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Antimicrobial Resistance Working Group Report

Technical Working Document



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I. Introduction

The AMR Working Group (AMRWG) was established by WOAAH's Director General, following the adoption of Resolution No. 14, at the 87th General Session. In accordance with its Terms of Reference ([ToR](#)), the AMRWG supports:

- the implementation of WOAAH's AMR and Prudent Use of Antimicrobials strategy
- the recommendations from the 2nd WOAAH Global Conference on AMR and prudent use of antimicrobials agents in animals.

The AMRWG meets twice a year (in Q1 and Q4). Additional *ad hoc* groups and subgroups are formed when necessary to address specific issues requiring specialist knowledge; these groups meet separately to the AMRWG.

The AMRWG currently consists of the below experts:

- Dr Tomoko Ishibashi (Japan) (Chair)
- Ms Barbara Freischem (The Netherlands)
- Dr Stephen Page (Australia)
- Dr Fajer Sabah Al Saloom (Bahrain)

1. Activities of the AMRWG

Dr Tomoko Ishibashi, Chair of the AMRWG, presented an overview of the AMRWG's activities since the 2023 General Session, including the outcomes of its biannual meetings, held between [10 - 12 October 2023](#) and [27 - 29 February 2024](#).

1.1 New members

Professor Moritz van Vuuren and Dr Donald Prater have stepped down from the AMRWG in December 2023 and March 2024, respectively.

It was then agreed by the AMRWG that new AMRWG Members should strengthen the representation of the Africa and Americas regions, with two Members to be appointed for the Americas region, due to South America's large livestock and poultry populations, and their role as major exporters of live animals and animal-derived food products.

Following an open recruitment selection process during the summer of 2023, three new AMRWG members were selected and appointed by the Director General:

- Dr Arshnee Moodley (Kenya) – team leader at the CGIAR¹ AMR Hub, hosted by the International Livestock Research Institute (ILRI) in Kenya
- Dr Jalusa Deon Kich (Brazil) – researcher at the Brazilian Agricultural Research Corporation (EMBRAPA), a state-owned research corporation affiliated with the Brazilian Ministry of Agriculture
- Dr Carolee Carson (Canada) – veterinary epidemiologist surveillance manager at the Public Health Agency of Canada

WOAH's Council was informed about the outcome of the selection process during its meeting on 7 March 2024. New AMRWG members are expected to join the group during their next meeting, planned between 29 – 31 October 2024.

1.2 Chapter 6.10. Responsible and prudent use of antimicrobial agents in veterinary medicine

A subgroup from the AMRWG started the revision of [Chapter 6.10. Responsible and prudent use of antimicrobial agents in veterinary medicine](#) of the *Terrestrial Animal Health Code* in

¹ Consortium of International Agricultural Research Centers

December 2021. Comments received from the AMRWG and WOAHA Members were considered by the Terrestrial Code Commission (TCC) in September 2023 and February 2024.

In its February 2024 meeting, the TCC recommended that Chapter 6.10 should be proposed for adoption at the General Session in May 2024, alongside other amendments to the *Terrestrial Code* (please refer to the *Terrestrial Animal Health Standards Commission – Proposed Amendments to the Terrestrial Animal Health Code*).

Upon request by the TCC, the AMRWG has proposed that Chapters [6.7. Introduction to the recommendations for controlling antimicrobial resistance](#) and [6.8. Harmonisation of national antimicrobial resistance surveillance and monitoring programmes](#) as the next chapters to be revised.

Key discussions from the October 2023 and February 2024 AMRWG meetings have concluded that there is an urgent need to revise chapters on the responsible use of antimicrobials in aquatic animals within the *Aquatic Animal Health Code*.

1.3 Revision of the Chapter 2.1.1. of the Manual of Diagnostic Tests and Vaccines for Terrestrial Animals

The AMRWG was updated on the progress of the revision of Chapter 2.1.1. The revision is being undertaken by three WOAHA Collaborating Centres (CC) and overseen by the Biological Standards Commission. The AMRWG endorsed the modifications proposed for sections 5.1 Phenotypic Susceptibility Testing Methods and 5.2 Genotypic Susceptibility Testing Methods, as well as the removal of section 5.4. Future Directions in Antimicrobial Susceptibility/Resistance, as it will be covered in the preceding sections.

The CCs have been instructed to execute their mapping update plan and submit the revised chapter to the BSC for its September 2024 meeting, with the goal of proposing the chapter for adoption in May 2025.

1.4 Roadmap on antimicrobial resistance in companion animals

The AMRWG has provided feedback on WOAHA's Roadmap on Antimicrobial Resistance in Companion Animals, based on WOAHA's [Strategy on Antimicrobial Resistance and the Prudent Use of Antimicrobials](#).

The first phase of implementation, planned for 2024-2026, will focus on two of the pillars of the Strategy: 1) improve awareness and understanding and 2) strengthen knowledge through surveillance and research. The first pillar's focus will be on improving awareness and understanding among companion animal veterinarians and pet owners, in collaboration with key partner organisations, such as the World Small Animal Veterinary Association ([WSAVA](#)). The second pillar will focus on strengthening knowledge on AMR in companion animals through surveillance activities, leading ANIMUSE to become the global reference database for both AMR and AMU surveillance purposes in these species, outside of FAO's remit.

1.5 WOAHA List of Antimicrobial Agents of Veterinary Importance

Since discussions took place in the October 2023 meeting, the AMRWG has been revising the recommendations section of the [WOAHA List of Antimicrobial Agents of Veterinary Importance](#) (WOAHA List), to align it with the new categorisation criteria of the *WHO List of Medically Important Antimicrobials (WHO MIA List)*. The *WHO MIA List* now includes the [AWaRe classification](#) and the [WHO Essential Medicines List](#) as part of its criteria for categorisation of antimicrobials. The new categorisation criteria have resulted in the move of phosphonic acid derivatives (e.g., fosfomicin), to the Highest Priority Critically Important Antimicrobials (HPCIA), together with third and fourth generation cephalosporins, fluoroquinolones and polymyxins. As such, the recommendations in the *WOAHA List* for the use of antimicrobials critically important for both animal and human health have now been extended to phosphonic acid derivatives (e.g., Fosfomicin), as described in [Annex 1](#).

In the February 2024 meeting, the AMRWG approved these changes, as well as other related to non-technical terminology (i.e., 'OIE' to 'WOAH'), recommending the Director General to present the revised WOAHP List as Resolution No. 35 for adoption at the 91st General Session. WOAHP's Council was informed during its meeting in March 2024 and endorsed the AMRWG's recommendation.

The AMRWG has also continued discussions on the revision of the categorisation criteria of the WOAHP List, which have not been revisited since the consultation in 2005. The AMRWG is considering risk-based approaches used by other classifications (i.e. Avoid-Restrict-Caution-Prudence, or Access-Watch-Reserve) and will continue to explore next steps in upcoming meetings. The revision of the List will start once the final Technical Reference Documents (described below in section 2.6) have been finalised and endorsed by the AMRWG. Members will be consulted during the revision process.

1.6 *Technical Reference Documents (TRDs) listing antimicrobial agents of veterinary importance for bovine animals and cats and dogs*

The AMRWG has been following the progress of the TRDs for the antimicrobial agents of veterinary importance for 1) bovine animals and 2) cats and dogs, which, are being developed by *ad hoc* groups chaired by Members of the AMRWG. The TRDs follow a similar methodological approach used for the development of the existing TRDs for poultry (2020), aquatic animals and swine (2022). The AMRWG will revise the TRDs before these are shared with external experts and partner organisations for feedback in Q2 2024. The TRDs are expected to be presented for endorsement of the AMRWG at its next meeting in October 2024. Moreover, the AMRWG recommended to make previously published TRDs more visible in WOAHP's website, and not only by accessing AMRWG meeting reports where those were approved.

1.7 *ANIMUSE Global Database*

In both the October and February AMRWG meetings, the AMRWG received updates on key [ANIMUSE](#) activities.

1.7.1 *Technical Reference Group*

The AMRWG has supported the creation of a technical reference group (TRG) to provide technical input on the collection and analysis of species level data. The AMRWG has been requested to provide feedback to the Terms of Reference for such TRG.

1.7.2 *ANIMUSE Global Database*

The preliminary results of the 8th AMU Report showed that data submissions were received from 152 WOAHP Members. Analysis of the data between 2019 - 2021 for 81 Members showed an overall increase of 2% in the mg/kg at the global level for this period. The AMRWG discussed potential reasons for this, including disease outbreaks, improved accuracy reporting by some countries, and the impact of the pandemic on importing countries.

As of 21 February, the ninth round of data collection had received 141 submissions, with a global participation rate of 77%. Despite this, Africa's participation rate has fallen to 57%. The AMRWG discussed the causes and implications of this, as well as how participation can be encouraged.

Data from the ninth round has also seen the antimicrobial class of polypeptides divided into two separate classes: cyclic polypeptides and polymyxins, to compare AMU data in animals and humans. The full ANIMUSE report is expected to be published in early May 2024.

1.7.3 *Animal Biomass Indicator*

In February 2024, the AMRWG was also updated on the animal biomass indicator used to analyse ANIMUSE data, including the development of an updated World Animal Health Information System ([WAHIS](#)) and the development of a dedicated animal biomass module within ANIMUSE. The AMRWG provided advice on mitigation strategies for the data gap between 2019-2022 (due to a pause in WAHIS reporting). It was agreed that the available animal population figures of 2018, would be used to fill in the data gap as an interim solution, acknowledging that there is a potential risk of underestimating the animal biomass during this period.

1.8 *Substandard and Falsified Veterinary Products (SFVP)*

The SFVP project has five pillars: a global notification and alert system (VSAFE), development of guidelines, establishment of laboratory networks, field level data collection and awareness.

Data from phase two of the VSAFE pilot were presented to the AMRWG, who was also informed about the specifications identified so far for the development of an IT system, based on feedback from Members. The AMRWG recommended that WOH propose a resolution at its 2025 General Session, to further engage Members in the VSAFE system. This is similar to the approach taken for ANIMUSE with [Resolution No. 26](#), adopted during the 83rd General Session in 2015.

WOAH is working with WHO's Team on Incidents and SF to refine VSAFE and to ensure a coordinated approach and importantly, a balance between prevention, detection and response to SF medical and veterinary products. Other areas of the agreement include guidelines for post-marketing surveillance, sustainable laboratory capacity and networks at regional level.

WOAH's first SFVP workshop for Asia & Pacific region will be held between 12-14 June 2024 in Bangkok (Thailand), funded by the Regional Tripartite AMR Project UNJP/RAS/399/EC – 'Working Together to Fight Antimicrobial Resistance'.

1.9 *WOAH activities with Quadripartite Joint Secretariat on Antimicrobial Resistance ([QJS AMR](#))*

1.9.1 *Global Leaders Group ([GLG](#)) on Antimicrobial Resistance*

WOAH has contributed to the GLG report - [Recommendations to address the antibiotic pipeline and access crisis in human health](#), in which GLG recognises the need for research and development (R&D) and access solutions across the One Health spectrum, recommending a future complementary piece of work, providing an in-depth analysis and prioritisation, to be carried out. From this report, the AMRWG noted the significant underfunding faced by the animal sector (less than 10% of total investments in R&D for AMR).

WOAH has strongly contributed, in association with other Quadripartite Organisations, to the development and release of a [report](#) with recommendations for consideration by UN Member States in the outcome document of the High-level Meeting on AMR in September 2024. This document encompasses WOH's four key priorities identified to be considered by the political declaration and endorsed by the AMRWG:

- Implementation of effective cross-sectoral coordination - Members must implement multisectoral National Action Plans (NAP) on AMR, clearly identifying funding priority needs for every sector
- Resource surveillance systems - National surveillance systems must be strengthened and institutionalised
- Prioritise prevention - Members should aim to have defined animal vaccination strategies with a funded implementation plan by 2030
- Set adequate funding - Sustainable and predictable sources of funding need to be established at national and global levels.

1.9.2 Multi-Stakeholder Partnership Platform (PP)

The AMRWG was informed that WOAAH actively contributes to the Multi-Stakeholder Partnership Platform (PP), ensuring inclusiveness of all stakeholders and Members. A Steering Committee has been formed to oversee the PP. Five clusters (Governments/UN agencies, financial institutions, civil society/networks, academia, and private sectors) make up the PP. The Steering Committee received and approved 16 Action Groups, including one dedicated to the UNGA HLM in September 2024. The First PP inaugural plenary assembly was held on 15 - 16 November 2023, in Rome, Italy.

1.9.3 Multi-Partner Trust Fund (MPTF)

WOAH is currently chairing the MPTF Steering Committee, leading the enhancement of its Secretariat. The MPTF Secretariat is undergoing restructuring to improve efficiencies but continues to manage projects in nine countries and has completed activities in five countries so far. WOAAH's Headquarters and Regional Representative Offices actively support countries in the implementation of their NAPs on AMR with Quadripartite partner organisations and relevant stakeholders.

2. Conclusion

WOAH thanks the AMRWG members for their continued commitment to the group and their support in the implementation of WOAAH's Strategy on Antimicrobial Resistance and Prudent Use of Antimicrobials and the recommendations of the 2nd WOAAH global conference on Antimicrobial Resistance.

Looking forward to 2024 – 2025, the AMRWG will focus on overseeing the completion of the TRDs for Cats and Dogs and Bovine animals and will start the revision of the WOAAH List, including its categorisation criteria, taking into consideration existing international lists and feedback from Members. The AMRWG will continue to provide guidance on WOAAH activities, including ANIMUSE and VSAFE.

Moreover, and following [recommendation number eight from the second global conference on AMR held in 2018](#), the AMRWG recommended to write a reflection paper on autogenous vaccines, leveraging the expertise sitting in WOAAH's Collaborating Centers on Veterinary Medicinal Products, as well as to explore writing a piece of work in one of WOAAH's publications, to encourage Members' opinions on the topic of alternatives to antimicrobials.

Further information on the AMRWG and its roadmap of activities can be found here: [Working Group on Antimicrobial Resistance - WOAAH](#).

Annex 1: WOAH List of Antimicrobial Agents of Veterinary Importance

OIE WOAH LIST OF ANTIMICROBIAL AGENTS OF VETERINARY IMPORTANCE (~~June 2024~~ [Month] [YEAR])

The **OIE WOAH**² International Committee unanimously adopted the List of Antimicrobial Agents of Veterinary Importance at its 75th General Session in May 2007 ([Resolution No. XXVIII](#)).

1. Background

Antimicrobial agents are essential drugs for human and animal health and welfare. Antimicrobial resistance is a global public and animal health concern that is influenced by both human and non-human antimicrobial usage. The human, animal and plant sectors have a shared responsibility to prevent or minimise antimicrobial resistance selection pressures on both human and non-human pathogens and reduce to the extent possible the spillover of antimicrobial resistance into the environment.

The FAO³/OIE/WHO⁴ Expert Workshop on Non-Human Antimicrobial Usage and Antimicrobial Resistance held in Geneva, Switzerland, in December 2003 (Scientific Assessment) and in Oslo, Norway, in March 2004 (Management Options) recommended that the **OIE WOAH** should develop a list of critically important antimicrobial agents in veterinary medicine and that WHO should also develop such a list of critically important antimicrobial agents in human medicine.

Conclusion No. 5 of the Oslo Workshop is as follows:

5. The concept of “critically important” classes of antimicrobials for humans should be pursued by WHO. The Workshop concluded that antimicrobials that are critically important in veterinary medicine should be identified, to complement the identification of such antimicrobials used in human medicine. Criteria for identification of these antimicrobials of critical importance in animals should be established and listed by OIE. The overlap of critical lists for human and veterinary medicine can provide further information, allowing an appropriate balance to be struck between animal health needs and public health considerations.

Responding to this recommendation, the **OIE WOAH** decided to address this task through its existing *ad hoc* Group on antimicrobial resistance. The terms of reference, aim of the list and methodology were discussed by the *ad hoc* Group since November 2004 and were subsequently endorsed by the Biological Standards Commission in its January 2005 meeting and adopted by the International Committee in May 2005. Thus, the work was officially undertaken by the **OIE WOAH**.

2. Scope

The **OIE WOAH** List of Antimicrobial Agents of Veterinary Importance:

- Addresses antimicrobial agents authorised for use in food-producing animals
- Does not include antimicrobial classes/sub classes only used in human medicine
- Does not include antimicrobial agents only used as growth-promoters
- Focuses currently on antibacterials and other important antimicrobials agents used in veterinary

² OIE: World Organisation for Animal Health. [World Organisation for Animal Health \(founded as OIE\)](#).

³ FAO: Food and Agriculture Organization of the United Nations

⁴ WHO: World Health Organization

medicine.

3. Preparation of the draft list

The Director General of [the OIE WOA](#) sent a questionnaire prepared by the *ad hoc* Group accompanied by a letter explaining the importance of the task to [OIE WOA](#) Delegates of all Member Countries and international organisations having signed a Co-operation Agreement with [the OIE WOA](#) in August 2005.

Sixty-six replies were received. This response rate highlights the importance given by [OIE WOA](#) Member Countries from all regions to this issue. These replies were analysed first by [the OIE's WOA's](#) Collaborating Centre for [Veterinary Medicinal Products](#)⁵, then discussed by the *ad hoc* Group at its meeting in February 2006. A list of proposed antimicrobial agents of veterinary importance was compiled together with an executive summary. This list was endorsed by the Biological Standards Commission and circulated among Member Countries aiming for adoption by [the OIE WOA](#) International Committee during the General Session in May 2006.

4. Discussion at the 74th International Committee in May 2006

The list was submitted to the 74th International Committee where active discussion was made among Member Countries. Concerns raised by Member Countries include: 1) the list includes substances that are banned in some countries; 2) some of the substances on the list are not considered "critical"; 3) nature of the list – is this mandatory for Member Countries?; and 4) the use of antimicrobial agents as growth promotor is included. While many Member Countries appreciated the work, it was considered appropriate to continue refinement of the list. The list was adopted as a preliminary list by [Resolution No. XXXIII](#).

5. Refinement and adoption of the List of Antimicrobial Agents of Veterinary Importance

The *ad hoc* Group was convened in September 2006 to review the comments made at the 74th General Session of [the OIE WOA](#) International Committee, and [Resolution No. XXXIII](#) adopted at the 74th General Session. Based on the further analysis provided by [the OIE WOA](#) Collaborating Centre for Veterinary Medicinal Products, the *ad hoc* Group prepared its final recommendations of the List of Antimicrobial Agents of Veterinary Importance together with an executive summary. Once again, this was examined and endorsed by the Biological Standards Commission in its January 2007 meeting and circulated among Member Countries. The refined List was submitted to the 75th International Committee during the General Session in May 2007 and adopted unanimously by [Resolution No. XXVIII](#).

This list was further updated and adopted in May 2013, May 2015 and May 2018 by the World Assembly of [OIE WOA](#) Delegates.

In July 2018, the *ad hoc* Group conducted a technical review of the List to improve coherence between the WHO and [OIE WOA](#) List with respect to terminology used for antimicrobial classification, and this revision was endorsed by the Scientific Commission in February 2019. The report of the Scientific Commission to the [OIE WOA](#) World Assembly of Delegates is detailed in the 86th General Session Final Report.

⁵ [French Agency for Food, Environmental and Occupational Health & Safety \(ANSES\) and French Agency for Veterinary Medicinal Products \(ANMV\), Fougères, France](#)

CRITERIA USED FOR CATEGORISATION OF VETERINARY IMPORTANT ANTIMICROBIAL AGENTS

In developing the list, the *ad hoc* Group agreed that any antimicrobial agent authorised for use in veterinary medicine according to the criteria of quality, safety and efficacy as defined in the *Terrestrial Animal Health Code* (Chapter 6.10 Responsible and prudent use of antimicrobial agents in veterinary medicine) is important. Therefore, based on OIE WOAH Member Country contributions, the Group decided to address all antimicrobial agents used in food-producing animals to provide a comprehensive list, divided into critically important, highly important and important antimicrobial agents.

In selecting the criteria to define veterinary important antimicrobial agents, one significant difference between the use of antimicrobial agents in humans and animals has to be accounted for: the many different species that have to be treated in veterinary medicine.

The following criteria were selected to determine the degree of importance for classes of veterinary antimicrobial agents.

Criterion 1. Response rate to the questionnaire regarding Veterinary Important Antimicrobial Agents

This criterion was met when a majority of the respondents (more than 50%) identified the importance of the antimicrobial class in their response to the questionnaire.

Criterion 2. Treatment of serious animal disease and availability of alternative antimicrobial agents

This criterion was met when compounds within the class were identified as essential against specific infections and there was a lack of sufficient therapeutic alternatives.

On the basis of these criteria, the following categories were established:

- Veterinary **Critically Important Antimicrobial Agents (VCIA)**: are those that meet **BOTH** criteria 1 **AND** 2
- Veterinary **Highly Important Antimicrobial Agents (VHIA)**: are those that meet criteria 1 **OR** 2
- Veterinary **Important Antimicrobial Agents (VIA)**: are those that meet **NEITHER** criterion 1 **NOR** 2

Revision of the list of antimicrobial agents of Veterinary Importance

2007

The Joint FAO/WHO/OIE Expert Meeting on Critically Important Antimicrobials held in Rome, Italy, in November 2007, recommended that the list of antimicrobial agents of Veterinary Importance should be revised on a regular basis and that the OIE WOAH further refine the categorisation of antimicrobial agents, with respect to their importance in the treatment of specific animal diseases.

2012

The OIE WOAH *ad hoc* Group on Antimicrobial Resistance met in July 2012 to review and update the OIE WOAH List of antimicrobial agents of veterinary importance (OIE List) taking into account the top three changes in the categorisation of critically important antimicrobial agents of the WHO list of Critically Important Antimicrobials for Human Medicine.

2018

The OIE WOAH *ad hoc* Group on Antimicrobial Resistance met in January 2018 to review and update the OIE WOAH List taking into account:

- the Global Action Plan on Antimicrobial Resistance supporting the phasing out of use of antibiotics for animal growth promotion in the absence of risk analysis;

- the [Resolution N°38](#) adopted by the [OIE WOA](#) World Assembly of Delegates in May 2017;
- the fifth revision of the WHO list of Critically Important Antimicrobials for Human Medicine (2016) moving Colistin among the Highest Priority Critically Important Antimicrobials; and
- the [OIE WOA](#) report on antimicrobial agents intended for use in animals (Second Report), in particular the antimicrobial agents used as growth promoters (English version, page 30, figure 5)

The [ad hoc](#) Group made recommendations for the use of the updated [OIE WOA](#) list.

[2019](#)

The Director General established the Working Group on Antimicrobial Resistance following the adoption of [Resolution No. 14](#) at the 87th WOA General Session. The Working Group replaced the ad hoc group on Antimicrobial Resistance to:

- ensure the sustainability of WOA's [Strategy on Antimicrobial Resistance and Prudent Use](#)
- implement the [recommendations](#) made during WOA's 2nd Global Conference on Antimicrobial Resistance.

[2021](#)

Editorial changes in the list were made public at the 2021 General Session. These changes addressed the incorrect spelling of some antimicrobial agents and an out-of-date reference to Chapter 6.9, which was updated to Chapter 6.10.

[2024](#)

The Working Group on Antimicrobial Resistance revised the recommendations section of the WOA List and endorsed it during its biannual meeting in February 2024. The Working Group took into account during the revision the new categorisation criteria of the [WHO List of Medically Important Antimicrobials](#) that now include the [AWaRe classification](#) and the [WHO Essential Medicines List](#), which resulted in the move of phosphonic acid derivatives (e.g., Fosfomycin) among Highest Priority Critically Important Antimicrobials (HPCIA).

The [Working Group on Antimicrobial Resistance](#) made recommendations for the use of the updated [OIE WOA](#) List

Recommendations

Any use of antimicrobial agents in animals should be in accordance with the [OIE WOA](#) Standards on the responsible and prudent use laid down in [the Chapter 6.9. 6.10](#) of the *Terrestrial Animal Health Code* and in the Chapter 6.3. of the *Aquatic Animal Health Code*.

The responsible and prudent use of antimicrobial agents does not include the use of antimicrobial agents for growth promotion in the absence of risk analysis.

According to the criteria detailed above, antimicrobial agents in the [OIE WOA](#) List are classified according to three categories, Veterinary Critically Important Antimicrobial Agents (VCIA), Veterinary Highly Important Antimicrobial Agents (VHIA) and Veterinary Important Antimicrobial Agents (VIA).

However, a specific antimicrobial/class or subclass may be considered as critically important for the treatment of a specific disease in a specific species (See specific comments in the following table of categorisation of veterinary important antimicrobial agents for food-producing animals).

For a number of antimicrobial agents, there are no or few alternatives for the treatment of [some specified specific](#) disease(s) in identified target species as it is indicated in the [specific related](#) comments in the [OIE WOA](#) List. In this context, particular attention should be paid to the use of VCIA and of specific VHIA.

Among the VCIA in the OIE WOAH List, some antimicrobial classes, subclasses and specific antimicrobial agents are considered to be Highest Priority Critically Important (HPCIA) by WHO both for human and animal health; this is currently the case for Fluoroquinolones, and for the third and fourth generation of Cephalosporins. Colistin (Polymyxin E) and Phosphonic acid derivatives (e.g., Fosfomycin) has been moved in 2016 to the WHO category of Highest Priority Critically Important Antimicrobials. Therefore, HPCIA these two classes and Colistin should be used according to the following recommendations:

- ~~Not to be used as preventive treatment applied by feed or water in the absence of clinical signs in the animal(s) to be treated;~~
- ~~Not to be used for prevention in an individual or group of animals at risk of acquiring a specific infection or in a specific situation where infectious disease is likely to occur if the drug is not administered.~~
- Not to be used as a first line treatment unless justified, when used as a second line treatment, it should ideally be based on the results of bacteriological tests; and
- Extra-label/off label use should be limited and reserved for instances where no alternatives are available and ~~Such use should be~~ in agreement with the national legislation in force; and
- Urgently prohibit their use as growth promoters.

The classes in the WHO category of Highest Priority Critically Important Antimicrobials HPCIA should be the highest priorities for countries in phasing out use of antimicrobial agents as growth promoters.

The OIE WOAH List of antimicrobial agents of veterinary importance is based on expert scientific opinion and will be regularly updated when new information becomes available.

Antimicrobial classes / sub classes used only in human medicine (e.g., carbapenems) are not included in ~~this OIE the WOAH~~ List. Recognising the need to preserve the effectiveness of ~~the these~~ antimicrobial agents in human medicine, careful consideration based on risk assessment and existing evidence should be given regarding their potential use (including extra-label/off-label use) ~~or~~ authorisation for use in animals or both.

Abbreviations

Animal species in which ~~these~~ antimicrobial agents are used and categories of antimicrobials of veterinary importance are abbreviated as follows:

AVI: Avian	EQU: Equine	VCIA: Veterinary Critically Important Antimicrobial Agents
API: Bee	LEP: Rabbit	VHIA: Veterinary Highly Important Antimicrobial Agents
BOV: Bovine	OVI: Ovine	VIA: Veterinary Important Antimicrobial Agents
CAP: Caprine	PIS: Fish	
CAM: Camel	SUI: Swine	

**Categorisation of Veterinary Important Antimicrobial Agents
for Food-producing Animals**

Antimicrobial Agents (Class, Sub-class, Substance)	Species	Specific comments	VCIA	VHIA	VIA
AMINOCOUMARIN Novobiocin	AVI, BOV, CAP, OVI, PIS	Novobiocin is used in the local treatment of mastitis and in septicaemias in fish. This class is currently only used in animals.			X
AMINOCYCLITOL Spectinomycin	AVI, BOV, CAP, EQU, LEP, OVI, PIS, SUI	Used for respiratory infections in cattle and enteric infections in multiple species.	X		
AMINOGLYCOSIDES Dihydrostreptomycin Streptomycin	AVI, BOV, CAP, EQU, LEP, OVI, SUI API, AVI, BOV, CAP, EQU, LEP, OVI, PIS, SUI	The wide range of applications and the nature of the diseases treated make aminoglycosides extremely important for veterinary medicine.			
AMINOGLYCOSIDES + 2 DEOXYSTREPTAMINE Amikacin Apramycin Fortimycin Framycetin Gentamicin Kanamycin Neomycin Paromomycin Tobramycin	EQU AVI, BOV, LEP, OVI, SUI BOV, LEP, OVI, SUI BOV, CAP, OVI AVI, BOV, CAM, CAP, EQU, LEP, OVI, SUI AVI, BOV, EQU, PIS, SUI API, AVI, BOV, CAP, EQU, LEP, OVI, SUI AVI, BOV, CAP, OVI, LEP, SUI EQU	Aminoglycosides are of importance in septicaemias; digestive, respiratory and urinary diseases. Gentamicin is indicated for <i>Pseudomonas aeruginosa</i> infections with few alternatives. Apramycin and Fortimycin are currently only used in animals. Few economic alternatives are available.	X		
AMPHENICOLS Florfenicol Thiamphenicol	AVI, BOV, CAP, EQU, LEP, OVI, PIS, SUI AVI, BOV, CAP, OVI, PIS, SUI	The wide range of applications and the nature of the diseases treated make phenicols extremely important for veterinary medicine. This class is of particular importance in treating some fish diseases, in which there are currently no or very few treatment alternatives. This class also represents a useful alternative in respiratory infections of cattle, swine and poultry. This class, in particular florfenicol, is used to treat pasteurellosis in cattle and pigs.	X		
ANSAMYCIN – RIFAMYCINS		This antimicrobial class is authorised only in a few countries		X	

Antimicrobial Agents (Class, Sub-class, Substance)	Species	Specific comments	VCIA	VHIA	VIA
Rifampicin Rifaximin	EQU BOV, CAP, EQU, LEP, OVI, SUI	and with a very limited number of indications (mastitis) and few alternatives. Rifampicin is essential in the treatment of <i>Rhodococcus equi</i> infections in foals. However, it is only available in a few countries, resulting in an overall classification of VHIA.			
ARSENICAL Nitarsonsone Roxarsone	AVI, SUI AVI, SUI	Arsenicals are used to control intestinal parasitic coccidiosis. (<i>Eimeria</i> spp.).			X
BICYCLOMYCIN Bicozamycin	BOV, PIS, SUI	Bicyclomycin is listed for digestive and respiratory diseases in cattle and septicaemias in fish.			X
CEPHALOSPORINS					
CEPHALOSPORINS FIRST GENERATION Cefacetrile Cefalexin Cefalonium Cefalotin Cefapryrin Cefazolin	BOV AVI, BOV, CAP, EQU, OVI, SUI BOV, CAP, OVI EQU BOV BOV, CAP, OVI	Cephalosporins are used in the treatment of septicaemias, respiratory infections, and mastitis.		X	
CEPHALOSPORINS SECOND GENERATION Cefuroxime	BOV				
CEPHALOSPORINS THIRD GENERATION Cefoperazone Ceftiofur Ceftriaxone	BOV, CAP, OVI AVI, BOV, CAP, EQU, LEP, OVI, SUI BOV, OVI, SUI	The wide range of applications and the nature of the diseases treated make cephalosporin third and fourth generation extremely important for veterinary medicine. Cephalosporins are used in the treatment of septicaemias, respiratory infections, and mastitis.	X		
CEPHALOSPORINS FOURTH GENERATION Cefquinome	BOV, CAP, EQU, LEP, OVI, SUI	Alternatives are limited in efficacy through either inadequate spectrum or presence of antimicrobial resistance.			
FUSIDANE Fusidic acid	BOV, EQU	Fusidic acid is used in the treatment of ophthalmic diseases in cattle and horses.			X
IONOPHORES Lasalocid Maduramycin Monensin Narasin Salinomycin	AVI, BOV, LEP, OVI AVI API, AVI, BOV, CAP AVI, BOV AVI, LEP, BOV, SUI	Ionophores are essential for animal health because they are used to control intestinal parasitic coccidiosis (<i>Eimeria</i> spp.) where		X	

Antimicrobial Agents (Class, Sub-class, Substance)	Species	Specific comments	VCIA	VHIA	VIA
Semduramicin	AVI	there are few or no alternatives available. Ionophores are critically important in poultry. <u>This class is currently only used in animals.</u>			
LINCOSAMIDES Lincomycin Pirlimycin	API, AVI, BOV, CAP, OVI, PIS, SUI BOV, SUI	Lincosamides are essential in the treatment of Mycoplasma pneumonia, infectious arthritis and haemorrhagic enteritis of pigs.		X	
MACROLIDES					
MACROLIDES 14-MEMBERED RING Erythromycin Oleandomycin	API, AVI, BOV, CAP, EQU, LEP, OVI, PIS, SUI BOV				
MACROLIDES 15-MEMBERED RING Gamithromycin Tulathromycin	BOV BOV, SUI	The wide range of applications and the nature of the diseases treated make macrolides extremely important for veterinary medicine.			
MACROLIDES 16-MEMBERED RING Carbomycin Josamycin Kitasamycin Mirosamycin Spiramycin Terdecamycin Tildipirosin Tilmicosin Tylosin Tylvalosin	AVI PIS, SUI AVI, SUI, PIS API, AVI, SUI, PIS AVI, BOV, CAP, EQU, LEP, OVI, PIS, SUI SUI BOV, SUI AVI, BOV, CAP, LEP, OVI, SUI API, AVI, BOV, CAP, LEP, OVI, SUI AVI, SUI	Macrolides are used to treat Mycoplasma infections in pigs and poultry, haemorrhagic digestive disease in pigs (<i>Lawsonia intracellularis</i>) and liver abscesses (<i>Fusobacterium necrophorum</i>) in cattle, where they have very few alternatives. This class is also used for respiratory infections in cattle.	X		
MACROLIDES C17 Sedecamycin	SUI				
ORTHOSOMYCINS Avilamycin	AVI, LEP, SUI	Avilamycin is used for enteric diseases of poultry, swine and rabbit. <u>This class is currently only used in animals.</u>			X

Antimicrobial Agents (Class, Sub-class, Substance)	Species	Specific comments	VCIA	VHIA	VIA
PENICILLINS					
NATURAL PENICILLINS (including esters and salts)					
Benethamine penicillin	BOV				
Benzylpenicillin	AVI, BOV, CAM, CAP, EQU, LEP, OVI, SUI				
Benzylpenicillin procaine / Benzathine penicillin	AVI, BOV, CAM, CAP, EQU, OVI, SUI				
Penethamate (hydroiodide)	BOV	Penethamate (hydroiodide) is currently only used in animals.			
AMDINOPENICILLINS					
Mecillinam	BOV, SUI				
AMINOPENICILLINS					
Amoxicillin	AVI, BOV, CAP, EQU, OVI, PIS, SUI				
Ampicillin	AVI, BOV, CAP, EQU, OVI, PIS, SUI				
Hetacillin	BOV				
AMINOPENICILLIN + BETALACTAMASE INHIBITOR					
Amoxicillin + Clavulanic Acid	AVI, BOV, CAP, EQU, OVI, SUI	The wide range of applications and the nature of the diseases treated make penicillins extremely important for veterinary medicine.	X		
Ampicillin + Sulbactam	BOV, SUI	This class is used in the treatment of septicaemias, respiratory and urinary tract infections.			
CARBOXYPENICILLINS					
Ticarcillin	EQU				
Tobicillin	PIS	This class is very important in the treatment of many diseases in a broad range of animal species.			
UREIDOPENICILLIN					
Aspoxicillin	BOV, SUI	Few economical alternatives are available.			
PHENOXYPENICILLINS					
Phenethicillin	EQU				
Phenoxymethylpenicillin	AVI, SUI				
ANTISTAPHYLOCOCCAL PENICILLINS					
Cloxacillin	BOV, CAP, EQU, OVI, SUI				
Dicloxacillin	BOV, CAP, OVI, AVI, SUI				
Nafcillin	BOV, CAP, OVI				
Oxacillin	BOV, CAP, EQU, OVI, SUI				

Antimicrobial Agents (Class, Sub-class, Substance)	Species	Specific comments	VCIA	VHIA	VIA
PHOSPHONIC ACID DERIVATIVES Fosfomycin	AVI, BOV, PIS, SUI	Fosfomycin is essential for the treatment of some fish infections with few alternatives however it is only available in a few countries, resulting in an overall classification of VHIA.		X	
PLEUROMUTILINS Tiamulin Valnemulin	AVI, CAP, LEP, OVI, SUI SUI	The class of pleuromutilins is essential against respiratory infections in pigs and poultry. This class is also essential against swine dysentery (<i>Brachyspira hyodysenteriae</i>) however it is only available in a few countries, resulting in an overall classification of VHIA.		X	
POLYPEPTIDES Bacitracin Enramycin Gramicidin	AVI, BOV, LEP, SUI, OVI AVI, SUI EQU	Bacitracin is used in the treatment of necrotic enteritis in poultry. This class is used in the treatment of septicaemias, colibacillosis, salmonellosis, and urinary infections.		X	
POLYMYXINS Polymixin B Polymixin E (colistin)	BOV, CAP, EQU, LEP, OVI AVI, BOV, CAP, EQU, LEP, OVI, SUI	Polymyxin E (colistin) is used against Gram negative enteric infections.			
QUINOLONES					
QUINOLONES FIRST GENERATION Flumequin Miloxacin Nalidixic acid Oxolinic acid	AVI, BOV, CAP, EQU, LEP, OVI, PIS, SUI PIS BOV AVI, BOV, LEP, PIS, SUI, OVI	Quinolones of the 1st generations are used in the treatment of septicaemias and infections such as colibacillosis.		X	
QUINOLONES SECOND GENERATION (FLUOROQUINOLONES) Ciprofloxacin Danofloxacin Difloxacin Enrofloxacin Marbofloxacin Norfloxacin Ofloxacin Orbifloxacin Sarafloxacin	AVI, BOV, SUI BOV, CAP, LEP, OVI, SUI AVI, BOV, LEP, SUI AVI, BOV, CAP, EQU, LEP, OVI, PIS, SUI BOV, EQU, LEP, SUI AVI, BOV, CAP, LEP, OVI, SUI AVI, SUI BOV, SUI PIS	The wide range of applications and the nature of the diseases treated make fluoroquinolones extremely important for veterinary medicine. Fluoroquinolones are critically important in the treatment of septicaemias, respiratory and enteric diseases.	X		
QUINOXALINES Carbadox	SUI				X

Antimicrobial Agents (Class, Sub-class, Substance)	Species	Specific comments	VCIA	VHIA	VIA
Olaquinox	SUI	Quinoxalines (carbadox) is used for digestive disease of pigs (e.g. swine dysentery). This class is currently only used in animals.			
SULFONAMIDES Phthalylsulfathiazole Sulfacetamide Sulfachlorpyridazine Sulfadiazine Sulfadimethoxazole Sulfadimethoxine Sulfadimidine (Sulfamethazine, Sulfadimerazine) Sulfadoxine Sulfafurazole Sulfaguanidine Sulfamerazine Sulfamethoxine Sulfamonomethoxine Sulfanilamide Sulfapyridine Sulfaquinoxaline	SUI AVI, BOV, OVI AVI, BOV, SUI AVI, BOV, CAP, OVI, SUI AVI, BOV, SUI AVI, BOV, CAP, EQU, LEP, OVI, PIS, SUI AVI, BOV, CAP, EQU, LEP, OVI, SUI AVI, BOV, EQU, OVI, SUI BOV, PIS AVI, CAP, OVI AVI, BOV, CAP, EQU, LEP, OVI, PIS, SUI AVI, PIS, SUI AVI, PIS, SUI BOV, CAP, OVI BOV, SUI AVI, BOV, CAP, LEP, OVI	The wide range of applications and the nature of the diseases treated make sulfonamides extremely important for veterinary medicine. These classes alone or in combination are critically important in the treatment of a wide range of diseases (bacterial, coccidial and protozoal infections) in a wide range of animal species.	X		
SULFONAMIDES+ DIAMINOPYRIMIDINES Ormetoprim+ Sulfadimethoxine Sulfamethoxypyridazine Trimethoprim+ Sulfonamide	AVI, PIS AVI, BOV, EQU, SUI AVI, BOV, CAP, EQU, LEP, OVI, PIS, SUI				
DIAMINOPYRIMIDINES Baquiloprim Ormetoprim Trimethoprim	BOV, SUI AVI AVI, BOV, CAP, EQU, LEP, OVI, SUI				
STREPTOGRAMINS Virginiamycin	AVI, BOV, OVI, SUI	Virginiamycin is an important antimicrobial in the prevention of necrotic enteritis (<i>Clostridium perfringens</i>).			X
TETRACYCLINES Chlortetracycline	AVI, BOV, CAP, EQU, LEP, OVI, SUI	The wide range of applications and the nature of the diseases treated make tetracyclines	X		

Antimicrobial Agents (Class, Sub-class, Substance)	Species	Specific comments	VCIA	VHIA	VIA
Doxycycline Oxytetracycline Tetracycline	AVI, BOV, CAM, CAP, EQU, LEP, OVI, PIS, SUI API, AVI, BOV, CAM, CAP, EQU, LEP, OVI, PIS, SUI API, AVI, BOV, CAM, CAP, EQU, LEP, OVI, PIS, SUI	extremely important for veterinary medicine. This class is critically important in the treatment of many bacterial and chlamydial diseases in a wide range of animal species. This class is also critically important in the treatment of animals against heartwater (<i>Ehrlichia ruminantium</i>) and anaplasmosis (<i>Anaplasma marginale</i>) due to the lack of antimicrobial alternatives.			
THIOSTREPTON Nosiheptide	SUI	This class is currently used in the treatment of some dermatological conditions.			X