

PETS AND ANTIMICROBIAL-RESISTANT BACTERIA

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Infection caused by antimicrobial-resistant bacteria is a growing problem in both human and veterinary medicine. Dogs, cats, and many other pets can carry and become infected by drug resistant bacteria just like their owners. The exchange of microbes between people and animals is complex and multifaceted. While much is still unknown about these dynamics, it is important to understand the following key points:

Methicillin-Resistant *Staphylococcus* spp. Infections

Staphylococcus bacteria are common and normal inhabitants of the skin, oral cavity, and respiratory tracts of people and animals. However, they can cause a variety of opportunistic infections. *Staphylococci* can be methicillin-resistant, possessing genes that make them resistant to all antibiotics in the important beta-lactam (penicillin) class. In addition, methicillin-resistant *Staphylococcus* (MRS) may be resistant to other antimicrobials that would commonly be used to treat the infections they cause. Data from Penn Vet's Clinical Microbiology Lab shows that, since 2004, the rate of MRS isolated from infected dogs has doubled (from approximately 25% to 50%). In general, the species of *Staphylococcus* that cause disease in people and pets are different. *S. pseudintermedius* and *S. schleiferi* are the most common organisms isolated from pets, but these organisms rarely cause disease in people. In contrast, methicillin-resistant *Staphylococcus aureus* (MRSA) has become one of the most important pathogens in human health care, but is uncommon in dogs and cats. MRSA can temporarily colonize pets and potentially cause disease. It is important to always practice good hygiene when handling animals, especially when an animal is known to carry MRSA.

Extended-Spectrum Beta Lactamase (ESBL) *E. coli*

Bacteria that contain the genes that encode extended-spectrum beta lactamases are also resistant to many beta-lactam drugs. Like MRS, they are often resistant to other clinically important drugs. The organism in pets that most commonly has this type of resistance is *E. coli*. ESBL *E. coli* may be carried in the GI tract of animals. In addition, ESBL *E. coli* is an infrequent agent of urinary tract infections in dogs and can also cause skin and soft-tissue infections as well as pneumonia. Recent antimicrobial exposure and feeding of raw poultry are considered risk factors for carriage of ESBL *E. coli* in dogs. Because it is very likely that ESBL *E. coli* can move between humans and their pets, good hygiene is critical.

Other Bacterial Pathogens of Concern

Many other bacteria can be resistant to a variety of antimicrobials. The Centers for Disease Control and Prevention's [antibiotic-resistant bacterial threats list](#) includes many organisms that are not of concern in small animal medicine. Some of these organisms do not infect animals (e.g., *Neisseria gonorrhoeae* or group A *Streptococcus*). In addition, since many veterinarians consider drugs such as vancomycin or carbapenems to be reserved for human use only, resistance to these drugs (e.g., vancomycin-resistant *Enterococcus* or carbapenem-resistant *Klebsiella*) is incredibly rare in animal isolates. Some pathogens, however, such as *Pseudomonas aeruginosa*, *Campylobacter* spp., and *Clostridium difficile*, do infect small animal patients and may have drug-resistance genes.

Pet Owners and Antimicrobial Resistance

Antimicrobial resistance can make infections difficult to treat, and veterinarians are committed to the judicious use of antibiotics. This means prescribing the right antibiotic for the right organism in the right way. Pet owners can help prevent antimicrobial resistance from developing during treatment of an infection by:

- Adhering strictly to the dosing instructions for antibiotics as prescribed by their veterinarian and always completing full courses of antimicrobials.
- Supporting their veterinarian's decision to perform bacterial culture and sensitivity. This test can help determine the best antibiotic to treat a pet's infection.
- Choosing to not feed bone- and raw food-based diets.
- Understanding that a veterinarian may choose not to treat a pet with an antibiotic because an infection may be self-limiting (clears on its own) or be caused by a virus (which does not respond to antibiotics).

Together, veterinarians and pet owners can work to combat the emergence of antibiotic resistance in our pets. These efforts can ultimately lead to healthier pets, families, and homes.

TO LEARN MORE ABOUT ANTIBIOTIC RESISTANCE, PLEASE VISIT THE RESOURCE PAGE ON THE PENN VET WEBSITE: WWW.VET.UPENN.EDU/ANTIBIOTIC-RESISTANCE.

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