

# Evaluating the use of a blood leukocyte differential on beef cattle arriving to a feed yard to predict those animals at risk for developing clinical or subclinical respiratory disease

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## Introduction

Bovine respiratory disease (BRD) is the leading cause of illness and death of US feedlot cattle, and it is most commonly associated with cattle newly arriving to the feedlot and the subsequent 30 days following arrival. Metaphylaxis, the prophylactic antimicrobial treatment of groups of animals that have a perceived elevated risk for developing disease, is commonly used on cattle entering feed yards in an attempt to limit BRD outbreaks and to treat subclinical respiratory infections that can greatly affect their growth performance. Our objective was to measure the blood leukocyte values of high risk steers newly arriving to a feedlot and identify correlations between those values and animals that develop clinical respiratory disease or have poor growth performance due to possible subclinical respiratory infection. If a correlation was identified, this could be used as a tool to identify individual animals among a group for prophylactic treatment rather than using metaphylaxis to the whole group, resulting in a more judicious use of antimicrobials while enhancing growth performance by treating subclinical respiratory disease.

## Materials and Methods

A feed yard in Manhattan, KS received 700 head of recently weaned Angus steers from a single source in Montana during the fall of 2017. The calves had received no preconditioning prior to their arrival to Kansas and were processed 3 days after arrival in which they were weighed, received a clostridial vaccine, and a modified-live BRD vaccine, and given an identifying ear tag. Metaphylaxis was not used on this group of cattle. A whole blood sample was collected from each calf and submitted to the Kansas State University Veterinary Diagnostic Lab for a complete blood count. During the 30-day study period, cattle were monitored by an experienced veterinarian for clinical signs of respiratory

disease using traditional means of diagnosis: depression, nasal discharge, coughing, and anorexia. Any calves diagnosed with respiratory disease were to be individually examined, and treated using the standard treatment protocol of the feed yard. Cattle were all fed the same ration and housed in pens of equal size, water source, and stocking densities. At 30 days-on-feed (DOF), cattle were re-weighed and average daily gain (ADG) was calculated. Blood parameters having significant ( $P \leq 0.05$ ) univariate Pearson correlations with ADG were further evaluated using generalized linear mixed effects models.

## Results

No steers became clinically ill with respiratory disease during the first 30 dof; therefore, no correlations between blood parameters and clinical respiratory disease were evaluated. White blood cell concentration (WBC), segmented neutrophil counts (SEG), mean corpuscular volume (MCV), and mean corpuscular hemoglobin (MCH) had significant ( $P \leq 0.05$ ) univariate correlations with ADG; however, no significant associations with ADG were found when using generalized linear mixed models that accounted for the hierarchical nature of the data. A significant ( $P < 0.01$ ) association between SEG and those cattle that had  $> 3$  lb (1.36 kg) ADG was identified.

## Significance

No correlations between blood leukocyte values and poor performance were identified in this group of animals. An association between segmented neutrophil counts and cattle that had an ADG over 3 lb (1.36 kg) was identified. Based on this research, blood leukocyte values of weaning calves upon arrival to a feed yard have limited value in identifying the performance of those animals in the first 30 DOF.