

BIOSECURITY: BEEF COW/CALF



OVERVIEW

- Biosecurity comprises efforts designed to prevent the introduction and spread of disease in a population, herd, or group of animals.
- Biosecurity is further categorized into:
 - External biosecurity: efforts directed at prevention of entry of new diseases into a group
 - Internal biosecurity (biocontainment): efforts directed at prevention of spread of disease within a group.
- A minimum biosecurity plan in beef cow/calf operations should address risks associated with
 - Importation of new animals
 - Quarantine of imported animals
 - Communal grazing practices
 - Basic practices of hygiene, cleaning, and disinfection
- Biosecurity programs can be efficiently integrated with Hazard Analysis Critical Control Point (HACCP) programs to enhance food quality and safety and decrease antimicrobial use in cattle.
- The most prevalent means of disease introduction is via the addition of new animals to a herd. A 1996 USDA, NAHMS study found that approximately 39% of producers imported cattle into their beef herds.
- Acquisition of a medical history from source herds is a recommended practice in the beef cattle industry.

ADDITIONS TO HERDS

- A National Animal Health Monitoring Service study (December 2009) found the percentage of beef operations that added cattle over a 12 month period increased as herd size increased, from 27.6% of operations with <50 cows to 69.9% of operations with >200 cows.
- Risk of introducing new diseases varied depending on the source and type of new cattle (e.g. known versus unknown source). Common sources for herd additions included another beef operation (70.3%) and sale barn/auction (34.8%)
- Common classes of cattle added to herds included weaned beef bulls (19.5%) and pregnant beef cows (9.2%).
- Biosecurity policies used in source herds should be no less stringent than those used in the buyer's herd.

Testing

- Testing of introduced cattle for diseases can decrease the risk of introducing new diseases.
- An alternative strategy to testing individually imported cattle involves testing the source herds and importing only from certified disease-free herds (or herds with low likelihood of disease).

- A test's performance and efficacy will depend on its sensitivity, specificity, and the prevalence of disease within the source herd.

Quarantine

- Quarantine of incoming cattle may decrease the likelihood of introducing certain diseases into a herd. Quarantine should also be considered for animals that have left an operation, subsequently been in contact with other cattle (e.g. shows, fair, etc.) and are returning to the operation.
- Quarantine is most likely to be effective for diseases with short incubation periods and no inapparent carrier states (e.g., bovine respiratory syncytial virus, parainfluenza virus-3, bovine viral diarrhea).
- Quarantine is unlikely to be effective for diseases with prolonged incubation periods and inapparent carrier states (paratuberculosis, leukosis, brucellosis, leptospirosis, neosporosis).
- Quarantine facilities should be physically separate from the main herd.
- Quarantined animals must be monitored for signs of disease.
- Animals placed in quarantine should all leave concurrently (all-in, all-out).
- Personnel attending quarantined animals should wear protective, washable clothing devoted solely to the facility.
- Equipment and supplies used in quarantine must be devoted to, and remain in the quarantine facility.
- Personnel working with quarantined animals should have minimal or no contact with the main herd
- A quarantine period of at least 60 days has been recommended. This period should allow adequate time for (1) the identification of diseases with short incubation times, (2) the return and evaluation of test data (serology, fecal culture, fecal egg quantification, etc.), and (3) the implementation of preventative measures (deworming, vaccination, etc.).

INCREASING DISEASE RESISTANCE; VACCINES AND NUTRITION

- Many producers attempt to mitigate the risks associated with importing animals by increasing the use of vaccines.
- Data on the efficacy of most vaccines for this practice are limited.
- Under optimal conditions, the response to a vaccine is not equal between cattle, and the occurrence of a response does not necessarily guarantee protection.
- Vaccines are useful adjuncts in a comprehensive biosecurity plan, but do not mitigate the need for a more comprehensive program.
- Vaccination programs used in source herds should be no less stringent than those used in the buyer's herd.
- The general nutritional status within a herd can influence the occurrence of disease. Under-conditioned or malnourished animals are more prone to infectious diseases because metabolic demands required for appropriate immunity may be compromised. Dietary deficiencies or excesses can include factors other than protein or energy. Inappropriate levels of macronutrients (calcium, phosphorus), trace minerals (cobalt, copper, selenium, zinc, iodine, iron), or vitamins (B complex, A, D, E, K) can result in either primary disease or exacerbation of secondary disease states.

EXPOSURE TO OTHER CATTLE

- Communal grazing of beef cow/calf operations is most prevalent in the western U.S. and Canada, northern Asia, Australia, New Zealand, and South America.
- Communal grazing increases the risk of disease exposure and transmission through contact with potentially large numbers of animals outside the herd.

INSECT, RODENT, AND ANIMAL CONTROL

- Insects, rodents and other animals can serve as reservoirs or mechanical carriers of disease.
- Fecal contamination from rodents and domestic animals (dogs, cats) is a risk factor for the transmission of various organisms including *Neospora caninum* and *Salmonella* spp.
- Deer and other wild Cervidae can transmit bovine tuberculosis to cattle.
- Pigs can serve as a source of pseudorabies for cattle.
- Results of the most recent NAHMS survey (2009) concluded that 82% of cattle operations used fly control and 65% used some type of rodent control.

FACILITY MAINTENANCE AND CLEANING

- Appropriate cleaning and disinfection is critical to breaking transmission of disease agents that contaminate housing, feeding and treatment equipment, or other vectors or fomites.
- Personal hygiene of animal handlers and strict sanitation practices are crucial to preventing the transmission of pathogens between animals and from animals to humans and humans to animals.
- Visitors from other animal operations, veterinarians, or the general public can serve as a source of disease agents.
- Personal hygiene should include frequent hand washing with hot water and soap, cleaning and disinfection of boots, and thorough washing of clothing with the use of bleach.
- The most important first step to cleaning involves the thorough removal of all organic debris (feces, urine, milk, sputum, etc.).
- Vigorous cleaning must precede the application of disinfectants for these substances to attain maximum effect.
- Numerous products are available for disinfection of equipment or premises. In addition to their chemical characteristics, other variables will determine the effectiveness of each product. These include the product concentration, contact time, temperature, pH, water content, water hardness, and the amount of organic debris present.
- The use of manure-handling equipment to feed cattle can increase the risk of transmission for disease agents such as *M. paratuberculosis* and *Salmonella* spp.
- Prevention of fecal contamination may be important in minimizing the prevalence of pathogens known to infect humans such as *E. coli* O157:H7 and *Salmonella* spp.



MISCELLANEOUS

MISCELLANEOUS COMMENTS

- The two most economically significant disease processes affecting beef cow/calf producers include acute undifferentiated diarrhea and respiratory diseases of calves.
- Prevention and control of acute undifferentiated diarrhea is of paramount importance in beef cow/calf operations. While no single management system is suitable to all herds under all circumstances, the following principles discussed by Radostits and Acres in 1983 are still relevant today.
 - Remove the source of infection from the calf's environment.
 - Remove the calf from the contaminated environment.
 - Increase nonspecific resistance of the calf.
 - Increase specific immunity of the calf.
 - Reduce stress.
- Specific measures regarding biosecurity for neonatal gastrointestinal diseases were reviewed by Barrington et al. (2002).

- Respiratory disease accounts for a significant proportion of morbidity and mortality in beef calves and also affects cattle of breeding age. Mitigation of respiratory disease through implementation of specific biosecurity measures was reviewed by Callan and Garry (2002).

ABBREVIATIONS

HACCP = Hazard Analysis Critical Control Program
 NAHMS = National Animal Health Monitoring Survey
 USDA = United States Department of Agriculture

SEE ALSO

Biosecurity: Research Herds (www.fiveminutevet.com/ruminant)

SUGGESTED READING

Biosecurity on US Beef Cow-calf Operations – Animal and Plant Inspection Service - US Department of Agriculture. https://www.aphis.usda.gov/.../beefcowcalf/downloads/beef0708_is_Biosecurity.pdf

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