

# BVDV

IDEXX **Informational Brochure**

## You have the power to control BVDV.

Stop the spread of bovine viral diarrhea virus through early detection and aggressive intervention.

### **The what, why and how of BVD**

Bovine viral diarrhea virus (BVD or BVDV) is a member of the genus *Pestivirus* within the family *Flaviviridae*. It is a single-stranded enveloped RNA virus that crosses the placenta in pregnant cows that are infected between days 30 and 150 of gestation, causing reproductive losses due to abortions, stillborn calves or calves that die early in life. Calves that survive are immunotolerant to and persistently infected (PI) with the virus.

Persistently infected cattle are the main source of BVDV transmission. PI calves shed large amounts of the virus every day of their life, infecting other animals in the herd. These carrier animals often die of mucosal disease within the first two years of life, however many may live two years or longer.

Testing is the only way to identify cattle persistently infected with BVDV.



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# Bovine Viral Diarrhea Virus

It passes.

The real risk is that it is passed on.

BVDV is not fatal to many cattle; a transient infection of the virus runs its course in just a few days. However, cattle that are persistently infected (PI) with BVDV due to exposure to the virus in utero maintain a viral infection throughout their lives. If a PI calf survives to live birth, it will continually shed the virus throughout its shortened life.

Exposure to PI cattle reaches beyond the cattle in a single pen or pasture to cattle in adjacent pens or pastures, therefore having the potential to infect and re-infect a large number of animals quickly. Regardless of age, all cattle are vulnerable to BVDV infection from PIs.

To understand the probability of risk in a cattle herd or in purchased cattle, refer to Table 1. If you purchase 500 animals from a population of cattle where the prevalence of PI cattle is 0.4%, there is an 86.5% chance of introducing at least one PI animal. The economic impact of BVDV as seen in Table 3 demonstrates that having PI animals in your herd is costly and damaging to your profitability.

A more complete summary of risk probability for a typical feedyard is represented in Table 2. In a 10,000-head feedyard with a prevalence of 0.4%, 71% of the pens are exposed to PIs.

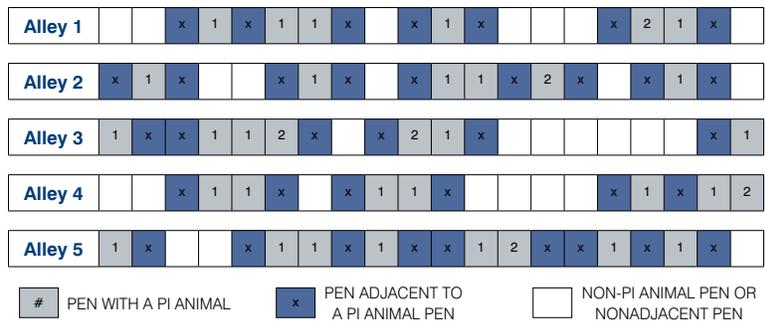
A PI animal not only exposes its pen mates but also the cattle that have fence line contact. According to a study of U.S. feedlot cattle, animals in the same and adjacent pens, that were exposed to a PI animal showed a detectable adverse effect on morbidity rate as compared to non-PI-exposed cattle. The study also showed a 43% increased incidence of treatment for bovine respiratory tract disease (BRD) in non-PI cattle exposed to a PI animal.<sup>1</sup>

## FACT:

*Bovine viral diarrhea virus (BVDV) challenges producer profitability and animal health with increased abortions, stillbirths and risk to healthy cattle.*

Number of Calves Introduced	PI Prevalence Rate in Source Calves			
	0.10%	0.20%	0.30%	0.40%
50	4.9%	9.5%	13.9%	18.2%
100	9.5%	18.1%	26.0%	33.0%
250	22.1%	39.4%	52.8%	63.3%
500	39.4%	63.2%	77.7%	86.5%
1,000	63.2%	86.5%	95.0%	98.2%
2,500	91.8%	99.3%	99.9%	100.0%
5,000	99.3%	100.0%	100.0%	100.0%
10,000	100.0%	100.0%	100.0%	100.0%

Random Simulated Outcome:	
Herd/Feedlot Size	10,000
Pen Size	100
Number of Pens	100
Number of Adjacent Pens per Alley	20
PI Source Prevalence	0.40%
Total PIs Introduced	40
% Pens Exposed	71%



Article	Country	Cattle Type	Reported Impact
Chi <i>et al. Prev Vet Med.</i> <sup>4</sup>	Canada	Dairy	\$31.07 per cow
Duffell <i>et al. The Veterinary Record</i> <sup>5</sup>	U.K.	Dairy	\$31.10 to \$88.75 per cow
Gunn <i>et al. The Veterinary Journal</i> <sup>6</sup>	Scotland	Beef cow-calf	\$72.68 per cow per year
Hessman. <i>BVD Control Conference</i> <sup>3</sup>	U.S.	Beef feedlot	\$41.17 per cow
Houe. <i>Vet Microbiol.</i> <sup>2</sup>	Denmark	Dairy	\$20.00 to \$57.00 per calving
Larson <i>et al. Bovine Practitioner</i> <sup>7</sup>	U.S.	Beef cow-calf	\$15.33 to \$20.16 per cow
Moennig <i>et al. Animal Health Res. Reviews</i> <sup>8</sup>	U.K., Norway and Denmark	All breeds	\$10.00 to \$40.00 per calving
Ridpath. <i>Hoard's Dairyman</i> <sup>9</sup>	U.S.	Dairy	\$35.00 to \$65.00 per calving
Wentink <i>et al. Tijdschr Diergeneesk.</i> <sup>10</sup>	The Netherlands	Dairy	\$81.71 per cow

Testing can save both cattle and money.

Testing all animals and removing PIs is the best way to decrease herd losses and reduce the financial impact of BVD—reported to be \$30–40/head (average) and up to \$80/head across an entire herd.

**Testing with the IDEXX HerdChek\* BVD Antigen Test Kit costs less than \$5 per head.**  
Source: IDEXX Laboratories, Inc.

# Academy of Veterinary Consultants Position



The Academy of Veterinary Consultants (AVC) is an association of veterinarians involved in beef cattle medicine, herd health programs and consultation.

## Control and Eradication of BVDV from North America

"It is the resolve of the Academy of Veterinary Consultants that the beef and dairy industries adopt measures to control and target eventual eradication of BVDV from North America."

*Adopted by the AVC in November 2001*

## AVC Producer Recommendations for Cow-Calf and Stocker/Feedlot Production

### Overview

- PI cattle are the major source for BVD infection and disease in other cattle. PI cattle become infected before they are born (before 125 days of gestation) and shed huge amounts of BVD virus throughout their lives.
- Any calf, replacement heifer, bull or cow can become temporarily infected with BVD virus for a few days to weeks until its immune system can clear the virus. The disease is usually not fatal by itself, but BVD virus suppresses the immune system and may make infected cattle more susceptible to diseases such as pneumonia, scours, footrot and others.
- Vaccination is a tool to manage BVD and persistent infection, but it cannot be relied upon to keep a herd free of PI cattle.

### Key recommendation

- Meet with your veterinarian to determine or review your BVD goals and current exposure risk.

## Cow-Calf Production

### Background

- The common ways BVD is introduced into herds are through herd additions that are PI or contact with other PI cattle, including PI calves, yearlings, bulls, females and fetuses carried by pregnant females.
- The virus may cause infertility and/or abortion in susceptible cows, heifers and bulls.
- Testing for PI cattle is different from testing for many other animal diseases because PI status stays the same throughout the animal's life. A non-PI animal will be negative its entire life and a PI animal will remain positive its entire life. Therefore, PI testing is usually done only once. A test for PI status needs to be repeated only to confirm a positive or if evidence indicates a faulty test. As with all tests, a few false-positive and false-negative results can occur.

*"...BVD virus suppresses the immune system and may make infected cattle more susceptible to diseases such as pneumonia, scours, footrot and others."*

*Permission for publication granted to IDEXX by AVC.*

## Designing best plans for BVDV control and eradication strategies

- Introduce only PI-negative animals into the herd. Calves from purchased pregnant females must test negative before the pair is added to the resident herd.
- A number of tests for PI cattle are available; work with your veterinarian and diagnostic laboratory to determine the best testing strategy for your situation.
- Prior to the start of the breeding season, test all calves and all non-pregnant females without calves (aborted, never confirmed pregnant, lost a calf for any reason) that have not been tested previously. Isolate pregnant females until they calve and their calves can be tested.
- Some herds may require annual calf testing.
- Prior to the start of the breeding season, test all bulls and replacement females (home raised or purchased) that have not been tested previously for PI status.
- Maintain documentation of test results.
- Work with your veterinarian to design a vaccination program that considers vaccine type and timing. This includes considerations of bull turn-out, preweaning, weaning, heifer prebreeding and mature cow vaccination to optimize fetal protection.
- Work with your veterinarian, neighbors and replacement suppliers to identify and minimize risk of introducing BVDV to your operation.

### What to do with a positive test result

- Immediately consult with your veterinarian to determine herd goals and appropriate measures.
- If any calf is a suspected PI animal, it may be euthanized immediately or held in isolation until a second confirmatory test is run. If a calf is confirmed as a PI, it should be euthanized immediately to eliminate the major source of BVDV transmission to the breeding herd.
- The mothers of PI-positive calves should be tested (there is a chance that the dam is also a PI).
- Cows with PI calves that are not PIs themselves may not need to be culled.
- Work with your veterinarian, neighbors and replacement supplier to identify and minimize risk of introducing BVDV to your operation.

## Stocker/Feedlot Production

### Background

- Vaccination is a tool to manage BVD, but it cannot be relied upon to prevent disease if PI cattle are present.

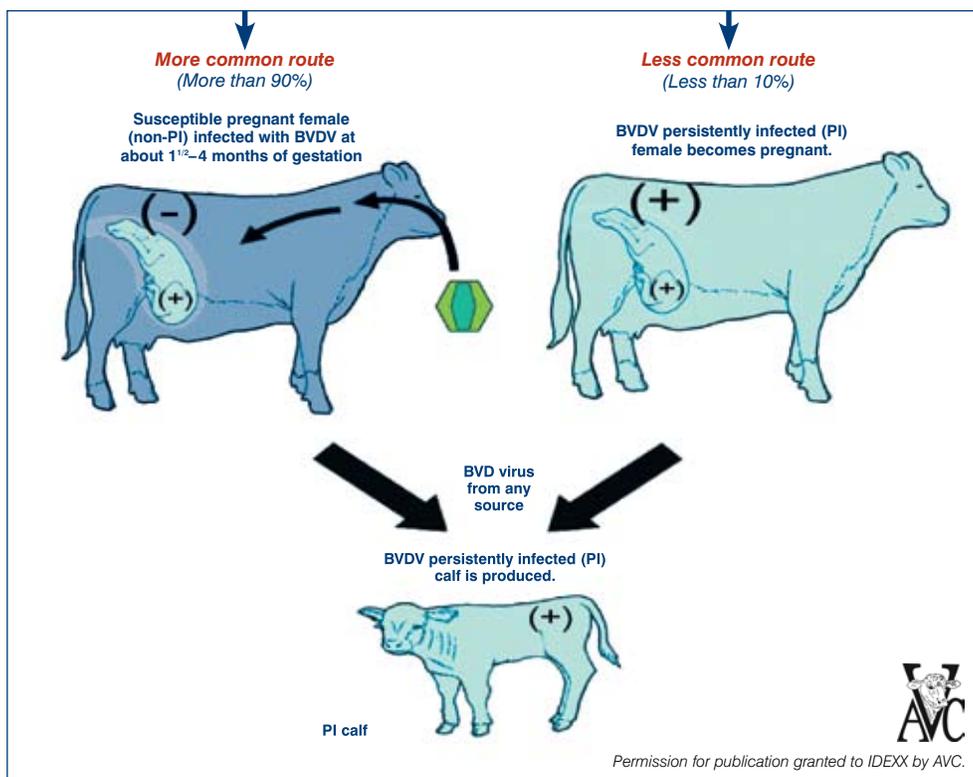
### Designing best plans for BVDV control and eradication strategies

- Consider sourcing previously tested cattle.
- Consider arrival testing.
- Initiate or continue a modified live virus (MLV) vaccination program.
- Euthanize or isolate PI cattle from other cattle.
- Discreetly inform the source of cattle when a PI test result is positive (may involve veterinarian-to-veterinarian contact).

AVC contact: Dr. Bob Larson, Chairman, AVC BVD Committee;  
e-mail: rlarson@vet.ksu.edu

# Cattle Persistently Infected with BVDV are the Main Source of BVDV Transmission

## Two ways PI calves are produced



## Experience and advice from the front lines

**Dr. Bob Larson, Kansas State University; Chairman, AVC BVD Committee** "We've not been able to control this disease with vaccinations alone. I think we have to look at testing and animal movement, and really get aggressive about controlling BVD. We're now getting the tools that we need to do that."

According to Dr. Larson, BVD poses unique challenges: "By far the largest source of the virus and the biggest threat is in persistently infected animals... these are calves that were infected when they were still inside their mothers as fetuses. When they're born they are persistently infected, meaning that they are infected for the rest of their life."

**Justin Nelson, Feedyard Operator, Dimmit, Texas** "When we started using this test, I was very skeptical of its accuracy. For a considerable amount of time, I would retest every positive [animal] and also retest the animal that went through the chute in front of it and the animal that went through the chute behind it. I have to say that over the course of this year, and with several thousand head going through the chute, I have yet to have a positive result come back to me that was not confirmed on a retest—and a blind retest at that. I am now very confident in the accuracy of this test."

Nelson reports that the HerdChek\* BVD Antigen Test Kit works well in his operation: "It works with ease and speed of results. I incorporated testing into a processing protocol and it added no time to the overall process. It's easy, simple and pretty straightforward. The only challenge is you have to find a way to identify each individual animal, which to me is a good thing. It forces me to do a good thing."

## BVDV Myths

### 1. PI calves will be killed by MLV vaccination.

Fact: Controlled experiments have not been able to induce sickness or death in PI calves following MLV vaccination. However, case reports indicate that MLV vaccination can cause a PI animal to become sick or to die though far less than 100% are negatively affected.

### 2. A PI calf will be thin, have a rough haircoat and be a poor doer.

Fact: While many PI animals are unthrifty, reports have indicated up to 50% will appear normal and may enter the stocker operation in excellent condition. PI calves cannot be visually identified.

### 3. Calves are PI because their dam is PI.

Fact: Recent research has shown that 7% of PI calves' dams were PI; the other 93% of calves have dams with a normal immune response to BVDV and are not persistently infected.

### 4. The greatest cost associated with a PI calf is the death of that calf.

Fact: The reproductive loss associated with lower pregnancy proportions, more abortions and higher calf mortality is the greatest economic cost of PI animals.

### 5. BVDV won't affect cattle if they are vaccinated.

Fact: The tremendous amount of virus secreted by a PI calf can overwhelm a level of immunity that is protective under less severe exposure.

**Vaccination alone will not solve BVDV problems.**

# Detect Isolate Control

Effective biosecurity begins with education, detection and vaccination and can control the spread of BVDV.

Detection is a critical step in controlling bovine viral diarrhea virus.

IDEXX Laboratories' HerdChek\* BVD Antigen Test Kit makes it easy. It's the only USDA-licensed test for detecting the bovine viral diarrhea virus in persistently infected (PI) cattle, the main source of BVDV transmission.

PI status remains the same throughout the animal's life, and one PI calf can put an entire herd at risk. Implementing a testing protocol to identify and remove PI cattle will help prevent exposure to BVDV and is a critical step in eradicating BVDV from the herd.

Source: IDEXX Laboratories, Inc.



# Knowledge gives you the power to end BVDV

## IDEXX HerdChek\* BVD Antigen Test Kit

Your essential weapon  
in the war on this virus.

### The only USDA-licensed test for detection of BVDV in PI cattle

- Convenient ear-notch sampling
  - Quick and easy chute-side sampling
  - Limited training and complexity, with no blood sampling required
- Rapid turnaround
  - Results within 24 hours, allowing rapid removal of PI animals
- Accurate and reliable
  - Demonstrated accuracy, ensuring correct identification of PI animals
- USDA-licensed
  - Standardized and validated to deliver results you can trust

Source: IDEXX Laboratories, Inc.



USDA-licensed

### References

1. Loneragan GH, Thomson DU, Montgomery DL, Mason GL, Larson RL. Prevalence, outcome, and animal-health consequences of feedlot cattle persistently infected with bovine viral diarrhoea virus. *JAVMA*. 2005; 226(4):595-601.
2. Houe H. Epidemiological features and economical importance of bovine virus diarrhoea virus (BVDV) infections. *Vet Microbiol*. 1999; 64(2-3):89-107.
3. Hessman B. Effects of bovine viral diarrhoea virus (BVDV) persistently infected (PI) calves in the feedyard and management of PI calves after initial identification. Proceedings from: BVDV Control: The Future is Now Conference; January 31, 2006; Denver, Colorado.
4. Chi J, VanLeeuwen JA, Weersink A, Keefe GP. Direct production losses and treatment costs from bovine viral diarrhoea virus, bovine leukosis virus, *Mycobacterium avium* subspecies paratuberculosis, and *Neospora caninum*. *Prev Vet Med*. 2002; 55(2):137-53.
5. Duffell SJ, Sharp MW, Bates D. Financial loss resulting from BVD-MD virus infection in a dairy herd. *The Veterinary Record*. 1986; 118(2):38-39.
6. Gunn GJ, Stott AW, Humphry RW. Modelling and costing BVD outbreaks in beef herds. *The Veterinary Journal*. 2004; 167(2):143-49.
7. Larson RL, Pierce VL, Grotelueschen DM, Wittum TE. Economic evaluation of beef cowherd screening for cattle persistently-infected with bovine viral diarrhoea virus. *Bov Pract*. 2002; 36(2):106-112.
8. Moennig V, Houe H, Lindberg A. BVD control in Europe: current status and perspectives. *Animal Health Research Reviews*. 2006; 6(1):63-74.
9. Ridpath J. Why BVD is a tough problem. *Hoard's Dairyman*. 2002; 697.
10. Wentink GH, Dijkhuizen AA. Economic consequences of an infection with the bovine diarrhoea virus (BVD virus) in 15 dairy farms. *Tijdschr Diergeneesk*. 1990; 115(22):1031-40.

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