

Use of Antimicrobial Metaphylaxis for the Control of Bovine Respiratory Disease in High-Risk Cattle

Samuel E. Ives, DVM, PhD*, John T. Richeson, PhD

KEYWORDS

• Bovine respiratory disease • Cattle • Control • Feedlot • Metaphylaxis • Stocker

KEY POINTS

- Despite decades of research, the prevalence and challenges associated with bovine respiratory disease (BRD) in stocker and feedlot operations remain.
- Preconditioned calves are better prepared to handle the transition from origin ranch to feedlot, yet there is incentive to purchase high-risk cattle at a reduced cost, which is influenced by the proven efficacy and availability of antimicrobial metaphylaxis.
- The poor sensitivity of current BRD field diagnostic methods, typical pathogenesis of BRD, and labor issues are additional reasons for use of metaphylaxis.
- Because of increased consumer concern surrounding antimicrobial use in food animals, practitioners should consider comprehensive and novel approaches to judiciously guide decisions on metaphylactic use of antimicrobials.

INTRODUCTION

It has been well documented that bovine respiratory disease (BRD) complex is the leading cause of morbidity and mortality in feedlot cattle.¹⁻³ Coupled with death loss, high treatment costs, decreased performance, and reduced carcass value, BRD leads to significant economic losses for cattle feeders.⁴⁻⁷ The BRD syndrome is also one of the most extensively studied cattle diseases, with research beginning in the late 1800s and continuing today.⁸ The US Library of Medicine Web site (PubMed) shows that from 1982 through April 29, 2009, there were 1952 publications on various aspects of bovine respiratory disease in that database.⁹ Since 2009, there have been an additional 1070 publications related to BRD; however, the clinical impact of BRD continues to be a major concern.

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Department of Agricultural Sciences, College of Agriculture, Science and Engineering, West Texas A&M University, Box 60998, Canyon, TX 79016, USA

* Corresponding author.

E-mail address: sives@wtamu.edu

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Over the years, multiple BRD symposiums have been held in an effort to bring together researchers, veterinarians, and industry members to review the latest in BRD research and to discuss future research needs. There are several common themes that have perpetuated throughout these symposiums and various other publications. From the published proceedings of the 1983 BRD symposium held in Amarillo, Texas, it was proposed that the true etiology of shipping fever (BRD) is the antiquated method that is used to market beef calves. Regarding the current beef marketing system, which has remained relatively unchanged for several decades, one could say that “we bring the cattle to the feed (ie, corn) rather than bringing the feed to the cattle.” It has been estimated that the average number of middlemen between the rancher and the consumer is 15.¹⁰ Similarly, it has also been suggested that 1 obstacle to the successful management of BRD in cattle populations is associated with the segmented infrastructure of the beef industry. Calves progress through the production phase, changing ownership at any and all points, which provides ample opportunity for pathogens associated with BRD to colonize the lower respiratory tract.¹¹ Calves entering the feedyard are often highly commingled from various sources, experiencing immunosuppression due to a multitude of stressors relative to the marketing process, and are susceptible to disease during the relocation process.

Although restructuring the beef production system would most likely reduce the incidence of BRD, this is not a realistic option for most producers, and overall beef production would likely decrease for alternative systems. The objective of this article is to serve as a practical guide for feedlot practitioners by addressing the importance of metaphylaxis and to address management considerations surrounding antimicrobial metaphylactic use.

THE IMPORTANCE OF ANTIMICROBIAL METAPHYLAXIS

Despite improved understanding of BRD and advancements in vaccine and antimicrobial technologies, the percentage of mortality associated with BRD has remained relatively unchanged.¹² Frequently advocated interventions in newly received feedlot cattle, such as vaccination against viruses or bacterial pathogens and nutritional manipulations, have been shown to have limited impact on the incidence of BRD.^{8,13} However, the use of antimicrobial metaphylaxis upon feedlot arrival to cattle considered at high risk for development of clinical BRD signs has consistently been shown to reduce morbidity and mortality.^{14–20} Metaphylaxis is defined as the treatment of an entire group or population of cattle with a US Food and Drug Administration (FDA)-approved antimicrobial with the intent of controlling the incidence of acute-onset disease in highly stressed, newly received calves.²¹

The etiology of BRD is multifactorial and often polymicrobial, with complex interactions among the host immune system, viral and bacterial pathogens, and the multiple phases of the beef production system resulting in environment, social and relocation challenges.^{13,21,22} Accurate diagnosis is critical for effective treatment of disease; however, the nature of the BRD complex makes accurate case identification a challenging task for feedlot animal health technicians. Classical methods of diagnosis are based on visual observations of clinical signs including depression, anorexia, nasal and/or ocular discharge, lack of rumen fill, or respiratory signs such as coughing or labored breathing.^{13,23,24} This method of diagnosis is subjective, and agreement between observers is often exceedingly divergent. Nevertheless, these clinical signs can be used to assign a semiobjective clinical illness score of 0 to 4 as defined by Perino and Apley (1998, [Table 1](#)).

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