

Summary of: Antimicrobial use in lactating sows, piglets, nursery, and grower-finisher pigs on swine farms in Ontario, Canada during 2017-2018

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Key Points:

- Understanding antimicrobials use (AMU) in food animals is necessary for the development of good antimicrobial stewardship practices and prevention of antimicrobial resistance
- Antimicrobials can be used for disease prevention or treatment and, at the time of the study growth promotion AMU was still permitted in Canada.
- Pig production in Ontario had the highest quantity of AMU was administered via feed for all production types, with the most common antimicrobial active ingredient varying by production type

Antimicrobials play an important role in disease prevention and disease treatment in swine production. The use of antimicrobials in food-animals is linked to the development of antimicrobial resistance in enteric bacteria. Good antimicrobial stewardship practices are vital for reducing the risk of antimicrobial resistance. No recent studies have examined antimicrobial use (AMU) during the earlier stages of pig production in Ontario, CA, which is one of the top three pork-producing provinces. Antimicrobials can be used in healthy pigs for disease prevention or growth promotion, or in clinically ill pigs for disease treatment. Many countries including Canada no longer permit the use of medically important antimicrobials for growth promotion. At the time of this study growth promotion use was still permitted in Canada (ceased Dec., 2018). This study aimed to determine which antimicrobial active ingredients are currently used in farrowing, nursery, and grower-finisher herds in the province of Ontario, Canada. It also aimed to estimate the frequency and quantity of AMU in each production stage using frequency measures, and weight, and dose-based metrics.

Data was collected on herd demographics, biosecurity, health statuses, and AMU during one production cycle from 25 farrowing and 25 nursery herds in Ontario, between May 2017 and April 2018, and from 23 Ontario grower-finisher herds during the same time frame from the Public Health Agency's Canadian Integrated Program for Antimicrobial Resistance Surveillance. We applied frequency measures, and weight, and dose-based metrics to the data.

In all pigs, the highest quantity of AMU was administered in-feed. By all routes of administration and compared to other production stages, nursery pigs used more antimicrobials in mg/kg biomass and the number of Canadian defined daily doses per 1000 pig-days (dose_{ca} rate), while grower-finisher pigs used more antimicrobials in total kilograms and the number of Canadian defined daily doses per pig. The antimicrobial active ingredient (AAI) used by the highest percentage of farms in sow feed, creep feed, and nursery feed was chlortetracycline (12%, 56%, and 72%, respectively). Lincomycin was used by the highest percentage of farms in grower-finisher feed (43%). By injection, procaine penicillin G was used by the highest percentage of farms in sows, suckling pigs, nursery pigs, and grower finisher pigs (52%, 56%, 52%, and 26%, respectively). In water, amoxicillin was used by the highest percentage of nursery farms (20%), and penicillin G potassium was used by the highest percentage of grower-finisher farms (9%). In this study population, most herds administered antimicrobials by at least one route of administration, with nursery herds having the highest frequency of administration of antimicrobials by any route, and grower-finisher herds the lowest. The most common route of administration of antimicrobials, measured as percentage of herds, was in-feed for nursery and grower-finisher pigs, and by injection for sows and suckling pigs. The injectable route of administration was most frequently used for individual animals, however some sow herds routinely administered antimicrobials by injection to entire litters for disease prevention. For nursery and grower-finisher pigs, in-water was the least frequent means of administration, however, the quantity of antimicrobial used in-water was higher than by injection due to administration to groups of pigs rather than individuals.

Also of interest was the effect of metric choice on the ranking of antimicrobials and production stages by quantity of use. Findings indicate that while more kilograms of antimicrobials overall were used in grower-finisher pigs and they received more doses of antimicrobial per pig, nursery pigs received more milligrams of antimicrobial per kg of pig produced and the dose rate was high in nursery pigs, suggesting that the intensity of use is high in the nursery phase of pig production in Ontario. As observed in this study, the choice of metric used to quantify AMU can influence the results obtained, which could influence subsequent antimicrobial stewardship decisions. The findings of this study will help provide a basis for further investigation into AMU in pigs in Ontario, and in the other major pig producing provinces of Canada.

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