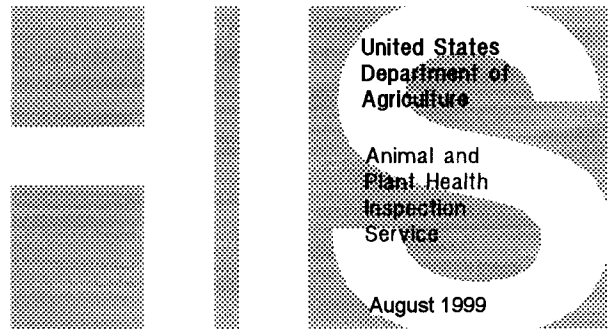


INFO SHEET

Veterinary Services



What Do I Need to Know About Johne's Disease in Beef Cattle?

Introduction

Johne's disease, pronounced YO-knees, was identified more than a century ago, yet remains a common and, sometimes, costly infectious disease of dairy cattle. Johne's disease has also been documented in beef herds throughout the U.S. Furthermore, Johne's disease is not limited to cattle, since it has been diagnosed in a variety of domestic and free-ranging animals, such as sheep, goats, deer, llamas, elk, and bison, and other ruminants. The infection is not limited to the U.S. as clinical Johne's disease has been reported in almost all countries around the world.

In spite of this situation, many U.S. beef producers are unfamiliar with Johne's disease.

The Beef '97 Study, a recent project by the USDA's National Animal Health Monitoring System (NAHMS), showed that 92.2 percent of beef producers were either unaware of Johne's disease or recognized the name but knew little else about it (Figure 1). Lack of familiarity with Johne's disease was generally present across regions of the country and across sizes of operations (Figure 2).

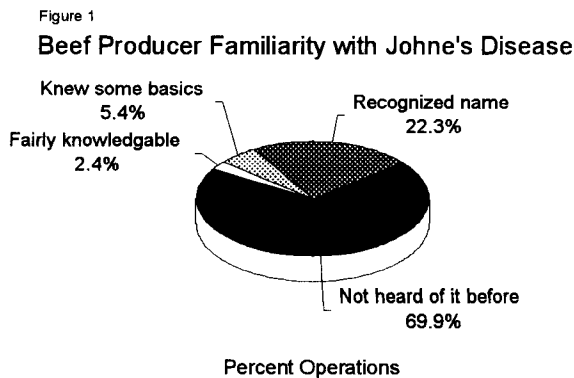
This lack of familiarity has hindered control and prevention of Johne's disease in this country, and efforts are currently underway to educate beef producers about Johne's disease.

Johne's disease typically starts as an infection in calves, though clinical signs do not generally appear until cattle are 2 to 5 years of age. The infection is difficult to detect in its early stages. In dairy cattle it reduces milk production and the productive life of cattle. Though not well documented, similar effects are thought to occur in beef cattle. There is no cure for Johne's disease once an animal becomes infected.

Producers and others in the industry need to be familiar with Johne's disease and its implications for their operations. While this is a complex disease that we do not completely understand, basic information is available about the bacteria that cause Johne's disease, how it is transmitted, and how to control it.

National Picture of Johne's Disease Prevalence

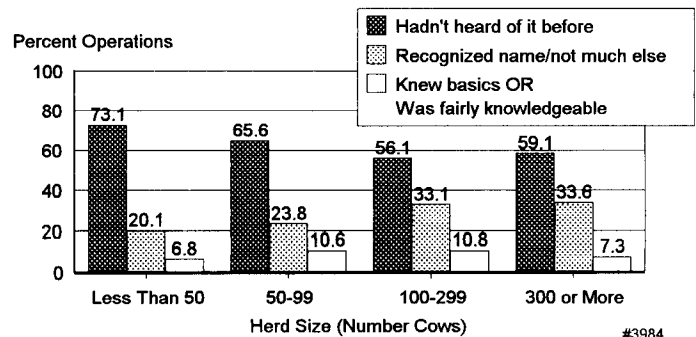
Previous USDA-Agricultural Research Service (ARS) studies have estimated prevalence of Johne's infection from individual states and regions, however it has been difficult to get a national perspective from these studies. A study conducted over a decade ago sampled cattle at slaughterhouses and, finding a low prevalence of



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Figure 2

Percent of Operations by Familiarity with Johne's Disease and Herd Size



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infected cull cows, failed to generate concern about Johne's disease. In that study, 2.9 percent of culled dairy cows and 0.8 percent of culled beef cows showed evidence of infection with the Johne's organism.

More recently, the NAHMS Dairy '96 study estimated that 21.6 percent of dairy herds had animals with Johne's infections. Overall, the study estimated 3.4 percent of cows were infected.

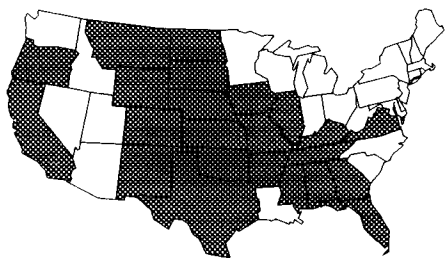
In the NAHMS Beef '97 study, blood samples from 10,372 cows in 380 herds from 21 states¹ (Figure 3) were submitted for testing. *Of these samples, 40 (0.4 percent) were positive for antibodies to the organism that causes Johne's disease.* These 40 positive animals were from 30 (7.9 percent) of the tested herds.

Though these percentages are low, readers should keep in mind that the sampling protocol was designed to identify herds with at least 10 percent of the animals infected. It is possible that the within-herd prevalence could have been lower than 10 percent in beef herds that were more extensively managed, and the study likely failed to identify most of these herds. The estimated prevalence of 7.9 percent should be considered a conservative estimate.

In addition, this study was set up to evaluate prevalence across the industry in general. Prevalences in certain locations of the country or in certain types of operations may be higher than the industry level as a whole. However, this study could not detect these differences. Since purebred operations supply genetics to a wide cross-section of the industry, future studies may attempt to evaluate this segment of the population more closely. As for now, given the low level of sampling in purebred operations in this study, there is not enough information to say whether this group is at lower or higher risk of being positive for Johne's disease.

Figure 3

Beef '97 Study Participating States



USDA:APHIS:VS, #3457

Cost of Disease

The NAHMS Dairy '96 Study estimated that the cost of Johne's disease in dairy herds can be quite high. Currently, we have no estimates for the cost of Johne's disease in beef herds because few studies have focused in-depth on Johne's disease in beef cattle.

About the Disease

Johne's disease results from infection with bacteria called *Mycobacterium paratuberculosis*. This organism grows very slowly, causes a gradually worsening disease condition, and is highly resistant to the infected animal's immune defenses. Therefore, infected animals may harbor the organism for years before they test positive or develop disease signs.

The bacteria primarily infect 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 an infected animal's feces. Once outside the animal, the bacteria no longer multiply, however they are quite hardy, living for months in water, feed, and manure. Susceptible, non-infected animals may then pick up the bacteria through fecally contaminated feed or water. These newly exposed animals may develop disease and spread it within the herd.

Calves less than 6 months old are most vulnerable to infection. Under intensive housing conditions with a high level of exposure of young cattle to the organism, clinical Johne's disease can become common in cattle from 1 to 3 years of age. As Johne's disease begins to spread in a herd, one or two animals may show 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.

Recent research has added to our understanding of Johne's disease transmission. 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 possible. Fetal infection can occur in 20 to 40 percent of calves from infected cows showing clinical signs and about 10 percent of calves from infected cows not showing clinical signs. The bacteria may also be shed directly in milk and colostrum from infected cows, even without fecal contamination.

About Testing

Both fecal culture and blood serum antibody tests are available to producers to determine the disease status of

¹ Data on producer familiarity were collected in 23 states. However, blood samples were not collected in Florida or Oklahoma.

a herd or an animal. Current tests are good tools, although they have some limitations, particularly in accurately determining the status of the individual animal. Both tests fail to detect early infections because blood antibody development and detectable fecal shedding do not usually occur until late in the course of the infection. In addition, blood serum antibody tests can give false positive results which is why actions with regard to an individual animal with positive test results should be made in consultation with a veterinarian. It may be helpful to confirm results with another type of test.

The difficulty in detecting early infections and the long period before clinical signs develop may allow Johne's disease to remain a hidden herd problem. However, informed use of tests along with a history of clinical signs of disease in the herd can provide information to assist disease management in the individual cow and the herd.

Liability

Producers should consider ethical responsibilities and the potential for legal liability. Absence of a definitive diagnosis of Johne's disease may not protect producers from legal liability for selling infected animals.

Public Health

Johne's disease bacteria, *M. paratuberculosis*, has been isolated from a few humans with Crohn's disease, as have numerous other bacteria and viruses. Since results from various studies evaluating the role of *M. paratuberculosis* in Crohn's disease have been contradictory, uncertainty about potential risk to public health from this organism persists. Some researchers have concerns about *M. paratuberculosis* bacteria in undercooked meat, unpasteurized milk products, and water.

Because of continued potential public health concerns relating to this disease, animal production industries must give this disease more attention.

Control

Principles of Johne's disease control include:

- *reducing exposure and infection of replacement cattle on farm*
- *identifying and removing the most highly infected cattle, and*
- *preventing introduction of infection by screening sources of off-farm replacements.*

Johne's disease control programs require a long-term commitment to prevention and must be adapted to

Johne's disease is a herd problem that worsens with time, reducing production and profit.

individual herds. This approach, however, has not yet been widely adopted by veterinarians and producers.

Opportunity for the Beef Industry

The estimated low prevalence of Johne's disease in beef herds could offer a bigger opportunity for the industry. A buyer beware strategy combined with herd status programs to identify and protect non-infected herds in the U.S. could feasibly eliminate Johne's disease as a future problem for the beef industry. An example of such a program is the Voluntary Johne's Disease Herd Status Program (VJDHSP) for cattle, approved by the U.S. Animal Health Association in 1998.

Taking an example from Australia, industry and government implemented the Australian Johne's disease cattle Market Assurance Program in 1996. This program is similar to the U.S. VJDHSP for cattle. The Australian program encourages low-risk herds to test to identify their status for buyers and publicizes the message for buyers to ask sources for a declaration about Johne's disease status. The industry has recognized the opportunity and advantage of protecting herds in uninfected regions of the country and eliminating Johne's disease from herds in the low prevalence areas, before the infection spreads further. The Australian sheep and llama industries have followed with similar programs.

Finding Replacements

Since Johne's disease occurs throughout the U.S., identification of uninfected or low-risk herds as sources of replacement heifers and bulls 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 limitation makes it difficult to prevent the introduction of disease when adding new cattle to beef operations. Questions about choosing a source for replacement heifers and bulls and the appropriate disposition of young stock from a positive herd remain difficult to answer.

The VJDHSP for cattle uses repeated herd testing to provide the best assurance of obtaining low-risk cattle for replacements. This practice represents a lower risk than introducing untested or test-negative cattle from a herd with no documentation as to its actual Johne's disease status.

Awareness about the Disease

Several states have Johne's disease advisory boards and control programs in place or are in the process of implementing them. State efforts should help to increase education about Johne's disease and develop constructive state policies to support the industries in controlling it and identify source herds at low risk. Good information and veterinary and industry involvement are needed to appropriately address the impact of Johne's disease in the industry.

The NAHMS Beef '97 study highlighted the need for education by showing that 92.2 percent of beef producers were either unaware of Johne's disease or recognized the name, but knew little else about it. Lack of familiarity has limited adoption of Johne's disease prevention efforts. Interested beef producers are encouraged to find out more about efforts in their state and perhaps consider participating on a board.

What's Next?

The time is past when we could think of the major impact of Johne's disease as an occasional cow with diarrhea that could be culled and forgotten. Johne's disease is a herd problem that worsens with time, reducing production and profit. It may even come under further scrutiny as a risk to human health. Implications of Johne's disease should be considered by all beef producers, and control strategies are available for implementation.

National industry-wide education programs have begun in the U.S. In 1995, the Johne's Disease Committee of the U.S. Animal Health Association formed the National Johne's Working Group which has begun cohesive education, research, and control efforts to deal with this insidious disease. This working group has been actively involved with planning the Johne's disease aspects of the NAHMS Dairy '96 and Beef '97 national studies, the USDA-ARS pasteurization studies previously mentioned, and development of a process to standardize Johne's disease tests across laboratories. The next steps for the National Johne's Working Group involve planning to provide additional educational materials and support to industry and state efforts to implement a coordinated education plan.

On a more direct level, we believe all beef producers should ask themselves the following questions:

- *Is Johne's disease important to me?*
- *How can I identify Johne's disease in my herd?*
- *If I find it, what should I do?*
- *If my herd doesn't have Johne's disease, how do I keep it out?*

To help improve recognition and familiarity with Johne's disease, we intend to distribute further articles on various Johne's disease considerations in the coming months. For additional sources of information, the following are available:

- ♦ Your local veterinarian
- ♦ Your state Johne's Disease Committee, if formed
- ♦ *Paratuberculosis (Johne's disease)*, Veterinary Clinics of North America-Food Animal practice, July 1996. Ed: R.W. Sweeney.
- ♦ Johne's Information Center on the World Wide Web at <http://www.vetmed.wisc.edu/pbs/johnes/>
- ♦ National Johne's Working Group, Education Subcommittee Chair, Dr. Don Hansen, Oregon State University
- ♦ USDA:APHIS:VS, Centers for Epidemiology and Animal Health on the World Wide Web at <http://www.aphis.usda.gov/vs/ceah> (for Johne's disease information, see the Center for Animal Health Monitoring then the Dairy Cattle or Beef Cow-calf pages)

For more information, contact:

Dave Dargatz,
USDA:APHIS:VS
Centers for Epidemiology and Animal Health

Franklyn Garry,
Department of Clinical Sciences
Colorado State University

Don Hansen,
Extension Veterinarian
Oregon State University

Chris Rossiter,
New York State Diagnostic Laboratory
Cornell University

Allen Roussel,
Department of Veterinary Large Animal Medicine and Surgery
Texas A&M University

Centers for Epidemiology and Animal Health
USDA:APHIS:VS, attn. NAHMS
2150 Centre Ave., Bldg. B, MS 2E7
Fort Collins, CO 80526-8117
(970) 494-7000

E-mail: NAHMSweb@aphis.usda.gov
<http://www.aphis.usda.gov/vs/ceah/cahm>