

# Effects of the administration of a bovine non-specific immune stimulant around transportation on health and performance of Jersey and Jersey-cross heifer calves in the first 60 days of life

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## Introduction

Health and performance of pre-weaned dairy calves have great influence on adult life performance. Amongst the diseases that affect young dairy calves, diarrhea and pneumonia are the most prevalent and economically important. The main objective of this study was to evaluate the effects of a non-specific immune stimulant (IS; Amplimune, NovaVive, Inc., Canada), administered around transportation, on the health and performance of Jersey and Jersey-cross heifer calves during the first 60 days of life. We hypothesized that calves receiving IS would have decreased disease treatment hazard, lower weekly health scores (HS), decreased mortality, and superior performance.

## Materials and Methods

Newborn heifer calves ( $5 \pm 2$  d) in a large well-managed dairy herd were randomly allocated to receive either 1 mL of saline (CON; n=446) or 1 mL of IS (BTIS; n=440) at nursery before transport to grower (~ 18 h from Minnesota to New Mexico), or 1 mL of IS immediately after transport to grower (ATIS; n=446). All treatments were administered subcutaneously and blood samples were collected for analysis of serum total solids at enrollment. Calves were health scored weekly (during the first 3 weeks) based on nasal/ocular discharge, coughing, ear position, temperature, attitude, and fecal consistency. Interval to disease treatment and time to death were analyzed using Cox proportional hazards regression. Average daily gain (ADG), final body weight, and HS were analyzed by linear logistic regression. All analyses were conducted using Stata® 14.1 (StataCorp, College Station, TX). For all analysis, CON was set as reference and non-significant variables ( $P > 0.15$ ) were removed from the models using backward step-wise elimination.

## Results

Morbidity and mortality were lower than the national average. A total of 211 (15.8%) calves were treated at least once and 21 (1.6%) calves died within the study period. The proportion of calves treated for any disease was 15.4, 15.2,

and 16.8% for BTIS, ATIS and CON groups, respectively. Only 57 calves were treated multiple times, of these, 14 (3.1%) were in the BTIS group, 22 (4.9%) in the ATIS groups, and 21 (4.7%) from the CON group. Weekly HS did not differ between BTIS and ATIS calves versus CON calves ( $P > 0.28$ ). Calves that received IS before transport had reduced hazard of treatment for pneumonia when compared to CON (HR: 0.53; 95% CI: 0.29 – 0.95;  $P = 0.03$ ). Of the 21 calves that died during the experimental period, 4 were in the BTIS group, 7 in the ATIS group, and 10 calves in the CON group. Calves in the BTIS group tended to have a reduced hazard of death when compared to CON (HR: 0.39; 95% CI: 0.12 – 1.25;  $P = 0.11$ ). Only numerical differences were observed when comparing ADG (BTIS = 0.95 lb [0.43 kg]/d, ATIS = 0.95 lb [0.43 kg]/d, CON = 0.93 lb [0.42 kg]/d;  $P > 0.38$ ) and final body weight (BTIS = 125 lb [56.7 kg], ATIS = 124.8 lb [56.6 kg], CON = 123.5 lb [56 kg];  $P > 0.41$ ) between groups. These differences are likely because of the consistency of calf growth and low incidence of diseases in this particular farm. The differences caused by the animals that were treated for any disease might have been masked by the other animals in each given group.

## Significance

In conclusion, the administration of IS did not influence ADG, final body weight, and weekly HS, but IS administration before transport reduced the number of calves treated for pneumonia and can potentially decrease the mortality rate during the first 60 days of life. Lastly, when used as a prophylactic, a large dose of IS might be necessary to demonstrate a greater response; thus, further research is needed to test this hypothesis.