Bovine Leukosis Virus (BLV) on U.S. Dairy Operations, 2007

In 2007, the U.S. Department of Agriculture's (USDA) National Animal Health Monitoring System (NAHMS) conducted the Dairy 2007 study. In all, 17 of the Nation's major dairy States* participated in the study. These States divided into two regions and represented 79.5 percent of U.S. dairy operations and 82.5 percent of U.S. dairy cows participated in the study.

This information sheet presents and compares data on BLV prevalence in U.S. dairy cattle collected during Dairy 2007 and during a previous NAHMS dairy study, Dairy 1996.

BLV

BLV is a retrovirus that infects dairy and beef cattle's lymphoid tissue, causing malignant lymphoma and lymphosarcoma in 1 to 5 percent of infected animals. The virus is transmitted to cattle primarily by direct exposure with infected blood, saliva, semen, and milk.[1] Most BLV-infected cattle seldom present with clinical signs of disease. Signs of infection may include tumors in lymphoid tissues, enlarged lymph nodes, weight loss, decreased milk production, fever, loss of appetite, rear-limb weakness or paralysis, protruding eyeballs, gastrointestinal obstructions, and increased blood lymphocytes counts. Because no vaccine is available for BLV, virus specific antibodies found in serum or milk are a good indicator of exposure and a practical method for disease screening.

Economic impact of BLV on U.S. dairies

Producers can incur economic losses because of BLV through cattle deaths, reduced reproductive efficiency, increased replacement and veterinary costs, and the ineligibility to export live cattle, semen, and ova to countries where BLV control efforts are in place.[2,3]

A BLV certification program conducted in New York indicated that the disease had a significant economic impact on operations with high seroprevalence of BLV in which morbidity and mortality rates were high due to malignant lymphoma.

The association between cattle exposed to BLV and herd-level productivity was studied using data from the NAHMS Dairy 1996 study.[4] This study found that herds with test-positive cows produced 218 kg less milk per cow, per year than those with no test-positive cows.

BLV prevalence on U.S. dairies, 1996 and 2007

The Dairy 1996 study was the first statistically based study in the United States to provide a baseline prevalence of BLV and the measures for controlling it. During the study, blood samples from cattle on 1,006 operations were tested using the Agar Gel Immuno-diffusion test (AGID). Results showed that 89.0 percent of U.S. dairy operations had cattle seropositive for BLV; 74.8 percent of these operations had an estimated within-herd prevalence of 25 percent or higher. Dairy operations with fewer than 100 cows had lower individual animal prevalences and were less likely to be seropositive for BLV than operations with more than 200 cows.

As part of the 2007 dairy study, bulk tank milk was collected from 534 operations with 30 or more dairy cows and tested with an Enzyme Linked-Immunosorbent Assay (ELISA) for the presence of antibodies against BLV. Results showed that 83.9 percent of U.S. dairy operations were positive for BLV (table 1).

Table 1. Percentage of Operations in Which Bulk Tank Milk Tested Positive for BLV via ELISA, by Herd size

Herd Size (Number of Cows)	Percent Operations
Small (fewer than 100)	83.2
Medium (100-499)	82.1
Large (500 or more)	100.0
All operations	83.9

***States/Regions:**

- **West:** California, Idaho, New Mexico, Texas, and Washington
- **East:** Indiana, Iowa, Kentucky, Michigan, Minnesota, Missouri, New York, Ohio, Pennsylvania, Vermont, Virginia, and Wisconsin

BLV prevalence estimates were also reported by region: 78.4 percent of operations in the study's West region and 84.4 percent in the East region tested positive for BLV antibodies.

Only 7.5 percent of all operations had independently confirmed the presence of BLV on their premises via laboratory testing during the 12 months prior to the Dairy 2007 interview (table 2). Of these operations, the majority (88.5 percent) submitted blood samples for disease confirmation. Only 6.3 percent submitted tissues for necropsy.

Table 2. Percentage of Operations in Which BLV was Confirmed Via Laboratory Testing During the Previous 12 months, by Herd size

Herd Size (Number of Cows)	**Percent Operations**
Small (fewer than 100)	5.7
Medium (100-499)	12.4
Large (500 or more)	7.8
All operations	7.5

Summary

Although the 1996 and 2007 dairy studies used different testing methods (AGID vs. milk ELISA) and different samples (serum vs. bulk tank milk), both studies suggest that BLV is present on the majority of U.S. dairy operations. Different regions were used in the 1996 and 2007 studies for the geographic distribution of dairy operations. For this reason, regional differences in BLV herd-level prevalence were not comparable.

In addition, the Dairy 2007 study found that only 7.5 percent of operations independently confirmed the presence of BLV on their operations via laboratory testing. Although no details were available regarding the reasons why these operations submitted samples for BLV testing, it is possible that they had cattle with clinical signs compatible with BLV. The low percentage of operations that tested for BLV supports the concept that although infection is common, clinical signs of BLV are not frequently observed. A lower percentage of small operations had antibodies detected than large operations.

The high individual animal prevalence of BLV reported in the Dairy 1996 study suggests that testing and culling seropositive animals may not be a cost effective method to control the disease. Instead, preventing disease transmission by implementing preventive practices would likely be more cost-effective. Since the primary route of infection is through contact with infected blood, prevention involves eliminating blood transmission from cow to cow. Prevention practices include using a new needle for each injection, discarding or cleaning syringes contaminated with blood, and cleaning blood-contaminated equipment such as dehorning equipment and tattoo pliers. Additionally, feeding calves pasteurized colostrum and milk, and using BLV seronegative dams for embryo transfer should assist in reducing the incidence of BLV.[1]

To review complete reports from the Dairy 1996 and Dairy 2007 studies, visit the NAHMS Website at: http://nahms.aphis.usda.gov.

References

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