

Evaluation Of Surveillance For Bovine Johne's Disease In Western Australia Using Scenario Tree Modelling

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Stochastic scenario tree modelling may be used to evaluate surveillance for disease freedom, including varied general and targetted surveillance activities, through estimation of the sensitivity of each surveillance process for the detection of disease at an agreed design prevalence.

In the State of Western Australia (WA), bovine Johne's disease (BJD) has been detected on eight occasions with the first being in 1952. It has been eradicated in each case by the depopulation of infected herds. Ongoing surveillance, including the clinical diagnostic system and periodic targetted surveys, continues to give negative results. The State maintains barrier quarantine restrictions based on quantitative import risk analysis.

This paper reports on the application of stochastic scenario tree modelling to multiple historic, ongoing, and proposed surveillance processes for BJD in WA, to give a quantitative estimate of the probability that the State is free from BJD. Specifically, the model includes the clinical diagnostic system, targetted surveys, and histology on samples collected at the abattoir. The annual probability of introducing BJD into WA is used to discount confidence in freedom from historic surveillance results, and thereby to estimate the prior for Bayesian estimation of the (posterior) probability of freedom based on current surveillance results.