

# Biosecurity on the Ranch to Reduce Risks For Bovine Respiratory Disease

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## Bovine Respiratory Disease Complex Series



### FAST FACTS

- Even if a herd is vaccinated, overwhelming exposure can still result in disease.

### What is biosecurity?

Biosecurity includes those set of management practices that prevent disease from entering the farm or ranch or prevent disease from being transmitted between animals. When you look at a cow-calf ranch, the extensive nature of the range the cattle inhabit can make the thought of biosecurity impractical. However, even large ranches can implement some disease prevention practices to reduce the risks for their cattle.

We think that if we keep cattle vaccinated, we can increase their resistance and prevent any disease problems. However, pathogens can overwhelm or even evade the immune system (Srikumaran et al., 2007). Nevertheless, there are certain things we can do to help reduce a herd's exposure to the agents that cause bovine respiratory disease (BRD), regardless of the extent of the range.

### Preventing BRD disease agent transmission

We do not really know the real risk of exposure to pathogens on ranches. However, we do know that even if a herd is vaccinated, overwhelming exposure can still result in disease. Thus, anything we can do to reduce exposure is in the best interest of the herd.

The first step is to understand the agents of the Bovine Respiratory Disease (BRD) complex. BRD, also called shipping fever, is a common cause of illness and death in cattle, especially calves. BRD is considered a complex because many different pathogens are known to cause respiratory disease and many factors can contribute to the development of clinical signs (Merck 2011).

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### FAST FACTS

- BRD usually begins when an environmental stressor suppresses immune function.
- Lung inflammation caused by the combined effect of viral and bacterial infection causes clinical signs that can progress to fatalities.

What disease agents are involved?

#### Viruses

Bovine Respiratory Syncytial Virus (BRSV)

Infectious Bovine Rhinotracheitis (IBR)

Bovine Viral Diarrhea (BVD)

Parainfluenza-3 Virus (PI-3)

#### Bacteria

*Pasteurella multocida*

*Histophilus somni*

*Mannheimia hemolytica*

*Mycoplasma bovis*

BRD usually begins when an environmental stressor suppresses immune function (Gulliksen et al., 2009). Examples of environmental stressors include: weaning, transportation, castration, dehydration, hunger, crowding, weather, parasitism, and respiratory irritants. Malnutrition and/or other infections (such as persistent infection (PI) with Bovine Viral Diarrhea virus) can also affect immune function (Stevens et al., 2007). When animals' defense mechanisms are compromised, they are susceptible to viral infections. Viral infections damage lung tissue and encourage secondary infections with bacteria. The resulting lung inflammation caused by the combined effect of viral and bacterial infection causes the clinical signs that can progress to fatalities (Callan and Garry, 2002).

#### **How are these disease agents transmitted?**

**BRSV** – This virus can be spread by aerosolized secretions from the respiratory tract and other secretions by direct or close contact. Seasonal factors related to commingling, housing and changes in atmospheric pressure may intensify the results of infection.

**IBR** – The IBR virus can be carried by non-symptomatic or clinically-affected animals and spread through direct contact, coughing, nasal discharge and in the semen of infected bulls. Aerosol contamination of feed or water by cattle secretions is also possible.

**BVDV** – The BVD virus can be spread to unborn calves in utero, by bulls to cows and heifers through the venereal route or even artificial insemination, and by direct contact with infected animals. Contaminated equipment and needles can also spread the virus between animals (USDA, 2007).

**PI-3** – The parainfluenza virus is usually spread through aerosol droplets.

***Pasteurella multocida*** – This bacterium is often a normal inhabitant of the upper respiratory tract and gains access to lungs when host defenses are impaired.

***Bibersteinia trehalosi*** – This bacterium is likely similar to infections with *Pasteurella*.



### FAST FACTS

- The biggest risk for introducing disease onto a premise is through contact with new animals.

*Mannheimia hemolytica* – This bacterium is also a normal inhabitant of the nasopharynx and invades the lungs when host defenses are impaired.

*Histophilus somni* – This agent is also spread by the aerosol route.

*Mycoplasma bovis* – This disease agent is spread directly through calf-to-calf contact, on fomites such as drenching equipment and balling guns; it is short-lived in the environment.

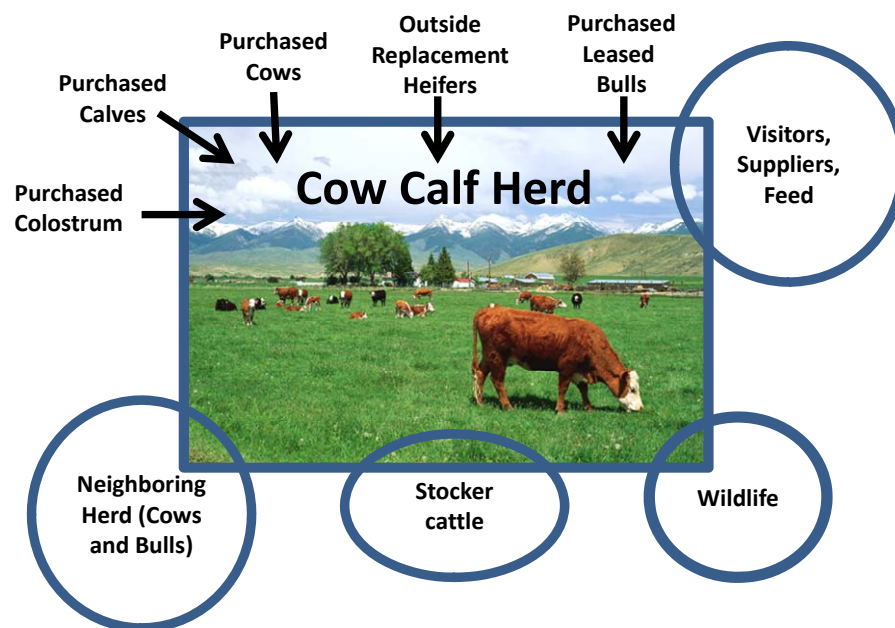
Many BRD agents are normal inhabitants of cattle and only a few are likely to be transmitted between animals. However, if an animal has not been exposed to a specific version of the agent – like flu strains in people – exposure to that new strain might result in disease.

### What are the risks for introducing disease onto ranches?

The biggest risk for introducing disease onto a ranch is through contact with new animals. New animals include:

- Purchased or leased bulls
- Purchased cows
- New Replacement Heifers
- Purchased calves
- Purchased colostrum
- Neighbor cattle
- Wildlife (Urcan-Chmiel and Grooms, 2002).

The following graphic provides an overview of potential sources of new disease agents to the herd.



(Adapted from M. Sanderson. Cow Calf Biosecurity. Farm and Ranch Biosecurity. <http://www.farmandranchbiosecurity.com/> )



### FAST FACTS

- To reduce pathogen build-up at calving time, calving could be done on pasture or on stubble fields, as opposed to in a barn.
- Keep in mind: airborne viruses can be dispersed for more than 12 feet from their source.

### What are the risks for transmitting disease between groups of animals on a ranch?

Many ranchers consider their operation one premise. However, there are a number of different systems and groups of animals on a ranch. The first group to consider is purchased replacements (heifers, cows and bulls). Not only do they represent a risk to the rest of the herd by possibly harboring new disease agents, they may be at risk for “ranch diseases” they have not seen before. After their transport to a new ranch, housing them in an isolation facility for rest and adjustment to surroundings would be advantageous for them and the resident herd.

For some disease agents, keeping younger and more susceptible animals away from older ones can help prevent disease transmission. For example, younger calves exposed to older ones in group housing have a higher risk for BRD. Wintering cows and heifers in separate lots and then moving cows and heifers into clean, separate calving lots can reduce pathogen loads. To reduce pathogen build-up at calving time, calving could be done on pasture or on stubble fields, as opposed to in a barn.

### What are the things that prevent BRD agents from being transmitted?

The following management practices can be used to decrease exposure to new BRD pathogens (Moore et al., 2008):

- Reduce the risk of infected animals being introduced into a herd
- Bring in animals from uninfected herds only
- Bring in animals from herds that vaccinate to protect against BRD viral agents
- Avoid purchasing animals from sale barns
- Test new animals for persistent infections with BVD and cull positive animals. Even short-term exposure to BVD-PI animals can increase the number of calves that become ill
- Isolate new animals for a minimum of 14 days (ideally for 30 days) before allowing contact with resident animals
- Sanitize housing areas and cattle equipment to reduce pathogen build-up
- Isolate sick animals because they are likely to shed pathogens in high numbers
- Prevent contact with neighboring cattle of unknown infection status
- Avoid overstocking, particularly during winter feeding and calving season

Keep in mind that airborne viruses can be dispersed for more than 12 feet from their source. Biosecurity practices are helpful in reducing a herd’s disease risk. Without the bug, there can be no disease. However, because of the nature of the BRD complex, strategies such as assisting the immune system need to be combined with reducing the risk of disease transmission. This assistance includes providing excellent herd-wide nutrition, instituting an effective vaccination program, minimizing stress, and treating affected animals promptly.

# References:

- Bovine Respiratory Disease Complex. The Merck Veterinary Manual. 2011. Merck, Sharpe and Dohme Corp.:Whitehouse Station, NJ, USA. URL: <http://www.merckvetmanual.com/mvm/index.jsp?cfile=htm/bc/121205.htm>. Accessed August 29, 2012.
- Callan, R. J. and F. B. Garry. 2002. Biosecurity and bovine respiratory disease. *Vet Clin Food Anim.* 18:57-77.
- Gulliksen, S. M., E. Jor, K. I. Lie, T. Loken, J. Akerstedt and O. Osteras. 2009. Respiratory infections in Norwegian dairy calves. *J Dairy Sci.* 92:5139-5146.
- Moore, D. A., M. L. Merryman, M. L. Hartman, and D. J. Klingborg. 2008. Comparison of published recommendations regarding biosecurity practices for various production animal species and classes. *J Am Vet Med Assoc* 233(2):249-256.
- Srikumaran, S., C. L. Kelling and A. Ambagala. 2007. Immune evasion by pathogens of bovine respiratory disease complex. *Animal Health Research Reviews*,8, pp 215-229 doi:10.1017/S1466252307001326.
- Stevens, E. T., D. U. Thomson, G. H. Lonergan, and N. Lindberg. 2007. Effects of short-term exposure of feeder cattle to calves persistently infected with Bovine Viral Diarrhea Virus. *Bovine Practitioner*.41(2):151-155.
- Urban-Chmiel, R. and D. L. Grooms. 2012. Prevention and control of bovine respiratory disease. *J. Livestock Sci.* 3:27-36.
- USDA:APHIS Veterinary Services, Centers for Epidemiology and Animal Health. 2007. Bovine Viral Diarrhea Virus Info Sheet. [http://www.aphis.usda.gov/animal\\_health/emergingissues/downloads/bvdinfosheet.pdf](http://www.aphis.usda.gov/animal_health/emergingissues/downloads/bvdinfosheet.pdf)

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