

The effect of becoming BVDV-free on fertility and udder health in dairy herds

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Introduction

Since 1998, the Animal Health Service (AHS) in The Netherlands carries out a BVDV programme which should help farmers to eliminate the virus from their herds. This programme is based on tracing and removing the BVDV-antigen positive animals from the herd, certifying the herds as BVDV-free and subsequently monitoring the free status. The aim of the study was to determine the change in reproductive performance and udder health in BVDV-infected dairy herds that became BVDV-free.

Results

Reproductive performance

After validation, data of 79,607 cows of 392 case herds and 124,831 cows of 730 control herds remained for the analysis. The results show that case herds had a significantly lower abortion rate in cows after becoming BVDV-free than the controls. However, no differences were found for the other reproductive parameters. In figure 1 the mean percentage of abortions for both the BVDV-infected and free period are shown.

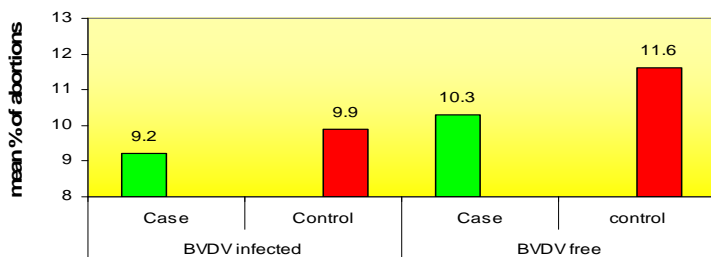


Figure 1. mean % abortions for cows in the BVDV-infected and free period for both cases and controls.

The results in figure 1 are corrected for herd size as confounder and are presented for cows only because the tree-way interaction term between case/control, before/after BVDV-free and heifer/ cow was significant. Case herds had a lower abortion rate than controls. For heifers this lower abortion rate was not significant in both BVDV-periods. Nevertheless cows in case herds had a significantly lower abortion rate in the BVDV-free period than the controls ($p < 0.01$).

Udder health

The analyses of the udder health parameters were performed on 319 case and 629 control herds and the results were corrected for herd size; age; standard cow production and quarter as cofounders in the model. No significant effect of case-control status was found in the proportion of cows with a high somatic cell count (SCC > 150,000 cells/ml for heifers and > 250,000 cells/ml for older cows) nor in bulk-milk SCC. The incidence of sub-clinical mastitis, however, was lower in the case herds after becoming BVDV-free ($p = 0.04$) (Figure 2).

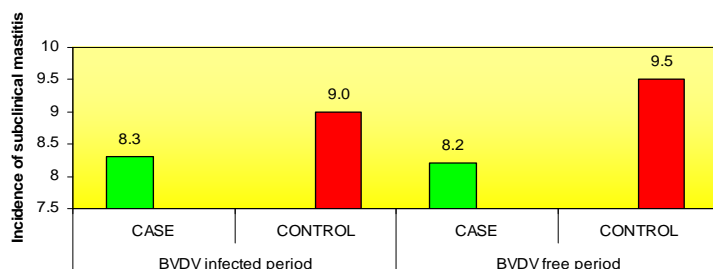


Figure 2. Incidence of sub-clinical mastitis in both the BVDV-free as infected period

Material and Methods

Cases were defined as dairy herds that had at least one BVD-antigen positive animal and subsequently obtained the BVDV-free status with the programme of the AHS and maintained this status for at least two years. Two control herds, with an unknown status for BVDV were matched to each case herd by region and herd size. Data concerning fertility and udder health of all herds were provided by the Dutch Royal Cattle Syndicate. Ten reproductive and three udder health parameters were analysed using mixed (for continuous variables) and log-linear (for count data) models in SAS 9.1 and population average models in Stata 8. To incorporate the matching, differences were calculated between each of the two pairs of case-control within a matching code for all variables. The analyses were performed with these differences as dependent variables. In addition matching code was included as a random effect.



Discussion

In our study the effect of obtaining the BVDV-free status may have been underestimated for several reasons. First, the BVDV status of the controls was unknown, and some of the controls might have been BVDV-free herds as well. Secondly, it was unknown whether or not the case herds experienced an acute infection with BVDV in the two years before certification due to lack of specific data. When BVDV is endemic in a herd the losses are limited because most cows already have antibodies, thus resulting in an underestimation of the real effect of becoming BVDV-free on reproductive performance and udder health. However, in a retrospective field study, it is difficult to determine the moment of introduction of BVDV and the exact status of each cow, because it requires regular whole-herd testing. Thirdly, management factors of the farms were unknown but farmers that voluntarily joined the BVDV programme may have been the better managers which may result in a less severe effect of a BVDV infection and thus underestimating the effect of becoming BVDV-free.

Conclusions

Interestingly, abortion rate and mastitis incidence are both variables that are less sensitive to farmers' management than the other variables (e.g. calving interval).