

# THE TECH BULLETIN



## WHAT IS JOHNE'S DISEASE?

Johne's disease is a chronic wasting disease in cattle that is caused by infection with *Mycobacterium avium* subsp. *paratuberculosis* (MAP). The direct impact of Johne's disease on the Canadian dairy industry comes from the reduced productivity and early culling of infected animals, costing the industry between \$21 million and \$35 million per year (US \$17M to \$28M).<sup>1</sup> Johne's disease was first diagnosed in Europe in the late 1800s and in the United States in 1908. Although clinical disease is rare, MAP is commonly found on Canadian dairy farms. In a recent survey of environmental samples from 362 dairy farms, the pathogen was estimated to be found on 66% of farms in Western Canada, 54% in Ontario, 24% in Québec, and 47% in Atlantic Canada, for an overall herd prevalence of 46% (true prevalence estimates adjusted for test characteristics).<sup>2</sup>

The biology of Johne's disease makes it challenging to control once a farm is infected. The long incubation period of MAP is the most troublesome part, as calves that are infected with MAP early in life do not typically show clinical symptoms for two or more years, if ever. Infected cattle also begin to shed MAP long before clinical signs occur, which in turn leads to the infection of youngstock. This resulting vicious cycle can continue unabated, causing the prevalence rates that are seen today.

## CAN WE CONTROL OR EVEN ERADICATE JOHNE'S DISEASE?

Many other dairy-producing nations began implementing control programs with varied success in the 1990s. The first control programs implemented used a test-and-cull approach, in which cattle that tested positive were culled from the herd. It did not take long to realize this method alone was ineffective and cost-prohibitive in controlling the disease. The low sensitivity of the test combined with the fact that animals were capable of shedding MAP at undetected levels for long periods of time before testing positive made this approach economically unsustainable.<sup>3,4</sup>

Control programs that are being implemented around the globe today are based on eliminating risk points that would allow for transmission of the agent, in accordance with the most current understanding of the disease. The implementation of these programs, along with a test-and-cull approach for positive animals, has been successful at reducing the prevalence in many countries.

One successful example of management-based prevention strategies was conducted in Minnesota, where more than 30% of all dairy herds were enrolled by 2006. A retrospective study of that program offered some encouraging insights into how well the control program works. In 2008, Wells et al. discovered that herds involved in the program reduced their mean within-herd seroprevalence by 1.1% during the first year, by 2.6% after two years, and by 4.0% by year three. The reduction of seroprevalence was observed even while many farms sourced cattle from herds with unknown Johne's disease status. Although this is not the ideal approach, it demonstrates that implementing the proper management changes can reduce the prevalence of the disease.<sup>5</sup>

Canadian pilot studies have been conducted with similar success. For example, Sorge et al.<sup>6</sup> completed a retrospective study that suggested the program was able to help reduce herd prevalence from 5.4% to 4.2% after a second herd test was conducted approximately 2.5 years after the initial test. One of the most encouraging discoveries from the study was the decrease in test-positive two-year-olds on farms that were milk ELISA-positive at test 1. For those farms, prevalence rates in first lactation cows dropped from 8.3% to 1.8%.<sup>6</sup> Every Canadian province had established a Johne's disease prevention program between 2007 and 2014, and nearly 35% of Canadian dairy farmers took part in one of these programs.<sup>7</sup> This is a great start, but we need to strive to get 100% of dairy farms implementing these control programs.



## WHAT DOES A CONTROL PROGRAM LOOK LIKE?

Currently, most control programs include an on-farm audit or risk assessment that will help identify opportunities to reduce the risk of young calves being exposed to MAP. We know that calf hygiene is an integral part of prevention, so the risk assessment focuses on calving pen management, colostrum-feeding protocols, and ensuring the producer is aware of and understands the current recommendations for calf rearing. These recommendations are not only beneficial for the prevention of Johne's disease, but also reduce the risk for other diseases (such as calf scours). Although it is not always easy to change habits or routines on a farm, it is essential to implement the changes that will allow for the greatest chance of success and that will be sustainable in the long term.

Another essential aspect of all control programs is to test the entire herd, using milk ELISA tests available through regular DHI programs, for example, or serum and fecal samples through your nearest lab. It is also possible to send environmental samples for culture in order to detect and quantify the presence of MAP on a farm, with the main disadvantage being that it does not help pinpoint which animals are positive within the herd.<sup>8</sup> Testing the entire herd is helpful in multiple ways. First, it helps measure the prevalence in your herd and allows you to find out whether your herd is considered high, medium or low risk. When performed on a regular basis, the test can also be used to make culling decisions for cattle that have a high titre.

High-titre cows (HTCs) should be removed from the herd as soon as possible. If the cow is not removed right away, all milk and colostrum from that animal should not be fed to young calves susceptible to infection. However, these are big decisions for a producer, and deciding to cull an animal based on one test result is not always easy – even given the fact that HTCs shed an extremely high amount of MAP and are the source of much of the contamination that happens on a farm. The true tough decisions are made when an animal's test result falls in a grey area and the animal is only considered "suspect." This is the perfect time to use the risk factors identified in the risk assessment to see if keeping "suspect" cows in your herd exposes young stock to MAP. If you have not yet assessed risk on your farm, it is never too late to speak with your herd veterinarian about doing so.

## IS THERE A CURE FOR JOHNE'S DISEASE?

Although there is currently no treatment that cures Johne's disease, research shows that Kexxstone™ boluses reduce the amount of MAP shed by cattle that have tested positive for MAP.<sup>9</sup> Kexxstone boluses should not be used as a replacement for other management changes, but should be used in conjunction with a Johne's disease management program for high-risk herds.

Education is also an essential part of every control program. This is not limited to formal classroom education sessions; educating oneself also includes having a conversation with your vet about Johne's disease during a herd health visit, reading articles such as this one, or attending small round-table discussions with other producers. These are all great ways to gain knowledge about the disease and potentially find ways to reduce its prevalence. Johne's disease herd prevalence is not discussed by producers and vets as often as it should be. We need to continue to raise awareness within the industry in order to ensure that everything is being done to reduce the impact that Johne's disease has on the Canadian dairy industry.

One of the lessons learned during pilot studies was that although there is a wealth of information available on Johne's disease and discussions about what should be done at the farm level do happen, the level of commitment necessary to make the changes required to start reducing the prevalence of the disease has become a major barrier.<sup>10,11</sup> Moving forward, this barrier must be removed, and the required changes need to be implemented in a timely manner. It is essential to remember that our industry must take a proactive approach to Johne's disease; this will protect consumer confidence in our product and reassure consumers that the industry is doing everything it can to make a safe and healthy product for them to enjoy.

As we continue to improve on existing research and as more details of the cost-effectiveness of Johne's disease prevention programs come to light, it is clear that the costliest mistake that can be made is not testing herds to determine Johne's disease status and failing to implement a Johne's disease prevention program in an overall herd-health program.

If you have any questions about Johne's disease or how to implement a control program, please do not hesitate to consult with your herd veterinarian.

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