

Biosecurity in dairy calf production: A scoping review of producers' knowledge and farm-level practices

B.A. Fonseca Martinez,¹ DVM, MS, PhD; A. Arevalo Mayorga,¹ BS, MS; J. Page,² BS, MS; G. Habing,¹ BS, MS, DACPVM

¹Department of Veterinary Preventive Medicine, College of Veterinary Medicine,
The Ohio State University, Columbus, OH 43210

²Hodesson Veterinary Medicine Library, The Ohio State University Libraries, Columbus, OH 43210

Introduction

Biosecurity practices play a crucial role ensuring the health and well-being of dairy calves; however, its successful implementation seems to be less frequent on dairy cattle farms in North America. This poses a challenge for the dairy industry not only in terms of the economic impact associated with disease outbreaks and decreased productivity, but also to public health. Multiple studies have focused on describing the biosecurity practices and producers' knowledge regarding the implementation of biosecurity measures in the dairy industry; however, this literature focused on dairy calf production systems has yet to be summarized. This study aims to provide a comprehensive mapping of the existing literature concerning biosecurity practices, as well as the knowledge and attitudes of producers within dairy calf production systems. By systematically analyzing relevant studies, we will identify knowledge gaps and areas requiring further research to improve biosecurity understanding and implementation within this critical sector of the dairy industry.

Materials and methods

We designed the protocol following PRISMA-ScR guidelines. The search included generic terms for dairy calf, knowledge, biosecurity practices and dairy producers. Electronic searches on 3 databases (AGRICOLA™, PubMed®, CAB Abstract® 2003-2023) were conducted. We also hand-searched the table of contents from the past 3 years of relevant conferences: AABP, ADSA and CRWAD.

Results

The initial search yielded 983 articles, reduced to 662 after removing duplicates. Further screening left 150 articles for full review, resulting in 30 relevant ones—10 focusing on producer knowledge and attitudes, and 20 on biosecurity practices. Relevant studies investigating biosecurity practices in dairy calf production evaluated various factors influencing calf management practices, biosecurity measures, disease prevalence and mortality rates in the dairy farming landscape. These studies explored elements such as housing conditions, ventilation systems, feeding practices, hygiene protocols, herd size and

geographic location. It's noteworthy that interventions like implementing biosecurity measures, utilizing individual calving pens, emphasizing colostrum feeding, and scrutinizing calf sources have exhibited substantial impacts on calf health outcomes. Simultaneously, within the articles examining the knowledge and attitudes of producers, it became evident that prioritizing aspects like time management, daily routines and farmers' attitudes is paramount for effective disease management initiatives. Notably, factors such as vaccination practices, disease perception, attitudes toward disease prevention programs, and the interplay of farmers' personalities emerged as pivotal determinants in shaping the efficacy of disease management strategies. Identified areas for enhancement within calf management span across calving practices, neonatal feeding, biosecurity protocols and the profound impact of human factors on calf health outcomes. Furthermore, it was identified that the successful integration of biosecurity measures depends on farmers' perceptions of their benefits, along with their commitment to animal welfare, public health and environmental sustainability.

Significance

The findings of this scoping review highlight the intricate interplay between biosecurity practices, producer knowledge and calf health outcomes within dairy production. By comprehensively evaluating the factors that influence disease management and producer attitudes, these insights pave the way for targeted interventions aimed at improving calf well-being and mitigating disease risks. Moving forward, a holistic approach that integrates better management practices, improved biosecurity measures and tailored educational initiatives holds promise for reinforcing the resilience and sustainability of dairy calf production systems.

