

effectively manage this disease. Swans Veterinary Services has strived to provide other veterinarians the tools to be able to do just that.

Swans pioneered ear notch testing for the identification of Persistently Infected (PI) animals from ear notch tissue in 2006. I had tried unsuccessfully to find another laboratory within Australia willing to offer the service. At the time, blood based antigen testing was the only modality offered. I had three serious issues with blood based testing:

1. It required expertise to acquire the sample
2. It lacked sensitivity in animals under six months of age due to maternal antibody interference.
3. It was expensive

Out of frustration, I imported a purpose built laboratory, primarily for the purpose of serving my own clientele. Soon, other vets became aware of my service and we began offering testing through other veterinary practices (see [www.swansvet.com/ent.php](http://www.swansvet.com/ent.php)).

Allowing producers to harvest their own ear notch samples vastly simplified the process of screening for PIs from populations of animals. I began setting up control programs, centered on appropriate ear notch testing guided by serology. However, once again I began to find my progress obstructed by the need to physically be on farm to take blood samples for antibody testing.



*Figure 1. The cow's ear shows a TEGO in action. Photo courtesy of Susan Pike Production.*

ITL, an Australian biotech company contacted our laboratory to gauge our interest in using their new Australian designed TEGO device to test for PI animals. The TEGO device makes it very simple for producers to collect blood samples onto specialized absorbent cards for analysis. The disposable TEGO device is applied with a set of Allflex tagging pliers, resulting in a card which can be stored at room temperature and mailed to an appropriate laboratory for analysis. Due to the incredible simplicity, robustness, and accuracy of ear notch tissue for the purpose of detecting PI animals I did not feel they would be useful in that capacity, however I was excited about their potential for antibody testing.

We began validation trials and found that the TEGOs work quite well with the IDEXX BVDV Antibody ELISA, a kit we were already using for bulk milk tank BVDV antibody testing. Finally, I had found a tool that could simplify the serological component of setting up herd level control programs!

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## W I N N E R

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# Systematic BVDV management for beef Herds

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As awareness of BVDV within the beef industry has improved, more producers are becoming amenable to getting vets out on farm to investigate their BVDV status. With guidance, many producers will implement control programs, as long as they are simple, transparent, and perceived to be profitable for them. By enabling producers to collect their own samples for antigen or antibody testing, veterinarians and producers can more cost



Experience has taught me that no farm which harbors a PI animal is safe. The more effective the exposure of young stock to PI animals prior to their first joining, the higher the proportion of immune animals during pregnancy, reducing the proportion of PI animals. Over time, fewer PI calves means reduced exposure of new young stock, potentially eventuating in groups of seronegative animals. Once these animals reach breeding age they will spend the majority of the rest of their lives either pregnant or trying to become pregnant. If they go to the bull without any form of immunity to BVDV, should they meet a PI later in life, a wreck could occur. Wrecks resulting in large numbers of PI's results in high overall immunity, and the cycle repeats itself. Without knowing the immune status of their animals and without understanding the epidemiology of the disease, it is no wonder that many producers that find themselves experiencing BVDV up close and personal often believe it has been brought in by their neighbors, when the reality is usually that they have been endemically infected for years.

The propagation of BVDV is all about timing. Animals without prior immunity, exposed to BVDV during their pregnancy from one to four months produce more PI animals. Managing BVDV effectively is all about timing as well. By providing seronegative animals immunity and removing PI animals before joining, BVDV can be successfully managed.

Antibody screening is the most sensitive way to screen for the presence of PI animals without directly ear notch testing all of the animals on the property. Quite simply, if an unvaccinated animal has immunity to BVDV then it is likely from direct exposure to a PI. If a PI has existed for a reasonable amount of time within a management group, most or all of the animals will have seroconverted to the virus.

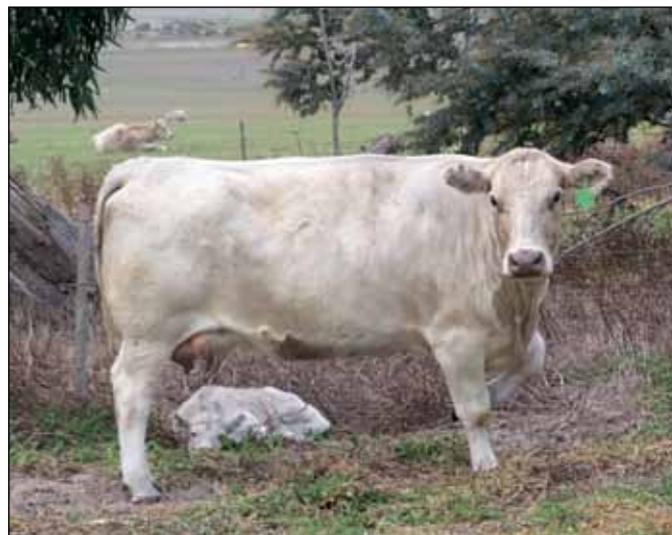
Many times we as veterinarians may begin our BVDV investigation as part of an abortion screen. AGID testing requires a reasonable amount of serum, more than the TEGO devices harvest. The AGID is a very useful tool to prove or disprove recent exposure to BVDV, excellent for abortion investigations. The antibody ELISA on the other hand is a less expensive tool to measure the lack of, or presence of, BVDV antibodies without estimating the recentness of infection.

Often I am called upon to work up a property's BVDV status from scratch. In other instances, I am following up an investigation that had either previously detected or implicated BVDV. The TEGO devices allow me to quickly set up a risk profile for the entire herd. As veterinarians, we can help our producers to invest their resources most cost effectively by measuring the immune status of individual mobs on each individual property.

1. Mobs with a high level of immunity will not benefit from vaccination.
2. Stable mobs with low levels of immunity do not contain PI animals.

I ask my producers to collect blood using the TEGO devices from 5% or a minimum of 6 animals from each stable management group on the property. When appropriate, mobs without immunity are advised to enrol in a Pestigard vaccination program. Mature mobs with high levels of immunity may contain a PI, or the immunity could be from historic exposure. Rather than ear notch testing the adult animals from these highly immune mobs, I monitor their calves for the presence of PI animals. At calf marking, any woody calves are ear notch tested and visually marked. If the calf is a PI, their mother may be a PI as well. The calves are observed to ascertain the identity of

their dam and she is eventually also ear notch tested. A new and handy tool for testing calves crush side is the IDEXX BVDV SNAP test. At the same cost, veterinarians can source the new



**Figure 2. The cow and calf represent: 'A PI cow discovered by identifying its calf as a PI first.'**

SNAP tests either from Swans Veterinary Services or IDEXX directly. Any PI's found at the end of each draft could be held back to identify their dam, allowing her to be tested immediately. Any adult PI animals would then be sold direct to slaughter.

After profiling the risk level of each of the mature mobs, my systematic control program focuses on annually ensuring that each new group of replacement heifers is both immune and PI free prior to mating. Screening a proportion of the unvaccinated replacement heifer mob well in advance of mating allows us to do just that. At the time of testing, the heifer replacement mob needs to be stable, without any recent additions, and well past maternal antibody interference. As a rule of thumb, they need to be at least 8 months old and have been in stable contact for at least 2 months. If they are found to have a low level of immunity, they should be enrolled in a vaccination program. If they are highly immune, the expense of vaccination can be forgone, and the heifers individually ear notch tested. Any PI animals which may exist within the mob can then be found and sold to slaughter before she begins to waste away.

Occasionally, especially in more extensive situations, or in large groups of replacement females, the seroprevalence of the group may still be maturing. If only a proportion of the animals are seropositive, there are three general scenarios:

1. Incomplete ongoing exposure (PI still present)
2. Historic PI exposure (PI present prior to heifer selection process)
3. The seronegative animals are in fact PI animals themselves

Scenario 3 can be quickly ruled in or out by performing an antigen capture ELISA on the same blood sample that was used to measure for antibody levels. If scenario 3 has been removed, scenarios 1 and 2 can be discerned by performing follow up serology on the replacement heifer group one month after the first screening. Producers should be directed to collect samples from the previously seronegative animals and an additional 5% randomly selected heifers. If all or a proportion of the previously seronegative animals have since seroconverted, there is ►



ongoing BVDV exposure, usually indicating the presence of a PI. The mob of heifers should therefore be ear notch tested immediately. Conversely, if the seronegative animals have been confirmed not to be PI and remain seronegative after the follow up serology, then it is likely that the partial seroconversion is from past exposure. Using the overall seroconversion rate from the first and second screenings, producers, guided by their veterinarian, can choose to vaccinate or not depending upon the estimated seroprevalence and their appetite for risk. Personally, I advise vaccinating replacement mobs with seroprevalences below 80%.

By following this process, we are ensuring that all breeding animals possess either natural immunity to BVDV or have been vaccinated, and that each new replacement heifer mob is both immune and PI free prior to mating. PI production will be greatly reduced, adult PIs will either die or be culled, and with time the entire property will likely become BVDV free. Maintaining freedom is achievable with simple biosecurity and can be further protected by maintaining a vaccination program. By continuing to annually screen their heifers as described above, we can monitor the freedom of the property, providing proof to the producer that their money is being appropriately invested in BVDV management. Should a biosecurity breach result in the production of one or more PI calves, they will be prevented from being retained as heifer replacements. The property will soon settle back down to a BVDV free status.

Lastly, and obviously, all introduced animals should be ear notch tested and preferably quarantined for 30 days prior to being introduced to any other management groups. The unborn progeny of any introduced animals should also be considered as introductions, and should be ear notch tested at birth. Direct exposure to a PI animal is the main way that BVDV is propagated, biosecurity to manage BVDV does not have to be complicated.

My goal has been to develop a range of tools that allow veterinarians to cost effectively manage BVDV, providing tools that producers can use to collect their own samples is the key to making BVDV management a profitable exercise for both producers and their veterinarians. Swans Veterinary Services provides ear notch testing, BVDV antibody ELISA testing, Bulk Milk Tank testing, specialized testing equipment, and free BVDV consultancy to veterinarians. My goal is to eradicate BVDV, one farm at a time!

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*Photo courtesy of Scott Reid.*



