Spatial modelling of the between-herd infection dynamics of bovine virus diarrhoea virus (BVDV) in dairy herds in Denmark

According to the current literature BVDV-infected neighbours probably impose a high risk of infection of susceptible cattle herds. In the present study, the objective was to evaluate the risk of a dairy herd changing infection status (from not having persistently infected (PI) animals to having PI-animals) in relation to location and infection status of neighbouring cattle herds in Denmark. In total, 7,921 dairy herds were included in the analysis of spatial and non-spatial risk factors. The spatial risk factors were derived based on the cattle herds in the neighbourhood (N = 36,639 cattle herds). The neighbourhood was defined as the first order neighbouring cattle herds using a Delauney triangulation. In total, 13.3% of the dairy herds changed herd status to PI-herds during the study period that lasted from January 1, 1995, to June 30, 1996. The risk of becoming a PI-herd was negatively associated with the mean distance to the neighbouring herds (OR = 0.7 for an increase of 1 km). Presence of PI-herds in the neighbourhood increased the risk of becoming a PI-herd (OR = 1.37, 1.40, 1.70 for 1, 2, ≥3 PI-herds in the neighbourhood). Increasing herd size increased the risk of becoming a PI-herd (OR = 3.9 for an increase of 10 cows). Regional differences were seen.

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