World Organisation for Animal Health

Technical Reference Document Listing Antimicrobial Agents of Veterinary Importance for Poultry

An appendix to the WOAH List of antimicrobial agents of veterinary importance

Scope

The objective of this Technical Reference Document Listing Antimicrobial Agents of Veterinary importance for Poultry is to provide additional, species specific information without serving as a treatment guideline. By identifying antimicrobial agents used in poultry, it can contribute to the development and update of national treatment guidelines, advice on prevention and best practice management, risk management, and risk prioritisation to minimise and contain AMR.

This document is focused on commercially important poultry species only, and does not include all the avian species accommodated by the 'AVI' designation in the WOAH List of Antimicrobial Agents of Veterinary Importance. It should be kept in mind that the antimicrobials listed in this technical reference document may not all be available or will be appropriate for use in all poultry species. For example, specific requirements apply to the authorisation of medicines for poultry used in egg production to account for the transfer of residues into the eggs from treated birds.

It is acknowledged that the situation is very diverse in different regions for licensing, availability, off-label use, and resistance to antimicrobial agents, and that the general information provided in this document should be interpreted in light of the local context.

Poultry-related recommendations stated in the WOAH Standards and Guidelines (namely on the WOAH List of Antimicrobial Agents of Veterinary Importance) should be considered alongside this document.

Methodology to prepare this document

An *ad hoc* Group was nominated by WOAH to work on the development of the Poultry Technical Reference Document. The ad hoc Group's members consisted of members of the Working Group on AMR, and consulted with international non-governmental organisations with whom WOAH has established a cooperation agreement.

As a first step, an evidence-guided rapid review was undertaken by the *ad hoc* Group to prepare a preliminary table of important bacterial pathogens of poultry and the antimicrobial agents used to treat these pathogens.

For the preparation of this table of poultry pathogens, four globally focused reviews of poultry disease published in the last 10 years were consulted for poultry pathogens and recommended treatments. The most detailed review was that contained within Diseases of Poultry (Swayne et al 2020). To commence the project, a thorough review of the chapters devoted to bacterial diseases (Chapters 16 -24, pages 719-1107) was undertaken and a table of disease names, causative pathogens, target poultry species and treatment options was compiled.

To assess the completeness of the information extracted from Swayne *et al* (2020), the relevant content in three contemporary guidance documents (Guidelines for Antimicrobial Use in Poultry 2009; Antimicrobial Drug Use in Poultry 2013; and the *Terrestrial Animal Health Code* 2019) was examined and new information integrated into the summary draft table of pathogens. The table compiled from this rapid review included 83 pathogens of poultry, including chicken, turkey, duck, quail, peacock, guinea fowl, goose and pigeon.

Additional sources of information used were:

- The original answers to a WOAH questionnaire sent to Members in 2006, which formed the basis for the current WOAH List of Antimicrobial Agents of Veterinary Importance. The answers to this questionnaire contain information on antimicrobials used to treat pathogens by animal species
- List of antimicrobials authorised for use in the named species in countries

- Existing specific treatment guidelines
- WOAH *ad hoc* Group report on vaccines that can reduce the use of antimicrobials
- *WOAH Terrestrial* and *Aquatic Animal Health Codes*

The end product of the review was a table presenting the following information:

- Disease;
- Pathogen involved;
- Antimicrobial class;
- Antimicrobial sub class;
- Molecule;
- Comments and other considerations.

Once this table was established by the poultry *ad hoc* Group, it was submitted to a panel of poultry experts. After this external review, the WOAH poultry *ad hoc* Group took into consideration the feedback received from the experts to prepare the final draft of the Poultry Technical Reference Document that was further validated by the WOAH Working Group on AMR, and afterwards endorsed by the WOAH hierarchy.

REFERENCES

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OIE (2019). *Terrestrial Animal Health Code*. Paris, France, World Organisation for Animal Health (OIE).

Swayne D.E., Boulianne M., Logue C.M., McDougald L.R., Nair V., Suarez D.L., Wit S. d., Grimes T., Johnson D., Kromm M., Prajitno T.Y., Rubinoff I. and Zavala G. (2020). Diseases of Poultry (14th Edition), John Wiley & Sons.

Abbreviations:

The animal species in which antimicrobial agents are used and categories of antimicrobials of veterinary importance are abbreviated as follows:

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

Annexes:

Annex 1: List of major pathogens and diseases affecting poultry species
Annex 2: Antimicrobial classes authorised to prevent, treat and control poultry infections

ANTIMICROBIAL AGENTS OF VETERINARY IMPORTANCE AUTHORISED FOR USE IN POULTRY

Antimicrobial Agents (Class, Subclass and Substance by International Nonproprietary Name [INN])	Categorisation			Molecules	Species	Authorised for use in poultry	Specific comments by class
	VCIA	VHIA	VIA				
AMINOCOUMARIN			x	Novobiocin (vet only)	**AVI**, CAP, OVI	Yes	Novobiocin is used to treat staphylococcal infections in poultry. **This class is currently only used in animals.**
AMINOCYCLITOL	x			Spectinomycin	**AVI**, BOV, CAN, CAP, EQU, FEL, LEP, OVI, SUI	Yes	Used in combination with lincomycin for colibacillosis (multisystemic syndromes, omphalitis, airsacculitis) and fowl cholera.
AMINOGLYCOSIDES	x			Dihydrostreptomycin	**AVI**, BOV, CAN, CAP, EQU, FEL, LEP, OVI, SUI	Yes	The wide range of applications and the nature of the diseases treated make aminoglycosides extremely important for veterinary medicine. Aminoglycosides are of importance in the following diseases: colibacillosis, coryza, necrotic enteritis, gangrenous dermatitis, prevention of infection with *Histomonas* spp. Few economic alternatives are available.
				Streptomycin	API, **AVI**, BOV, CAN, CAP, EQU, FEL, LEP, OVI, SUI	Yes	
AMINOGLYCOSIDES + 2 DEOXYSTREPTAMINE	x			Amikacin (synonyms: amikacillin, amicacin)	BOV, CAN, EQU, FEL	No	
				Apramycin (vet only)	**AVI**, BOV, LEP, OVI, SUI	Yes	
				Astromycin (vet only) (synonym: fortimycin)	LEP, OVI	No	
				Framycetin	CAN, CAP, FEL, OVI	No	
				Gentamicin	**AVI**, BOV, CAM, CAN, CAP, EQU, FEL, LEP, OVI, SUI	Yes	
				Kanamycin	**AVI**, BOV, CAN, EQU, FEL, SUI	Yes	
				Neomycin	API, **AVI**, BOV, CAN, CAP, CRU, EQU, FEL, LEP, OVI, PIS, SUI	Yes	
				Paromomycin	**AVI**, BOV, CAN, CAP, FEL, LEP, OVI, SUI	Yes	
				Tobramycin (synonym: tobramicin)	CAN, EQU, FEL	No	
AMPHENICOLS	x			Chloramphenicol	CAN, FEL	No	

Antimicrobial Agents (Class, Subclass and Substance by International Nonproprietary Name [INN])	Categorisation			Molecules	Species	Authorised for use in poultry	Specific comments by class
	VCIA	VHIA	VIA				
				Florfenicol (vet only)	**AVI**, BOV, CAN, CAP, CRU, EQU, FEL, LEP, OVI, PIS, SUI	Yes	The wide range of applications and the nature of the diseases treated make amphenicols extremely important for veterinary medicine. This class represents a useful alternative in respiratory infections of poultry.
				Thiamphenicol	**AVI**, BOV, CAN, CAP, FEL, OVI, PIS, SUI	Yes	
ANSAMYCINS - RIFAMYCINS		x		Rifampicin (synonym: rifampin)	EQU	No	
				Rifaximin	BOV, CAN, CAP, FEL, EQU, LEP, OVI, SUI	No	
ARSENICALS			x	Nitarsone (vet only)	**AVI**, SUI	Yes	Arsenicals are used in poultry to treat intestinal parasitic coccidiosis (*Eimeria* spp.). Arsenicals have been withdrawn from the market in some countries/regions due to the detection of tissue residues containing inorganic arsenic, a carcinogen. **This class is currently only used in animals.**
				Roxarsone (vet only)	**AVI**, SUI	Yes	
BICYCLOMYCIN			x	Bicozamycin (synonym: bicyclomycin)	SUI	No	
CEPHALOSPORINS		x					
Cephalosporin 1st Generation				Cefacetrile (synonyms: cephacetrile, cefacetril, cephacetril)	BOV	No	First generation cephalosporins are used in poultry to treat and control coryza, fowl typhoid, fowl cholera, bacillary white diarrhoea, colibacillosis and gangrenous dermatitis.
				Cefalexin (synonyms: cephalexin, cephacillin, cephalexine, cefalexine)	**AVI**, BOV, CAN, CAP, EQU, FEL, OVI, SUI	Yes	
				Cefalonium (vet only) (synonyms: cephalonium, cefalonum)	BOV, CAN, CAP, OVI	No	
				Cefalotin	BOV, CAN, EQU	No	
				Cefapirin (synonyms: cephapirin, cefapyrin)	BOV	No	

Antimicrobial Agents (Class, Subclass and Substance by International Nonproprietary Name [INN])	Categorisation			Molecules	Species	Authorised for use in poultry	Specific comments by class
	VCIA	VHIA	VIA				
				Cefazolin (synonyms: cephazolin, cephazoline, cephazolidin)	BOV, CAP, OVI, SUI	No	
Cephalosporin 2nd Generation				Cefuroxime	BOV	No	
Cephalosporin 3rd Generation	x			Cefixime	CAN, FEL	No	Third and fourth generation cephalosporins are critically important for human health and subject to specific recommendations in the WOAH List of Antimicrobial Agents of Veterinary Importance. Their use in animals should only occur when the pathogen is resistant to the first choice antimicrobial; its use should be supported by antimicrobial susceptibility testing whenever possible. Extra-label/off label use should be limited and reserved for instances where no alternatives are available and in agreement with national legislation. Third generation cephalosporins are used in poultry for the prevention and treatment of omphalitis caused by *E. coli.*
				Cefoperazone	BOV, CAP, OVI	No	
				Cefovecin (vet only)	CAN, FEL	No	
				Cefpodoxime	CAN	No	
				Ceftiofur (vet only)	**AVI**, BOV, CAN, CAP, EQU, LEP, OVI, SUI	Yes	
				Ceftriaxone	BOV, CAN, OVI, SUI	No	
Cephalosporin 4th Generation				Cefquinome (vet only)	BOV, CAP, EQU, LEP, OVI, SUI	No	
FUSIDANE			x	Fusidic acid	CAN, EQU, FEL	No	
IONOPHORES		x		Lasalocid (vet only)	**AVI**, BOV, LEP, OVI	Yes	Ionophores are essential for animal health because they are used to control intestinal parasitic coccidiosis (*Eimeria* spp.) where there are few or no alternatives available, as well as necrotic enteritis. Ionophores are critically important in poultry. **This class is currently only used in animals.**
				Maduramicin (vet only)	**AVI**	Yes	
				Monensin (vet only)	API, **AVI**, BOV, CAP	Yes	
				Narasin (vet only)	**AVI**	Yes	
				Salinomycin (vet only)	**AVI**, LEP	Yes	
				Semduramicin (vet only)	**AVI**	Yes	
LINCOSAMIDES		x		Clindamycin	CAN, FEL	No	Used in combination with spectinomycin for colibacillosis (multisystemic syndromes; omphalitis, airsacculitis) and fowl cholera.
				Lincomycin	API, **AVI**, BOV, CAN, CAP, FEL, OVI, PIS, SUI	Yes	
				Pirlimycin (vet only)	BOV	No	
MACROLIDES	x						

Antimicrobial Agents (Class, Subclass and Substance by International Nonproprietary Name [INN])	Categorisation			Molecules	Species	Authorised for use in poultry	Specific comments by class
	VCIA	VHIA	VIA				
Macrolides 14-membered ring				Erythromycin	API, **AVI**, BOV, CAN, CAP, EQU, FEL, LEP, OVI, PIS, SUI	Yes	The wide range of applications and the nature of the diseases treated make macrolides extremely important for veterinary medicine. Macrolides are used to treat *Mycoplasma* spp. infections in poultry (chronic respiratory diseases, arthritis), fowl cholera, *Ornithobacterium rhinotracheale* infection, necrotic enteritis, avian intestinal spirochetosis, ulcerative enteritis, gangrenous dermatitis.
				Oleandomycin		No	
Macrolides 15-membered ring				Azithromycin	CAN	No	
				Gamithromycin (vet only)	BOV, SUI	No	
				Tulathromycin (vet only)	BOV, SUI	No	
Macrolides 16-membered ring				Carbomycin	**AVI**	Yes	
				Josamycin	SUI	No	
				Kitasamycin (vet only)	**AVI**, PIS, SUI	Yes	
				Mirosamicin (synonyms: mirosamycin, miporamicin)	API, **AVI**, SUI	Yes	
				Spiramycin	**AVI,** BOV, CAP, EQU, LEP, OVI, SUI	Yes	
				Tildipirosin (vet only)	BOV, SUI	No	
				Tilmicosin (vet only)	**AVI**, BOV, CAP, LEP, OVI, PIS, SUI	Yes	
				Tylosin (vet only)	API, **AVI**, BOV, CAP, LEP, OVI, SUI	Yes	
				Tylvalosin (vet only)	**AVI**, SUI	Yes	
Macrolides 17-membered ring				Sedecamycin (synonym: lankacidin A)		No	
				Terdecamycin		No	
ORTHOSOMYCINS			x	Avilamycin (vet only)	**AVI**, LEP, SUI	Yes	Avilamycin is used in the treatment of many diseases including *Clostridium* spp. infections in poultry (necrotic enteritis, gangrenous dermatitis). **This class is currently only used in animals.**
PENICILLINS	x						

Antimicrobial Agents (Class, Subclass and Substance by International Nonproprietary Name [INN])	Categorisation			Molecules	Species	Authorised for use in poultry	Specific comments by class
	VCIA	VHIA	VIA				
Natural penicillins (including esters and salts)				Benethamine penicillin		No	The wide range of applications and the nature of the diseases treated make penicillins extremely important for poultry. Agents within this class are used in poultry to treat many diseases, *E. coli* infections (local and systemic infections, airsacculitis, arthritis), *Clostridium* spp. infections (necrotic enteritis, botulism, ulcerative enteritis) and respiratory diseases such as fowl cholera, coryza, *Riemerella anatipestifer* infection, and *Ornithobacterium rhinotracheale* infection. Few economical alternatives are available.
				Benzylpenicillin (synonyms: penicillin G, benzylpenicillin G, benzopenicillin, benzyl penicillin)	**AVI**, BOV, CAM, CAN, CAP, EQU, FEL, LEP, OVI, SUI	Yes	
				Procaine benzylpenicillin (synonyms: benzylpenicillin procaine, procaine G penicillin) Benzathine benzylpenicillin (synonyms: benzathine penicillin, benzathine penicillin G)	BOV, CAM, CAN, CAP, EQU, FEL, OVI, SUI	No	
				Penethamate hydriodide (vet only)	BOV, CAN, SUI	No	
				Tobicillin		No	
Amidinopenicillins				Mecillinam (synonyms: amdinocillin, hexacillin, penicillin HX)		No	
Aminopenicillins				Amoxicillin (synonym: amoxycillin)	**AVI**, BOV, CAN, CAP, EQU, FEL, OVI, PIS, SUI	Yes	
				Ampicillin	**AVI,** BOV, CAN, CAP, EQU, FEL, OVI, PIS, SUI	Yes	
				Hetacillin (synonym: phenazacillin)	BOV	No	
Aminopenicillin plus betalactamase inhibitor				Amoxicillin + clavulanic acid	**AVI**, BOV, CAN, CAP, EQU, FEL, OVI, SUI	Yes	
				Ampicillin + sulbactam	BOV	No	
Carboxypenicllins				Ticarcillin	EQU	No	

Antimicrobial Agents (Class, Subclass and Substance by International Nonproprietary Name [INN])	Categorisation			Molecules	Species	Authorised for use in poultry	Specific comments by class
	VCIA	VHIA	VIA				
Phenoxypenicillins				Pheneticillin (synonyms: phenethicillin, penicillin B)	EQU	No	
				Phenoxymethylpenicillin (synonyms: penicillin V, pen V, penicillin phenoxymethyl, phenoxymethyl penicillin, beromycin, oraxillin)	**AVI**, CAN, SUI	Yes	
Antistaphyloccocal penicillins				Cloxacillin (synonym: methocillin S)	BOV, CAN, CAP, EQU, FEL, OVI	No	
				Dicloxacillin (synonym: dicloxacycline)	BOV, CAP, EQU, OVI	No	
				Nafcillin (synonym: naphcillin)	CAP, OVI	No	
				Oxacillin (synonyms: oxazocillin, MPI-penicillin)	BOV, CAP, EQU, OVI	No	
Antipseudomonal penicillins				Aspoxicillin		No	
PHOSPHONIC ACID DERIVATIVES		x		Fosfomycin (synonyms: phosphomycin, phosphonomycin)	**AVI**, BOV, PIS, SUI	Yes	Phosphonic acid derivatives are critically important for human health and subject to specific recommendations in the WOAH List of Antimicrobial Agents of Veterinary Importance. Their use in animals should only occur when the pathogen is resistant to the first choice antimicrobial; its use should be supported by antimicrobial susceptibility testing whenever possible. Extra-label/off label use should be limited and reserved for instances where no alternatives are available and in agreement with national legislation. Phosphonic acid derivatives are used in the treatment of colibacillosis and necrotic enteritis.
PLEUROMUTILINS		x		Tiamulin (vet only) (synonym: thiamutilin)	**AVI**, CAP, LEP, OVI, PIS, SUI	Yes	The class of pleuromutilins is essential to treat respiratory infections and avian intestinal spirochetosis in poultry. It is also used to treat ulcerative enteritis.
				Valnemulin (vet only)	SUI	No	
POLYPEPTIDES		x					

Antimicrobial Agents (Class, Subclass and Substance by International Nonproprietary Name [INN])	Categorisation			Molecules	Species	Authorised for use in poultry	Specific comments by class
	VCIA	VHIA	VIA				
Cyclic polypeptides				Bacitracin	**AVI**, BOV, CAN, FEL, LEP, OVI, SUI	Yes	Bacitracin and enramycin are used for the treatment of *Clostridium* spp. infections (necrotic enteritis, gangrenous dermatitis, ulcerative enteritis).
				Enramycin	**AVI**, SUI	Yes	
				Gramicidin	EQU	No	
Polymyxins				Polymyxin B (synonym: polymixin B)	CAN, CAP, EQU, FEL, LEP, OVI, SUI	No	Colistin is critically important for human health and subject to specific recommendations in the WOAH List of Antimicrobial Agents of Veterinary Importance. Its use in animals should only occur when the pathogen is resistant to the first choice antimicrobial; its use should be supported by antimicrobial susceptibility testing whenever possible. Extra-label/off label use should be limited and reserved for instances where no alternatives are available and in agreement with national legislation. Polymyxins are used for colibacillosis (local and systemic infections).
				Colistin (synonym: polymyxin E)	**AVI**, BOV, CAN, CAP, EQU, FEL, LEP, OVI, SUI	Yes	
QUINOLONES							
Quinolones 1st Generation		x		Flumequine (synonym: flumequin)	**AVI**, BOV, CAN, CAP, EQU, FEL, LEP, OVI, PIS, SUI	Yes	Quinolones of the 1st generation are used in the treatment of *E. coli* infections (colibacillosis, airsacculitis, arthritis), *Mycoplasma* spp. infections (chronic respiratory disease) and *Pasteurella* spp. infections (fowl cholera).
				Miloxacin		No	
				Nalidixic acid (synonyms: nalixidate, nalidixinic acid, nalidic acid)		No	
				Oxolinic acid	**AVI**, BOV, LEP, OVI, PIS, SUI	Yes	

Antimicrobial Agents (Class, Subclass and Substance by International Nonproprietary Name [INN])	Categorisation			Molecules	Species	Authorised for use in poultry	Specific comments by class
	VCIA	VHIA	VIA				
Quinolones 2nd Generation (Fluoroquinolones)	x			Ciprofloxacin	**AVI**, BOV, PIS, SUI	Yes	Fluoroquinolones are critically important for human health and subject to specific recommendations in the WOAH List of Antimicrobial Agents of Veterinary Importance. Its use in in animals should only occur when the pathogen is resistant to the first choice antimicrobial; its use should be supported by antimicrobial susceptibility testing whenever possible. Extra-label/off label use should be limited and reserved for instances where no alternatives are available and in agreement with national legislation. Quinolones of the 2nd generation (Fluoroquinolones) are used in the treatment of *E. coli* infections (colibacillosis, airsacculitis, arthritis), *Mycoplasma* spp. infections (chronic respiratory disease) and *Pasteurella* spp. infections (fowl cholera).
				Danofloxacin (vet only)	BOV, CAP, LEP, OVI, SUI	No	
				Difloxacin	**AVI**, LEP, SUI	Yes	
				Enrofloxacin (vet only)	**AVI**, BOV, CAN, CAP, CRU, EQU, FEL, LEP, OVI, PIS, SUI	Yes	
				Ibafloxacin	CAN, FEL	No	
				Levofloxacin	CAN	No	
				Marbofloxacin (vet only)	BOV, CAN, EQU, FEL, LEP, SUI	No	
				Norfloxacin	**AVI**, BOV, CAN, CAP, FEL, LEP, OVI, SUI	Yes	
				Ofloxacin	**AVI**, CAN, FEL, SUI	Yes	
				Orbifloxacin (vet only)	BOV, CAN, FEL, SUI	No	
				Pradofloxacin (vet only)	BOV, CAN, FEL	No	
				Sarafloxacin		No	
QUINOXALINES			x	Carbadox (vet only)	SUI	No	
				Olaquindox (vet only) (synonym: olachindox)		No	
SULFONAMIDES	x			Phthalylsulfathiazole (vet only) (synonyms: sulfathalidine, phthalazol, phthalylsulphathiazole, phthalylsulfonazole)	CAN, FEL, SUI	No	Sulfonamides alone or in combination are critically important in the treatment of a wide range of diseases (bacterial and coccidial infections) in poultry.
				Sulfacetamide (synonyms: sulphacetamide, acetosulfamine, acetosulfamin, N-acetylsulfanilamide)	**AVI**, BOV, CAN, FEL, OVI, SUI	Yes	

Antimicrobial Agents (Class, Subclass and Substance by International Nonproprietary Name [INN])	Categorisation			Molecules	Species	Authorised for use in poultry	Specific comments by class
	VCIA	VHIA	VIA				
				Sulfachlorpyridazine (synonym: sulfachloropyridazine)	**AVI**, BOV, SUI	Yes	
				Sulfadiazine (synonyms: sulphadiazine, sulfapyrimidine, sulfadiazin, sulfazine, sulfadiazene)	**AVI**, BOV, CAN, CAP, FEL, OVI, PIS, SUI	Yes	
				Sulfamethoxazole (synonyms: sulfadimethoxazole sulphamethoxazole, sulfisomezole)	**AVI**, BOV, CAN, FEL, SUI	Yes	
				Sulfadimethoxine (synonyms: sulphadimethoxine, sulfadimethoxin, sulfadimethoxydiazine)	**AVI**, BOV, CAN, CAP, EQU, FEL, LEP, OVI, PIS, SUI	Yes	
				Sulfadimidine (synonyms: sulfamethazine, sulfadimethyldiazine, sulfamezathine, sulphamethazine, sulfadimerazine)	**AVI**, BOV, CAN, CAP, EQU, FEL, LEP, OVI, SUI	Yes	
				Sulfadoxine (synonyms: sulphadoxine, sulforthomidine, sulphormethoxine, sulfadoxin)	**AVI**, BOV, CAN, EQU, FEL, OVI, SUI	Yes	
				Sulfafurazole (synonyms: sulfisoxazole, sulfizole sulphafurazole, sulfisoxazol, sulfafurazol)	CAN, PIS	No	
				Sulfaguanidine (synonyms: sulfaguanidin, sulphaguanidine,	**AVI**, BOV, CAN, CAP, FEL, OVI, SUI	Yes	

Antimicrobial Agents (Class, Subclass and Substance by International Nonproprietary Name [INN])	Categorisation			Molecules	Species	Authorised for use in poultry	Specific comments by class
	VCIA	VHIA	VIA				
				sulfanilguanidine, sulfoguanidine)			
				Sulfamerazine (synonyms: sulphamerazine, sulfamerazin, sulfamethyldiazine)	**AVI**, BOV, CAN, CAP, EQU, FEL, LEP, OVI, PIS, SUI	Yes	
				Sulfamethoxydiazine (synonyms: Sulfamethoxine, sulfameter, Sulfamethoxydiazine, Sulfamethoxypyrimidine)	**AVI**	Yes	
				Sulfamonomethoxine (synonyms: sulfamonomethoxin, sulfamonmethoxine)	**AVI**, BOV, CAN, FEL, PIS, SUI	Yes	
				Sulfanilamide (synonyms: sulphanilamide, sulfamine, sulfonylamide)	BOV, CAN, CAP, FEL, OVI, SUI	No	
				Sulfapyridine (synonym: sulphapyridine)	BOV, CAN, FEL, SUI	No	
				Sulfaquinoxaline (synonyms: sulfabenzpyrazine, sulphaquinoxaline)	**AVI**, BOV, CAP, LEP, OVI, SUI	Yes	
				Sulfamethoxypyridazine (synonyms: sulphamethoxypyridazine, sulfapyridazine, sulfametoxipiridazine)	**AVI**, BOV, CAN, EQU, FEL, SUI	Yes	
Sulfonamides + diaminopyrimidines				Ormetoprim (synonyms: ormethoprim, ormetorprim) + sulfonamide	**AVI**, BOV, PIS, SUI	Yes	

Antimicrobial Agents (Class, Subclass and Substance by International Nonproprietary Name [INN])	Categorisation			Molecules	Species	Authorised for use in poultry	Specific comments by class
	VCIA	VHIA	VIA				
				Trimethoprim (synonym: trimetoprim) + sulfonamide	**AVI**, BOV, CAP, EQU, LEP, OVI, PIS, SUI	Yes	
DIAMINOPYRIMIDINES				Baquiloprim		No	
				Ormethoprim (synonyms: ormethoprim, ormetorprim)	**AVI**	Yes	
				Trimethoprim (synonym: trimetoprim)	**AVI**, BOV, CAP, EQU, LEP, OVI	Yes	
STREPTOGRAMINS			x	Virginiamycin (vet only) (synonym: pristinamycin)	**AVI**, BOV, OVI, SUI	Yes	Virginiamycin is an important antimicrobial in the prevention of necrotic enteritis (*Clostridium perfringens*).
TETRACYCLINES	x			Chlortetracycline	**AVI**, BOV, CAN, CAP, EQU, FEL, LEP, OVI, PIS, SUI	Yes	The wide range of applications and the nature of the diseases treated make tetracyclines extremely important for poultry. These classes alone or in combination are critically important in the treatment of a wide range of diseases (bacterial and coccidial infections).
				Doxycycline (synonyms: doxytetracycline, doxycyclin)	**AVI**, BOV, CAM, CAN, CAP, EQU, FEL, LEP, OVI, PIS, SUI	Yes	
				Oxytetracycline (synonyms: oxyterracine, oxytetracyclin, oxitetracyclin, oxyterracyne)	API, **AVI**, BOV, CAM, CAN, CRU, CAP, EQU, FEL, LEP, OVI, PIS, SUI	Yes	
				Tetracycline (synonym: tetracyclin)	API, **AVI**, BOV, CAM, CAP, EQU, LEP, OVI, PIS, SUI	Yes	
THIOSTREPTON			x	Nosiheptide	BOV	No	
				Thiostrepton	CAN, FEL	No	
HALOGENATE HYDROXYQUINOLINES				Halquinol	SUI	No	
PSEUDOMONIC ACID				Mupirocin	CAN, FEL	No	
NITROIMIDAZOLES				Metronidazole	CAN, FEL	No	
				Ornidazole	CAN	No	
				Tinidazole	CAN, FEL	No	

Annex 1. List of major pathogens and diseases affecting poultry species.

Pathogens	Examples of diseases
Bacteria	
Avibacterium (Haemophilus) paragallinarum	Infectious coryza
Bordetella avium	Bordetellosis (Turkey coryza)
Brachyspira pilosicoli	Avian intestinal spirochaetosis
Chlamydia psittaci	Avian chlamydiosis
Clostridium spp.	Botulism (intoxication and / or infection)
	Gangrenous dermatitis
	Necrotic enteritis (NE)
	Ulcerative enteritis (UE)
E. coli	Airsacculitis
	Arthritis
	Colibacillosis: local and systemic infection
	Omphalitis
Enterococcus spp.	Enterococcosis
Erysipelothrix rhusiopathiae	Erysipelas
Gallibacterium anatis (formerly *P. haemolytica*)	Respiratory disease, salpingitis
Riemerella anatipestifer	Acute to chronic septicaemia with polyserositis; Septicaemia in ducklings; Respiratory disease, salpingitis
Mycobacterium avium	Tuberculosis
Mycoplasma spp.	Arthritis
	Chronic respiratory disease (CRD)
	Mycoplasma gallisepticum infection (MG) and *Mycoplasma synoviae* (MS) infection
	Mycoplasma iowae infection
	Mycoplasma meleagridis infection (MM)
Ornithobacterium rhinotracheale	Respiratory tract infections
Pasteurella multocida	Fowl cholera
Pseudomonas aeruginosa	Septicaemia, cellulitis
Salmonella spp.	Arizonosis
	Fowl typhoid (FT)
	Paratyphoid infections (PT)
	Pullorum disease (PD)
	Salmonellosis
Spironucleus (Hexamita) meleagridis	Spironucleosis
Staphylococcus aureus	Arthritis
Streptococcus spp.	Streptococcosis
Protozoa	
Eimeria spp.	Coccidiosis
Histomonas meleagridis	Histomoniasis

Annex 2. Antimicrobial classes authorised to prevent, treat and control poultry infections

	Avibacterium paragallinarum infection	*Bordetella* spp. infection	*Brachyspira* spp. infection	*Chlamydia psittaci* infection	*Clostridium* spp. infection	*E. coli* infection	*Eimeria* spp. infection	*Enterococcus* spp. infection	*Erysipelothrix rhusiopathiae* infection	*Gallibacterium* spp. infection	*Histomonas* spp. infection	*Mycoplasma* spp. infection	*Ornithobacterium rhinotracheale* infection	*Pasteurella multocida* infection	*Spironucleus* spp. infection	*Staphylococcus aureus* infection	*Streptococcus* spp. infection
AMINOCOUMARIN																X	
AMINOCYCLITOL						X								X			
AMINOGLYCOSIDES	X					X										X	
AMINOGLYCOSIDES + 2 DEOXYSTREPTAMINE	X				X	X					X						
AMPHENICOLS	X					X						X	X	X			
CEPHALOSPORINS						X											
IONOPHORES							X										
IONOPHORES + ANTICOCCIDIAL							X										
LINCOSAMIDES					X	X		X	X			X	X	X		X	
LINCOSAMIDES + AMINOCYCLITOL					X	X						X					
MACROLIDES	X		X		X							X	X	X		X	
MACROLIDES + TETRACYCLINES												X					
ORTHOSOMYCINS					X												
PENICILLINS	X				X	X		X	X	X			X	X		X	X
PENICILLINS + MACROLIDES					X												
PHOSPHONIC ACID DERIVATIVES					X	X				X							
PLEUROMUTILINS			X		X							X					
POLYMYXINS					X	X											
POLYPEPTIDES					X												
QUINOLONES	X	X				X				X		X	X	X			
STREPTOGRAMINS					X												
SULFONAMIDES	X					X	X							X			
SULFONAMIDES + DIAMINOPYRIMIDINES	X				X	X	X		X				X	X		X	
TETRACYCLINES	X	X	X	X	X	X	X	X	X			X	X	X	X	X	