

Johne's disease- What do I need to know?

About the disease: Clinical Johne's disease has been reported similarly from almost all countries in the world. It has also been reported from sheep, goats, deer, llamas, and other ruminants. Johne's disease typically starts as an infection in calves though clinical signs do not usually appear until 2 to 5 years later. The disease is difficult to find in its early stages. It reduces milk production, the productive life of cattle, and has no cure. While this is a complex disease that we do not completely understand, basic information about this microbe, how it is transmitted and how to control it, is available.

The Culprit: Johne's disease results from infection by bacteria called *Mycobacterium paratuberculosis*. This organism grows very slowly, causes the disease to gradually worsen and is highly resistant to the infected animal's immune defenses. Therefore, infected animals harbor the organism for years before they test positive or develop disease signs. According to the NAHMS Dairy '96 study, the greatest number of test-positive animals was in milk cows in their third and fourth lactation (Figure 1). The infection primarily affects the intestine, leading to prolonged diarrhea, poor digestion and excessive weight loss. Diseased animals do not refuse feed until they are severely affected. These bacteria are typically shed, in varying numbers, in a diseased animal's feces. Once outside the animal, the bacteria is quite hardy, living for months in water, feed and manure. The bacteria may then be picked up in fecally contaminated feed or water by non-infected animals. These newly exposed animals may develop disease and spread it within the herd.

Transmission: Many of our previous beliefs about this disease's transmission and control have been challenged by the results of recent research studies. Contrary to earlier notions that fecal contamination of feed and water was the sole means of transmission, infection of calves before they are born is also possible. It appears to happen to calves from 20-40% of infected cows showing clinical signs and about 10% of infected cows not showing clinical signs. In addition, the bacteria may be shed directly in milk and colostrum from infected cows, even without fecal contamination. Calves less than 6 months old are most vulnerable to infection. Under group housing conditions with high levels of exposure to the organism, Johne's disease can occur in cattle 16 to 27 months old. As Johne's disease is just beginning to spread in a herd, there may be only one or two animals showing clinical disease signs at a time. These sick animals are culled and the disease may go unrecognized as a whole herd problem for some time.

National Picture: Based on blood testing and clinical history, the NAHMS Dairy '96 Study estimated that about 22% of our dairies are infected with the Johne's disease organism. Herd prevalence increases with herd size, as about 40% of the herds with at least 300 cows are infected, compared to less than 20% of herds with less than 50 cows (Figure 2). The larger the herd the higher the risk of Johne's disease. Only minor regional differences were noted (Figure 3), indicating that dairy producers in all regions of the country need to consider implications and risks associated with this disease.

About testing: For determining the disease status of a herd or an animal, both fecal culture and blood serum antibody-tests are available to producers. A problem with current tests, particularly for the individual animal, is their failure to detect early infections. This is because blood antibody development and/or heavy fecal shedding do not usually occur until late in the course of the disease. The difficulty in detecting early infections, along with very long period before clinical signs develop, may allow Johne's disease to remain a hidden herd problem. However, test results

may be used along with clinical signs of disease to effectively provide disease management information for either an individual cow or whole herd.

Control: The principles of Johne's disease control on a herd basis have been established and can be effective. These principles relate to factors such as source of replacement heifers, manure management to reduce fecal contamination of the environment, and repeated herd monitoring. A problem to date is that Johne's disease control programs, requiring a long-term commitment to a consistent approach while adapted to the needs of individual herds, have not been met with overwhelming enthusiasm.

Finding replacements: Since Johne's disease occurs throughout the U.S., identification of uninfected or low risk herds as sources of replacement heifers would be beneficial. Currently, identification of infected animals before they are in an advanced disease stage and/or shedding significant numbers of pathogens in their feces is not very accurate. This makes it difficult to prevent the start of disease when introducing new cattle to dairy operations. Questions about choosing a source for replacement heifers and the appropriate disposition of young stock from a positive herd remain difficult to answer. Since an estimated 44% of U.S. dairy operations introduce cattle of various classes and ages each year (USDA-APHIS-VS, 1996), the availability of low risk cattle as herd replacements is critical. Johne's herd certification programs, with repeated herd testing, provide best assurance for obtaining low risk cattle for replacements. This is certainly a lower risk than that from introducing untested or test-negative cattle from a herd with no documentation as to its actual Johne's disease status.

Public health: The Johne's disease bacteria, *M. paratuberculosis*, has been isolated from humans with Crohn's disease, a chronic intestinal disease. Since results from various studies evaluating possible associations between these diseases of humans and cattle have been contradictory, uncertainty about potential risk to public health from this organism persists. USDA-ARS research on the effectiveness of pasteurization to kill the organism in milk indicates that commercial pasteurization does inactivate the Johne's bacteria in milk. However, potential public health concerns remain about Johne's bacteria still active in undercooked meat, unpasteurized milk products, and water.

Awareness about the disease: Several states have Johne's disease control programs in place or are in the process of implementing them but, to this date, there has not been a consistent national or industry-wide education or control program in the U.S. This is beginning to change. The Johne's Committee of the U.S. Animal Health Association has formed the National Johne's Working Group to begin more cohesive education and control efforts to deal with this insidious disease. This group is planning to provide additional educational materials and a coordinated education plan in the near future.

This information is condensed from an article by Franklyn Garry of CSU, Scott Wells of CEAH and Don Hansen of Oregon State University that will appear in national publications.