

Spatial Distribution of Bluetongue Surveillance and Cases in Switzerland

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Key words

Bluetongue, bulk milk serology, cluster analysis, surveillance, cattle

Aim of the study

This study aims to provide a descriptive and spatial analysis of the BT (BTV-8) surveillance schemes currently in place for susceptible animals in Switzerland. Based on the results, regional prevalence estimates of BTV-8 infection by the end of the 2007 vector period should be determined.

Material and methods

We examined data collected from the bulk milk surveillance scheme, clinical suspects and sheep clinical surveillance in 2007 to 2008 for BTV-8 on farms throughout Switzerland.

Spatial clustering was assessed using a Poisson- based model in the SaTScan™ software (Kulldorff and Nagarwalla, 1995). Global spatial autocorrelation was evaluated on the county level using Moran's I statistic in the Geoda™ 0.9.5-i software. The observed test statistic was compared to a Monte Carlo Randomization distribution as outlined by Anselin (1986), to obtain a p-value for significance.

Prevalence estimates were calculated using a Binomial predictive model using the Beta function in @Risk.

Results and significance

The spatial scan statistic identified two significant clusters. The most likely cluster (Cluster A) incorporated the Cantons AG, BL, BS, JU and SO. The smaller secondary cluster (Cluster B) was based in TI. The RR of a farm being included in surveillance was shown to be 5.85 times higher inside Cluster A, and 28.21 times higher inside Cluster B. Global spatial autocorrelation using Moran's I statistic was 0.164 (P = 0.001).

The prevalence within Cluster A was significantly higher with 9.62% compared to the prevalence of 0.98% outside this cluster. From this figure the estimate for the number of infected farms within the cluster is 136 out of a total of 1,415 farms, and 494 outside the cluster from a total of 50,365 farms. The results presented show a high level of surveillance intensity for BT all over Switzerland. In the area where cases were detected early in 2007, the surveillance was significantly higher than in the rest of Switzerland. This suggests a limited incursion of infectivity either through vectors or hosts or a less effective transmission prior to case detection in Switzerland compared to the situation in UK. On the national scale, such spatial variation in surveillance data needs to be considered if the epidemic is interpreted. Based on the useful utilisation of data from clinical suspects, this method will be of high value within the future BT surveillance in Switzerland, especially as all susceptible species will be vaccinated against BTV-8 from autumn 2008 onwards.

Publications, posters and presentations

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