



Why should we care about High Titre Johne's Cows?

Background of Disease:

Mycobacterium avium paratuberculosis (MAP) is the bacterium that causes Johne's Disease in cattle. Cows infected with MAP can be detected by identifying antibody produced against MAP in their serum (blood) or milk. The level of antibody detected is called the antibody titre. As infection advances towards illness/disease, the antibody titre rises. While this is truly what happens in the body, only very small amounts of antibody are produced by infected cows. These small amounts are in large volumes of milk and blood. This means that tests like the ELISA that look for antibody often find it difficult to always detect the antibody that the cow produces. Changes in the value of the ELISA may not always show the changes in antibody production which could indicate advancing disease - some variation in titres may occur because there is fluctuation in antibody production or there is dilution of the antibody concentration in the blood or milk.

This uncertainty about the meaning of the titre values changes when an ELISA test report shows a high titre. When a cow is found with an antibody titre of 1.0 or higher, in either serum or milk, research shows that this value can reliably be classified as a true high level AND that a cow with this value can reliably be considered to be infected. Even more importantly research shows that a very high proportion of these cows (over 90%) are actively shedding the MAP bacteria in their manure. Cows with antibody titres of 1.0 or higher, who are actively shedding MAP bacteria, can infect the next generation of young stock on the farm. Cows with antibody titres of 1.0 or higher are often sick or are close to becoming sick themselves with Johne's Disease.

What is a "high titre cow (HTC)" in the Ontario program?

A high titre cow (HTC) in the Ontario program is defined as a cow with an antibody titre on a milk or serum ELISA of 1.0 or higher.

Why are producers encouraged to remove these HTC cows?

As part of the Ontario program producers who find a cow with a titre of 1.0 or higher are STRONGLY encouraged to remove her permanently from production by euthanasia and on-farm burial or composting, or by having her picked up by a deadstock collector for rendering. These cows are highly likely to be spreading infection. Immediate removal stops the spread and protects the young stock in the home herd from getting infected. Preventing the movement or sale of these cows to other herds prevents the spread of MAP infection to other herds.

What is a "super shedder"?

One of the goals of testing is to remove as many MAP-shedding cattle as possible as soon as they are reliably identified. Shedding cows cannot be identified visually as many will appear normal. Some will have diarrhea or be close to illness but this cannot be relied on to predict when a cow has become a shedder.

Cows with high antibody titres are frequently shedding MAP bacteria in manure. Some infected cows (we don't know what proportion) develop uncontrolled shedding of MAP bacteria and become what are called "super shedders". Super-shedders shed vast numbers of MAP bacteria. Information has shown that one super-shedder cow can excrete in her manure the same number of MAP bacteria as 100 other lower shedding cows.

Most "super shedders" will be HTC's, but not all HTC's will be super shedders. However, cows shedding any level of MAP bacteria are a bad thing to keep on a farm regardless of shedding numbers. Removing the HTC's identified on whole herd testing is the most reliable way to ensure that the burden of MAP in the farm environment is reduced.

What would suggest that a particular herd might turn out to have a HTC?

There are no hard and fast rules about which herds are at risk of having HTCs. However, so far in Ontario, HTCs are most likely to be identified in herds where clinical Johne's Disease has occurred in the last 5 years, but no herd testing has been done nor have changes been made to maternity or young stock management.

How many HTCs are there in Ontario?

This is unknown at this time. However, over the last 5 years about 595 herd owners (who had 31,970 cows) have tested their entire lactating herd on one herd test, using the milk ELISA at CanWest DHI. Among these cows, 116 (0.36% of cows) had a positive test that was 1.0 or higher (a HTC). Among the 595 herds, 74 (12% of herds) had at least one HTC. Of these 74 herds, 46 (62%) had only one HTC in the herd, 20 had two, and 8 had 3 or more. If this group of herds (approx 15% of all Ontario herds) is representative, then about 1 in 10 Ontario herds tested could have a HTC and there could be about 1000 to 1500 HTC cows (of about 320,000 total) in the province.

Most herds will not identify a HTC on testing. For the 10% that do, this is an important finding. Removing these cows will be a critical part of their Johne's Disease prevention strategy.

Which cows turn out to be HTC's?

No one can predict this without testing. Anecdotally, producers report that looking back after finding a HTC on the herd test they have noticed that that cow has had a decrease in production in the current lactation. Ontario research on over 5000 cows found that the milk production was 3 kgs lower on test day when the production of all test positive cows (low, medium or high titre cows included) was compared to their test negative herd mates. It seems likely that HTC's will not be producing to their expected potential, and that their removal may also be justified based on reduced milk production.

What if my most valuable cow turns out to be a HTC?

Under the Ontario program removal of the HTC is voluntary, but is required for reimbursement of herd testing costs at \$8 per cow. But owners can keep these cows if they choose. We strongly encourage owners keeping HTCs to seek veterinary advice on the best ways to take extra care managing these cows to prevent the spread of MAP via manure, milk and colostrum. If the cow is pregnant, it is estimated that over 50% of calves born to cows with advanced MAP infection will be born infected and may be at higher risk for developing advanced Johne's Disease at a young age. Occasionally an owner may wish to preserve genetic material before removing a test positive cow. Dr. Sheila McGuirk of Wisconsin recently published an article about this in Hoard's Dairyman which is posted at www.johnes.ca. Embryo transfer may be an option as MAP infection is not spread via the embryo. The success of flushing may be affected by the cow's health. If a valuable cow turns out to be a HTC, a veterinarian should be contacted to discuss the situation.

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Take Home Facts:

- **High Titre Cows (HTC's) are not common in Ontario.**
- **Approximately 10% of herds doing a whole herd test could expect 1 HTC.**
- **It is estimated that 1000-1500 cows in the province will have a titre >1.0.**
- **Of the herds with a HTC, 2/3 of the herds only had 1 HTC.**
- **HTC's pose great risk for the spread of MAP infection to calves and other herds.**
- **The Ontario program encourages owners to "do the right thing" by permanently removing these cows.**

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