EXTENSION
BEEF CATTLE RESEARCH UPDATE
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April 2021

Bovine Respiratory Disease: Observations from Vaccination History

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] 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 preliminary observations related to BRD morbidity in high-performing cattle related to cow-calf operations and the number of vaccines received before the feedlot.[4]

This study used a total of 4,346 cattle from 36 different cow-calf operations that were Noble Research Institute cooperators that were fed at a commercial feedlot in Kansas in 2017 through 2019. These producers had selected for cattle with increased growth characteristics, including weaning weight, yearling weight, and average daily gain.

Each cow-calf operation adhered to a herd health protocol that incorporated vaccination, deworming, and castration of male cattle before shipment to the feedlot. At a minimum, the cattle must have received one multivalent clostridial bacterin/toxoid, viral respiratory complex, and bacterial vaccine (i.e., *Mannheimia, Pasteurella, Histophilus*, or all 3) before shipment to the feedlot. The producers also weaned and preconditioned the cattle for a minimum of 60 days before shipping. None of the cattle were administered metaphylaxis at the feedlot. Health records such as BRD first treatment, BRD mortality, and overall mortality at the feedlot were extracted.

The cattle were evaluated by the number of modified-live-viral, *Mannheimia haemolytica, Histophilus somni*, or *Clostridia* spp. vaccines administered before feedlot entry. The lot level average arrival pay weight was 723 lb (range of 564 to 881 lb). The average days on feed at first treatment for BRD was 41 (range of 1 to 184 days: median 35 days).

These researchers reported that first treatment for BRD was associated with the number of times cattle received modified-live-viral vaccine before the feedlot (P = 0.02; Figure 1). Cattle administered a modified-live-viral vaccine 3 times before the feedlot had a greater first treatment for BRD (21.32%) compared with cattle vaccinated 1 time (9.56%; P = 0.06). The number of times that cattle were vaccinated with *Mannheimia haemolytica* (P = 0.15), *Histophilus somni* (P = 0.32), and *Clostridia* spp. (P = 0.93) vaccines was not significantly associated with first treatment for BRD at the feedlot (Figure 1). The average days on feed at first treatment for BRD was not associated with the number of MLV (P = 0.71), *Mannheimia haemolytica* (P = 0.99), *Histophilus somni* (P = 0.21), and *Clostridia* spp. (P = 0.70) vaccines received before the feedlot. These authors noted that they were “not suggesting discontinuing the use of vaccines before feedlot entry, but in this analysis, increasing the number of times cattle were vaccinated with these vaccines did not decrease BRD morbidity”. Cattle that were administered 3 MLV vaccines had increased BRD morbidity, indicating more vaccination may not result in improved health outcomes.

In conclusion, this study illustrated that there is great variability in BRD morbidity among cow-calf operations. A greater number of vaccinations administered before the feedlot was detrimental to health outcomes. The authors noted that follow-up research with more observations with the number of MLV vaccines administered is warranted. Furthermore, it was noted that additional research is needed to further evaluate the entire host, environment, and pathogen triad for development of BRD in high-performing cattle.

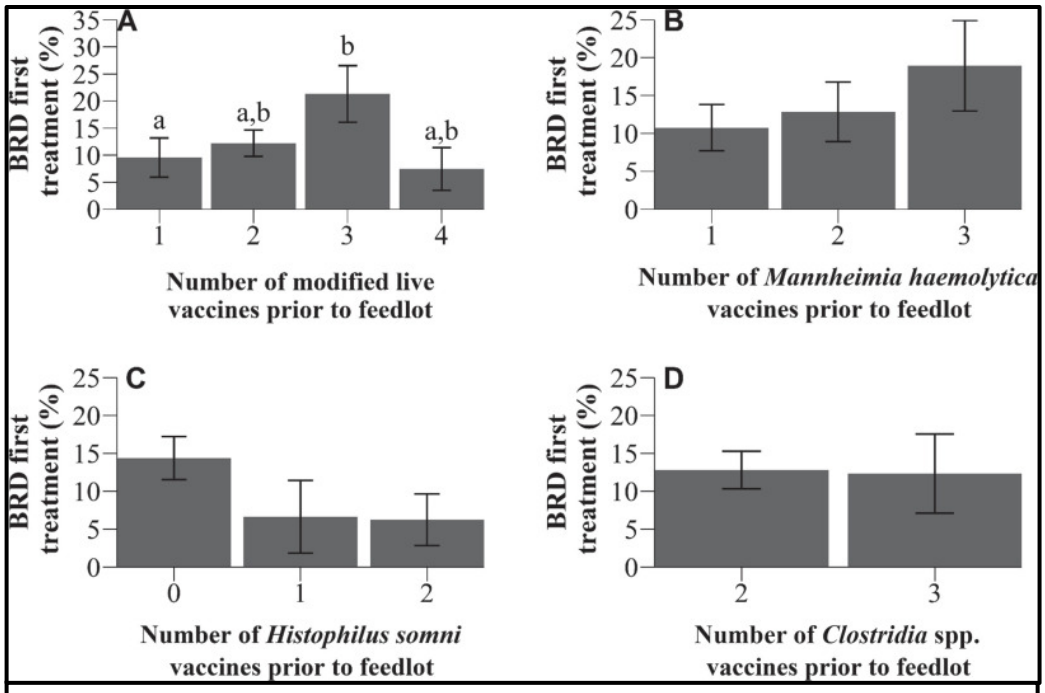

Figure 1. Model-adjusted bovine respiratory disease (BRD) first treatment at the feedlot by number of modified-live vaccines (A; P = 0.02) and *Mannheimia haemolytica* (B; P = 0.15), *Histophilus somni* (C; P = 0.32), and *Clostridia* spp. (D; P = 0.93*)* vaccinations received before entering the feedlot. Model included random effects for producer, year, lot, and covariates for average in weight of lot at feedlot arrival and number of days preconditioned. Means without common letters (a, b) differ (P < 0.10; adjusted for multiple comparisons). Source: Theurer et al. (2021).

[1] USDA-APHIS. 2013. Page 18 in Feedlot 2011 Part IV: Health and Health Management on U.S. Feedlots with a Capacity of 1,000 or More Head. USDA–APHIS–Veterinary Services, Fort Collins, CO.

[2] Edwards, A. J. 1996. Respiratory diseases of feedlot cattle in the central USA. Bovine Practitioner 30:5–7.

[3] Loneragan, G. H., D. A. Dargatz, P. S. Morley and M. A. Smith. 2001. Trends in mortality ratios among cattle in US feedlots. J. Am. Vet. Med. Assoc. 219: 1122-1127.

[4] Theurer, M. E., M. D. Johnson, T. Fox, T. M. McCarty, R. M. McCollum, T. M. Jones and D. O. Alkire. 2021. Bovine respiratory disease during the mid-portion of the feeding period: Observations from vaccination history, viral and bacterial prevalence, and rate of gain in feedlot cattle. Appl. Anim. Sci. 37: 59-67.