# Take Control

## Prevent BVDV Associated Production Losses

SWANS Veterinary Services

IDEXX

# BVDV and PI's

Australian producers are beginning to appreciate that Bovine Viral Diarrhoea Virus (BVDV) is one of the most economically significant cattle diseases present within Australia. Estimates of the cost of BVDV have varied from $20 to $90 per breeder unit on beef and dairy properties harbouring the disease due to reproductive losses or immune suppression. Approximately 90% of Australian beef production systems have evidence of recent exposure to the virus and over half are likely to be actively infected with BVDV.

BVDV can cause reproductive losses at any stage of the breeding cycle. The virus replicates in testicular and ovarian tissue, interfering with conception. Animals exposed to the virus during any stage of pregnancy can resorb their embryo, abort or give birth to a weak calf or calves born with congenital defects, especially of the brain or eyes.

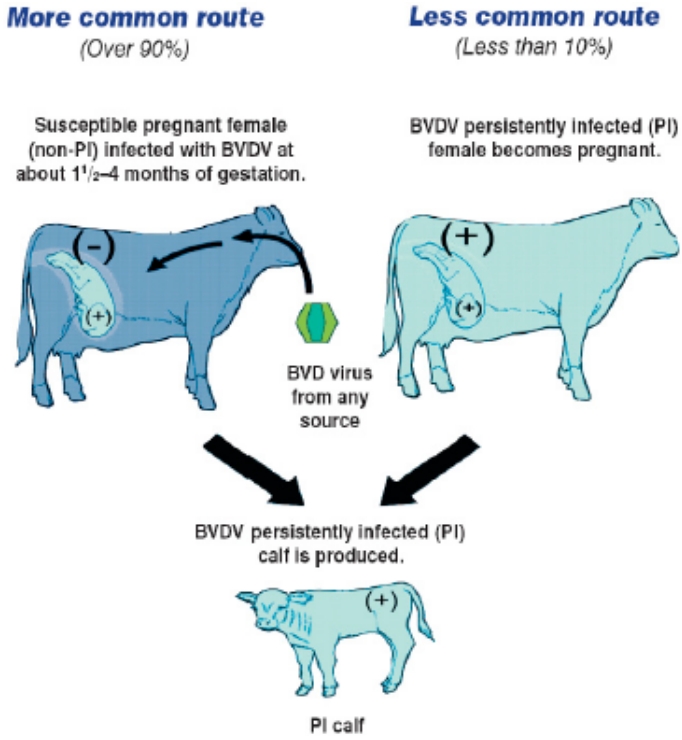
BVDV can suppress an animal's immune system for up to a couple of months, allowing other diseases to more severely manifest themselves. This is especially evident in young calves or during stressful management procedures such as the early phases of lot feeding.

BVDV is almost exclusively transmitted by Persistently Infected (PI) animals. When PI's infect other animals, they usually become transiently infected, mount an immune response and recover.

Managing PI's manages BVDV.

$4000 PI Bull diagnosed 9 months after sale day

# Two Ways PI's **are Produced**




PI dams always have PI calves, however most PI's were exposed to BVDV before they were born, whilst in utero. Their mother contracted a transient BVDV infection during pregnancy, usually from contact with a PI. Exposure at any stage of pregnancy can result in foetal loss, however, when exposed between one and four months of gestation, the unborn calf's immune system mistakenly believes that the virus is normal. If the calf survives to birth, it will be infected with BVDV for life. PI's shed enormous amounts of BVDV virus and transiently infect most of the animals they meet. In this way, the virus is maintained within production systems and propagated between them.

# Systematically
# **Managing BVDV**

Controlling BVDV centers around controlling PI animals. PI animals initiate transient infections in other animals, however, unlike other diseases, the transient infections normally do not further propagate the disease. If animals are immune to BVDV prior to being exposed to a PI, they may avoid becoming transiently infected and if pregnant, their foetus may be protected from foetal loss or from becoming a PI.

**The goals of Systematic BVDV control are straightforward.**

1. Identify at risk management groups and provide them with immunity
2. Ensure annually that all replacement heifer management groups are both PI free and reasonably immune prior to their first joining
3. Ensure no adult PI animals exist within any of the pre-existing adult management groups
4. Maintain simple biosecurity procedures

Swans Veterinary Services provides consultancy and specialised testing to assist veterinarians to help their producers to manage BVDV systematically, cost effectively and profitably. By managing the immunity of their existing breeders and annually ensuring that each new group of replacement females is both PI free and relatively immune, producers can take control of BVDV.

A 4 year old PI cow and her third PI calf

# Tools for
# **Managing BVDV**

**There are 3 classes of tools for managing BVDV**

## Antigen Testing (or PI Testing)
Tests designed to diagnose animals persistently infected with BVDV.

## Antibody Testing
Tests designed to document evidence of immunity to BVDV, either from past exposure to the virus (usually via exposure to a PI animal), from vaccination or from consumption of colostrum.

## Vaccination
Currently, there is only one commercially available vaccine for BVDV in Australia. The vaccine requires 2 preliminary doses from between 4 weeks to 6 months apart, followed by annual boosters. Some vaccinated animals may still produce PI calves should they be exposed during pregnancy and vaccinating PI animals is ineffective.

## The Evolution of BVDV Tools
Diagnosing PI animals and screening groups of animals for immune status has historically been laborious for veterinarians and a costly exercise for producers. Swans Veterinary Services has been committed to innovating and providing new tools and techniques to assist veterinarians and cattle producers to cost effectively manage and control BVDV since 2006. Our focus has been to enable veterinarians to set up their producers to collect their own samples, to accurately test for either PI animals or for the presence of BVDV antibodies.

# Diagnosing
# **Persistently Infected Animals**

Globally, ear notch tissue is the most widely used sample for PI testing due to the simplicity of collection, stability of the sample and accuracy of the test. Swans Veterinary Services pioneered ear notch testing in Australia and have since tested over a quarter of a million ear notch samples in their purpose built laboratory using the IDEXX BVDV Ag serum plus assay. The assay has been shown to be 100% sensitive and >99.6% specific[1] in diagnosing PI animals from ear notch tissue.

**Swans Veterinary Services offers the following range of options for PI testing:**

### Classic Ear Notch Testing Kit

Everything a producer needs to start ear notch testing, including pliers, directions, submission sheets, a return con note, and 144 pre-labeled sequentially numbered vials, all packed in a small foam esky.

1

2

3

4

[1] Kuhnn et al

# Diagnosing
# **Persistently Infected Animals**

### Conical Vials
Small pre numbered vials accompanied by a submission sheet, ideal for mailing small batches of ear notch samples back to the lab.

### Zee Tag  Ear Tissue Samplers
A simple to load, one step collection device, allowing producers to collect their sample directly into a clear pre-labelled pouch.

### Allflex Tissue Sampling Unit (TSU)
A one step collection device, allowing producers to collect and visualise their sample directly into a small pre-labelled vial.

### Traditional Blood Tubes
Blood samples collected from animals over 6 months of age can be analysed to detect PI animals.

### TEGO™ Devices
An excellent tool allowing producers to collect their own blood samples typically for antibody testing, but can also be used to detect PI animals over 6 months of age.

### IDEXX BVDV Ag Point-of-Care Test
A rapid crush side test, to diagnose PI's from small numbers of cattle in under 30 minutes from sample collection.

# Testing
# **for BVDV Antibodies**

The presence of antibodies to BVDV in blood samples from unvaccinated animals over six months of age usually indicates past exposure to a PI animal. Screening representatives from stable management groups for antibodies to BVDV provides important information, enabling veterinarians to choose the most cost effective strategy to manage BVDV for that particular management group. Management groups with low levels of immunity are PI free but are at risk of infection should they encounter a PI in the future. Conversely, highly immune management groups may contain a PI animal, but will not benefit from vaccination. Measuring the immune status of individual management groups is a sound investment as it assists veterinarians to choose the most cost effective management strategy.

**Sample collection methods offered:**

### Traditional Blood Tubes

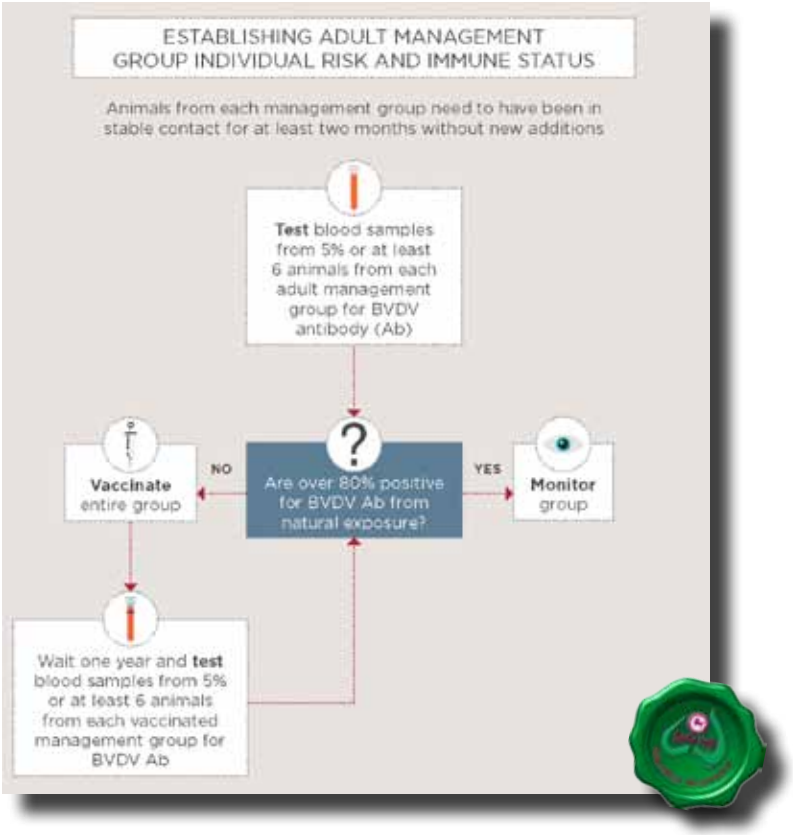
Blood samples collected from unvaccinated animals over 6 months of age can be analysed for the detection of BVDV antibodies from natural exposure.

### TEGO™ Devices

An Australian innovation which allows producers to collect their own blood samples from the ear without requiring special training.

# Establishing the **Herd Risk Profile**

Usually the first step towards managing BVDV at the herd level is to measure the immune status of existing management groups within an individual production system. By collecting blood samples from a small proportion of the animals from each discrete, stable management group, those management groups without acceptable levels of immunity to BVDV can be identified and vaccinated. Each vaccinated management group could then be revisited on an annual basis. Should the level of measurable natural immunity improve sufficiently, the producer could cease administering annual booster vaccinations to the group.



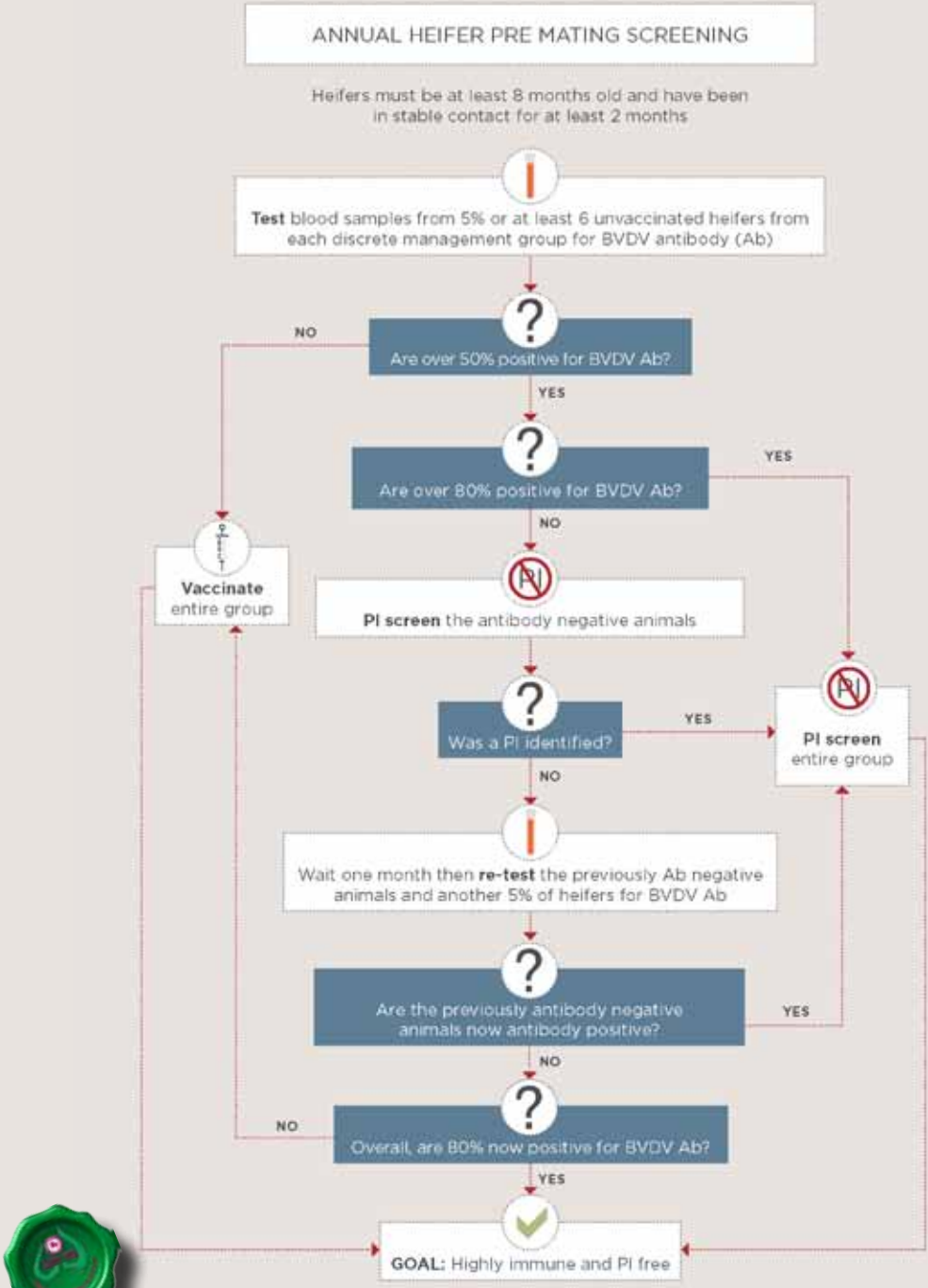
# Annual Heifer
# **Pre Mating Screening**

Regardless of the BVDV management strategy implemented, assessing the immune status of each year's replacement heifers prior to mating is essential. Each new group of replacement heifers represent a potential risk to the remainder of the breeding population or may be at risk themselves. Assuming they have been in contact for at least two months and are at least eight months old, analysing blood samples for BVDV antibody from a small proportion of the group will estimate both the level of immunity within the mob and the likelihood that a PI exists within the group.

Producers choosing to simply vaccinate can use the results to decide if vaccination is worth the expense. Enrolling a group of heifers in a vaccination program and providing them annual boosters for the remainder of their life is a significant investment that may be unnecessary in many instances.

The goal of systematic management of BVDV is to ensure that each new group of replacement heifers is both relatively immune and PI free prior to joining. Using the antibody results, producers will be better informed to invest in the most appropriate strategy whether that be to ear notch or vaccinate each group of replacement heifers.

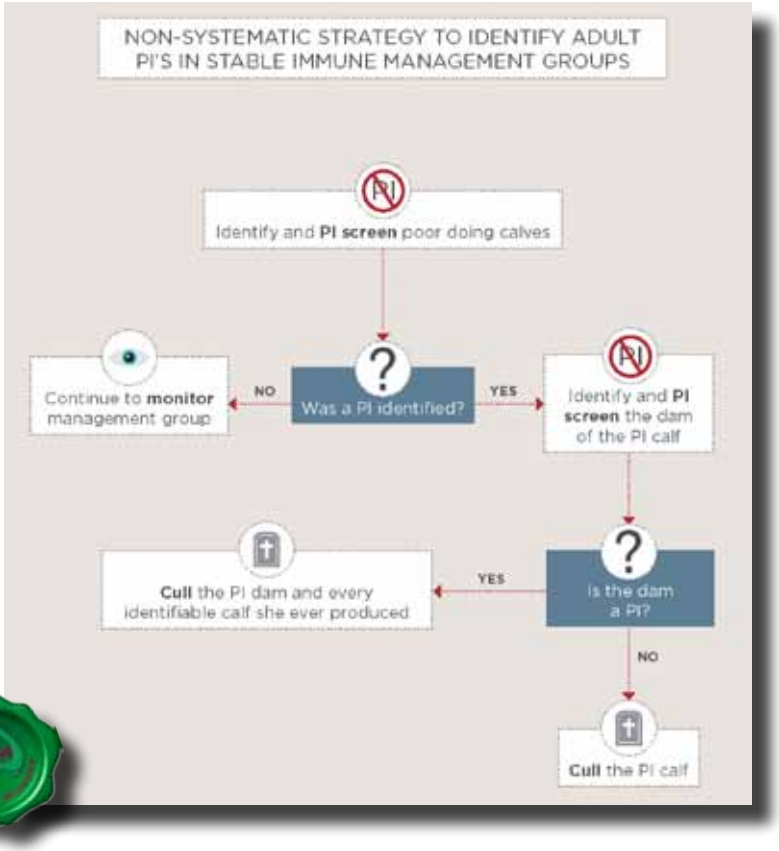
Ultimately, the results provide producers and their veterinarians an indication of the efficacy of the management strategy chosen. If the results from the heifers consistently reveal low or no immunity to BVDV, the control program is successful.


ANNUAL HEIFER PRE MATING SCREENING
Heifers must be at least 8 months old and have been in stable contact for at least 2 months
Test blood samples from 5% or at least 6 unvaccinated heifers from each discrete management group for BVDV antibody (Ab)
Are over 50% positive for BVDV Ab?
NO
YES
Are over 80% positive for BVDV Ab?
YES
NO
Vaccinate entire group
PI screen the antibody negative animals
Was a PI identified?
YES
PI screen entire group
NO
Wait one month then re-test the previously Ab negative animals and another 5% of heifers for BVDV Ab
Are the previously antibody negative animals now antibody positive?
YES
NO
Overall, are 80% now positive for BVDV Ab?
NO
YES
GOAL: Highly immune and PI free

# Finding
# **Adult PI's**

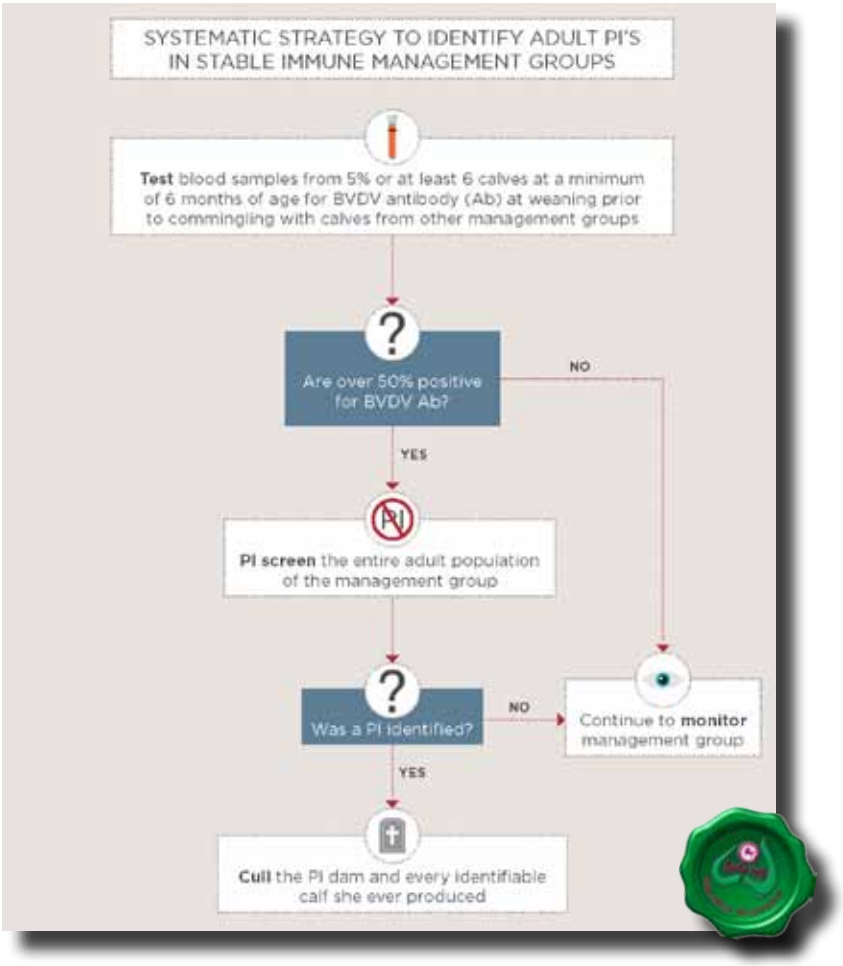
If each new group of replacement heifers is both relatively immune and PI free, however, subsequent heifer premating screening continues to produce evidence of active exposure to BVDV, there may be adult PI animals surviving in some of the established older management groups. There are both non-systematic and systematic means of identifying adult PI animals.

The non-systematic strategy focuses upon identifying and ear notching poor doing calves. Should a PI calf be diagnosed, identify its mother and test her at the nearest opportunity.



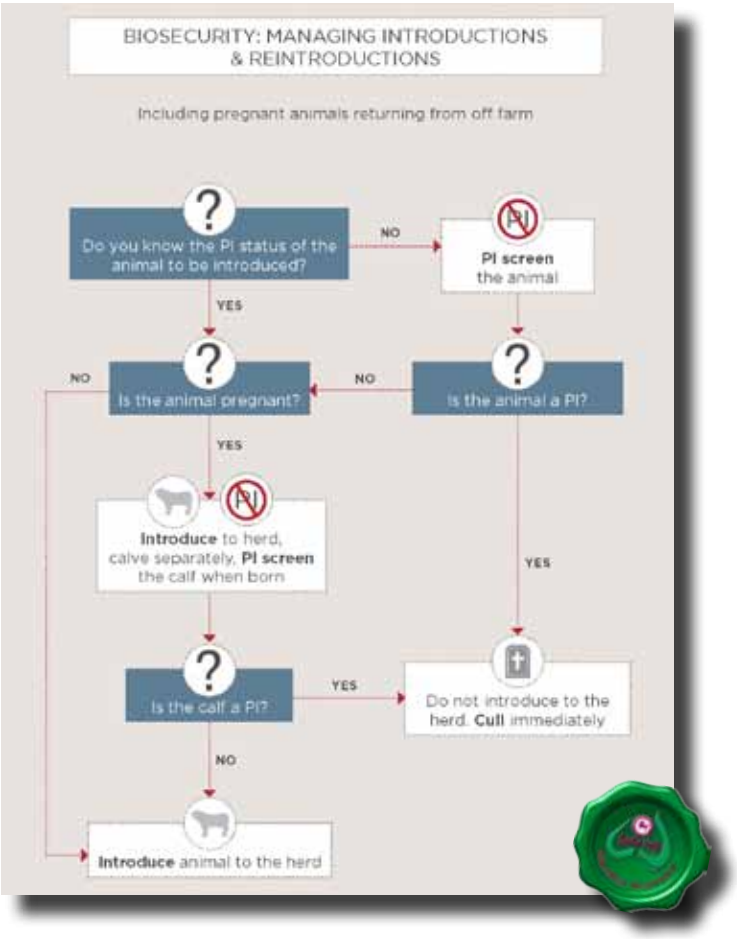
# Finding
# **Adult PI's**

A systematic strategy to narrow the search for an adult PI focuses upon measuring the immunity of a sample of the calves from each discrete adult management group at weaning. Should the calves be found to possess a high degree of immunity at weaning, ear notch the entire adult population of the management group. If the calves lack immunity at weaning, it is unlikely that a PI exists within the management group.



# Maintaining **Biosecurity**

Once a production system is BVDV free, simple biosecurity measures will help to maintain freedom. Producers should continue to vaccinate where appropriate and work with their veterinarian to investigate any incidents of poor reproductive performance. Attempts should be made to minimise contact with neighboring cattle populations, especially during early to mid pregnancy. All introductions, their unborn progeny and any unborn progeny of reintroductions should be ear notched as soon as possible.



# Strategic
# **PI Testing**

**Sale Bulls:** A PI bull introduced into an immune-naïve population would have drastic consequences. Producers that ear notch test their sale animals protect their reputation, their clients and can add value to their sale animals. We are happy to provide sale certificates for ear notch tested and vaccinated sale bulls.

**Sale Bred Heifers:** Pregnant heifers can easily be tested to confirm that they are not a PI, however we currently do not have an effective means of testing their unborn foetus. Value addition through documentation of risk minimisation would entail ear notch testing and vaccinating all heifers and the bulls they are joined to prior to joining. We are happy to provide sale certificates for ear notch tested and vaccinated sale heifers.

**Embryo Transfer:** We strongly advocate ear notch testing all recipients and any calves at foot prior to synchronisation. Wrecks associated with ET programs due to the inadvertent inclusion of PI recipients or PI calves at foot have been well documented. Ear notch testing and vaccinating all recipients is good risk management. ET calves are worth far too much to gamble with.

**Artificial Insemination:** Animals selected for AI programs often come from different management groups. Commingling animals with potentially different levels of immunity with potential PI's could have a significant effect upon the success of an AI program. We advocate that all animals involved in AI programs be ear notch tested and vaccinated prior to the programs commencement. Any animals which may come in contact with the AI'd animals also need to be considered, especially back-up bulls. We have helped investigate some spectacular wrecks, wherein over half of the AI progeny have been born PI due to post program exposure to BVDV.

PI bull diagnosed before sale day

Our goal at Swans Veterinary Services is to provide as complete of a service as possible to assist other veterinarians to work with their clients to cost effectively manage BVDV. Over 50% of Australian farms are actively infected with BVDV. Until recently, Australia lacked the tools to successfully manage BVDV. **We now have the tools!**

Feel free to contact Swans for further options or to design a specific BVDV herd control program.


**Dr. Enoch Bergman** DVM
Mobile: **0427 716 907**

**Sharon Slater** BSc BVDV Lab Manager
**Lauren Norris** Assistant BVDV Lab Manager

Clinic Number: **(08) 9071 5777**
Clinic Fax: **(08) 9071 5057**
Email: **lab@swansvet.com**

**www.swansvet.com**


SWANS Veterinary Services