Antimicrobial resistance in fecal generic *Escherichia coli* in 90 Alberta swine finishing farms: prevalence and risk factors for resistance

Varga, C., Rajić, A.,1,2 McFall, M.,3 Avery, B.,4 Reid-Smith, R.,1,2 Deckert, A.,1,2 Checkley, S., and McEwen, S.1

1Department of Population Medicine, University of Guelph, Ontario N1G 2W1
2Laboratory for Foodborne Zoonoses, Public Health Agency of Canada, Guelph, Ontario N1G 3W4
3Food Safety Division, Alberta Agriculture, Food and Rural Development, Edmonton, Alberta T7H 4P2

The objective of this retrospective study was to determine the prevalence of antimicrobial resistance (AMR) in generic *Escherichia coli* isolates obtained from 90 Alberta finisher swine farms, and to evaluate the potential associations between on-farm antimicrobial use (AMU) practices and observed AMR. The farms were visited three times, approximately one month apart (n=269 farm visits). In total, 5 pen fecal samples were collected per each visit and mixed into one pool per visit. Conventional culture and susceptibility testing were employed. Reported AMU practices through feed, water and injection in different phases of pig production, were collected using a questionnaire. Of the 1322 isolates, 166 (12.56%) were susceptible to all 15 antimicrobials. No resistance to amikacin, ceftiofur, ceftriaxone, ciprofloxacin, or naladixic acid was observed. This is an encouraging finding from a public health perspective. Lower frequencies of resistance were observed to gentamicin (1.1%), amoxicillin/clavulanic acid (0.7%), and cefoxitin (0.7%). Higher frequencies of resistance were observed for tetracycline (78.9%), sulfisoxazole (49.9%), streptomycin (49.6%), ampicillin (30.6%), chloramphenicol (17.62%), kanamycin (10%), and trimethoprim/sulfamethoxazole (6.4%). Most of the aforementioned antimicrobials are members of drug classes frequently used in veterinary medicine. Therefore, both judicious antimicrobial selection and use is needed when treating animals to preserve their efficacy. The most common multidrug-resistant patterns (resistance to ≥ 2 antimicrobials) were streptomycin-tetracycline (9.38%), streptomycin-sulfisoxazole-tetracycline (6.20%), and ampicillin-streptomycin-sulfisoxazole-tetracycline (6.15%). More clustering (less variation) in AMR was observed at the farm visit than the farm level indicating that sampling more farms with longer periods of time between farm visits might be required for better understanding of shifts in AMR over time. Risk factor analysis on the potential associations between certain on-farm AMU practices and observed AMR has been initiated and the results will be presented at the Symposium.

*Laboratory for Foodborne Zoonoses
Public Health Agency of Canada
160 Research Lane, Unit 103
Guelph, Ontario N1G 5B2
Phone: 1-519-826-2980
Fax: 1-519-826-2255
E-mail: andrijana_raji@phac-aspc.gc.ca