

NAHMS Dairy 2002: Johne's Disease on U.S. Dairy Operations

Data related to Johne's disease, collected during the National Animal Health Monitoring System's (NAHMS) Dairy 2002 study, will be released in February in a 170-page report entitled "Johne's Disease on U.S. Dairies, 2002." The report describes, in part, management practices that most likely prevent transmission of *Mycobacterium avium* subspecies *paratuberculosis* (MAP), a risk assessment evaluation, within-herd-level prevalence of MAP infection in U.S. dairy operations, and a significant reference section. Some material in this report was also included in previous NAHMS Dairy 2002 descriptive reports.

Producer Knowledge: Results from Dairy 2002 indicate that awareness about Johne's disease has increased among dairy producers since the NAHMS Dairy '96 study. Dairy '96 revealed that 17.7 percent of producers were fairly knowledgeable about the disease, while 9.9 percent had not heard of it. Dairy 2002 reported that 45.3 percent of producers were fairly knowledgeable about Johne's disease, while only 1.0 percent had not heard of it.

Clinical Signs Compatible with MAP Infection: Although not specific to Johne's disease, common clinical signs of MAP include normal appetite, diarrhea, and weight loss. Overall, 47.8 percent of operations had ever observed at least one cow in their herd with clinical signs of Johne's disease. The majority (70.9 percent) of large operations (500 or more dairy cows) observed at least one cow with clinical signs, compared to 58.4 percent of medium operations (100 to 499 dairy cows) and 43.1 percent of small operations (fewer than 100 dairy cows). The majority of operations (69.6 percent) observed no cows in their herd with clinical signs of Johne's disease during the 12 months prior to the 2002 study interview. A higher percentage of small operations observed no cows with clinical signs compared to medium and large operations.

Source of First and Youngest Case: The source of the first cow in the herd to exhibit clinical signs of Johne's disease differed by herd size. A higher percentage of medium operations (65.6 percent) reported that the first cow with clinical signs was a purchased animal compared to small operations (44.4 percent). The majority of operations (63.6 percent) reported that home-raised cows were the source of the youngest cows to display clinical signs. Since clinical signs may not be observed prior to shedding MAP, purchased cows may infect home-raised calves.

Testing for MAP Infection: Overall, 67.6 percent of operations that tested for Johne's disease used only a serum ELISA to test at least one cow during the 12 months prior to the 2002 study interview. Only 5.7 percent used only fecal culture to diagnose Johne's disease. Approximately one-fourth of operations (26.7 percent) used both fecal culture and serum ELISA to test for Johne's disease.

Participation in a Control Program: The percentage of operations participating in Johne's disease certification, control, or herd-status programs (Federal, State, or herd specific) increased since the Dairy '96 study (11.2 and 0.9 percent, respectively). There was no difference in program participation by herd size within in each study year.

Herd Additions: During 2001, bred heifers and lactating cows were the classes of cattle brought onto the most operations, with 15.8 percent of all operations reporting that bred heifers were added, and 16.4

percent of operations reporting that lactating cows were added. Any class of beef or dairy cattle was brought onto 45.7 percent of all operations.

Testing New Arrivals: There was no difference between Dairy '96 and Dairy 2002 in the reported percentage of operations that required testing for MAP infection prior to bringing animals onto the operation (9.1 and 9.8 percent, respectively). There were no differences in testing among herd-size categories.

Management Practices

Maternity housing—The percentage of operations providing separate maternity housing increased from 1996 to 2002, with over half of operations (53.1 percent) providing separate housing. The percentage of operations that provided separate housing increased significantly as herd size increased.

Separating calves from dams—Although the trend toward removing newborn calves before any nursing occurs continued during the 1996 and 2002 studies (47.9 percent and 52.9 percent of operations, respectively), many producers still allow calves to nurse their dams.

Colostrum—In the 2002 study, approximately one-third of operations (30.5 percent) relied on first nursing for colostrum delivery, as opposed to hand-feeding where colostrum can be aseptically collected and the amount consumed can be controlled. Pooling colostrum from more than one cow increases the risk of spreading milk-borne pathogens to more than one calf. Overall, 27.0 percent of operations pooled colostrum. A much higher percentage of large operations (70.6 percent) pooled colostrum than did medium and small operations (37.4 percent and 22.1 percent, respectively). Pasteurizing colostrum is being investigated as a method to reduce MAP transmission. Only 0.6 percent of operations pasteurized colostrum. A higher percentage of large operations (3.6 percent) fed pasteurized colostrum compared to medium and small operations (0.8 percent and 0.4 percent, respectively).

Waste milk—Waste milk was fed to dairy heifer calves on 87.2 percent of operations. Waste milk was pasteurized prior to feeding on only 1.0 percent of operations. However, a higher percentage of large operations (11.3 percent) pasteurized waste milk compared to medium and small operations (1.0 percent and 0.5 percent, respectively). Pasteurizing waste milk significantly reduces—and in some cases eliminates—pathogens in milk, thus reducing calves' exposure to these pathogens. Since consumption of contaminated waste milk can occur repeatedly over time—resulting in multiple doses of MAP—an individual calf's exposure to MAP can be overwhelming.

Equipment use—Using the same equipment for manure removal and feeding increases the risk of transmitting fecal-borne pathogens. Nevertheless, 58.8 percent of all operations used the same equipment to handle manure and feed cattle. Of these operations, 54.2 percent washed the equipment with only water or steam after handling manure, while 5.7 percent washed and chemically disinfected the equipment after handling manure. No cleaning procedures were performed after handling manure on 15.2 percent of operations that used the same equipment for manure and feeding cattle.

Risk Assessment

Five different management areas were assessed. Within each of these areas, multiple practices were assessed, either through questions or visual observations. The majority of questions and observations were assigned a risk score for the specific management area in order to account for different risks

associated with different age groups. Within each management area, risk scores were summed to produce a total score. The total risk score for each management area was used to quantify potential risk and predict which area(s) was more likely to contribute to MAP transmission.

Calving Area—Management practices that contributed the majority of the score for the calving area were: multiple use of calving area, allowing calves access to dams for more than 3 hours, and allowing calves to suckle dams.

Preweaned Heifer Calves—Feeding pooled waste milk and colostrum, and housing preweaned heifer calves near cows, were practices that increased the risk of transmission of MAP, based on the scoring system used.

Postweaned Heifer Calves—Housing of postweaned calves accounted for the greatest risk. Housing calves adjacent to and/or sharing feed, water or housing were the practices that accounted for the majority of risk in this group.

Bred Heifers—Housing bred heifers near cows or sharing feed, water, and housing (including pasture) as well as cow-manure contamination of feed, water, or housing areas were the sources of greatest exposure of MAP for bred heifers.

Cows—The greatest single source of risk for MAP exposure to cows was manure spread on pasture or harvested forage.

In summary, management practices used in the calving area and for preweaned calves accounted for more than half of most operations' total risk scores, regardless of herd size or region of the country. However, since these two areas had greater total possible risk-score points than the other areas, these results were expected. Although the exact risk of many of these practices with regard to MAP transmission are unknown, most veterinarians would agree that preventing all cattle, especially calves, from exposure to manure is important for all infections transmitted via the fecal-oral route.

Johne's Disease Testing

Four different testing methods were used during the 2002 study; fecal culture, serum ELISA, milk ELISA, and environmental sample culturing. The sampling design for the 2002 study was chosen in order to maximize the potential for identifying risk factors for MAP transmission and not to determine new herd- or animal-level prevalence estimates.

Environmental samples were collected from 98 of the 106 dairy operations participating in Johne's biological sampling. Ideally, five environmental samples were taken from areas where manure accumulated from a majority of adult animals. Slightly more than three-quarters of infected operations (76.0 percent) that had one or more positive individual fecal culture were detected using environmental sampling. Samples taken from parlor exit ways, holding pens, common alleyways, and manure storage systems were most frequently positive.

A comparison of milk and serum ELISA methods revealed the milk ELISA performed comparably to serum ELISA in identifying animals that were fecal-culture positive. Results of ELISA and fecal culture

comparison reaffirmed past evidence that the ability of the test to detect infected animals is related to the amount of fecal shedding. The serum and milk ELISA detected the majority of cows shedding large amounts of MAP (86.7 and 76.9 percent, respectively).

One significant finding in the study was the relatively low within-herd level prevalence observed in the test herds. The majority of herds, tested by any method, had less than or equal to 10 percent of the herds test positive. This suggests that the 1996 study, which was designed to detect herds with 10 percent or greater prevalence, reported the percentage of herds in the U.S. that had high levels of infection. The results of the 2002 study suggest that the herd-level prevalence of MAP infection is significantly greater than the 21.6 percent reported in 1997. In addition, increasing consolidation of the dairy industry has likely led to increased herd-level prevalence.

Summary

Results from the Dairy 2002 study on Johne's disease reveal that most producers are aware of the disease, but implementation of management practices to reduce MAP transmission is moving slowly. Continued education aimed at improving management practices and adoption of these practices by producers is paramount to controlling and eventually eliminating MAP infection from cattle.