



JOINT FAO/WHO FOOD STANDARDS PROGRAMME

CODEX COMMITTEE ON FOOD HYGIENE

Fifty-fourth Session

Nairobi, Kenya

11 - 15 March 2024

MATTERS ARISING FROM THE WORK OF FAO AND WHO (INCLUDING JEMRA)

(Prepared by FAO and WHO)

INTRODUCTION

1. This paper describes the scientific advice as well as related information and resources that the Food and Agriculture Organization (FAO) and the World Health Organization (WHO) have developed relevant to the specific agenda items of the 54th Session of the Codex Committee on Food Hygiene (CCFH).

A) Joint FAO/WHO Expert meetings on microbiological risk assessment (JEMRA)

A.1 Control of *Salmonella* and *Campylobacter* in chicken meat (Relevant to Agenda Item 11)

2. CCFH52 requested that JEMRA collate the relevant scientific information on *Salmonella* and *Campylobacter* in chicken meat in preparation for an update of the existing *Guidelines for the Control of Campylobacter and Salmonella in Chicken Meat* (CXG 78-2011). As a result, a JEMRA meeting on pre- and post-harvest control of thermotolerant *Campylobacter* spp. in poultry meat was convened in Rome, Italy from 6 to 10 February 2023.

3. The group of subject matter experts reviewed the available data on *Campylobacter* spp. control in the broiler production chain, from primary production to post-processing, including scientific literature published since 2008 and data submitted in response to a call for data for this meeting. The Expert Committee: 1) determined the quality and quantity of evidence of control measures for *Campylobacter*, 2) evaluated the impact of measures to control *Campylobacter* in the broiler production chain, 3) determined which hazard-based interventions pertained specifically to *Campylobacter* and which were general to the control of foodborne pathogens in the pre- and post-harvest broiler production chain, and 4) reviewed and recommended revisions to the *Guidelines for the Control of Campylobacter and Salmonella in Chicken Meat* (CXG 78-2011), paragraphs 1 to 115, based on the currently available scientific evidence. The experts recommend the use of a combination of multiple interventions (multi-hurdle approach) suitable to the production and processing stages to lower *Campylobacter* contamination on chicken meat.

4. A **summary report on *Campylobacter*** was published¹ and the meeting report is in development.

5. The **full meeting report on *Salmonella*** was published².

Follow-up action by CCFH

6. CCFH54 is invited to consider the aforementioned information in determining the next steps with regard to the possible revision of the *Guidelines for the Control of Campylobacter and Salmonella in Chicken Meat* (CXG 78-2011).

¹ <https://www.fao.org/3/cc4758en/cc4758en.pdf> and <https://www.who.int/publications/m/item/joint-fao-who-expert-meeting-on-the-pre-and-post-harvest-control-of-campylobacter-spp-in-poultry-meat>

² <https://www.fao.org/documents/card/en/c/cc9026en> and <https://www.who.int/news-room/events/detail/2022/09/12/default-calendar/joint-fao-who-expert-meeting-on-the-pre-and-post-harvest-control-of-non-typhoidal-salmonella-spp.-in-poultry-meat>

A.2 Microbiological risk assessment of viruses in foods (Relevant to Agenda Item 10)

7. In response to the request by CCFH53, the JEMRA meeting on microbiological risk assessment of viruses in foods – Part 1: food attribution, analytical methods and indicators was convened in Rome, Italy from 18-22 September 2023.

8. The Expert Committee: 1) reviewed the literature and available surveillance databases, and participated in an expert knowledge elicitation, which ranked foodborne viruses according to frequency and severity; 2) ranked the relevant food commodities of highest public health concern; 3) discussed methods for virus testing performed for outbreak investigation and product testing as part of surveillance and monitoring strategies; and 4) reviewed current and potential indicators for viral contamination.

9. The Expert Committee considered commodities from a global perspective and identified commodities with the highest global public health burden commodity associated with specific viruses as follows:

Norovirus	Hepatitis A virus	Hepatitis E virus
1. Prepared food	1. Shellfish*	1. Pork
2. Frozen berries*	1. Frozen berries*	2. Wild game
2. Shellfish*	1. Prepared foods*	

*Substantial regional differences were noted.

Note: In the above table, the number “1” means ranked higher than “2”, and having the same number means ranked equally. For example, “norovirus/prepared food” is ranked higher than “norovirus/frozen berries”; while “norovirus/frozen berries” is ranked equally with “norovirus/shellfish” with substantial regional differences.

10. Despite the methodological advancements in detection, there remain challenges in their use, most notably ensuring accurate interpretation; application to other viruses and/or matrices; integration of sequencing technologies; and implementation in low resource countries. It was noted that sharing of laboratory and epidemiological data, nationally, regionally, and internationally can improve the understanding and control of foodborne viruses.

11. A variety of indicators for foodborne zoonotic viral contamination have been investigated, including bacteria, bacteriophages, and plant and animal viruses. Up to this point, the use of these indicators has been mostly studied in environmental waters and shellfish, with variable utility. Additional research is needed to determine if there is an appropriate viral indicator for use in other food commodities associated with foodborne virus infections.

12. A **summary report** of the JEMRA meeting on Microbiological risk assessment of viruses in foods was published³. The meeting report is in development. Another JEMRA meeting to review of the scientific evidence on prevention, interventions to control viruses in foods is scheduled for February 2023.

Follow-up action by CCFH

13. CCFH54 is invited to consider the aforementioned information in determining the next steps for revision of the *Guidelines on the Application of General Principles of Food Hygiene to the Control of Viruses in Food* (CXG 79-2012).

A.3 Microbiological risk assessment of *Listeria monocytogenes* in foods (Relevant to Agenda Item 12)

14. CCFH52 requested that JEMRA develop a complete production to consumption risk assessment for *Listeria monocytogenes* in foods that could inform any update of the *Guidelines on the Application of General Principles of Food Hygiene to the Control of Listeria monocytogenes in Foods* (CXG 61-2007). In response to this request, JEMRA convened two meetings, one from 22 to 28 October 2022 and one from 29 May to 2 June 2023.

15. In the first meeting, the expert group elaborated formal models for the risk assessment of *L. monocytogenes* for lettuce, cantaloupe, frozen vegetables and ready-to-eat (RTE) fish and it was concluded that these models should be programmed, tested and reviewed. They also highlighted the paragraphs in the three annexes of the *Guidelines on the Application of General Principles of Food Hygiene to the Control of Listeria monocytogenes in Foods* (CXG 61-2007) that could benefit from an update.

16. In the second meeting in 2023, by considering the outcomes of the first meeting, the expert group tested and evaluated the risk assessment models with different scenarios including factors related to climate change

³ <https://www.fao.org/3/cc8193en/cc8193en.pdf> and <https://www.who.int/publications/m/item/jemra-of-viruses-in-foods-part1-food-attribution-analytical-methods-and-indicators>

to characterize the risk of listeriosis due to the consumption of diced RTE cantaloupe, frozen vegetables, and cold-smoked RTE fish. The conclusions based on the application of the risk assessment models include:

- Diced RTE cantaloupe: The use of fit-for-purpose water in primary production was shown to reduce the risk. Poor management of wash water and environmental hygiene during processing increased the risk.
- Frozen vegetables: Poor environmental hygiene management during processing (blanching and packaging) increased the risk.
- Cold-smoked RTE fish: Increased *L. monocytogenes* levels on incoming fish increased the risk. Poor environmental hygiene practices at filleting and slicing increased the risk.

17. The expert meeting also concluded that factors related to climate change can drive increases in occurrence, growth and survival of *Listeria monocytogenes* in different stages of the food production chain as tested in the models and may considerably increase the risk of Listeriosis.

18. **Summary reports** were published^{4,5} and the meeting reports are in development.

Follow-up action by CCFH

19. CCFH54 is invited to consider the aforementioned information in determining the next steps with regard to the possible revision of the *Guidelines on the Application of General Principles of Food Hygiene to the Control of Listeria monocytogenes in Foods* (CXG 61-2007).

B) Ad hoc Joint FAO/WHO Expert Consultation on Risk Assessment of Food Allergens (Relevant to Agenda Item 13)

20. In response to the requests by CCFH and the Codex Committees on Food Labelling (CCFL) for scientific advice on food allergens and evidence related to the consumers understanding of the issue, FAO and WHO convened a series of expert meetings on the risk assessment of food allergens since 2020. More background information on the expert meetings Part 1 (priority food allergen list); Part 2 (thresholds); and Part 3, (precautionary labelling) can be found in the previous JEMRA papers for CCFH⁶.

21. The Part 4 expert meeting took place in Rome, Italy from 14 to 18 November 2022. The Expert Committee elaborated the recommendations on derivatives of food allergens and established a framework for evaluating labelling exemptions for derivatives of priority allergenic foods. A flowchart was developed and tested against allergen derivatives previously granted exemptions in various countries or regions and found to be effective for consideration of future exemption decisions.

22. The Expert Committee recommended that the process outlined in the flowchart process be used to guide any future development and evaluation of derivative exemptions. Establishment of safety based upon this weight of evidence approach is dependent upon consideration of data quality, outcome of the exposure assessment for all intended ingredient uses (specified for exemption) and review by competent authorities (as needed). When safety is established, exemption can be justified.

23. In March 2023, Part 5 of the expert meeting was convened virtually to work on the thresholds of food allergens that are not on the priority list. These food allergens include specific tree nuts (Brazil nut, macadamia nut or Queensland nut, pine nut), soy, celery, lupin, mustard, buckwheat, and oats. An overview of the available data and recommended RfDs (Reference doses) (or reasons no RfD could be derived) were given for these specific food allergens. These RfDs were derived following the guidelines described in Part 2 of the Ad hoc Joint FAO/WHO Expert Consultation for deriving an RfD for priority allergenic foods.

24. Codex organized a food allergen webinar on 23 March 2023, where FAO and WHO presented the outcomes of the Parts 1 to 4 expert meetings to facilitate a better understanding of this topic. The video can be found on the webpage of the CCFL47⁷.

⁴ <https://www.fao.org/3/cc2966en/cc2966en.pdf> and <https://www.who.int/news-room/events/detail/2022/10/24/default-calendar/joint-fao-who-expert-meeting-on-microbiological-risk-assessment-of-listeria-monocytogenes-in-foods>

⁵ <https://www.fao.org/3/cc6993en/cc6993en.pdf> and https://cdn.who.int/media/docs/default-source/food-safety/jemra/jemra-listeria-part2-meeting-summary-and-conclusion.pdf?sfvrsn=3da7cbf2_3

⁶ https://www.fao.org/fao-who-codexalimentarius/sh-proxy/en/?Ink=1&url=https%253A%252F%252Fworkspace.fao.org%252Fsites%252Fcodex%252FMeetings%252FCX-712-52%252Ffh52_03e.pdf and https://www.fao.org/fao-who-codexalimentarius/sh-proxy/en/?Ink=1&url=https%253A%252F%252Fworkspace.fao.org%252Fsites%252Fcodex%252FMeetings%252FCX-712-53%252FWorking%2Bdocuments%252Ffh53_03e.pdf

⁷ <https://www.fao.org/fao-who-codexalimentarius/meetings/detail/en/?meeting=CCFL&session=47>

25. A **summary report** of the Part 4 meeting was published⁸, while the meeting report is in development. The Part 5 meeting report was published⁹.

Follow-up action by CCFH

26. CCFH54 is invited to consider the aforementioned information in determining the next steps to update the *Code of Practice on Food Allergen Management for Food Business Operators* (CXC 80-2020) and align the work and language/terminology between different Codex Committees.

C) OTHER RELATED INFORMATION

Matters arising jointly from FAO and WHO

C.1 FAO/WHO Early warning/alert, preparedness and response to food safety incidents (Relevant to Agenda Item 13)

27. The Secretariat of the joint FAO/WHO International Food Safety Authorities Network (INFOSAN)¹⁰, continues to promote rapid exchange of information during food safety incidents, to share information on global food safety issues, promoting partnerships and assisting countries in strengthening their capacity to manage food safety emergencies.

28. In 2022 and the first semester of 2023, INFOSAN played a crucial role in facilitating the exchange of information during 298 international food safety incidents. During this timeframe, a total of 169 international food safety incidents reported through INFOSAN were associated with biological hazards, with *Salmonella* spp. and *Listeria monocytogenes* identified as the primary overall and biological hazards in INFOSAN events. Historically, international food safety incidents communicated through INFOSAN have been predominantly associated with biological hazards.

Matters arising from FAO

C.2 GHP and HACCP toolbox for Food Safety (Relevant to Agenda Item 9)

29. FAO launched a new website, entitled “GHP and HACCP Toolbox for Food Safety”¹¹ on World Food Safety Day 2023. This toolbox contains guidance on the application of the GHP and HACCP principles described in the revised edition of the Codex *General Principles of Food Hygiene* (CXC 1-1969)¹². The contents have been developed for an audience with experience in food production and processing, handling, food safety management training, and food control. Specifically, the guidance materials are intended for competent authorities, food businesses, academia, organizations providing food safety training and food management capacity development.

30. The toolbox captures the insights gained from decades of experiences from food safety capacity building programmes carried out by FAO in developing countries and was developed in collaboration with the University of Guelph, Canada¹³. The toolbox and the topical materials are designed for use on handheld devices. The web-content is available in Arabic, Chinese, English, French, Spanish and Russian; the guidance documents are available in English and translations are foreseen once first feedback has been received.

Matters arising from WHO

C.3 FER: Burden of foodborne diseases (Relevant to Agenda Item 13)

31. WHO is actively advancing the initiative to estimate the national, regional and global burden of foodborne diseases that are caused by selected hazards, and is aiming to publish the updated estimates by 2025 in terms of a number of illnesses, deaths, and disability-adjusted life years (DALYs). WHO is advised by its technical advisory group, “Foodborne Disease Burden Epidemiology Reference Group (FERG)” for 2021-2025 and held

⁸ <http://www.fao.org/3/cc3825en/cc3825en.pdf> and <https://www.who.int/publications/m/item/ad-hoc-joint-fao-who-expert-consultation-on-risk-assessment-of-food-allergens-part-4-review-and-establish-exemptions-for-the-food-allergens>

⁹ <https://www.fao.org/documents/card/en/c/cc8387en> and <https://www.who.int/publications/i/item/9789240083332>

¹⁰ <https://www.who.int/groups/fao-who-international-food-safety-authorities-network-infosan/about>

¹¹ <https://www.fao.org/good-hygiene-practices-haccp-toolbox/en>

¹² <https://doi.org/10.4060/cc6125en>

¹³ <https://www.uoguelph.ca/foodscience/>

three meetings in the period from November 2022 to December 2023^{14,15,16}. The 7th expert meeting is planned in Abu Dhabi, United Arab Emirates on 5-7 February 2024.

32. A list of hazards, for which burden of foodborne disease estimates will be generated for reporting in 2025, has been agreed by the FERG and WHO¹⁷. The list includes 14 diarrhoeal disease agents, 8 non-diarrhoeal disease agents, 11 parasitic agents, and 8 chemicals and toxins.

33. For the purpose of attributing the source to foodborne transmission to specific foods as part of the required estimation process, a global structured expert judgement study is actively being prepared for the second time to update the previous results^{18,19}. Delft University of Technology, Delft, Netherlands was commissioned to lead the work after being selected through the open bidding process²⁰, and to date, over 100 experts and 30 elicitors have been recruited through open calls^{21,22}. The actual elicitation process is planned for the first quarter in 2024.

34. A call²³ for data on foodborne outbreak investigations for source attribution on foodborne pathogens was advertised in November 2023 to collect national outbreak data derived from public health surveillance required to determine the relative role of different putative sources in foodborne infections.

35. In order to facilitate the country consultation process according to the WHO data principles²⁴, a special page has been established to mutually communicate with WHO Member States. Officially nominated national focal points for respective Member States have been granted an access to the membership-only Country Portal page dedicated to the burden estimates of foodborne diseases. They will receive various technical documents, input data, preliminary estimates for their review, and the final estimates prior to the publication. WHO will also request data inputs when possible, via the Portal.

36. In addition to estimating the public health burden of foodborne diseases, the World Bank and WHO agreed to jointly estimate the economic burden of foodborne diseases, building upon the previous work published in 2019²⁵. A call for experts²⁶ on health valuation was advertised in December 2023 in order to gather the required expertise for the work, and the expert meeting to determine the estimation methodology is being planned for this year.

C.4 World Health Assembly Resolution and the Update of WHO Global Strategy for Food Safety (Relevant to Agenda Items 5, 11 and 13)

37. The WHO Global Strategy for Food Safety 2022-2030 was adopted by the WHO World Health Assembly 75 (WHA75) in May 2022 (Resolution WHA 75(22))²⁷. It updates the previous strategy in order to address current and emerging challenges, incorporate new technologies, and include innovative approaches for strengthening national food safety systems. This request was made by Member States in recognition that food safety remains a public health priority with a critical role in the achievement of the 2030 Agenda for Sustainable Development.

38. In developing this strategy WHO has had the support from the Technical Advisory Group on Food Safety: Safer Food for Better Health, consulted widely with scientific experts, with WHO Regional Advisors for food safety, international partners such as FAO and WOAHA, Member States and also held a public consultation. Existing regional food safety frameworks and food safety strategies were also considered, as well as the recommendations and guidelines of the Codex Alimentarius and the FAO Strategic Priorities for Food Safety.

¹⁴ <https://www.who.int/news-room/events/detail/2022/11/15/default-calendar/fourth-meeting-of-the-who-foodborne-disease-burden-epidemiology-reference-group-2021-2024>

¹⁵ [https://www.who.int/news-room/events/detail/2023/06/15/default-calendar/fifth-meeting-of-the-who-foodborne-disease-burden-epidemiology-reference-group-\(ferg\)-2021-2025](https://www.who.int/news-room/events/detail/2023/06/15/default-calendar/fifth-meeting-of-the-who-foodborne-disease-burden-epidemiology-reference-group-(ferg)-2021-2025)

¹⁶ [https://www.who.int/news-room/events/detail/2023/12/05/default-calendar/sixth-meeting-of-the-who-foodborne-disease-burden-epidemiology-reference-group-\(ferg\)-2021-2025](https://www.who.int/news-room/events/detail/2023/12/05/default-calendar/sixth-meeting-of-the-who-foodborne-disease-burden-epidemiology-reference-group-(ferg)-2021-2025)

¹⁷ https://cdn.who.int/media/docs/default-source/foodborne-diseases/ferg/ferg-6th-meeting-presentation-2023.pdf?sfvrsn=165dbd0_3

¹⁸ <https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0145839>

¹⁹ <https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0183641>

²⁰ https://cdn.who.int/media/docs/default-source/foodborne-diseases/ferg/ferg-satf-001-tor.pdf?sfvrsn=3ade1f0f_3

²¹ <https://www.who.int/news-room/articles-detail/call-for-experts-on-source-attribution-of-foodborne-disease-hazards>

²² <https://extranet.who.int/dataformv3/index.php/782137?lang=en>

²³ <https://www.who.int/news-room/articles-detail/call-for-data-on-foodborne-outbreak-investigations-for-source-attribution-on-foodborne-pathogens>

²⁴ <https://www.who.int/data/principles>

²⁵ <https://openknowledge.worldbank.org/entities/publication/83a34062-c6c8-5edf-857c-62a643c16bb8>

²⁶ <https://www.who.int/news-room/articles-detail/call-for-experts-on-health-valuation>

²⁷ [https://apps.who.int/gb/ebwha/pdf_files/WHA75/A75\(22\)-en.pdf](https://apps.who.int/gb/ebwha/pdf_files/WHA75/A75(22)-en.pdf)

39. The WHO Global Strategy for Food Safety has been developed to guide and support Member States in their efforts to prioritize, plan, implement, monitor and regularly evaluate actions towards the reduction of the burden of foodborne diseases by continuously strengthening food safety systems and promoting global cooperation.

40. The WHO strategy proposed 3 indicators. The outcome indicator, for impact measurement, is the Foodborne diarrhoeal disease incidence estimated per 100 000 – attributable fraction of diarrhoea due to food contamination. This indicator is calculated taking into consideration the cases due to five pathogens: *Campylobacter* spp., Enteropathogenic *E. coli* - EPEC, Enterotoxigenic *E. coli* - ETEC, Shiga toxin-producing *E. coli* - STEC, and Non-typhoidal *Salmonella enterica*. The health outcome indicator on foodborne diarrhoeal disease incidence estimated per 100 000 was set with a global target to reduce 40% in the global average by 2030. The specific methods for calculation and implementation are currently under development.

41. WHO also proposed capacity indicators to monitor the progress of the implementation of the Global Strategy for Food Safety by Member States. The two progress indicators come from i) the Joint External Evaluation (JEE) for the food safety capacity (Surveillance of foodborne diseases and contamination) and ii) from the IHR State Party Self-Assessment Annual Report (SPAR) (Multisectoral collaboration mechanism for food safety events). The implementation of the strategy is aligned with priorities and workplans of WHO Regional Offices. Global targets were also established for 2030 for both indicators as a global average score of 3.4 for the JEE indicator and 100% countries worth at least 80% capacity for the SPAR indicator.

42. WHO is preparing a roadmap and technical papers to support Member States in the implementation of the Strategy, WHO Regional Offices are working with their Member States to assess food control systems and prepare national roadmaps and workplans to guide the implementation of the strategy.

C.5 World Health Assembly Decision on Traditional Food Markets (Relevant to Agenda Item 8)

43. The WHA75, in May 2022²⁸, requested the WHO Director-General to update the interim guidance on reducing public health risks associated with the sale of live wild animals of mammalian species in traditional food markets in order to answer questions on the scope of the guidance, including the species that the guidance covers (mammalian species or mammalian species plus other species) and farmed or wild live animals.

44. Member States are requested to develop plans to support country implementation of the interim guidance on reducing public health risks associated with the sale of live wild animals of mammalian species in traditional food markets – infection prevention and control.

45. WHA75 requested WHO to report on progress made in updating the interim guidance on reducing public health risks associated with the sale of live wild animals of mammalian species in traditional food markets – infection prevention and control and the country support plans every two years until 2030.

46. WHO selected 19 experts on the topics related to food markets to form the Guidelines Development Group that is supporting the update of the document. The first meeting was held on November 2023 and discussed the scope and the topics for the systematic reviews to support the recommendations.

C.6 Developing tools for microbiological risk assessment (Relevant to Agenda Items 11 and 12)

47. Following the two JEMRA meetings on *Salmonella* and *Campylobacter* control measures in poultry meat as described in the above sections, WHO will work to develop tools for microbiological risk assessment by updating and combining the risk assessment models that were developed in 2011 (the web-based risk management tool for the control of *Salmonella* and *Campylobacter* in chicken meat²⁹) for these two pathogens. Quantitative farm to table risk assessment modelling tools that can be applicable to risk management settings in the different countries' contexts will be developed. The tools should be populated with national or regional data and include emerging factors such as antimicrobial resistance and those related to climate change from One Health perspective approach.

48. Following the JEMRA meetings on *Listeria monocytogenes*, the agreed quantitative risk assessment models for diced Ready-To-Eat (RTE) cantaloupe, frozen vegetables and RTE fish are being incorporated into a web-based risk management tool. The tools and related materials will be delivered mid-2024 and promotion activities are planned to introduce and initiate potential users to these tools.

D) PUBLICATIONS

49. All the publications in the Microbiological Risk Assessment (MRA) Series and Food Safety and Quality (FSQ) Series are available on the FAO (<https://www.fao.org/food-safety/resources/publications/en/>) and WHO

²⁸ [https://apps.who.int/gb/ebwha/pdf_files/WHA75/A75\(23\)-en.pdf](https://apps.who.int/gb/ebwha/pdf_files/WHA75/A75(23)-en.pdf)

²⁹ <https://tools.fstools.org/poultryRMTTool/>

([https://www.who.int/groups/joint-fao-who-expert-meetings-on-microbiological-risk-assessment-\(jemra\)](https://www.who.int/groups/joint-fao-who-expert-meetings-on-microbiological-risk-assessment-(jemra))) websites.

Recent publications:

Full reports

- Risk assessment of food allergens, part 1: Review and validation of Codex Alimentarius priority allergen list through risk assessment: meeting report. Food Safety and Quality Series No 14. Available at: <https://www.fao.org/3/cb9070en/cb9070en.pdf> and <https://www.who.int/publications/i/item/9789240042391>
- Risk assessment of food allergens, part 2: Review and establish threshold levels in foods for the priority allergens: meeting report. Food Safety and Quality Series No 15. Available at: <https://www.fao.org/documents/card/en/c/cc2946en> and <https://www.who.int/publications/i/item/9789240065420>
- Risk assessment of food allergens, part 3: Review and establish precautionary labelling in foods of the priority allergens: meeting report. Food Safety and Quality Series No 16. Available at: <http://www.fao.org/documents/card/en/c/cc6081en> and <https://www.who.int/publications/i/item/9789240072510>
- Risk assessment of food allergens, part 5: Review and establish threshold levels for specific tree nuts (Brazil nut, macadamia nut or Queensland nut, pine nut), soy, celery, lupin, mustard, buckwheat and oats: meeting report. Food Safety and Quality Series No 23. Available at: <http://www.fao.org/documents/card/en/c/cc8387en> and <https://www.who.int/publications/i/item/9789240083332>
- Safety and quality of water use and reuse in the production and processing of dairy products: meeting report. Microbiological Risk Assessment Series No. 40. Available at: <https://www.fao.org/documents/card/en/c/cc4081en> and <https://www.who.int/publications/i/item/9789240066588>
- Safety and quality of water used in the production and processing of fish and fishery products: meeting report. Microbiological Risk Assessment Series No. 41. Available at: <https://www.fao.org/documents/card/en/c/cc4356en> and <https://www.who.int/publications/i/item/9789240066281>
- Prevention and control of microbiological hazards in fresh fruits and vegetables - Part 1 & 2: General principle: meeting Report. Microbiological Risk Assessment Series No 42. Available at: <https://www.fao.org/documents/card/en/c/cc8490en> and <https://www.who.int/publications/i/item/9789240082083>
- Prevention and control of microbiological hazards in fresh fruits and vegetables - Part 3: Sprouts: meeting Report. Microbiological Risk Assessment Series No 43. Available at: <https://www.fao.org/documents/card/en/c/cc3810en> and <https://www.who.int/publications/i/item/9789240067677>
- Prevention and control of microbiological hazards in fresh fruits and vegetables - Part 4: Specific Commodity: meeting report. Microbiological Risk Assessment Series No 44. Available at: <https://www.fao.org/documents/card/en/c/cc7460en> and <https://www.who.int/publications/i/item/9789240077959>
- Measures for the control of *Salmonella* spp. in poultry meat: meeting report. Microbiological Risk Assessment Series No 45. Available at: <https://www.fao.org/documents/card/en/c/cc9026en> and <https://iris.who.int/handle/10665/375710>

Summary reports

- The summary report of JEMRA meeting on the pre- and post-harvest control of *Campylobacter* spp. in poultry meat. Available at: <https://www.fao.org/3/cc4758en/cc4758en.pdf> and <https://www.who.int/publications/m/item/joint-fao-who-expert-meeting-on-the-pre-and-post-harvest-control-of-campylobacter-spp-in-poultry-meat>
- The summary report of JEMRA meeting on Microbiological Risk Assessment of *Listeria monocytogenes* in foods. Available at: <https://www.fao.org/3/cc2966en/cc2966en.pdf> and <https://www.who.int/publications/m/item/jemra-of-listeria-monocytogenes-in-foods>
- The summary report of JEMRA meeting on Microbiological Risk Assessment of *Listeria monocytogenes* in foods. Part 2: Risk Assessment Models. Available at:

<https://www.fao.org/3/cc6993en/cc6993en.pdf> and <https://www.who.int/publications/m/item/jemra-of-listeria-monocytogenes-in-foods-part-2-risk-assessment-models>

- The summary report of JEMRA meeting on microbiological risk assessment of viruses in foods. Part 1: food attribution, analytical methods, and indicators. Available at: <https://www.fao.org/3/cc8193en/cc8193en.pdf> and <https://www.who.int/publications/m/item/jemra-of-viruses-in-foods-part1-food-attribution-analytical-methods-and-indicators>
- The summary report of Ad hoc Joint FAO/WHO Expert Consultation on Risk Assessment of Food Allergens Part 4: Review and establish exemptions for the food allergens. Available at: <https://www.fao.org/3/cc3825en/cc3825en.pdf> and <https://www.who.int/publications/m/item/ad-hoc-joint-fao-who-expert-consultation-on-risk-assessment-of-food-allergens-part-4-review-and-establish-exemptions-for-the-food-allergens>

Forthcoming publications include:

- Measures for the control of *Campylobacter* spp. in poultry meat: meeting report. Microbiological Risk Assessment Series No 46.
- Risk assessment of *Listeria monocytogenes* in foods: Part 1: Formal models: meeting report. Microbiological Risk Assessment Series No 47.
- Risk assessment of *Listeria monocytogenes* in foods: Part 2: Risk Assessment: meeting report. Microbiological Risk Assessment Series No 48.
- Microbiological risk assessment of viruses in foods. Part 1: Food attribution, analytical methods and indicators: meeting report. Microbiological Risk Assessment Series No 49.
- Risk assessment of food allergens, Part 4: Establishing exemptions from mandatory declaration for priority food allergens: meeting report. Food Safety and Quality Series No 17.