

Johne's Disease

Johne's disease (pronounced "yo-knees") is a contagious, chronic, and usually fatal infection that affects primarily the small intestine of ruminants. All ruminants are susceptible to Johne's disease. It is caused by *Mycobacterium paratuberculosis*, a hardy bacterium related to the agents of leprosy and tuberculosis. The disease occurs worldwide.

Clinical Signs

Signs of Johne's disease include weight loss and diarrhea (in cattle) with a normal appetite. Several weeks after the onset of diarrhea, a soft swelling may occur under the jaw (bottle jaw). Bottle jaw or intermandibular edema is due to protein loss from the bloodstream into the digestive tract. Animals at this stage of the disease will not live very long, perhaps a few weeks at most.

For cattle, signs are rarely evident until 2 or more years (maybe sooner in other species) after the initial infection, which usually occurs shortly after birth. Animals are most susceptible to the infection in the first year of life. A newborn most often becomes infected by swallowing small amounts of infected manure from the birthing environment or from the udder of its mother. In addition, newborns may become infected while in the uterus or by swallowing bacteria passed in milk and colostrum. Animals exposed at an older age, or exposed to a very small dose of bacteria at a young age, are not likely to develop clinical disease until they are much older than 2 years.

A national study of U.S. dairies ("National Animal Health Monitoring and Surveillance (NAHMS) 2007 Dairy Study") found that approximately 68 percent of U.S. dairy herds had at least one cow actively shedding the organism in their feces. In the study, the herd prevalence rate increased to 95 percent in large herds with over 500 animals. The NAHMS 1996 Dairy Study determined that producers with infected herds that had more than 10 percent of their cull cows showing clinical signs experienced losses of \$227 per cow in their inventory per year. In herds with less than 10 percent of the culls showing clinical signs, the loss was estimated at \$40 per cow in the herd. This loss was due to reduced milk production, early culling, and poor conditioning at culling. Accurate estimates of the cost of Johne's disease in beef herds still need to be determined.

Producers can implement farm-specific plans to reduce economic losses and cleanup Johne's disease from their farms. For more information on Johne's disease, diagnosis, prevention, and control, contact your herd veterinarian or your State's extension office.

How Johne's Disease Spreads

The primary site targeted by Johne's disease is the lower part of the intestine known as the ileum. The bacteria that causes Johne's disease embeds itself in the wall of the ileum. As an immune response, infected tissues attempt to regenerate healthy tissue, which leads to visible thickening of the intestines. This prevents nutrient absorption and results in weight loss. Late in the infection, antibody production by the animal can be found in its serum. This is an indicator that clinical signs of disease and death from the infection will soon follow.

Prevention

Transmission of Johne's disease occurs when infected animals that appear healthy are introduced to a new herd. Owners of herds that are not infected should take precautions against introduction of Johne's disease. Such precautions include keeping a closed herd, or requiring that replacement animals come from test-negative herds.

In April 2002, the U.S. Department of Agriculture's (USDA) Animal and Plant Health Inspection Service's (APHIS) Veterinary Services staff published Uniform Program Standards for the Voluntary Bovine Johne's Disease Control Program (VBJDCP). The objective of this program is to bring uniformity to the States that currently have individual Johne's disease control programs. It also assists those States that would like to implement programs of their own.

Some basic prevention strategies include:

- Ensure that calves, lambs, kids, and other ruminants are born in a clean environment.
- Reduce newborns' exposure to manure from adult animals by separating when possible.
- Avoid manure contamination in feed by using feed bunks and not using the same equipment to handle feed and move manure.
- Avoid manure contamination of water sources where animals drink.
- Use colostrum from Johne's-negative animals for the natural colostrum needs of newborn animals.
- Do not pool colostrum.

- Avoid natural nursing and milk feeding whenever possible. Feed an artificial milk replacer or pasteurized milk instead of raw milk to supply the needs of newborns. Never feed pooled milk or waste milk.
- Thoroughly clean the udder and teats before collecting colostrum to avoid manure contamination.
- Remember that *M. paratuberculosis* can survive up to a year in the environment. If possible, for pastures that have become contaminated, till the ground or graze the pasture with nonreplacement feeder cattle.
- Identify all females in the herd. Identify and remove, or keep separate, all test-positive animals.
- Prevent infection from spreading by culling or separating offspring of infected mothers as soon as possible.
- Try to buy from low risk herds when purchasing herd additions. Some herds are enrolled in the VBJDCP to help identify their herd as low risk.
- Work with your veterinarian to develop a strategic plan for Johne's prevention and control for your farm. Consult with a veterinarian about which Johne's test is best for your situation, and use a test-certified diagnostic laboratory.

Johne's Disease and Humans

The *M. paratuberculosis* bacteria—sometimes referred to as MAP bacteria—that causes Johne's disease is not currently known to cause disease in humans, but it has been detected in humans with Crohn's disease, as have numerous other bacteria and viruses. The symptoms of Crohn's disease in humans are similar to the signs of Johne's disease in ruminants. However, no definitive evidence is available proving MAP causes Crohn's disease. A few publications have shown MAP to be an opportunistic pathogen in people with compromised immune systems.

Research from USDA's Agricultural Research Service indicates that commercial pasteurization inactivates MAP bacteria in milk. However, some researchers still have concerns about MAP in undercooked meat, unpasteurized milk products, and water as potential sources of exposure. While MAP remains largely an animal health issue, the risk of human exposure through contaminated food sources creates a quality assurance concern in milk and meat products.

APHIS' Role

APHIS' role in the design and implementation of a national Johne's disease control program has been to provide expertise and help coordinate implementation of Johne's disease programs by the States. In addition, APHIS works closely with State and industry counterparts through the U.S. Animal Health Association (USAHA).

In the fall of 1995, USAHA appointed a National Johne's Working Group to assist the Johne's committee of USAHA in developing a national, coordinated Johne's disease effort in conjunction with the States and cattle industries. The working group, in coordination with APHIS, developed a strategic plan designed to reduce the prevalence of Johne's disease in U.S. cattle. This plan includes a national educational campaign, the VBJDCP, and guidelines for States to assist infected herds. This national program is designed to be producer driven and voluntary. Other U.S. livestock industries are examining potential certification and control programs for their industries as well. The American Zoological Association has prepared Johne's disease guidelines.

For More Information

For more information on the working group's activities, visit USAHA's Web site at: <http://www.usaha.org>.

For more information on APHIS' role in developing and implementing the VJDBCP contact:

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