

A pilot study for animal sampling in NARMS

**Mary. E. Torrence DVM, Ph.D., DACVPM
National Program Leader, Food Safety**


Pilot Studies

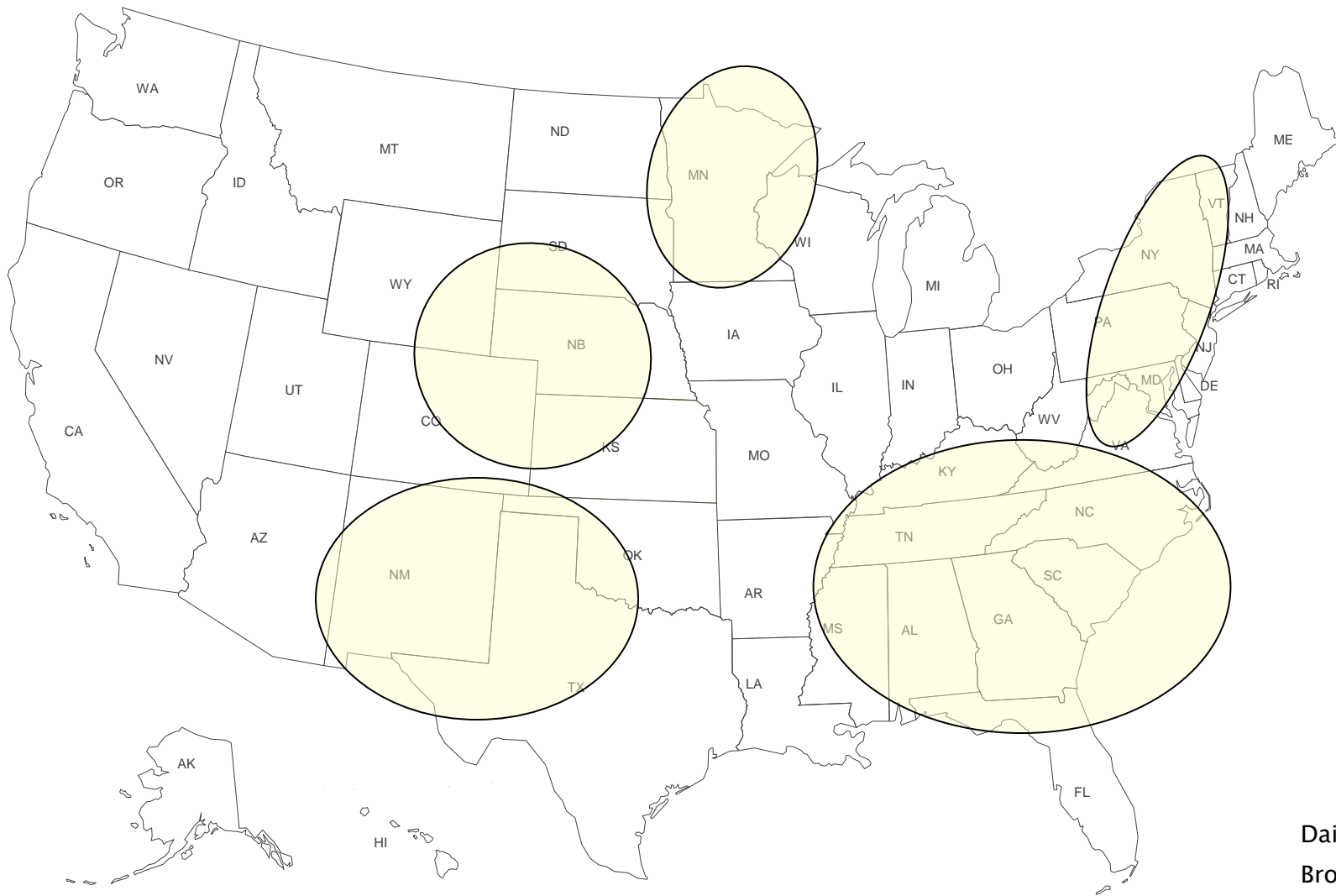
- In 2011- 2012, USDA, FDA, and university scientists initiated pilot studies to inform revisions to on-farm sampling designs within NARMS
- Goals:
 - Pilot the “process” of sustainably collecting on-farm samples, performing primary isolation, and shipping isolates to FDA for sensitivity testing
 - Provide 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

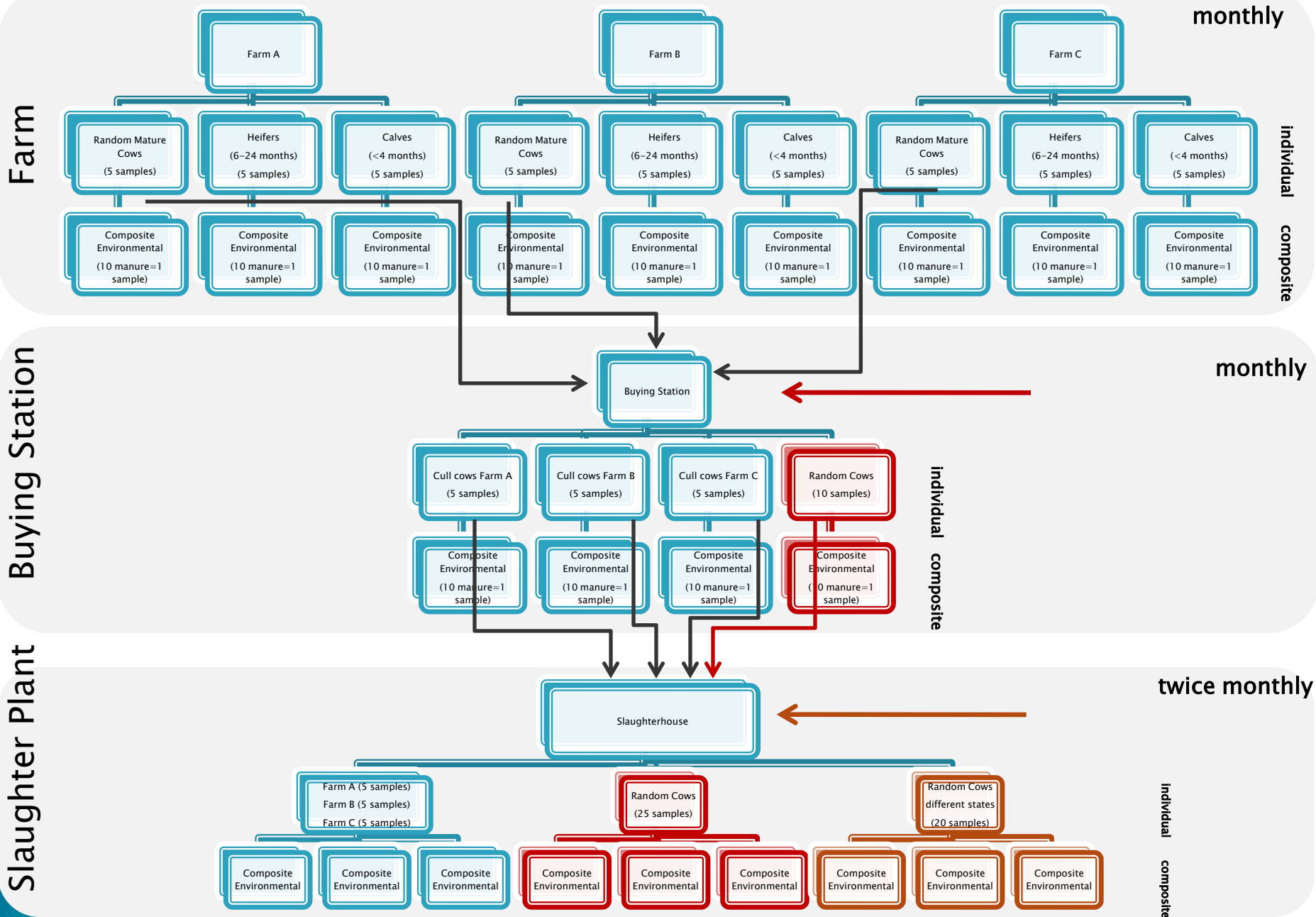
Design

- ▶ **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)**
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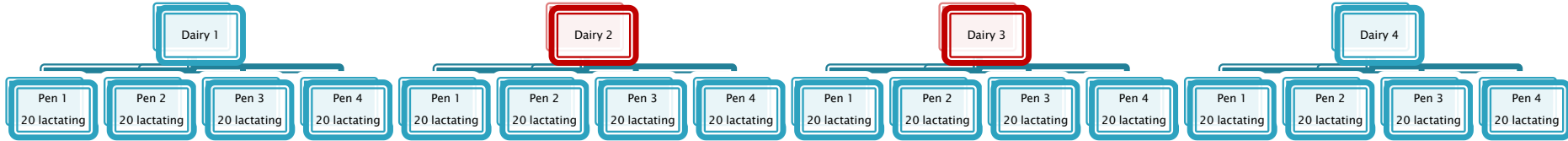
Dairy (~2.5%)
Broilers (~43%)
Turkey (~40%)
Feedlot (~66%)

Dairy Sampling

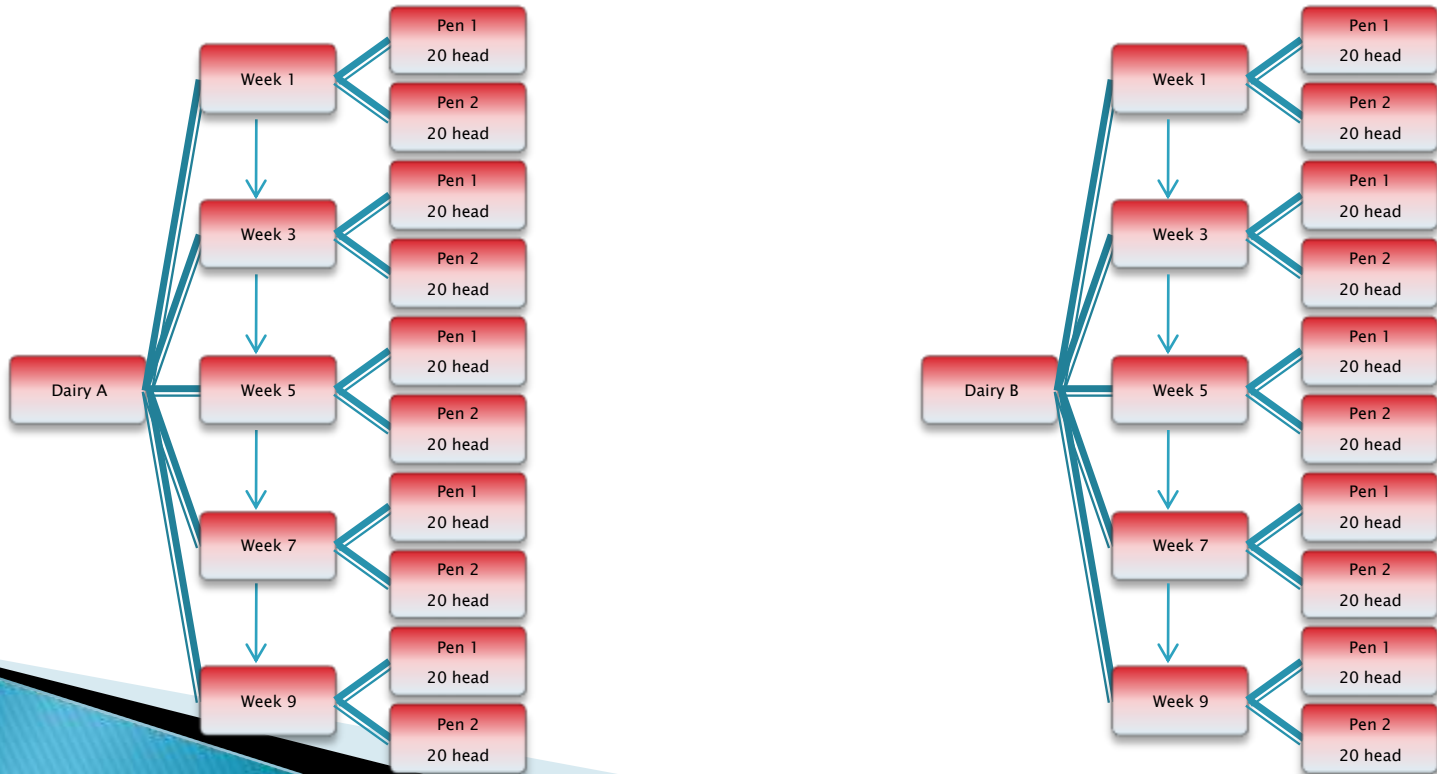


Dairy Sampling Scheme 2

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

Preliminary Thoughts

- 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)
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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
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