Aim for Johne’s eradication

By Kimberlee Bungert

It’s time for the dairy industry to rid itself of Johne’s disease. Here’s why.

You remember the day she came home. It was just a little more than 10 years ago. She turned out to be the top producer in the herd. One day she calved. You rejoiced, a heifer. Then it happened, your milking wonder began to lose weight, suffer diarrhea, and the ultimate blow — a drop in milk production. You had no choice but to cull her. Her daughter remained. Soon she freshened, another high producer. Then it happened again. This time you did something about it, you had her tested for Johne’s disease. It came back positive.

Johne’s disease, or Mycobacterium paratuberculosis, usually creeps into a herd through the purchase of infected cattle, even from a purchase you made more than 10 years ago. Regardless of when it occurred, it’s there and you can’t ignore it. It slashes milk production anywhere from 5 percent to 25 percent, causing production losses of $227 per cow, according to a recently-released study by the National Animal Health Monitoring System (NAHMS) entitled, “Johne’s Disease on U.S. Dairy Operations.”

Furthermore, Johne’s disease infects 20 percent to 40 percent of U.S. herds. Granted, this percentage isn’t large, but if left unchecked, it will increase.

In light of this, the dairy industry needs to be proactive. Here’s why it’s a worthy goal to eradicate Johne’s:

**Eradication can be done**

Sure, it might take awhile before you notice Johne’s in a herd, and by then it might seem like an impossible goal to eradicate it, but don’t give up hope. If you understand the biology of the disease — specifically, how the Johne’s-causing bacteria replicate — you can see some reason for optimism.

First of all, the mycobacterium almost always lives in the intestine of an infected animal.

When a calf eats feed, colostrum, or milk which has been infected with Johne’s, specialized cells in the small intestine capture the mycobacteria, intending to kill it. Unfortunately, they can’t, so the mycobacteria end up growing inside the white blood cells — macrophages — that normally kill harmful bacteria, explains Mike Collins, University of Wisconsin School of Veterinary Medicine.

Over a two- to three-year period, as the macrophages multiply to try and overpower the disease, the disease multiplies as well. The result: The intestinal wall thickens, becomes

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Lost milk income from one Johne’s cow

**Healthy cow**

**Johne’s-positive cow**

Pounds milk per lactation: 18,500 - 17,100 = 1,400 lb. loss

Lost income when milk is priced at $12 per hundredweight

$2,220 - $2,052 = $168

A cow that tests positive for Johne’s disease produces about 1,400 pounds less milk per lactation than a healthy cow, with a loss of $168 per cow per lactation.

Adapted from Sweeney, et al., 1992, University of Pennsylvania School of Veterinary Medicine.
Dairy producer ruminarity with Johne’s Disease

- Knew some basics
- Fairly knowledgeable
- Not heard of it before
- Recognized name


Testing holds promise
Eradication may seem impossible since diagnostic tests to find infected animals are not 100 percent reliable. The leading blood test, the ELISA, has a sensitivity of 45 percent to 50 percent, meaning it detects roughly half of the infected animals in a herd.

However, as far as sensitivity is concerned, the ELISA is comparable to other tests which have been used successfully in disease eradication.

For example, the test for bovine tuberculosis (TB) has a sensitivity of 84 percent, Collins says. Despite the test’s less-than-absolute sensitivity, and the fact that it is a crude skin test, TB has been eradicated from the U.S.

And, the only brucellosis test available detects 70 percent to 75 percent of brucellosis-infected cattle, yet the U.S. is almost free of this disease, too.

The TB and brucellosis tests worked because they are used in conjunction with herd-wide eradication programs rather than concentrating on individual animals.

Researchers have developed more than one test for Johne’s disease. Besides a $5 ELISA blood test, tests for Johne’s range from fecal cultures that cost about $12 per animal to more expensive DNA probes for fecal samples that cost $25 per sample. Fecal culturing tests have a 50 percent to 60 percent sensitivity. DNA probes have a 25 percent to 30 percent sensitivity, but detect the bacterium faster, with results in 10 days.

“We have more than enough tools,” Collins says.

Economic importance
If you think eradication is unnecessary because your cows are milking profitably, think again. Because Johne’s creeps into a herd gradually over several years, you may not notice the subtle economic impacts. However, they add up, costing a producer almost $227 per cow, according to the NAHMS study. (Note: This $227 loss occurs for every cow within a herd which has at least 10 percent of its total cows showing clinical signs, like diarrhea and weight loss.)

In other words, a 100-cow herd, with 10 cows showing clinical signs, experiences an annual loss of nearly $23,000.

In a four-year study conducted by Ray Sweaney and associates at the University of Pennsylvania School of Veterinary Medicine, researchers found that healthy Holstein cows produced 18,502 pounds of milk in their last lactation, compared to 17,098 pounds for cows infected with Johne’s, but not displaying clinical signs of the disease.

Taking this one step further, if you milk an infected cow, you would lose about 1,400 pounds of milk. At $12 per hundredweight, this amounts to a $168 loss in milk production per year for one cow alone. If you have 10 infected cows, you lose $1,680 in milk production in one year.

Researchers at the University of Wisconsin School of Veterinary Medicine reported in the June 1996 Journal of the American Veterinary Medical Association that Johne’s-infected cows produced 2 percent to 19 percent less milk than Johne’s-negative herdmates. Out of 1,653 cows, 147 Johne’s-positive cows produced 829 fewer pounds of milk per lactation, on average, than healthy cows.

Although losses due to reduced milk production remain the largest concern, additional losses occur from increased culling and the inability to sell purebred stock.

Human health concerns
Although the threat of economic loss drives most producers to consider eradication, a possible, yet unproven, link between Johne’s and a human infection — Crohn’s disease — has impacts on the industry as well.

“The threat of a public health scare

Educate yourself about Johne’s

Don’t be left in the dark. Use the following resources to learn more about Johne’s disease and how to eradicate it from your herd:

- Your local veterinarian.
- Your state Johne’s Disease Committee, if formed.
- The NAHMS Dairy ‘96 Study: Johne’s Disease on U.S. Dairy Operations, 1997. To receive a copy, call the USDA Centers for Epidemiology and Animal Health at (970) 490-8000, or e-mail the agency at: nahms_info@aphis.usda.gov., or look for it on the Internet at http://www.aphis.usda.gov/VS/ceah/cahn, then look under NAHMS and dairy.
- National Johne’s Working Group. Contact Don Hansen, Oregon State University, phone (541) 737-6533, or e-mail him at hanson@ccmail.orst.edu.
is a subtle, but strong driving force,” Collins says. The dairy industry needs to look at Johne’s on an industry level more so than on an individual herd level, he adds.

Crohn’s disease peaks in humans between the ages of 15 to 35, causing chronic diarrhea that can recur at various times throughout an individual’s lifetime. Crohn’s victims can die, but, in most cases, patients end up living with the disease, often requiring two to three surgeries to remove damaged parts of the intestine.

“...The easiest way to live with the disease (Johne’s) is to certify your herd is free of it.” —Mike Collins, veterinary microbiologist, University of Wisconsin School of Veterinary Medicine.

Medical literature indicates that antibiotics are successful in treating some Crohn’s patients.

Although the cause of Crohn’s disease continues to elude researchers, some speculate it may be a hereditary condition, particularly for females. It also appears to develop more frequently among urban residents. But, researchers can’t yet prove whether exposure to animals with Johne’s or consumption of food products from infected animals can lead to Crohn’s disease or not.

If a link between Crohn’s and Johne’s does exist, perhaps the biggest unanswered question for dairy producers is whether pasteurization kills the Johne’s-causing mycobacterium. A study conducted in 1996 at the USDA’s National Animal Disease Center in Ames, Iowa, concluded that pasteurization does kills the mycobacterium. The study noted that a heat treatment of 161.5°F — similar to commercial pasteurization — was effective at reducing bacterial numbers, thus reducing the organism’s potential threat as a human pathogen.

However, two other studies contradict this finding, leaving the issue of pasteurization unresolved, Collins says. One of these studies, published in 1996 in Applied and Environmental Microbiology, stated that the mycobacterium could survive a pasteurization temperature of 161°F if present in milk in sufficient numbers, such as greater than 10,000 mycobacteria per milliliter. However, the USDA study used a laboratory-scale pasteurizer to simulate the industrial process, whereas the other studies did not.

What are the consequences if the potential link between Crohn’s and Johne’s seeps into the popular press and is misinterpreted? It is only too well-known what happened to the beef industry regarding the mad cow disease scare and, more recently, the E. coli-contaminated hamburger recall that caused the shutdown of a plant in Nebraska. Both of these cases demonstrate the potential backlash which can occur when the public questions food safety. Let’s remove the potential danger hanging over our heads by simply getting rid of Johne’s.