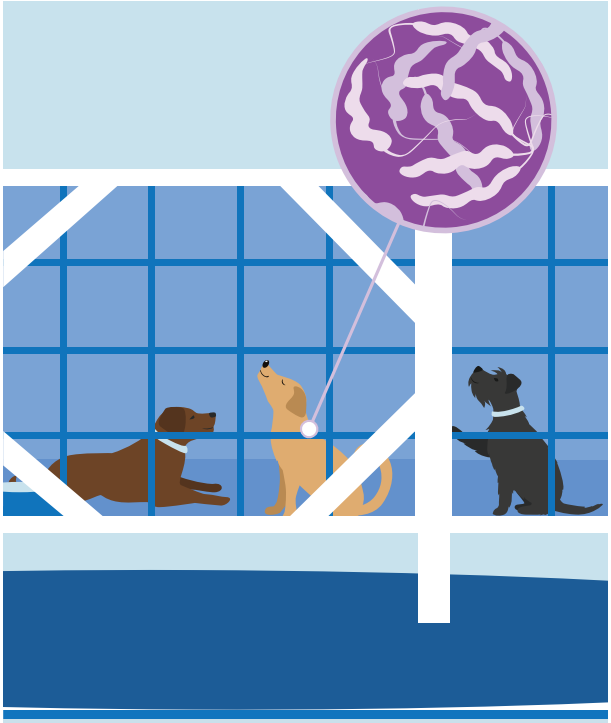
Assessing *Campylobacter* Burden in Dogs

TO PREVENT OUTBREAKS IN PEOPLE

A project by Iowa State University, funded through CDC's Antibiotic Resistance Solutions Initiative.



In recent years, CDC has responded to multidrug-resistant *Campylobacter jejuni* illness outbreaks in people linked to pet store puppies. From 2016 to 2018, these multistate outbreaks resulted in 118 illnesses in 18 states.

People with *Campylobacter* infection usually have diarrhea (often bloody), fever, and stomach cramps. Symptoms usually go away on their own, but some people can develop severe illness and require antibiotic treatment.

Dogs with *Campylobacter* infections may have diarrhea, loss of appetite, and lethargy. Some dogs and puppies may not show any signs of infection but can still spread the pathogens to people.

Campylobacter infection in dogs usually does not require antibiotic treatment. However, dogs can develop these signs for other reasons, and, without diagnostic testing, antibiotics may be used when not needed. Administering antibiotics when they are not needed contributes to antibiotic resistance.

SNAPSHOT

- The project assessed prevalence and antibiotic susceptibility patterns of *Campylobacter* in dams and puppies in breeding kennels. A survey asked dog breeders about antibiotic use and infection control practices.
- The results provided information regarding *Campylobacter* occurrence, antibiotic resistance, and use of antibiotics in breeding kennels.
- Implementing infection control measures and antibiotic stewardship practices in puppy breeding operations may reduce *Campylobacter* infections and the spread of antibiotic-resistant infections among dogs and to people.

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RESULTS

Among 430 fecal samples
from seven kennels with 106 puppies and 13 dams

- 16 (3.7%) samples were positive with *Campylobacter jejuni*
- 42 (9.8%) samples were positive with *Campylobacter upsaliensis*

Among 32 *C. jejuni* isolates and 58 C. upsaliensis isolates
from positive samples in kennels

- All *C. jejuni* isolates were susceptible to the nine antibiotics tested.[1]
- Most *C. upsaliensis* isolates were susceptible to the antibiotics tested.
  - 5 (8.6%) showed decreased susceptibility to ciprofloxacin, a first-line treatment for infections in people. Of these, 2 isolates showed decreased susceptibility to additional antibiotics.[2]
  - Genetic analysis using whole-genome sequencing showed these isolates had a genetic mutation that can convey resistance to fluoroquinolones (an important antibiotic in human medicine).

Among 16 breeders who responded to the survey

- 12 (75%) cleaned kennels daily. The other 4 (25%) cleaned weekly.
  - 3 (19%) did not use disinfectants for cleaning.
- 14 (88%) use antibiotics. The most common reasons for use were ear infections, diarrhea, and prevention of diarrhea in high stress conditions.
  - 6 (43%) gave for disease prevention (before disease is observed in any animals).
  - 6 (43%) gave before shipping or selling.
  - 3 (21%) gave for disease control (treatment in group of animals after disease observed in one).
  - 3 (21%) gave at time of breeding.
- Of the 14 breeders that reported using antibiotics:
  - 6 (43%) made antibiotic use decisions independently.
  - 3 (21%) made antibiotic use decisions working with a veterinarian.
  - 5 (36%) deferred to veterinarians to make antibiotic use decisions.

FUTURE DIRECTIONS

These findings lay the groundwork for further study of the emergence and transmission of *Campylobacter* strains and antibiotic resistance in the commercial dog breeding process. The survey, while limited in sample size, provides insights on antibiotic use and infection control practices in breeder operations that could lead to the emergence of multidrug-resistant *Campylobacter* and can be used to inform prevention strategies.

Improving standardized infection control practices could help prevent the spread of diarrhea among puppies, reducing a top reason breeders use antibiotics. Overall, the results indicate a need to reduce unnecessary antibiotic use in breeder kennels. CDC is working with partners to address this need.

[1] Azithromycin, ciprofloxacin, erythromycin, gentamicin, tetracycline, florfenicol, nalidixic acid, telithromycin, and clindamycin.

[2] Gentamicin, tetracycline, and clindamycin

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