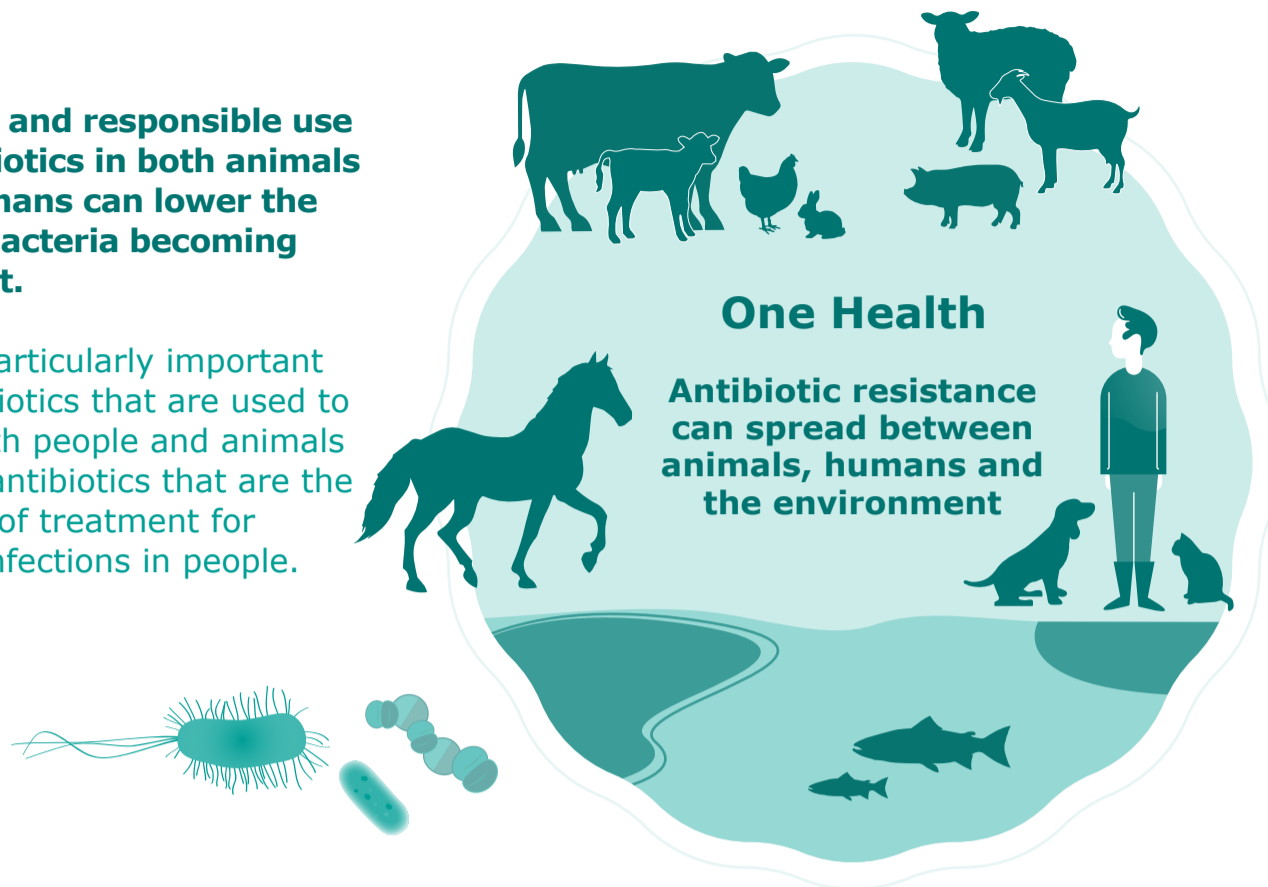


Prudent and responsible use of antibiotics in both animals and humans can lower the risk of bacteria becoming resistant.

This is particularly important for antibiotics that are used to treat both people and animals and for antibiotics that are the last line of treatment for critical infections in people.



The Antimicrobial Advice Ad Hoc Expert Group (AMEG) has categorised antibiotics based on the potential consequences to public health of increased antimicrobial resistance when used in animals and the need for their use in veterinary medicine.

The categorisation is intended as a tool to support decision-making by veterinarians on which antibiotic to use.

Veterinarians are encouraged to check the AMEG categorisation before prescribing any antibiotic for animals in their care. The AMEG categorisation does not replace treatment guidelines, which also need to take account of other factors such as supporting information in the Summary of Product Characteristics for available medicines, constraints around use in food-producing species, regional variations in diseases and antibiotic resistance, and national prescribing policies.

Category A Avoid

- antibiotics in this category are not authorised as veterinary medicines in the EU
- should not be used in food-producing animals
- may be given to companion animals under exceptional circumstances

Category B Restrict

- antibiotics in this category are critically important in human medicine and use in animals should be restricted to mitigate the risk to public health
- should be considered only when there are no antibiotics in Categories C or D that could be clinically effective
- use should be based on antimicrobial susceptibility testing, wherever possible

Category C Caution

- for antibiotics in this category there are alternatives in human medicine
- for some veterinary indications, there are no alternatives belonging to Category D
- should be considered only when there are no antibiotics in Category D that could be clinically effective

Category D Prudence

- should be used as first line treatments, whenever possible
- as always, should be used prudently, only when medically needed

For antibiotics in all categories

- unnecessary use, overly long treatment periods, and under-dosing should be avoided
- group treatment should be restricted to situations where individual treatment is not feasible
- check out the European Commission's guideline on prudent use of antibiotics in animals: <https://bit.ly/2s7LUF2>

AMEG is the acronym for EMA's Antimicrobial Advice Ad Hoc Expert Group. It brings together experts from both human and veterinary medicine. They work together to provide guidance on the impact on public health of the use of antibiotics in animals.

Categorisation of antibiotic classes for veterinary use (with examples of substances authorised for human or veterinary use in the EU)

A	Aminopenicillins mecillinam pivmecillinam	Carbapenems meropenem doripenem	Drugs used solely to treat tuberculosis or other mycobacterial diseases isoniazid ethambutol pyrazinamide ethionamide	Glycopeptides vancomycin	AVOID	
Ketolides telithromycin	Lipopeptides daptomycin	AVOID	Glycylcyclines tigecycline			
Monobactams aztreonam	Oxazolidinones linezolid		Phosphonic acid derivatives fosfomycin			
Rifamycins (except rifaximin) rifampicin	Riminofenazines clofazimine		Pseudomonic acids mupirocin			
Carboxypenicillin and ureidopenicillin, including combinations with beta lactamase inhibitors piperacillin-tazobactam	Sulfones dapsona		Substances newly authorised in human medicine following publication of the AMEG categorisation to be determined			
Streptogramins pristinamycin virginiamycin	Other cephalosporins and penems (ATC code J01DI), including combinations of 3rd-generation cephalosporins with beta lactamase inhibitors ceftobiprole ceftaroline ceftolozane-tazobactam faropenem		AVOID			
B	Cephalosporins, 3rd- and 4th-generation, with the exception of combinations with β-lactamase inhibitors cefoperazone ceftiofur cefovecin cefquinome	Polymyxins colistin polymyxin B		Quinolones: fluoroquinolones and other quinolones cinoxacin danofloxacin difloxacin enrofloxacin flumequine ibafloxacin marbofloxacin norfloxacin orbifloxacin oxolinic acid pradofloxacin		RESTRICT
C	Aminoglycosides (except spectinomycin) amikacin apramycin dihydrostreptomycin framycetin gentamicin kanamycin neomycin paromomycin streptomycin tobramycin	Aminopenicillins, in combination with beta lactamase inhibitors amoxicillin + clavulanic acid ampicillin + sulbactam		Amphenicols chloramphenicol florfenicol thiamphenicol	Macrolides erythromycin gamithromycin oleandomycin spiramycin tildipirosin tilmicosin tulathromycin tylosin tylvalosin	
Cephalosporins, 1st- and 2nd-generation, and cephamycins cefacetrile cefadroxil cefalexin cefalonium cefalotin cefapirin ceftazolidin	Lincosamides clindamycin lincomycin pirlimycin	Pleuromutilins tiamulin valnemulin		Rifamycins: rifaximin only rifaximin		
D	Aminopenicillins, without beta-lactamase inhibitors amoxicillin ampicillin metampicillin	Aminoglycosides: spectinomycin only spectinomycin		Sulfonamides, dihydrofolate reductase inhibitors and combinations formosulfathiazole phthalylsulfathiazole sulfacetamide sulfachlorpyridazine sulfaclozine sulfadiazine sulfadimethoxine sulfadimidine sulfadoxine sulfafurazole sulfaguanidine sulfalene sulfamerazine sulfamethizole sulfamethoxazole sulfamethoxypyridazine sulfamonomethoxine sulfanilamide sulfapyridine sulfaquinoxaline sulfathiazole trimethoprim		PRUDENCE
Tetracyclines chlortetracycline doxycycline oxytetracycline tetracycline	Anti-staphylococcal penicillins (beta-lactamase-resistant penicillins) cloxacillin dicloxacillin nafcillin oxacillin	Cyclic polypeptides bacitracin	Nitroimidazoles metronidazole			
Natural, narrow-spectrum penicillins (beta lactamase-sensitive penicillins) benzathine benzylpenicillin benzathine phenoxymethylpenicillin benzylpenicillin penethamate hydriodide	pheneticillin phenoxymethylpenicillin procaine benzylpenicillin	Steroid antibacterials fusidic acid	Nitrofurans derivatives furaltadone furazolidone			

Other factors to consider

The **route of administration** should be taken into account alongside the categorisation when prescribing antibiotics. The list below suggests routes of administration and types of formulation ranked from the lowest to the highest estimated impact on antibiotic resistance.

- Local individual treatment (e.g. udder injector, eye or ear drops)
- Parenteral individual treatment (intravenously, intramuscularly, subcutaneously)
- Oral individual treatment (i.e. tablets, oral bolus)
- Injectable group medication (metaphylaxis), only if appropriately justified
- Oral group medication via drinking water/milk replacer (metaphylaxis), only if appropriately justified
- Oral group medication via feed or premixes (metaphylaxis), only if appropriately justified

