Factors associated with *Coxiella burnetii* antibody positivity in Danish dairy cows

The aim of the study was to identify associations between the level of *Coxiella burnetii* (C. burnetii) antibodies in individual milk samples and cow and herd level factors in Danish dairy cows. The study, designed as a prospective cross sectional study with follow up, included 24 herds identified by a stratified random sampling procedure according to the level of C. burnetii antibodies in one bulk tank milk (BTM) sample at the beginning of the study. Ten herds were BTM positive, ten herds were BTM negative and four herds had an intermediate level. The samples were tested with an ELISA and results determined as S/P (sample to positive control) values. Three cross sectional studies of all lactating cows within each herd were then conducted during an 11 months follow up period with collection of a total of 5829 milk samples from 3116 cows. Each sample was tested with the same ELISA as used for BTM testing, and cows were considered test positive for S/P values ≥40, and otherwise negative. Individual cow information was extracted from the Danish Cattle Database and herd information was obtained from a telephone interview with each farmer. From multivariable logistic regression analysis accounting for hierarchical structures in the data it was concluded that odds for seropositivity increased with Danish Holstein breed, increasing number of parity and high milk protein contents, but decreased with increasing milk yield and high milk fat contents. Cows were at a higher risk during summer than other seasons. Among the herd level factors, herd size, tie stall housing system, quarantine of newly purchased animals and good hygienic precautions taken by the veterinarian before entering into the stable were also significantly associated with reduced odds of C. burnetii antibody positivity. The prevalence of test positive cows was almost constant during the study period in herds which were initially BTM positive and BTM intermediate, whilst the prevalence of positive cows in a few of the initial BTM negative herds changed from almost zero to higher than 60%. This indicates that herd infections last quite long and that test negative herds may convert to positive due to a few latently infected cows or due to transmissions from other herds.

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