INFECTIOUS DISEASES

# Long-term analysis of maternal bovine coronavirus antibodies: a prospective cohort study in Dutch Holstein-Friesian female breeding calves

H. Kuijk[1], M. Bakker[2], P.A.A. Penterman[1], H. Swam[3], G. Vertenten[4] and B. Sustronck[1]

## INTRODUCTION

- Serologic screening to identify which major respiratory pathogens are circulating on a farm (BRD quick scan) is frequently being used on dairy farms in The Netherlands (Kuijk et al 2022).
- In the last decades bovine coronavirus (BCoV) has gained momentum as possible viral pathogen involved in respiratory disease in calves, necessitating the inclusion of BCoV in the routine BRD quick scan.
- To correctly interpret the result of a serologic BRD screening, including BCoV antibodies, a better knowledge of the evolution of maternal BCoV antibodies over time seems appropriate.

## OBJECTIVE

- The aim of the present study is to obtain better insight in the evolution of maternal BCoV antibodies in the first 6 months of life of Dutch Holstein-Friesian female breeding calves.
- Additionally, the influence of dam vaccination against BCoV on those maternal antibodies in calves will be explored.

## MATERIALS AND METHODS

- A prospective cohort study was conducted on a convenience sample of 5 Dutch Holstein-Friesian dairy herds, all belonging to the same veterinary practice.
- On each farm five new-born calves were randomly selected to be included in the trial. All calves received at least 3 litres of colostrum from their own dam in the first 24h after birth. The calves were blood sampled in the first month of life and each month thereafter for 6 consecutive months.
- The serum samples were analysed in the Centre for Diagnostic Solutions (MSD Animal Health, Netherlands) for antibodies against BCoV by ELISA using a commercial test kit (Bio K 392, Bio-X Diagnostics SA, Rochefort, Belgium).
- Repeated measures ANOVA with post-hoc Tukey HSD testing was performed to assess the influence of dam vaccination on the BCoV serum titer of the calves.

**Active BCoV circulation amongst breeding calves on Dutch dairy farms can be monitored by antibody screening from 3 months of age onwards. This can be helpful to justify the implementation of a BCoV vaccination plan at young age.**

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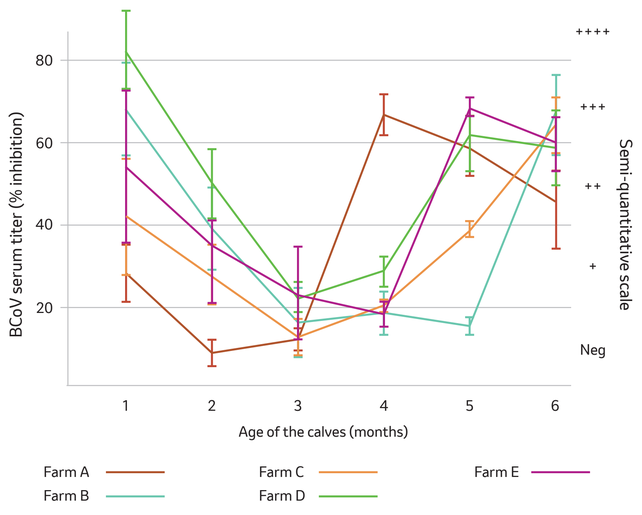
## RESULTS

At three months of age the mean BCoV serum titer of the calves was at its lowest level on all the farms and ranged between 0 and 37.5% inhibition (neg to +, on a semi-quantitative scale) . From three months of age farms with a mean titer of >40% inhibition or ≥++ can be considered as having encountered an active circulation of BCoV. Furthermore, seroconversion to BCoV was shown on all the farms **(Fig 1).**

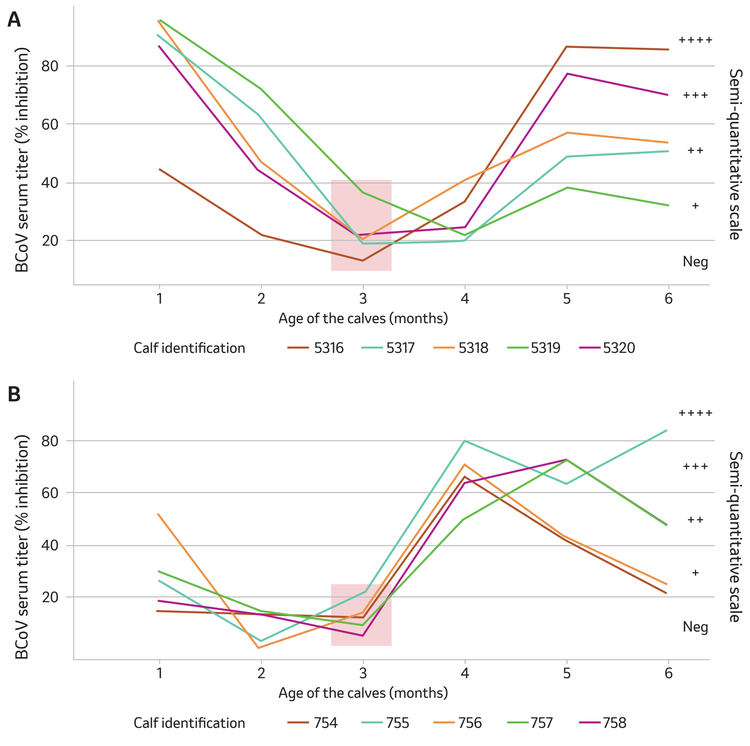
**FIGURE 1.** Evolution of bovine coronavirus (BCoV) serum antibody titer over time in Dutch Holstein-Friesian female breeding calves grouped by farm.




## RESULTS

On farms where no dam vaccination against BCoV was applied the majority of the calves were seronegative at the age of three months. Whereas, on farms that applied dam vaccination against BCoV most of the calves at three months of age were still slightly seropositive for BCoV (<40% inhibition, ≤+ on a semi-quantitative scale) **(Fig 2).**

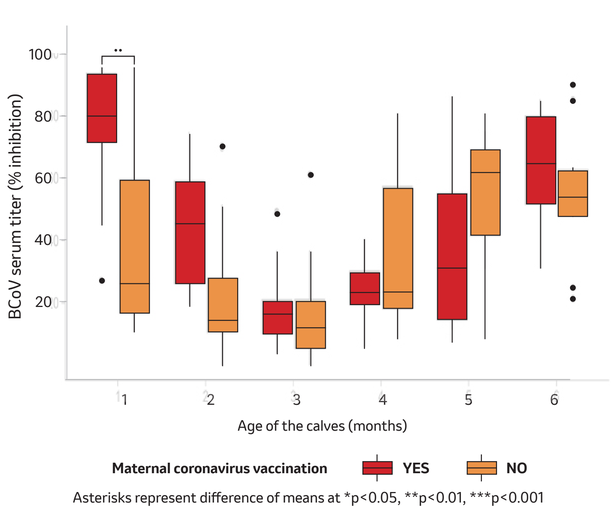
**FIGURE 2.** Evolution of bovine coronavirus (BCoV) serum antibody titer over time in Dutch Holstein-Friesian female breeding calves on a farm on which dam coronavirus vaccination is applied (A) compared to a farm on which no vaccination is applied (B).




## RESULTS

On farms where maternal vaccination against BCoV was applied significantly higher serum BCoV titers in one month old calves were observed in comparison with farms where no maternal vaccination was applied. This difference was still observed, although not significant, at two months of age but no longer subsequently **(Fig 3).**

**FIGURE 3.** Bovine coronavirus (BCoV) serum antibody titer over time in Dutch Holstein-Friesian female breeding calves grouped by maternal coronavirus vaccination.




## AUTHORS' AFFILIATION

1. MSD Animal health Benelux, Ruminant Business Unit, The Netherlands/Belgium
2. Diergeneeskundig Centrum Midden Salland, The Netherlands
3. MSD Animal Health, Center for Diagnostic Solutions, The Netherlands
4. MSD Animal Health, Global Ruminant Biologicals, The Netherlands



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