Dynamic changes in antibody levels as an early warning of Salmonella Dublin in bovine dairy herds - DTU Orbit (26/08/2017)

Salmonella Dublin is a bacterium that causes disease and production losses in cattle herds. In Denmark, a surveillance and control program was initiated in 2002 to monitor and reduce the prevalence of Salmonella Dublin. In dairy herds, the surveillance includes herd classification based on bulk tank milk measurements of antibodies directed against Salmonella Dublin at 3-mo intervals. In this study, an "alarm herd" concept, based on the dynamic progression of these repeated measurements, was formulated such that it contains predictive power for Salmonella Dublin herd classification change from "likely free of infection" to "likely infected" in the following quarter of the year, thus warning the farmer 3mo earlier than the present system. The alarm herd concept was defined through aberrations from a stable development over time of antibody levels. For suitable parameter choices, alarm herd status was a positive predictor for Salmonella Dublin status change in dairy herds, in that alarm herds had a higher risk of changing status in the following quarter compared with nonalarm herds. This was despite the fact that both alarm and nonalarm herds had antibody levels that did not indicate the herds being "likely infected" according to the existing classification system in the present quarter. The alarm herd concept can be used as a new early warning element in the existing surveillance program. Additionally, to improve accuracy of herd classification, the alarm herd concept could be incorporated into a model including other known risk factors for change in herd classification. Furthermore, the model could be extended to other diseases monitored in similar ways.