A pilot study for animal sampling in NARMS

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Pilot Studies

- In 2011-2012, USDA, FDA, and university scientists initiated pilot studies to inform revisions to on-farm sampling designs within NARMS

- Goals:
  - Pilot the “process” of sustainably collecting on-farm samples, performing primary isolation, and shipping isolates to FDA for sensitivity testing
  - Provide preliminary data in poultry, beef and dairy cattle to help define sources of variation in prevalence and AMR
  - Bring in epidemiology expertise to collaborate with microbiologists
On-Farm Sampling

- Broilers and turkeys for *Campylobacter* and *Salmonella* using bootsock sampling
- Feedlot cattle for *E. coli* and *Salmonella* using fresh fecal pats and cecals
- Dairy cattle for *Salmonella* and *E. coli* using 1) on-farm and 2) longitudinal (on-farm to buying station to slaughter plant)
- Swine conducted in collaboration with Russell Research Center and OSU
Design

- Convenience sample based on higher production regions
- Mix of cross-sectional and longitudinal to capture variation between animals and between farms
- Primary isolation and culture- Isolates sent to FDA for sensitivity analysis
- Test coding scheme (blinded)
Dairy (~2.5%)
Broilers (~43%)
Turkey (~40%)
Feedlot (~66%)
Dairy Sampling Scheme 2

cross-sectional: 320 samples/period
(2 periods = 640 samples)

longitudinal: 400 samples total
The Good and the Ugly
Preliminary results

- Poultry- 20% Salmonella and 65% Campylobacter.
- Feedlot- E. coli, almost 100%, Salmonella varied by region- Salmonella was around 60% in south.
- Close to 60% pan-susceptible, Range of 1 up to 9 antibiotics that are resistant
Preliminary Thoughts

- “Process” still needs work to facilitate rapid exchange of samples, isolates and data
- On-farm sampling is labor intensive but offers a mechanism for sporadic animal monitoring
- Long term collaboration with industry is critical
- Consortia take energy and coordination
Final analysis of AMR data will allow us to design sampling scheme focused on most relevant sources of variation and the question to be answered
- Amount of variation directly informs sample size
- On-farm sampling enables the implementation of focused, short-term research questions
- Consortia provide support and collaboration for future projects
Current and Future Plans

- Finalize animal sampling plan and solicit stakeholder input
- Refine and expand consortium
- Pilot antibiotic use survey on-farm
- Developing a research component into NARMS (e.g. prevalence of ESBL, intervention)
- Assess sources of variation at the slaughter (matched pair design)
Conclusions

- Pilot studies have provided data to contribute to the future NARMS plan
- A “consortium” of expertise will enable interactions among industry, academia, and government and future research
- Voluntary AMR monitoring on-farm is complicated and resource intensive