

NNYADP Research Results Highlight an Opportunity for Improved Antibiotic Stewardship on Dairy Farms

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Calf diarrhea (scours) is reported to be one of the two biggest challenges on U.S. dairy farms and likewise, on NNY dairy farms. A 2017 Northern New York Agricultural Development Program (NNYADP) research project titled “Calf Health Treatment Protocols, Compliance and Economic Impact on NNY Dairy Farms” indicated that calves between the ages of 8 and 31 days were most commonly treated with antibiotics for diarrhea.

Diarrhea can be caused by a variety of different enteropathogens, including bacteria (*E. Coli*, *Salmonella*), viruses (coronavirus, rotavirus), and protozoa (cryptosporidium). Identification of the diarrhea-associated pathogen(s) can be difficult to achieve on-farm yet many producers make the decision to treat affected calves with antibiotics. Broad-spectrum antibiotics have proven to be an effective treatment plan for calves affected by some bacterial diarrhea; however, antibiotics will not treat viral, protozoal, or parasitic agents. Antibiotic treatment of viral, protozoal, or parasitic diarrhea is not only an ineffective and unnecessary cost to the farm, but also may increase the chance of antibiotic resistance on-farm. Despite this, research conducted in 2019 in NNY confirmed that the most common use for antibiotics on-farm was for the treatment of diarrheic calves.

Over the past decade, considerable focus has been placed on antibiotic use in production animals with a heavy focus on antibiotic resistance. It is important to note that the aim of this research was not to discredit the efficacy of antibiotic treatment or to suggest that antibiotics should not be used for diarrheic calves. Rather, the objective of this research was to identify an opportunity to minimize antibiotic use in situations where the animal will not benefit. Lastly, it is universally recommended that free choice water provision and electrolyte therapy are beneficial for supportive care of calves with diarrhea. Therefore, a secondary objective was to characterize how often each of these practices (antibiotic use and water and electrolyte therapy) are part of normal calf management and if there is opportunity to apply these practices more efficiently on NNY farms.

This research was funded by the NNYADP program in 2020. Overall, 90 fecal samples were collected from diarrheic calves and submitted for diagnostic testing. Of those 90 samples, 72 were from calves that were treated with antibiotics, and 18 were from calves that were not treated with antibiotics.

The prevalence of pathogens infecting pre-weaned calves was variable across the region (Figure 1). The most prevalent pathogen across farms was Rotavirus, with 61.1% of calves sampled testing positive. The least common pathogen was *Salmonella* with only 5.6% of calves sampled testing positive. The *Salmonella* isolates included *Salmonella muenster* and *Salmonella kiambu*.

Interestingly, of the calves that were sampled and treated with antibiotics (n=72), only 33% of those calves required antibiotic treatment based on the identified pathogen, i.e., bacterial species

(Figure 2). However, this assumes that all cases of *E. Coli* and *Salmonella* were suitable candidates for antibiotic treatment, which is not necessarily the case. Out of all the calves sampled (n=90), 89.6% had free choice access to water, and approximately 61.7% were administered electrolytes (Figure 3).

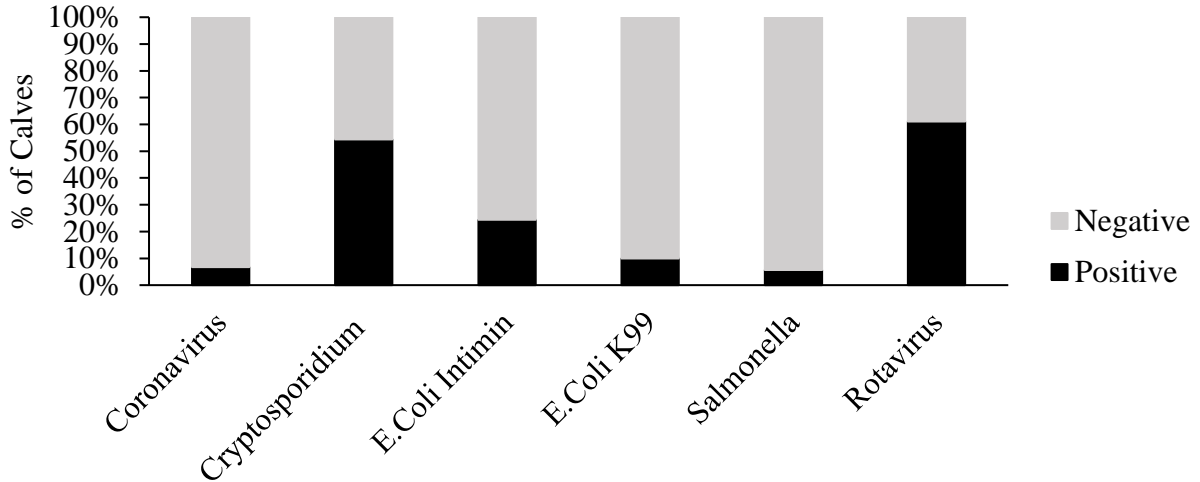


Figure 1. Prevalence of various pathogens infecting neonatal calves on NNY dairy farms, NNYADP project, 2020.

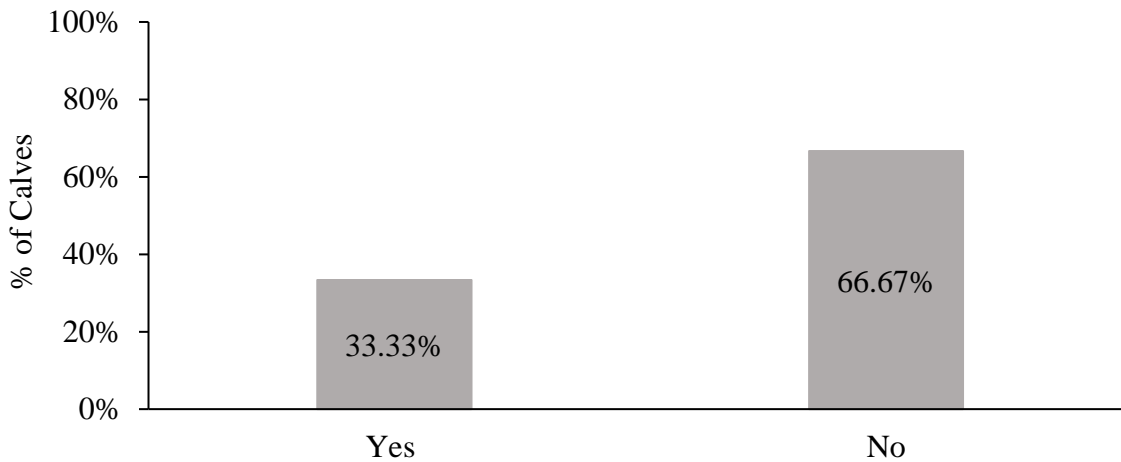


Figure 2. Percentage (%) of calves sampled and treated that required antibiotic treatment based on pathogen identified in the fecal sample.

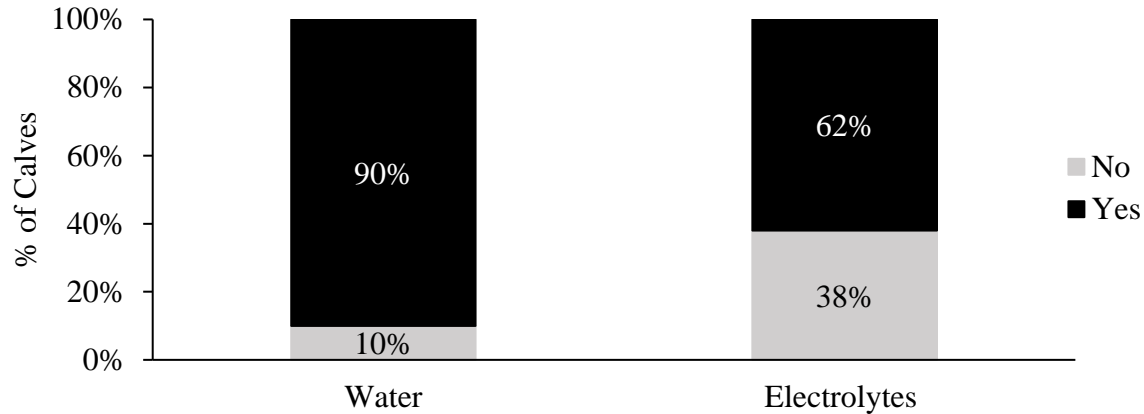


Figure 3. Water and electrolyte administration for diarrheic neonatal calves on participating NNY dairy farms.

Overall, it was impactful to determine the frequency of potentially unnecessary antibiotic usage for diarrheic calves on these NNY dairy farms. Antibiotic usage in agriculture is a topic that has received a lot of attention over the past several years as consumers are becoming more aware, and concerned, about antibiotic resistance. Recently, Wemette et al. (2021) surveyed 1,000 US public citizens on their perceptions of antibiotic usage in the dairy industry. Of those that responded, 90.7% reported that “antibiotic usage on dairy farms pose some level of threat to human health” and 71.5% reported that “they would be willing to pay more for milk produced from cows raised without antibiotics” (Wemette et al., 2021). These findings highlight the importance for dairy farmers to improve their antibiotic stewardship and present an opportunity for herds to continue to work with their veterinarians on treatment protocols for calves with diarrhea.

A second objective of this research was to determine the frequency of electrolyte usage and water provision for diarrheic calves. Overall, the results from this portion of the study are promising as 89.6% of calves had access to water, and 61.7% were given electrolytes. Dairy producers should be reminded that water provision starting at 3 days of age is now a mandatory requirement according to the FARM 4.0 requirements. Additionally, keeping calves hydrated using electrolytes is a very cost-effective and efficient way of helping calves recover from a case of infectious diarrhea.

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