EXTENSION

BEEF CATTLE RESEARCH UPDATE

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**Bovine Respiratory Disease during the Mid-Portion of the Feeding Period: Observations of Frequency, Timing, and Population from the Field**

Shipping fever, or bovine respiratory disease complex (BRD), is the most common morbidity and mortality event among feedlot cattle in the United States.[1] BRD accounts for approximately 75% of morbidity[2] and 50 to 70% of mortality in feedlots.[3] Even with advancements in technology and product efficacy, feedlot death loss has continued to increase. A 2011 USDA study of the U.S. cattle feedlot industry showed that feedlot death loss in yards with 8,000 or more head capacity increased 33.3% from 1994 to 2011 (1.2% in 1994, 1.3% in 1999, and 1.6% in 2011).[4] A 2015 study of feedlot closeout records from January 2005 through September 2014 (484,193 lots) showed that closeout mortality has increased 0.04% per year from 2005 through 2014.[5]

Over the last several years, cattle producers have selected for increased growth rate and increased carcass quality (through the use of EPDs).[6, 7] Furthermore, feedlot finish weights and average daily gains (ADG) have continued to increase.[5] Both feedlot close-out data (K-State Focus on Feedlots[8]) and USDA livestock slaughter annual summary reports (federally inspected carcass weight data[9]) suggest that the average weight of finished beef steers and heifers has increased approximately 200 to 250 lb since 1990. In addition to genetic selection, producers have used practices such as preconditioning to improve the management of their cattle. In general, preconditioning encompasses many management characteristics including administering respiratory vaccines, training cattle to use water and feed troughs, and weaning for a minimum of 45 days before feedlot entry.[10, 11, 12]

How have all of these changes affected death in the feedlot? These management practices have individually and collectively improved the subsequent health outcomes of cattle while they are in the feedlot; however, there have been anecdotal observations of increased incidence of BRD at later days on feed in these high-performing cattle that have gone through preconditioning programs.[13]

Mortality is not desired, but an animal that dies early in the feeding period has less resources (feed, hay, water, medicine, equipment, and labor) invested compared with animals that die later in the feeding period. Researchers with Veterinary Research and Consulting Services LLC (Hays, KS) and the Noble Research Institute (Ardmore, OK) conducted a study with the objective to provide observations related to BRD morbidity in high-performing cattle during the mid-portion of the feeding period (MFP) describing the occurrence and timing of BRD and the population in which BRD occurs during MFP.[13]

In this study, data from 2017 and 2018 for a commercial feedlot in southwest Kansas (Hy-Plains Feedyard LLC, Montezuma, KS) were evaluated for the occurrence of BRD in high-performing and high-risk calves on a lot level. Lots were categorized into high-performing and high-risk groups. High-performing lots were categorized based on performance potential of top 25% of cattle fed in the industry for ADG and feed conversion with high-quality carcasses that were 90% prime and choice from the retained ownership population for arrival weight, sex, and time of year. Expected performance potential was categorized based on breeding decisions made at the cow-calf operation. High-risk calves were categorized based on preventative mass medication of an antimicrobial at arrival processing. The decision to mass medicate individual lots was based on subjective risk classification by feedlot personnel with oversight from a consulting veterinarian. The subjective risk classification was independently and collectively based on origin, distance traveled, arrival body weight, shrink, and visual appearance of the calves upon arrival to the feedlot, as well as environmental conditions. Cumulative incidence of BRD was evaluated within high-performing and high-risk categories. Additional data came from high-performing calves from Noble Research Institute cooperators' cattle from 2 separate feedlots (one in Kansa and one in Texas).

These researchers reported that there was a significant interaction ($P < 0.01$) between days on feed (DOF) and classification status on cumulative BRD incidence (Figure 1). The actual average cumulative incidence for BRD in the high-performing group and in the high-risk group was 12.8% (range 2.8 to 36.1%) and 15.1% (range 1.0 to 54.1%), respectively. Overall mortality in the high-performing category and in the high-risk category was 2.54% (range 0 to 7.14%), and 4.83% (range 0 to 26.78%), respectively. The authors noted that all calves included in the high-performing group were preconditioned and received a minimum of one modified-live viral vaccine and *Mannheimia haemolytica* vaccine before shipment to the feedlot.

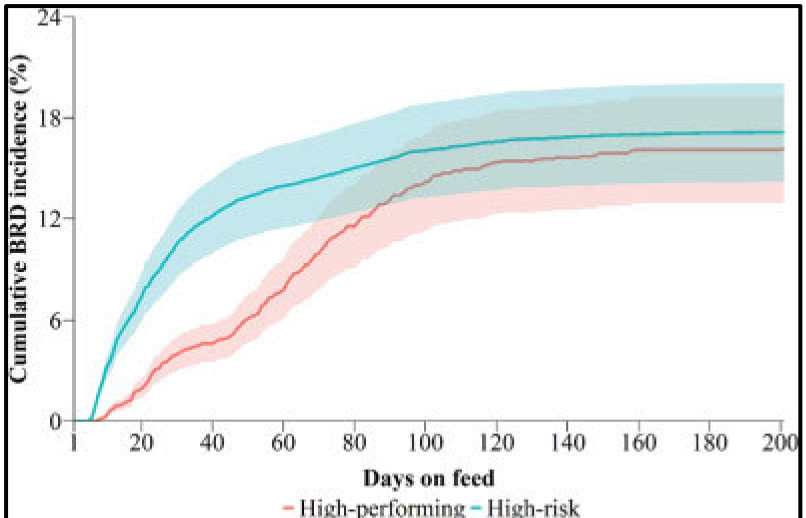


Figure 1. Retrospective cumulative bovine respiratory disease (BRD) incidence from high-performing and high-risk lots at a southwest Kansas commercial feedlot. Source: Theurer et al., 2021.

These researchers also reported that the inflection point of increased BRD morbidity for the high-risk and high-performing groups occurred at 7 and 45 days on feed (DOF), respectively (Figure 2). They further noted that this data provide evidence for the population where BRD occurs during the mid-portion of the feeding period (MFP). They defined MFP BRD as incidence for BRD occurring between 45 and 120 DOF based on temporal patterns of BRD. The cumulative percentages of BRD for the high-performing and high-risk categories at 45 DOF were 33.7 and 67.2%, respectively. These results indicate that BRD occurs later in the feeding period for high-performing cattle compared with high-risk cattle. Traditionally, it is believed that once cattle reach 30 to 45 DOF, the bulk of morbidity has already occurred. However, this data suggest that high-performing cattle appear to break with respiratory disease later than traditional morbidity patterns.

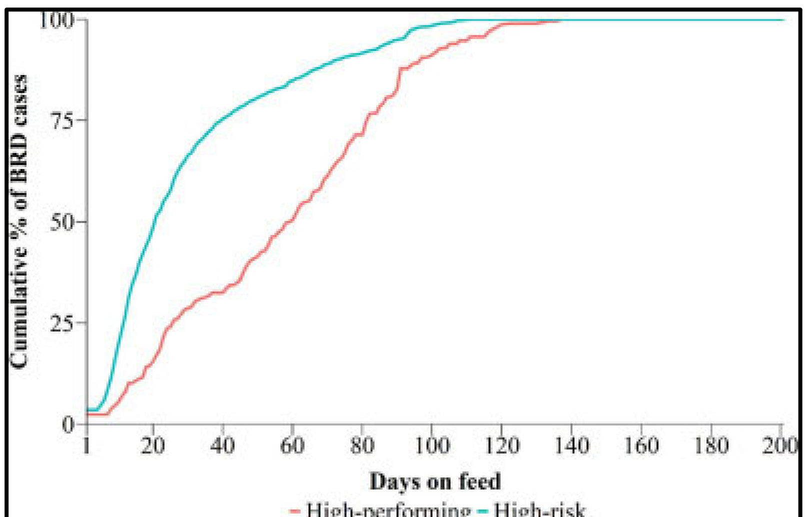


Figure 2. Cumulative percentage of bovine respiratory disease (BRD) cases within high-performing and high-risk lots of feedlot cattle at a southwest Kansas commercial feedlot. Source: Theurer et al., 2021.

It was reported that the cumulative BRD incidence for the Noble Research Institute cooperators from the Kansas feedlot and Texas feedlot had an earlier onset of BRD morbidity observed descriptively to the high-performing group. At 45 DOF, 69.2 and 78.0% of the morbidity had already occurred for calves at the Kansas and Texas feedlots, respectively. However, both feedlots had BRD incidence past 45 DOF.

These authors concluded that morbidity caused by BRD in high-performing cattle is greater than expected. The timing of BRD morbidity occurs at later DOF in high-performing calves compared with high-risk calves. In all 3 feedlots evaluated, the incidence for BRD occurred at ≥45 DOF. They noted that feedlot management needs to be aware of the timing and occurrence of BRD during the mid-portion of the feeding period in high-performing cattle to develop appropriate management strategies.

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