

Prevalence, Biosecurity and Risk Management of Bovine Coronavirus Infections in Calves on Dairy Farms in Europe

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INTRODUCTION

- ▶ Bovine Coronavirus (BCoV) is part of the calf neonatal disease complex, enteric disease outbreaks in adult cattle, and is a pathogen part of the Bovine Respiratory Disease Complex.
- ▶ There is lacking information on the prevalence of BCoV on dairies in Europe and the management and biosecurity risk factors that are associated with BCoV infection in calves.

OBJECTIVE

To obtain an estimate of the farm prevalence of Bovine Coronavirus (BCoV) in dairy production in Europe, and to characterize farm-level risk factors in management and biosecurity that are linked to BCoV infection in neonatal and weaned dairy calves.

MATERIALS AND METHODS

- ▶ A cross-sectional field study of 125 conventional dairy farms in Europe (convenience sample).
- ▶ From 10-20 neonatal calves, 10-20 weaned calves and 5-10 fresh cows, nasal and faecal swabs were collected for BCoV detection using RT-PCR. One bulk tank milk sample and serum from all sampled cattle and were evaluated for BCoV antibodies using ELISA (expressed in % Optical Density (OD) from 0 till 100).
- ▶ A questionnaire included various husbandry and management factors and biosecurity was scored using the Biocheck (<https://biocheckgent.com/>).
- ▶ Multiple logistic regression models with random effects of herds were used to evaluate relationship between BCoV shedding in neonatal and weaned calves with herd health, productivity, husbandry, management, and biosecurity.

BCoV is commonly present in both the respiratory and enteric pathway in neonatal calves, weaned calves and fresh cows in EU dairies, with all herds being seropositive to the virus, and the virus present in 80% of herds. Reduced shedding of virus was observed in neonatal calves that received colostrum from cows vaccinated against BoCV at the end of the gestation. No such effect was observed in weaned calves.

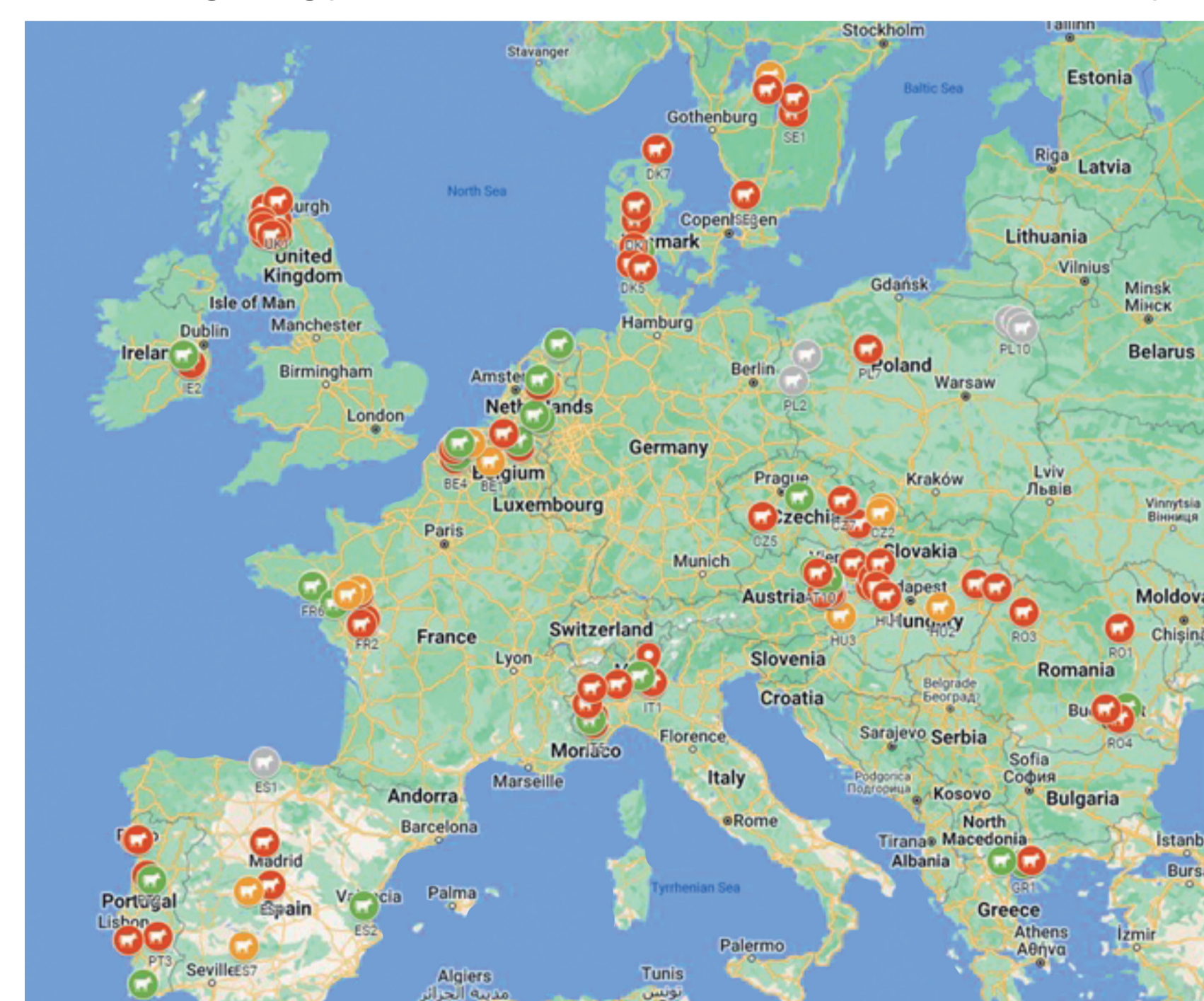


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RESULTS

- ▶ BCoV was detected in 80% of 125 dairy farms, and all dairy farms had antibodies to BCoV.
- ▶ BTM antibodies were 89 %OD (++++) and poorly correlated to animal antibody levels
- ▶ BCoV was found in 26% of neonatal calves, 26% of weaned calves, and 5% of fresh cows. BCoV shedding in calves from 0 to 180 days of age.
- ▶ Herds that vaccinated their dams against BCoV had significant lower shedding in neonatal calves and significant higher shedding in weaned calves.
- ▶ The biosecurity was scored at 60%, with external scores at 71% and internal scores at 41%.

FIGURE 1. 125 dairies were included from all over Europe, allowing for an overview regarding prevalence and risk factors for BCoV on dairies in Europe



Color code based on BCoV PCR positive samples: green, yellow, red corresponds with respectively 0%, 0-10% and >10%.

Figure 2. Nasal and fecal BCoV (RT-PCR) prevalence and average antibody levels (ELISA) in 2957 neonatal and weaned calves by month of life,

Months	N Calves	Nasal BCoV	Fecal BCoV	Nasal/Fecal BCoV	ELISA serum antibody
0	1290	24%	17%	26%	62 (+++)
1	170	34%	33%	41%	54 (++)
2	603	24%	24%	34%	46 (++)
3	568	24%	26%	37%	45 (++)
4	217	13%	13%	20%	42 (++)
5	63	8%	27%	30%	39 (+)
6	46	4%	11%	11%	49 (++)

FIGURE 3. Comparison of BCoV shedding levels and antibody levels in neonatal and weaned calves on farms implementing dry cow BCoV vaccination (such as Bovilis® Rotavec® Corona)

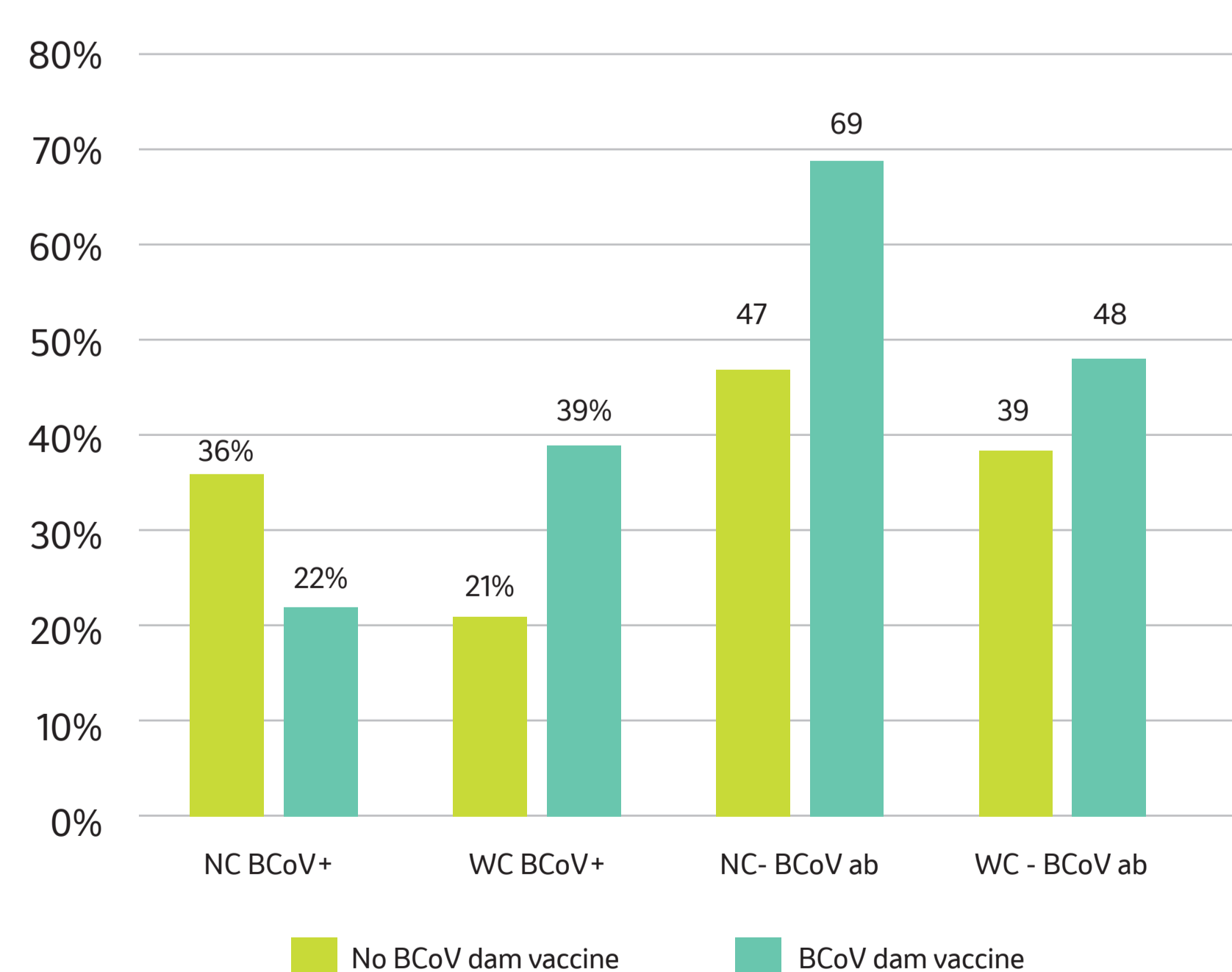
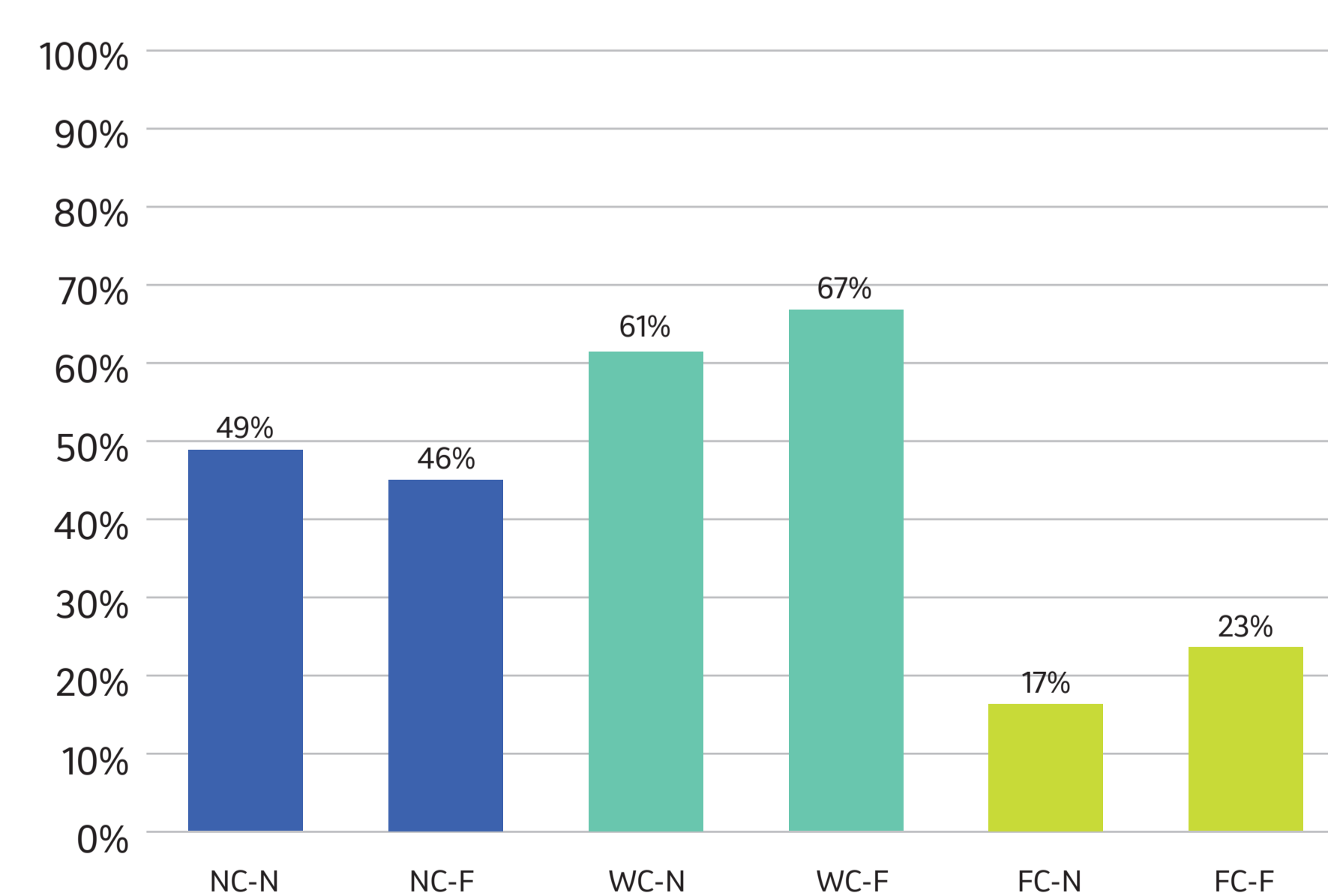


FIGURE 4. % of Dairy herds where BCoV was identified by RT-PCR in nasal (N) or faecal swabs (F) from neonatal calves (NC), weaned calves (WC) and fresh cows (FC)



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Abstract number: 1149. Board number: 16 May 22nd