

TECHNICAL DOCUMENT



Incorporating Rules for Cattle Health Schemes

Issued:.....

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Introduction

Cattle Health Certification Standards (UK), abbreviated to CHeCS, is the regulatory body for Cattle Health Schemes in the UK and Ireland. It is a non-trading organisation established by the British cattle industry for the control and eradication of non-statutory diseases by a set of standards to which all licensed Cattle Health Schemes must adhere.

These standards ensure that herd health status in one scheme is equivalent to that in all other schemes in the UK and Ireland. Close collaboration by CHeCS with other countries ensures that licensed schemes in the UK and Ireland are as good as any in the world.

CHeCS is owned by the British Cattle Veterinary Association, the National Beef Association, Holstein UK and the National Cattle Association (Dairy). It received start up funding from the Milk Development Council (DairyCo) and the Royal Association of British Dairy Farmers (RABDF) provides administrative back-up.

CHeCS principal objectives are:-

- To promote improvements in cattle health and welfare.**
- To provide standards and certification for Cattle Health Schemes.**
- To develop and maintain links with cattle farmers, breed societies, veterinary practitioners, laboratories, Government agencies and animal welfare organisations to promote the above objectives.**

This Technical Document sets out the rules to which CHeCS licensed Cattle Health Schemes and their member herds must adhere in order to meet the CHeCS standards. The rules have been agreed and found to be acceptable to the cattle industry.

To ensure that CHeCS is operating to best practice and takes into account the latest available science, a technical group comprising representatives from the CHeCS licensed cattle health schemes plus a number of recognized international experts on the diseases of interest meet annually to review the Technical Document, which has been edited by Dr Peter Nettleton.

Cattle Health Schemes provide programmes for the monitoring, control and ultimate eradication of disease. The schemes also provide certification when a herd meets the agreed national CHeCS cattle health standards.

Contained within this Technical Document are programmes for the four most important non-statutory diseases that are prevalent in both beef and dairy herds in the UK and Ireland.

Infectious Bovine Rhinotracheitis (IBR)

Leptospirosis

Johne's disease

Bovine Viral Diarrhoea (BVD)

Herd owners may test for any or all of the diseases at the same time. Where to start depends on a herd's individual circumstances. The entry level to a Cattle Health Scheme only requires routine monitoring (which in dairy herds is by regular bulk milk testing). This will give a good assessment of the health status of the herd. Once the health status is known, a herd may progress through a programme of control and eradication to eventual accreditation of disease free status. All of this is explained in much greater detail in this Technical Document.

Achieving and maintaining freedom from Johne's disease can prove difficult on some farms. Until now, two clear annual tests were sufficient to achieve accreditation. Experience has shown that the risk of breakdown after only two clear annual tests is unacceptably high. This year's version of the Technical Document specifies that three annual tests are required to achieve accreditation (see Page 25). Any herd joining a Johne's disease control scheme after 31st July 2011 will need three clear annual tests to achieve accreditation.

Finally, it is important to note that CHeCS is not itself a Cattle Health Scheme. It is the regulatory body for Cattle Health Schemes. CHeCS is a stamp of approval and a quality mark signifying conformity to an industry standard.

Tim Brigstocke, Executive Director, CHeCS
May 2011

The Diseases

Infectious Bovine Rhinotracheitis (IBR)

IBR is caused by bovine herpesvirus 1 (BoHV-1). The virus causes an acute upper respiratory tract disease which can lead to fatal pneumonia. In adult cows, infection is associated with a severe and prolonged drop in milk yield, reduced fertility and abortions. However, on occasions, the disease may be so mild that it may be overlooked. The virus is shed in secretions from the respiratory tract but can also be spread in the semen of infected bulls. Once an animal has become infected, it remains infected for life, despite the development of a detectable immune response. The virus survives as a latent infection in nervous tissue and can be shed at any time when the animal is stressed. Movement of such animals into a herd is often the source of new infections. Vaccination is an effective means of control, but this does not stop infected animals from shedding the virus at a later date.

Screening tests are carried out on blood or milk samples to detect antibodies produced by the animal in response to previous infection. Any animal with antibody to BoHV-1 should be considered to be latently infected with virus. These tests cannot differentiate between antibodies stimulated by field BoHV-1 and those stimulated by conventional BoHV-1 vaccines licensed for use in the UK. However, in 2001, BoHV-1 marker vaccines were introduced into this country. By using a marker antibody test, animals vaccinated with these vaccines can be differentiated from those that have been naturally infected with BoHV-1. Marker vaccines can now be used in an infected herd where the long-term objective is to achieve freedom from infection with minimum culling.

Despite the effect this disease has on animal health and productivity, its main significance is as a barrier to the export of live cattle to other regions or countries within Europe, where the disease has already been eradicated. In future, in order to gain access to these markets, herds will have to be able to prove freedom from BoHV-1 infection. Cattle with antibody due to marker vaccine will not be accepted by some countries.

Leptospirosis

Leptospirosis in cattle is caused by the organisms collectively referred to as *Leptospira* Hardjo (*Leptospira borgpetersenii* serovar Hardjo and *Leptospira interrogans* serovar Hardjo). *L. Hardjo* causes milk drop in cattle and has been associated with infertility, abortion and the birth of weak calves with a reduced survival rate. Most cases of abortion occur during the second half of pregnancy, in the period from five months to full term.

After infection, *L. Hardjo* localises in the kidneys and urinary tract as well as in the reproductive tract of both males and females. Once cattle have been infected subsequent pregnancies are unlikely to be aborted, although calves may be weak at birth and have a poor survival rate.

Because *L. Hardjo* localises in the kidneys and urinary tract, the organism can be shed in the urine. Some animals excrete it continuously for a short time and then stop; others shed either continuously or intermittently for life. Infection due to *L. Hardjo* arises from contact with infected urine, or from water or pasture contaminated with urine. The organism has not been identified in wildlife in the UK, and cattle are the recognised reservoir of infection. Disease is therefore usually introduced to a herd by the purchase of infected cattle. *L. Hardjo* has been recovered from the urine of sheep, and one study has shown that cattle herds are more likely to be infected with leptospirosis if sheep are present on the farm. It is recommended that contact between cattle and sheep is kept to a minimum. As leptospira do not tolerate drying or exposure to sunlight, a rest period of two months after grazing by sheep or infected animals should make pasture safe for uninfected animals.

Because of the ability of infected cattle to excrete the bacteria in their urine, there is a risk of infection in humans, with dairymen working in the parlour at particular risk. The infection causes flu-like symptoms and severe headaches. Herd owners must therefore be aware of their responsibilities under the Control of substances hazardous to health (COSHH) regulations.

Confirmation of infection in premature or stillborn calves is difficult, but evidence of infection in a herd can be obtained by blood or milk sampling the cows. Where animals test positive in the course of the herd test, careful analysis of the results is required. If the proportion of seropositives is high, vaccination may be the best method of control. If a smaller number of seropositives is detected, confined to older animals, and these animals have mixed freely in the herd, there is the option to treat with antibiotic as advised by your veterinary surgeon. Antibiotic treatment will markedly reduce the number of organisms an animal is shedding, but as it will not necessarily give a microbiological cure, in-contact animals should be monitored for evidence of seroconversion. The herd will not achieve accredited status until all antibody positive animals have left the herd.

Where testing shows no evidence of the disease, breeding stock from such a herd can be considered to be free of infection and sold and purchased safely. Accreditation of freedom from *L. Hardjo* infection is a useful tool in safeguarding the health and breeding performance of cattle, and in preventing the infection of people working with cattle.

Johne's disease

This disease is a chronic, progressive, wasting condition that affects ruminants and is caused by the organism *Mycobacterium avium* subspecies *paratuberculosis* (Map). The infectious agent is shed in large numbers in faeces, can cross the placenta and can be found in colostrum and milk. Animals are generally infected by ingesting the agent and young animals are considered to be the most susceptible to infection. However, clinical signs of diarrhoea and weight loss usually do not occur until some time after 18 months of age. In heavily infected herds, this leads to a high rate of wastage

in older cattle. Infection is nearly always introduced to a herd by purchasing infected replacement breeding stock, including bulls.

It has been suggested that the causal organism of Johne's disease may be implicated in the human disease of the bowel known as Crohn's disease, although no direct link between the diseases has yet been shown to exist. However, both the Food Standards Agency and Defra have advised that the precautionary principle should be observed and that measures should be taken to minimise the number of Map organisms that enter the food chain. To date, their strategies have focused on the dairy herd and milk. There is therefore more reason than ever before to seek to control Johne's disease in the UK cattle herd.

Tests carried out on blood or milk samples to detect antibodies and on faeces samples to detect the bacterium are both valuable procedures for the diagnosis of Johne's disease. However, they can only be used to detect infected animals in the later stages of the disease, when clinical disease has become apparent, or in the short period prior to this. This means that infected animals may test negative on several occasions at annual tests before they test positive. Testing individual animals at the point of sale may be of very limited value.

However, the tests are very useful as an indicator of herd infection. If a herd repeatedly tests negative for the disease at annual intervals, the herd can be categorised as free from Johne's disease.

Because of the difficulties with testing and because the organism survives well in the environment, control and eradication are more difficult than for the other diseases in the cattle health schemes. However, for the reasons given above, an effort should be made to eradicate the disease from an infected herd. A simple test and cull programme is not sufficient. It must be supplemented by the removal of offspring of any positive dam from the breeding herd as these are at particularly high risk of developing the disease, and by a hygiene programme designed to reduce calf exposure to adult faeces. It will take a minimum of three years before progress can be appreciated and at least a further three years before the disease is removed from the herd. In many situations, removal of the disease from the herd may take considerably longer.

Vaccination may be useful in heavily infected herds to reduce the number of cases and thereby to reduce the amount of infection in the environment. However, vaccination will not remove the infection from a herd, and use of the vaccine is not recommended for herds that are selling breeding stock.

Bovine Viral Diarrhoea (BVD)

BVD virus (BVDV) is closely related to the viruses that cause classical swine fever in pigs and border disease in sheep. BVDV causes a complex of diseases in cattle, the most important of which interfere with reproduction,

affect the foetus and lead to mucosal disease. BVDV can also cause enteritis, which is usually mild but is occasionally severe enough to kill even adult cows. BVDV infection causes significant suppression of disease resistance and so contributes to disease complexes in calves such as pneumonia and neonatal diarrhoea. The economic losses from an uncontrolled outbreak of BVD can be very high. It was calculated in 2004 that in a 100-cow beef herd, these can exceed £45,000 over a ten-year period, while losses in the dairy herd have been estimated at twice this level. In most outbreaks, reproductive losses are the most significant, although mucosal disease cases are the most obvious.

Infection immediately before or during the breeding season will reduce conception rates of the affected group of cattle and cause early death of embryos. Infection at any stage of pregnancy can result in abortion. The virus can also cause deformities in the calf. However, of particular importance is infection of developing calves during the first third of pregnancy. Calves that survive such infection remain persistently infected (PI) with the virus. It is these PI calves, once born, which provide the major source of BVDV for new infections.

PI calves do not produce antibody against BVDV. They often appear normal, but they shed virus continuously throughout their lives. Many develop a fatal enteritis known as mucosal disease before they reach maturity. When mucosal disease is acute animals have severe diarrhoea, are extremely unwell, quickly lose body condition and soon die. In some, the disease may progress more slowly and these animals will appear unthrifty compared to their contemporaries in the herd. However, significant numbers of PI animals maintain their health and survive into adulthood. A PI cow will always produce a PI calf and a PI bull, although often infertile, can cause widespread disease if introduced into a BVDV-free herd.

Despite the significant impact that infection has on breeding cattle, in most cases the infection of any animal after birth will usually result in a short-lived infection that may go unrecognised. This is termed a transient infection. During transient infection, disease resistance of the animal is compromised and susceptibility to other diseases increased.

When bulls are transiently infected BVDV may be passed in the semen for a variable period of time and bulls may suffer reduced fertility for periods up to two months after infection. An extremely rare occurrence is for bulls that encounter transient infection at puberty to become antibody positive, but to persistently produce virus in their semen. Laboratory tests are available to screen the semen for the presence of BVDV.

In theory, other ruminant species, such as sheep and deer, can be a source of infection for cattle, although sheep are at greater risk from cattle than vice versa. Contaminated needles and other equipment can also spread virus from

animal to animal and herd to herd. Therefore, careful herd health security and quarantine are essential parts of control.

Where possible, control by identification and removal of PI animals is advised, with subsequent exclusion of any potential sources of re-infection. Screening tests for antibodies are carried out on blood or milk samples, including bulk milk, with secondary screening for BVD virus in animals with low or negative antibody titres. A test for the genetic material of the virus (reverse transcriptase-polymerase chain reaction (RT-PCR test)) may also be employed on certain occasions. The virus spreads readily from a PI calf to other calves in the group if they are housed together. Screening a sample of animals from the group for antibodies to BVDV is a robust method for detecting the presence of a PI. This procedure is known as the Check test and is central to the BVDV free accreditation procedure.

Herd vaccination can be used in both the eradication of BVDV and the prevention of BVDV outbreaks. Vaccination, however, should be seen as part of a series of measures employed in a herd to control and maintain freedom from BVDV infection. The use of the vaccine does not prevent a herd from participating in the BVD accreditation programme.

The Rules of CHeCS

CHeCS seeks to identify herds free from certain diseases and to offer a control programme for those herds in which those diseases have been identified. The CHeCS rules are mandatory for herds in the Accreditation programmes. They are not mandatory for herds in the Monitoring or Eradication programmes, although they are strongly recommended as good practice for those herds.

Herd Biosecurity

1. Herd biosecurity: Herd biosecurity is explained and the general principles are detailed in the Defra document entitled "Biosecurity Guidance to Prevent the Spread of Animal Diseases", published 1 July 2003:http://archive.defra.gov.uk/foodfarm/farmanimal/diseases/documents/biosecurity_guidance.pdf

(Accessed 20May2011)

Herd owners, managers and veterinary surgeons participating in a cattle health scheme must be familiar with this document and should seek to achieve the standards set.

In addition to this general guidance, set out below are more specific conditions and requirements to which participants in the CheCS accreditation programmes must adhere.

2. Herd Definition: A herd is defined as cattle that are under a unified management system but not necessarily on one premises.

3. Farm boundaries: Farm boundaries must prevent cattle from straying off or onto the farm and must prevent nose to nose contact with cattle of a lower health status over fences or walls. Installation of double fencing, or use of an equivalent boundary to provide a gap of 3 metres, between scheme cattle and any neighbouring cattle of a lower health status, is essential where scheme participants are following the IBR and/or BVD Accredited free programmes. It is also a useful standard to adopt for all disease control programmes.

4. Accredited status: Accredited status is specific to each disease. If herds are accredited for different diseases, the rules for movement and contact between those herds shall be the same as if they were non-accredited herds.

5. Added animals: Cattle must not be added to a health scheme herd unless they are of similar or superior health status within the scheme. Otherwise, they must be placed in isolation for the required period and tested by the appropriate test(s) for the disease(s) in question.

6. Contact with cattle of different health status: Cattle from health scheme herds must not come into contact with non-health scheme cattle or health scheme cattle of a lower status; otherwise they will lose their status within the scheme. To re-introduce them to the herd, they must be regarded as non-accredited added animals and must be placed in isolation for the required period and tested by the appropriate test(s) for the disease(s) in question.

7. Grazing of cattle: Cattle must not be grazed on pasture previously grazed by non-accredited cattle until a period of 2 months for BVD, IBR or leptospirosis accredited cattle or 1 year for Johne's disease accredited cattle 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.

8. Feed and bedding: When buying feed and bedding, care must be taken to avoid the risk of introducing infection into the herd. Feed and bedding stores should be protected against access by vermin and wildlife.

9. Colostrum: Colostrum from non-health scheme herds, or from health scheme herds of a lower status, must not be brought in to a health scheme herd.

10. Water: Piped mains water should be used rather than natural water sources whenever possible because there is a risk of cattle becoming infected with leptospirosis and/or Johne's disease from water courses. Where scheme participants are following the programmes for these diseases, it is preferable, but not essential, that scheme cattle do not have access to watercourses that have other cattle or sheep grazing upstream or that have flowed through another farm.

11. Veterinary Equipment: Equipment such as drenching guns, surgical instruments and hypodermic needles must not be shared with cattle from

another herd. Veterinary surgical instruments must be sterilised before use in the herd.

12. Farm Equipment: Equipment, machinery, livestock trailers and handling facilities that are shared between health scheme cattle and other livestock must be cleaned and disinfected before use by health scheme cattle. For herds in the Johne's disease programme, a Defra-approved product at the dilution recommended for tuberculosis control must be used: http://disinfectants.defra.gov.uk/Default.aspx?Location=None&module=ApprovalsList_S1

(Accessed 20May2011)

13. Delivery or collection of stock: Delivery and pick-up points should be at a site isolated from other cattle on the farm. Where possible, the driver should remain in his cab and should certainly never assist in removing cattle from pens unless using farm-dedicated protective clothing and footwear.

14. Isolation facility: An isolation facility that prevents contact with other stock must be provided for all added animals. A dedicated building separate from other cattle buildings is ideal, but a separate paddock that prevents contact with other stock may suffice. No air space, drainage or dung storage may be shared with other cattle. Dung may only be removed from the dedicated storage area, to be spread on land or added to the main dung store, when all animals in the isolation facility have passed the required health tests and been added to the herd.

However, if any of the animals in the isolation facility have tested positive for any of the four diseases, dung from the isolation facility must not be disposed of onto pasture that is to be grazed by cattle within 12 months (for Johne's disease) or two months (for the other three diseases). Where paddocks have been used to isolate positive animals, or for the quarantining of disease breakdown cattle, other cattle must not be allowed to graze them for at least two months for the IBR, leptospirosis and BVD programmes. For the Johne's disease programme, this period must be extended to 12 months.

15. Isolation period: A defined isolation period must be observed for all additions to a health scheme herd and appropriate testing carried out as required for the particular disease programme being adopted. It is only when both the isolation period and the requisite tests have been completed, with results indicating freedom from infection, that those animals can enter the herd.

16. Co-grazing with sheep or other domestic ruminants or camelids: for the control of *L. Hardjo* it is recommended that there should be a two month interval before cattle follow sheep or other domestic ruminants or camelids onto pasture. Although not a mandatory requirement, it is strongly recommended that, wherever possible cattle and sheep do not graze together.

17. Notification: herd owners, managers and veterinary surgeons participating in a cattle health scheme must inform the health scheme's supervising veterinary surgeon of any changes that could affect herd biosecurity.

Herd Testing Rules

18. Sample identification: At the time of collection, all samples must be identified in order to allow blood, milk or faeces samples to be unequivocally matched with the individuals tested.

19. Sample collection: Samples can only be collected by: -

- A veterinary surgeon.
- Someone designated by the veterinary surgeon who is neither the owner of the cattle nor an employee of the owner.
- In the case of milk samples, the milk recorder.

Where the herd uses more than one bulk tank, representative samples must be collected from each tank and tested separately.

20. Records: The following records must be kept for all CHeCS cattle:

- Identification
- Breed
- Sex
- Date of birth
- Identity of dam

21. Establishment of new herd from accredited stock: Where it is intended to establish an IBR, leptospirosis, Johne's disease or BVD accredited herd by acquiring cattle accredited free of the particular disease, the premises must be inspected by a veterinary surgeon before the new stock is introduced in order to ascertain that the biosecurity of the premises and farm boundaries meet the requirements of the scheme. The appropriate accreditation test for the disease 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.

22. Previous results: Herds enrolling onto a CHeCS programme must declare any screening carried out in the previous 12 months for the disease for which accreditation is being sought. Also if the disease in question has been confirmed in the past 12 months, this information must be communicated to the scheme's veterinary surgeon. It is implicit within the membership of the scheme that all results relevant to the accreditation process are made available to the health scheme provider by the member. Failure to disclose any such relevant results will result in loss of status.

23. Testing programme: The testing programme for each disease is detailed in the relevant section and must be followed.

24. Suspicion and confirmation of target disease: Any disease condition which might be attributable to a disease that is the target of the scheme must be investigated by the owner's own veterinary surgeon. If the veterinary surgeon is satisfied that the condition is not the target disease, no further action need be taken. If the veterinary surgeon cannot rule out the target disease, the requisite samples as detailed in the programme must be collected from each affected animal and tested. The affected animals must be isolated from the herd until the results of the laboratory tests are known.

25. Confirmation of target disease: After the target disease has been confirmed in a herd, the herd will not be eligible for accredited status until all known reactors have been removed, and the herd has passed the requisite tests, as detailed in the specific programme, following removal of the last reactor from the herd. Where animals have been confirmed as BVDV PI or infected with Johne's disease, they must not be sold on except to slaughter. To do otherwise is to risk prosecution under the Sale of Goods Act.

26. Movement of accredited cattle off farm for shows and sales: It should be recognised that any contact with other stock puts the status of the herd at risk. 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.

In the absence of CHeCS accredited sections at cattle shows and sales, any accredited cattle attending a show or sale will be deemed to have lost their accredited status. On being returned to the herd of origin, such cattle must be treated as non-accredited added animals, and must be isolated and tested according to the requirements of the individual disease programmes. The only exception to this is for Johne's disease accreditation, when providing the period of contact is less than one week, the added animal procedure need not apply. (See page 24, paragraph 1.6)

Should any show or sale be held exclusively for BVD accredited stock then cattle must only be allowed to travel to the event after the owner has faxed a current CHeCS certificate of herd accreditation for BVD to the veterinary surgeon designated by the show or sale. BVD vaccinated monitored free cattle will not qualify for such events, because of the lower biosecurity requirements for that programme. Any cattle returning from such an accredited event will not be required to be tested in quarantine after returning to their herd, providing the transport vehicle has been suitably cleansed and disinfected before use and carries only stock of the same status.

27. Movement of accredited cattle off farm for purposes other than show and sale: Accredited cattle leaving their home herd for any other purpose must be loaded, unloaded, transported and accommodated separately from

non-accredited cattle. No direct or indirect contact between accredited and non-accredited cattle must be allowed to occur at any time. If these conditions are met, then accredited cattle may return to their herd of origin, or to another accredited herd, without any isolation or testing.

28. Contact with non-accredited cattle: Accredited cattle that have come into contact with non-accredited cattle must be treated on their return to the farm as non-accredited added animals. The isolation and testing programmes as required by the particular disease programme(s) must then be carried out. Failure to observe this condition will result in the loss of accredited status.

29. Certification (1): Certificates are only issued by cattle health scheme operators accredited by CHeCS. No other certificates are acceptable to the operators of CHeCS cattle health schemes. Only herds with valid certificates are deemed accredited for the disease(s) for which they have been tested. The certificates will be valid for 13 months from date of issue, providing the rules of the scheme continue to be adhered to. Certificates will not be renewed until the testing required to maintain the accredited status of the herd has been carried out, with negative results, for the disease(s) in question.

30. Certification (2): Certification is based upon: -

- Owner's declaration of compliance with the rules.
- Inspection of the herd by the practising veterinary surgeon.
- The veterinary surgeon's declaration of compliance with collection of the appropriate samples.
- Appropriate laboratory tests carried out at a CHeCS approved laboratory, with results indicating freedom from infection.
- The standards for certification stated in the Royal College of Veterinary Surgeons guide to professional conduct. Veterinary surgeons who are members of a cattle health scheme operating to the CHeCS rules must take cognisance of the Royal College of Veterinary Surgeons guidance on self-certification.

31 Certification (3): Certificates may be used as proof that acquired stock, or stock for sale, are accredited for the particular disease.

32. Loss of accreditation: Failure to observe any of the above rules will result in loss of status until such time as follow up testing can demonstrate that the disease status of the herd has not been compromised. This will be in the judgement of the CHeCS scheme provider's veterinary surgeon.

33. Veterinary Surgeons: CHeCS strongly recommends that veterinary surgeons participating in a cattle health scheme are members of the British Cattle Veterinary Association and have received appropriate training on the CHeCS scheme and the target diseases.

Bulk Milk Monitoring Programmes

Monitoring Programmes are only available to dairy herds and use regular bulk milk testing. They will give a good assessment of the health status of the herd. Antibody testing of bulk milk samples is a simple and convenient tool to provide dairy farmers and their veterinary surgeons with information on the likely health status of their herds. It is based on the recognition that like blood, milk also contains antibodies that reflect the animal's disease status.

Bulk milk samples are tested for antibodies against BoHV-1, *L. Hardjo* and BVDV. A similar test exists for antibodies to *Map*, but due to the nature of the disease, the test has a more limited sensitivity for detecting infection in a herd and is therefore not included in the bulk milk monitoring programme.

The interpretations provided from the antibody results offer a composite picture from the cows in milk at the time of sampling. Antibody levels that are either high or low are the simplest to interpret, with a high level of antibody indicating either a widespread exposure to infection in the herd that need not be recent or the use of vaccines, and negative results indicating likely freedom from current infection. Intermediate antibody levels generally suggest the presence of some infected or vaccinated animals, but it is not possible to give precise prevalence figures. Sampling is typically conducted quarterly, and the information derived becomes more reliable and helpful as sequential results are added and any trends of rising or falling levels become clear.

General points

1. There are no requirements for biosecurity, although all farmers are advised to consult with their veterinary surgeon and have an active biosecurity plan for their herd.
2. Milk samples should be taken from the bulk tank after all cows have completed milking to provide a representative whole-herd sample. If different groups of animals are milked separately, more information can be gained by submitting samples from each group
3. Herd owners following a Monitoring Programme should consider a herd health visit by their own veterinary surgeon to discuss the interpretation of results and future plans for the herd.

Infectious Bovine Rhinotracheitis (IBR) Programmes

For IBR, there are two programmes:-

Accredited Free Programme

Objective: To demonstrate the herd is free from BoHV-1, to maintain freedom from BoHV-1, and to allow the sale of stock as accredited free of BoHV-1.

Eradication Programme

Objective: To implement a control programme to reduce the detrimental effects on herd productivity caused by this disease. The long-term goal is to achieve freedom from the disease and accredited status.

Marker Vaccine

The gE deleted marker vaccine may be used in the Accredited Free and the Eradication Programmes. However, where any animal is vaccinated with the marker vaccine, this information must be noted when the animal is blood sampled in order to allow the appropriate laboratory test to be carried out.

1. Essential Points on Testing Methods

1.1 Samples: Blood samples should be either clotted or heparinised. Individual milk samples may provide an alternative sample. Advice on this can be obtained from your cattle health scheme organiser.

Where herds are vaccinated with the gE deleted marker vaccine, the antibody test that is used should be the gE antibody ELISA.

1.2 Reactor: Any animal that is positive to the antibody test is a reactor. This will result in loss of status if found in an accredited herd. Similarly, status will be lost if the bulk milk tests positive for antibody.

1.3. Added animals - Non-accredited: When added animals cannot be obtained from accredited herds, it is strongly recommended to blood sample and test them for antibodies to BoHV-1 on the farm of origin. If positive, the animals cannot enter the herd and there will be considerable savings in time and expense.

On entry to the herd, added animals must be placed in isolation and the general CHeCS rules on isolation and testing apply. The animals must be blood sampled and tested for antibodies to BoHV-1 at least 28 days after entry into isolation. In addition, an earlier test is strongly recommended to identify antibody positive cattle as soon as possible. Only if all the results are negative can the animals be introduced to the herd. Where there are two or more animals in isolation and both negative and positive animals are found,

the positive animals must be removed from the herd. The negative animals must remain in isolation and be retested 28 days after the removal of the positive animals.

Owners should be aware that occasional animals from non-accredited herds can test negative but be latently infected and therefore still present a small risk of infection. All non-homebred animals of 12 months of age or older must therefore be tested every year (see 2.3 and 2.4 below). Only after a clear test at least one year after introduction can animals be classed as accredited.

2. Accredited Free Programme

2.1. Qualifying Tests: Two herd tests are carried out, with a minimum interval between tests of 4 weeks and a maximum interval of 12 months. At these first two tests, all animals 12 months of age or older are sampled, plus all younger animals that are not homebred. If reactors are found, move to the Eradication Programme (see section 3).

2.2. Accreditation: A herd is Accredited after the two clear qualifying tests have been achieved without any reactor being detected then or during any reproductive failure (see section 2.5) or clinical disease investigations (see section 2.6).

2.3. Maintaining Accreditation - Dairy Herd: Following Accreditation, bulk milk should be tested quarterly for antibody. In addition, a statistically based sample of animals 12 months of age or older in each separately managed group within the herd, but excluding those that have entered the milking herd, must be tested annually. (*See section 4 for statistical sampling information*). In addition, all breeding bulls, all animals that are not homebred and have come from a herd that was not accredited free of BoHV-1, and all animals vaccinated with a marker vaccine must be tested annually.

2.4. Maintaining Accreditation - Beef Herd: Following Accreditation, a statistically-based sample of animals 12 months of age or older in each separately managed group within the herd must be tested annually. This would usually mean a sample from the cow herd and a sample from the followers. (*See section 4 for statistical sampling information*). All breeding bulls, all animals that are not homebred and have come from a herd that was not accredited free of BoHV-1, and all animals vaccinated with a marker vaccine, must be tested annually.

2.5. Reproductive Failure: Any cow that aborts, produces a stillborn calf or fails to calve having previously been identified as pregnant, should be tested for antibodies to BoHV-1.

2.6. Clinical Disease: Any animal showing ill health, and where IBR cannot be excluded on clinical grounds, should be isolated. Blood samples should be collected on first examination, and again 21 days later, and tested for

antibodies to BoHV-1. Samples for virus detection (e.g. nasal swabs, broncho-alveolar lavage) may also be collected on first examination. These should be packaged to preserve the samples according to the test method to be applied (e.g. placed in virus transport medium for virus isolation) and immediately dispatched to the laboratory.

2.7. Loss of Status: When evidence of disease is found in an Accredited herd, the status of the herd is lost and the herd has the option to progress as for the eradication programme.

3. Eradication Programme

3.1. Initial Herd Test: All animals 12 months of age or older, plus all younger animals that are not homebred, should be tested. If all samples in the initial herd test are negative, then this is the first qualifying test for accreditation.

3.2. Removal of Reactors: If the number of reactors is low, they may be culled and the initial herd test will be repeated at intervals of not less than 3 months until a clear test is achieved. Once a clear test is achieved, this is the first qualifying test of the accreditation programme.

3.3. Vaccination: Where the number of reactors is too great to remove them from the herd, the herd may be vaccinated with the gE deleted marker vaccine. This should continue until all the original test positives have left the herd. At this time, the herd can again undergo the accreditation programme above. However, the antibody test used should be the gE antibody ELISA and this request should be made on the herd test submission form.

4. Appendix

4.1. Sample size for IBR annual tests in herds accredited free of infection: Use the table below to give the sample size for each separately managed group within the herd. Hence for a 100 cow herd with 20 followers, 38 cows should be sampled and 19 of the followers. In addition, all breeding bulls should be tested, as well as any animals introduced from a herd not accredited for IBR, and all cattle vaccinated with a marker vaccine.

GROUP SIZE	SAMPLE SIZE	GROUP SIZE	SAMPLE SIZE
10	10	100	38
20	19	150	40
30	24	200	42
40	28	300	43
50	31	500	45
70	34	800	45

*For values that fall between those in the table use the next highest figure in the table or all the animals in the group, whichever is lower.

Leptospirosis Programmes

For leptospirosis, there are three programmes:-

Accredited Free Programme

Objective: To demonstrate the herd is free from *L. Hardjo* infection, to maintain freedom from infection with *L. Hardjo*, and to allow the sale of stock as accredited free of *L. Hardjo*.

Monitored Free Programme

Objective: to demonstrate that despite the presence of a small number of reactors in the herd (a single reactor in herds with 20 or fewer breeding animals, or up to 5% of breeding animals in other herds) there is no evidence of disease transmission. This will provide a transition stage towards accreditation during which time the lack of active leptospirosis in the herd can be recognised. The status of *L. Hardjo* Monitored Free herds is lower than that of *L. Hardjo* Accredited Free herds.

Eradication Programme

Objective: To identify reactors and to remove them from the herd with the objective of achieving accreditation of freedom from *L. Hardjo* infection. The long-term goal is to achieve freedom from the disease and to gain accredited status.

1. Essential points on Testing Methods

1.1. Samples: Blood samples should be either clotted or heparinised. Individual milk samples may provide an alternative sample. Advice on this can be obtained from your cattle health scheme organiser.

1.2. Reactor: Any animal that is positive to the antibody test is a reactor. This will result in loss of status if found in an accredited herd. Similarly, status will be lost if the bulk milk tests positive for antibody.

1.3. Added Animals - Non-accredited: When added animals cannot be obtained from accredited herds, it is strongly recommended to blood sample and test them for antibodies to *L. Hardjo* on the farm of origin. If positive, the animals cannot enter the herd and there will be considerable savings in time and expense.

On entry to the herd, added animals must be placed in isolation and the general CHeCS rules on isolation and testing apply. The animals must be blood sampled and tested for antibodies to *L. Hardjo* at least 28 days after entry into isolation. In addition, an earlier test is strongly recommended to identify antibody positive cattle as soon as possible. Only if all the results are

negative can the animals be introduced to the herd. Where there are two or more animals in isolation and both negative and positive animals are found, the positive animals must be removed from the herd. The negative animals must remain in isolation and be re-tested 28 days after removal of the positive animals.

Owners should be aware that animals from non-accredited herds might test negative but be infected and therefore present a small risk of infection. All non-homebred animals 12 months of age or older must therefore be tested every year. Only after a clear test at least one year after introduction can animals be classed as accredited.

Note: it is possible for infected carrier cattle to give negative antibody results, particularly when infection happened some years previously. It is therefore recommended that seronegative cattle from non-accredited sources should receive treatment with an appropriate antibiotic as advised by your veterinary surgeon.

2. Accredited Free Programme

2.1. Qualifying Tests: Two herd tests are carried out at an interval of at least 6 months and no longer than 12 months. All animals 2 years of age and older, plus any females or males between 1 and 2 years of age which are intended for breeding, must be tested.

2.2. Accreditation: A herd is Accredited after the two clear qualifying tests have been achieved without any reactor being detected then or during any reproductive failure (see section 2.5) or clinical disease investigations (see section 2.6).

2.3. Maintaining Accreditation - Dairy Herd: Following Accreditation, bulk milk should be tested quarterly for antibody. In addition, a statistically based sample of animals 1 year of age or older in each separately managed group of followers within the herd must be tested annually. (*See Section 4 for statistical sampling information*) All breeding bulls must be tested annually.

2.4. Maintaining Accreditation - Beef Herd: Following Accreditation, a statistically based sample of breeding animals 1 year of age or older in each separately managed group within the herd must be tested annually. This would usually mean a sample from the cow herd and a sample from the followers. (*See Section 4 for statistical sampling information*) All breeding bulls must be tested annually.

2.5. Reproductive Failure: Any animal that aborts, produces a stillborn calf or fails to calve having been previously identified as pregnant, should be blood tested for antibodies to *L. Hardjo*.

2.6. Clinical disease: Any animal showing ill health, and where Leptospirosis cannot be excluded on clinical grounds, should be isolated. Blood samples should be collected on first examination, and again 28 days later, and tested for antibodies to *L. Hardjo*.

3. L Hardjo Monitored Free Programme

3.1. Qualifying Tests: Where a herd has entered the Accredited Free programme, and reactors are identified, but the number of reactors is 5% or lower (or one reactor where the number of eligible animals is less than 20) the herd will have the option to move to the L Hardjo Monitored Free Programme. The second qualifying test is carried out after 12 months when all animals 2 years of age and older, plus any females or males between 1 and 2 years of age which are intended for breeding, must be tested. Animals that tested positive in the first herd test may be excluded from further testing.

3.2. Monitored Free Status: A herd is Monitored Free after the second qualifying test has been completed without any new reactor being identified then or during any reproductive failure (see section 2.5) or clinical disease investigations (see section 2.6).

3.3. Maintaining Monitored Free Status - Dairy and Beef Herds: Once L Hardjo Monitored Free Status has been achieved an annual herd test is carried out as for the qualifying tests; previously identified seropositive animals may be excluded from this test.

3.4. Reproductive Failure: Any animal that aborts, produces a stillborn calf or fails to calve having been previously identified as pregnant, should be blood tested for antibodies to *L. Hardjo*.

3.5. Clinical Disease: Any animal showing ill health, and where Leptospirosis cannot be excluded on clinical grounds, should be isolated. Blood samples should be collected on first examination, and again 28 days later, and tested for antibodies to *L. Hardjo*.

4. Eradication Programme

4.1. Initial Herd Test: All animals 1 year of age or older that are intended for breeding should be tested. If all samples in the initial herd test are negative, then this is the first qualifying test for accreditation.

4.2. Removal of reactors: If the number of reactors is low, they may be culled and the initial herd test may be repeated at an interval of not less than 6 months until a clear test is achieved. Once a clear test is achieved, this is the first qualifying test of the accreditation programme.

4.3. Options if large numbers of reactors are found in young stock and young cows:

Three options are available:-

- If the initial herd test shows seropositive, non-vaccinated animals across all age ranges, consistent with recent/current exposure, treat all animals over 12 months of age simultaneously with an appropriate antibiotic therapy (in consultation with the herd's veterinary surgeon). Thereafter, testing of sentinel groups of heifers and first calvers can be used to monitor progress. Repeated negative results in these groups are consistent with absence of active infection and would suggest that in time the herd will become seronegative in the absence of vaccination.
- In vaccinating herds, or where the initial herd test shows only seropositive cattle in the older age groups, consistent with absence of current infection in the herd, maintain herd biosecurity and retest a sentinel group of serologically negative animals every 6 months. Ongoing negative results are consistent with absence of active infection and would suggest that in time the herd will become seronegative in the absence of vaccination. Where positive results are found in sentinel animals, consideration should be given to antibiotic treatment or vaccination.
- Vaccinate the herd.

4.4. Vaccination: A vaccination programme will prevent losses associated with the disease. However, once a vaccination programme has been implemented in all breeding animals in the herd it will not be possible to determine whether infection is active within the herd as the currently available tests are unable to differentiate infection from vaccination. Accreditation cannot begin until all antibody positive animals have left the herd.

5. Appendix

Sample Size for Leptospirosis annual tests in herds accredited free of infection: Use the table below to give the sample size for each separately managed group within the herd. Hence for a 100 cow herd with 20 followers, 38 cows should be sampled and 19 of the followers. In addition, all breeding bulls should be tested, as well as any animals introduced from a herd not accredited for leptospirosis.

GROUP SIZE	SAMPLE SIZE	GROUP SIZE	SAMPLE SIZE
10	10	100	38
20	19	150	40
30	24	200	42
40	28	300	43
50	31	500	45
70	34	800	45

*For values that fall between those in the table use the next highest figure in the table or all the animals in the group, whichever is lower.

Johne's Disease Programmes

For Johne's disease, there are two programmes:-

Accredited Free Programme

Objective: To demonstrate the herd has tested free from Johne's disease, to maintain freedom from Johne's disease, and to allow the sale of stock as accredited free of Johne's disease.

Disease Reduction Programme

Beef

Objective: To implement a control programme to reduce the detrimental effects on herd productivity caused by this disease. The long-term goal is to achieve freedom from the disease and accredited-free status, but it should be recognised that this is a lengthy procedure that might take many years.

Disease Reduction Programme

Dairy

Objective: To implement a control programme to reduce the detrimental effects on herd productivity caused by this disease and to reduce disease prevalence over time. The ultimate long-term goal is to achieve freedom from the disease.

1. Essential points of the programmes: The instructions contained within 1.1 to 1.6 are mandatory for herds participating in the accreditation programme, but are discretionary for herds following the disease reduction programme.

1.1 Samples: Blood samples should be either clotted or heparinised. Individual milk samples may provide an alternative sample. Advice on this can be obtained from your cattle health scheme organiser. Faeces samples should weigh at least 5g submitted in a sample pot designed for the purpose.

1.2. Definition of a reactor: Any animal that tests positive for antibodies to Johne's disease by the milk or blood test must be placed in isolation and retained there as a suspected reactor until further testing has been carried out and the results are known. The further tests available are: -

a. Examination for the infective organism in faeces by culture or PCR.

b. If the animal concerned is sent for slaughter, examination of tissues for the infective organism by culture or PCR or histological assessment of the ileocaecal junction and drainage lymph node.

If the animal is confirmed as having Johne's disease, either by detecting the organism in faeces or tissues or by finding typical histological lesions in the intestine, that animal is defined as a reactor. Any animal that tests positive for antibody is also defined as a reactor if no further testing is done.

1.3. Whole Herd Faecal Screen: The option exists for herds to test the whole herd by faecal culture or PCR instead of the blood test. Faecal samples will be pooled in the laboratory and tested in batches of five.

1.4. Clinical Disease: Any disease condition in an animal 6 months of age or older that might be attributable to Johne's disease must be investigated by the supervising veterinary surgeon. This includes all animals that may have diarrhoea or weight loss or both. If the veterinary surgeon is satisfied that the condition is not Johne's disease, then no further action need be taken. If the veterinary surgeon cannot rule out Johne's disease, then a blood sample and faeces sample should be collected from each affected animal and tested. The affected animals should be isolated from the herd until the results of the laboratory tests are known. Animals that die before blood or faeces samples are collected must be examined as in 1.2b above.

1.5. Added Animals – Non-accredited: These animals always constitute a risk of introducing infection and if at all possible should not be added to the herd; young stock, in particular, can be incubating infection but test negative. When this risk is taken, it is preferable to blood sample and test animals for antibody to Johne's disease while they are on the farm of origin. If positive, the animals cannot enter the herd and there will be considerable savings in time and expense.

On entry to the herd, added animals must be placed in quarantine and the general CHeCS rules on isolation and testing apply. The animals must be tested for Johne's disease using both blood and faeces samples irrespective of the age of the animal. Only when the results are negative can the animals be introduced to the herd. Note that the time required to test for Johne's disease by faecal culture can be up to 10 weeks and these animals must be isolated until the results are known. In addition, they must also be re-tested every 12 months, notwithstanding any annual or biennial herd-screening programme (see section 2.3 below). Where a group of animals has been purchased from one source and one or more of them tests positive, none of that group of animals can enter the herd without loss of the herd's status.

Non-home bred cattle from non-accredited herds are not included in a herd's accreditation.

1.6. Shows, Sales etc: Animals normally require prolonged exposure to large doses of the Johne's disease organism before becoming infected. Therefore, if Johne's disease accredited cattle have been away from the herd at a show for a period not exceeding 7 days and have been prevented from having

direct contact with other cattle, particularly their dung and soiled bedding, the accredited cattle can rejoin their herd of origin without the need for isolation or testing.

2. Accredited Free Programme

2.1 Qualifying Tests: Three herd tests are carried out on all animals 2 years of age or older at an interval of 12 months apart.

2.2. Accredited Free Status: A herd is Accredited Free if three clear qualifying tests at an interval of 12 months have been achieved without any reactor being detected. The date the herd first achieved Accredited Free status will be included on the Certificate of Accreditation. Should a herd lose status and then regain it having met the subsequent testing requirements the date on the certificate will be when accreditation was regained.

2.3. Annual or Biennial Herd Tests:

- Annual - following Accreditation, all animals 2 years of age or older must be tested every 12 months.
- Biennial – once a herd achieves accredited free status for Johne's disease and has subsequently had 2 further clear annual herd tests, there is the option to follow the non-homebred and cull screen programme (see 2.4 below), where testing of homebred animals may be carried out biennially rather than annually.

2.4. Non-home bred and Cull Screen: This option is not available to herds with less than 20 homebred animals of 2 years or older. At 12 months from the last complete herd test, all animals of 2 years or older that are not homebred or are scheduled for culling are blood sampled (this does not apply to finishing cattle). Animals should not be removed from the herd before the test result is known or a faeces sample has been collected. Where, in the course of the second 12 months from the full herd test, further animals are culled they too are sampled as above. If the blood results are positive or inconclusive then their faeces samples will be screened for the presence of the infective organism. Where this can be complied with, biennial herd testing of homebred cattle will suffice.

2.5. Definition of a clear test: For a qualifying test or herd test to be considered clear, irrespective of whether an annual or biennial programme is being followed, any animals with positive antibody results must have further testing carried out as in section 1.2 with negative results, to demonstrate they are not reactors. If further testing is not carried out, animals with positive antibody results are considered to be reactors by default, the herd status will be lost and the herd must enter the disease reduction programme. A full 12 months must pass between a reactor being identified in the herd and the first time that a herd test can again count towards accreditation.

3. Disease Reduction Programme - Beef

3.1. Initial Herd Test: All animals 2 years of age or older must be blood sampled. If all samples in the initial herd screen are negative, then this is the first qualifying test for accreditation.

3.2. Cull all reactors and their offspring: Cows confirmed as reactors should be culled as soon as possible. The offspring of any confirmed positive cow should not be retained for breeding and should be removed from the herd as soon as is practical.

3.3. Annual Herd Test: Routine annual testing (testing the same animals as in the initial herd screen) continues and management procedures to reduce the exposure of cattle to infection are implemented.

3.4. Suspected cross-reactions following intradermal tuberculin testing: Following the tuberculin test animals may produce antibody that will cross-react in the Johne's antibody test and result in false positives. To avoid this it is recommended that testing is not carried out within three months following tuberculin testing. Where this cannot be avoided or where it has inadvertently occurred it is recommended that seropositive animals are tested again at one month and at three months after the original blood test. If the positive results have been due to cross-reacting antibody then the level of antibody will have declined. Any animal remaining antibody positive at three months should be subjected to faecal screening. If no Map is detected the animal is considered to be free of infection and the herd status is retained.

3.5. Vaccination: If the number of positive animals at a herd test is such that a culling policy cannot be pursued, herd vaccination may be considered. The vaccine programme detailed in the manufacturer's data sheet should be followed. Management procedures to reduce the exposure of cattle to infection are implemented. Vaccination continues until no clinical Johne's disease occurs for a period of at least 2 years. At this point, vaccination can cease and progression towards Johne's disease accredited free status can begin.

4. Disease Reduction Programme - Dairy:

4.1. Initial herd test: All animals 2 years of age or older must be blood or milk sampled. If all samples in the initial herd screen are negative, then this is the first qualifying test for accreditation.

For quarterly screening, all animals currently in milk at the start of the screening programme should be tested in the initial test. Where herds are using this programme they may progress to the accreditation programme once a complete clear herd test has been attained. This will require blood sampling any animals of 2 years or older that have not had a milk sample tested as part of the herd screen including cows not in-milk and bulls.

As with the conventional testing system there is the option to confirm milk antibody positives using a faecal test (defined in 1.2 above). Having achieved a clear 12 month period they will then enter the accredited programme at the level of a first clear herd test of two where no reactor has previously been identified in the herd or the first of three where one or more reactor has previously been identified in the herd. These subsequent clear herd tests may be based on either continued complete 12 month cycles of quarterly milk testing or annual/biennial whole herd tests as defined in 2.3.

4.2. Managing reactors and their offspring:

It is advised that the offspring of any reactor cow are not retained for breeding and should be removed from the herd as soon as is practical.

In the case of quarterly individual cow testing, a management strategy for high and medium risk cows should be agreed between the vet and the farmer. Where possible, no high risk cows should remain in the herd at calving. Medium risk cows should be isolated at calving to avoid risk of infecting young stock.

4.2.1 Definition of High Risk Cow: A cow is identified as high risk if she has tested positive on two consecutive quarterly milk antibody tests or on one blood antibody test.

4.2.2 Definition of Medium risk Cow: A cow is identified as medium risk if she has tested positive on one occasion in the quarterly milk sample of her current lactation. Cows that have been identified as medium risk on the last milk sample of their current lactation should be further blood sampled after one month and before the animal calves. Should she test positive on blood she will be categorised as high risk.

4.2.3 Definition of Low Risk Cow: A cow is low risk if she has had more than two consecutive milk antibody tests or a single blood antibody test in the negative zone, including the most recent result, irrespective of previous testing results.

4.3. Routine herd test: Routine annual testing (testing the same animals as in the initial herd screen) or quarterly individual cow milk testing (testing all animals in milk at each test) continues and management procedures to reduce the exposure of cattle to infection are implemented.

4.4. Suspected cross-reactions following intradermal tuberculin testing:

Following the tuberculin test animals may produce antibody that will cross-react in the Johne's antibody test and result in false positives. In most cases such cross-reactions will disappear within three months and before the next round of Johne's antibody testing. Therefore cows testing false positive as a result of the skin test will eventually return to the low risk category.

4.5. Vaccination: If the number of positive animals at a herd test is such that a culling policy cannot be pursued, herd vaccination may be considered. The vaccine programme detailed in the manufacturer's data sheet should be followed. Management procedures to reduce the exposure of cattle to infection are implemented. Vaccination continues until no clinical Johne's disease occurs for a period of at least 2 years. At this point, vaccination can cease and progression towards Johne's disease accredited free status can begin. Antibody tests cannot distinguish between vaccinated non-infected cattle and infected cattle therefore discussion should be had with your health scheme provider before enrolling on a disease reduction programme.

Bovine Viral Diarrhoea (BVD) Programmes

For BVD, there are three programmes, allowing the farmer to work with his own vet to formulate a BVD health strategy to suit the particular circumstances on that farm. Vaccination of the breeding herd can be used in all three programmes without compromising the integrity of the programmes.

Accredited Free Programme

Objective: To demonstrate the herd is free from BVDV, to maintain freedom from BVDV, and to allow the sale of stock as accredited free of BVDV.

Vaccinated Monitored Free Programme

Objective: To control BVD through vaccination of the breeding herd and, by regular monitoring of young stock, to demonstrate that the control is effective and exposure of young stock to BVDV has not occurred. The goal is to allow the sale of stock that are accredited as being from a vaccinated herd and monitored free of active BVDV infection. This programme is considered appropriate for commercial herds selling stock for finishing. The status of BVD Vaccinated Monitored Free herds is lower than that of BVD Accredited herds.

Eradication Programme

Objective: To implement a control programme in order to reduce the detrimental effects on herd productivity caused by the disease and to achieve freedom from the disease. This programme applies where there is evidence of recent BVD infection in the herd or where positive results have been found in the course of an accreditation programme.

1. Essential Points on Testing Methods

1.1. CHeCS Rules: The Rules of CHeCS apply to BVD Accredited Free and Vaccinated Monitored Free Programmes. However, in the case of the Vaccinated Monitored Free Programme, there is no requirement for double fencing with a 3-metre gap as boundary biosecurity.

1.2. Samples: Blood samples should be either clotted or heparinised, as specified by the testing laboratory. Individual milk samples may provide an alternative sample for antibody alone. Skin samples, typically ear notch samples, may also be used for detection of BVDV by ELISA or molecular tests. Advice on sampling can be obtained from your cattle health scheme provider. Bulk tank screens for antibody to BVDV and for the presence of BVD virus are tests that may be used within the programmes. Your cattle health scheme provider may provide advice on their use.

1.3. Added animals - Non-accredited Pre-Purchase Screen: When added animals cannot be obtained from accredited herds, it is preferable to blood

sample and test them for antibodies to BVDV on the farm of origin. If negative, the animals must then be tested for BVD virus. BVD virus-positive animals cannot enter the herd and elimination of them at this stage will create considerable savings in time and expense.

1.4 Added animals - Quarantine and Screening: On entry to the herd, added animals must be placed in quarantine and the general CHeCS rules on isolation and testing apply. An animal can only enter the herd if it is deemed not to be either transiently or persistently infected (PI) with BVDV. The animals must be blood sampled and tested for antibodies to BVD at least 28 days after entry into isolation (see 1.7 below for bulls). Any animal that is antibody negative must be tested for BVD virus. If animals have not been screened as in 1.3, an earlier test is strongly recommended to identify infected cattle as soon as possible. The status of any virus positive animals should be determined as transiently or persistently infected (section 3.4). If any PI animals are found they must be removed, and the remainder of the group should be held in isolation for a further 28 days and then tested to determine if any of the group have seroconverted. If no seroconversion is found, the animals may enter the herd. If seroconversion has occurred, then the same process should be repeated until no further seroconversions are detected. Thus added animals can only enter the herd 28 days after the last seroconversion.

1.5 Quarantine and testing of calves: Maternal antibody can interfere with BVD virus screening in calves. Calves should only be released from quarantine after they have been screened negative for virus and on the advice of your CHeCS scheme provider's veterinary surgeon.

1.6 Quarantine and testing of pregnant cattle: Pregnant cattle with positive antibody results cannot be released from quarantine because they may be carrying a PI calf. Seropositive pregnant cattle must be excluded from the herd or maintained in quarantine until the calf is born and tested negative for BVDV. Exceptionally, the cow may be removed from quarantine before its calf is born if it was known to be seropositive or fully vaccinated against BVDV prior to service. The calves of such cows must be screened as soon as possible after birth to confirm that they are not persistently infected (PI).

1.7 BVD virus in semen: Bulls that are antibody-positive have a small chance of excreting virus in semen, and should not be used for breeding for a minimum period of 9 weeks after entry to quarantine. It is also possible that a bull that is antibody positive may persistently produce BVD virus in its semen. This is considered to be extremely rare, but, if required, to reduce risk further semen can be screened for virus under the guidance of your veterinary surgeon and the scheme's veterinary surgeon.

1.8. Animals added prior to commencing the accreditation programmes: All animals that have been purchased before beginning a BVD programme, and have not been in contact with a sentinel group (see 2.3 below) by the time

of the initial screen, should be identified, blood sampled and tested for BVD antibody and virus.

2. Test systems used in the accreditation and the vaccinated monitored free programmes

Various herd tests are carried out at different times depending on the programme being followed and the results of previous tests. These are defined below and the criterion for a test pass or fail is provided. It should be noted that a test fail need not mean a failure in achieving accredited status. This is explained further in the section on the implementation of the programmes (5.0 onwards).

2.1. Bulk Milk Test: A representative sample of milk is taken from the bulk tank and tested for antibody to BVDV. If the milk from the cows goes into more than one tank, then a separate sample must be collected from each tank. **If the Bulk Milk Test is antibody positive the result is a Fail. If the Bulk Milk Test is antibody negative the result is a Pass.**

2.2. First Lactation Test: Individual milk samples are collected from all cows in their first lactation. These samples will be combined at the testing laboratory to give a single sample for testing. **If the First Lactation Test is antibody positive the result is a Fail. If the First Lactation Test is antibody negative the result is a Pass.**

2.3. Check Test: From each separately managed group of cattle in the age range 9 to 18 months*, sample 5 unvaccinated home reared cattle and test for antibody to BVDV.

- where groups are made up after weaning, these are considered to be separate subgroups and 5 samples must be collected from each group
- In groups of dairy heifers where animals have been added to the group at intervals it is necessary to sample the 5 oldest in the group and the 5 that have been added most recently.
- cattle should only be sampled after they have been together for at least two months.
- where more than one subgroup is included in the Check Test and at least five animals are sampled in each subgroup and are all antibody negative the Check Test is considered to be a pass and no further testing is required.
- where fewer than seven animals have been sampled and are all antibody negative then one animal should be tested for BVD virus. The Check test is considered a pass if the single animal is also negative for BVD virus.
- where fewer than five animals are sampled in any subgroup included in the Check Test and all animals are antibody negative then one animal from each subgroup with fewer than five animals should be tested for BVD virus. The Check Test is considered a pass when the animals tested for BVD virus are also negative.

Vaccinated animals may test positive for antibody to BVDV and should be excluded from the Check test where possible. If there is evidence of exposure to BVDV in the Check Test the result is a Fail. If every animal in the Check Test is antibody negative and providing that any test carried out for BVD virus is also negative the result is a Pass.

**In herds where complete subgroups may be sold off the farm before 9 months of age, the age range for the Check Test should be 6 to 9 months. If these groups of calves have been sold without being housed for at least two months then the sample size should be 10 per group of animals and not five. It should be noted that maternally derived antibody may occasionally persist beyond 6 months of age. In herds where vaccine is used cattle should be sampled before vaccination.*

3. Tests used in the Eradication Programme

When testing in the accreditation programme results in a failure, indicating active BVDV infection in the herd, the emphasis changes to disease eradication. The precise approach taken in any herd will depend on the specific conditions of the herd. The objective is to provide the most cost-effective and timely testing programme required for the herd to remove BVDV infection. It should be recognised that the probability of a PI animal existing in the adults of the herd is much lower than in the young animals of the herd. Therefore approaches that minimise screening the adult herd may be adopted (3.1 and 3.2). However the gold standard remains screening each individual animal for the presence of BVD virus.

3.1 Screening the breeding herd for BVD virus (dairy): The bulk tank can be screened for the presence of BVD virus by the RT-PCR test. There will be an upper limit for the number of animals that can be tested in a single pooled sample. This number may vary according to the scheme provider. Therefore in herds where the numbers in milk exceed this then the pooled samples for screening may be produced by collecting individual milk samples and producing pools from those. If the test for any pool is positive then the individuals making up the pool must be individually tested in order to identify the virus positive animal(s). All animals not contributing to the bulk tank must be screened individually by the blood test.

3.2 Screening the breeding herd for BVD virus (beef): After the calf crop has been screened individually (3.3), dams of calves which are not PI do not need to be tested. Other breeding females and bulls should be tested individually.

3.3 Screening immature cattle for BVD virus (beef and dairy): All immature cattle (includes all females yet to calve and young bulls not specifically covered by 3.1 and 3.2) on the farm should be screened for BVD virus from an age within the detection limit of the test used. Testing of all

calves born into the herd should continue for 12 months after the last PI animal has been identified and removed, or for a period of 12 months after eradication step 1 (sections 9.1 or 10.1) has been completed without detecting any PI cattle.

3.4 Confirming BVD virus positives as PI animals: All animals that are identified as virus positive should be placed in quarantine and re-sampled three weeks after the first sample to confirm persistent infection. Once confirmed, PI animals should be removed immediately from the herd to slaughter.

4. Other Essential Tests for all Three Programmes

4.1. Reproductive Failure: Any animal that aborts, produces a stillborn calf or fails to calve having been previously identified as pregnant, should be blood-tested for antibodies to BVD. It is at the discretion of the herd's veterinary surgeon whether this sample is also tested for virus. The interpretation of the result of this test must be made against the herd status and any knowledge of the seroprevalence within the herd.

4.2. Clinical Disease: Any animal showing ill health, and where BVD infection cannot be excluded on clinical grounds, must be blood tested for BVD antibodies and virus. Virus positive cattle must either be removed immediately or be placed in strict isolation and undergo a second test for virus at least 21 days later to confirm if they are PI or transiently infected. Animals confirmed as PI must be removed from the herd immediately.

Step-By-Step Implementation of BVD Programmes

5. Accredited Free Programme - Dairy Herds

5.1. Accreditation Step 1: Carry out a bulk milk test. If this is negative, repeat quarterly and proceed to Step 2. If positive, a first lactation test should be carried out. If both are positive there is the possibility of current or recent infection in the herd. Proceed to Step 2 (check test) to investigate further. If the bulk milk test is negative or the first lactation test is negative, this suggests the herd may be currently free of infection; proceed to Step 2 (check test) to investigate further.

5.2. Accreditation Step 2: A check test should be carried out as described (see 2.3 above). If the test is positive, there is evidence of current or recent infection and the herd should enter the eradication programme. If negative, the check test is repeated on successive groups of heifers.

5.3. Achieving Accreditation: A dairy herd is accredited free of BVDV if Step 1 is completed followed by negative check tests, on successive groups of heifers over a 12 month period, and either the bulk milk test or first lactation test remain negative on quarterly sampling. Note that where previous

serological screening has shown that some of the animals contributing to the first lactation screen are seropositive, these animals may be excluded from testing, with the remaining seronegative animals serving as a sentinel group in this population. In herds where BVDV vaccine is used the bulk tank and first lactation screen may produce positive results. Where control has been achieved the antibody result will be a low positive. Therefore herds that are vaccinated can achieve accreditation providing the first lactation test result is consistent with vaccination and not infection and the check tests continue to be negative.

5.4. Maintaining Accreditation: Following accreditation, a bulk milk test for antibody must be carried out quarterly. If this is positive on the first test, then a first lactation test carried out quarterly must replace it. A check test (see 2.3 above) is also carried out on successive groups of heifers. Reproductive failure and clinical disease testing should be carried out whenever such disease occurs.

6. Accredited Free Programme - Beef Herds

6.1. Accreditation Step 1: A check test (see 2.3) should be carried out. If the test is positive, there is evidence of infection and the herd should enter the eradication programme. If negative, proceed to accreditation Step 2.

6.2. Accreditation Step 2: A check test (see 2.3) is carried out again on the following year's calf crop. If the test is positive, then there is evidence of infection and the herd should enter the eradication programme. If negative, the check test is repeated annually.

6.3. Achieving Accreditation: A herd is accredited free of BVDV if Steps 1 and 2 are completed and negative results achieved without there being any other evidence of active BVD infection in the herd.

6.4. Maintaining Accreditation: Following accreditation, a check test (see 2.3) is carried out on each successive calf crop. Reproductive failure and clinical disease testing should be carried out whenever such disease occurs.

7.0. Loss of Accredited Status - Dairy and Beef Herds: Where any test for the presence of BVDV is positive, except antibody tests in vaccinating herds in adult animals that were positive prior to accreditation or added seropositive animals, then accreditation is lost. Where further screening is done and the results indicate a limited breakdown without the birth of a PI then status may be regained if the tests carried out on the succeeding calf crop show no evidence of infection and the review of herd biosecurity indicates that it is compatible with the CHeCS rules for this disease.

8. Vaccinated Monitored Free (VMF) Programme

8.1 VMF Step 1: Carry out a check test (see 2.3). Where evidence of exposure to BVDV is obtained in the young stock, a herd should move into the eradication programme for dairy or beef herds as appropriate. Where no evidence of exposure to BVDV in the young stock is found, this constitutes the first clear test.

8.2 VMF Step 2: A check test (see 2.3) is carried out again on the following year's calf crop. If positive results are obtained, then the options are as in step 1.

8.3 VMF Accreditation: A herd is accredited as BVD vaccinated monitored free if step 1 and step 2 are completed and negative results achieved without there being any other evidence of active BVDV infection in the herd.

8.4 Maintaining VMF Accredited Status: Following accreditation, a check test (see 2.3) is carried out on each successive calf crop. Reproductive failure and clinical disease testing should be carried out whenever such disease occurs. The breeding herd should continue to be vaccinated according to the instructions of the vaccine manufacturer.

9. Eradication Programme - Dairy herds

9.1 Eradication Step 1: Either all animals in the herd are screened individually or the bulk tank is screened for BVD virus by PCR (see 3.1) and all animals not contributing to the bulk tank are screened individually. Virus positive animals that are confirmed as PI should be removed from the herd to slaughter immediately.

9.2 Eradication Step 2: All calves to be screened as in section 3.3.

9.3 Eradication Step 3: After step 2 has been completed, Check tests (2.3) are carried out as heifer groups reach 9 months of age. If positive, then step 2 should be repeated, testing all animals in the target range that have not already been tested.

9.4 Eradication Step 4: At 12 months after passing step 3, a check test is carried out. Negative results in two check tests, allow accreditation.

10. Eradication Programme - Beef herds

10.1 Eradication Step 1: Either all animals in the herd are screened individually for BVD virus or screening is restricted initially to the immature cattle as detailed in section 3.3. If the latter option is selected then once the results of the immature cattle screen are obtained this is followed by screening the dam of any virus positive animal identified, any female that has not had a calf tested and all bulls (see 3.2). Virus positive animals that are confirmed as PI should be removed from the herd to slaughter immediately.

10.2 Eradication Step 2: Following step 1 all calves born are tested as detailed in section 3.3.

10.3 Eradication Step 3: After step 2 has been completed, Check tests (see 2.3) are carried out as calf groups reach 9 months of age. If positive, then step 2 should be repeated, testing all animals in the target range that have not already been tested individually.

10.4. Eradication Step 4: At 12 months after passing step 3, a check test (see 2.3) is carried out. Negative results in two check tests allow accreditation.