

## How well does Tri-Shield<sup>®</sup> First Defense<sup>®</sup> perform in a robust, controlled rotavirus challenge?

### QUICK READ

- A study published in the *Journal of Dairy Science*, “Effect of passive antibodies derived from rotavirus-like particles on neonatal calf diarrhea caused by rotavirus in an oral challenge model,” was designed to answer two questions for calves challenged orally with rotavirus:
  1. What is the level of protection from disease severity and duration using rotavirus antibodies in colostrum-deprived calves (USDA approval trial)?
  2. What is the level of protection from disease severity and duration using the combination of colostrum and Tri-Shield<sup>®</sup>?
- Under a strong rotavirus challenge, calves that received colostrum plus Tri-Shield experienced the fewest symptoms by far, with only 7% of calves contracting severe diarrhea for 0.9 days.
- The trial for Tri-Shield was conducted at Cornell University under highly controlled conditions. Researchers enrolled clean calves to assure there was as little contamination after birth as possible. Calves were born into clean plastic sheets, immediately removed from the dam, and transported to the Cornell Research Facility where each calf was housed separately, not sharing any water, feed equipment or airspace.
- First Defense products, including Tri-Shield, are overseen by the USDA under the same strict guidelines as vaccines. To get USDA approval, products must prove safety and efficacy through independent trials.

## Tri-Shield Trial

### THE GROUPS

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**Group 1:** No colostrum, just milk replacer

**Group 2:** No colostrum, milk replacer plus rotavirus antibodies (same as found in Tri-Shield)

**Group 3:** Received colostrum plus Tri-Shield

### STUDY DESIGN

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All groups received their first feeding within six hours of birth.

All were orally infected with rotavirus three hours after initial feeding.

## INTERPRETING THE DATA

Group 1 and Group 2 are a direct comparison. Group 3 should be looked at as an indirect comparison due to the number of variables changed. Group 1 and Group 2 were both colostrum-deprived while Group 3 received colostrum and Tri-Shield, which provides *E. coli/K99*, coronavirus and rotavirus antibodies, not just rotavirus antibodies like Group 2. All three groups were orally challenged with rotavirus using the identical protocol.

## LEARNINGS

Scours severity and duration: The rotavirus challenge was strong. In Group 1, 86% of calves developed severe diarrhea for a period of 2.7 days. In Group 2, 57% of calves had severe diarrhea for a period of 1.7 days. Group 3 had only 7% of calves with severe diarrhea for 0.9 days.

## ROTAVIRUS SHEDDING

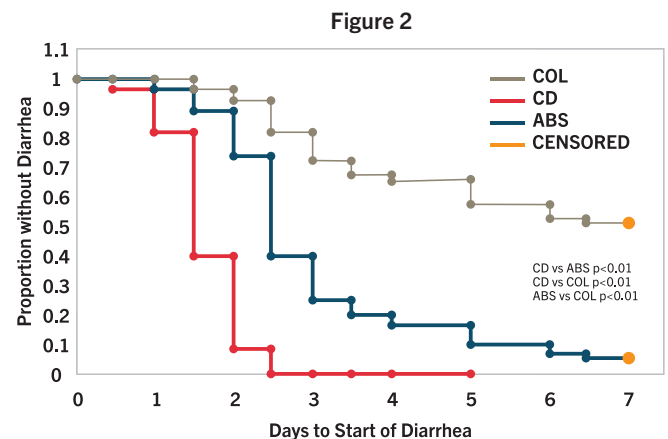
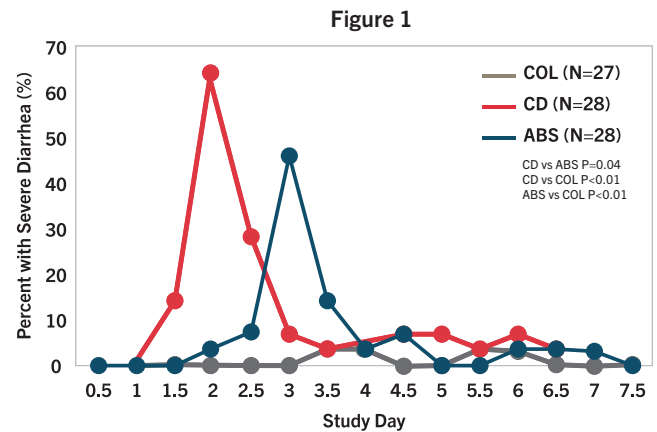
The difference in shedding pattern between Group 1 and Group 2 is characterized by Group 1 peak shedding at 3.5 days post-infection versus Group 2 at 5.5 days post-infection. Group 3 shows peak shedding at 6.5 days, and there is a reduction in peak shedding by one order of magnitude.

## Relevance to Your Calves

Group 3 better represents a real-life scenario. Looking at the outcomes, we can see that in this severe oral rotavirus challenge the combination of commercial colostrum with Tri-Shield protected 93% of calves from severe diarrhea, reduced overall disease length by 1.8 days and reduced shedding of rotavirus. Tri-Shield in combination with commercial colostrum protects your calves during a severe rotavirus challenge.

**Figure 1.** Percent of calves with severe diarrhea by study day. Severe diarrhea are those calves with fecal score = 3. CD = colostrum-deprived and received milk replacer only; ABS = colostrum-deprived and received milk replacer mixed with antirotavirus antibody for the first feeding; COL = colostrum replacer mixed with antirotavirus, anti-*Escherichia coli* K99, and anticoronavirus antibodies for first feeding.

**Figure 2.** Kaplan-Meier plots of time to onset of diarrhea by treatment group. CD = colostrum-deprived and received milk replacer only; ABS = colostrum-deprived and received milk replacer mixed with antirotavirus antibody for the first feeding; COL = colostrum replacer mixed with antirotavirus, anti-*Escherichia coli* K99, and anticoronavirus antibodies for first feeding.



## SOURCES

1. Department of Population Medicine and Diagnostic Sciences, College of Veterinary Medicine, Cornell University, Ithaca, NY 14853
  2. Department of Biomedical Sciences, Cornell University, Ithaca, NY 14853
  3. ImmuCell Corporation, Portland, ME 04103
- J. Dairy Sci.* 104 – Effect of passive antibodies derived from rotavirus-like particles on neonatal calf diarrhea caused by rotavirus in an oral challenge model