Association between Risk Assessment scores and milking cow Johne's ELISA results on Ontario dairy farms

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Introduction

Johne's disease (JD) is a chronic, gastrointestinal disease of ruminants, including cattle. After initial calfhood infection through ingestion of *Mycobacterium avium* spp. *paratuberculosis* (MAP) in feces, colostrum or milk, it usually takes years before signs of JD can be detected. To date, no treatment for JD has been found. Disease control strategies focus on farm management practices to prevent the disease from spreading. Subclinical and clinical JD significantly limits the production of dairy cows and reduces the slaughter value of affected animals. Of great concern is the suspected association between JD or MAP in cattle and Crohn's disease in humans. However, a definite link between those two diseases has not yet been established. To control JD, the Ontario dairy industry launched the Ontario Johne's Education and Management Assistance Program (OJEMAP) in January 2010. The OJEMAP is based on a veterinary administered on-farm risk assessment and management plan (RAMP), where a high risk score indicates a high risk for JD transmission. Farmers can test lactating cows for antibodies to MAP using a milk or serum ELISA. The RAMP focuses on management strategies for biosecurity, calving area, calf and heifer rearing, milking and dry cow hygiene and general manure handling. As of April 2013 half of all Ontario dairy farms have voluntarily participated in this program; however, an evaluation of the use of the RAMP and its association with Johne's disease in this broader Ontario program has not been conducted.

The objective of this cross-sectional study was to determine relationships among RAMP scores, ELISA results and the recommendations made by veterinarians administering the RAMP.

Materials and Methods

Available data included RAMP scores and ELISA results from 1,668 dairy herds participating in the program between January 2010 and December 2012. Herds were classified as JD positive if they had at least one ELISA positive animal. The statistical analyses were conducted using STATA 10.1 (StataCorp, Texas, USA). The individual question scores were summarized to create section scores and tallied to

create the overall RAMP score. RAMP scores and ELISA results were screened for variability with descriptive statistics, and univariate logistic regression, using herd ELISA status (positive/negative) or recommendation given (yes/no) as dependent variables. Question scores were used as categorical variables, whereas section and overall scores were introduced as continuous variables. Linearity of continuous variables was assessed and transformations performed as necessary. Multivariable mixed logistic regression models, using assessing veterinarian as a random effect, were built. The logarithmic transformed number of tested animals (lognotest) was forced into all models.

Results

The apparent herd-level prevalence for JD was 25% (95% Conf. Interval 23.0-27.1%). The overall RAMP score (OR=1.01, p<0.001) as well as the section scores for biosecurity ([dichotomous as 0/ >0] OR=1.64, p=0.001), calving area (OR=1.03, p<0.001), calf rearing (OR=1.02, p=0.001), cow cleanliness and manure management (OR=1.03, p=0.001) were positively associated with the herd ELISA results. The section score for heifer cleanliness was not associated with the ELISA result (OR=1.01, p=0.274). RAMP scores and recommendations given for each section had a strong positive association.

Significance

These results indicate that the Johne's RAMP as used in the OJEMAP is a valuable tool for determining a JD risk reduction strategy for dairy farms in Ontario.

Special Notes: