

2009 MONTANA BVD-PI HERD BIOSECURITY PROJECT

Montana State University & Montana Stockgrowers Association

Administered by:

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The Montana BVD-PI Herd Biosecurity Project continues efforts begun in 2006 by providing technical assistance and testing supplies to Montana ranchers who want to screen their herds for persistent infection with bovine viral diarrhea (BVD) virus. The focus of this project is to assist ranchers in adopting an array of biosecurity practices that will prevent transmission of the BVD virus from PI animals to cattle breeding herds.

Management and control of BVD in cattle herds must consider two ways the virus passes from one animal to another. The first is horizontal transmission – when a transiently (temporarily) infected animal releases the virus in its nasal and other secretions and the virus enters a susceptible animal through the mouth or respiratory tract. The second is vertical transmission of BVD virus from an infected dam’s bloodstream to her fetus during pregnancy.

Subsequent fetal infection can lead to fetal death, the birth of an “abnormal” calf that is persistently infected (PI) with the BVD virus, or the birth of an otherwise normal but also PI calf – meaning that the infection lasts the entire life of the animal. It’s important to note that PI females of breeding age are not only a source of horizontal transfer of BVD virus, but will always produce a PI calf themselves. The primary source of BVD virus is PI cattle; with transiently infected cattle considered a less important source.

The cost of the presence of at least one PI animal in a beef herd has been reported to range from \$14.85-\$24.84 per cow/year⁴. These costs are attributable to lost reproductive efficiency and the immunosuppressive effects of the BVD virus on susceptible animals.

The project consists of four major components:

- 1) Education:** Understanding how the virus originates and spreads on a cow-calf operation and how it affects production efficiency throughout the beef chain. It’s important that scientific research information is shared among education professionals, veterinarians and producers; and that this information is applied under a wide array of field conditions by ranchers and cattle feeders acting alone or under the guidance of an attending veterinarian. Systems have been developed to help producers and veterinarians assess to a degree of *reasonable assurance* the BVD-PI status of individual animals within their herds or under their care.

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⁴ Bob Larson, DVM, PhD, University of Missouri, Columbia, *Planned BVD Control in Beef Herds*, Conference proceedings “BVD Control and Eradication: The future is now!” Jan. 31, 2006, Denver, CO.

2) Risk Assessment: Integral to BVD-PI biosecurity is an assessment of risk for transmission of the virus between herds and within an individual herd. Experience working with hundreds of ranchers on anecdotal BVD-PI risk analysis has yielded a BVD Virus Biosecurity Risk Assessment ⁵. Ranchers can use this risk assessment to measure their herd's risk of BVD into *Low*, *Moderate* or *High* Risk categories.

Once the risk is assessed ranchers can consult with a veterinarian or BVD control specialist and initiate a Recommended Action Plan based on the level of risk. It is important to note that this risk assessment tool is only an *estimation of risk* and should not be considered a predictor of BVD infection in a herd. Also, "low" risk should not be thought of as "no" risk!

3) Diagnosis: Recent innovations in diagnostics allow us to screen cattle herds for the BVD virus at a relatively minimal cost through reverse transcriptase polymerase chain reaction (PCR) technology⁶ using pooled animal tissue samples. Results of the referenced study suggest that performing a reverse transcriptase-PCR assay on pooled fresh tissue samples is a "*sensitive and specific method*" of screening cattle for persistent infection with BVD virus. Diagnosis must be coupled with an animal identification system that allows efficient and accurate identification of BVD-PI animals so they can be removed from the herd. **Also critical to the success of this project is rapid turn-around time of screening results.** Once samples are received from participants, the contracting laboratory must deliver "next-business day" screening results and documentation.

Because of the low prevalence of PI animals (in Montana estimated at about 8.0% or 1:12 - 1:13 of cattle herds, and 0.09% of all calves or about 1:1100 head of calves born) not all producers can justify diagnostic screening for PI cattle. However, if ranch history, a significant breach in biosecurity or changes in production practices increases the risk of PI cattle being present in the herd, a partial-* or whole-herd** screening protocol can be defended.

4) Biosecurity: Biosecurity is an integral part of preventing transmission of the BVD virus and overall BVD-PI control. Biosecurity addresses all aspects of livestock movement and handling, mixing and sorting, identification, record keeping and documentation. The general principles of biosecurity and biocontainment as applied to BVD virus include increasing resistance of the host individuals to transient infection. **Immunizing cattle herds with appropriate vaccines to protect against transient infection should be the first consideration in a herd biosecurity program.**

Producers with the help of their veterinarians must make decisions about the biosecurity tolerance levels they will accept based on the chances of disease

⁵ *Montana BVD Virus Risk Assessment* – Reviewed and approved by consensus, National Cattlemen's Beef Association BVD Working Group, Jan 2009.

⁶ *Diagnostic efficacy of a reverse transcriptase-polymerase chain reaction assay to screen cattle for persistent bovine diarrhea virus infection* – James A. Kennedy, DVM, MS, Colorado State University Diagnostic Laboratory, Rocky Ford Branch; JAVMA, Vol. 229, No. 9, November 2006.

transmission and the expected risks and losses from disease. Recently animal health scientists have developed a series of vaccination “Reliability Guides”⁷ to help producers and veterinarians make decisions on vaccination protocol. We encourage use of these guides when planning annual vaccination programs.

Herd Screening/Diagnosis

The centerpiece of this project is a systematic screening protocol that guides the producer through a series of steps to identify PI animals in the herd and in new arrivals to the herd. The screening process is based on analysis of fluid from “pooled” tissue samples (usually 28 or fewer tissue samples per pool). If a pool is “positive” for the virus, the individual tissue sample contributing to the pool are individually re-tested. Therefore, individual animals carrying the BVD virus can be identified by matching the tissue sample using the animal identification number.

Once an animal is identified as a carrier of the virus, the livestock owner/manager is notified. We suggest that the animal (and its dam, if still nursing) be segregated from the herd and held for re-sampling 3-4 weeks later. The second tissue sample should be submitted to the lab for a confirmation test in order to segregate transiently infected animals from PI animals. In the case of an extremely valuable animal, a third sampling may be warranted.

***Partial-Herd Screening/Testing**

At least 30 days before breeding begins test:

- All non-pregnant breeding-age females including all replacement heifers.
- All non-biological pairs (both cow & calf).
- All calves from two-year-old heifers.
- All aborted fetuses, stillbirths, deformed or defective calves.
- All calves born later than 60 days after the start of calving.
- All breeding bulls, yearling steers, or other cattle you plan to expose to the breeding herd early in the breeding season.

****Whole-Herd Screening/Testing**

At least 30 days before breeding begins, test:

- All of the above.
- All new crop calves.

Key BVD virus Biosecurity Points:

- Screen the herd at least 30 days in advance of breeding to avoid exposure of a pregnant cow by a PI animal.
- Sampling is based on a small ear notch placed in a dry tube kept cool or frozen. Imagine the size of a pie-shaped piece taken from a dime.
- The same tissue sample used for initial PCR screening is the source sample for re-testing to identify individual “reactors” in the pool.

⁷ “Simple Targeted BVD Control” – M. Daniel Givens, DVM, PhD, Auburn College of Veterinary medicine

- Cows do not need to be sampled and tested unless they have a positive PI calf. In the case of a PI calf, the cow should be identified, sampled and tested.
- Individual identification is critical to match all samples with the animal tested and match the calf with its dam.
- If an animal tests negative for BVD-PI status, there's no need to ever retest that animal.
- PI surveillance should include the sampling and testing of as many aborted fetuses, stillborns and pre-weaning deaths as possible.
- PIs that live to be breeding females can horizontally transfer the virus to other animals in the herd – and they will always produce a PI calf.
- Ear notches can be frozen for up to 30 days, facilitating sampling over an extended period of time.
- PI animals should be removed from the herd as soon as discovered.
- Purchased bred heifers or cows with an unknown BVD-PI status should be kept separate from the resident herd until their PI status can be confirmed. Calves from these animals should be screened prior to commingling.
- All non-biological pairs should be screened for PI status.
- Screen all cows that lose a calf and a tissue sample was not obtained from the calf.
- Bulls should be purchased as BVD-PI free. If not, bulls should be screened prior to breeding season.

Perpetual whole-herd testing from a practical cow-calf management standpoint is not necessarily recommended. Once a rancher screens his/her herd according to our herd screening protocol there can be *reasonable assurances* of PI-free cattle with the following management in place:

- A properly applied vaccination protocol.
- A sound biosecurity and biocontainment program.
- Surveillance of suspect animals.

We highly recommend that all ranchers work with their attending or consulting veterinarians to develop a herd health protocol that incorporates the above management components including an overall biosecurity program.

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