

BVD

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Introduction

BVD (Bovine Viral Diarrhoea) is a global disease. It is also common in NZ, with an estimated 80% of herds being infected at any one time. The effect of BVD depends on the age and stage of pregnancy at which animals become infected. It is estimated each infected cow can cost around \$90.00. Infection can easily be prevented by vaccination.

What is BVD?

BVD is a highly infectious virus. It has two major types, cytopathic and non-cytopathic. Non-cytopathic virus is the most common and important. It can invade the uterus of a pregnant cow and infect her fetus. If the timing of this invasion is right, the fetus will become infected for life. This animal is **Persistently Infected (PI)**. The cytopathic type is far less important. If a PI animal is also infected with a cytopathic type, this leads to a disease called Mucosal Disease. Animals with Mucosal Disease often die, but some are “poor doers”.

What is a PI?

A PI is an animal Persistently Infected with BVD. They only develop if their dam becomes infected when she is about 45 to 125 days pregnant and the fetus survives. A PI animal will shed millions of virus particles every minute for the rest of their life. The virus is shed in faeces, urine, saliva, nasal discharges, milk, semen, and other secretions. PIs may not grow normally, and often die young. However, they can also appear normal. PIs are very important as they are the reason infection continues to cycle in a herd. It is estimated between 0.5 and 2% of cattle in NZ are PIs.

What effect can infection with BVD have on farm?

The effect of BVD depends on the immune status, age, gender, and the stage of pregnancy of the animal at the time of infection:

Immune animals

Animals that have immunity due to vaccination or previous exposure generally have no clinical signs following infection.

Non-Immune animals

Non-immune animals exposed to virus usually become infected and shed virus for about 2 weeks. During this time they are described as **Transiently Infected (TI)**. They stop shedding virus because they develop immunity (antibodies); this eliminates infection. This immunity lasts for years.

Importantly, not only can BVD cause the ailments listed below it can suppress the immune system. This makes them more susceptible to infection; for example pneumonia and mastitis.

Young stock (<12 months)

Young TIs can scour, cough, be lame grow poorly, have rough coats or ulcers in their mouths. Often it is confused with “worms”. Usually all animals in a mob are infected, but thankfully very few die.

Older non-pregnant stock

Generally disease is less severe and often goes unnoticed. Animals may not eat, be depressed or have mild diarrhoea for a few days. During this time milk production usually drops. A very important exception is bulls around mating. A TI bull will shed virus in their semen; this can lead to severe mating failures. Note virus can also be found in extended semen.

Cows at mating

Cows infected at insemination, either from other cattle or semen, have lower conception rates as they fail or are late to ovulate. For example, in one study of a herd infected with BVD, the conception rate was 79% in the immune cows and only to 22% in non-immune cows.

Pregnant cows

The outcome of infection in non-immune cows depends on the stage of pregnancy.

- **0 to 45 of days of gestation:** Cows often fail to conceive, this leads to repeat breeders and a fall in pregnancy rate.

Notes:

- **45 to 125 days of gestation:** The virus will cross the placenta and invade the fetus. The fetus may die, develop congenital defects (e.g. cleft palate, hydrocephalus, or cataracts) or most importantly, if they are born, be a PI.
- **125 to 175 days of gestation:** Virus will invade the fetus and can cause congenital defects, mummification or abortion.
- **180 days to term:** The functional immune system of the fetus will usually eliminate the virus. Some animals may abort or produce stillborn or weak calves.

What does BVD cost?

The cost of BVD differs widely. Factors to consider include embryo losses, fetal losses, congenital disease losses, growth losses, mastitis cost, PI cost, mucosal disease cost, increased culling cost, concurrent disease cost; this list could go on.

In a recent NZ article (Economics of BVD in Dairy Herds by Andrew Weir and Cord Heuer) the cost of BVD was divided into two main areas; ‘The cost of BVD in persistently infected (PI) cows’, and ‘The cost of transient BVD infection (TI)’.

The cost of BVD in persistently infected (PI) cows

PI cows are generally poor performers. They have a:

- 23% higher risk for mastitis
- 22% higher risk for illness or sudden death
- 18% slower growth rate
- 23% lower milk production
- 6% higher abortion rate
- 18% higher mortality rate of <2 year animals.

The cost of transient BVD infection (TI)

The major economic impact is seen with transient BVD infections. The authors examined this using two studies, one at “cow-level” and the other at “herd-level”. At cow-level, they estimated that each time a non-immune cow was infected it cost about \$90.00. The basis for this is outlined in the table below:

Outcome	Effect	Cost
Reduced days in milk through increased calving-conception period	+6.6 days	\$35.64
Lower final pregnancy rate	-3.1%	\$32.24
Lower conception to artificial breeding	-11%	\$ 8.58
Extra clinical disease		\$13.67
Milk production decline (kg solids/day)	Not detected	
Total loss per TI		\$90.13

Assumptions \$4.50/kg, 1.2kg/day, \$120 premium for AB calf, \$800 premium for pregnant cow.

At herd-level, based on a study of 590 randomly selected herds, they estimated the total cost of BVD was \$152 per cow in an infected herd compared to a non-infected herd. For an average herd of 386 cows the cost would be \$58,672. They assumed the following: a 5% lower daily milk production, 2.4% later conception with a further 1% milk loss, 2% higher abortion rate, a higher mastitis/SCC rate and a payout of around \$4.50.

Does control of BVD infection make economic sense?

The simple answer is yes. In a NZ research paper the authors (MP Reichel, FI Hill and H Voges) analysed the cost of control or eradication of BVD against the estimated cost of disease over 10 years. They concluded: “ ... *all singular control strategies emerged as less costly than incurring the cost of ongoing infection in the herd.*”

How to control BVD on your farm

1. Define the status of your herd
2. Assess the risk of BVD infecting your herd
3. Action steps available

Notes:

1: Define the status of your herd

Several tests (i.e. Bulk tank antibody, PCR and Antigen) are available to determine the infectious status of your herd. Often the best place to start is a bulk milk BVD antibody test. But make sure that you consult your veterinarian for a tailor-made testing programme and interpretation of the results.

2: Assess the risk of BVD infecting your herd

If your herd is not infected, prevention of infection is paramount. Conversely if your herd is infected preventing it from infected other herds is also paramount. A good way of thinking about possible biosecurity risks is:

- IN** Bulls, bought in cows/Trojans (cow carrying a PI fetus), heifers, calves, trade stock, dairy grazers, trucks, vets, AI techs etc.
- OUT** Cows away at grazing, especially during in first 4 months of pregnancy as this carries the risk of Trojan cows, shows etc.
- OVER** Contact over the fence, neighbours, during droving.

3: Action steps available

The main aim is to cut off the supply of PIs, by stopping pregnant cows or heifers from producing PI calves, and avoid keeping any PI calves that have already been born.

Control options:

1. Test and cull:

Bulk milk testing is a good way to determine if you have any PI milking cows. This is best done prior to mating. If a PI cow is suspected, then test individual cows to detect the culprit(s). It is best to start with the lowest 10% of producers as most PIs are poor producers.

To eradicate BVD from the whole herd, also test all remaining stock not in the milking herd, i.e. calves, heifers, carry overs, bulls, steers, penicillin cows, late calvers etc.

Make sure cattle coming onto the property are also tested prior to contacting breeding stock. Be aware of Trojan cows.

2. Vaccinate to prevent PIs:

Use a robust vaccine (i.e. Bovilis® BVD) that offers fetal protection. This ensures that no PIs are born. Vaccinate at the correct time:

Heifers/Cows not previously vaccinated:

Two shots 3-4 weeks apart, completed 3-4 weeks before mating .

If previously vaccinated as calves (see below):

One shot annual booster, 3-4 weeks before mating.

This will provide 6 month fetal protection and maximum immunity through critical early stages of pregnancy; but also 12 months duration of immunity to the vaccinated animal.

Vaccinate calves from 4 months of age with a 2 mL dose, two shots, 3 - 4 weeks apart. This will provide 12 months protection against clinical disease. Also they will only require one dose prior to heifer mating

3. Reduce risk:

Become a closed herd by preventing nose to nose contact with neighbour's stock (e.g. outrigger). Avoid contact between cattle and transporters etc. Insist vets, AI techs, scanners etc. have clean overalls, boots and equipment when they arrive.

If you do nothing else about BVD, you must make sure bulls coming onto your property for mating are BVD virus negative and vaccinated.

References

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