

Multi-drug resistant organisms can be transmitted between healthy dogs and cats and their hospitalised owners

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Heartworms are a deadly disease in both dogs and cats, but can be prevented with medication and mosquito control. Credit: Unsplash/CC0 Public Domain

Healthy dogs and cats could be passing on multidrug-resistant organisms

(MDROs; bacteria that resist treatment with more than one antibiotic) to their hospitalized owners, and likewise humans could be transmitting these dangerous microbes to their pets, according to new research being presented at this year's European Congress of Clinical Microbiology & Infectious Diseases (ECCMID) in Copenhagen, Denmark (15-18 April).

The study of over 2,800 [hospital patients](#) and their companion animals is by Dr. Carolin Hackmann from Charité University Hospital Berlin, Germany, and colleagues.

"Our findings verify that the sharing of multidrug-resistant organisms between [companion animals](#) and their owners is possible," says Dr. Hackmann. "However, we identified only a handful cases suggesting that neither cat nor [dog ownership](#) is an important risk factor for multidrug-resistant organism colonization in hospital patients."

The role of pets as potential reservoirs of MDROs is a growing concern worldwide. Antimicrobial resistance happens when infection-causing microbes (such as bacteria, viruses or fungi) evolve to become resistant to the drug designed to kill them. Estimates suggest that antimicrobial resistant infections caused almost 1.3 million deaths and were associated with nearly 5 million deaths around the [world in 2019](#).

In this [case control study](#), researchers wanted to find out whether pets (ie, cats and dogs) play a role in the infection of hospital patients with MDROs.

They focused on the most common superbugs in hospital patients—methicillin-resistant *Staphylococcus aureus* (MRSA), vancomycin-resistant enterococci (VRE), 3rd generation cephalosporin-resistant Enterobacterales (3GCRE) and carbapenem-resistant Enterobacterales (CRE), which are resistant to multiple antibiotics including penicillin and cephalosporins.

Between June 2019 and September 2022, nasal and rectal swabs were collected from 2,891 patients hospitalized in Charité University Hospital Berlin (1,184 patients with previous colonization or colonization on admission and 1,707 newly admitted patients as controls), and from any dogs and cats that lived in their households.

Genetic sequencing was used to identify both the species of bacteria in each sample, and the presence of drug resistance genes. Whole genome sequencing was used to confirm the possible sharing of resistant bacteria.

Participants were also asked about well-known risk factors for MDROs (e.g., recent MDRO infections or use of antibiotics, recent hospital stays, presence of urinary or [central venous catheters](#)), as well as information about the number of pets in the household, the closeness of contact and pet health.

Overall, 30% (871/2,891) of hospital patients tested positive for MDROs, and 70% (2,020/2,891) tested negative. The rate of dog ownership was 11% (93/871) and cat ownership 9% (80/871) in those who tested MDRO-positive, and 13% (267/2,020 and 253/2,020 respectively) in MDRO-negatives.

All 626 pet owners were asked to send throat and stool swab samples of their pets. Overall, 300 pet owners sent back samples from 400 pets. Of these samples, 15% (30/203) of dogs and 5% (9/197) of cats tested positive for at least one MDRO. In four cases, MDROs were phenotypically matching (MDROs were the same species and showed the same antibiotic resistance) between pets and their owners.

Whole genome sequencing confirmed that only one of the matching pairs were genetically identical in a dog and its owner. The matching pathogen was 3GCR *Escherichia coli* (common in the intestines of

healthy people and animals).

"Although the level of sharing between hospital patients and their pets in our study is very low, carriers can shed bacteria into their environment for months, and they can be a source of infection for other more vulnerable people in hospital such as those with a weak immune system and the very young or old," says Dr. Hackmann.

This is an observational study and cannot prove that close contact with pets causes colonization with MDROs, but only suggest the possibility of co-carriage, while the direction of transfer is unclear. The authors point to several limitations, including a possible under-reporting of MDRO colonization in pets due to problems in taking swab samples, which was done by the pet owners themselves. Finally, the study results apply to the setting of [hospital](#) patients in an [urban area](#) and therefore may not be applicable to the general population or MDRO high risk groups like livestock farmers.

Provided by European Society of Clinical Microbiology and Infectious Diseases

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