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Project Title: Vertical Transmission of *Salmonella* in Dairy Cattle

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Objective: To investigate vertical transmission of *Salmonella enterica* from the dam to various tissues of healthy, viable full-term calves.

Experimental Design & Analysis:

A convenience sample of twenty Holstein calves were collected immediately post-parturition at a commercial dairy located in the High Plains. Calves were immediately euthanized and placed on a disinfected surface for necropsy. Samples were aseptically collected into plastic bags and placed on ice for transport to the laboratory. Tissues included peripheral (right and left femoral and pre-scapular) and mesenteric lymph nodes (LN), and liver and spleen tissue. Additionally, tissue and luminal contents were collected from the spiral colon, small intestine, cecum and rectum. A fecal grab sample was collected from the dam prior to parturition.

Key Results:

Two hundred and twenty samples were collected from 20 full-term calves over 2 sample collections in August ($n=88$) and September ($n=132$). Eleven unique samples were taken from each neonatal calf. *Salmonella* was recovered from at least one sample in 50% of neonates, and from 12.7% ($n=28$; 95% CL= 12.67, 12.72%) of all samples and 95% of fecal samples from the dams. The prevalence of *Salmonella* recovered from various tissues was 10, 10, 5, 15, and 15% for femoral LN, pre-scapular LN, mesenteric LN, spleen and liver, respectively. The prevalence of *Salmonella* in gastrointestinal samples was 5, 30, 20 and 20% for small intestine, cecum, spiral colon and rectum, respectively. Multiple serogroups were present with the primary serogroups consisting of C₁ (42%), C₂ (30%), E₁ (15%) and other (13%).

Industry Application:

Our understandings of the ecology of *Salmonella* has grown dramatically recently and this research adds important new knowledge. The data herein provide novel insights that indicate vertical (transplacental) transmission of *Salmonella* to the fetus without notably affecting viability. This has two important implications: 1) host adaption may allow some *Salmonella* to avoid normal immunological responses to foreign organisms; and 2) exposure to *Salmonella* appears to occur before birth. This raises challenges for control, but also illuminates areas for further research to interrupt the transmission dynamics of *Salmonella*.

Figure 1. Prevalence of *Salmonella* by sample type collected from 20 full-term calves.

