



CIPARS 2019 Executive Summary – Key Findings

The Canadian Integrated Program for Antimicrobial Resistance Surveillance (CIPARS) monitors trends in antimicrobial use and antimicrobial resistance in select bacterial species from people, animal, and food sources across Canada. In addition to this Executive Summary-Key Findings document, CIPARS is releasing 6 other documents this year: the Integrated Findings Report, the Figures and Tables Report, the Broiler Chicken Report, the Turkey Report, the Pig Report and the Design and Methods document. We are working to incorporate new tools and processes for a more rapid and user-friendly approach to communication of surveillance findings.

Integrated antimicrobial use

New Health Canada regulations required manufacturers, importers, and compounders to report annual sales of medically important antimicrobials intended for use in animals. To meet this requirement, the Public Health Agency of Canada and Health Canada designed and developed the online reporting tool: the Veterinary Antimicrobial Sales Reporting (VASR) System. The VASR system collects data on volumes of antimicrobials (national and provincial-level data), and the averaged total quantity sold or compounded by animal species.

Between 2018 and 2019, the overall sale of antimicrobials (kg) intended for use in production animals decreased by 11% and decreased by 12% when accounting for the number of animals and their weights (animal biomass). Between 2018 and 2019, sales of antimicrobials intended for use in pigs, poultry, and fish decreased, whereas sales for use in cattle, horses, cats and dogs, and small ruminants increased. After adjusting for the underlying biomass, there were approximately 1.4 times more antimicrobials sold for use in production animals (food animals and horses) than for people.

Integrated antimicrobial use and resistance

CIPARS integrates farm surveillance data across AMR, AMU and herd/flock mortality for broiler chickens, grower-finisher pigs, and turkeys. The occurrence of resistance to 3 or more antimicrobial classes was substantially unchanged, except for turkeys where resistance in *Salmonella* to 3 or more classes decreased between 2018 and 2019. For antimicrobial use, there was a general decreasing trend in overall reported antimicrobial use (disease prevention, disease treatment and growth promotion) without any changes to herd or flock mortality. However, the reported use of antimicrobials for disease treatment increased between 2018 and 2019.

Integrated antimicrobial resistance

***Salmonella* Enteritidis and nalidixic-acid resistance from humans**

Nalidixic acid resistance in *S. Enteritidis*, the most common serovar from sick people, has been increasing since 2014. Linking resistance data from CIPARS with case history data from FoodNet Canada showed that nalidixic acid resistant *S. Enteritidis* was more common in people with a history of travel outside of Canada. Whole genome sequencing may further explain the potential relationship of travel with the detection of nalidixic acid-resistant *S. Enteritidis*.



Salmonella Enteritidis and nalidixic acid resistance from broiler chicken

Starting in 2018 and continuing in 2019, there was an increase in the detection of nalidixic acid resistant *S. Enteritidis* from broiler chicken. Historically, these isolates from CIPARS have been fully susceptible. Although the absolute number of isolates were few ($n = 12$), this was an important new observation as there was detection from multiple provinces and surveillance components.

Increase of highly drug-resistant Salmonella from both people and animal sources

We continued to see an increase in *Salmonella* resistant to 6 or 7 of the 7 antimicrobial classes tested from both people and animal sources (although the absolute numbers of isolates were few; $n = 153$). *Salmonella* Heidelberg resistant to 5 or more antimicrobial classes from healthy cattle on Alberta feedlots were detected for the first time (although a small number of isolates; $n = 7$). Previously, CIPARS did not detect resistant *Salmonella* from healthy Canadian feedlot cattle. The resistant *S. Heidelberg* were recovered from pens with Holstein (dairy-origin) cattle from the United States. It is important to note that whole genome sequencing showed no relationship between these cattle isolates and human *S. Heidelberg* isolates. The finishing of US-origin Holstein cattle is a new practice in Canada.

Other findings of note

Broiler chickens

Resistance to ceftriaxone from *E. coli* and *Salmonella* isolates decreased across all CIPARS surveillance components (farm, abattoir and retail) for broiler chickens.

Farm surveillance of healthy chickens: For *E. coli*, resistance decreased from 32% (2013) to 7% (2019); for *Salmonella*, resistance decreased from 22% (2013) to 8% (2019). Despite this national trend, there was an increase in resistance to ceftriaxone from *Salmonella* isolates from the Prairies from 1% (2015) to 18% (2019).

Abattoir surveillance of healthy chickens: For *E. coli*, resistance decreased from 38% (2010) to 3% (2019); for *Salmonella*, resistance decreased from 32% (2013) to 8% (2019).

Retail surveillance of chicken meat: Decreases in resistance to ceftriaxone from *E. coli* and *Salmonella* were observed since 2015 in British Columbia and Québec. For *E. coli* in each province, resistance decreased from 14-15% (2015) to 6% (2019). For *Salmonella* from British Columbia, resistance decreased from 31% (2015) to 9% (2019); from Québec, resistance decreased from 12% (2015) to 2% (2019). There were not enough samples from other provinces to comment on changes in retail trends.

Beef cattle

Resistance to ciprofloxacin from *Campylobacter* isolates increased across CIPARS surveillance components (farm and abattoir) for beef cattle. Note: CIPARS does not sample retail beef for *Campylobacter* because of a historic very low prevalence of recovery from those samples.

Farm surveillance of healthy beef cattle: Farm surveillance for healthy beef cattle started in Alberta in 2016, and expanded to include Saskatchewan and Ontario in 2019. For isolates from Alberta,



resistance to ciprofloxacin from *Campylobacter* increased from 9% (2016) to 26% (2019) with similar frequencies of resistance observed in Saskatchewan (33%) and Ontario (28%) for 2019.

Abattoir surveillance of healthy beef cattle: Resistance to ciprofloxacin from *Campylobacter* increased from 5% (2015) to 20% (2019).

New surveillance activities

CIPARS, in collaboration with academic and industry partners, is participating in the Canadian Dairy Network for Antimicrobial Stewardship and Resistance project in the major dairy producing regions of Canada. The objectives include the establishment of a framework for ongoing farm-level data and sample collection, and the reporting of trends in antimicrobial use and resistance to support improved stewardship in the dairy production sector. Data collection activities are underway.

CIPARS surveillance in Canadian beef cattle is conducted with provincial and industry partners. The objectives are farm-level data and sample collection, reporting trends in antimicrobial use and resistance, and collating data to assess public and animal health risks of antimicrobial use in the finishing feedlot sector. Data collection and reporting activities are underway.

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