



Categorization of penicillins and Good Veterinary Practice for treatment of *Streptococcus suis* disease

Introduction

The European Medicines Agency (EMA) categorizes veterinary antibiotics into four groups (A-D) based on public health risk (table 1).

<p>Category A Avoid</p> <ul style="list-style-type: none">• antibiotics in this category are not authorized as veterinary medicines in the EU• should not be used in food-producing animals• may be given to companion animals under exceptional circumstances	<p>Category B Restrict</p> <ul style="list-style-type: none">• 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
<p>Category C Caution</p> <ul style="list-style-type: none">• 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	<p>Category D Prudence</p> <ul style="list-style-type: none">• should be used as first line treatments, whenever possible• as always, should be used prudently, only when medically needed

Table 1: categories of antimicrobials according to the European Medicines Agency

Veterinarians are encouraged to check this categorization before prescribing any antibiotic treatment for animals. This system helps veterinarians select appropriate, lower-risk antibiotics, prioritizing the mitigation of antimicrobial resistance (AMR) in humans. 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 people¹.

Categorisation of penicillin

Natural penicillin, like penicillin V, has a narrow-spectrum and is categorized in the lowest risk group D. It is evident that broad-spectrum aminopenicillin use increases the selection pressure towards AMR. Indeed, resistance to amoxicillin is common in *Escherichia coli* of animal and human origin, due to the abundant presence of β -lactamase genes in this bacterial species and other *Enterobacteriaceae*². Because it is difficult to estimate to what extent the use of amoxicillin in animals may contribute to negative health effects in humans, the broad-spectrum aminopenicillins are also placed in Category D rather than in Category C. At this moment, only aminopenicillins with β -lactamase inhibitors (e.g. amoxicillin + clavulanic acid) are categorized in the higher risk group C¹.

Use of penicillin in veterinary medicine and AMR

Measured in mg/PCU (population correction unit), penicillins were the second most used antimicrobial class in food-producing animals in the EU in 2018 and accounted for 28.8% of the total sales. For countries other than the Nordics, broad-spectrum penicillins (mainly represented by amoxicillin) accounted for the major proportion of penicillin sales².

Streptococcus suis management

Streptococcus suis is a highly prevalent pathogen that can cause severe symptoms in the post-weaning period of pigs worldwide. Management strategies to prevent this disease, and to minimize impacts on animal health and welfare, include improvements in hygiene in swine farms, use of vaccinations and proper diagnostics.

Antimicrobial treatment is necessary during acute outbreaks. It is estimated that *S. suis* disease accounts for about 1/3rd of the total antibiotic usage in weaner pigs in the Netherlands. Approximately 90% of the total amount of amoxicillin and ampicillin prescribed in weaner pigs is used for treatment and metaphylaxis of *S. suis* infections³.

Good Veterinary Practice for treatment of *Streptococcus suis* disease

While there are no specific recommendations to avoid use of Category D substances, there is a general recommendation that responsible use principles should be adhered to in everyday practice to keep the risk from use of these classes as low as possible. **Narrow-spectrum penicillin with a lower risk of AMR selection, like penicillin V, should be used for first-line treatment whenever possible and where susceptibility testing suggests the likely efficacy of this approach².**

References

1. Categorization of antibiotics in the European Union. EMA/CVMP/CHMP/682198/2017-Rev1 20250909
2. Reflection paper on the use of aminopenicillins and their beta-lactamase inhibitor combinations in animals in the European Union: development of resistance and impact on human and animal health. EMA/CVMP/AWP/842786/2015– 20210217
3. Dame-Korevaar A et al.. Quantification of antibiotic usage against *Streptococcus suis* in weaner pigs in the Netherlands between 2017 and 2021. Preventive Veterinary Medicine 2025;235 <https://doi.org/10.1016/j.prevetmed.2024.106400>

