

TECHNICAL DOCUMENT



Incorporating Rules for Cattle Health Schemes

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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 licensed scheme is equivalent to that in all other licensed 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 startup 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. These 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 recognised international experts on the diseases of interest meet annually to review the Technical Document, which has been edited by Hilary Burgess.

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 five 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)
Neospora

Herd owners may test for any or all of the diseases at the same time. The programmes may be used as a framework for routine monitoring, for disease reduction, disease eradication and for certification of freedom from the disease in question. The starting point for any herd will depend on their own objectives and current disease status. At its simplest, monitoring can be limited to quarterly bulk milk antibody testing while at the top end herds can achieve elite status by reaching risk level 1 for Johne's disease and being accredited free for BVD, IBR, *L. Hardjo*, and Neospora.

CHeCS is not itself a Cattle Health Scheme but 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
July 2015

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, with the exception of rule 19 which is mandatory for all herds enrolled in CHeCS programmes.

General Rules

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 15 April 2015)

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 site. All cattle on the holding are considered to be part of the herd except under exceptional circumstances where the herd's owner and veterinary surgeon can show that adequate separation of two sets of animals exists and can be maintained to satisfy the rules of the scheme. Documentation to this effect must be produced by the herd's veterinary surgeon, reviewed annually and held on file by the CHeCS licensee.

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.

Accreditation means that the standard defined for the disease in question has been met.

5. Added animals: Cattle should not be added to a health scheme herd unless they are of the same 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 two months for BVD, IBR or leptospirosis accredited cattle or twelve months 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. For Neospora and grazing recommendations see point 34.

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 with 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_SI (accessed: 19th February 2015)

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 manure storage may be shared with other cattle. Manure may only be removed from the dedicated storage area to be spread on land or added to the main manure store when all animals in the isolation facility have passed the required health tests and been added to the herd.

If any of the animals in the isolation facility test positive for any of the five diseases, manure from the isolation facility must not be used in recycled bedding or 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 diseases). Where paddocks have been used to isolate test positive animals, or to quarantine 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.

18. Semen/embryos. Accredited herds should only source new genetic material from reliable sources (e.g. semen collection centre approved for intra-community trade).

Herd Testing Rules:

19. Previous results: All herds which are enrolled onto a CHeCS programme (accredited, monitored and eradication schemes) must declare the results of 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.

20. 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. The animal's full official ear number must be used as the unique identifier.

21. 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.
- In the case of tissue samples collected by ear punch, the farmer or someone acting on his behalf. In such cases samples must be unambiguously traceable to the animal from which they have been collected e.g. button tags labeled with the official identification number of the animal or by use of tissue sample enabled official identity tags.

22. 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 are 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.

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 the herd have passed the requisite tests, as detailed in the specific programme, and all known test positive animals have been removed 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 Johne's disease section, paragraph 1.8)

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 purpose other than to attend a show or sale must be loaded, transported, unloaded 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 licensed 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.
- All results relevant to the accreditation process (from private as well as CHeCS approved laboratories) are required to be made available to the health scheme provider by the member.
- The standards for certification stated in the Royal College of Veterinary Surgeons guide to professional conduct are adhered to. 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): Sample certificates are in Appendix 2 and 3. Two certificates are produced to show farm status. One is signed by the health scheme provider, which can be displayed at sales etc. (Appendix 2), and the other is signed by the vendor and should be used to record the ear numbers of stock leaving the farm and supplied to purchasers as a record (Appendix 3).

Two certificates are produced to show Individual Health Declarations in Appendix 4; the A3 and A4 Individual Health Declarations or 'Pen Cards'. The A4 certificate contains additional information on vaccination, status and testing results. It is important to note that individual animals that are not from CHeCS accredited herds can be sold with a pen card, however column two containing the Herd Accreditation boxes will be blank.

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.

34. Herd Biosecurity - Neospora

Below is a list of biosecurity measures that are specific to the control of neosporosis. It is important that herds participating in CHeCS Neosporosis programmes conform to these.

1. All dogs should be prevented from having access to the calving areas and any carcass material or placentae. This includes farm dogs, visitors' dogs, dogs belonging to members of the public and fox hounds.
2. Placentae, stillborn calves and carcasses should be removed from the calving accommodation/paddocks as soon as possible to a secure location ready for removal by fallen stock contractors. Dogs should be prevented from gaining access to potentially infected material.
3. Feed storage facilities, both 'straights' and forage, must be dog-proof to prevent contamination with dog faeces. They should also be vermin-proof.
4. Suppliers of feed should provide assurance that measures are in place to prevent contamination of feed by faecal material from dogs.
5. Access of dogs to pasture used for cattle grazing or for the production of cattle forage should be kept to a minimum because it increases the risk of cattle becoming infected with *N. caninum*.
6. Where practical, the public and dogs should not have access to paddocks used for calving.

Bulk Milk Monitoring Programmes

These are only available to dairy herds and use regular bulk milk antibody testing. They will give a good assessment of whether or not the herd has been exposed to the disease in question. Antibody testing of bulk milk samples is simple and convenient and is based on the recognition that like blood, milk also contains antibodies that reflect the animal's disease status.

Bulk milk samples may be 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 is no requirement 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 three 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. The installation of double fencing or the use of an equivalent boundary to provide a gap of three meters between scheme cattle and any neighbouring cattle of a lower health status is mandatory for this programme.

Vaccinated Monitored free (VMF) Programme

Objective: To demonstrate that the herd is operating a marker vaccination policy and is free from infection based on testing for gE antibodies. The goal is to allow herds that are free of IBR, but for whom double fencing is not an option, to get recognition of that status and to enable the purchase of stock that have a much lower risk of being latently infected carriers than those in the general population. The status of IBR VMF herds is lower than that of IBR accredited free herds.

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 - A gE deleted marker vaccine may be used in the VMF and the Eradication Programmes. A marker vaccination programme must be in place for the IBR VMF programme (3.1). Where any animal is vaccinated with the marker vaccine, this information must be noted on the laboratory request form 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 provider.

Where herds are vaccinated with the gE deleted marker vaccine, the antibody test that is used should be the gE antibody ELISA. This should be the default test for the IBR VMF programme, unless otherwise requested.

1.2 Test positive animal or herd: Any animal or bulk milk sample that is positive to the appropriate antibody test is a test positive animal or herd. This will result in loss of status.

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.

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 isolation facilities and 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 of 4 weeks and a maximum interval of 12 months between tests. At these first two tests all animals 12 months of age or older are sampled, plus all younger animals that are not homebred. If test positive animals are found, move to the Eradication Programme (see section 4).

2.2. Accreditation: Herd accreditation is achieved when all animals test negative in two consecutive qualifying tests and no evidence of infection is found in investigations into reproductive failure or clinical disease investigation (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 5). All breeding bulls, all animals that are not homebred and originate from a herd 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 5). All breeding bulls, all animals that are not homebred and originate from a herd 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 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/ocular 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. Vaccinated Monitored Free Programme

3.1 Vaccination strategy: With permitted exceptions, all cattle over 12 months of age must be vaccinated with marker vaccine as per the Specific Product Sheet. It is permissible to leave some breeding stock unvaccinated e.g. to provide BoHV-1 antibody-free colostrum. Such animals should make up no more than 5% of the adult herd (over two years of age). Note that bulls that may enter semen collection stations should not be vaccinated in order to maintain their eligibility but must be managed to avoid accidental exposure to vaccine virus. Decisions on vaccine selection (live or inactivated; route of administration) should be made with the herd's veterinary surgeon.

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

3.3. VMF Accreditation: Herd accreditation is achieved when all animals test negative in two consecutive qualifying tests and no evidence of infection is found in investigations into reproductive failure or clinical disease investigation (see section 3.6 and 3.7).

3.4. Maintaining VMF Accreditation - Dairy Herd: Following VMF Accreditation, bulk milk may be tested quarterly for antibody. All breeding stock and all animals that are not homebred and originate from a herd not accredited free of BoHV-1 must be tested annually.

3.5. Maintaining VMF Accreditation - Beef Herd: Following VMF Accreditation all breeding stock and animals that are not homebred and originate from a herd not accredited free of BoHV-1 must be tested annually.

3.6. 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.

3.7. Clinical Disease: Any animal showing ill health 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/ocular 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.

3.8. Loss of Status: When evidence of disease is found in a Vaccinated Monitored Free herd the status of the herd is lost and the herd has the option to progress as for the eradication programme.

4. Eradication Programme

4.1. 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.

4.2. Removal of Test positive animals: If the number of test positive animals is low they may be culled and the initial herd test repeated at intervals of not less than three 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. Vaccination: Where the number of test positive animals 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 gE antibody ELISA test should be used and this request should be made on the herd test submission form.

5. Appendix

5.1. Sample size for IBR annual tests in herds Accredited Free and not vaccinating. The table below gives 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	GROUP SIZE	SAMPLE SIZE
10	10	50	31	200	42
20	19	70	34	300	43
30	24	100	38	500	45
40	28	150	40	800	45

*For group sizes that fall between those in the table use the next highest group size to give the sample size.

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 test positive animals in the herd (a single test positive animal 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 test positive animals and to remove them from the herd to achieve freedom from *L. Hardjo* infection. The long-term goal is to achieve freedom from the disease and to gain accredited free 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 provider.

1.2. Test positive animal or sample: Any animal or bulk milk sample that is positive to the antibody test is a test positive animal or herd. This will result in loss of status.

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.

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 isolation unit and the herd. The negative animals must remain in isolation and be re-tested 28 days after

removal of the positive animals. Negative animals can enter the herd and positive animals must be removed from the herd.

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 if infection occurred some years ago. 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 six months and no longer than 12 months. All animals two years and older, plus any females or males between one and two years of age which are intended for breeding, must be tested.

2.2. Accreditation: Herd accreditation is achieved when all animals test negative in two consecutive qualifying tests and no evidence of infection is found in investigations into reproductive failure or clinical disease investigation (see section 2.5 and 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 one year of age or older in each separately managed group of followers within the herd must be tested annually (*See Section 5*). All breeding bulls must be tested annually.

2.4. Maintaining Accreditation - Beef Herd: Following Accreditation, a statistically based sample of breeding animals one year of age and 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 5*). 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 test positive animals are identified, but the number of test positive animals is 5% or lower (or one test positive animal 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 at an interval of at least six months and no longer than 12 months. All animals 2 years of age and older, plus any females or males between one and two 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: Herd accreditation is achieved when all animals test negative in two consecutive qualifying tests and no evidence of infection is found in investigations into reproductive failure or clinical disease investigation (see section 3.4 and 3.5).

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 one year of age and 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 test positive animals: If the number of test positive animals is low, they may be culled and the initial herd test may be repeated at an interval of not less than six months and no more than 12 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 test positive animals 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 lactation animals 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	GROUP SIZE	SAMPLE SIZE
10	10	50	31	200	42
20	19	70	34	300	43
30	24	100	38	500	45
40	28	150	40	800	45

For group sizes that fall between those in the table use the next highest group size to give the sample size.

Johne's Disease Programmes

For Johne's disease, there are two programmes:

- 1. Johne's Disease Risk-Level Certification Programme (beef and dairy)**
- 2. The Johne's Disease Risk-Level Reduction Programme (dairy)**

1. Johne's Disease Risk-Level Certification Programme (beef and dairy)

Objective: To provide an assessment of the risk of Johne's disease being present in the herd, to provide a control programme that achieves a reduction in the risk of Johne's disease within the herd and to allow the marketing of cattle with an accredited risk level.

Method: Herds may progress from level 5 to level 1 as they progress in controlling the disease. In addition to adhering to the CHeCS rules there are mandatory requirements that support the control and prevention of Johne's disease within this programme (detailed below). Herds will be CHeCS accredited for the four risk levels within the programme. Herds may choose to test animals but not adhere to the mandatory requirements. These herds and any herds not testing will be risk level 5 and will constitute the highest risk of being a source of Johne's disease infected stock. This programme of risk accreditation can be used in both beef and dairy herds, but it is envisaged that for many commercial dairy herds participation in the Johne's Disease Risk Level Reduction Programme may be more appropriate.

Definition of levels within the Johne's Disease Risk-Level Certification Programme: To progress to the next level, testing cannot be sooner than 12 months after the previous test. Testing is at annual intervals except for those herds qualifying for biennial testing. When assigning a herd risk level, all test positive animals identified in the previous 12 months must be included in the calculation.

All animals two years of age and over must be tested in order to qualify for this risk level certification program.

Accreditation of herd for levels 1 to 4: The date the herd achieves a particular level will be included on the Certificate of Accreditation. Should a herd, having reached a particular level, fail to meet the standard and drop down a level, but subsequently regains the original level, the date on the certificate will be when the particular level was regained.

Level 1: Herds must have had three consecutive clear herd tests at annual intervals. Level 1 will be further defined by stating the year in which the herd achieved level 1 assessment. This is directly equivalent to the previous

CHeCS Accredited Free Status and is associated with the lowest risk of Johne's disease in relation to buying breeding stock from participating herds.

Level 2: This applies to all herds that have had an initial, or two consecutive clear tests, but are yet to achieve level 1 status. Level 2 will be further qualified by the number of consecutive clear herd tests that have been achieved (e.g. Level 2, one year clear; Level 2, two years clear). This is directly equivalent to the previous CHeCS Qualifying Status.

Level 3: These are herds that have test positive animals identified within the herd, but the number of test positive animals does not exceed 3% of the herd eligible for testing in the Johne's programme at the most recent test.

Level 4: These herds have more than 3% of eligible animals identified as test positive animals at the most recent test.

Level 5: These herds may be carrying out a testing programme, but are not adhering to the mandatory requirements of the programme.

2. The Johne's Disease Risk-Level 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 but the removal of test positive animals is not a strict requirement. However, in order to achieve certification for Johne's disease, participating herds are required to join the Johne's Disease Risk-Level Certification Programme (beef and dairy).

1. Essential points on Testing Methods

The instructions contained within 1.1 to 1.6 are mandatory for herds participating in the Johne's Disease Risk-Level Certification Programme (beef and dairy), but are discretionary for herds following the Johne's Disease Risk-Level Reduction Programme (dairy).

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 provider. Faeces samples should weigh at least 5g and be submitted in a sample pot designed for the purpose.

1.2 Definition of a test positive animal: Any animal that tests positive for antibodies to Johne's disease by a milk or blood ELISA test must be placed in isolation and retained there as a test positive animal. Any animal that tests positive for antibody is also defined as a test positive animal if no further testing is done. Further testing may not be appropriate in herds where more than 2% of the herd is positive for antibody.

Where animals test positive for antibody in a milk sample, or positive close to the cut-off threshold with a blood sample, then at the laboratory's discretion

retesting after one month may be carried out using blood antibody ELISA test. If it is negative on that occasion then it should be considered not to be a test positive animal.

Where a herd has vaccinated against Johne's disease, it is likely that a significant proportion of the herd will test positive using the antibody ELISA and testing option 1.4 may be more appropriate.

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 ileo-caecal junction and draining 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 test positive animal.

1.3 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 should be separated from test negative animals and be tested again at one month, and if still positive, 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 faecal testing is negative the animal is considered to be free of infection and the herd status is retained.

1.4. 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 may be pooled in the laboratory and tested in batches of up to five.

1.5. Clinical Disease: Any disease condition in an animal six months of age or older that might be attributable to Johne's disease must be investigated by the herd's 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.

1.6. 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. This is mandatory for herds with status Levels 1, 2, 3, or 4 and strongly advised for Level 5 herds. 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 ten weeks and these animals must be isolated until the results are known. In addition, they must also be re-tested every twelve months, notwithstanding any annual or biennial herd-screening programme (see section 2.4 below). Where a group of animals has been purchased from a single source and one or more of them tests positive, the remainder of the animals in the group should be viewed as level 5 animals carrying the highest risk of introducing infection to a herd.

1.7 Selling on animals that have been purchased from another herd:

When an animal is purchased from a herd with an inferior Johne's disease risk level than the herd to which it is added, the purchased animal retains the risk level of the herd of origin should it be sold on. For example it cannot be sold as risk level 1 if purchased as risk level 2, 3, 4 or 5. Animals that are purchased from a herd with a superior risk level can be sold only at the risk level that applies to the purchasers herd at the time of subsequent sale. For example an animal purchased as risk level 1 into a risk level 4 herd can only be sold at the risk level that applies to the level 4 receiving herd at the time of subsequent sale.

1.8. 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 seven days and have been prevented from having contact with other cattle, particularly their manure and soiled bedding, the accredited cattle can rejoin their herd of origin without the need for isolation or testing.

2. Johne's Disease Risk-Level Certification Programme (beef and dairy)

2.1 Annual Herd blood tests: These are carried out on all animals two years of age or older at an interval of 12 months. An annual herd test can only count as clear providing 12 months have passed since there was a herd test with any test positive animal and providing no other test positive animal has been identified in the herd in those 12 months.

2.2 Quarterly individual milk samples: This can be used in place of a herd test as described in 2.1. A clear cycle of testing is achieved when four

quarterly tests have been carried out and all bulls and other eligible non-milking cattle have been blood tested and no test positive animal has been identified in the herd over a 12 month period.

2.3. Accreditation of herd for levels 1-4: The date the herd first achieved a particular level will be included on the Certificate of Accreditation. Should a herd, having reached a particular level, fail to meet the standard and drop down a level, but subsequently regain the original level, the date on the certificate will be when the particular level was regained.

2.4. Annual or Biennial Herd Tests:

- Annual - All animals two years or older must be tested every 12 months.
- Biennial – once a herd achieves Risk Level 1 status and has subsequently had two further clear annual herd tests, there is the option to follow the non-homebred and cull screen programme (see 2.5 below), in which testing of homebred animals may be carried out biennially rather than annually. This option is only available to herds that have at least 20 homebred breeding animals of two years of age and over.

2.5. Non-Home Bred and Cull Screen: This test must be performed when the biennial herd test has been selected. This option is not available to herds with less than 20 homebred animals two years or older. At 12 months from the last complete herd test, all animals two years or older that are not home-bred 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 by culture or PCR.

2.6. Definition of a clear test: For a herd test to be clear, irrespective of whether an annual or biennial programme is being followed, any animal with positive antibody results must have further testing carried out as in section 1.2 with negative results. If further testing is not carried out, animals with positive antibody results are considered to be test positive animals by default and the herd will drop down a level or levels depending on the number of test positive animals. Further testing may not be appropriate in herds where more than 2% of eligible animals test positive by blood or milk antibody ELISA.

3. Mandatory Control Elements of the Johne's Disease Risk-Level Certification Programme 3.1-3.6

3.1. Antibody positive animals: All seropositive animals must be placed in isolation (see 1.2) with any follow up testing being carried out as soon as is practical.

3.2. Cull all test positive animals: Notwithstanding the requirements for separation of test positive animals in 3.1, all animals confirmed as test positive animals must be removed from the breeding herd as soon as is

practical. Where cows are in late pregnancy or rearing calves they may be retained until the calf can be weaned, but must be separated from other breeding animals or animals intended for breeding. If the test positive animal is kept at pasture no breeding animal or animal intended for breeding can graze that pasture for 12 months following the removal of the test positive animal. The faeces from test positive cattle must be kept away from other cattle.

3.3. Offspring of female test positive animals: Any calf that has been reared by a cow since the time the cow was recognised as a test positive animal must not be retained for breeding or sold as a breeding animal. See also 4.7.

3.4. Health Plan: A health plan covering the control of Johne's disease must be in place. It must be updated annually and it must be signed off by both the herd's Veterinary Surgeon and by the herd owner or manager. The health plan must be available to the health scheme provider on request. The health plan must cover the four mandatory control elements (3.1 to 3.4) and the seven advisory measures listed in the guidelines (4.1 to 4.7) The herd's Veterinary Surgeon must detail in writing within the health plan why any particular guideline has not been followed.

3.5 Failure to adhere to mandatory requirements: Should a herd fail to adhere to any of the points 3.1 to 3.4 then it will immediately lose status and be categorised as level 5. Furthermore failure to provide a current and signed off health plan within one week of it being requested by the health scheme provider will result in the immediate loss of status and the herd will be categorised as level 5.

3.6 Re-accreditation: Herds that have lost status as detailed in 3.5 can only regain their previous status following all mandatory requirements being satisfied and after the next herd test.

4.0 Guidelines for the Johne's Disease Risk-Level Certification programme health plan (4.1- 4.7)

4.1 Hygiene programme: Detailed herd specific instructions should be in place to reduce the amount of faecal contamination that stock are exposed to. The main focus for this is to keep cows in the immediate pre-calving period as clean as possible and to ensure that faecal contamination of any calving area, post calving housing and for young calves sucking their dams is minimised. It should include guidelines on slurry and manure management.

4.2 Feed and water delivery systems: Procedures should be in place to keep all feed and water delivery systems as free of faecal contamination as possible.

4.3 Water provision at grass: Where ever possible mains water should be provided. Herds in extensive grazing are exempt from this requirement, but note that enclosed grazings (in-by) are not exempt. The definition of extensive

grazing is unenclosed grazings that are categorised as rough grazing (RGR) within an EU Integrated and Administration Control System (IACS) and are at least 50 hectares.

4.4 Natural water sources: Ponds and other areas that allow cattle to defecate into them and then drink from them should be fenced off. Extensive grazing is exempt from this requirement.

4.5 Co-grazing with other ruminant species: Other ruminants can be a source of infection for cattle and should not co-graze with cattle. This applies to all but extensive hill grazings.

4.6 Rabbits: Rabbit populations can become infected with Map and should be considered as a potential source of environmental Map contamination.

4.7 Offspring of female test positive animals: The mandatory requirement of 3.3 that, any calf that has been reared by a cow since the time the cow was recognised as a test positive animal must not be retained for breeding or sold as a breeding animal, should be extended to include her previous calf.

5. Dairy Johne's Disease Risk-Level Reduction Programme (dairy) –Test systems

5.1 Initial herd test: All animals two years or older must be either blood tested annually or milk sampled quarterly. Any animals two years and older that have not had a milk sample tested as part of the herd screen, must be blood sampled, including any cows not being milked and bulls. If all samples in the initial herd blood test or first year of quarterly milk samples are negative, then this can be the first clear test for the Johne's Disease Risk-Level Certification Programme, providing the rules of the scheme are adhered to and the mandatory requirements (3.1 to 3.4) are satisfied.

Where herds are using this programme they may progress to the Certification programme once a complete clear herd test has been attained and the mandatory elements of the Certification programme are being followed. 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 may then enter the assessment programme at level 2, providing the other requirements detailed (3.1 to 3.4) have been met. These subsequent clear herd tests may be based on either continued complete 12 month cycles of quarterly milk testing or annual whole herd tests as defined in 2.4 and 2.5.

5.2. Managing test positive animals and their offspring:

It is advised that the last two calves of any test positive animal should not be retained for breeding and any test positive animal should be removed from the herd as soon as is practical.

In the case of quarterly individual cow milk 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.

5.2.1 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.

5.2.2 Definition of Medium risk Cow: A cow is identified as medium risk if she has tested positive on one occasion in a quarterly milk sample during 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.

5.2.3 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.

5.3. Routine herd test: Routine annual testing (testing all eligible animals over two years old) and/or quarterly individual cow milk testing (testing all eligible animals in milk over two years old at each test) continues and management procedures to reduce the exposure of cattle to infection are implemented.

5.4. Suspected cross-reactions following intradermal tuberculin testing in milk antibody testing schemes:

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 positive as a result of the skin test will eventually return to the low risk category.

6 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. There is no licensed Johne's disease vaccine available in the UK, but the use of an imported vaccine may be authorised and the herd's Veterinary Surgeon can advise on this. Antibody tests cannot distinguish between vaccinated non-infected cattle and infected cattle, therefore discussion should be had with your health scheme provider before enrolling a vaccinated herd on a disease reduction programme. Vaccination will not prevent infection but may delay the onset and reduce the severity of clinical disease signs. Management procedures to reduce the exposure of cattle to infection should be implemented. Vaccination continues until no clinical Johne's disease occurs for a period of at least two years. At this point, vaccination can cease and progression towards Johne's disease risk level assessed status can begin.

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 their integrity.

1. 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.

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 for this programme.

2. 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 from a vaccinated herd that is 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.

3. Eradication Programme

Objective: To implement a control programme 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. Tissue samples, typically ear notch samples, may also be used for detection of BVDV by ELISA or molecular tests. Bulk tank screens for antibody to BVDV and for the presence of BVD virus are tests that may be used within the programmes. Advice on sampling can be obtained from your cattle health scheme provider.

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 BVD virus and for antibodies to BVDV on the farm of origin. 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. If animals have not been screened as in 1.3, an early test is strongly recommended to identify infected cattle as soon as possible. Notwithstanding this, added 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. Animals less than 9 months of age must be tested for virus by an appropriate test regardless of the antibody result. An animal can only enter the herd if it is deemed to be neither transiently or persistently infected (PI) with BVDV (section 3.4). In a group of animals with mixed antibody results, animals must be held in isolation for a further 28 days and the seronegative animals re-tested. If no seroconversion is found, the animals may enter the herd. If seroconversion has occurred, the same process must 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 chance of shedding virus in their semen and should not be used for a minimum period of ten 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 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 group which will be screened by a Check Test (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

There are a range of testing options that may be 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 failure 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 five 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 five samples must be collected from each group.
- In groups of cattle where animals have been added to the group at intervals it is necessary to sample the five oldest in the group, which have not been vaccinated and the five 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 group is included in the Check Test and at least five animals are sampled in each subgroup and all are antibody negative the Check Test is considered to be a pass and no further testing is required.
- Where fewer than seven animals in total 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 group included in the Check Test and all animals are antibody negative then one animal from each group 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.

Animals that have been vaccinated with a BVD vaccine or a multivalent vaccine containing BVD may test positive for antibody to BVDV and should be excluded from the Check Test where possible.

Where multivalent pneumonia vaccines are used consideration should be given where possible to refining the vaccine programme to avoid the use of vaccines that have a BVD component.

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 groups may be sold off the farm before 9 months of age, the age range for the Check Test should be 6 to 9 months and the sample size should be 10 per group of animals or the whole group if less than ten animals are available within this age range 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.*

2.4 Calf virus test: The calf virus test is an alternative to the Check Test and can be used where the majority of the calves are sold before they reach nine months of age (and are not available for the check test, see 2.3 above). All calves born are tested for virus using blood or tissue samples (see 1.2). The testing laboratory should be consulted prior to testing to ensure that the correct samples are tested for the age of calf and virus test to be used.

A positive result for any animal in the calf virus test is a Fail. If every animal is virus-negative the result is a Pass. Calves that test negative for BVD virus within a “failed” herd test can be sold as individually tested BVD virus free.

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 and to detection of animals that are carrying BVD virus. The 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. 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 individual animals contributing to 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 either be removed immediately or be placed in quarantine and re-sampled three weeks after the first sample to differentiate persistent infection (PI) and transient 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 whether 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 for BVD antibody. If this is negative, repeat quarterly over the next year 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 or calf virus test) to investigate further.

5.2. Accreditation Step 2:

Option 1. 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.

Option 2. A calf virus test should be carried out as described (see 2.4 above). If the test is positive (virus detected in one or more calves) the herd should enter the eradication programme. If negative, the calf virus test should be used on the following year's calf crop. After one or more rounds of calf virus testing, herds may revert to check testing.

5.3. Achieving Accreditation: without herd vaccination against BVDV: A dairy herd is accredited free of BVDV if Step 1 is completed followed by either negative check tests on successive groups of heifers over a 12 month period or negative calf virus tests in two successive years, and either the bulk milk test or first lactation test remain negative on quarterly sampling.

5.4 Achieving Accreditation with vaccination against BVDV: A vaccinated dairy herd is accredited free of BVDV when there are negative check tests on successive groups of heifers over a 12 month period or negative calf virus tests on two successive years. (There are several BVDV vaccines available that will impact on the bulk milk test differently. In general where BVDV vaccine has been used in the herd bulk milk testing options may not be appropriate for accreditation. Your health scheme provider can advise on this in relation to the vaccine and antibody test used and whether bulk tank milk antibody may be used in the accreditation process.)

5.5. Maintaining Accreditation: Following accreditation a Check Test (see 2.3) is also carried out on successive groups of heifers or calf virus test (see 2.4) is carried out on all calves born into the herd each year. Bulk tank monitoring may be used in unvaccinated herds or as explained in 5.4. 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 or calf virus test (see 2.3 or 2.4) 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 or calf virus test (see 2.3 or 2.4) 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 or calf virus 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 or calf virus test (see 2.3 or 2.4) 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 or calf virus test (see 2.3 or 2.4). Where evidence of exposure to or infection with 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 or infection with BVDV in the young stock is found, this constitutes the first clear test.

8.2 VMF Step 2: A Check Test or calf virus test (see 2.3 or 2.4) 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 deemed 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: After gaining BVD VMF status, a Check Test or calf virus test (see 2.3 or 2.4) 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.

Neospora Programmes

There are three Neospora programmes – **Accredited free, Eradication Programme and Disease control programme**

1. Accredited Free programme

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

2. Eradication programme

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

3. Disease control programme

Objective: To achieve cost-effective control of *Neospora* infection by identifying test positive animals and removing a proportion of these from the herd in order to reduce the impact of the disease. Known test-positive animals will not be used to provide a source of female breeding replacements in the herd. These offspring should not be sold as breeding animals, but may be finished. Test-positive animals may be retained and can be used to breed bulls, if there is justification such as high genetic merit.

1. Essential points on testing methods for all programmes

1.1 Samples: All blood samples taken during the course of this protocol should be collected in plain (red top) vacutainer tubes without anticoagulant (clotted). Individual milk samples may provide an alternative sample. Advice on this can be obtained from your cattle health scheme provider.

1.2 Test positive animal: Any animal that is positive to the antibody test is a test positive animal. This will result in loss of status if found in an accredited herd.

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 *Neospora* on the farm of origin. Where possible the dams of prospective purchased heifers should also be blood sampled. If any are positive, the animals cannot enter the herd and there will be considerable savings in time and expense. Added animals that are not within the sampling window (see 2.1) should be resampled when they are. Under no circumstances should any offspring from sero-positive added animals be retained to introduce into the breeding herd.

2. Accredited free programme

2.1 Qualifying tests: Each breeding female is serologically tested for *Neospora* antibodies between 12 and 4 weeks before calving. Each individual

animal is considered *Neospora* infection free once she has two negative ELISA results at successive pregnancies.

2.2 Accreditation: The herd is accredited after all the breeding females in the herd have had two clear qualifying tests and no test positive animals have been detected during any abortion/further investigation (see section 2.5).

2.3 Maintaining Accreditation - Dairy and Beef Herd: Following accreditation, any animal that aborts, is barren, gives birth to a stillborn calf or where there is unexplained calf mortality within 24 hours of birth must have a full investigation according to section 2.4

2.4 Abortion/further investigation: The minimum requirement is testing of the aborted cow's blood for antibodies to *N. caninum* by ELISA at the time of abortion. As well as being a statutory requirement to report abortions, it is good practice to fully investigate abortion events by submission of the aborted foetus to your regional APHA/SAC/AFBI laboratory and this is strongly recommended.

If neosporosis is confirmed to have been involved in the abortion by any of the above testing, the herd will lose its accredited status while a herd investigation is carried out. This involves immediate blood sampling for *Neospora* ELISA of all adult animals in the same cohort as the aborted cow. The cohort is defined as all animals which are due to calve or have calved from 1 month before to 1 month after the abortion date of the aborted cow. If the cohort is outwith the period 12-4 weeks prior to expected calving date, the cohort bleed should be repeated at the appropriate time. If the cohort bleed(s) is/are negative, the herd accredited status is retained.

3. Eradication Programme

3.1 Initial Herd Test: All female animals intended for breeding should be tested as described in section 2.1 as they enter the testing period of 12-4 weeks before calving. If all the samples in the initial herd test are negative, then this is the first qualifying test for accreditation.

3.2 Removal of test positive animals: If the number of test positive animals is low, they should be culled at the end of their productive period (ie the end of the current lactation). Once they are removed this is the first qualifying test of the accreditation programme.

3.3 Options if large numbers of test positive animals are found: Significant numbers of test positive animals are likely to be difficult to manage on a herd basis. Options available include following the disease reduction programme to reduce the proportion of test positive animals to manageable levels.

4. Disease Reduction Programme

4.1 Initial Herd Test: The objective is to determine the neosporosis status of the herd. This is done by carrying out a **snapshot bleed**.

The snapshot bleed involves testing a specified proportion of the female breeding herd (using *Neospora* ELISA) 12 to 4 weeks before their expected calving date.

When determining the size of the breeding herd, all the cattle on the farm that are over 2 years of age and are or will be part of the breeding herd should be counted (see appendix below). If both milking and suckler cows are present on the same farm they should be considered as one group.

It is recommended that the snapshot bleed is carried out at a time when as many cattle as possible are between 12 and 4 weeks before calving. It is preferable that these are tested at one visit.

The snapshot bleed will provide an early indication of whether neosporosis is on the farm. However, it is not possible to conclusively prove the absence of infection by a snapshot bleed. Where tested cattle give negative ELISA results, these will count as one of the two negative qualifying tests results needed to classify them as neosporosis-free.

For any herd to complete a valid snapshot bleed, there must be enough cattle within the period 12 to 4 weeks before calving to make up a valid sample size as calculated from the appendix. The Veterinary Surgeon and farmer should decide if a valid snapshot bleed can be performed and, if this is the not case, the initial herd test is done by means of a **progressive bleed**- ie animals are tested as they enter the period 12-4 weeks prior to a calving date (see section 2.1).

4.2 Removal of test-positive animals: Under this scheme, a proportion of test positive animals will be removed at the end of their productive period (usually the end of lactation). However, a proportion of test positive animals will be retained to maintain production levels. This proportion, typically around 10%, and the animals involved will be decided by the farmer and their Veterinary Surgeon. However, **known test positive animals must not be used to provide replacements for the breeding herd.**

Any test negative result obtained in the initial herd test (4.1) would count as the first qualifying test for that individual animal should the herd proceed towards disease eradication.

4.3 Abortion investigation: This should be carried out according to section 2.4.

4. Appendix: Sample Size for Neosporosis Snapshot Bleed

GROUP SIZE	SAMPLE SIZE	GROUP SIZE	SAMPLE SIZE	GROUP SIZE	SAMPLE SIZE
<23	all	36-40	35	61-80	47
23-25	22	41-50	36	81-100	51
26-30	26	51-55	39	101-150	53
31-35	31	56-60	43	>151	61

The Diseases

Infectious Bovine Rhinotracheitis (IBR)

IBR is caused by bovine herpesvirus 1 (BoHV-1). This virus causes an acute upper respiratory tract disease which can lead to fatal pneumonia. Infection can also cause severe and prolonged drop in milk yield, reduced fertility and abortion, however, on occasions, the disease can be so mild that newly infected animals are not seen to be affected. The virus is mainly shed in secretions from the nose, but can also be spread in the semen of infected bulls. An important characteristic of the disease is that once an animal has become infected, it remains infected for life. This is termed latent infection with the virus surviving in neural tissue. Reactivation and shedding of the virus can occur at periods of stress. The experience of transport and introduction to a new herd is a common trigger for reactivation of the virus, leading to new infections in the herd. Vaccination is an effective means of preventing the disease but does not stop infection nor does it stop infected animals from shedding the virus at a later date.

Infected animals can be detected by testing either milk or blood for antibody to BoHV1. The available tests cannot differentiate between antibodies stimulated by the naturally occurring virus and those stimulated by conventional BoHV-1 vaccines. However, in 2001, BoHV-1 marker vaccines were introduced into this country. Central to the marker vaccine system is an antibody test that can distinguish marker vaccinated animals that have not been infected from marker vaccinated animals that have been infected. Marker vaccines can now be used in an infected herd where the long-term objective is to achieve freedom from infection with minimum culling. However, it must be recognised that the marker vaccine test is less able to detect infection than the standard test. The consequence of this limitation is that marker vaccinated bulls are not accepted onto AI studs and may not be accepted for import to some countries.

IBR is endemic in the UK and in many parts of the world, but some countries are free of infection and there are moves in other EU countries to eradicate the disease. 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.

Leptospirosis

Leptospirosis is an important cause of illness in humans throughout the world with infection being contracted from the urine of infected wildlife or livestock. Most mammals have their own *Leptospira* organism or organisms that are adapted specifically to them, some of which cause very little disease in their natural host. In cattle leptospirosis is caused by two organisms collectively

referred to as *Leptospira* Hardjo (*Leptospira borgpetersenii* type *hardjobovis* and *Leptospira interrogans* type *hardjoprajtno*). When new infections occur in cattle the outcome can range from no adverse effect through milk drop to infertility and abortion and the birth of weak calves.

After infection *L. Hardjo* localises in the kidneys and urinary tract as well as in the reproductive tract of both males and females, but for transmission of infection localisation in the urinary tract is of great importance. The urine of infected animals is the most important medium for the spread of infection.

Some animals shed the organism continuously for a short time in their urine 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. Disease is usually introduced to a herd by the purchase of infected cattle. Antibiotic treatment has been used to reduce the number of organisms an animal is shedding, but it will not necessarily clear the infection. The herd will not achieve accredited status until all antibody positive animals have left the herd.

L. Hardjo has been recovered from the urine of sheep and sheep are therefore a potential source of infection. It is recommended that contact between cattle and sheep is kept to a minimum. As leptospira organisms 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.

The biggest risk to humans is where there is exposure to urine from infected cows. Clearly people milking cows are at highest risk in this respect. In humans infection with the cattle leptospires results in 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.

Once cattle have been infected they produce antibody to the leptospires within two to four weeks. This antibody can be detected in the blood and milk with the *L. Hardjo* antibody test. Where infection has been demonstrated in a herd vaccination may offer the best means of control. However once animals have been vaccinated they are likely to test positive for life. Therefore when antibody positive animals are detected in a herd test it is important to consider the results carefully to assess if the infection is active or is the result of previous vaccination. In those situations where infection is considered to be unlikely the situation can be monitored by annually testing the animals that tested negative to confirm no new infection has occurred. Where no new infection is detected and the number of positive animals is less than 5% of the herd the status of *L. Hardjo* Monitored Free can be gained.

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. It is caused by the organism *Mycobacterium avium* subspecies *paratuberculosis* (Map). The infectious agent is shed 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 sometime after 18 months of age. In heavily infected herds this leads to a high rate of wastage in cattle mostly in the three to five years age range. 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. This can be achieved by having a herd Johne's disease control programme. Tests carried out on blood or milk samples to detect antibodies and on faeces samples to detect Map are valuable procedures for the diagnosis of Johne's disease. However, they can only be reliably used to detect infected animals in the later stages of infection in the short period before clinical disease becomes apparent. 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. Nevertheless the tests are a good indicator of herd infection. If a herd repeatedly tests negative for the disease at annual intervals, the herd can be categorised as low risk with regards to Johne's disease.

As the diagnosis of the disease is difficult and because the organism survives well in the environment, control and eradication of Johne's disease is more difficult than for the other diseases in the CHeCS portfolio. 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 test positive dam from the breeding herd, as these are at particularly high risk of developing the disease, and by a hygiene programme designed particularly to reduce calf exposure to faeces from adults and more generally to reduce the amount of faecal contamination for all ages of breeding stock. 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 herds removal of the disease from the herd may take considerably longer.

Map infection is not limited to cattle, and sheep flocks can be infected and be a source of infection for cattle. Rabbit populations on farms where there are

infected cattle herds have also been shown to be infected with Map. These potential sources of infection must be considered in any control programme.

In heavily infected herds, particularly where there are barriers to introducing the control programme, vaccination may be used to reduce the number of clinical cases of Johne's disease and possibly to reduce the amount of infection in the environment. However, vaccination will not remove the infection from a herd and the use of 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 can lead to persistent infection and 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 contributes to disease complexes in calves such as pneumonia and neonatal diarrhoea.

Many European countries have eradicated BVD virus (BVDV) or are well advanced in their national control programmes. Ireland, Northern Ireland and Scotland fall into this second category and England and Wales are considering national initiatives. The CHeCS programmes have been based on the Scandinavian approach to control and are now incorporating elements of the Swiss and German programmes. That such effort has been made underlines the benefits of BVDV eradication at the herd level through improving fertility and in particular improving the health and welfare of younger cattle.

Infection with BVDV immediately before or during the breeding season will reduce conception rates in 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 120 days 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.

In general PI calves do not produce antibody against BVDV. They often appear normal but they shed virus continuously throughout their lives. The majority of PI animals develop a fatal enteritis known as mucosal disease before they reach maturity. When mucosal disease is acute affected animals are extremely unwell; they have severe diarrhoea, 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 they 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 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 biosecurity 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. As with the other diseases antibody detection tests are used on milk and blood but, unlike the situation with IBR and L. Hardjo, these antibody positive animals only serve as an indicator that there has been exposure to a PI animal and that there may be a PI animal in the herd. If groups of calves older than nine months are screened for antibody and found to be negative this shows that there is no PI present in those groups of calves. This is the Check test and it is central to the BVD accreditation system. Similarly, if the bulk tank milk is negative for antibody there is no PI animal in the adult herd and unlikely to be a PI in the younger animals.

For those herds where infection has been shown to be present the main tests for BVDV are to show the presence of the virus. This can be done using virus antigen ELISA to detect a particular part of the virus in blood or tissue or by using a test for the genetic material of the virus (reverse transcriptase-polymerase chain reaction (RT-PCR) test in blood, tissue or bulk milk.

Herd vaccination can be used in both the eradication of BVDV and the prevention of BVDV outbreaks. Vaccination 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.

Neospora

Neosporosis is the disease in cattle caused by *Neospora caninum*, a protozoal parasite with worldwide distribution. The organism is related to

toxoplasmosis in sheep and similarly has a two animal life cycle. With *N. caninum* the intestinal phase of the infection occurs in dogs, but the majority of infections in cattle are passed directly from the mother to the developing calf before it is born and relatively few are the result of infection arising from pasture or feed contamination with dog faeces (see below).

Neosporosis is the most frequently diagnosed cause of abortion in cattle in the UK. It occurs in beef and dairy cows but at a lower rate in beef cows. The cost of abortion, which involves not just the loss of the calf but also reduced milk production and additional breeding costs, is well documented. Therefore, the cost of neosporosis to the UK cattle industry is significant.

The organism causes infection of cattle by one of two routes:

- endogenous ('vertical') infection in which the organism passes from an infected dam to its calf as it develops in the uterus
- exogenous ('horizontal') infection in which the cow ingests oocysts from dog faeces contaminating the environment, e.g. feed or pasture grass.

It is not currently possible to distinguish between the two routes of infection using available diagnostic tests. Cattle are most commonly infected via the endogenous route.

Both these routes give rise to infection of the foetus. Infection may, in turn, lead to abortion, usually between 3 and 8 months gestation (median 6 months). However, not all cases of intra-uterine infection lead to abortion; some infected calves survive and appear clinically normal but will remain infected.

Infection can enter a naïve herd either via infectious dog faeces contaminating feed or pastures or by the purchase of infected animals. It is perpetuated by vertical transmission. Dogs may be infected by the ingestion of dead calves or placentae. Therefore, control of the disease is by a combination of biosecurity measures and the identification of infected animals and not keeping replacement animals bred from these animals.

An ELISA, which detects antibodies to *N. caninum*, is used for screening in the Neosporosis programme. Sero-positive animals are approximately six to seven times more likely to abort compared to sero-negative animals. The amount of antibody to *N. caninum* fluctuates throughout the life of an infected animal and those in the late stage of pregnancy or that have recently aborted or calved are more likely to test positive for antibody. It is important for the success of the neosporosis programme that all incidents of abortion are appropriately investigated. Confirmation that an animal is not infected requires sampling at a specific time:

- during an animal's pregnancy (12 to 4 weeks before the due calving date), **or**
- at the time of abortion, provided this occurs within the period of 12 to 4 weeks before the due calving date.

Certificate of Accredited Status

Issued by CHeCS Licensee

This certifies that the herd owned by:

And kept at:

Herd No.

Holding No.

is registered as

Accredited Free of

Bovine Virus Diarrhoea since

Infectious Bovine Rhinotracheitis since

Leptospirosis since

Neosporosis since

And/or has achieved

Level 1 Johne's Disease Status since

in the

Cattle Health Scheme

on the basis of laboratory tests

carried out in accordance with the Technical Document of
Cattle Health Certification Standards (UK)

This Certificate valid until:

Signed:

Authorised Officer of Cattle Health Scheme

Name:

Date:



Owner's Declaration of Health Status

Issued as a requirement by the CHeCS Licensee

Owner:

Premises:

Herd No.

Holding No.

I hereby declare that the animals listed below are from the above herd which is

Accredited Free of

Bovine Virus Diarrhoea since

Infectious Bovine Rhinotracheitis since

Leptospirosis since

Neosporosis since

And/or has achieved

Level 1 Johne's Disease Status since

in the

Health Scheme

and have been managed in accordance with Health Scheme Rules Specified in the Technical Document of Cattle Health Certification Standards (UK)

Please list animal ear marks

This Certificate valid until:

Signed:



INDIVIDUAL HEALTH DECLARATIONS (PEN CARDS)

Explanatory Notes

All cattle with individual health declarations should have an A3 copy, signed by the testing laboratory, for display in the sale pen, and an A4 copy containing more detailed information to be passed on to the purchaser. It is important to note that individual animals that are not from CHeCS accredited herds can be sold with a pen card, however column 2 containing the Herd Accreditation boxes will be blank.



1. The **diseases** are listed in column (1). The TB testing interval is given beside the TB title if known.
2. **Herd** accreditation is shown in column (2). Herds that are accredited for BVD, IBR or leptospirosis have a white coloured box in this column containing the number of years the herd has been accredited. The herd's Johne's Disease risk level is shown, along with the number of years the herd has been at this level. Only Johne's Disease risk level 1 herds are given a white box. When provided, the date of the last clear herd TB test is displayed. Further details of testing are given on the accompanying A4 sheet.
3. Results for **individual** testing, if done, are shown in column (3) and are colour-coded as follows:

Antibody negative
IBR or Leptospira hardjo antibody positive
BVD antibody positive

Antibody testing must be carried out within three months of the date of sale. If not from a BVD accredited herd, BVD antibody and virus testing is required. **Bulls with positive BVD antibody titres** (green box) and no known history should not be used for 10 weeks after testing as they can carry the virus after infection. **Pregnant females that test positive for antibodies to BVD** will not be given pen cards unless the animal was known to be antibody positive or fully vaccinated prior to service.




4. **Vaccination** details are given in column (4). Where marker vaccination has been given for IBR, this is indicated. Further details on vaccination are given on the accompanying A4 sheet.

Example of A3 Individual Health Declaration

Name: BEST BEEF OUT		Ear Number: UK12345 700910	
DISEASE	HERD ACCREDITED (YEARS)	INDIVIDUAL TEST RESULT	VACCINATED
BVD	3		12-Jan-13
IBR		12-Jan-13	12-Jan-13 (MARKER)
LEPTO		12-Jan-13	12-Jan-13
TB 1	Jan-13		Information Applies to Sale
JOHNE'S	RISK LEVEL 1 (3 years)		
Veterinary Provider:		Date:	 <p>This animal has tested free of BVD virus or is from a BVD accredited free herd</p>
		Lab Ref:	
			

Standard Cattle Health Certificate developed by an all industry group facilitated by NFU Scotland

Example of A4 Individual Health Declaration

Name: BEST BEEF OUT		Ear Number: UK12345 700910	
DISEASE	HERD ACCREDITED	INDIVIDUAL TEST RESULT	VACCINATED
BVD	01-Jan-12		BVD vaccine 1st dose: 12-Dec-12 2nd dose: 12-Jan-13
IBR		Antibody Negative 12-Jan-13	IBR marker vaccine 1st dose: 12-Jan-13 (MARKER)
LEPTO		Antibody Negative 12-Jan-13	
TB 1	Jan-13		Information Applies to Sale
JOHNE'S	Risk Level 1 since 01-Jan-12		 <p>This animal is tested free of BVD virus or is from a BVD accredited free herd.</p>
Signed by Veterinary Provider:		Date: 14-Feb-13	
		Biobest Ref: XXXXXXX	 

Standard Cattle Health Certificate developed by an all industry group facilitated by NFU Scotland