

# Bovine leukemia virus in the U.S. dairy industry: Prevalence and associations with economically important production indicators

R. M. LaDronka, MPH, DVM; P. C. Bartlett, MPH, DVM, PhD; B. Norby, DVM, PhD

Department of Large Animal Clinical Sciences, Michigan State University, East Lansing, MI 48823

## Introduction

Bovine leukemia virus is a deltaretrovirus of cattle and the causative agent of enzootic bovine leukosis. A small proportion of infected animals develop the clinical manifestation of lymphoma, however the majority remain subclinically infected. Infection is common in the U.S. dairy cattle population and in other major dairy producing countries that have not taken steps to reduce and eradicate infection in their populations. The 1997 and 2008 NAHMS dairy studies examined the prevalence of BLV infection at the cow and herd levels, respectively. There has been no updated estimates of prevalence in the U.S. cattle population in the last decade. Within that time, evidence of the negative impact of subclinical infection has been mounting. Cows exhibit alterations in immune function, decreased longevity, and reduced milk production. The first major objective of this study was to provide an updated estimate of BLV prevalence in a multistate sample of U.S. dairy cattle. The second major objective was to measure herd and cow level associations between BLV prevalence and economically important dairy production outcomes, namely milk production, reproductive efficiency, and somatic cell count.

## Materials and Methods

A population of 4120 dairy cows from 103 commercial dairy herds in 11 states were ELISA tested for BLV using routine DHIA milk samples. Apparent prevalence was estimated from the results of BLV testing. For a subsample of these cows where herd records were electronically available through PC

Dart, production data, including milk production, breeding and calving records, and somatic cell counts, was collected longitudinally for approximately 2 years. Associations between BLV status and outcomes of interest were analysed using generalized linear mixed models accounting for clustering of cows within herd as a random effect.

## Results

The average within-herd apparent prevalence estimate for all herds was 46.5%, with 94.2% of herds having at least one BLV antibody positive cow detected. No significant differences were detected by state, region, breed or herd size.

## Significance

The prevalence observed in this study is consistent with a historical trend of increasing BLV prevalence in the absence of any sort of control program. The observed associations with reproductive outcomes and milk production demonstrate the potential for high levels of BLV infection to undercut the long-term profitability and sustainability of U.S. dairy herds. These findings are clinically relevant for veterinarians counseling dairy clients regarding managing risk of BLV in their herds.