Risk factors for changing test classification in the Danish surveillance program for Salmonella in dairy herds

A surveillance program in which all cattle herds in Denmark are classified into Salmonella infection categories has been in place since 2002. Dairy herds were considered test negative and thus most likely free of infection if Salmonella antibody measurements were consistently low in bulk tank milk samples collected every 3 mo. Herds were considered test positive and thus most likely infected if the 4-quarter moving average bulk tank milk antibody concentration was high or if there was a large increase in the most recent measurement compared with the average value from the previous 3 samples. The objective of this study was to evaluate risk factors for changing from test negative to positive, which was indicative of herds becoming infected from one quarter of the year to the next, and risk factors for changing from test positive to negative, which was indicative of herds recovering from infection between 2 consecutive quarters of the year. The Salmonella serotypes in question were Salmonella Dublin or other serotypes that cross-react with the Salmonella Dublin antigen in the ELISA (e.g., some Salmonella Typhimurium types). Two logistic regression models that accounted for repeated measurements at the herd level and controlled for herd size and regional effects were used. Data from 2003 was used for the analyses. A change from test negative to positive occurred in 2.0% of the quarterly observations (n = 21,007) from test negative dairy herds. A change from test positive to negative occurred in 10.0% of quarterly observations (n = 6,168) available from test positive dairy herds. The higher the number of test-positive neighbor herds in the previous year-quarter, the more likely herds were to become test positive for Salmonella. The number of purchased cattle from test-positive herds was also associated with changing from test negative to positive. The bigger the herd, the more likely it was to change from negative to test positive. The effect of herd size on recovery was less clear. Large herds consisting mainly of large breeds or having test-positive neighbors in a 2-km radius were less likely to change from test positive to negative, whereas the breed and neighbor factors were not found to be important for small herds. Organic production was associated with remaining test positive, but not with becoming test positive. The results emphasize the importance of external and internal biosecurity measures to control Salmonella infections.

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