

HerdSure® protocol for bovine viral diarrhoea (BVD) in cattle herds



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Introduction

This protocol describes the process used to establish the disease status for bovine viral diarrhoea (BVD) in cattle and for control and subsequent monitoring.

This protocol is suitable for both dairy and suckler herds.

The three main elements of this Herdsure® protocol for BVD are:

- sampling and testing to determine status.
- sampling and testing to identify and remove persistently infected (PI) cattle and, therefore, active infection from the herd.
- advice on appropriate measures to reduce the risk of re-introducing BVD virus (BVDV) infection together with sampling and testing to monitor the improved BVD health status of the herd.

The BVD protocol comprises three levels of 'health status':

Level 1	Establishes the BVD status of the herd.
Level 2	Aims to improve the health status of the herd for BVD.
Level 3	Monitors and aims to maintain the improved (or established as satisfactory at Level 1) health status of the herd for BVD.

The disease

Introduction

Bovine viral diarrhoea (BVD) is the name used to describe the diseases caused by infection with bovine viral diarrhoea virus (BVDV). The economic losses resulting from BVDV infection of cattle are considerable but are difficult to quantify because of its complex nature and because of the wide range of diseases it can influence.

The disease

The cycle of disease is maintained by infection of the pregnant cow. BVD is observed as a number of different syndromes determined by the stage of pregnancy at the time of infection. Avoidance of infection of the unborn calf is crucial to the control of disease.

If cattle are infected just before breeding conception rates are reduced. Infection at the time of breeding may lead to early embryonic death and indeed abortion can be the result of infection at any stage of pregnancy. However, infection during the first third of pregnancy is critical because, at this stage, the immune system of the unborn calf has not yet achieved the ability to eliminate the virus. As a result of this, the unborn calf is eventually born with what is termed 'persistent infection' (PI).

These PI cattle, which do not produce antibody against BVDV, maintain the cycle of active infection. They produce large amounts of virus throughout their lives and, although they may appear to be normal, they often succumb to fatal mucosal disease before reaching maturity. However, significant numbers of PI cattle do survive to adulthood.

Occasionally, calves may show a range of defects at birth, particularly where BVDV infection takes place in months 3-5 of pregnancy. These defects include cataracts, abnormal brain development causing difficulty in walking, as well as growth defects such as domed heads, shortened tails and changes to the texture of the coat. These calves may or may not be PI.

PI cattle maintain the cycle of infection when they come into contact with pregnant cattle and the opportunity for the creation of new PI unborn calves arises once again.

When non-pregnant cattle of any age are infected by BVDV the consequences are less devastating. This is termed 'transient infection'. During this time the virus is present in the blood stream and there is a reduction in the animal's white blood cell count, thus impairing its immune system. During this period the animal has an increased susceptibility to other diseases such as enteric infections or pneumonia. Transient infection of bulls may result in reduced fertility with excretion of virus in the semen for a variable period of time. Very occasionally, when young bulls are transiently infected, excretion of BVDV is maintained for life.

Detecting and removing the virus

Detection and removal of the PI calf are key to the control and eradication of BVDV. Cattle can be tested for both the presence of virus and antibody to assess their exposure to BVDV. Blood, milk and tissue samples can be used.

Biosecurity

Avoiding the introduction of the virus into a 'clean herd'

Control and eradication of BVD is also dependent on meticulous attention to biosecurity principles.

'Bought-in' cattle are a particularly dangerous source of new infection. The introduction of a PI animal into a herd can have disastrous consequences. Furthermore, a pregnant animal might carry an unborn calf that may turn out to be a PI.

The virus can also be introduced via the clothing of personnel or via shared machinery.

The programme outlined in this handbook includes a strategy to allow for the discovery of infected cattle before they are able to infect in-contact stock.

Principles of biosecurity

- the boundaries of the farm premises must prevent cattle from straying off or onto the farm and must prevent nose-to-nose contact over fences or walls. For herds wishing to undergo or maintain CHeCS accreditation, installation of double fencing with a 3 metre gap between scheme cattle and neighbouring cattle is required.
- isolation facilities must be used for all added animals and must prevent contact with other stock. Discuss with your vet the suitability of any existing isolation facilities prior to use. If any of the animals are confirmed as infected, dung from the isolation facility must not be disposed of onto pasture that is to be grazed by cattle within 2 months. Where paddocks have been used for the quarantine of infected animals, other cattle must not be allowed to graze there for at least 2 months.
- all added animals should be isolated on arrival at the farm and testing carried out as specified in the protocol. Those animals can only enter the herd once the isolation period and tests have been completed, with results indicating freedom from infection. Additional rules apply to the purchase of bulls and are found in the added animals section.
- staff who work on other livestock enterprises must use farm-dedicated protective clothing and footwear.
- cattle, sheep and camelids should not graze together.
- colostrum from non-health scheme herds, or from health scheme herds of a lower status, must not be used.
- equipment such as drenching guns, surgical instruments and hypodermic needles must not be shared with another herd. If livestock trailers and handling facilities are shared between health scheme cattle and other livestock they must be cleaned and disinfected before use with health scheme cattle.
- delivery and pick-up points should be at a site isolated from other cattle on the farm. Where possible, drivers should remain in the cab and should certainly never assist

in removing cattle from pens unless they are using farm-dedicated protective clothing and footwear.

- you should discuss any proposed management changes with your veterinary practitioner as these may affect your herd's disease security.
- procedures for moving cattle onto the farm are contained within the protocol and should be adhered to. Where embryo transfer is used, it is important to ensure that embryos are sourced from herds of equivalent or higher health status than the recipient herd.
- accredited cattle must not be grazed on pasture previously grazed by non-accredited cattle until a period of 2 months has elapsed. The same grazing restrictions apply to accredited cattle if slurry or manure collected from non-accredited cattle has been used on the pasture.

Keeping track of your herd's progress in Herdsure[®]

An **annual herd progress report** will be issued to Herdsure[®] members. The progress report will detail the level achieved for each protocol for which the herd is enrolled on the date of issue.

For a small fee, an updated progress report can be produced. The updated progress report, like the annual report, will detail the level achieved for each protocol for which the herd is enrolled on the date of issue.

Adding cattle – avoiding buying in disease

Continued freedom from infection will depend on certain biosecurity measures and establishment of the BVD status of any added cattle before they come into contact with the herd.

The Herdsure[®] service recommends that all added animals are isolated and tested before joining the herd. Testing and isolation of added animals is mandatory for herds seeking CHeCS accreditation. The only exception to this is where animals are sourced from CHeCS disease-free certificated herds. Refer to the CHeCS technical document for the rules that apply.

All classes of cattle should be tested for BVD antigen, ideally prior to leaving the farm of origin or, if not, on entry into isolation. Any antigen positive cattle should not be brought onto the farm.

Non-pregnant cattle

Following a 4 week period of isolation, non-pregnant cattle should be tested for BVD antibody and the results entered onto the Herdsure[®] database.

If significant numbers of sero-positive milking cows are brought into a herd, a significant rise in the bulk milk antibody readings for the herd will result. This is important in assessing the significance of rising BVD antibody levels in herds that have achieved Level 3 status.

Pregnant cattle

Pregnant cattle that are antigen negative may be brought onto the farm but should be isolated for a period of 4 weeks. Prior to release from isolation, a blood sample for BVD antibody should be collected and the results recorded. If the sample is negative no further action is required. If the antibody results are positive then these cows should remain isolated from the rest of the herd till they calve. A blood or tissue sample should be taken from the calf as soon as possible after birth and tested for BVDV by individual PCR (TC0655) or Erns tissue antigen (TC0872). Calves showing positive results are PIs and should be removed from the farm immediately.

Breeding Bulls

Bulls that have been transiently infected and, as a result, are antibody positive may excrete virus in semen. This is a rare occurrence but, for this reason, they should not be used for breeding until they have been in on farm for a minimum period of 9 weeks. They should remain in isolation for the first 4 weeks and be blood tested for BVD antibody after this time. There is a documented incidence of prolonged excretion of BVD in semen following transient exposure. If herds wish to exclude this risk, a Herdsure[®] consultant will be able to advise the practitioner on screening semen for BVDV.

Establishment of a new herd from accredited stock

Where it is intended to establish a BVD-free accredited herd by acquiring cattle accredited free of BVD, the premises must be inspected by the veterinary practitioner before the new stock is introduced in order to ascertain that the biosecurity of the premises and farm boundaries meet the requirements of CHeCS. Accreditation testing for BVD must be carried out no sooner than three months after establishing the herd. Once testing has been completed, with satisfactory results, the herd can be recognised as having achieved accredited status.

Shows and sales

Contact with other stock puts the status of the herd at risk. CHeCS-accredited cattle attending CHeCS-accredited sections may return to their herds of origin without isolation and testing. All other cattle will lose their Herdsure[®] health status. Consequently, on returning to their herd of origin, they will be subject to the testing and isolation requirements described above. For CHeCS-accredited herds, animals moving off the owner's holding for preparation for sale will lose accredited status if the CHeCS biosecurity rules are not adhered to on the premises where preparation is taking place.

The protocol

Level 1

Objective of Herdsure® testing

- Level 1 testing aims to establish whether or not there is evidence of active BVD in a herd.

This level will also use any herd history and history of relevant test results already held by the veterinary practitioner or by AHVLA, covering the last 12 months.

Where the history and test results indicate clear evidence of BVD in the herd in the past 12 months, herds should start the BVD protocol testing at Level 2.

Sampling

When BVDV is circulating within a herd, cattle that have come into contact with the virus produce antibody to it. We can measure this antibody in both blood and milk samples.

In dairy herds, bulk milk samples are collected from every bulk tank used on the farm. If the level of antibody to BVDV in milk is below a defined level we can be confident that the milking cows have not been exposed to BVDV recently. (Refer to Appendix 7 for an example of instructions on bulk milk sampling.)

Where suckler cows are present on the farm, we can make the same assessment from blood sampling 10 cows and the breeding bulls. If the BVD antibody level is negative in all the samples, we can be confident that they have not been exposed to BVDV recently.

In the same way, measuring BVD antibody in the blood of separately managed youngstock will allow us to see if they have been exposed to the virus.

How many to sample?

We can calculate the number of cattle we need to sample in each management group to tell us whether or not virus has been circulating in that group. Since the contact between different management groups is variable, we need to be sure that samples are collected from all the management groups.

Your veterinary practitioner has been provided with a table showing how many of the cattle in each management group need to be sampled. Your veterinary practitioner will also be able to tell you the criteria for deciding whether or not particular groups of cattle should be considered as 'separately managed'.

If all the blood samples and, in the case of dairy herds, the milk sample prove negative for BVDV antibody the herd can progress to Level 3. Herds working towards CHeCS accreditation can be certified free of BVDV infection 12 months after testing negative at Level 3. If any of the samples prove positive for BVDV, it will be necessary to do a systematic search of the herd for any PI cattle. This is the basis of Level 2 – finding and removing PI cattle.

Level 2

Objective of HerdSure® testing

- Level 2 testing aims to reduce the detrimental influence of active BVDV infection in the herd by identifying the PI cattle, which are responsible for the maintenance of the infection. Once identified, these cattle should be removed.

There are two routes into Level 2. Either:

- recently collected samples from the herd have identified the presence of BVDV, or
- blood and/or milk samples collected at Level 1 have identified BVD antibody.

An animal produces BVD antibody after it comes into contact with BVDV or, to a much lesser extent, after it has been vaccinated. Antibodies may persist for a long period of time – up to several years. Antibody may have originated from an encounter with BVDV that has since been removed from the farm, e.g. by the death or culling of a PI animal. There is no way of establishing this and therefore a thorough search of all the cattle in the herd must be carried out to ensure that none of them are infected with BVDV.

Sampling

At this stage, it is vital that no cattle at sampling are missed and that PI cattle are removed from the farm as soon as they are identified. PI cattle should not be sold to another holding because this would expose that farm to the animal health and welfare implications of BVDV infection.

Where milking cattle are present, we can test these for BVDV by using the PCR test on a bulk milk sample. (Refer to Appendix 7 for an example of the sampling instructions.) This test can detect the virus in a milk sample that is made up of 300 contributing milking cows. It is important that the ear tag numbers of the cows that contributed to this sample are recorded accurately.

If more than one bulk milk tank is used, a sample from each tank must be collected and the cows contributing to each one must be recorded accurately. Where more than 300 milking cows are present, your veterinary practitioner will discuss a strategy to sample these in two groups.

If BVD virus is detected in the milk, we will ask for samples of milk individually collected directly from each cow, or individual blood samples collected by your vet, to identify which of the cows are infected. (Refer to Appendix 8 for an example of the individual milk sampling instructions.) The individual samples will be pooled and tested in groups of 10. If any of the milk pools are virus positive, your veterinary practitioner will blood sample the contributing cows to determine the infected animal(s). Discuss the options with your vet.

Following this, all cattle over 30 days of age in suckler herds and all non-lactating cattle in dairy herds should be blood sampled for BVD virus. These will be tested as before.

Your veterinary practitioner will not take blood samples from cattle under 30 days of age because the test used is not reliable below this age. When calves on the farm have reached this age they can be tested individually or in pools of 10. Until these calves have been established as BVD-free, they must not be in contact with other stock, particularly pregnant cows. For suckler herds this may pose a problem and for many the best solution will be to keep pregnant and recently calved cows in separate groups. Tissue samples (ear notch samples) may be used as an alternative to blood samples in calves. Tissue samples allow calves to be tested from birth thus eliminating the risk of PI calves infecting pregnant cattle whilst awaiting a blood test. Consult with your vet for sampling options.

One of the difficulties with BVDV control is that transient infection of a pregnant cow may or may not result in the development of a PI unborn calf. With either outcome, that cow will develop antibody and so we have no way of knowing if the calf is PI until it is born. Once we have tested all the cattle on the farm and removed the PI animals, there will be a number of unborn calves, which can only be tested after they are born.

It will take 9 months for all of these to be born and therefore we cannot be confident that freedom from disease has been achieved until after this. To allow for time taken to remove infected calves, and any residual infection accompanying them, all newborn calves should be tested until a period of 12 months has elapsed without the discovery of a PI animal. Either tissue or blood samples may be used for this.

Please note: BVD tissue samples must be sent to HerdSure. We are unable to import results from another lab onto the HerdSure Management System.

Level 3

Objective of Herdsure[®] testing

- Level 3 testing aims to monitor and maintain the improved health status of the herd. The sampling and testing is designed to alert the veterinary practitioner to the re-introduction of active infection into the herd.

Once all the PI cattle from the herd have been removed, or it has been established that there are none, it is necessary to put in place a monitoring programme to ensure and demonstrate that BVDV infection does not become re-established in the herd.

Freedom from disease cannot be maintained without paying close attention to the principles outlined in the biosecurity section. Also, it will be necessary to put in place a programme to ensure no infected cattle are brought onto the farm.

Sampling

The monitoring of dairy herds for antibody to BVDV will consist of two components:

- 3-monthly bulk milk antibody testing and
- annual testing of a number of cattle from each management group of youngstock between 9 and 18 months of age for antibody to BVDV.

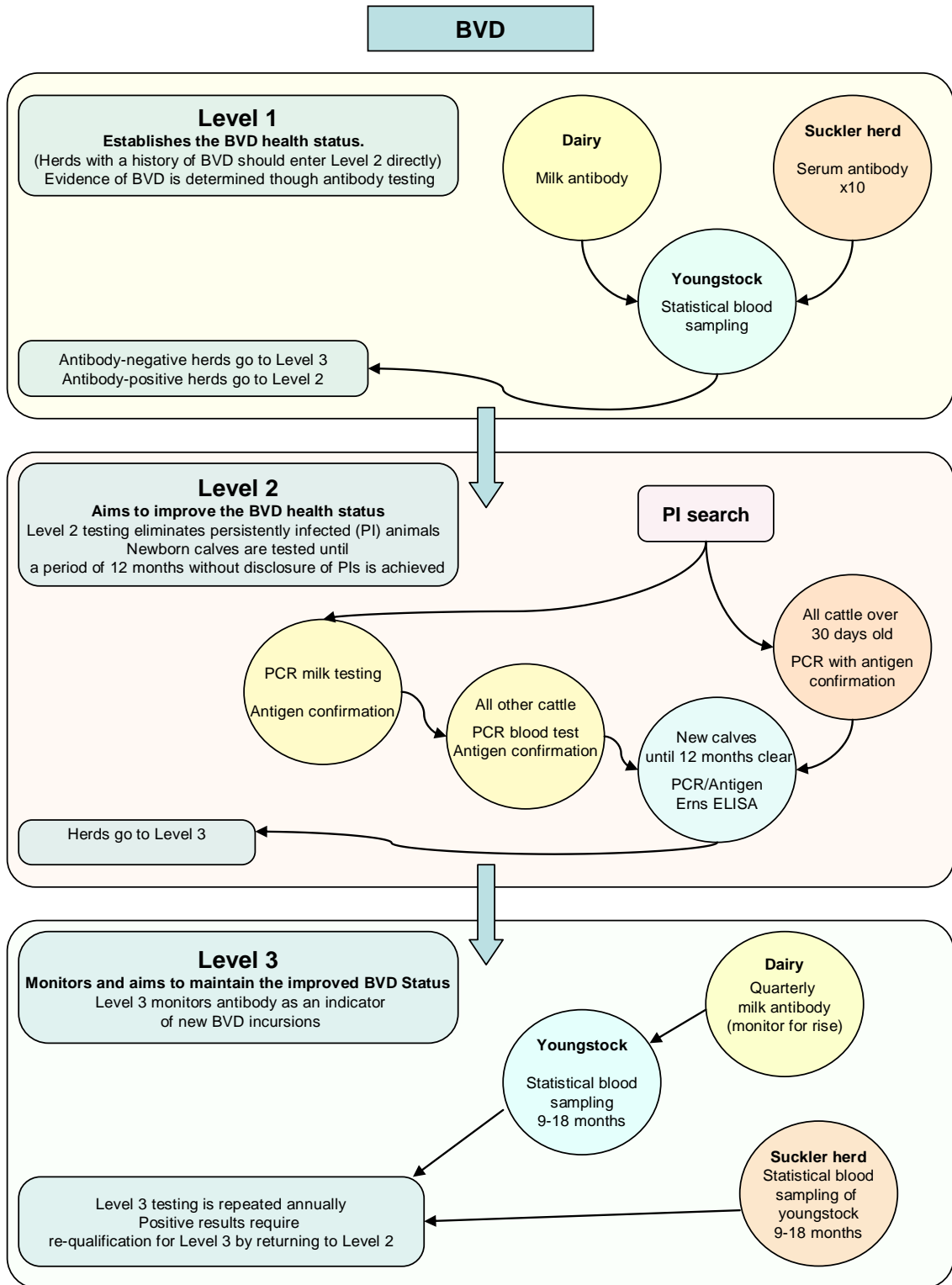
Suckler herds will monitor by annual statistically significant testing of youngstock.

CHeCS Accreditation

Herds entering Level 3 direct from Level 1 will be eligible to apply for BVD CHeCS accreditation following completion of 12 months testing at Level 3, provided all the results are negative.

Herds entering Level 3 following a PI search at Level 2 will be eligible for BVD accreditation status after 24 months of testing at Level 3, provided all results are negative.

Please note there are additional biosecurity rules for herds undergoing accreditation and stringent requirements for farmer and vet declarations. More information is available on the CHeCS website (www.checs.co.uk).



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