

OBJECTIVES OF 3 FEEDLOT CATTLE-RELATED ANTIMICROBIAL RESISTANCE (AMR) &/OR ANTIMICROBIAL USE (AMU) PROJECTS IN WESTERN CANADA



Feedlot Health
Management Services

Feedlot Health is currently participating in the following 3 collaborative studies. Results for each study will be presented once completed. The Canadian Beef Industry and Feedlot Health continue to be leaders in promoting and supporting antimicrobial stewardship in feedlot cattle.

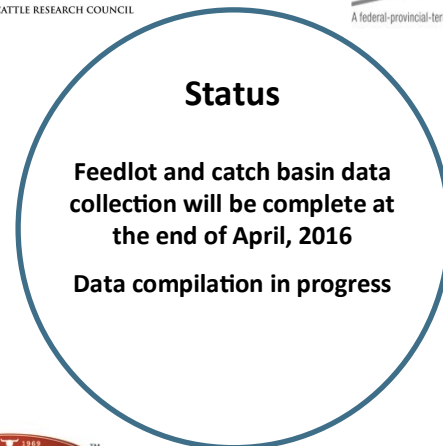


Surveillance of *E. coli*, enterococci, AMR and *Enterococcus* species distribution in beef operations-associated environments (Investigator Dr. T. McAllister)

2013-2018: Objectives

- 1) Identify *E. coli* and *Enterococcus* spp, determine the AMR profiles and evaluate human clinical enterococcus isolates
- 2) Genetically characterize enterococci from human, livestock, environment and retail
- 3) Determine association between AMU info and AMR info from indicator bacteria (*E. coli* and enterococci)
 - Enterococcus species can give us info on macrolide use (e.g. tulathromycin, tylosin, tilmicosin), while *E. coli* cannot because of natural macrolide resistance
- 4) Determine nature of AMR genes and mobile genetic elements in metagenomic (microbial community) samples

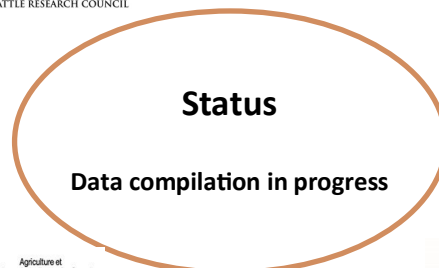
Sample collection: feedlot cattle feces, catch basin water, up and downstream surface water, processing plant, retail meat (4 feedlots sampled every 2 months for 2 years)



Describe/understand collection of AMU data from a representative population of the Canadian feedlot sector using *iFHMS* (Investigator Dr. S. Hannon)

2015-2018: Objectives

- 1) Provide robust AMU estimates for Canadian feedlot cattle (~2.2 million cattle represented based on 2008-2012 data)
- 2) Interpret AMU data and relate these to feedlot production practices (data for 36 feedlots)
- 3) Compare/validate Population Corrected Unit (PCU), a metric commonly used internationally to estimate use, to actual AMU in feedlot cattle
- 4) Investigate the feasibility/logistics of collecting electronic AMU data and determine the most meaningful parameters to report



Assessing water quality, microbial risks and waterborne pathogens in rural Alberta using a One Health framework (Investigator Dr. S. Checkley)



2016-2019: Objectives

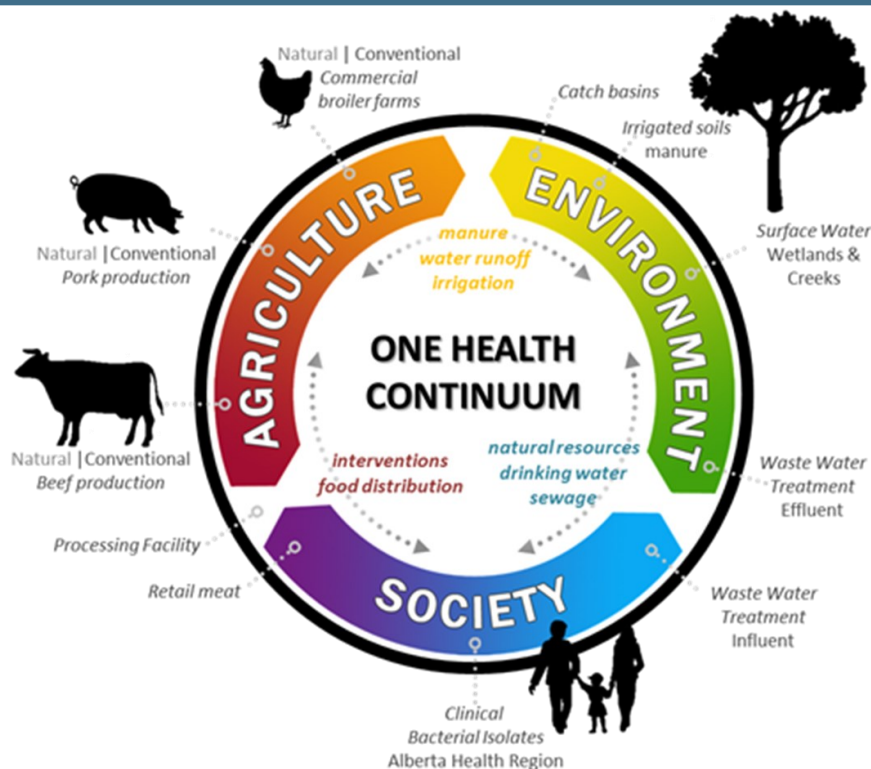
- 1) Identify total coliforms (*E. coli*), Shiga toxin-producing *E. coli* (STEC), *Enterococcus* spp, *Campylobacter* spp, *Salmonella* spp and viral pathogens, and determine *E. coli* AMR profiles in the human drinking well water
- 2) Describe temporal and spatial patterns of STEC and resistant organisms
- 3) Assess epidemiological risk factors associated with well water contamination
- 4) Examine livestock producers' perception of water quality and contamination and the influence of perceptions on management practices related to water contamination

Sample collection: 30 feedlots, 30 poultry, 30 cow/calf farms, including cattle and poultry feces, human drinking well water

10-12 Feedlot Health feedlots sampled once a year for 3 years

Status

Feedlot and poultry farm data collection ongoing



Removing gaps in knowledge, making practical data collection recommendations, improving understanding of AMU and AMR in Canadian feedlot cattle, and disseminating these data in a variety of mediums are all meant to provide transparency on feedlot production practices and to support beef production, international trade, and access to antimicrobials for Canadian producers

We would like to thank collaborators including the University of Calgary, Colorado State University, the University of Guelph, the Alberta Provincial Laboratory for Public Health, Alberta Agriculture and Forestry, Agriculture and Agri-Food Canada and the Public Health Agency of Canada.

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