Johne's disease in Cattle - Article 2

This is the second article in a series presenting current information regarding Johne's disease in cattle. It is directed toward helping veterinarians and their clients prevent or control this disease and was adapted with permission from the original 1999-2000 series presented by the AABP Food Safety Committee. Content was edited and reviewed by the National Johne's Working Group and endorsed by the USAHA.

Critical Management Points for Prevention and Control of Johne's Disease in Dairy Cattle

Prepared and edited by Christine Rossiter and Don Hansen
of the AABP Food Safety Committee and the National Johne's Working Group

Premise for critical management points

1. Management points directed at prevention or control of Johne's disease will also reduce the risk for other important cattle pathogens and improve animal performance.

2. Johne's disease is an intracellular intestinal infection caused by the acid-fast bacterium *Mycobacterium avium subspecies paratuberculosis (Map).* The infection eventually causes weight loss (despite good appetite), a drop in milk production, diarrhea (sudden onset or intermittent) and death. Some cows may develop "bottle jaw" due to a low protein edema or appear unthrifty overall. Clinical signs of the disease occur most commonly during the end stages of infection, typically at three to six years of age.

3. Not all cows advance to clinical disease. What proportion does and why they do is not always known. It may be because the infection is arrested, progresses slowly or the cow leaves the herd for other reasons.

4. The infection is chronic and mostly subclinical in nature. Only 1 to 5 percent of infected cows in a herd may show signs of the disease each year, while the rest appear healthy. Thus, Johne's should be regarded as a herd problem. A cow with clinical Johne's disease represents the "tip of the iceberg" of infected animals in the herd.

5. An infected cow may shed the pathogen in her feces for months to years before she develops clinical signs. The clinical cow may shed 10^6 to 10^8 mycobacteria per gram of feces; thus severely contaminating her immediate environment since two feedings of 10^6 organisms can infect a calf. In the late stage of disease, the microbe can disseminate into colostrum, milk (10 to 10^3 organisms/ml) and the fetus.

6. Johne's disease can be prevented, controlled or even eliminated from infected herds by applying critical management points that are based on the epidemiology and pathogenesis of the disease.

7. Prevention or control of Johne's takes commitment and time. Half-hearted attempts to prevent or control the disease generally fail. Since infection from the pathogen can spread through the herd for a few years before clinical cases are noticed, prevention is always cheaper than control. While herd programs can be shortened from the typical five years, this can increase cost.

8. Many other pathogens that affect dairy cattle are also transmitted via the fecal-oral route. A partial list includes Corona and Rotaviruses, E.coli, Salmonella, Coccidia, Cryptosporidia and intestinal nematodes.

Prevention

The NAHMS Dairy '96 survey showed that 60

to 80 percent of U.S. dairy herds are at low risk for Johne's disease infection. Therefore, prevention should be the goal of every farm that is currently disease-free.

Preventing the introduction of Johne's disease is straightforward: prevent introduction of the microbe by closing the herd to infected replacements or herd-addition animals and guard against entry of equipment, feed and waters contaminated with manure.

The Johne's disease-status of a source-herd provides critical information to estimate infection status of an individual animal.

Current diagnostic tests for Johne's are adequate tools for use in disease prevention at the herd level. However, detection accuracy at early stages of infection, even in mature animals, is low. Negative test results from immature animals (less than 24 months of age) for Johne's generally have limited value.

Confidence that an animal or herd is not infected requires repeated tests with negative results.

National USAHA approved guidelines exist to establish a low-risk herd status using cost effective testing.

I. Critical Management Points for Prevention of Johne's Disease

A. Prevent infections by closing the herd to animals with unknown Johne's infection status.

1. *Acquire from a test-negative herd.*
   - Owner has individual cow/calf records.
   - Owner practices critical management points against Johne's disease.
2. *Pre-test mature cow additions.*
   - Only necessary when the cows are acquired from outside sources with unknown Johne's infection status.
   - Test each cow two to three times at six to twelve month intervals, depending on the level of assurance desired.

B. Secure replacements and additions from herds that are low-risk for Johne's disease.

1. *Acquire cattle from a herd with negative Johne's history.*
   - Owner and veterinarian monitoring documents that the herd did not have any Johne's cases for the past five years.
2. *Acquire from a herd with low Johne's prevalence*.
   - Animals have tested positive for Johne's disease but history and test results indicate a low incidence.
3. *Purchase from a herd that tests negative on a sub-sample of the herd*.
   - Negative test results from 30 randomly chosen cows, less than four years old, likely indicate that less than 10 percent of the cows are infected.
4. *Pre- and post-test adult animal additions*.
   - Keep them isolated until cleared by tests.
   - Test them two to three times at six to twelve month intervals for increased confidence in their negative status.

Control

Additional steps are required for control of infection. The critical management points are aimed to protect young stock from infection and to reduce the pathogen load in the environment for reduced transmission risk.

Control is based on improving management and offers the opportunity to capitalize on the decision to manage against Johne's disease. Many health and performance issues involve the same management areas and can be targeted as additional client goals. Examples include reduced risk for other pathogens, improved maternity management, increased monitoring of fresh cows, improved heifer development and improved bunk management.

II. Critical Management Points for Control of Johne's Disease

A. Reduce infections by manure management (all manure is suspect).

1. *Reduce exposure of newborns to Map in the maternity area.*

- Clean the dry maternity area -- it should pass the " knee test".
- Remove newborn calves from dams and do not allow calves to seek or nurse.
- Avoid keeping high-risk or sick cows in common calving areas.
- Separate maternity and hospital areas.

2. *Provide clean feed for young stock and mature animals.*
- Do not feed rations contaminated by manure from potentially infected adults, including refused cow feed.
- Use separate equipment to handle manure and feed.
- Reduce cross-over contamination from human and equipment traffic patterns.
- Do not allow young stock and infected adults to use the same feed, pasture or water sources.
- Do not feed hay or forage with residual manure, i.e., applied during the same growing season.

3. *Provide clean water for young stock and mature animals.*
- Supply clean water that is not contaminated by potentially infected animals.
- Use troughs or individual waterers.
- Restrict runoff and access to standing water that collects runoff.

4. *Keep manure from mature animals separate from young stock.*
- Raise young stock in separate facilities or use solid barriers to prevent contact with adult manure.
- Prevent transportation of bacteria to young stock by people, runoff or equipment.
- Prevent young stock contact with manure runoff from mature animals.

B. Reduce infections by colostrum and milk management.

1. *Feed "low risk" colostrum.*
- Collect from healthy cows that were negative on recent tests and are not suspected to have Johne's.
- Separate by one cow to one calf. Do not pool colostrum.
- Set up a colostrum bank from test-negative cows. Refrigerate and/or freeze this bank.
- Consider colostrum supplement use.

2. *Feed "low risk" milk.*
- Milk replacer is best.
- Pasteurize milk or collect it only from healthy cows with recent negative tests.
- Thoroughly clean the udder and teats before collection to avoid fecal contamination.

C. Reduce infections by management of infected animals.

1. *Identify and remove clinical and late stage animals as soon as possible*.
- Watch for and confirm diagnosis of Johne's-suspect animals.
- Cull test-positives immediately or segregate them from maternity areas and young stock.
- Do not feed colostrum or milk from test-positive animals.
- Consider culling or segregating all offspring from infected dams.

2. *Test to manage subclinical animals and define herd status.*
- Carry out test strategies to identify subclinically infected animals.
- Cull, segregate or manage subclinical animals to reduce pathogen exposure to others.
- Develop plans for high and low risk animals, based on test results, to enhance control efforts.
- Schedule herd testing to provide optimal information for dairy management, i.e., monthly testing of late-lactation cows.

3. *Be aware of disease risks when adding animals.*
- Know the risk for infections that may be acquired from the source-herd, i.e., Johne's, Salmonella, Strep ag, Staph aureus, BVD, Mycoplasma or infectious foot diseases.
- Consider pre-testing, including the source herd, where appropriate.
- Isolate, observe and test new arrivals before adding them to the herd. Also, create a routine test program

D. Work with clients and key employees to develop a plan.

- Discuss participating in the New York Cattle Health Assurance Program. This program provides assistance to develop a Johne's plan that meets the client's goals and other

priority issues.
- Consider purchasing the “Johne’s Disease Manual for Veterinarians,” Bovine Practitioner, June 1999 as a guide to Johne’s planning.
- Develop a prevention or control plan with your clients.
- Assess herd history and estimate the level and potential impact of Johne’s disease.
- Conduct a risk assessment of areas where infection can spread on the farm.
- Help clients define specific control measures to meet their objectives and situation.
- Involve employees and other advisors from the start as a team responsible for carrying out the plan over the long-term.

Note:
Some additional recommendations are:

1 Obtain current information on Johne’s disease epidemiology, control points and diagnostic test performance and interpretation.

2. Ask if the diagnostic laboratory is approved by the NVSL for the Johne’s disease diagnostic tests offered and what test interpretation is provided.