

# Raising Johne's-Free Calves

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## ■ Take Home Message

The spread of Johne's disease (JD) can be prevented in herds if we remember the following points:

- ▶ The bacteria causing JD—*Mycobacterium avium* subspecies *paratuberculosis* (MAP)—is mainly spread through manure.
- ▶ An infected cow can shed billions of organisms into the environment for years prior to showing any clinical signs of the disease.
- ▶ Calves are the most easily infected.
- ▶ A small amount of manure is all it takes to infect a calf.
- ▶ Only 1 - 5% of infected cows in a herd will show clinical signs of the disease (signs of illness). The rest of the infected animals will appear healthy ("tip of the iceberg").
- ▶ Tests for JD do not detect animals in the early stages of infection.
- ▶ Eliminating JD from a herd takes a long-term commitment (at least 5 – 7 years). Animal purchases must be very limited so that no new infected animals are added.
- ▶ Keeping the infection out of your herd is always cheaper than trying to control the disease once it is present.
- ▶ Prevention measures will help you to raise "Johne's-free calves" which will become Johne's-free adults.
- ▶ Prevention measures will improve overall calf health.

## ■ General Information

### What is Johne's Disease?

JD is a contagious, slow, progressive bacterial infection that affects cattle, sheep, goats, deer, elk and bison, as well as camels, llamas and alpacas.

### What Causes the Disease?

JD is caused by a bacterium called *Mycobacterium avium* subspecies *paratuberculosis* (MAP). MAP is a distant relative of the bacteria that causes tuberculosis in animals and humans.

Infection results in an abnormal thickening of the lining of the intestinal tract. This leads to poor absorption of nutrients, which results in diarrhea and weight loss.

### Why Is This Disease Important? Should You Be Concerned?

The most recent research suggests that 20% of Ontario herds (random sample of Canwest DHI herds) could have at least 2 or more infected Johne's animals in their herd (Hendrick et al. 2004). Similar results have been reported from other provinces.

JD can have a significant financial impact in a herd due to clinical illness, reduced milk production, increased and less advantageous culling, loss of heifer sales, loss of good heifers to purchase, and reduced beef production. JD may also be associated with an increased incidence of other diseases and there may be an association with milk and meat safety.

JD has been linked with Crohn's disease—an incurable, chronic intestinal disorder in humans. If the diseases are proven to be associated, there is concern that consumption of contaminated food (milk, meat and water) could be a route of exposure for people to the MAP organism. Continued discussion in the media about potential links between JD, milk and human illness, damages consumer confidence in milk, milk producers and milk production systems. Research continues on this controversial subject.

### How Would You Know if You Had JD in Your Herd?

Animals are usually first infected with MAP as calves. No signs of disease are seen for years. The average incubation period (time from infection to when signs are first seen) is 5 years but can range from 2 to 10+ years. Animals may become infected but appear normal and spread the disease to other animals in the herd before showing signs themselves. During this time infected animals

may be sold, culled or die without owners being aware that their herd is infected.

Clinical signs in an infected animal are long lasting diarrhea and weight loss, despite the animal having a good appetite.

Once the disease is diagnosed in an animal showing clinical signs of the disease, a producer could expect to find:

- 1 – 2 clinically diseased cows (infected and starting to show signs of disease)
- 6 – 8 subclinically infected cows (infected but not showing signs of disease, may test positive on a JD test)
- 10 – 15 infected calves and young stock (infected but not showing signs of disease, will not test positive yet on a JD test).

### **How is the Disease Spread?**

Johne's infection enters the herd through the purchase of an infected animal. The bacteria are shed in the manure, contaminating the environment. While MAP does not multiply in the environment it can survive in manure, water and pastures for up to 1 year depending on conditions.

Manure carrying bacteria that contaminates the environment, feed and/or water, spreads the MAP organism to other animals. It is the most common way animals become infected. Calves are the most susceptible to new infection. They are usually infected early in life.

MAP can also be in the colostrum of cows showing clinical signs of the disease and those infected but not showing signs of the disease. The amount of bacteria shed in the colostrum varies. MAP may also be shed in the milk from infected dams. Research suggests that 35% of clinically ill cows shed the bacteria in their milk and 3 - 19% of subclinical cows (those infected but not showing signs of illness) shed MAP in their milk depending on their stage of infection (Sweeney, 1996).

Occasionally calves can be born already infected. Fetal infection can occur in 20 – 40% of calves born to cows already in the late stages of infection (Sweeney, 1996). Calves infected during pregnancy may show clinical signs of JD at an earlier age than calves infected after birth.

With increasing age, calves appear to become resistant to becoming newly infected. By approximately 1 year of age, the resistance of calves equals that of an adult. However, if high levels of manure contamination of feed and water occur, adults are susceptible to infection.

## ■ Testing for Johne's Disease

### Why Test for Johne's Disease?

In herds with JD, testing will aid in the identification of infected animals that result in economic losses due to clinical disease and decreased milk production.

Some producers want to test proactively for JD in their herds because of the potential link between JD and Crohn's disease in humans. Maintaining consumer confidence is key to the dairy industry.

Producers may test repeatedly and make changes to their herd management over a number of years to achieve a low risk herd status. There is a potential marketing advantage in the sale of Johne's-free calves that will mature into Johne's-free adults.

Testing is just the beginning. Producers cannot test their way out of the disease—testing is one piece of the puzzle. Veterinary involvement and the development of herd specific management plans are also needed to prevent and control JD in herds.

### How Accurate are the Tests?

Current Johne's tests lack the ability to correctly detect infected animals—false negative test results. Most diseased animals are in the early stages of infection and tests may only identify 40% of these subclinically infected animals. In animals showing clinical signs of disease, tests correctly identify greater than 70% of infected animals.

To a much lesser degree, some tests lack the ability to correctly identify negative animals—tests occasionally call an uninfected animal positive for JD.

JD is a herd problem in addition to an individual animal problem. Since no tests are 100% accurate, it is best to use tests on the herd versus an individual animal. In other words, the tests are more valuable when used on the herd. A herd's history will also aid in interpreting test results. The confidence of test results is increased with repeated negative herd tests. However using today's technology it is only possible to call a herd "low risk" for JD, never "proven negative".

### What are the Tests?

There are a number of tests that can be used to diagnose JD. These tests can be divided into three categories: those that detect the *Mycobacterium avium*

subspecies *paratuberculosis* (MAP) organism in manure, those that detect MAP genetic material in manure, and those that detect antibodies to MAP in blood or milk.

### **How Will the Test Results be Used?**

- To screen animals to estimate the prevalence of Johne's in the herd.
- To identify the most infectious animals in the herd to manage and/or cull.
- To identify subclinically infected animals (infected but not showing signs of the disease) in the herd to manage.
- To identify daughters from an infected cow.
- To achieve a low risk herd status.

### **How Often Should You Test for Johne's Disease in Your Herd?**

The frequency of testing will depend on the speed with which an owner wants to decrease the prevalence of JD in the herd. The slow, progressive nature of the disease means that test results will not change quickly. Therefore yearly testing is most often recommended.

## **■ Prevention and Control Strategies**

### **The Benefits to Prevention**

Management changes implemented to protect calves from JD infection will also reduce the risk of other calf diseases (calf scour viruses, *E. coli*, Salmonella, respiratory disease) and improve overall calf health.

### **Developing a Prevention Strategy**

JD is a complex disease and test result interpretation is difficult. Producers need to work with their herd veterinarian to develop a prevention program that is right for their herd.

At the outset of developing a prevention program a herd risk assessment is completed. Based on the issues identified, a farm specific program is developed and implemented. This program is reviewed annually to assess herd progress and make necessary changes.

Preventive management strategies are listed below. Options are given under each heading. Consult with your veterinarian to determine which options would best apply to your specific herd situation.

### **Preventing JD from Entering via Purchased Animals**

Prevent infected animals from entering the herd by:

- ▶ Maintaining a closed herd
  - introduce genetics only by the use of frozen semen

If it is necessary to purchase animals:

- ▶ Know the history of the herd you are buying from
  - “buyer beware” applies to JD as not all herds are aware of their JD status
  - ask about history or suspicion of JD
- ▶ Pre-test mature cow purchases
  - there is the potential for infected animals to test negative but this is better than testing heifers (who rarely test positive even if infected) or doing nothing
- ▶ Buy from test negative herds
  - pick herds who have a health status the same or better than your herd
- ▶ Pre-test 30 animals from the herd of origin to estimate their infection status
  - select 2<sup>nd</sup> lactation or older animals to test

### **Preventing the Spread of JD to Calves:**

Decrease the exposure of newborns to contaminated manure in the maternity area by:

- ▶ Having dedicated maternity pens that are separate from hospital pens
- ▶ Only having one cow per pen at a time
- ▶ Keeping the pens clean, dry and very well-bedded
  - if you kneel on bedding and your knee is wet after 25 seconds, add more bedding
  - reduce the rate of manure contamination by having enough pens for the number of cows calving or keeping cow numbers low in the pens
  - consider all manure infective and remove it as soon as possible
- ▶ Bedding routinely between calvings
  - remove old and/or wet bedding before rebedding

- ▶ Never allowing animals suspected of having JD (ill, test positive or suspect animals) in the calving area

Prevent ingestion of manure by calves in the maternity area by:

- ▶ Removing calves from the pen within 30 minutes of birth
  - move them to an area that has never held cows
- ▶ Not letting the calf search for the udder or nursing
  - let the cow lick the calf dry and then remove prior to the calf standing
- ▶ Clipping & cleaning (with soap, water and drying) the cow's udder and teats prior to calving
- ▶ Prevent the calf from having "manure meals"

Feed colostrum unlikely to have MAP in it by:

- ▶ Feeding only the colostrum from a single cow to a single calf
  - do not feed pooled colostrum
- ▶ Feeding colostrum from recent test negative cows
  - set up a bank of frozen colostrum collected from recent test negative animals
- ▶ In the absence of testing, feed colostrum from younger cows to calves
- ▶ Preventing manure contamination of colostrum during collection by utensils, hands and/or during storage.

Feed milk unlikely to have MAP in it by:

- ▶ Feeding only milk from recent test negative cows to calves
- ▶ In the absence of testing, feed milk from younger cows to calves
- ▶ Substituting a good quality milk replacer for whole milk
- ▶ Pasteurizing milk on-farm

Decrease exposure of calves to manure in calf housing area by:

- ▶ Housing calves in a facility or location separate from cows or older heifers
- ▶ Separating calves located in the same facility as cows by distance (buffer zone)
- ▶ Not allowing runoff from manure or pens to enter the calf area
- ▶ Not allowing any contact with manure or manure storage

- ▶ Not entering the calf area after walking through cow manure
  - wear clean boots & use clean equipment before entering the calf area
- ▶ Preventing manure contamination of feed by splattering from cows or equipment

### **Preventing Infection among Replacement Animals**

Raise uninfected replacements by:

- ▶ Not keeping replacement heifers from dams showing clinical signs of JD
- ▶ Aggressively managing replacements born to test positive cows by removing the calf within 30 minutes of birth and feeding low-risk colostrum
- ▶ Raising heifers off-site at a heifer raising facility
- ▶ Not raising replacements from a herd with a high prevalence of JD until the level of disease in the mature cows has declined to a level decided upon by the owner and the herd veterinarian

Prevent exposure to infected animals and manure by:

- ▶ Housing replacements in separate facility or by separating them from the cows by distance within the same barn
- ▶ Locating replacements upstream of manure runoff
- ▶ Not co-mingling replacements with adults (such as bred heifers with dry cows).

Prevent contamination of feed with MAP by:

- ▶ Not using common mangers / bunks for replacements and mature animals
- ▶ Using separate equipment for feeding and manure handling
- ▶ Not walking through feed areas / mangers with dirty boots
- ▶ Cleaning manure out of mangers / bunks
- ▶ Keeping animals out of mangers / bunks
- ▶ Not allowing heifers to graze a pasture the same season after manure application

Prevent contamination of water with MAP by:

- ▶ Not using common waterers for replacements and mature animals
- ▶ Cleaning manure out of waterers



- Preventing manure build-up around waterers
- Preventing access to natural water or wet areas that collect manure or runoff from cows

### **Preventing the Spread of JD due to Infected Mature Animals**

Eliminate high-risk animals by:

- Separating and culling clinical animals as soon as possible
  - sell to slaughter

Manage JD test positive animals (infected but not showing signs of illness) by:

- Visibly identifying test positive animals
- Targeting to cull animals when economically feasible
- Designating cows as Do Not Breed
- Grouping cows in high prevalence herds according to test results
  - keep test positives separate from test negative or low risk cows
- Keeping clinical, test positive or suspect animals off pasture

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