

Immune Stimulant Therapy May Reduce Pneumonia in Transported Calves

If you transport calves to a heifer grower or move them on your home farm, new research shows that administration of an immune stimulant (IS) prior to the move may reduce the need for respiratory disease treatments during the first month of life. Calf mortality may be reduced as well.

These are some of the findings of a clinical trial on Jersey and Jersey-cross calves, funded in part by the AJCC Research Foundation, and led by Dr. Luciano Caixeta of the University of Minnesota. The study was carried out by scientists from Minnesota, Texas Tech University, Alabama A&M University and the Universidad CEU Cardenal Herrera in Valencia, Spain. Its objective was to determine if a non-specific IS administered prior to transport would improve health and performance following the move and decrease calf mortality during the rearing period.

The 1,305 Jersey and Jersey-cross calves that completed the study were born at nine different sites from the same dairy system in Minnesota, treated between 3-5 days of life, then transported to a growing facility in New Mexico. Calves received one of three treatments: a saline inoculation (control), an IS injection before transport to a grower facility, or an IS injection upon arrival at the grower facility.

Caixeta and his team found no statistical differences in health scores (respiratory and fecal) or average daily gain among the test groups. However, calves that received IS therapy prior to movement required fewer treatments for pneumonia than untreated calves, with respective rates of 4.4% and 7.5%. As well, mortality was lower among calves that received IS therapy, with death rates of 0.9% for treated calves and 2.3% for untreated calves.

Scientists surmise the unrealized improvements in health scores and average daily gain were due to several factors, including stellar herd management and calf age at transport. The overall good health of the calves yielded a smaller study group

and smaller statistical differences than anticipated. As well, the early timing of calf movement preceded the window of opportunity for critical disease, which occurs at about two weeks-of-age, when disease resistance from maternal antibodies has dropped substantially and calf antibodies have not reached levels that can ward off disease.

The good news is that IS therapy is useful, even in the best managed herds and even when calves are transported shorter distances. With a published retail price of about \$5 per injection, it can be strategically included in pre-move protocol to curtail one of the most prevalent and

economically important diseases to dairy calves.

Additionally, studies like this help the dairy industry put its best foot forward to address consumer concerns about the use of antibiotics and development of resistant pathogens. The research investment by Jersey breeders is a win-win for everyone.

Study Design

Immune stimulants have emerged as an alternative to disease treatment because they activate the innate immune system and provide a first line of defense for newborns.

Among the commercial products available to dairy producers is a mycobacterium cell wall fraction licensed as Amplimune (NovaVive Inc., Napanee, Ont.). It has been approved for the reduction of clinical signs and mortality associated with K99 Escherichia coli diarrhea in neonatal calves and was the therapy used in the Caixeta trial.

Calves in the study were born in Minnesota between March and December 2018 and immediately separated from their dam after birth, weighed, fed four liters of colostrum within six hours of birth, and transported to a temporary facility for 3-4 days. They were housed in individual hutches bedded with straw inside a large cross-ventilated barn. Calves were fed 1.8 liters of a reconstituted milk replacer (27% crude protein, 25% crude fat on a dry matter basis) twice daily and ad libitum water in individual feeding bottles. Depending on study group, one-milliliter treatments were administered within two hours before or two hours after transportation to the grower facility.

At the grower facility in New Mexico, calves were housed in individual hutches bedded with straw, received 1.8 liters of a reconstituted milk replacer (27% crude protein, 22% crude fat on a dry matter basis) twice daily and had ad libitum access to water and calf starter throughout the rearing period.

Calf health was evaluated weekly for

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Get your calves packed and ready for their trip, whether it is cross country to a heifer grower or a pen move on the home farm, with immune stimulants prior to the move. This therapy may reduce respiratory disease and the need for antibiotics during the rearing period.

Immune Stimulant Therapy

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the first three weeks post transport using a health scoring system adapted from McGuirk and Peek at the University of Wisconsin. Body weights were taken at nine weeks-of-age. According to farm protocol, calves were considered sick when clinical signs, including weakness, depression, rectal temperatures over 104°F, difficult, shallow, or rapid breathing, dehydration, nasal discharge, diminished appetite, coughing, or watery stools were observed.

Study Results

Overall, the research team found no statistical differences in weekly health scores when comparing the three groups over three weeks nor were there any differences in average daily gain when comparing treatments during the rearing period.

As a group, 196 calves (15%) were treated at least once for any disease and just 18 calves (1.4%) died during the first nine weeks of life. Of the 266 treatments administered, pneumonia accounted for 61.3% of them, diarrhea for 35% and both diseases at the same time for 3.7% of treatments.

Though the team observed no differences in the odds of receiving a disease treatment across all experimental groups, they did find that more calves in the control group received disease treatments around 15 days-of-age as compared to calves that received IS therapy.

Dr. Caixeta and his team believe the lack of statistical significance for some of the analysis is likely a consequence of inadequate sample size. The calves in the study received an adequate amount of good quality colostrum, were housed individually, and transported at a young age. Few calves required treatment and calf mortality was low. The most stressful event in this

multiple herds with treatment and mortality rates higher than was used for this trial.

The publication can be read in its entirety free-of-charge at <https://222.frontiersin.org/articles/10.3389/fvets.2020.550202/full>.

The AJCC Research Foundation

The AJCC Research Foundation has funded studies like this, to address issues relative to the Jersey breed and Jersey owners, since it was established in 1988. In the years since, more than \$1 million has been appropriated for such research, with seed money averaging \$8,900 per project since 2011.

Researchers who desire to submit proposals for funding in 2022 may do so by filing an application by the deadline of December 1, 2021. The Research Advisory Committee will

evaluate proposals, then forward their recommendations to the American Jersey Cattle Association Board of Directors, which will award funds at its meeting in March 2022.

Individuals may also contribute to the AJCC Research Foundation at any time. A benefit auction held in conjunction with the annual meetings of the national Jersey organizations every year also raises funds for the foundation.

For more information on submitting proposals or making contributions, contact Cari W. Wolfe, Director of Research and Genetic Program Development, at 614-322-4453 or cwolve@usjersey.com.

Disease Treatments and Mortality

Condition	CON 438 Calves	BTIS 431 Calves	ATIS 436 Calves
Pneumonia	55 (12.5%)	49 (11.3%)	62 (14.2%)
Diarrhea	38 (8.7%)	29 (6.7%)	26 (6.0%)
Pneumonia and Diarrhea	4 (0.9%)	3 (0.7%)	3 (0.7%)
Mortality	10 (2.3%)	4 (0.9%)	4 (0.9%)

Cumulative incidence of disease treatments and mortality during the rearing period for newborn Jersey and Jersey-cross calves receiving subcutaneous administration of a non-specific immune stimulant (Amplimune) around transportation during the rearing period (nine weeks). CON = control; BTIS = before transport immune stimulant; ATIS = after transport immune stimulant.

trial—transportation—occurred within the first four weeks of life, when passive immunity transferred from cows via colostrum provides immunologic protection to calves.

Future Research

As far as we know, this is the first study to evaluate the effectiveness of IS administered to newborn dairy calves immediately before and after transport. To build on what we have learned, Dr. Caixeta and his colleagues note that further research is warranted, particularly in terms of disease duration, lifetime performance and economic impact. Furthermore, it would be beneficial to study a group of calves from