Although *Campylobacter* are common in Ontario sheep, few strains were resistant to important human antibiotics

**What is this research about?**

*Campylobacter* is a family of disease-causing bacteria that are one of the most frequent causes of bacterial gastroenteritis ("stomach flu") in humans in North America. The *Campylobacter* species most commonly associated with disease in humans are *Campylobacter jejuni* (*C. jejuni*) and *Campylobacter coli* (*C. coli*). A number of different livestock species, including sheep, can carry these bacteria in their digestive tracts, and therefore may pose a public health risk. The risk to human health is also increased if the bacteria are resistant to the antibiotics that would otherwise be effective at treating infections. Sheep carrying *Campylobacter* do not typically show signs of infection or disease, although certain members of this bacterial family (*e.g.* *C. foetus foetus*, and some strains of *C. jejuni*) are important causes of abortion in ewes. These bacteria are transmitted between sheep through contamination of the environment from aborted sheep fetuses, placentas, or discharge from the uterus. Few studies have examined patterns of antimicrobial/antibiotic resistance (AMR) in sheep, and little research has investigated the link between antimicrobial/antibiotic use (AMU) in sheep and AMR in *Campylobacter* taken from healthy Canadian sheep.

**What did the researchers do?**

The researchers took fecal (stool) samples from sheep and lambs in 51 flocks across southern Ontario, including one feedlot. Flocks were enrolled in the study for 12 months, and fecal samples (pooled for all sheep in a single pasture or pen) were collected at the beginning and end of the study period. Next, *Campylobacter* species were isolated from these samples and identified, and then each isolated strain was tested for its resistance to nine antibiotics important for human health. Sheep producers were asked to keep treatment records for all antimicrobial/antibiotic treatments, including medicated feeds, and a questionnaire provided information on flock size and farm management practices. Finally, the researchers attempted to make a mathematical model of the relationship between AMU and AMR.

**What you need to know:**

*Campylobacter* bacteria were frequently found in healthy Ontario sheep. Although 41.5% of *C. jejuni* strains were resistant to at least one antibiotic, resistance to the antibiotics most important for human health was infrequent. No link between antimicrobial use and antibiotic resistance was discovered.
What did the researchers find?
Of the 283 composite fecal samples collected in total, *Campylobacter jejuni* was found in 52%, *Campylobacter coli* in 7%, and *Campylobacter lari* in 1%. Of the isolated *C. jejuni* strains, 39% were resistant to tetracycline, 4% to ciprofloxacin or nalidixic acid, and 1% to telithromycin. In isolated *C. coli* strains, 74% were resistant to tetracycline, and 5% to azithromycin, clindamycin, erythromycin, or telithromycin. The single isolated strain of *C. lari* was resistant to nalidixic acid. Researcher found no significant links between AMU and AMR.

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How can you use this research?
Sheep producers can use this research to better understand the prevalence of *Campylobacter* bacteria in healthy Ontario sheep, and the rates of antibiotic resistance among these bacteria.

Public health agencies can use this research to better understand the human health risks posed by sheep carrying *Campylobacter* and resistance to antibiotics important for human health among these bacteria.

Infectious disease researchers can further this research by investigating the links between antimicrobial/antibiotic use and antibiotic resistance in a larger study of *Campylobacter* in healthy sheep.

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