



BVD VIRUS TESTING OPTIONS FOR DAIRY AND SUCKLER HERDS

The objective of this document is to explain the key steps in the Northern Ireland (NI) BVD eradication programme and how the testing programme will lead to the eventual eradication of BVD. It is also designed to help veterinary practitioners to provide farmers with the best advice on how to use their test results in the context of BVD control. In particular it contains advice on: what to do if you detect a BVD virus-positive animal; the options for defining the status of other animals in the herd; and how to investigate breakdowns or transient infections.

The NI BVD Eradication Programme

The NI BVD eradication programme uses tissue sample-enabled official ID tags as the main sampling method and the standard programme is designed to define a BVD status (PI or non-PI) for all calves as they are born from 2013 onwards. Test results from non-PI calves will be also used to assign an inferred non-PI status to their dams. It is envisaged after three years of the programme that breeding herds will contain few or no animals whose status remains unknown and over the period the vast majority, if not all, PI animals will have been identified. In the later stages (years 4 to 6) of the programme it is envisaged that young stock serology or pooled milk testing will become the main tools for continued surveillance.

Herd control options for BVD

The tissue testing of new born calves is only one part of controlling BVD. Each herd, whether BVD negative or positive, is encouraged to formulate a BVD control plan. This will help remove or keep BVD virus out of the herd and also help to ensure the success of the programme. Devising a BVD control programme is **herd-specific** and requires close communication between farmers and their veterinary practitioners. The essential components of a successful control programmes are:

1. BIOSECURITY

It is essential for each herd to have a biosecurity plan in place. The aims of the biosecurity plan are to keep BVD from entering the herd (bio-exclusion) and to reduce the risk of BVD spreading within the herd (bio-containment).

See for more detail <http://www.animalhealthni.com>

Bio-exclusion

By far the greatest risk to **bio-exclusion** is purchased animals. As such the best farm policy is to avoid buying in any stock. Where this is not possible, introduced animals should preferably have been tested BVD virus-negative prior to purchase (demonstrated via the mart sale board or a farmer-generated declaration of negative

results). However it is possible that cattle that tested negative for BVD virus (note disclaimer in relation to testing at the end of this document) prior to purchase may have been in contact with BVD virus around the time of the sale, and therefore be transiently infected (TI). Where this possibility cannot be excluded, purchased cattle should be isolated for 3-4 weeks after arrival to reduce the risk of spreading a transient infection to other cattle within the purchaser's herd. Furthermore, pregnant cattle that have a PI negative status may still carry a PI calf and should therefore be kept in isolation until their calves are born and tested negative. This restriction can be removed where the pregnant heifer or cow has been shown to be BVD antibody negative 3 to 4 weeks after introduction. Where pre-purchase test results are not available, introduced cattle should be isolated and tested BVD virus-negative before having direct or indirect contact with other cattle in the herd. Other risks include contact with animals from other herds (especially where farm boundaries are weak), visitors and equipment.

Bio-containment

Activities that enhance bio-containment include having suitable isolation facilities for bought-in or test-positive animals and prompt culling of identified PI animals. Vaccination may also contribute to managing this risk (see appendix). These risks should be discussed with farmers and a plan to reduce them agreed.

2. DEFINING HERD STATUS AND IDENTIFYING AND REMOVING EXISTING INFECTIONS

Two flowcharts (Figures 1 and 2) have been developed as part of this document to help guide the decision-making process in a herd control programme and the investigation of any BVD virus-positive results obtained. The appendix to this document contains explanatory information relevant to the superscripts on the steps of the flowcharts.

Herd control options for BVD (Figure 1). Broadly speaking, the main choice concerns the speed with which the farmer wants to define the status of all animals within the herd.

The flowchart illustrates the choice of either using the **Standard Programme** alone or in combination with the **Enhanced Programme**. Deciding which programme is appropriate for a particular herd will depend on factors including the herd owner's attitude, the BVD status of the herd, the proportion of the herd with an unknown status and the cost of testing. The Enhanced Programme is particularly relevant to herds where positive results have been found or to negative herds where the farmer wishes to ensure that the whole herd is virus-negative as quickly as possible. This will ensure that the herd is ultimately free of the potential detrimental effects of BVD as soon as possible and provide negative test results for sale of animals of all ages.

Figure 3 shows a comparison of the changes in herd profile test status for an example dairy herd using either Standard or Enhanced programme options.

The Standard Programme

The **Standard Programme** incorporates both of the components of a successful BVD control programme described above and each herd should have a biosecurity plan as discussed. Annual tag testing of calves provides a direct or inferred BVD virus-status for an increasing proportion of the herd each year and surveillance to detect the generation of new PIs within the herd. However, it may take three years to establish the status of the majority of the herd. Additional monitoring may be in the form of young stock antibody screening or bulk tank milk testing in future years of the eradication programme.

Enhanced Programme

The **Enhanced Programme** aims to define a status for all animals in the herd over a shorter period. This requires additional testing and two approaches are suggested:

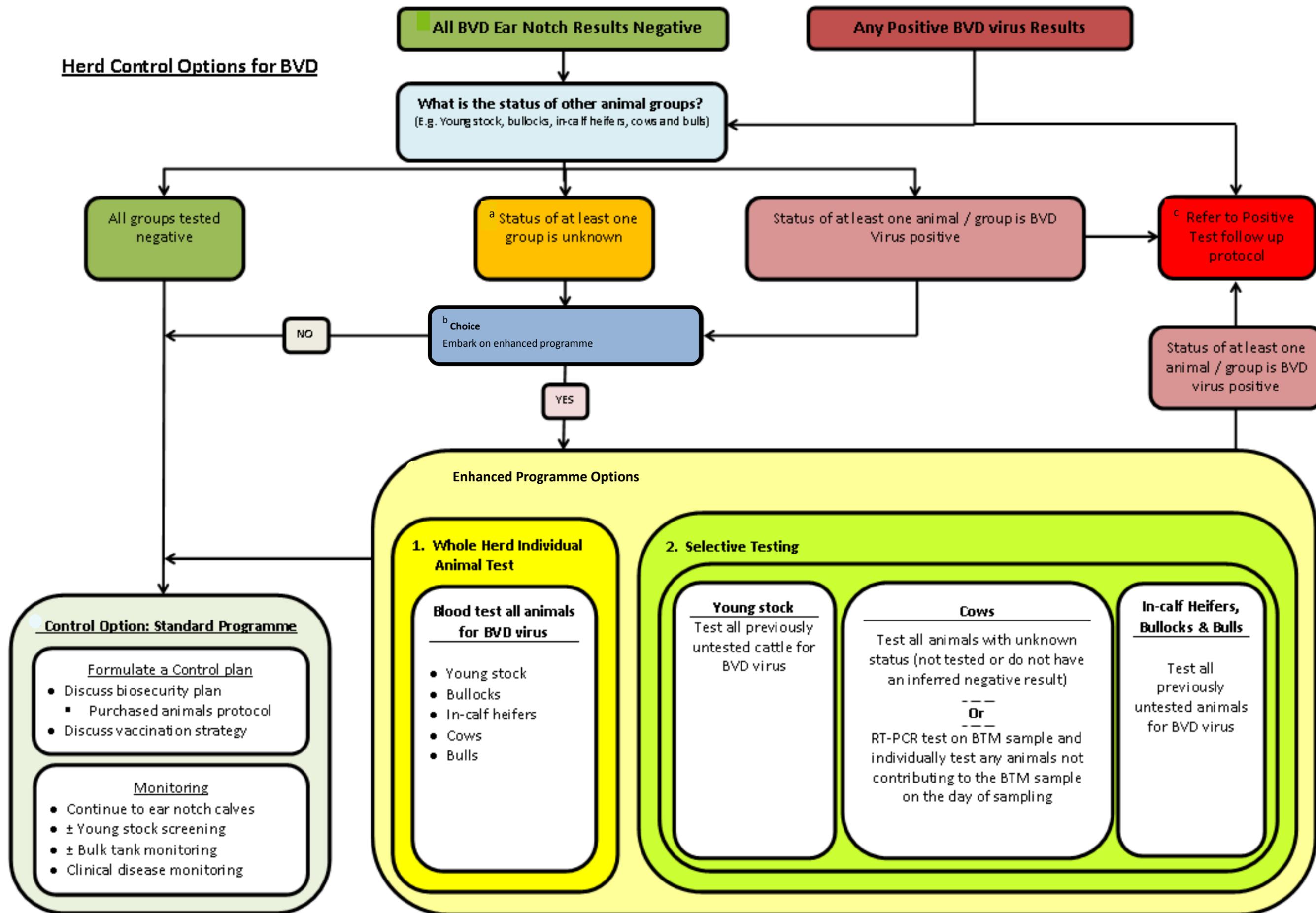
1. A whole herd test of individual animals for BVD virus.
Although it will result in additional testing costs, this offers the most comprehensive approach.
2. Alternatively, in some cases a more selective approach may be applicable, depending on herd type and previous testing. This excludes the testing of animals that have been previously tested and cows that have a negative result. In dairy herds screening a bulk tank milk (BTM) sample by RT-PCR may also be useful. A negative BTM result is consistent with none of the cows contributing to the BTM sample being BVD virus positive. This will not confer an official status to each individual animal contributing to the sample but it will allow a rapid assessment of the milking herd. Veterinary practitioners are advised to contact the testing laboratory to determine sampling requirements (including use of preservatives) and the sensitivity of the test (the maximum number of animals that may contribute to the tank while retaining confidence that a single PI animal will be detected). The bulk tank should be thoroughly agitated prior to collection of the sample. Any cows not contributing to the tank on the day of sampling (dry, sick, milk withheld etc.) must be identified and tested separately. Care should always be taken when testing pregnant stock as the status of a calf *in-utero* cannot be determined until the calf is ear notched at birth.

Herds Where BVD Virus has been detected

For herds with BVD virus-positive results, the Testing Protocol for BVD Virus-positive Animals (Figure 2) should be referred to. The flow chart should be followed through for each test-positive animal and its dam (testing, retesting and culling PI animals). As the detection of any BVD virus-positive animal (PI or TI) means that BVD virus has been in the herd, it is recommended to follow up the individual testing with the Enhanced Programme. This will screen the herd for other potential PI animals, meaning the herd can attain a BVD virus-negative status for all animals in the herd as quickly as possible. Along with further testing, investigations should also include a reassessment of the herd's biosecurity controls and previous testing records to look

for potential problem areas and clues as to the source of infection. This is especially important where new infections are detected in previously clear herds.

Herd Control Options for BVD



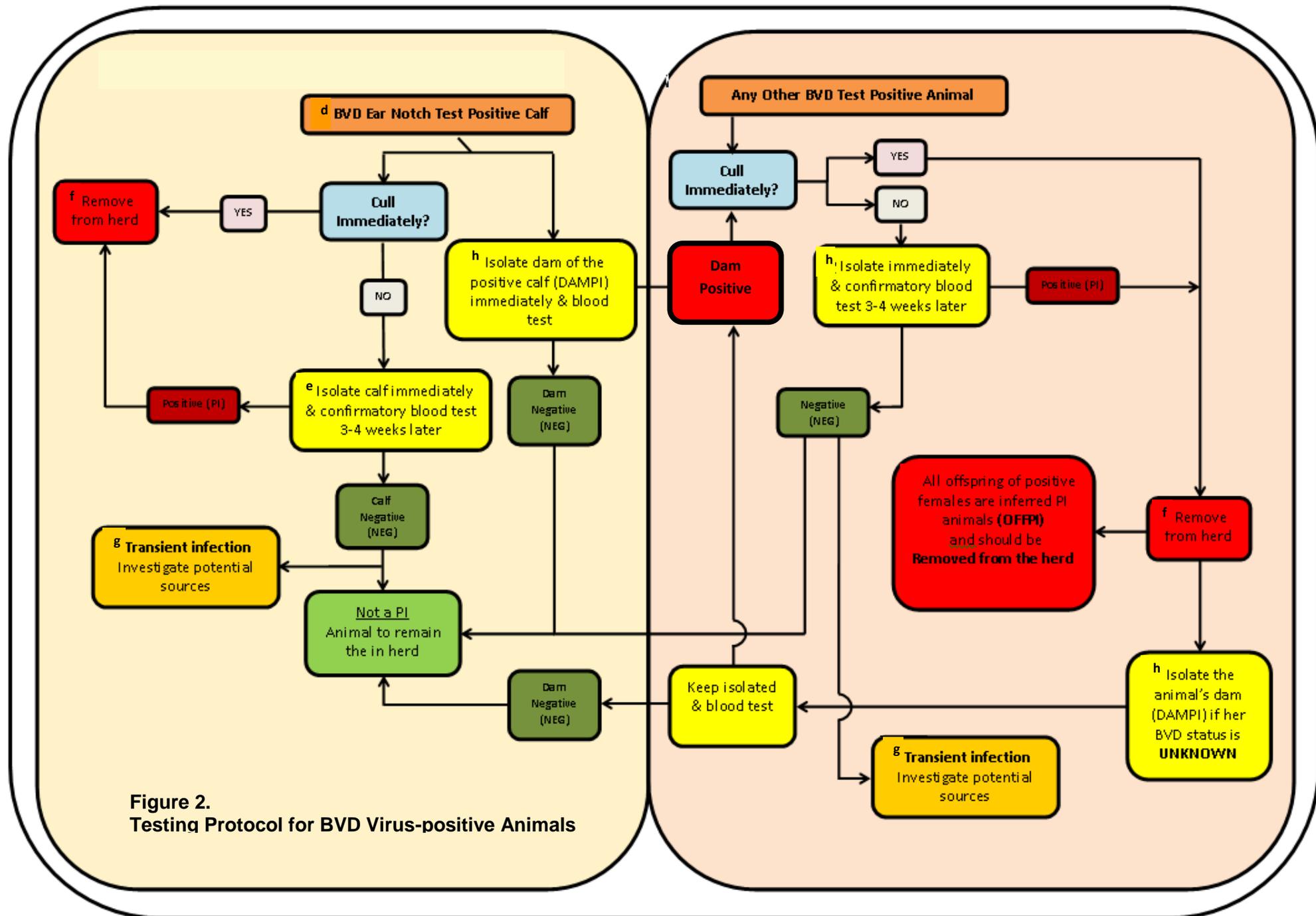


Figure 2. Testing Protocol for BVD Virus-positive Animals

APPENDIX

Explanatory Notes: Herd Control Options for BVD (Figure 1)

- a. Status of at least one group is unknown. A virus-negative calf will not have a persistently infected dam. Therefore a non-PI status for a calf also indirectly implies a non-PI status for its dam. However, particularly after the first year of tag testing, the status of groups other than calves and cows may be unknown.
- b. Choice. An enhanced programme may be followed either where BVD virus is detected in the herd, or where the decision is taken to determine the BVD status of all animals in the herd as quickly as possible.
- c. Refer to Testing Protocol for BVD Virus-positive Animals. This protocol details the next steps at animal level when a virus-positive animal is detected, either from routine ear tag sampling or an enhanced programme

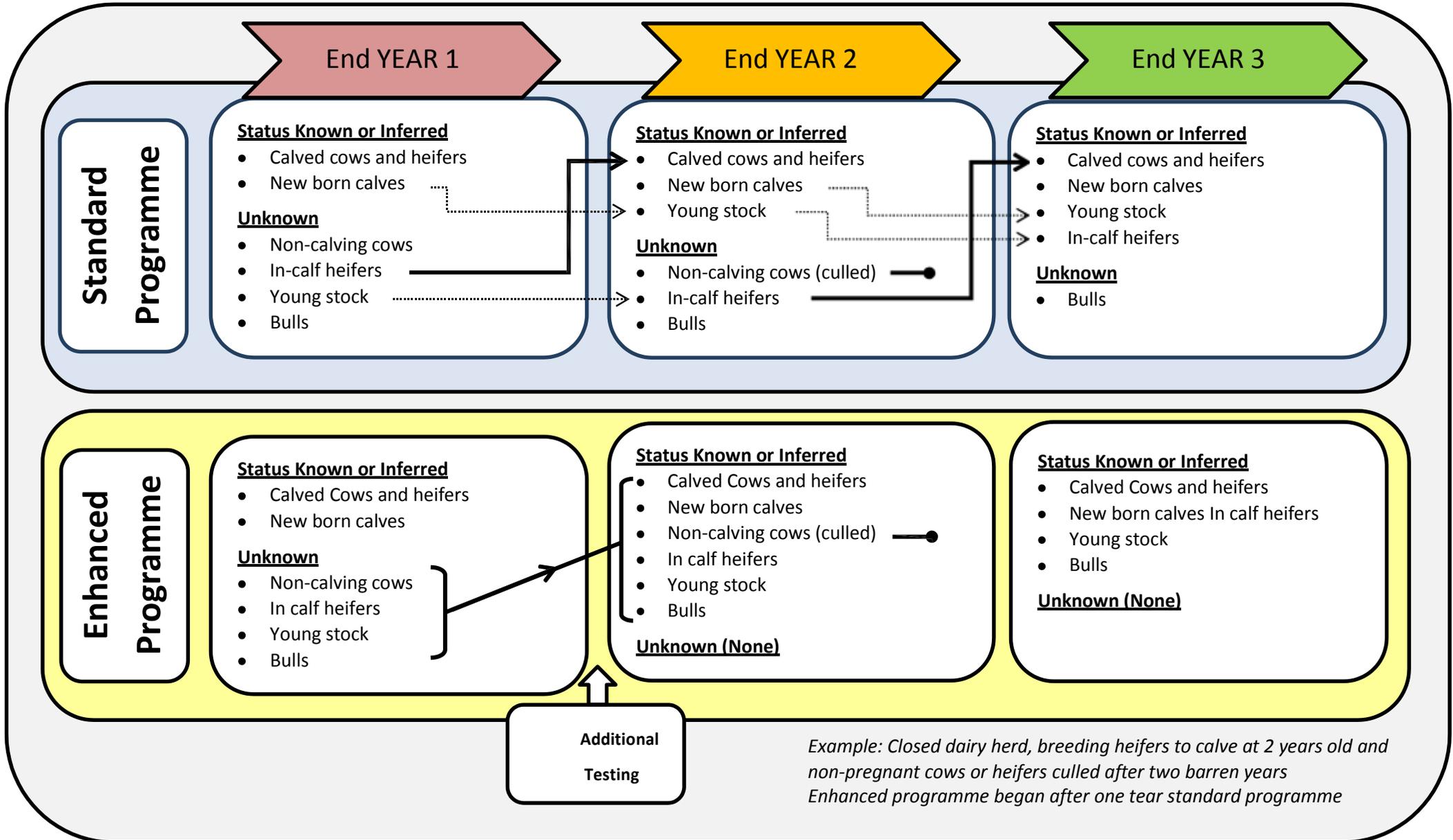
Explanatory Notes: Testing Protocol for BVD Virus-positive Animals (Figure 2)

- d. BVD Virus Ear Notch-positive Calf. The diagnostic laboratories designated by AHWNI report results to farmers via the AHWNI Cattle Health database, which in the first instance issues an SMS (text) message each time new results are received. For those results which are not negative (i.e. positive, inconclusive or empty [no tissue sample present]), the AHWNI Cattle Health database will also issue a letter to farmers notifying them of the result and advising them on the next steps, including discussing the result with their veterinary practitioner. For positive (and inconclusive) results the option of re-testing, either by blood or tissue sample, is available.
- e. Isolate (calf) immediately and confirmatory blood test 3-4 weeks later. Animals that test BVD virus-positive as a result of being transiently infected are expected to test negative for virus 3-4 weeks later. Testing at a shorter interval will increase the risk of a second BVD virus-positive result from a transiently infected animal. A longer interval would create the risk that a PI animal would be retained in the herd for a longer period than necessary.
- f. Remove from herd. PI animals are a constant source of infection for cattle in their own and neighbouring herds. In addition, the majority will die from mucosal disease or fail to thrive due to secondary infections before reaching slaughter weight. Animals awaiting confirmatory testing results should stay in isolation and be culled as soon as they are confirmed PI.
- g. Transient infection (TI). Detection of a transiently infected animal still provides evidence of BVD virus exposure. The most likely source of this is contact with a PI animal, and appropriate steps should be taken to identify and remove the source of exposure.
- h. Isolate the animal's dam (DAMPI) if her BVD status is UNKNOWN. The mothers of PI animals are assigned a DAMPI status within the programme and must be tested to exclude them as also being PI. If present in other participating herds, the owner will be notified. If testing

returns a BVD virus-positive result it is unlikely that the animal will be a TI, but the option for confirmatory testing is again available. Ultimately, if testing of a DAMPI shows her to be PI, her mother in turn should then be identified and tested if her status is unknown. This trail of investigation should be continued until the statuses of all relevant dams are confirmed.

- i. OFFPI. A PI female will always give birth to PI offspring. Therefore all offspring of any female that has tested BVD virus-positive will be given an OFFPI status. If present in other herds, the owner will be notified. OFFPI animals of confirmed PI dams will themselves be PI. Confirmatory testing is therefore typically not necessary, but may be carried out for example: where the dam of an OFFPI was not subject to a confirmatory test or where the farmer requests it.

Figure 3: Comparison of Standard and Enhanced programmes



Vaccination

BVD vaccines are primarily intended to provide foetal protection and prevent the birth of PI calves. It is recognised that vaccination alone is not a suitable means to eradicate infection. A successful BVD eradication programme will mean that in time BVD vaccination will no longer be routinely necessary. In the meantime, the decision to begin, continue or stop a vaccination programme in a given herd should be taken by the herd owner in conjunction with his own vet, based on assessment of the likelihood (e.g. by purchase, contact, visitors and shared equipment) and impact of introduction.

Submission of Samples to Testing Laboratories

Confirmatory testing, DAMPI, OFFPI

The letter issued to the farmer by the AHWNI identifies the registered dam of positive (and inconclusive) calves and also contains a submission form for the calf/dam samples. Blood samples collected from these animals must be returned to “**The NI BVD Eradication Programme, Disease Surveillance and Investigation Branch, Veterinary Sciences Division, Stoney Road, Stormont, Belfast, BT4 3SD**” for testing. AFBI will not apply a charge for these samples in 2013, with results being reported directly to the submitting vet and also to the farmer via the AHWNI Cattle Health database. *Please remember to include a signed copy of this form, including the practice name, to avoid delays in processing and reporting of blood samples.* Blank copies of this form are available at www.animalhealthni.com

Additional samples

A number of laboratories have been designated to provide testing for the NI eradication programme. Details of these laboratories, and the sample types and test methods for which they are designated, may be found www.animalhealthni.com. ELISA tests on blood samples from young calves may give false negative results due to the influence of maternally derived antibodies (MDA) for a period referred to as the “diagnostic gap”. For this reason blood samples from young calves (currently less than 45 days of age) should not be submitted to laboratories that test by ELISA. ELISA tests on tissue samples are considered much less susceptible to the influence of MDA. A diagnostic gap is not considered to exist for blood or tissue samples tested by RT-PCR.

To ensure that additional results for blood and milk samples are transferred to the AHWNI Cattle Health database, it is necessary to include a request that this is done on practice submission forms and to have the farmer countersign this. To grant the laboratory permission to transfer the results, the following wording should be used: *“I give the testing Laboratory permission to transfer my test results to the AHWNI Cattle Health database to be used and shared in the administration of the BVD eradication programme and I agree to comply with the programme guidelines.”* These results will also be reported (and invoiced) directly to the farmer’s vet.

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IMPORTANT NOTICE — DISCLAIMER

NO BIOLOGICAL TEST IS 100% ACCURATE. IF AN INACCURATE RESULT IS SUSPECTED, THE ANIMAL SHOULD BE ISOLATED AND RE-TESTED.

All designated laboratories are independently accredited for BVD testing and the test methods used (ELISA or RT-PCR) will, in the great majority of cases, accurately detect the presence or absence of virus in tissue and blood samples when submitted and tested correctly. However, results relate only to the sample as received by the laboratory and, whilst laboratories warrant that their tests will meet their applicable declared specifications, the laboratories make no other warranty, expressed or implied and accept no responsibility or liability in respect of false results which are within the limits of the declared specifications of the tests offered. No representation or warranty is given by AHWNI, AFBI, the Technical Working Group, the Implementation Group or any member, employee or other person connected with any of the foregoing bodies as to the accuracy of any BVD test methods or test results [referred to herein]. Neither AHWNI, AFBI, the Technical Working Group, the Implementation Group nor any member, employee or other person connected with any of the foregoing bodies shall have any liability or responsibility in respect of any laboratory or the accuracy of any test methods, test results or reports produced by any laboratory.

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