

# Campylobacter antimicrobial resistance in dogs and humans

Campylobacteriosis has been the most frequently reported zoonotic disease in humans in Europe since 2005, and the annual number of notified campylobacteriosis cases has increased in many European countries in recent years. The species most associated with human infection are *C. jejuni*, followed by *C. coli*, *C. lari*, and *C. upsaliensis*.

Antimicrobial therapy may be required in severe cases, in immune-compromised patients, or in prolonged disease.

In humans, macrolides (primarily erythromycin, or alternatively clarithromycin or azithromycin) remain the frontline agents for treating culture-confirmed *Campylobacter* cases. Quinolones (e.g., ciprofloxacin) are also commonly used because of their common use in the empirical treatment of undiagnosed diarrheal illness such as travellers' diarrhoea. Tetracycline, doxycycline, and chloramphenicol are alternative treatments. Serious systemic infections should be treated with aminoglycosides such as gentamicin or beta-lactamases including carbapenem and imipenem. Third generation cephalosporins have not been proven effective for treating bacteremia due to the *Campylobacter* species other than *C. fetus*.

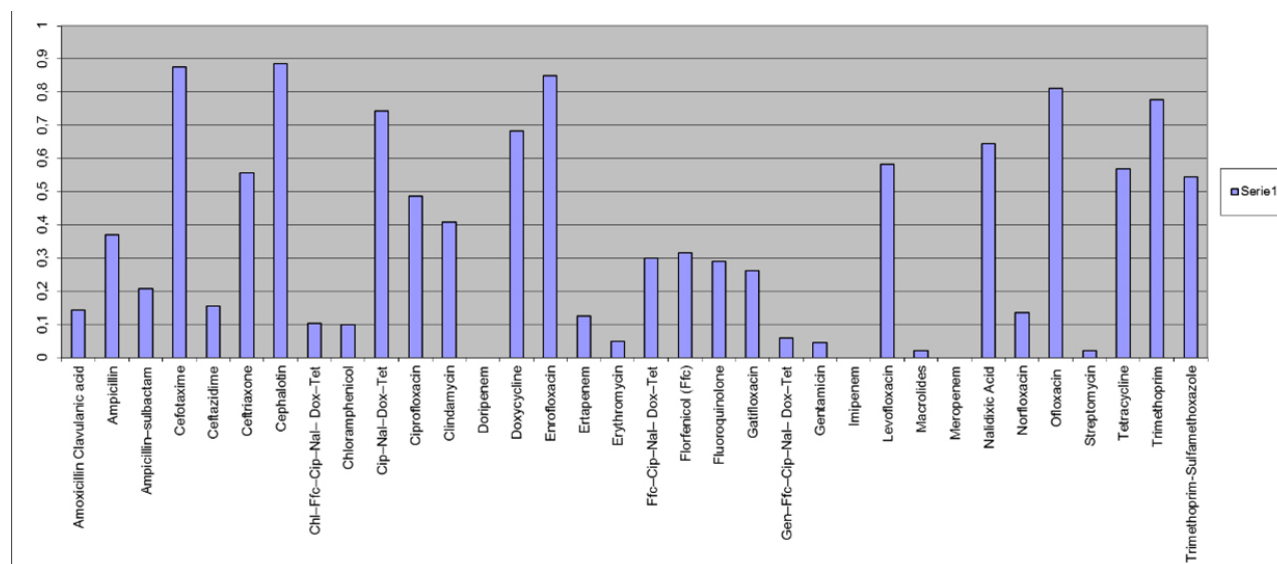


Fig. 1. Humans. *Campylobacter* antimicrobial resistance

Increasing antimicrobial resistance has made the clinical management of campylobacteriosis cases more complex. Companion animals may play an important role as a reservoir of resistant bacteria or resistance genes. Furthermore, human beings may be a reservoir of pathogens for their pets.

Antimicrobial resistance can be classified into 3 groups: intrinsic, mutational, and acquired resistance. Intrinsic resistance refers to the inherent resistance to an antibiotic. Mutational resistance occurs due to a spontaneous chromosomal mutation that produces a genetically altered bacterial population that is resistant to a drug. Resistant bacteria transfer their resistance genes to a bacteria's progeny during DNA replication. Acquired resistance refers to the horizontal acquisition of a genetic element that encodes antibiotic resistance from another micro-organism. This implies that genetic elements transfer from some outside source, such as other bacteria of the same species or even between different species.

When they reach the new host, resistant bacteria can either colonise and infect, or remain for only a very short period and can not only spread their resistance genes to other bacteria residing in the new host (commensals or pathogens), but also accept resistance genes from other bacteria.

Antimicrobial resistance amongst dogs is a complex area representing an increasing public health concern. At the crux of this critical issue is the fact that dogs often live in a close proximity to humans.

The same antimicrobials used in dogs are used in humans (Fig. 1 and Fig. 2).

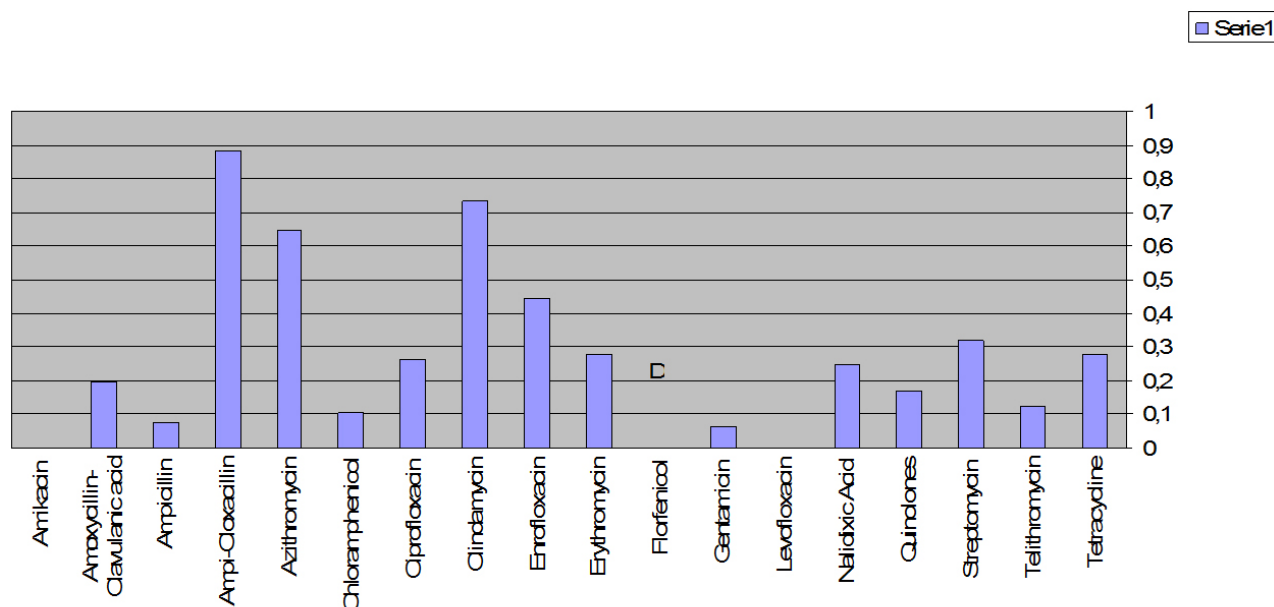


Fig. 2. Dogs. *Campylobacter* antimicrobial resistance

The major concern to both humans and animals is the resistance to macrolides, quinolones, and aminoglycosides such as gentamicin, which are the drugs used to treat serious campylobacteriosis, thus is extremely important to apply the principles of prudent use in order to contain the

development of antimicrobial resistance. It is advised that veterinarians strictly observe the instructions from the EU-COMMISSION NOTICE - Guidelines for the prudent use of antimicrobials in veterinary medicine (EU-COMMISSION NOTICE 2015):

The prescription and dispensation of antimicrobials must be justified by a veterinary diagnosis in accordance with the status of scientific knowledge.

the prescription should be based on a diagnosis made following the clinical examination of the dog by the prescribing veterinarian. Where possible, antimicrobial susceptibility testing should be carried out

Routine prophylaxis must be avoided.

All information relating to the animals, the cause and the nature of the infection, and the range of available antimicrobial products must be considered.

A narrow-spectrum antimicrobial should be the first choice unless prior susceptibility testing (where appropriate supported by relevant epidemiological data) shows that this would be ineffective.

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## **Publication**

### [Campylobacter and antimicrobial resistance in dogs and humans: "One health" in practice](#)

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*Vet Ital. 2019 Sep 30*