other Committees	99th	21 October 2021
ACM/1376	Items of interest from the literature	99th	21 October 2021
ACM/1377	Salmonella in Livestock Production in GB	99th	21 October 2021

Meeting minutes in 2021

32. The full Committee met via Microsoft teams twice in 2021. Meetings in April and October (chaired by Professor Bill Keevil) were plenary meetings open to the public. Some agenda items were considered in close session. Minutes for the two meetings are available on the committee's website (April and October).

Subgroup activities in 2021

In this guide

In this guide

Subgroup activities in 2021

Newly Emerging Pathogens Working Group

33. The Chair of the above group (Prof Dan Tucker) provided updates on the activities of his group. In January 2021 the group revisited the opinion they had previously provided to the FSA on risk-based considerations associated with consumption of human placenta. Members noted that a revised summary paper has been published that clarifies some of the terms used in the earlier published opinion.

34. The Committee noted that the group commented on the FSA's microbiological hazard identification process for Prohibited and Restricted goods (minced meat and meat preparations). This request originated from the Defra market access team who commissioned the FSA to assess the risk to public health from imported chilled meat preparations (all species), chilled minced meat (bovine, porcine, ovine and caprine) and minced meat (poultry). Members' individual comments

were used to inform the FSA's risk assessment.

Antimicrobial Resistance and Surveillance Working Groups

35. Prof Bill Keevil (Chair of the AMR Working Group) reported that the above groups in 2021 were asked by the FSA to review the following survey reports:

- FSA Survey of AMR in *Campylobacter jejuni* and *Campylobacter coli* and levels of *Campylobacter* contamination in fresh whole UK-produced chilled chickens at retail sale (non-major retailers)
- FSA's Project FS102121: Year 5 and 6 (2018 to 2020) Final Report: A survey of the levels of *Campylobacter* spp. contamination and prevalence of selected antimicrobial resistance determinants in fresh whole UK-produced chilled chickens at retail sale (non-major retailers)

AMR Working Group

36. Members also noted that the AMR Working Group met on 6 October 2021. Key issues they considered include:

• Discussing the findings of two FSA projects: FS307036: Assessing the impact of heat treatment on antimicrobial genes and their potential uptake by other "live" bacteria and FS301050: Burden of AMR in RTE Foods

• Commenting on the FSA's Risk assessment for colistin resistant *E. coli* carrying the *mcr*-1 and *mcr*-3 genes in fresh retail turkey meat purchased in the UK.

• Reviewing progress made by the FSA in addressing high priority recommendations in the ACMSF AMR task and finish report.

Subgroup on regulated products

37. The Committee noted that a subgroup on regulated products was setup earlier in the year. The group (Chaired by Prof Bill Keevil) will consider risk assessment matters relating to regulated products.

Subgroup on toxin-producing Clostridia in food

38. Details of the above group’s activities (chaired by Dr Gary Barker) can be found in paragraphs 5 to 8.

FSA Social Science study on food safety behaviour in kitchens (Advisory group supporting study)

39. Mr Alec Kyriakides updated members on the activities of the above group. He reported that the FSA Social Science team is funding research on food hygiene behaviours in the kitchen through the FSA’s Advisory Committee for Social Science (ACSS). Working Group entitled the Advisory Group on Kitchen Life was established with members of the ACSS, independent experts, the research team and ACMSF (invited to provide specific microbiological advice). Members noted that Mr Kyriakides is representing ACMSF on the group.

40. The study is being led by the research firm Basis Social who, together with the University of Leeds, will analyse and explore food hygiene behaviours in 35 domestic and 35 catering kitchens across the UK. The outputs will inform behavioural interventions and risk assessment models at the FSA.

Outcomes and Impact of ACMSF advice

In this guide

9. Annexes
10. Glossary of terms -2021
11. Glossary of abbreviations

Outcomes and Impact of ACMSF advice

41. The Committee's advice in a number of areas has been used to underpin the FSA's risk management decisions, survey reports and research proposals. Areas that received ACMSF's advice include:

42. FSA's Foodborne Disease Policy Framework (paragraphs 15 to 17). The Committee was asked to comment on the approach used by the FSA in its framework to tackle foodborne disease. The Committee endorsed the framework as an informed approach of managing microbiological hazards. Comments were provided for the FSA to employ in strengthening the framework. The FSA welcomed the comprehensive discussion on the framework and the suggestion for the framework to be a live document to take on board comments that will inform actions plans and interventions.

43. FSA's systematic literature review concerning botulism in cattle, sheep, and goats 2006 to 2021 (paragraphs 9 and 10). The Committee considered this literature review together with the issue of whether the recommendations in the ACMSF reports on botulism in cattle, sheep and goats need revisiting (particularly whether the advice on voluntary restrictions to cattle, sheep and goats, and the potential risk to human health, is still supported). The literature review was considered in a number of meetings and signed off as the highlighted queries were addressed. The Committee agreed that information in the literature review continues to support the safety recommendations contained in the 2006 and 2009 ACMSF reports on botulism in cattle, sheep and goats.

44. FSA's Food and You 2 – Wave 1 (paragraphs 24 to 29). The Committee discussed and commented on this FSA's survey: Food and You 2: wave 1 findings. The FSA welcomed the comments which will be considered in the protocol for wave 2.

45. Horizon scanning (paragraphs 30 and 31). The Committee's horizon scanning workshop held in June 2020 identified emerging issues around a series of specific questions and agreed a prioritised list of recommendations that could be seen to have the greatest impact on reducing foodborne illness. As the committee received an update on progress being made on prioritised list of

recommendations, additional comments were provided for the FSA to consider.

46. The Newly Emerging Pathogens Group (paragraphs 33 and 34) revisited the opinion it provided the FSA on risk-based considerations associated with consumption of human placenta. The revised opinion provided clarification on some of the terms used in the earlier published opinion. The FSA welcomed the revised opinion which will be considered in the advice that will be produced and published by the FSA on the issue of consumption of human placenta.

47. The above group also advised the FSA on the Agency's microbiological hazard identification process for Prohibited and Restricted goods (minced meat and meat preparations). This request originated from Defra who commissioned the FSA to assess the risk to public health from imported chilled meat preparations, chilled minced meat (bovine, porcine, ovine and caprine) and minced meat (poultry).

48. At the request of the FSA, the subgroup on toxin-producing Clostridia in food produced an opinion on the issue of the significance of a shortage of gaseous carbon dioxide used in packaging of food (paragraph 9). The advice focussed on the use of CO2 atmospheres to restrict the growth of aerobic spoilage bacteria, and to slow the growth of many moulds and yeasts (and other post process contamination that causes food spoilage), in large sectors of fresh and cooked foods.

49. AMR Working Group (paragraph 36) was asked to consider and comment on the findings of two FSA projects: FS307036: Assessing the impact of heat treatment on antimicrobial genes and their potential uptake by other "live" bacteria and FS301050: Burden of AMR in ready-to-eat (RTE) foods. Comments made will be considered by the FSA. The group also:

- Considered and approved the FSA's risk assessment on mcr-positive *E. coli* in retail chicken meat and risk assessment on colistin resistant *E. coli* carrying the *mcr*-1 and *mcr*-3 genes in fresh retail turkey meat purchased in the UK. Comments made on these risk assessments were be used to strengthen the risk assessment report.
- Discussed (made suggestions) and approved the FSA's future surveillance of AMR in retail foods.
- Reviewed progress made by the FSA in addressing high priority recommendations in the ACMSF AMR task report. The group also revisited the priority recommendations that have not been taken forward, highlighting the recommendations that remain high priority (such as the recommendation relating to companion animal raw feeds as it was

highlighted that there are currently a number of reports of illness coming from companion animal's food) and identifying any other gaps that may need attention in relation to the FSA's AMR research priorities.

50. Antimicrobial Resistance and Surveillance Working Groups (paragraph 35). These groups reviewed the reports for the following studies:

- FSA Survey of AMR in *Campylobacter jejuni* and *Campylobacter coli* and levels of *Campylobacter* contamination in fresh whole UK-produced chilled chickens at retail sale (non-major retailers)
- FSA's Project FS102121: Year 5 and 6 (2018 to 2020) Final Report: A survey of the levels of *Campylobacter* spp. contamination and prevalence of selected antimicrobial resistance determinants in fresh whole UK-produced chilled chickens at retail sale (non-major retailers).

51. The group's comments were used to make appropriate revisions on the study reports before publication.

Forward Look

In this guide

Forward Look

52. The Committee will keep itself informed of developing trends in relation to foodborne disease through its close links with the FSA, FSS, UKHSA and Defra. We will continue to respond promptly with advice on the food safety implications of issues referred to the Committee by the FSA.

53. The newly set-up Ad Hoc Group on toxin-producing Clostridia in food (established in April 2021) is working on a defined timescale to produce a report by early 2023.

54. At the FSA's request, the subgroup on microbiological risk assessments in relation to food incidents will review the FSA's risk assessments if this is needed.

55. The Working Group on AMR will continue to provide advice to the FSA on issues relating to AMR and the food chain.

56. 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.

57. 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.

58. Details of the Committee's work plan for 2021/22 can be found here.

Annual Costs

The operation of the ACMSF is funded by the FSA. The total cost for members expenses and fees in 2021 was £35,050. Information on fee rates and expenses guidance are included in the ACMSF's Code of Practice.

Annexes

In this guide

In this guide

Annexes

Annex I Membership

Professor Bill Keevil, Chair

Professor of Environmental Healthcare, Head of the Microbiology Group, at the University of Southampton. Chair of the subgroups on Antimicrobial Resistance (AMR) and regulated products. Member of the incidents subgroup.

Professor Dan Tucker (Deputy Chair)

Professor in Veterinary Public Health at the Department of Veterinary Medicine, University of Cambridge. He is fellow and Director of Studies in Medicine and Veterinary Sciences, Pembroke College, Cambridge. Chair of the New Emerging Pathogens subgroup. Member of the AMR and regulated products subgroups

Dr Gary Barker

Research Scientist in Norwich. He has been actively involved in research since 1981 in the Physics Department at Sheffield University and from 1984 until 2018 at the Institute of Food Research. Chair of the subgroup on incidents, botulinum toxin-producing Clostridia in food and quaternary ammonium compounds and biocides used in food processing. Member of the Newly Emerging Pathogens subgroup.

Dr Gauri Godbole

Consultant Medical Microbiologist and Parasitologist at the National Infection Service, UK Health Security Agency. Member of the AMR, Newly Emerging Pathogens and Incidents subgroups.

Mrs Emma Hill

She is a qualified professional in commercial catering with over 20 years' experience of working, managing, and training in the industry. Currently the Global Health, Safety and Sustainability Director at Soho House and Co.

Mr Alec Kyriakides

Independent Food Safety Consultant. Former Head of Product Quality, Safety & Supplier Performance at Sainsbury's. Chair of the Surveillance subgroup. Member of the incidents, Newly Emerging Pathogens, quaternary ammonium compounds and biocides used in food processing and botulinum toxin-producing Clostridia in food subgroups.

Miss Heather Lawson

Senior Environmental Health Officer at the Royal Borough of Greenwich where her work involves food hygiene and food standards inspections involving microbiological food safety issues. Member the surveillance and quaternary ammonium compounds and biocides used in food processing subgroups.

Dr Rohini Manuel

Consultant Clinical Microbiologist at the Public Health Laboratory London, National Infection Service, UK Health Security Agency. Member of the AMR, Newly Emerging Pathogens and regulated products subgroups.

Professor Peter McClure

Microbiologist and former Microbiology Department Manager for Europe, at Mondelēz International R&D Ltd. Member of the surveillance, incidents and botulinum toxin-producing Clostridia in food subgroups.

Mrs Ann Williams

Commissioning and contracts manager at Liverpool City Council responsible for the local Healthwatch services. Member of the AMR subgroup.

Dr Wayne Anderson

Director of the Food Science and Standards Division at the Food Safety Authority of Ireland. Member of the incidents and botulinum toxin-producing Clostridia in food subgroups.

Dr Edward Fox

Senior Lecturer at Northumbria University and has previously held a Newman Fellowship at University College Dublin's Centre for Food Safety where his research examined food processing hygiene and food safety, and the role of microbial communities in influencing the colonisation of pathogenic bacteria in food processing environments. Member of the regulated products subgroup.

Dr Jane Gibbens

Consultant veterinary epidemiologist with extensive experience in providing advice to enable veterinary policy making and development, and in the design, implementation and analysis of disease surveillance and control protocols. She formerly worked for Defra and the Animal and Plant Health Agency, most recently as Head of the Bovine TB Epidemiology Assessment Centre, and Head of the Epidemiology and Risk Group. Her focus has been on bovine tuberculosis, statutory diseases exotic to the UK and scanning veterinary surveillance. Member of the surveillance subgroup.

Professor Francis Butler

Professor in the School of Biosystems and Food Engineering at University College Dublin and a Principal Investigator in the UCD Centre for Food Safety. His main research area is in food safety with a particular focus on quantitative risk assessment /modelling of microbiological hazards in foods. Member of the Newly Emerging Pathogens subgroup.

Mr Martin Briggs

Currently works for GLW Feeds Ltd. His scientific background is in applied biology. Member of the regulated products subgroup.

Dr Nicol Janecko

She is a Career-Track Group Leader at the Quadram Institute Bioscience, Norwich, UK with a research emphasis in genomic and metagenomic approaches to understanding *Campylobacter* diversity and transmission. She is an epidemiologist and microbiologist with a long-standing career focus on foodborne zoonotic pathogens and antimicrobial resistance. Member of the surveillance subgroup.

Prof Linda Scobie

Presently teaches Biomedical Science and Microbiology programmes at Glasgow Caledonian University. She leads a research group interested in viral zoonoses in the context of novel technologies.

Annex II Register of Members' Interests

In line with FSA policy and established good practice for accessing external expertise, Scientific Advisory Committee members are required to declare any personal or non-personal interests which represent a real or potential conflict in respect of general or specific aspects of work undertaken. Interests will be managed in accordance with the FSA’s policy and guidance.

If members have interests not specified in these notes, but which they believe could be regarded as influencing their advice or other work for FSA, they should declare them. However, members are not under any obligation to search out interests of which they might reasonably not be aware. For example, either through being unaware of all the interests of family members, or of not being aware of links between one company and another.

Professor Bill Keevil (Chair)

Personal:

- Direct employment: University of Southampton.
- Membership: American Academy of Microbiology, Royal Society of Biology, Royal Society of Public Health, BSI Committees.

Non-Personal:

- Various research grants from public and private sector.

Professor (AW) Dan Tucker (Deputy Chair)

Personal:

- Direct employment: University of Cambridge, Fellow and Trustee, Pembroke College, Cambridge.
- Consultancy: Genus plc, Farming Partnership, WJW Tucker and sons.
- Membership: Royal College of Veterinary Surgeons, UK Pig Veterinary Association, UK Veterinary Public Health Association, European College of Pig Health Management, American Association of Swine Veterinarians.

Non-Personal:

- Grants: Research funding to support pig clinical residency training programs (Zoetis Animal Health and Ceva Animal Health).

Dr Gary Barker

Personal:

- Direct employment: Nil (Retired research scientist).
- Membership: Nil

Non-Personal:

- Grants: Research Funding in collaboration with industrial partners.

Dr Gauri Godbole

Personal:

- Direct employment: UK Health Security Agency.
- Membership: Nil

Non-Personal:

- Grants: Research funding from part public sector.

Dr Rohini Manuel

Personal:

- Direct employment: Employee UK Health Security Agency.
- Membership: Nil

Non-personal:

- Grants: Research funding from public and private sector.

Mrs Ann Williams

Personal:

- Direct employment: Liverpool City Council.
- Membership: Nil

Non-Personal:

- Nil

Mrs Emma Hill

Personal:

- Direct employment: Soho House
- Membership: Nil

Non-personal:

- Working partnership UK Hospitality.

Mr Alec Kyriakides

Personal:

- Direct employment: Nil
- Consultancy: Independent Food Safety Consultant.
- Shareholder: J Sainsbury Plc
- Non-Executive Board Member (unremunerated): Campden BRI.
- Non-Executive Board Member (unremunerated): Institute of Food Science and Technology.
- Honorary Lecturer (unremunerated): Queen’s University Belfast.
- Independent Governance Board Member and Chair of Technical Standards Committee (remunerated): Safe to Trade Scheme.
- Membership: Institute of Food Science and Technology, International Association for Food Protection.

Non-Personal Interests

- Nil

Professor Peter McClure

Personal:

- Direct employment: Nil (former Microbiology Department Manager for Europe, at Mondelēz International R&D Ltd).
- Shareholder: Unilever
- Royalties for book chapters: Woodhead Publishing and Elsevier.
- Membership: Nil

Non-personal:

- Nil

Miss Heather Lawson

Personal:

- Direct employment: Royal Borough of Greenwich.
- Membership: Chartered Institute of Environmental Health.

Non-personal:

- Nil

Dr Wayne Anderson

Personal:

- Direct employment: Food Safety Authority Ireland (FSAI).
- Membership: International Commission on Microbiological Specifications for Food (ICMSF) and IFST.

Non-personal:

- Nil

Dr Jane Gibbens

Personal:

- Direct employment: Nil

- Consultancy: Fee paid work from organisations and consultancies seeking veterinary epidemiological advice, including membership of the Defra bovine TB Partnership.
- Membership: Royal College of Veterinary Surgeons, European College of Veterinary Public Health, Association of Government Veterinary Surgeons, British Veterinary Association.

Non-personal:

- Nil

Professor Francis Butler

Personal:

- Direct employment: University College Dublin.
- Consultancy: Fee paid work from relevant organisations and consultancies; occasional fee-paying consultancy with the Saudi Food and Drug Authority in relation to risk assessment and occasional food safety consultancy with the Irish Food Industry.
- Board member: Food Safety Authority for Ireland.
- Membership: Nil

Non-personal:

- Grants: Partial industry support for research project on dairy products safety (Dairy industry); recent (2022) grant relating to biotoxins in shellfish (Irish Ministry of Agriculture).

Dr Edward Fox

Personal:

- Direct employment: University of Northumbria
- Membership: International Association for Food Protection, Australian Society for Microbiology.

Non-personal:

- Grants: Research funding from public and private sector.

Mr Martin Briggs

Personal:

- Direct employment: GLW Feeds
- Membership: Nil

Non-personal:

- Nil

Dr Nicol Janecko

Personal:

- Direct employment: Quadram Institute, Bioscience, Norwich
- Membership: Royal Society of Biology, Microbiology Society.

Non-personal:

- Grants: Institute Strategic Program Microbes in the food chain Campylobacter objectives.

Professor Linda Scobie

Personal:

- Direct employment: Glasgow Caledonian University
- Consultancy: Axiom/Xenotherapeutics Plc, USA
- Membership: Nil

Non-personal:

- Grants: Food Standards Agency, Other research funding from public and private sectors.

Glossary of terms - 2021

In this guide

In this guide

Glossary of terms

Botulism: is caused by botulinum toxin, a poison produced by the bacterium *Clostridium botulinum*

Clostridium botulinum. The organism is common in the soil and aquatic sediments and can survive in these environments as a resistant spore.

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 characterised by severe diarrhoea and abdominal pain.

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

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.

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.

Glossary of abbreviations

In this guide

In this guide

Glossary of abbreviations

ACMSF: Advisory Committee on the Microbiological Safety of Food

APHA: Animal and Plant Health Agency

AMR: Antimicrobial Resistance

Defra: Department for Environment Food and Rural Affairs

EFIG: Epidemiology of Foodborne Infections Group

FSA: Food Standards Agency

FSS: Food Standards Scotland

MAP: Modified-atmosphere-packaged

STEC: Shiga toxin-producing Escherichia coli

UKHSA: United Kingdom Health Security Agency

VP: Vacuum-packaged

WGS: Whole genome sequencing