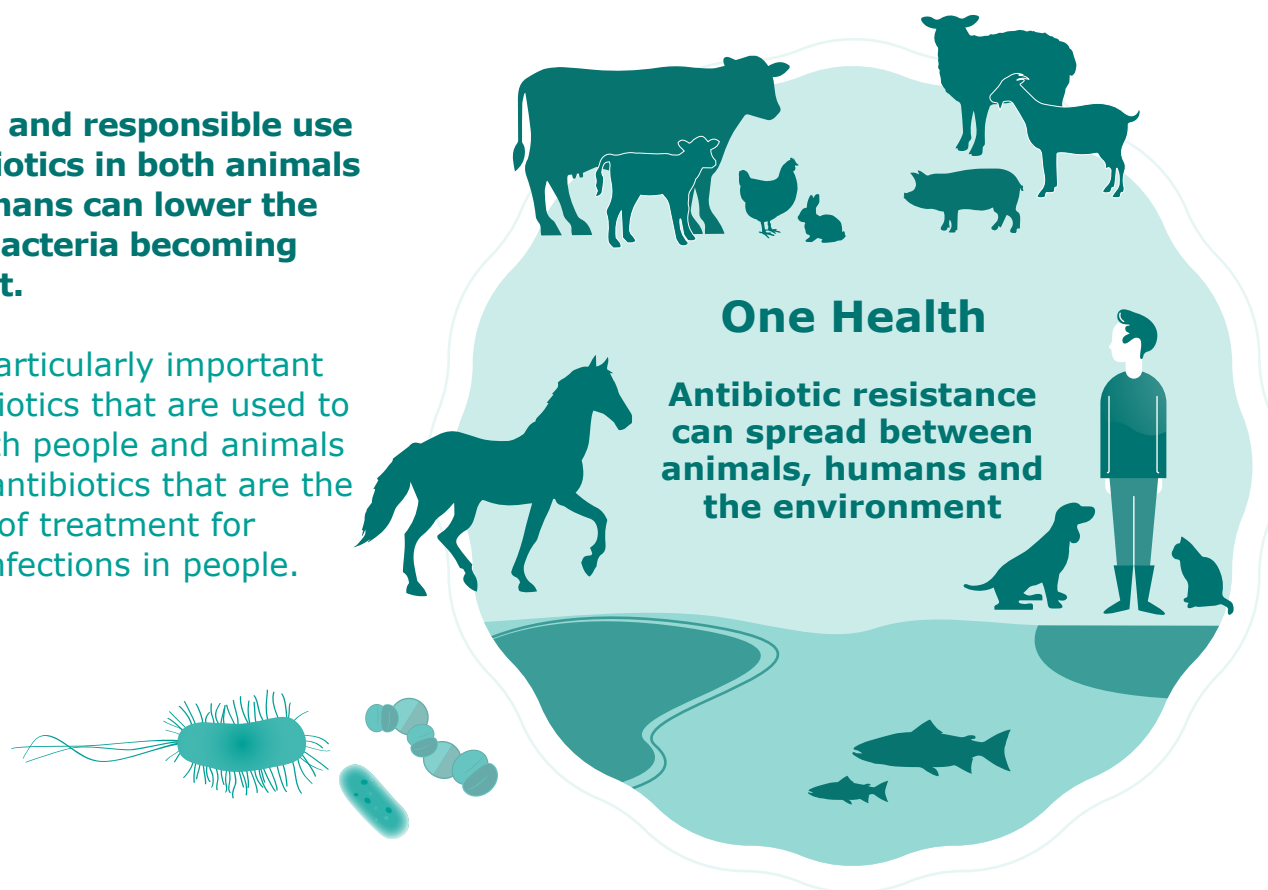


**Prudent and responsible use of antibiotics in both animals and humans can lower the risk of bacteria becoming resistant.**

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

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- 
- 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

