

CODEX ALIMENTARIUS COMMISSION



Food and Agriculture
Organization of the
United Nations



World Health
Organization

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CL 2021/32/OCS-AMR

April 2021

TO: Codex Contact Points
Contact Points of international organizations having observer status with Codex

FROM: Secretariat, Codex Alimentarius Commission,
Joint FAO/WHO Food Standards Programme

SUBJECT: Request for comments at Step 6 on the revised *Code of practice to minimize and contain foodborne antimicrobial resistance (CXC 61-2005)*

DEADLINE: 25 May 2021

BACKGROUND

1. For background information, please refer to paragraph 4 of this Circular Letter (CL).

REQUEST FOR COMMENTS

2. Codex members and observers are invited to submit comments at Step 6 on the revised *Code of practice to minimize and contain foodborne antimicrobial resistance (COP)* as presented in Appendix II to this CL.
3. In particular, Codex members and observers are invited to provide general and specific comments to facilitate the consideration of the COP during the virtual meeting of the Working Group on the COP as follows:
 - 3.1 General comments on
 - a. the overall content of the COP and points necessary for discussion by TFAMR08 (October 2021) with a view to final adoption of the text by CAC44 (November 2021)
 - b. overarching comments to facilitate consensus on the major areas covered by the COP as well as indicating any important concepts that may be missing.
 - 3.2 Specific comments on particular points of the document that need refinement for accuracy and/or to improve coherence of the text.
4. In submitting comments, Codex Members and Observers are invited to consider the following:
 - The discussions held and agreements reached at different sessions of the Ad Hoc Intergovernmental Task Force on Antimicrobial Resistance (TFAMR) on the different sections of the COP, in particular the last session of TFAMR (REP20/AMR, paragraphs 13 - 127)¹
 - The recommendations made by the 79th Session of the Executive Committee during the Critical Review (REP20/EXEC2, paragraphs 42-43)²
 - The discussions held and decisions taken at the 43rd Session of the Codex Alimentarius Commission (REP20/CAC, paragraphs 96 – 113)³
 - The information already contained in the *Guidelines for Risk Analysis of Foodborne AMR (CXG 77-2011)*⁴
 - The recommendations of the Electronic Working Group on the use of the term “therapeutic use” in the COP (Appendix I to this CL)⁵
 - The information provided during the webinar on the COP⁶.
5. CL 2021/32-AMR, Appendix II is uploaded to the Codex Online Commenting System (OCS): <https://ocs.codexalimentarius.org/>, as per the guidance below.

¹ <http://www.fao.org/fao-who-codexalimentarius/committees/committee/related-meetings/en/?committee=TFAMR>

² <http://www.fao.org/fao-who-codexalimentarius/committees/executive-committee/meetings/pt/>

³ <http://www.fao.org/fao-who-codexalimentarius/committees/cac/meetings/en/>

⁴ <http://www.fao.org/fao-who-codexalimentarius/committees/committee/related-standards/en/?committee=TFAMR>

⁵ <http://www.fao.org/fao-who-codexalimentarius/committees/committee/related-circular-letters/en/?committee=TFAMR>

⁶ <http://www.fao.org/fao-who-codexalimentarius/meetings/detail/en/?meeting=TFAMR&session=8>

GUIDANCE ON THE PROVISION OF COMMENTS

6. Comments should be submitted through the Codex Contact Points of Codex members and observers using the OCS.
7. Contact Points of Codex members and observers may login to the OCS and access the document open for comments by selecting “Enter” in the “My reviews” page, available after login to the system.
8. Contact Points of Codex Member and Observer organizations are requested to provide proposed changes and relevant comments/justifications on a specific paragraph (under the categories: editorial, substantive, technical and translation) and/or at the document level (general comments or summary comments). Additional guidance on the OCS comment categories and types can be found in the OCS [Frequently Asked Questions \(FAQs\)](#).
9. Other OCS resources, including the user manual and short guide, can be found at the following link: <http://www.fao.org/fao-who-codexalimentarius/resources/circular-letters/en/>.
10. For questions on the OCS, please contact Codex-OCS@fao.org.

APPENDIX I

**Report of the Electronic Working Group on the
Revision of the Recommended *Code of Practice to Minimize and Contain Antimicrobial Resistance*
(CXC 61-2005)
(Fourth Revision, COP4)
(For information)**

Introduction

1. The 7th Session of the Ad Hoc Intergovernmental Task Force on Antimicrobial Resistance (TFAMR07, 2019) agreed to establish an electronic Working Group (EWG) chaired by the United States of America and co-chaired by China, Chile, Kenya, and the United Kingdom, working in English only, and open to all Members to address the outstanding issues in square brackets and report back to the next session of TFAMR08 (originally 2020, now planned for 2021).
2. TFAMR07 further agreed to forward the proposed draft revision of the *Code of Practice to Contain and Minimize Foodborne Antimicrobial Resistance* (CXC 61-2005) to CAC43 for adoption at Step 5. These conclusions can be found in the report of the meeting (REP20/AMR) at paragraph 126.
3. The 43rd session of the Codex Alimentarius Commission (CAC43, 2020) adopted at Step 5 the Revision of *the Code of Practice to Minimize and Contain Foodborne Antimicrobial Resistance* (CXC 61-2005). These conclusions can be found in the report of the meeting (REP20/CAC) at paragraph 113.
4. The EWG conducted two rounds of discussion on the outstanding issues in square brackets. The first round was completed in May 2020 and the second round was completed in February 2021. Both rounds of discussions included all text in square brackets.
5. Based on comments received in Round 1 and in Round 2, a draft revised text was prepared by the EWG Co-Chairs and is available in Appendix II.
6. In Round 1, the EWG received comments from a total of 22 participants--18 Codex Members, 1 Codex Member Organization, and 3 Observers. In Round 2, the EWG received comments from a total of 12 participants--10 Codex Members, 1 Codex Member Organization, and 1 Observer.
7. In summary, the EWG which initiated its work in February 2020 and concluded in March 2021, received a total of 34 sets of comments from 20 Codex Members, 1 Codex Member Organization, and 4 Observers.
8. When reviewing the comments, the EWG Co-Chairs gave consideration to comments from Codex Members (Argentina, Australia, Brazil, Canada, Chile, China, Columbia, France, Japan, Republic of Korea, Netherlands, New Zealand, Norway, Poland, Singapore, Sweden, Switzerland, Thailand, United States of America, Uruguay) and Member Organizations (European Union), followed by Observers, as appropriate in Codex. A complete list of Members and Observers is attached as Appendix III.
9. Following is a summary of comments and main points of discussion during the two rounds of the EWG.

Summary of comments by Codex Members and Observers and main points of discussion in the EWG on selected sections (text in square brackets) of the revision of the *Code of Practice to Minimize and Contain Foodborne Antimicrobial Resistance* (CXC 61-2005)

3. Definitions

[Therapeutic use: Administration or application of antimicrobial agents for the treatment, control/metaphylaxis or prevention/prophylaxis of disease.]

10. A majority of Members and Observers overall supported the retention of a definition of therapeutic use. The rationale for retaining the definition included: the terms therapeutic and therapy are used in several places throughout the document; the definition draws a distinction between those uses that are intended to address disease in animals and plants/crops and uses that are not intended to address disease (i.e. production uses, growth promotion, weight gain, feed efficiency); aligns with the definition of “veterinary medical use” in animals as adopted by the OIE; is consistent with national legislation in some countries; aligns with the common approach adopted by G7 Chief Veterinary Officers in 2017; supports the clinical and scientific judgement of veterinarians and plant/crop health professionals when using medically important antimicrobials; and maintains a One Health definition in line with the approach of the Code of Practice.

11. Some Members supported deletion of the definition providing a rationale which included: therapeutic use should not include prevention of disease/prophylaxis; definitions for treatment of disease, control of disease/metaphylaxis, and prevention of disease/prophylaxis have already been agreed in the document and the definition is not needed; the definition only occurs a few times in the document and could be replaced with other terms in paragraph 54; potential inconsistency with how the term “therapeutic” is used with respect to humans; and inconsistent with a phrase in FAO’s Action Plan on Antimicrobial Resistance 2016-2020.
12. The EWG Co-Chairs noted the majority of support to retain the definition. The EWG Co-Chairs further noted the desire by Codex Members and Observers to draw a clear distinction between uses of antimicrobials for disease as opposed for production purposes. Alignment with the World Organisation for Animal Health (OIE) standards and maintaining a One Health definition were also noted as important components of the rationale to retain the definition.
13. The EWG Co-Chairs noted the position of some Members that prevention of disease/prophylaxis should not be included within therapeutic use. However, this position does not align with veterinary medical use in OIE which was carefully pointed out by a Member to include treatment, control, and prevention of disease. As a compromise, the EWG Co-Chairs contemplated a Member’s alternative approach to replace the definition of therapeutic use with the OIE’s definition of veterinary medical use. The EWG Co-Chairs discussed that in doing so, one definition in the Code of Practice would now be sector-specific (i.e. animals). In favor of the approach, the EWG Co-Chairs noted that some paragraphs in the Code of Practice are sector-specific (e.g. para 52 (food-producing animals) and para 53 (plants/crops)). Against the approach, the EWG Co-Chairs noted that having a sector-specific definition could undermine the aim of the TFAMR to take a One Health Approach in the Code of Practice to the greatest extent possible and that OIE has appropriately addressed the issue for the animal sector.
14. The EWG Co-Chairs discussed the suggestions to harmonize with other relevant documents (i.e. OIE standards, FAO’s Action Plan on Antimicrobial Resistance 2016-2020, G7 Chief Veterinary Officers common approach). The EWG Co-Chairs felt strongly that harmonization with OIE standards, where appropriate, was essential to advancing coherence among internationally recognized texts on AMR and reinforcing the role of Codex Alimentarius with respect to global efforts to minimize and contain AMR. The EWG Co-Chairs noted that the FAO’s Action Plan on Antimicrobial Resistance 2016-2020 was not a Member State consensus document, with the FAO noting that it was “was developed by a multidisciplinary FAO team” in response to FAO Members Resolution 4/2015 at the Thirty-ninth Session of the FAO Conference¹. The EWG Co-Chairs observed the resolution does not mention “therapeutic use” and further the phrase from the Action Plan appears to be related to “extensive and smallholder livestock production systems” and perhaps should not be construed as a policy position by the Members of FAO. With respect to the G7 Veterinary Officers common approach, the EWG Co-Chairs noted the alignment between the definition in the common approach and the definition in the Code of Practice. Nevertheless, the EWG Co-Chairs noted the G7 may only reflect the views of its members--Canada, France, Germany, Italy, Japan, the United Kingdom, the United States, and the European Union.
15. The EWG Co-Chairs reflected on the frequency with which the terms “therapeutic use” or “therapy” are used in the Code of Practice as a consideration for the need to retain or delete the definition. Several Members noted that in addition to the definition, Principle 6, and Paragraph 54, these terms are used in other places (i.e., paragraphs 33, 52 and 55). Suggestions to modify these terms were made by some Members (see below under discussion of Paragraph 54).
16. Reflecting on the comment of a Member suggesting the definition of “therapeutic use” for the purpose of this document (i.e., animals, plants/crops) would not be appropriate context for its use in the definition of medically important antimicrobials, the EWG Co-Chairs discussed differences in commonly used terminology between human medicine and the animal sector. The concept of administering antimicrobials to control the spread of disease within a population is common to both. While the term metaphylaxis is used more commonly in veterinary medicine, a similar therapeutic approach would likely be described as prevention/prophylaxis in human medicine. A useful example in human medicine would be where a child/children in a classroom are diagnosed with meningococcal meningitis necessitating urgent treatment of all other in-contact children².

¹ [http://www.fao.org/policy-support/tools-and-publications/resources-details/en/c/459933/#:~:text=Increasing%20global%20Antimicrobial%20Resistance%20\(AMR,of%20our%20food%20and%20environment](http://www.fao.org/policy-support/tools-and-publications/resources-details/en/c/459933/#:~:text=Increasing%20global%20Antimicrobial%20Resistance%20(AMR,of%20our%20food%20and%20environment)

² <https://www.aafp.org/afp/2005/1115/p2049.html>

17. Based on comments from Codex Members and Observers and further discussion and reflection, the EWG Co-Chairs concluded there is a need for a definition of “therapeutic use” in the Code of Practice. Further, the EWG Co-Chairs suggest a further refinement to the current definition could be useful to clarify its use within the context of the document. The EWG Co-Chairs propose inserting “food-producing animals or plants/crops” so that the definition would read as follows:

[Therapeutic use (food-producing animals or plants/crops): Administration or application of antimicrobial agents for the treatment, control/metaphylaxis or prevention/prophylaxis of disease.]

4. General principles to minimize and contain foodborne antimicrobial resistance

Principles on the use of antimicrobials in specific circumstances

[**Principle 6:** Medically important antimicrobial agents should only be used for therapeutic purposes (treatment, control/metaphylaxis or prevention/prophylaxis of disease).]

18. A majority of Members and commenters overall supported the retention of Principle 6, as written, limiting the use of medically important antimicrobials to therapeutic purposes only. The rationale for retaining the Principle included: the need to draw a clear distinction between uses of medically important antimicrobials to address disease as opposed to production purposes (i.e. growth promotion, weight gain, feed efficiency); alignment with OIE; Principle 6 is complimented by Principles 7 and 7bis; Principle 6 compliments Principle 5 and provides clarity on when medically important antimicrobials may be used; and limiting the use of medically important antimicrobials to address disease, together with other guidance in the document, promotes global antimicrobial stewardship efforts.
19. Some Members supported deletion of Principle 6 or significant modification with a rationale that included: the principle includes prevention/prophylaxis; the principle is unnecessary as sufficient guidance is provided elsewhere; the principle could be modified to limit the use of medically important antimicrobials to only individual animals when no other antimicrobial is available and only for prophylaxis and metaphylaxis under the conditions of Principles 7 and 7bis, respectively; an additional Principle 6bis could be added to encourage the adoption of additional risk management measures to further promote the prudent use of antimicrobial agents, in particular medically important antimicrobial agents, including restrictions proportionate to risk and supported by scientific evidence.
20. The EWG Co-Chairs noted the majority of support to retain Principle 6. Providing additional guidance, clarity, and limitations on the use of medically important antimicrobials were frequently cited by Members and Observers. The EWG Co-Chairs noted the alignment of Principle 6 with OIE standards.
21. The EWG Co-Chairs noted the interconnection of the comments between the definition of “therapeutic use” and Principle 6 reflecting similar rationales.
22. With respect to a suggestion to exclude prevention of disease/prophylaxis, the EWG Co-Chairs reflected on the same points as above: does not align with veterinary medical use in OIE; FAO’s Action Plan on Antimicrobial Resistance 2016-2020 was not a Member State consensus document and the referenced phrase should not be construed as a policy position by the Members of FAO; G7 Chief Veterinary Officers common approach may only reflect the views of its members-- Canada, France, Germany, Italy, Japan, the United Kingdom, the United States, and the European Union.
23. The EWG Co-Chairs carefully considered the suggestion to modify Principle 6 to include additional limitations and restrictions on the use of medically important antimicrobials for therapeutic purposes and the suggestion to develop an additional Principle 6bis to encourage countries to adopt additional risk management measures and restrictions.
24. The EWG Co-Chairs considered the suggestion to limit the use of medically important antimicrobials to individual animals could result in divergence of Codex texts with OIE standards. The EWG Co-Chairs reflected that the provisions of Principle 7 and 7bis can stand independently and, as above, noted the suggestion would result in a sector-specific, rather than a One Health Approach. While animal health is within the remit of OIE rather than Codex, the potential impact on animal health was raised, but was not given consideration for the purpose of the EWG.
25. The EWG Co-Chairs discussed the proposal for a new Principle 6bis, during which it was noted that the potential for countries to use “additional risk management measures” with respect to prevention of disease/prophylaxis is already described in Principle 7. As drafted, the EWG Co-Chairs observed the proposed Principle 6bis could have overarching consequences with respect to guidance on other uses of medically important antimicrobials in the Code of Practice that would be better discussed in the context of the TFAMR.

26. Therefore, after discussion and further reflection, the EWG Co-Chairs recommend retaining Principle 6, as written, taking note of the suggested refinement to the definition of “therapeutic use” above.

5. Responsible and prudent use of antimicrobial agents

5.4 Responsibilities of Veterinarians³ and Plant/Crop Health Professionals

54. Determination of the choice of an antimicrobial agent should be based on:
(first two bullets are omitted here)
- If the label conditions allow for flexibility, the veterinarian or plant/crop health professional should consider a [therapeutic] regimen that is long enough to allow an effective treatment, but is short enough to limit the selection of resistance in foodborne and/or commensal microorganisms.
27. A majority of Members and commenters overall supported the retention of the term “therapeutic” in this paragraph. The rationale for retaining the term included: reinforces the overall approach to limiting the use of medically important antimicrobials to address disease; the term “therapeutic” is widely used in the animal sector and retaining its use here and throughout the document provides helpful guidance to veterinarians and plant/crop health professionals; consistent with use of terminology in paragraphs 33, 52 and 55 in addition to Principle 6; reinforces the approach with respect to off-label use described in para 55.
28. While the majority of Members and Observers indicated concurrence with or no objections to the term “therapeutic” in para 54, there were a number of suggestions for replacement terms including: “dosing”, “administration/application”, “treatment”, “dosage” or simply deleting the term. In addition, a Member and an Observer provided further suggestions to improve the wording in para 54.
29. The EWG Co-Chairs reflected on the Terms of Reference for the EWG COP and observed the mandate to be limited to the text in square brackets. Replacement terms were considered, including simply deleting the term. Because the majority of Members indicated concurrence or no objections, because the term is used and adopted elsewhere in the document, and taking note of their recommendation to retain the definition, the EWG Co-Chairs recommend retaining the term in paragraph 54.

Acknowledgements

30. The EWG Chair and Co-Chairs appreciate the participation of and thoughtful comments by Codex Members and Observers in the two rounds of discussion in the EWG.

Conclusion

31. Reflecting on the conclusion of what we believe may be the final EWG for the Code of Practice, we are gratified that all the hard work, negotiation and compromise on the text of the document has resulted in a host of significant advancements in the area of risk management to minimize and contain antimicrobial resistance in Codex Alimentarius. We sincerely thank everyone once more for your dedication and devotion to this work to advance public health.

Recommendations

32. The EWG recommends that the virtual meeting of the Working Group on the Guidelines established by TFAMR07 consider the following:
- To make a refinement of the definition of “therapeutic use” as described on paragraph 17 of this report with the aim to have greater clarity on the guidance provided in Principle 6 and in places where this term is used throughout the Code of Practice.
 - With respect to Principle 6 and paragraph 54, to retain these as written for the reasons discussed above.

³ Under some circumstances, this may refer to a suitably trained person authorized in accordance with national legislation, for example an Aquatic Animal Health Professional.

**REVISION OF THE
CODE OF PRACTICE TO MINIMIZE AND CONTAIN FOODBORNE ANTIMICROBIAL RESISTANCE
(CXC 61-2005)
(For comments at Step 6)**

1. Introduction

1. Antimicrobial resistance (AMR) poses an important, complex, and priority global public health challenge. Along the food chain, there is a need to address the risks associated with development, selection and dissemination of foodborne resistant microorganisms and resistance determinants. Responsible and prudent use of antimicrobial agents in all sectors following a One Health Approach and strategies for best management practices in animal production (terrestrial and aquatic), plant/crop production and food/feed processing, packaging, storage, transport, and wholesale and retail distribution should form a key part of multi-sectoral national action plans to address risks of foodborne AMR.

2. This Code of Practice addresses the responsible and prudent use of antimicrobial agents by participants in the food chain, including, but not limited to, the role of competent authorities, the pharmaceutical industry, veterinarians, and plant/crop health professionals, and food producers and processors. It provides guidance on measures and practices at primary production, and during processing, storage, transport, wholesale and retail distribution of food to prevent, minimize and contain foodborne antimicrobial resistance in the food supply. It also identifies knowledge gaps and provides guidance on communication strategies to consumers.

3. In keeping with the Codex mandate this Code of Practice addresses antimicrobial use along the food chain. It is recognized that the use of antimicrobial agents along the food chain may result in exposure to antimicrobial resistant bacteria or their determinants in the food production environment. As part of a One Health approach to minimize and contain antimicrobial resistance, only authorized products should be used and best practices in the food production sector should be followed to minimize the occurrence/persistence in the food production environment of antimicrobials and their metabolites from food production related activities, and to minimize the risks associated with the selection and dissemination of resistant microorganisms and resistance determinants in the food production environment.

4. This Code of Practice is an integral part of risk analysis focusing on risk management options and should be read in conjunction with other Codex texts including the Guidelines on Integrated Monitoring and Surveillance of Foodborne Antimicrobial Resistance and the *Guidelines for Risk Analysis of Foodborne Antimicrobial Resistance* (CXG 77-2011). In addition, the *Code of Hygienic Practice for Fresh Fruits and Vegetables* (CXC 53-2003), the *Code of Practice on Good Animal Feeding* (CXC 54-2004), and the *Guidelines for the Design and Implementation of National Regulatory Food Safety Assurance Program associated with the Use of Veterinary Drugs in Food Producing Animals* (CXG 71-2009) are particularly relevant for use of agricultural chemicals on plants/crops, animal feed, and veterinary drugs, respectively.

5. This Code of Practice provides risk management advice, including the responsible and prudent use of antimicrobial agents that can be applied proportionately to the risks identified through the risk analysis process described in the *Guidelines for Risk Analysis of Foodborne Antimicrobial Resistance*. Risk managers are responsible for prioritizing and assessing foodborne AMR risks appropriate to the country and determining how best to reduce risk and protect public health.

6. The *Principles and Guidelines for the Conduct of Microbiological Risk Management* (CXG 63-2007) contains guidance for developing and implementing risk management measures. Setting priorities and identifying risk management measures should take into account the following:

- *WHO Guidance on Integrated Surveillance of Antimicrobial Resistance in Foodborne Bacteria, application of a One Health Approach*;
- *WHO List of Critically Important Antimicrobials for Human Medicine*, specifically the Annex with the complete list of antimicrobials for human use, categorized as critically important, highly important and important;
- Relevant chapters of the *OIE Terrestrial and Aquatic Animal Health Codes* and the *OIE List of Antimicrobial Agents of Veterinary Importance*; and
- National lists of important antimicrobials for humans and animals where they exist.

7. Where available, national and local guidelines to prevent, minimize and contain foodborne AMR should be taken into consideration. Best management practices and guidelines on the responsible and prudent use of antimicrobials developed by governmental and professional organizations should also be considered.

8. This document is designed to provide a framework, for the development of measures to mitigate the risk of foodborne AMR that countries may implement, as part of their national strategy on AMR, in accordance with their capabilities, based on their national priorities and capacities, and within a reasonable period of time. A progressive implementation may be used by some countries to properly apply elements in this document proportionate to the foodborne AMR risk and should not be used to generate unjustified barriers to trade.

2. Scope

9. This Code of Practice provides risk management guidance to address the risk to human health of the development and transmission of antimicrobial resistant microorganisms or resistance determinants through food. It provides risk-based guidance on relevant measures and practices along the food chain to minimize and contain the development and spread of foodborne antimicrobial resistance, including guidance on the responsible and prudent use of antimicrobial agents in animal production (terrestrial and aquatic) plant/crop production, and references other best management practices, as appropriate.

10. This document includes guidance for all interested parties involved in the authorization, manufacture, sale and supply, prescription and use of antimicrobial agents in the food chain together with those involved in the handling, preparation, food processing, storage, transport, wholesale and retail distribution and consumption of food who have a role to play in ensuring the responsible and prudent use of antimicrobial agents and/or who have a role with limiting the development and spread of foodborne antimicrobial resistant microorganisms and resistance determinants.

11. Most of the recommendations in this Code of Practice focus on antibacterials, however some recommendations may also be applicable to antiviral, antiparasitic, antiprotozoal, and antifungal agents, where there is scientific evidence of foodborne AMR risk to human health.

12. As there are existing Codex or internationally recognized guidelines, the following areas related to antimicrobial agents or AMR are outside the scope of this document: residues of antimicrobial agents in food; AMR marker genes in recombinant-DNA plants/crops¹ and recombinant DNA microorganisms²; non-genetically modified microorganisms (for example, starter cultures) intentionally added to food with a technological purpose; certain food ingredients, which could potentially carry antimicrobial resistance determinants, such as probiotics³; and biocides. In addition, AMR from non-food animals, non-food plants/crops, or non-food routes are also outside the scope of this document.

3. Definitions

The relevant definitions presented in the Codex Procedural Manual, *Guidelines for Risk Analysis of Foodborne Antimicrobial Resistance*, *General Principles of Food Hygiene* (CXC 1-1969), *Principles and Guidelines for the Conduct of Microbiological Risk Assessment* (CXG 30-1999) and *Guidelines on Integrated Monitoring and Surveillance of Foodborne Antimicrobial Resistance* are applicable to this document.

The following definitions are included to establish a common understanding of the terms used in this document:

Antibacterial: A substance that acts against bacteria.

Antimicrobial agent: Any substance of natural, semi-synthetic, or synthetic origin that at *in vivo* concentrations kills or inhibits the growth of microorganisms by interacting with a specific target.

Antimicrobial resistance (AMR): The ability of a microorganism to multiply or persist in the presence of an increased level of an antimicrobial agent relative to the susceptible counterpart of the same species.

Antimicrobial resistance determinant: The genetic element(s) encoding for the ability of microorganisms to withstand the effects of an antimicrobial agent. They are located either chromosomally or extra-chromosomally and may be associated with mobile genetic elements such as plasmids, integrons or transposons, thereby enabling horizontal transmission from resistant to susceptible strains.

Control of disease/metaphylaxis: Administration or application of antimicrobial agents to a group of plants/crops or animals containing sick and healthy individuals (presumed to be infected), to minimize or resolve clinical signs and to prevent further spread of the disease.

¹ The food safety assessment on the use of antimicrobial resistance marker genes in recombinant-DNA plants is addressed in the *Guidelines for the Conduct of Food Safety Assessment of Foods derived from Recombinant-DNA Plants* (CXG 45-2003).

² The food safety assessment on the use of antimicrobial resistance marker genes in recombinant-DNA microorganisms is addressed in the *Guideline for the Conduct of Food Safety Assessment of Foods produced using Recombinant-DNA Microorganisms* (CXG 46-2003).

³ The food safety assessment on the use of probiotics in foods is addressed in the Report of the *Joint FAO/WHO Working Group on drafting Guidelines for the Evaluation of Probiotics in Foods* (FAO/WHO, 2002).

Extra- or off-label use: The use of an antimicrobial agent that is not in accordance with the approved product labelling.

Food chain: Production to consumption continuum including, primary production (food-producing animals, plants/crops, feed), harvest/slaughter, packing, processing, storage, transport, and distribution to the point of consumption.

Food-producing animals: Animals raised for the purpose of providing food to humans.

Food production environment: The immediate vicinity of the food chain where there is relevant evidence that it could contribute to foodborne AMR.

Growth promotion: Administration of antimicrobial agents to only increase the rate of weight gain and/or the efficiency of feed utilization in animals. The term does not apply to the use of antimicrobials for the specific purpose of treating, controlling, or preventing infectious diseases.

Marketing authorization: Process of reviewing and assessing a dossier to support an antimicrobial agent to determine whether to permit its marketing (also called licensing, registration, approval, etc.), finalized by granting of a document also called marketing authorization (equivalent: product license).

Medically important antimicrobials: Antimicrobial agents important for therapeutic use in humans, taking into account the *WHO List of Critically Important Antimicrobials for Human Medicine*, including the classes described in the Annex of the “*List of Medically Important Antimicrobials, categorized as Critically Important, Highly Important, and Important*”, or equivalent criteria established in a national list, where available. It does not include ionophores or other agents determined not to be a foodborne AMR risk consistent with the *Guidelines for Risk Analysis of Foodborne Antimicrobial Resistance*.

One Health Approach: A collaborative, multisectoral, and trans-disciplinary approach working with the goal of achieving optimal health outcomes recognizing the interconnection between humans, animals, plants/crops, and their shared environment.

Pharmacovigilance: The collection and analysis of data on how products perform in the field after authorization and any interventions to ensure that they continue to be safe and effective. These data can include information on adverse effects to humans, animals, plants or the environment; or lack of efficacy.

Plants/crops: A plant or crop that is cultivated or harvested as food or feed.

Plant/crop health professional: An individual with professional or technical training, knowledge and experience in plant/crop health and protection practices.

Prevention of disease/prophylaxis: Administration or application of antimicrobial agents to an individual or a group of plants/crops or animals at risk of acquiring a specific infection or in a specific situation where infectious disease is likely to occur if the antimicrobial agent is not administered or applied.

Therapeutic use (food-producing animals or plants/crops): Administration or application of antimicrobial agents for the treatment, control/metaphylaxis or prevention/prophylaxis of disease.

~~**Therapeutic use:** Administration or application of antimicrobial agents for the treatment, control/metaphylaxis or prevention/prophylaxis of disease.~~

Treatment of disease: Administration or application of antimicrobial agents to an individual or group of plants/crops or animals showing clinical signs of infectious disease.

4. General principles to minimize and contain foodborne antimicrobial resistance

Principles on AMR Risk Management (generally)

Principle 1: A One Health Approach should be applied, wherever possible and applicable, when identifying, evaluating, selecting, and implementing foodborne AMR risk management options.

Principle 2: Considering that this document is to provide risk management guidance to address foodborne AMR risks to human health, for animal health and plant health aspects, relevant OIE and IPPC standards should be considered.

Principle 3: Foodborne AMR risk management measures should be implemented in a way that is proportionate to the risk and reviewed on a regular basis as described in the *Guidelines for Risk Analysis of Foodborne Antimicrobial Resistance*. Risk managers should consider potential unintended consequences to humans, animal, and plant health of recommended risk management measures.

Principle 4: The *WHO List of Critically Important Antimicrobials for Human Medicine*, the *OIE List of Antimicrobial Agents of Veterinary Importance*, or national lists, where available, should be considered when setting priorities for risk assessment and risk management to minimize and contain antimicrobial resistance. The lists should be regularly reviewed and updated as necessary when supported by scientific findings as new scientific data emerges on resistance patterns.

Principle 5: On a continuous and progressive implementation of risk management measures along the food chain to minimize the possible risks associated with foodborne AMR, priority should be given to the most relevant elements from a public health perspective.

Principle on preventing infections and reducing the need for antimicrobials

Principle 6: Biosecurity, appropriate nutrition, vaccination, animal and plant/crop best management practices, and other alternative tools where appropriate, and that have been proven to be efficacious and safe, should be considered to reduce the need for use of antimicrobial agents.

Principles on the responsible and prudent use of antimicrobials (generally)

Principle 7: The decision to use antimicrobial agents should be based on sound clinical judgement, experience, and treatment efficacy. Where feasible and appropriate the results of bacterial cultures and integrated resistance surveillance and monitoring should also be considered.

Principle 8: Medically important antimicrobials should be prescribed, administered, or applied only by, or under the direction of, veterinarians, plant/crop health professionals, or other suitably trained persons authorized in accordance with national legislation.

Principle 9: Antimicrobial agents should be used as legally authorized and following all applicable label directions; except where specific legal exemptions apply.

Principle 10: The choice of which antimicrobial agent to use should take into consideration relevant professional guidelines, where available, results of antimicrobial susceptibility testing of isolates from the production setting, where appropriate, and make adjustments to the antimicrobial agent selection based on clinical outcomes or when foodborne AMR risks become evident.

Principle 11: Science-based species or sector-specific responsible and prudent antimicrobial use guidelines should be developed, implemented, and reviewed on a regular basis to maintain their effectiveness in minimizing the risk of foodborne antimicrobial resistance. Such guidelines could be included as a part of national action plans or stakeholder-led plans on antimicrobial resistance with development and dissemination shared among countries and organizations.

Principles on the use of antimicrobials in specific circumstances

Principle 12: Responsible and prudent use of antimicrobial agents does not include the use for growth promotion of antimicrobial agents that are considered medically important. Antimicrobial agents that are not considered medically important should not be used for growth promotion unless potential risks to human health have been evaluated through procedures consistent with the *Guidelines for Risk Analysis of Foodborne Antimicrobial Resistance*.

Principle 13: Medically important antimicrobial agents should only be used for therapeutic purposes (treatment, control/metaphylaxis or prevention/prophylaxis of disease)

~~**Principle 6:** Medically important antimicrobial agents should only be used for therapeutic purposes (treatment, control/metaphylaxis or prevention/prophylaxis of disease).~~

Principle 14: Medically important antimicrobials should only be administered or applied for prevention/prophylaxis where professional oversight has identified well-defined and exceptional circumstances, appropriate dose and duration, based on clinical and epidemiological knowledge, consistent with the label, and in line with national legislation. Countries could use additional risk management measures for medically important antimicrobials considered highest priority critically important as described in the *WHO List of Critically Important Antimicrobials for Human Medicine*, the *OIE List of Antimicrobial Agents of Veterinary Importance*, or national lists, where available, including restrictions proportionate to risk and supported by scientific evidence.

Principle 15: When used for the control of disease/metaphylaxis, medically important antimicrobial agents should only be used on the basis of epidemiological and clinical knowledge and a diagnosis of a specific disease and follow appropriate professional oversight, dose, and duration.

Principle on surveillance of antimicrobial resistance and use

Principle 16: Monitoring and surveillance of the use of antimicrobial agents and the incidence or prevalence, and in particular trends, of foodborne antimicrobial resistant microorganisms and resistance determinants are among the critical factors to consider when developing risk management measures and evaluating the effectiveness of implemented risk management measures. Use of antimicrobial agents in humans, food-producing animals, and plants/crops and transmission of pathogens and resistance genes between humans, food-producing animals, plants/crops, and the environment are additional factors to consider, through the foodborne AMR risk analysis process described in the *Guidelines for Risk Analysis of Foodborne Antimicrobial Resistance*.

5. Responsible and prudent use of antimicrobial agents

13. The *OIE Terrestrial and Aquatic Animal Health Codes* and the *OIE List of Antimicrobial Agents of Veterinary Importance* contain detailed information with respect to the control of veterinary medicines for use in food-producing animals and aquaculture.

14. For more information on the data requirements for authorization of antimicrobial agents for food-producing animals see relevant national guidelines or internationally harmonized guidelines.

5.1 Responsibilities of the competent authorities

15. The competent authorities, including the authority responsible for granting the marketing authorization for antimicrobials for use along the food chain, have a significant role in specifying the terms of the authorization and in providing appropriate information to the veterinarian and plant/crop health professionals, or other suitably trained persons authorized in accordance with national legislation and producers through product labelling and/or by other means, in support of the responsible and prudent use of antimicrobial agents along the food chain. It is the responsibility of competent authorities to develop up-to-date guidelines on data requirements for evaluation of antimicrobial agent applications, as well as ensuring that antimicrobial agents used in the food chain are used in accordance with national legislation.

16. National governments in cooperation with animal, plant/crop, and public health professionals should adopt a One Health Approach to promote the responsible and prudent use of antimicrobial agents along the food chain as an element of a national strategy to minimize and contain antimicrobial resistance. Good animal production (terrestrial and aquatic) and best management practices for plant/crop production, vaccination and biosecurity policies and development of animal and plant/crop health programs at the farm level contribute to reduce the prevalence of animal and plant/crop disease requiring antimicrobial administration and can be incorporated into national strategies to complement activities in human health.

17. National action plans may include recommendations to relevant professional organisations to develop species or sector-specific guidelines.

18. In order to promote responsible and prudent use of antimicrobial agents, it is important to encourage the development, availability, and use of validated, rapid, reliable diagnostic tools, where available, to support veterinarians and plant/crop health professionals in diagnosing the disease and selecting the most appropriate antimicrobial, if any, to be administered/applied.

19. The competent authorities should determine appropriate labelling, including the conditions that will minimize the development of foodborne AMR while still maintaining efficacy and safety.

Quality control of antimicrobial agents

20. Competent authorities should ensure that quality controls are carried out in accordance with national or international guidance and in compliance with the provisions of good manufacturing practices.

Assessment of efficacy

21. Assessment of efficacy is important to assure adequate response to the administration of antimicrobial agents. As part of the marketing authorization process, the assessment should include the efficacy with optimal dosages and durations, supported by clinical trials, microbiological data (including antimicrobial susceptibility testing), pharmacokinetic (PK) data, and pharmacodynamic (PD) data.

Assessment of the potential antimicrobial agents to select for resistant microorganisms

22. The competent authorities should assess the potential of medically important antimicrobial agents used along the food chain to select for foodborne AMR taking into account the *Guidelines for Risk Analysis of Foodborne Antimicrobial Resistance*, the *WHO List of Critically Important Antimicrobials for Human Medicine*, the *OIE List of Antimicrobial Agents of Veterinary Importance*, or national lists, where available.

Assessment of the impact on the food production environment

23. In accordance with their national guidelines, competent authorities should consider results of foodborne AMR risk assessment of sources that contribute to the food production environment, e.g. reuse of waste water for irrigation, and use of manure, and other waste-based fertilizers for soil fertilization. When a foodborne AMR risk is determined through the *Guidelines for Risk Analysis of Foodborne Antimicrobial Resistance* the need for monitoring and proportionate risk management measures should be considered.

Establishment of a summary of characteristics for each antimicrobial product

24. Competent authorities should establish a Summary of Product Characteristics or similar document for each authorized antimicrobial product. The information in these documents can be utilized in labelling and as a package insert. Such information may include:

- brand/chemical/drug name
- product description
- dosage forms/strengths/application rates
- contraindications; warnings
- adverse reactions/phytotoxicity/incompatibilities
- product interactions and uses in specific populations for each authorized antimicrobial product, when available
- withdrawal periods
- application intervals
- duration of treatment
- indications for use
- storage conditions

Monitoring and surveillance programs

25. Competent authorities should establish systems for the monitoring and surveillance of foodborne antimicrobial resistance and antimicrobial use (AMU) following the Codex Guidelines on Integrated Monitoring and Surveillance of Foodborne Antimicrobial Resistance and OIE standards for monitoring of antimicrobial resistance and use in animals.

26. Competent authorities should have in place a pharmacovigilance program for the monitoring and reporting of suspected adverse reactions to veterinary antimicrobial agents, including lack of the expected efficacy that could be related to foodborne antimicrobial resistance. The information collected through the pharmacovigilance program can contribute to a comprehensive strategy to minimize antimicrobial resistance along the food chain.

27. In cases where the assessment of data collected from pharmacovigilance and from other post-authorization surveillance including, if available, targeted surveillance of antimicrobial resistance in veterinary or plant/crop pathogens, suggests that the conditions of use of the given antimicrobial agent marketing authorization should be reviewed, competent authorities shall endeavor to achieve this re-evaluation.

Distribution of antimicrobial products

28. Competent authorities should make sure antimicrobial products are distributed through licensed/authorized distribution systems in accordance with national legislation.

29. Competent authorities should prevent illegal medicines and unapproved formulations from entering distribution systems.

Control of advertising

30. Competent authorities should ensure that advertising and promotion of antimicrobial products is done in accordance with national legislation or policies.

31. Advertising and promotion of antimicrobial agents should be done in a manner consistent with specific regulatory recommendations for the product.

Training on foodborne antimicrobial resistance and the responsible use of antimicrobial agents

32. Training should be supported, to the extent possible, by the competent authorities on topics related to minimizing antimicrobial resistance and encouraging the responsible use of antimicrobial agents. Training may take the form of communication and outreach and should be relevant to veterinarians and plant/crop health professionals, manufacturers and marketing authorization holders, wholesale and retail distributors, food animal and plant/crop producers, and other participants along the food chain as appropriate. Training and communication may broadly address other public health-related activities.

33. Relevant information may include, but is not limited to:

- information on disease prevention and management strategies to reduce the need to use antimicrobial agents;
- relevant information to enable the veterinarians and plant/crop health professionals to use or prescribe antimicrobial agents responsibly and prudently;
- the need to adhere to responsible and prudent use principles and using antimicrobial agents in production settings in agreement with the provisions of the marketing authorizations and professional advice;
- utilizing the *WHO List of Critically Important Antimicrobials for Human Medicine*; the *OIE List of Antimicrobial Agents of Veterinary Importance*, and national lists where they exist;
- information on appropriate storage conditions for antimicrobial agents before and during use and the safe disposal of unused and out of date antimicrobials;
- understanding relevant risk analysis of antimicrobial agent products and how to use that information;
- national action plans, if available, and international strategies to fight and control antimicrobial resistance;
- good antimicrobial use practices, antimicrobial prescription writing and establishment of withdrawal period;
- training in new methodologies for molecular analysis of resistance; understanding methods and results of susceptibility testing of antimicrobials and molecular analysis;
- the ability of antimicrobial agents to select for resistant microorganisms or resistance determinants that may contribute to animal, plant/crop, or human health problems;
- understanding the process of identifying, evaluating, implementing, and monitoring the effectiveness of risk management options; and
- the collection and reporting of AMR and AMU monitoring and surveillance data.

Knowledge gaps and research

34. To further elucidate the risk from foodborne AMR, the relevant authorities could encourage public and private research in the following areas and not limited to:

- improve the knowledge about the mechanisms of action, pharmacokinetics and pharmacodynamics of antimicrobial agents to optimize the therapeutic regimens and their efficacy;
- improve the knowledge about the mechanisms of transmission, selection, co-selection, emergence and dissemination of resistance determinants and resistant microorganisms along the food chain;
- develop practical models for applying the concept of risk analysis to assess the public health concern precipitated by the development of foodborne AMR;
- further develop protocols to predict, during the authorization process, the impact of the proposed use of the antimicrobial agents on the rate and extent of foodborne AMR development and spread;
- assess the primary drivers leading to use of antimicrobials at the farm, sub-national, and national levels, and the effectiveness of different interventions to change behavior and reduce the need to use antimicrobial agents in food production;
- improve the knowledge on behavior change and on cost-effective interventions to reduce the need of antimicrobial agents;
- develop safe and effective alternatives to antimicrobial agents, new antimicrobial agents, rapid diagnostics, and vaccines;
- improve knowledge on the role of the environment on the persistence of antimicrobial agents, and the emergence, transfer and persistence of foodborne antimicrobial resistance determinants and resistant microorganisms.

Collection and disposal of unused or out-of-date antimicrobial agents

35. The competent authorities should develop effective procedures for the safe collection and disposal of unused, substandard and falsified drugs, illegally marketed, or out-of-date antimicrobial agents.

5.2 Responsibilities of Manufacturers and Marketing Authorization Holders**Marketing authorization of antimicrobial agents**

36. It is the responsibility of the antimicrobial agent marketing authorization holders:

- to supply all the information requested by the national competent authority in order to establish objectively the quality, safety and efficacy of antimicrobial agents;
- to ensure the quality of this information based on the implementation of procedures, tests and trials in compliance with the provisions of good manufacturing, good laboratory and good clinical practices; and
- to utilize manufacturing standards/practices and comply with national regulations in order to minimize contamination of the food production environment.

Marketing and export of antimicrobial agents

37. Only officially licensed/authorized antimicrobial agents should be marketed, and then only through distribution systems in accordance with national legislation.

38. Only antimicrobial agents meeting the quality standards as specified in the legislation of the importing country should be exported.

39. The amount of antimicrobial agents marketed should be provided to the national competent authority when requested, and in addition, when feasible, information on estimated types of use (e.g. treatment, control, prevention), route of administration and target species.

40. Package size and the concentration and composition of antimicrobial formulations should be adapted, as far as possible, to the approved indications of use in order to avoid improper dosing, overuse, and leftovers.

Advertising

41. It is the responsibility of manufacturers and marketing authorization holders to advertise antimicrobial agents in accordance with the provisions of paragraphs 30 and 31, and not to inappropriately advertise antimicrobial agents directly to producers.

42. Manufacturers and marketing authorization holders should not provide incentives that have a financial value to prescribers or suppliers for the purpose of increasing the use or sales of medically important antimicrobials.

Training

43. It is the responsibility of the marketing authorization holders to support training on topics related to foodborne antimicrobial resistance and the responsible use of antimicrobial agents as described in paragraph 32, as appropriate.

Research

44. It is the responsibility of the marketing authorization holders to supply required data to register antimicrobial agents including data regarding the safety and efficacy of products as appropriate.

45. Research on the development of new antimicrobials, safe and effective alternatives to the use of antimicrobials, rapid diagnostics and vaccines are encouraged.

5.3 Responsibilities of wholesale and retail distributors

46. Wholesalers and retailers distributing medically important antimicrobial agents should only do so on the prescription of a veterinarian or order from a plant/crop health professional or other suitably trained person authorized in accordance with national legislation. All distributed products should be appropriately labelled.

47. Distributors should keep records of medically important antimicrobials supplied according to the national regulations and may include, for example:

- date of supply
- name of responsible veterinarian or plant/crop health professional or other suitably trained and authorized person
- name of medicinal product, formulation, strength and package size
- batch number
- quantity supplied
- expiration dates
- manufacturer name and address
- target species

48. Distributors should support training, as appropriate, on topics related to foodborne antimicrobial resistance and the responsible use of antimicrobial agents using information provided by the competent authorities, manufacturers and marketing authorization holders, veterinarians and plant/crop professionals and other relevant entities as described in paragraph 32, as appropriate.

5.4 Responsibilities of Veterinarians⁴ and Plant/Crop Health Professionals

49. Veterinarians and plant/crop health professionals should identify new or recurrent disease problems and develop strategies in conjunction with competent authority to prevent, control, or treat infectious disease at the national level. These may include, but are not limited to, biosecurity, improved production practices, proper animal nutrition and safe and effective alternatives to antimicrobial agents, including vaccination or integrated pest management practices where applicable/available.

50. Professional organizations should be encouraged to develop species or sector-specific guidelines on the responsible and prudent use of antimicrobial agents.

51. Antimicrobial agents should only be prescribed or administered when necessary, only as long as required, and in an appropriate manner:

- A prescription, order for application, or similar document for medically important antimicrobial agents should indicate the dose, the dosage intervals, route and the duration of the administration, the withdrawal period, when appropriate, and the amount of antimicrobial agent to be delivered, depending on the dosage and the characteristics of the individual or population to be treated, in accordance with national legislation. Prescriptions or orders should also indicate the owner and the location of the food-producing animals or plants/crops to which the antimicrobials are to be administered;
- All medically important-antimicrobial agents should be prescribed or applied and used according to label directions and/or the direction of a veterinarian or consultation with a plant/crop health professional, and the conditions stipulated in the national legislation;
- Protocols for monitoring use to allow for data collection or for quality assurance purposes should be considered as recommended in the Guidelines on Integrated Monitoring and Surveillance of Foodborne Antimicrobial Resistance.

52. For food-producing animals, the appropriate use of medically important antimicrobial agents in therapeutic practice is a clinical decision that should be based on the experience of the prescribing veterinarian, and epidemiological and clinical knowledge and, if available, based on adequate diagnostic procedures. When a group of food-producing animals, which may have been exposed to pathogens, they may need to be treated without recourse to a laboratory confirmed diagnosis based on antimicrobial susceptibility testing to prevent the development and spread of clinical disease.

53. For plant/crop production, the appropriate use of medically important antimicrobial agents to manage disease/pests should be based on the principles of integrated pest management (IPM), consultation with a plant/crop health professional, historical and epidemiological knowledge of the disease/pest situation, and monitoring of the current disease/pest status. Only authorized products should be used following label directions. Alternatives to medically important antimicrobials should be considered when available and their safety and effectiveness has been determined. Medically important antimicrobial agents should only be used to the extent necessary for a specific disease and follow appropriate professional oversight, dose, and duration.

⁴ Under some circumstances, this may refer to a suitably trained person authorized in accordance with national legislation, for example an Aquatic Animal Health Professional.

54. Determination of the choice of an antimicrobial agent should be based on:

- The expected efficacy of the administration based on:
 - the expertise and experience of the veterinarian, plant/crop health professional or suitably trained and authorized person;
 - the spectrum of the antimicrobial activity towards the pathogens involved;
 - the history of the production unit particularly in regard to the antimicrobial susceptibility profiles of the pathogens involved. Whenever possible, the antimicrobial susceptibility profiles should be established before the commencement of the administration. If this is not possible, it is desirable for samples to be taken before the start of the administration to allow, if necessary, for adjustment of therapy based on susceptibility testing. Should a first antimicrobial administration fail, or should the disease recur, the use of a second antimicrobial agent should ideally be based on the results of microbiological susceptibility tests derived from relevant samples;
 - the appropriate route of administration;
 - results of initial administration;
 - previous published scientific information on the treatment of the specific disease and available scientific knowledge on antimicrobial use and resistance;
 - evidence-based therapeutic guidelines, such as species or sector-specific guidelines on the responsible and prudent use of antimicrobial agents, if available;
 - the likely course of the disease.
- The need to minimize the adverse health effect from the development of antimicrobial resistance based on:
 - the choice of the activity spectrum of the antimicrobial agent. Narrow-spectrum antimicrobials should be selected whenever possible/appropriate;
 - the targeting of specific microorganism;
 - known or predictable susceptibilities using antimicrobial susceptibility testing whenever possible;
 - optimized dosing regimens;
 - the route of administration;
 - the use of fixed combinations of antimicrobial agents (i.e. only combinations contained in authorized veterinary medicinal products) which are effective against the target pathogens; and
 - the importance of the antimicrobial agents to human and veterinary medicine.
- If the label conditions allow for flexibility, the veterinarian or plant/crop health professional should consider a therapeutic regimen that is long enough to allow an effective treatment, but is short enough to limit the selection of resistance in foodborne and/or commensal microorganisms.

Off-label use

55. For food-producing animals, the off-label use of a veterinary antimicrobial agent may be permitted in appropriate circumstances and should comply with the national legislation including the use of approved or appropriate withdrawal periods. It is the veterinarian's responsibility to define the conditions of use including the therapeutic regimen, the route of administration, and the duration of the administration and the withdrawal period.

56. Human health risk related to foodborne antimicrobial resistance should be an important factor when considering the off-label use of veterinary antimicrobial agents in food-producing animals.

57. Medically important antimicrobials should not be used off-label for plants/crops, except off-label use for emerging disease control, in accordance with national legislation.

Record keeping and recording

58. For food-producing animals and plants/crops, records on antimicrobial agent prescription or application should be kept in conformity with national legislation or best management practice guidelines.

59. In particular, for investigation of antimicrobial resistance, veterinarians and plant/crop health professionals or suitably trained persons authorized in accordance with national legislation should:

- record the antimicrobial susceptibility testing results; when genomic information, when available;
- record the antimicrobial used, the dosage and the duration; investigate adverse reactions to antimicrobial agents, including lack of expected efficacy, and report it, as appropriate, to the competent authorities (through a pharmacovigilance system, if available).

60. Veterinarians and plant/crop health professionals should also periodically review farm records on the use of antimicrobial agents to ensure compliance with their directions.

61. Veterinarians and plant/crop health professionals may have a role to play assisting the competent authorities in monitoring and surveillance programs related to AMU and AMR as appropriate.

Training

62. Professional or other organizations should support the development and/or delivery of training on issues related to antimicrobial resistance and the responsible use of antimicrobial agents as described in paragraph 32, as appropriate.

5.5 Responsibilities of food animal and plant/crop producers

63. Producers are responsible for implementing health programs on their farms to prevent and manage disease outbreaks with assistance of veterinarians, plant/crop health professionals, or other suitably trained persons authorized in accordance with national legislation. All participants involved in primary production of food have an important role to play in preventing disease and reducing the need to use antimicrobial agents to minimize risk of foodborne AMR.

64. Producers of food animals and plants/crops have the following responsibilities:

- to use antimicrobial agents only when necessary, under the supervision of a veterinarian or plant/crop health professional when required, and not as a replacement for good management and farm hygiene practices, or other disease prevention methods;
- to implement a health plan in cooperation with the veterinarian, plant/crop health professional, or other suitably trained person authorized in accordance with national legislation that outlines measures to prevent disease;
- to use antimicrobial agents in the species, for the uses and at the doses on the approved labels and in accordance with the prescription, product label instructions or the advice of a veterinarian, plant/crop health professional or other suitably trained person authorized in accordance with national legislation familiar with the food-producing animals or the plant/crop production site;
- to isolate sick animals and dispose of dead or dying animals or plants/crops promptly under conditions approved by competent authorities;
- to comply with the storage conditions of antimicrobial agents according to the approved product labelling;
- to comply with the recommended withdrawal periods or pre-harvest intervals;
- to not use out-of-date antimicrobial agents and to dispose of all unused or out-of-date antimicrobial agents in accordance with the provisions on the product labels and national legislation;
- to inform the veterinarian, plant/crop health professional, or other suitably trained person authorized in accordance with national legislation in charge of the production unit of recurrent disease problems or suspected lack of efficacy of antimicrobial applications;
- to maintain or have their veterinarian, plant/crop health professional, or other suitably trained individual maintain all clinical and laboratory records of microbiological diagnosis and susceptibility testing. These data should be made available to the professional in charge of the administration in order to optimize the use of antimicrobial agents.
- to keep adequate records of all antimicrobial agents used, including, for example, the following:
 - copy of the prescription, order for application or other documentation, when available;
 - name of the antimicrobial agent/active substance and batch number;
 - name of supplier;
 - date of administration; species and number of animals or plants/crops;
 - identification of the production unit to which the antimicrobial agent was administered;
 - disease treated, prevented, or controlled;

- relevant information on animals or plants/crops treated (number, age, weight);
 - quantity/dose and duration of the antimicrobial agent administered;
 - withdrawal periods;
 - result of treatment, in consultation with the veterinarian or plant/crop health professional;
 - name of the prescribing veterinarian, plant/crop health professional or other suitably trained person authorized in accordance with national legislation.
- To ensure sound management of wastes and other materials to minimize dissemination of excreted antimicrobial agents, resistant microorganisms and resistance determinants into the environment where they may contaminate food;
 - To address on-farm biosecurity measures and take infection prevention and control measures as appropriate and as provided in the *OIE Terrestrial and Aquatic Animal Health Codes*;
 - To participate in training on issues related to antimicrobial resistance and the responsible use of antimicrobial agents as described in paragraph 32, as appropriate;
 - To assist the relevant authorities in surveillance programs related to antimicrobial use and antimicrobial resistance, as appropriate.

65. The responsible and prudent use of antimicrobial agents should be supported by continuous efforts in disease prevention to minimize infection during production. Efforts should aim to improve health, thereby reducing the need for antimicrobial agents. This can be achieved by, for example, improving hygiene, biosecurity, health management on farms, improving animal and plant/crop genetics, and implementing national or international good animal production (terrestrial and aquatic), and plant/crop production practices.

66. Disease prevention through the use of vaccines, and other measures that have been clinically proven to be safe and efficacious for supporting animal health, such as adequate nutrition can be considered and applied when appropriate and available.

67. Prevention and reduction of the incidence and severity of plant pests and diseases should be implemented by applying good agricultural practices, such as crop rotation, accurate and timely diagnosis and monitoring of diseases, use of disease resistant crop varieties, exclusionary practices that prevent introduction of pathogens into a crop, careful site selection integrated pest management strategies and biological controls when appropriate and available.

6. Practices during production, processing, storage, transport, retail and distribution of food

68. Concerted efforts of all stakeholders along the food chain are required to minimize and contain foodborne illness, including illness related to foodborne AMR. While this Code focuses on responsible and prudent use of antimicrobial agents in primary production at the farm level, the later phase of the food chain also plays an important role in preventing foodborne AMR infection and illness.

69. The food processing industry and food retailers should refer to the *Principles and Guidelines for the Conduct of Microbiological Risk Management*).

70. Food should be produced and handled in such a way as to minimize the introduction, presence and growth of microorganisms, which apart from having the potential to cause spoilage and foodborne illnesses can also disseminate foodborne AMR. Slaughterhouses and processing plants should follow good manufacturing practices and the Hazard Analysis and Critical Control Points (HACCP) principles. The *General Principles of Food Hygiene* is a useful reference in this respect.

71. Food business operators should provide training on good hygienic practices, including those for minimizing cross-contamination. The *WHO Five Keys to Safer Food* contains useful information for food handlers to minimize the transmission of foodborne illness, including resistant infections.

7. Consumer practices and communication to consumers

72. Government, food industry and other stakeholders along the food chain should inform and educate consumers on the risks of foodborne illness, including infections with resistant microorganisms and ways to minimize the risk of infection.

73. Some aspects to consider when communicating to consumers are:

- Identifying all the stakeholders and having a common message;
- Providing information that is science-based, clear, accessible, and targeted to a non-scientific audience;
- Considering local characteristics that affect how risks are perceived (e.g. religious belief, traditions).

74. Various manuals from international organizations, such as the FAO, WHO and OIE can be used as tools to assist in awareness raising for consumers on how to minimize foodborne bacteria in their food.

75. For more information on risk communication refer to *WHO Integrated Surveillance of Antimicrobial Resistance in Foodborne Bacteria, Application of a One Health Approach* and *FAO/WHO Risk Communication applied to Food Safety Handbook* and *the Guidelines for Risk Analysis of Foodborne Antimicrobial Resistance*.

APPENDIX III**LIST OF PARTICIPANTS**

Chair United States of America Donald Prater	Vice-Chairs China – Haihong Hao Chile – Constanza Vergara Kenya – Allan Azegele United Kingdom – Niloy Acharyya
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MEMBER COUNTRY / ORGANIZATION ¹	OBSERVER ORGANIZATIONS ¹
1. Argentina 2. Australia 3. Brazil 4. Canada 5. Chile 6. China 7. Columbia 8. European Union 9. France 10. Japan 11. Republic of Korea 12. Netherlands 13. New Zealand 14. Norway 15. Poland 16. Singapore 17. Sweden 18. Switzerland 19. Thailand 20. United States of America 21. Uruguay	22. Health for Animals 23. International Dairy Federation (IDF) 24. International Feed Industry Federation (IFIF) 25. World Organization for Animal Health (OIE)

¹ Please contact the focal point of the Member Country or Observer Organization for the details of the delegates. The list of Codex contact points for members and observers are available from the Codex website at:
<http://www.fao.org/fao-who-codexalimentarius/about-codex/members/en/>
<http://www.fao.org/fao-who-codexalimentarius/about-codex/observers/observers/obs-list/en/>