



New York State Cattle Health Assurance Program Bovine Viral Diarrhea Module

Bovine Viral Diarrhea: Background, Management and Control

What is Bovine Viral Diarrhea?

Bovine Viral Diarrhea (BVD) is a disease of cattle caused by the Bovine Viral Diarrhea Virus (BVDV). The virus is widespread and most herds are at risk for infection. In the susceptible herd, BVD can be a serious, costly disease.

The signs of BVD vary, depending on the immune status of the exposed animals, and the strain of the infecting virus. The incubation period is about three to five days. If susceptible (non-vaccinated) animals are infected with a virulent strain of the virus, the disease will likely appear as an acute, severe sickness, with bloody diarrhea, high fever (105-107 degrees), off-feed, mouth ulcers, and often pneumonia. Some infected animals may die, while others will recover, usually within one or two weeks. Occasionally an animal will die very quickly, before other signs are apparent. Since BVD is a viral disease, antibiotics are ineffective.

If pregnant animals recover, they may abort about 2 to 4 weeks after exposure, especially if they are in the second trimester of pregnancy. Those exposed in the first trimester may experience early embryonic death, while open cattle may fail to conceive and return to heat. Some cows, if exposed between approximately 60 and 120 days of pregnancy, may not lose their fetus, but rather may go on to deliver a persistently infected (PI) carrier calf. For the rest of its life this PI carrier calf will shed lots of BVD virus that can then infect other animals.

When cattle are well vaccinated (as is more common today) and not heavily stressed, the disease is usually much less severe, and often the only visible signs are sporadic abortions and/or repeat breeding. However, vaccinated cows exposed to the virus between approximately 60 and 120 days of pregnancy may still occasionally produce persistently infected carrier calves.

Does this disease cause serious economic losses?

BVD is currently one of the most costly diseases of cattle. Abortions, infertility, and/or embryonic deaths associated with BVD lead to significantly reduced reproductive performance and increased premature culling. These symptoms are especially marked if one or more BVDV carriers are in the herd. Animals that

develop acute diarrhea and fever may die or have long, costly recovery periods with decreased milk production and/or growth. During recovery their immune system is often depressed, making them more susceptible to other diseases.

How does BVD virus spread?

Most animals become exposed through contact with other recently infected or persistently infected (carrier) animals that are shedding the virus. It is also possible for cattle to become infected via contact with contaminated fomites, such as water buckets, calf feeders, feed bunks, IV equipment, nose leads, clothing or people and cattle trucks.

At what age are cattle susceptible to BVDV infection?

Cattle of all ages are susceptible to acute infection. However, since colostral antibodies are effective in preventing infection in young animals, the disease is seldom seen before 3 months of age when management includes adequate feeding of colostrum from immune dams.

Persistent infection (PI carrier) only develops *in utero*, and then only if the dam is exposed to BVDV, at less than 125 days of pregnancy. An animal cannot become persistently infected after it is born.

How is BVDV diagnosed?

BVDV infection is diagnosed on the basis of the clinical signs plus confirmation through necropsy findings and laboratory tests of blood samples. If blood is drawn during the acute phase of the disease the laboratory can often isolate the virus from the white blood cells (buffy coat). If two serum samples are obtained, one in the acute phase and one a few weeks later, a rise in serum antibodies (SN test) between the two samples also confirms BVDV infection.

When abortion is the only sign, diagnosis is often more difficult. In these cases it is important for your veterinarian to submit the aborted fetus and placenta, in addition to serum samples from the dam, to the laboratory for testing.

The persistently infected (PI carrier) animal is easy to detect. This animal sheds so much virus that a viral antigen in its serum readily confirms its condition. Colostral antibodies may neutralize enough of the virus

in a persistently infected calf to render a “false negative” result. Therefore, other test methods have been developed, including skin notch testing and whole blood viral DNA detection that can be applied to baby calves and also older animals.

How does BVDV usually get into a herd?

The most common practices that allow BVDV to enter a herd are:

1. Purchasing replacement animals through an auction market: These animals are often exposed to other BVDV infected animals as they pass through the market. In addition, they are heavily stressed at this time, which lowers their immunity. Consequently, there is a good chance they will be incubating and/or shedding the virus when they arrive at the farm. The fetuses of pregnant animals moving through market situations are at risk of infection to become persistently infected or for abortion.

2. Introducing animals directly into the herd without spending a week or two in isolation: If new additions are first placed in an isolation facility, animals incubating disease will become apparent before they have an opportunity to expose the entire herd. A common history associated with herd outbreaks of BVD is that one or more new animals entered the herd about one week before the first case appeared.

3. Failure to maintain a strong herd vaccination program against BVD at all times: A good vaccination program will prevent illness in most vaccinated animals.

4. Failure to test new additions to make sure that they are not BVDV carriers: BVDV carriers shed so much virus that they will likely overwhelm even the best vaccination programs.

5. Contaminated semen: If natural service is being used, semen can be infected with BVDV, if the bull was recently infected or is persistently infected. It is extremely unlikely for semen from certified artificial breeding establishments to contain virus, since these organizations screen all of their bulls for BVD infection

If BVDV gets into the herd, how do I get it out?

If BVDV gets into a non-vaccinated or improperly vaccinated herd, it will spread from animal to animal. Thus it is important to maintain a strong BVDV vaccination program that will minimize this type of transmission and allow containment of the virus before it infects a large portion of the herd.

Keep in mind that cattle exposed to the virus at less than 125 days of pregnancy may give birth to persistently infected calves. These calves, if not

removed from the herd, will serve as a continuous source of the virus that will perpetuate the disease in the herd. Consequently, once BVD occurs in the herd, all calves born over the next 12 months should be tested for persistent infection. If any such carriers are detected, they must be removed from the herd immediately. It is best to test calves for persistent infection at birth or as soon as possible thereafter.

How do I prevent BVDV from reentering my herd?

An effective BVDV prevention program is based on maximizing immunity and minimizing exposure of the herd to the virus. The appropriate program for each farm will vary, depending on the farm’s goals and other factors, such as open vs. closed herd, source of purchased animals, feasibility of isolation facilities, etc.

1. Vaccination:

BVD vaccines are an important part of the prevention program. Vaccines are available in two forms - modified live and killed. Both forms have their advantages and disadvantages.

An advantage of modified live BVD vaccines is that they stimulate the entire immune system (both cell-mediated and humoral immunity). Therefore, it is generally recommended that every animal receive a modified live BVD vaccine at least once in its lifetime, preferably when it is 3-6 months of age. A disadvantage of modified live BVD vaccines is there may be label restrictions against using them on some or all pregnant animals, thus their use in mixed populations of bred and open animals must be carefully controlled.

An advantage of killed BVD vaccines is that they can be used on all open and pregnant animals, thus the entire herd can be vaccinated at any time. Disadvantages of the killed BVD vaccine include: a shorter duration of immunity, a reduced ability to stimulate cell-mediated immunity, and sometimes a slight drop in milk production for a day or two after vaccination. As indicated on the label, killed vaccines must be administered twice (two or three weeks apart) if the animal is being vaccinated for the first time. Only one shot is required thereafter at 4 to 6 month intervals

Both types of vaccines, if administered properly and according to the label, will provide sufficient immunity to prevent the clinical onset of acute BVD. To maintain this level of immunity, the modified live vaccine needs to be given at least annually, and the killed vaccine needs to be given every 4-6 months.

Both types of vaccines can also help prevent transmission of BVD virus to the fetus and therefore prevent abortions and/or the birth of persistently infected calves. Some clinical trials indicate superior protection of the fetus by certain MLV vaccines against some strains of virus. No vaccine is expected to afford

100% fetal protection. Thus it is still possible to occasionally have BVDV induced abortions and/or persistently infected calves in a vaccinated herd exposed to a field strain of BVD.

Vaccines are a tool for prevention, not a cure. Don't wait for the first case of BVD to occur before deciding to vaccinate. By then many or all of the animals will already be exposed and/or infected. The added stress of vaccination may only make symptoms worse. Similarly, if new animals will be entering the herd, it is always best to vaccinate them at least a week prior to their assembly and movement, rather than waiting until they arrive in the herd.

Keep in mind that vaccines do not induce good immunity in heavily stressed or poorly conditioned animals. So, even the best vaccination program is likely to fail in an environment with poor nutrition, stress overcrowding and without an isolation facility.

2. Biosecurity

Maintain a closed herd, if possible. Since BVD outbreaks are commonly associated with new animals entering the herd, maintaining a closed herd is the ideal approach to keep the virus out. Unfortunately, this may not be possible. Today, many farms purchase all replacements, while others temporarily send heifers to contract raisers. And these raisers typically commingle heifers from many farms before they are returned home to the milking herd.

3. If the herd is not closed, "best management" practices for moving cattle into the herd (purchased or your own) include:

Vaccinate with BVD vaccine two weeks prior to moving. When deciding which vaccine to use, consider the vaccine program of the herd of origin. If that herd is well vaccinated, one dose of killed BVD vaccine should be sufficient. If it is not well vaccinated, or if the history is unknown, two doses of killed (2 weeks apart) or one dose of modified live vaccine (non pregnant animals only) are indicated.

Before moving, test all cattle not previously tested for persistent BVDV infection (BVDV carriers). Since animals can only become carriers prior to birth, previously tested cattle do not need to be retested. Do not allow carriers on the farm. Calves born to test negative pregnant replacements must also be tested.

Move animals with your own truck, directly from farm to farm. Do not purchase them through an auction market or move them with unknown cattle due to the high risk of exposure to BVDV under these conditions.

Isolate all new arrivals (purchased or your own heifers) for two to three weeks in a well-ventilated area, away

from the rest of the herd, yet close enough to permit frequent checking for any signs of disease. If any diseases are noted, remove the affected animals immediately, and call the veterinarian to establish a diagnosis and treatment regime. During isolation, administer a booster vaccine, especially if the vaccine history is unclear or if the previous owner's vaccine program was inadequate.

4. Ongoing testing for BVD carriers (persistent infection)

Continual exposure to BVDV from one or more persistently infected carriers may cause infection in vaccinated animals, so the herd may experience sporadic abortions and infertility. Since exposure to BVDV from any source can result in a cow giving birth to a BVDV carrier, one can never be sure an animal is not a carrier until it tests negative. Therefore, it is recommended that all purchased cattle be tested before entering the herd, and all newborn calves be tested.

What is the NYSCHAP BVD prevention module?

The New York State Cattle Health Assurance Program (NYSCHAP) offers a specific module to prevent and control BVD. This module is a structured program for BVD prevention that is based on a series of "best management" practices. It is implemented on the farm in conjunction with the core module of NYSCHAP as a joint effort between the State Veterinarian (NYS Dept. of Ag and Markets) and your herd veterinarian. Together, these veterinarians discuss with farm owners and managers the important aspects of BVD prevention. In addition, they tour the farm to establish the level of risk for BVD, they develop a farm management plan to control and prevent the disease, and they establish a system to monitor the success of the program.

All participants will be recognized and identified by a certificate stating the level at which their herd is enrolled in the NYS Cattle Health Assurance Program. This certificate will serve as evidence to cattle buyers and consumers that animals, milk, and meat from this herd have a value-added component in the form of reduced risk for both cattle diseases and foodborne pathogens.

How can this module be implemented on my farm?

To enroll in NYSCHAP, contact your herd veterinarian. They will then make arrangements with the regional field veterinarian from the Department of Agriculture and Markets. For additional information, contact one of the sources below:

Enrolling or contacting a state field veterinarian, call NYS Division of Animal Industry at 518-457-3502

Diagnostic testing services or information, call the Animal Health Diagnostic Center at Cornell University, 607-253-3900

Mastitis testing or information, call Quality Milk Promotion Services at 607-255-8202

Additional NYSCHAP information, contact the NYSCHAP coordinator at 607-253-3910

Visit the NYSCHAP website at: www.nyschap.vet.cornell.edu or email us at nyschap@cornell.edu

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