

Prevalence of Johne's disease across Canada

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Johne's disease (JD) is a progressive, chronic infection and inflammation of the small intestines of ruminants caused by *Mycobacterium avium* subspecies *paratuberculosis* (MAP). Accurately estimating the prevalence of MAP infections is an important part of controlling the spread of infections, and monitoring the effectiveness of control programs. Due to the number of varying diagnostic methods that are used across Canada, prevalence estimates between regions and programs cannot be compared. The aim of the current study was to estimate the prevalence of MAP infection in Western Canada, Ontario, Quebec, and the Atlantic provinces using the same sampling method across Canada.

In all 10 provinces, 2 environmental samples were collected from adult cattle areas and cultured for the detection of MAP on 362 dairy farms as part of the National Dairy Study. At the time of sampling, an on-farm questionnaire was completed regarding on-farm management practices. Diagnostic sensitivity (Se) and specificity (Sp) were calculated for the ability to detect positive farms using only 2 environmental samples based on previous research. These test characteristics were applied to the results in order to accurately estimate the true prevalence in the 4 regions of Canada when using 2 environmental samples at one sampling time. The Se and Sp were 0.48 and 0.99, respectively, which indicates that only 48% of MAP-positive farms are actually testing positive with 2 environmental samples. These test characteristics were applied to the environmental culture results from the 362 participating farms in the 4 regions resulting in adjusted true prevalence estimates of 67% of farms in Western Canada, 58% in Ontario, 22% in Quebec, and 41% in the Atlantic provinces.

Implications: This is the first nation-wide study in which the same sampling method was used to estimate prevalence of MAP-infected farms across all of Canada, allowing for the direct comparison among regions. Future research will allow for the investigation of factors that contribute to the differences in prevalence observed in the current study, and lead to better surveillance and impact of current control programs across the country.