Salmonella Heidelberg: An Emerging Problem in the Dairy Industry

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Salmonella in Humans

- Estimated 1.2 million cases occur each year
  - 42,000 culture confirmed cases reported annually in U.S.
  - 11% of infections are due to contact with animals (CID 2012; 54:S472-9)

Symptoms: diarrhea, fever, abdominal cramps;
- Can be invasive and lead to blood stream infections
- Infection and severe illness more common in children, elderly, immune-compromised persons

Duration of symptoms: usually 4-7 days

Transmission: food, zoonotic (animal contact), person-to-person, water, environment.
Salmonella Heidelberg

- Not all Salmonella behave the same!!!
- Current outbreak started in 2015
- Peaked in summer of 2016
- 47 humans cases confirmed in 14 different states
- 30% of confirmed cases required hospitalization
- 33% of hospitalizations were children under age 5
- 66% of confirmed cases had direct contact with dairy beef calves that were sick from Salmonella Heidelberg vs. national average of 11% for other Salmonella
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*n = 36 for whom information was reported as of 3/10/2017. Some illness onset dates have been estimated from other reported information.
2016-2017

S. Heidelberg isolates submitted by WVDL to WSLH for PFGE subtyping

Updated 4/5/17
Salmonella Heidelberg

Dairy beef calves (37 of 44 (84%) cases confirmed by WVDL)

History of trucking to calf raising facility

Start dying 5-10 days post-arrival at calf raising facility. Typically 7-14 days of age

Colostrum (FPT) not protective

Death loss 20-65%

Die 4-8 hours after first noticed to be ill or found dead

Die of a generalized bacteremia/septicemia (invasive disease)

Diarrhea not a consistent finding
Salmonella Heidelberg

Grossly: May see enlarged mesenteric lymph nodes and occasionally peritonitis as well

Histologically may see a suppurative enteritis and lymphadenitis (mesenteric LN)

Mild interstitial pneumonia

MDR: Only susceptible to gentamicin

Proper cleaning and disinfection of affected premises and trucks problematic

Probiotics: May help
Final Thoughts

• Not all Salmonella behave the same
• It is **very important** to know the serotype.
• Calf killers (well managed herds)
  - *Salmonella* Dublin (D1)
  - *Salmonella* Heidelberg (B)
  - *Salmonella* Schwarzengrund (B)
  - *Salmonella* Newport (C2)
• Cow killers (well managed herds)
  - *Salmonella* Newport (C2)
Final Thoughts

- More Veterinary Diagnostic Laboratories need to do serotyping.
- Collaboration of State Veterinary Diagnostic Laboratories with Public Health Laboratories and CDC is essential.
- Need Agriculture equivalent of PulseNet for Salmonella and other zoonotic disease pathogens.
- Salmonella vaccines (important tool).
- Proper cleaning (biofilm removal) using low pressure foam cleaning and disinfection (contact time and concentration) are obligatory (high risk areas) in affected herds.
- Verification cleaning done properly (ATP meter).
- Biggest problem is inadequate facilities (sanitary) design for proper C&D.
ATP Meter