

# Thoughts on Biosecurity and Biocontainment in Beef Cow-Calf Herds

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## Abstract

Biosecurity and biocontainment plans designed by veterinary practitioners for beef cow-calf operations offer promise for increasingly effective health programs. Individualized utilization of practical methods to eliminate or control pathogen exposure in combination with increased herd immunity engages the operation in health programs that effectively reduce risk for health related losses and increase economic returns to the enterprise. Biosecurity and biocontainment principles address elimination of the agent or agents, prevention of contacts that result in transmission of an agent or agents, and increasing animal resistance to disease.

Changes and trends in the beef industry suggest these concepts are becoming more applicable, practical and potentially of more value. Biosecurity and biocontainment concepts are being further developed. Additionally, more tools, such as diagnostic tests and epidemiological information, are available.

Education and changes in how beef producers address disease control will allow implementation of biosecurity and biocontainment concepts across the industry. Proactive veterinary profession leadership is required for the most successful implementation.

## Résumé

Les plans de biosécurité et de confinement établis par les praticiens vétérinaires dans les troupeaux de boucherie de type vaches-veaux promettent des programmes de santé de plus en plus effectifs. L'utilisation de méthodes pratiques individualisées afin d'éliminer ou de contrôler l'exposition aux agents pathogènes jumelée avec une meilleure immunité de troupeau enlignent l'opération vers des programmes de santé qui réduisent efficacement le risque des pertes liées à la santé et augmentent les retombées économiques pour l'entreprise. Les principes de biosécurité et de confinement incluent l'élimination d'un ou de plusieurs agents pathogènes, la prévention des contacts qui permettent la transmission d'un ou de plusieurs agents et l'augmentation de la résistance des animaux à la maladie.

Les changements et les tendances dans l'industrie du bœuf suggèrent que ces concepts sont plus applicables

et pratiques et donc plus valables. Les concepts de biosécurité et de confinement sont toujours en développement. De plus, plusieurs autres outils, tels les tests diagnostics et l'information épidémiologique, sont aussi disponibles.

L'éducation et des changements dans l'approche des producteurs de bœuf face au contrôle des maladies faciliteront l'adoption des concepts de biosécurité et de confinement dans l'industrie. Un rôle de leader proactif pour la profession vétérinaire est requis pour une mise en œuvre réussie.

## Introduction

Proactive methods to achieve higher levels of health and productivity are very important for sustainability and competitiveness of the beef industry. Economic returns to the cow-calf sector are cyclic and market driven. However, animal health has a clear impact on economic outcome. One analysis showed that each 1% increase in perinatal mortality of beef calves had a negative effect of 0.26% on return on assets for beef operations.<sup>9</sup> Many herds have greatly compromised economic returns due to unresolved health issues as well as risks for both catastrophic and chronic health related losses. Veterinarians have recognized the potential value of biosecurity and biocontainment plans to accomplish higher levels of disease control.<sup>3,4,5,7,8,10,11,12</sup> Implementation into current production management systems appears to offer significant promise.<sup>1,19</sup>

Veterinary medicine and the beef industry have traditionally tended to focus narrowly on aspects of control and prevention, which has limited the success of beef herd health programs.<sup>3,10-12</sup> True inclusion of the epidemiologic triad, including the individual host animal, the disease agent and the environment is often not accomplished.<sup>3</sup> There are excellent exceptions to these statements. However, prevailing practices suggest these tools are not used often enough. Very often, results achievable by vaccination alone have been touted as the goal for animal health programs.<sup>3,10-12</sup> Predominantly, dairy herds rely on visual observation, regulatory compliance, vaccination and limited attention to biosecurity for new animal additions.<sup>2,6</sup>

Biosecurity may be defined as the sum of all interventions designed to prevent entry of a disease agent or

agents into a unit of interest. This includes individual operations as well as larger geographical areas, including states and countries. Biocontainment may be defined as the sum of interventions designed to control a disease agent or agents already present in a unit of interest.<sup>3,8</sup>

This discussion focuses on applying biosecurity and biocontainment principles to production management strategies that reduce disease risk and negatively impact productivity and profitability of beef operations. These concepts may be implemented in a broad manner addressing a number of pathogens.<sup>13-16</sup> Addressing targeted, specific diseases and health issues that are resulting in known losses may provide greater opportunity in many cow-calf operations. Biosecurity and biocontainment principles have been used for many years for regulatory programs, such as brucellosis and tuberculosis.

### Industry Considerations

Changes in production systems have increased need as well as potential impact of biosecurity and biocontainment plans in individual operations. Larger herds being managed with lower labor inputs necessitate effective health plans that reduce disease and risk for disease. Adverse health issues in an overall low-margin business can significantly affect profitability and sustainability.

Marketing systems are differentiating value of animals based on health and potential health by rewarding sellers with added monetary gains. Additionally, producers retaining ownership are able to capitalize on added value health, not only in the cow-calf enterprise but through the beef production cycle. Thus, addition of production value to the beef industry is achievable and economically measurable. It remains to be seen how the market may respond to health programs going beyond vaccinations and weaning, including management practices associated with weaning. The ability to market animals with added value gained through effective biosecurity and biocontainment at the cow-calf level can augment the returns obtained at that level in both commercial and seedstock operations.

Control and reduction of health risk at the cow-calf level of production is important for both zoonotic and non-zoonotic pathogens. Consumer demands and perceptions can be addressed effectively by the industry through increased emphasis on practical biosecurity and biocontainment.

### Needed Paradigm Change

Fundamental change in thought processes related to animal health will speed change to the more effective, comprehensive approaches afforded by biosecurity

and biocontainment. This will reinforce commitment to continual improvement and needs to occur across the beef industry. Components of biosecurity and biocontainment plans include prevention of transmission, elimination of the agent and increasing immunity.<sup>3,8</sup> Immunity to pathogens on an individual and herd basis has received most attention in disease outbreaks and other cases of adverse health as well as prevention plans. Obviously, resistance to disease is of profound importance. However, factors addressing exposure, including prevention of transmission and elimination of the agent, tend to be ignored or poorly addressed even in situations where increasing resistance to disease is not possible or likely to be ineffective.<sup>3</sup> Management methods that would aid in reducing effective contacts and pathogen dose load are often not given adequate consideration. Only minorities of producers introducing new animals into operations vaccinated or tested animals for any disease agent or agents.<sup>18</sup>

Veterinary practitioners are highly regarded by producers as sources of animal health information and work closely with beef producers for optimal disease control in beef operations.<sup>17</sup> Education of clientele as well as the beef industry to expand thinking to include pathogen control through implementation of biosecurity and biocontainment plans is a critical component. Demonstration of practicality and economic feasibility as these plans are designed and implemented is critical. Cow-calf producers have multiple opportunities that affect profitability that must be prioritized as decisions are made. Education must also document effectiveness and expectations of biosecurity and biocontainment if owners are to be convinced these concepts are of significant value and plans are to be implemented.

### Implementation

*Goal Setting* - Essential to successful implementation is the establishment of a clear set of goals a producer has for the cow-calf enterprise. This enables discussion for what might be accomplished, what changes may be practical and possible, and also expectations for the plan and includes veterinary input. Clearly, ownership in and commitment to individualized biosecurity and biocontainment plans is critical.

*Risk Assessment* - Risk assessment may range from a formal process of evaluation that might include detailed data collection and analysis to relatively informal assessment and problem investigation. Risk assessment is a key part of the process but should not be a barrier to the design and implementation of biosecurity and biocontainment plans. This step helps to identify factors or gaps that need the most attention as a plan is developed.

*Biosecurity and biocontainment plans* – Plans must address principles directed at elimination of reservoirs of the agent, preventing contacts that result in disease transmission and increase animal disease resistance.<sup>8,13</sup> Elimination, reducing, or controlling exposure to pathogens are major components. Elimination of disease reservoirs may not be possible or practical in some cases, necessitating attention to reduction and control strategies.

These plans are customized documents for individual operations. Efforts should not be regarded as absolutely perfect since success will be measured relative to goals of the operation and expectations established at the outset of discussions. Changes should be discussed and planned as part of a continuous improvement process and should be incorporated as needs, goals and expectations change.

Veterinary practitioner inputs may often include need for outside study, consultation with experts, assembly of a resource team, and use of other resources to develop written plans that meet the mutually established goals and expectations of operations. Complexity of plans is variable. Commitment to this process in a practice setting should include appropriate scheduling of time and charging of fees to insure development of quality biosecurity and biocontainment plans.

### Conclusions

Higher levels of animal health in the beef industry reduces economic and production risk and adds value for subsequent owners of animals, and especially consumers. Use of biosecurity and biocontainment plans offers opportunity to achieve improved health in cow-calf operations. Dedication over time to client education about best approaches to improve health and productivity is warranted. Commitment by bovine practitioners to improved health plans and expanding practice offerings has great potential for economic returns to cow-calf producers, veterinarians and the beef industry.

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