On-Farm Research Studies

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Introduction

• Studies began in 2011- completed in 2015
• Funded by FDA as part of NARMS
• Large and complex study
  – Multiple scientists- from both government and academic institutions
Goal

• Evaluate the relationship of food safety bacteria between on-farm isolates and in-plant isolates
• Determine the feasibility of a study on food borne pathogens and AMR to be performed long term on farms
Goals (cont.)

• Use as point for obtaining on-farm antimicrobial use information

• Evaluate the logistical challenges and the potential value in adding a pre-harvest component to NARMS
Overview

- Species evaluated:
  - Dairy cattle
  - Beef cattle
  - Poultry – broilers and turkeys
  - Swine
Dairy Cattle

• On farm and cull cow sampling
• Research conducted by Drs. Van Kessel, Karns and Harhay (ARS) and Drs. Wolfgang and Hovingh (Penn State)
• Studies conducted in Pennsylvania
• Cultured Salmonella and *E. coli*
Dairy Cattle (cont.)

• 3 studies conducted:
  – Study 1: determine optimal sample collection and culture methods
  – Study 2: Collected samples from 2 commercial dairy farms and a slaughter facility
  – Study 3: Sampling a cross section of the dairy herds
    • Pre-weaned calves
    • Post-weaned calves
    • Dry cows
    • Lactating cows
Beef Cattle

- Objectives:
  - Three sample types
  - Variability of AMR between cattle operations
  - Determine the prevalence, statistical variation, and AMR across feedlots in Texas and NE

- Research conducted by: Drs. Loneragan (TTU), Schmidt (ARS) and H. Morgan Scott (KSU/Tex A&M)
Beef (cont.)

- Sampled for: *E. coli* and Salmonella
- Assessed for carbapenemase and ESBL resistance genes
- One study investigated the potential presence of extra intestinal *E. coli* associated with HUT infections
Poultry

• Broilers and turkeys
• Drs. Hofacre (UGA) and Singer (U of MN)
• Testing for Salmonella and Campylobacter
• 3 studies – 2011-present
• Dr. Singer is continuing this project
Swine

• Objectives:
  – Impact of normal lairage practices on Salmonella and Campylobacter
  – Uptake of AMR bacteria at lairage and cecal samples

• Research conducted by Drs. McKean, Frana, Logue, O’Connor (ISU) and Cray and Plumblee (ARS/NC State)
Swine (cont.)

• Study design: truckloads of pigs directly from farm at slaughter
  – Samples collected at:
    • Directly from truck
    • 6 additional samples from holding area at lairage
    • Cecal sample at slaughter
Results

• Data for each study will be published by scientists
• High prevalence of foodborne pathogens – *E. coli* and Salmonella present in all species of animals
• Most isolates were pan-susceptible to all antibiotics
• AMR bacteria found in all species
• No significant levels of carbapenamase or ESBL resistant bacteria found
• No extra intestinal *E. coli* associated with HUT found
Conclusions

• Limited sampling – a small snapshot
• On-farm sampling protocols need to be developed for each species and production type
• Obtaining data requires the trust of the producers that the data and information will be held confidential
• Educating industry and producers the rationale for collecting the data is required
Questions and Thank you!

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