Understanding Bovine Viral Diarrhea, Part 1

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The weather is cooling in Mississippi and it's once again time for the fall cattle production sales. "PI tested" is a term frequently used on many advertisements that we see this time of year, and I often get calls from potential buyers wanting to know exactly what this means. This month we will look at the disease targeted by this testing, bovine viral diarrhea.

Bovine Viral Diarrhea (BVD) is an economically important disease first identified in 1946 in dairy cattle in New York State. It has since been found worldwide in cattle and other species, and has become a serious threat to both the US beef and dairy industries. Infection with BVDV often causes immunosuppression, a reduction in the animal's immunity, resulting in additional disease problems and production losses.

Approximately 4% of beef cattle herds and 15% of dairy herds contain at least one animal positive for BVD. The prevalence of BVD infected animals within these herds has been estimated to be low in beef cattle and dairy herds (less than 0.05%), depending on the age of animals tested. The seemingly low prevalence of the disease in beef herds is likely an underestimate due to management factors which remove positive animals prior to herd testing.

BVD is caused by the BVD virus (BVDV), a type of pestivirus. There are two different genotypes of BVDV, BVD type 1 and BVD type 2, which are further classified into cytopathic or non-cytopathic strains based upon their laboratory characteristics. While most infections in the US are caused by type 1 infections, both genotypes can cause serious disease.

Clinical syndromes associated with BVD

BVDV infections are classified into three clinical syndromes: fetal infection, persistent infection, and transient (acute) infection.

- Depending on the stage of gestation when infected with the virus, fetal infections can result in early embryonic death, abortion, congenital defects, the birth of sick or weak calves, the birth of persistently infected calves, or the birth of normal calves.
- Persistent infections occur when the fetus is infected at early stages of gestation (40 – 125 days). A persistently infected (PI) animal will be infected for life, and can shed millions of virus particles in its nasal discharge, saliva, urine, semen, milk, and possibly feces.
- Transient, or acute, infections occur in the post-natal period and can result in fever, depression, reproductive problems (such as infertility, abortions), diarrhea, respiratory disease, and much more depending on the age and immune status of the animal infected, as well as the strain of BVDV involved. Some animals will show no outward signs of illness (subclinical disease), but

the immunosuppressive effects of the virus leaves them susceptible to other diseases. Transiently infected calves have the potential to shed and transmit BVD for up to 3 weeks after infection. Most animals recover from acute infections, but some animals will remain as "poor-doers" or die.

BVDV transmission

Direct transmission between animals is the most common route of transmission of BVDV. Since they can shed millions of viral particles every day, persistently infected (PI) animals, especially calves, are the most significant source of infection in a herd. PI animals therefore serve as a constant source of BVDV exposure in a herd because they continuously shed virus in saliva, mucous, tears, milk, feces, urine, and any other bodily secretion. PI females that survive and enter the breeding herd not only become a source for acute infections, but will also always produce a PI calf. Likewise, purchased pregnant heifers pose a high risk for PI introduction. Postnatal infection results in a transient infection, and these acutely infected animals are a temporary source of BVDV transmission.

Testing for BVDV

There are several testing options for the detection of BVDV in your herd based on the age and use of your animals. Acute or transient infections may be detected through serum or blood sampling. The most sensitive testing methods to detect PI animals utilize a skin biopsy such as an ear notch. Ear notches are easily taken at the time of processing and results can be returned within a number of days. If you suspect a BVDV infection or if you are concerned about the possibility of a PI animal(s) being present in your herd contact your veterinarian. He or she will know the proper samples to send to the laboratory for BVDV testing.

Prevention and management of BVD in the herd

A BVD control plan consists of several management steps: good biosecurity practices to prevent the introduction or spread of the disease onto your farm, vaccination of animals to reduce the risk of acute disease and the birth of PI animals, and identification and removal of positive animals. Producers should work with their herd veterinarian to develop an appropriate program to meet the needs of his/her individual operation.

- Do not purchase BVDV infected cattle. Test all replacement animals for BVDV persistent infection prior to admission to the herd.
- Isolate all newly purchased cattle for at least 30 days, preferably on another farm.
- Purchase only animals from herds with a known effective vaccination program.
- Consult your herd veterinarian and/or extension livestock specialist when developing a vaccination program. Make certain your own cattle are properly vaccinated before bringing new cattle into the herd.
- Monitor for the presence of BVD in your herd by seeking veterinary assistance with outbreaks of respiratory disease, reproductive failure, or other herd health problems.
- Consider implementing a BVD monitoring program. In cow-calf operations, this may involve testing prior to the breeding season. In stocker operations, this may involve testing prior to or at arrival.

The Mississippi Voluntary Bovine Viral Diarrhea Control Program

Several states have initiated voluntary BVDV control programs based on recommendations by animal health professionals across the US. A cooperative effort between the Mississippi Board of Animal Health (MBAH), the Mississippi State University College of Veterinary Medicine, and the MSU Extension Service has developed the Mississippi Voluntary Bovine Viral Diarrhea Control Program. This program follows guidelines under the Uniform Program Standards for the Mississippi Voluntary Bovine Viral Diarrhea Control Program, which are available through the MBAH website or by contacting the BVD program coordinator at 662-325-1183. Talk to your veterinarian if you are interested in participating in the Mississippi Voluntary BVD Control Program.

Bovine viral diarrhea is a serious disease that can have severe economic impacts in an infected herd. Given the complexity of the disease and the wide variety of control options available, we will answer some of the most frequently-asked-questions in this column next month.

Persistent Infection (PI)	**Transient (Acute) Infection (TI)**
• Calf is infected in utero in early gestation (40-125 days) • Clinical signs may or may not be present • Infected calf can shed virus throughout its entire life • Calf will never clear virus or become BVDV negative	• Calf is infected postnatal • Clinical signs may or may not be present • Infected calf can shed virus up to 3 weeks after infection • Calf can clear virus and become BVDV negative