

## BVD virus – FAQ

### What is BVD?

A highly damaging, widespread, but controllable virus of cattle. Probably the most important production viral disease of Irish cattle - related to both Border disease of sheep and classical swine fever of pigs.

### What does it cause?

Gastrointestinal, respiratory and reproductive disease including scouring, ill thrift, coughing, rough coats, mouth ulcers. Can also cause poor calf health, lameness, infertility, increased somatic cell counts and importantly immunosuppression. Remember however that in the majority of infected animals, there are little or no clinical signs at all.

### What is a PI?

Persistently infected (PI) animals are born infected with BVD virus and will die infected with BVD virus. Clinically they can appear perfectly normal. During their lifetime, they shed huge quantities of virus, spreading infection to every naïve animal they come in contact with.

### How do PI animals spread the virus?

Virtually all secretions and excretions - nasal discharges, saliva, semen, urine, tears, milk, blood, foetal fluids and faeces. Other animals come in contact with the virus usually orally.

### How good are PI animals at spreading BVD?

Extremely so, PI animals are veritable BVD factories. They produce incredible amounts of virus (10, 000, 000 virus particles per ml) day-in, day-out for their entire lives. Only 10 virus particles are needed for infection.

It takes as little as one hour for a susceptible animal to become infected if in direct contact with a PI animal.

### Is keeping a “pet” PI, as good as vaccination?

Probably not – it is extremely difficult to guarantee that every animal will be properly and fully exposed to the virus. This is especially, the case in larger herds. The “pet” PI approach has welfare implications and can complicate other vaccinations, selling animals, and buying in. PIs have a habit of dying just when you need them most i.e. just before the breeding season. Also remember you are playing with full-strength, live virus doing this – there is a risk of that virus causing clinical respiratory or enteric disease.



**Are PIs the only source of BVD?**

No - animals can also acquire infection by contact with other acutely infected cattle. An acute infection is a self-limiting virus infection similar to human flu, typically lasting 10-14 days. Acute (transient) infections are less efficient at transmitting the disease than PI animals because they shed much less virus and do not shed it very long. However these acute infections can keep circulating between different animals within larger herds for years. In Ireland, this type of BVD infection is a common component of respiratory disease in young cattle.

**How do cattle become PIs?**

By being exposed to BVD virus, before birth, during a critical stage in the development of their immune system. This can only occur if the dam is exposed to BVD virus for the FIRST time during pregnancy (around day 90-125).

Surprisingly many PI calves (up to 20%) survive to breeding age. It is often the better, more careful farmers who manage to support and keep alive these PI animals. Every PI animal which manages to reproduce will produce another PI calf.

**Are PIs single events?**

PIs tend to appear in clusters, possibly due to exposure of a number of susceptible females at one time, or due to vertical transmission – a PI calf being born to a PI cow. Remember by the time, you start looking PIs may already be dead and gone.

**PI animals are virus positive and antibody negative, right?**

PI cattle usually have no antibody to BVD virus. Their immune system doesn't recognise the virus as foreign.

Rarely however, a low amount of antibody can be detected in these animals due to either natural or vaccine exposure to a different strain of the virus. Often these are in herds where there is more than one PI animal.

**What is mucosal disease?**

An invariably fatal disease which only affects PI animals and usually occurs between 6 and 24 months of age. It is characterised by severe damage to the mucosal surfaces of the body, in particular the gastrointestinal tract. Afflicted animals have fever, persistent diarrhoea, chronic wasting, mouth ulcers, etc.

**How big a role does the bull play in BVD transmission?**

Semen is an excellent transmission vehicle for BVD virus.

When a PI bull serves a naïve cow, early embryo loss is the most likely outcome until the dam develops immunity to the virus. Once immune, she should conceive as normal. So, PI calves rarely result from services by PI bulls. It is much more common for them to cause delays in conception, thereby lengthening your calving interval.

Semen from PI bulls is always of poorer quality than that from non-PI bulls, and so in itself is less effective at getting cows pregnant.



When a naïve bull undergoes BVD infection, he will shed BVD virus in his semen for 10-14 days. The amount of BVD virus in that semen is much lower than in the semen of BVD PI animal. It will have the same effects as that from a PI bull, over that period.

### **Are any other animals capable of getting BVD?**

Small ruminants such as sheep and goats have the potential to harbour BVD infection and could well act as a reservoir for cattle. Whether or not this is an important source of infection for Irish cattle has not been determined.

### **Can man spread BVD virus?**

Blood transfusions, nose tongs, rectal gloves, contaminated needles and even biting flies can all transmit BVD experimentally. The important source for all of these is the PI animal. Remove it and you will remove the vast bulk of your BVD problem.

### **Is BVD a young animal or an adult animal disease?**

If the dam is naïve to BVD or unvaccinated, the calf will have no protection against BVD. Colostrum from vaccinated or naturally infected dams generally provides good protection from BVD to calves in young life. However the protective antibody transferred declines constantly and by 6 months will have reached an undetectably low level. In herds where the disease is endemic, the virus often starts to cause disease at this stage. If the infecting dose is large enough however, antibody from colostrum will not be sufficient to prevent disease in younger animals.

### **Do you always see clinical signs with BVD infection?**

No. Foetal infection is often silent – no clinical signs. As BVD suppresses the immune system, commonly clinical signs may be related to secondary infections rather than BVD itself.

### **Once an animal has been infected, has it lifelong immunity?**

Most animals, which have experienced an acute BVD infection are immune and protected for life. Unless she herself is a PI, each normal pregnant dam can only ever have ONE PI. The amount of immunity stimulated by carrying a PI calf, will persist for the remainder of the dams life. Effectively she will be immune to BVD for life.

### **How do you best protect pregnant cattle?**

BVD vaccination should be timed so as to give maximum protection in the first four months of pregnancy – this is when the developing foetus is most vulnerable to infection. The animal should be fully vaccinated before the breeding season commences. Try to keep pregnant cattle away from fields with fence contact to neighbouring farms, during the first six months of pregnancy



**What is a Trojan cow?**

A non-PI cow or heifer carrying a PI calf. This is one of the main dangers of buying-in “springing” animals. Extremely hard to reliably identify until she calves and the calf itself can be tested for virus, hence why management of this group is so important.

**Is there any human risk from BVD?**

BVD is not a zoonosis – humans cannot contract BVD infection.

**Can annual vaccination alone control BVD?**

Every vaccine has its limitations. If the infection dose is large enough, it is likely to overwhelm the protective immunity provided by vaccination. (think about the “unsinkable” Titanic and what happens when the iceberg was big enough...). Across a herd, vaccine protection, is unlikely to reach 100% due to individual animal factors (age, nutrition, genetics, stage of pregnancy, etc). This is why the removal of PIs (the virus factories) and biosecurity is so important in BVD control - vaccination is a huge help but it will not do it alone.

**Can you vaccinate PI animals?**

Yes. No problem. All BVD vaccines in Ireland are inactivated. In other countries, where live vaccines are used there is the potential for recombination to occur in PI animals which receive the vaccine and then mucosal disease triggered.

**How does BVD affect fertility?**

Failure to conceive, early embryo loss, abortion, stillborns, mummification, “dummy” calves, developmental defects. You may also see an increased numbers of empty cows on scanning, more late calvers than normal, and increased numbers of calf losses. IF BVD infection is longstanding, losses may be greater among younger cows as the older ones are probably immune already to the virus.

**Off the animal, is BVD hard to kill?**

No. BVD virus survives in the environment for no greater than 4 days. It can persist longer if temperatures are below 10°C. Most common disinfectants will kill BVD.

**Can BVD be treated?**

Once an animal is acutely infected, the virus must run its course. Affected animals can be treated for their particular clinical signs – fluids if scouring, antibiotics to keep off secondary bacterial infections, etc. There is no effective treatment for persistently infected or mucosal disease animals – they are simply a liability for the rest of the herd. Immediate removal from the herd is by far the best advice. Remember meat withdrawal times if considering slaughter.



**We found a PI..., we removed a PI...,what next?**

Many of the animals in your herd will have antibody (& protection) against BVD. Use the antibody profile of your herd to decide whether complete or partial vaccination of the herd is required. It is always sensible to focus vaccination on high risk groups such as the breeding heifers, the bull, etc.

**In young cattle (<6 months), how do you determine if they are PI?**

The most feasible approach is to wait. After about six months, the maternal antibody the calves received from their dams will have declined and there should be no problem doing the testing. Time the herd screen so that it coincides with the time when most calves are over six months old.

Ideally, untested young calves should be isolated – at least kept away from pregnant animals. Their own dams are fine, they should be immune to the virus.

**Is BVD a cause of diarrhoea in young (10 days old) calves?**

Unlikely – would need two things. A PI animal in the calf shed and that all of the calves were receiving either no colostrum or BVD negative colostrum. Much more likely to be caused by nutrition, coronaviruses, rotaviruses, etc.

