Prevention and Control of Johne's Disease in Beef Cattle

Lew Strickland, DVM, Extension Veterinarian, Animal Science Department

University of Tennessee

Introduction

Many animals in the early stages of Johne's disease may not be seen. Therefore, it becomes a herd problem, besides an individual animal problem. Johne's disease can be prevented, controlled and even eliminated from infected herds, based on a thorough understanding of the disease. Half-hearted attempts to prevent or control Johne's disease will generally fail. Once a herd becomes infected, control of Johne's disease takes time. Usually, the infection has been spreading through the herd for a few years before clinical cases are noticed. A typical herd control program may take 5 years or longer. Faster programs are possible, but may be more expensive. Prevention is cheaper than control.

Prevention

As veterinarians and producers alike believe most of the U.S. beef herds do not have Johne's disease, a contagious bacterial intestinal infection, prevention should be the goal of every ranch and farm that is currently free of the disease. It is encouraging to note that management practices directed at preventing Johne's disease will also reduce the risk for other important cattle diseases as well.

Several viral, bacterial and parasitic intestinal diseases that affect beef herds are also transmitted from infected animals excreting or shedding the pathogen in their feces. A potential list of these pathogens includes calf scour microbes like BVD, Corona and Rota viruses, *E. coli*, and Salmonella bacteria. There are also intestinal parasites like Coccidia and Crypto plus nematodes or worms transmitted through manure.

The basics of prevention are straightforward. Prevent infections by closing the herd from animal additions or securing additions or replacements from Johne's-free or Johne's test-negative herds. In herds where infection is already present, additional steps are required for control. These include manure management, colostrum or milk management, identification of infected animals and their removal or separation from the herd, and by culling offspring of known infected mothers.

I. Prevention Practices

Prevent infections by closing the herd or securing additions from Johne's free or Johne's test-negative herds.

Purchase replacements from a herd that has individual cow/calf records, good management practices and is currently herd-test-negative.

Purchase replacements from a herd that has had no evidence of Johne's disease for 5 years as a second choice.

II Control Practices for an infected Herd

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

1. Maintain high standards of cleanliness in animal handling during calving periods.
2. Avoid build-up of manure and contaminated mud in pastures and corrals where animals are kept.
3. Calves should be born in a clean environment with minimal fecal contamination.
4. Avoid crowded calving areas.
5. Place new cow/calf pairs into clean uncrowded pastures as soon as bonding has occurred.
6. Keep cow/calf pairs and replacement heifers in clean uncrowded pastures.
7. Protect post-weaned replacement heifers from adult fecal contamination at least until they are a year old.
8. Avoid manure contamination of feed by using feed bunks, hay racks and by not using the same equipment to handle feed and move manure.
9. Avoid manure contamination of water sources where animals drink.
10. For maximum risk reduction, infected pastures could be tilled or grazed by non-replacement, feeder-cattle until environmental conditions destroy the microbe.

B. Reduce infections in calves by colostrum management

1. Use the colostrum from Johne's-negative dams if needed to supplement some newborn calves.
2. Thoroughly clean the udder and teats before collection of the colostrum to avoid manure contamination.
3. Clean dam's udder and teats following any assisted births.

C. Reduce infection spread by identifying and removing infected animals and their calves

1. Consult with your veterinarian for decisions on how best to use and interpret tests used for diagnosis of Johne's disease.
2. Use a test-certified diagnostic laboratory for running your tests.
3. Identify all females and their daughters remaining in the herd.

4. Remove, or keep separate, all test-positive animals.
5. Prevent infection spread by culling, or separating, offspring of infected mothers.

Note: Information in this section has been reviewed by the National Johne's Working Group, a subcommittee of the Johne's Committee of the U. S. Animal Health Association.

Some Johne's Disease Prevention or Control Plan Options for Beef Herds

1. Make Management changes only
It should be noted that these management practices are essential for the success of other program options. Reduce risk to calves by separating new cow/calf pairs from the rest of the herd when possible after birth. Avoid the spread of disease through fecal contamination by using elevated feeding troughs, hay racks and water troughs. Other management changes should include at least four steps:

1. Immediate isolation of any scouring or unthrifty animals;
2. Taking samples to diagnose condition;
3. Culling of any animal with diarrhea that is unresponsive to therapy and of an unknown cause;
4. Culling offspring of infected cattle.

Further management recommendations are to restrict access of susceptible stock to high-risk areas (including swamps and ponds) where infected animals are known or highly suspected to have been recently.

To buy time to clear heavily contaminated pastures, graze non-breeding stock on these high-risk areas. Sell these high-risk stock, i.e., cattle less than 12 months old exposed to infection, only through slaughter channels. Finally, keep a closed herd or purchase only from test-negative herds.

A management-only choice is generally more affordable than other more stringent choices. Most often it will likely reduce the load of infection in the herd and incidence of clinical cases to a steady state. In some herds, of low risk and low prevalence, good management only may eliminate Johne's disease.

A disadvantage to the management-only option may be that costs will not always be evident. These methods are unlikely to work in heavily infected herds or unsuitable environments. For best results, this management only option must become a permanent part of the operation. One final note: if the prevalence of infection in the herd is not known, an initial screening test is advised to establish a baseline for the herd. The test-positive animal(s) found by herd screening should be considered for culling.

2. Test and cull

This option requires adoption of the improved management practices as described. Whole-herd tests are recommended at least once per year. Confirmed positive cattle and their offspring must be immediately isolated and/or sold through feeder/slaughter channels. In herds with a low prevalence of infection, ELISA-positive test results should be confirmed with a culture test or with appropriate samples collected at slaughter. This approach permits assessment of the herd status, identification of high-risk groups, and monitoring of progress. Another advantage is the ability to have an objective assessment of herd status for the purpose of selling breeding stock. Managed well, there will likely be a quick reduction in infection and clinical disease, allowing rapid progress toward a test-negative status.

A disadvantage may be the cost associated with testing and culling reactors. Further, since some infected cattle will not be detected by the diagnostic tests early in their disease course, this option requires a long-term commitment.

Expected outcomes include a rapid reduction in the prevalence of the disease and a decrease of environmental loads of Johne's microbes. Further, this option can assist eradicating infection from most herds. The test and cull approach may be an option for seed-stock beef herds, commercial beef herds selling breeding stock, and some self-replacing herds.

3. Partial depopulation

This option requires sending high-risk groups of livestock and any other home-bred culls to slaughter only. Cull normally and sell all home-bred cattle through feeder or slaughter channels only. The operator must buy replacement cattle from test-negative herds.

Another option is to obtain a written statement from both the herd owner and the veterinarian of record that, to the best of their knowledge, Johne's disease has not been in the herd for the past 5 years. Long-term considerations suggest that management should progressively create low-risk pastures, i.e., grazing with low-risk terminal stock. Manage the herd as described above, emphasizing animal identification, record-keeping, whole-farm planning and risk assessment of operation.

This option generally incurs lower costs as compared with other options and, with good management skills and effective planning, will improve the prospects for overall success. One disadvantage is that low-risk replacement stock may not be identifiable or available for purchase until herd certification programs are more widely used. However, using this option to eliminate infection may still be possible in most herds. This may be an option for a beef herd where high-risk groups are well defined.

4. Two-herd program

This option requires producers to rear calves from seronegative dams in isolation like dairy calves, then gradually depopulate infected animals by selling to slaughter. Restocking occurs after an appropriate time lapse. Maintaining hygiene precautions is essential between the two locations.
This option may be tried with other options as well. It may also provide an excellent means of saving family lines of high genetic merit. As a caution, it should be noted that some infected cows will test negative and a small percent of calves from these cows may have become infected before birth. These infected calves might not be detected until they are adults. Currently, there are no tests commercially available that detect light infection in animals less than a year old.

5. Embryo transfer

There is minimal risk of embryos being contaminated. As a precaution, it is recommended to use embryos from Johne's-negative dams; however, embryos from infected dams may also be harvested with limited risk. Regardless, all embryos must be implanted in uninfected recipients. This option provides a means of saving family lines of high genetic merit. Success will depend on risk and disease freedom of recipients.

6. Vaccinate

Vaccinated cattle may become infected and shed the organism, but vaccination usually results in a reduction of clinical disease in herds. It also reduces the number of cows shedding the microbe. By that the environmental load of Johne's bacteria is also reduced, thus lowering the risk of infection spread to the herd. However, without other management practices, herd infection continues and is maintained at an unknown level. Vaccination may be an option for any heavily infected herd with a high rate of clinical disease to reduce some impact of clinical disease, but it is not a way to eliminate infection from the herd.

As with all other options, producers will need to adopt improved management as described. Use of the vaccine requires approval from the State Veterinarian and is only available in certain states. Every year, all calves must be vaccinated within 35 days of birth. Some states require permanent identification of all vaccinated cattle.

The expense of vaccination may be a disadvantage for some. The per-dose cost of vaccine may be high as it must be administered by a veterinarian. Further, vaccinated herds may remain infected. Vaccinated cattle may be sensitized to the standard tuberculin (TB) test and require a comparative test to be done. Vaccinates may be false-positive reactors to serological Johne's tests thus limiting the testing options that may be used in a control program. Injection-site lesions are common and severe tissue reactions occur from accidental injections into humans.

> Note: Information in this section has been reviewed by the National Johne's Working Group, a subcommittee of the Johne's Committee of the

U.S. Animal Health Association. Some material has been adapted with the kind permission from CSL Limited, Parkville Australia.