

## The surveillance and control programme for bovine virus diarrhoea (BVD) in Norway

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# Surveillance and control programmes for terrestrial and aquatic animals in Norway

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# The surveillance and control programme for bovine virus diarrhoea (BVD) in Norway 2011

*Johan Åkerstedt, Madelaine Norström, Tormod Mørk*

*Bovine virus diarrhoea virus was not detected in any of the herds sampled in 2011.*

## Introduction

Bovine virus diarrhoea (BVD) is caused by bovine virus diarrhoea virus (BVDV) in the genus pestivirus. The virus is the cause of mucosal disease and hemorrhagic syndrome, but the economically most important manifestations of disease are related to infection in pregnant animals, resulting in embryonic death, abortion and congenital defects. Persistently infected calves may be born and serve as the main reservoir of infection to other animals (1). Bovine virus diarrhoea is a notifiable disease in Norway.

An eradication programme, financed by the authorities and the industry, started December 1992 (2). During the programme period, the number of herds with restrictions decreased from 2,950 in 1994 to none at the end of 2006. Details of the programme and a discussion of factors important for its success are given in the annual report for 2006 (3). Since 2007, the aim of the programme has been surveillance and control (4).

The Norwegian Food Safety Authority was responsible for carrying out the surveillance and control programme for BVD. The Norwegian Veterinary Institute was in charge of planning the programme, collecting the bulk milk samples from the dairies and performing the tests. Blood samples from beef herds were collected by inspectors from the Norwegian Food Safety Authority.

## Aim

The aim of the surveillance and control programme for BVD in 2010 was to document freedom from the infection in Norwegian livestock and to contribute to the maintenance of this favourable situation.

## Material and methods

Twelve and a half per cent of all Norwegian dairy and beef cattle herds were selected for examination. The target dairy herd population consisted of all herds delivering milk to dairies during the sampling period. The target population of beef herds was all herds delivering cattle to slaughter in 2011. Bulk milk samples from the dairy herds were provided by the dairies, while beef cattle older than 24 months were sampled at slaughterhouses, with a maximum of ten animals per herd.

In 2011, bulk milk samples from 1,226 randomly selected dairy herds were collected. A total of 4,758 individual blood samples from 1278 beef cattle herds were tested in pools. The sampled herds represented 17.0% of all Norwegian cattle herds (Table 1).

All samples were tested for antibodies against BVDV using a commercial indirect enzyme-linked immunosorbent assay (ELISA; Svanova Biotech AB, Uppsala, Sweden) at the Norwegian Veterinary Institute in Sandnes (5). In case of positive or inconclusive results in pooled blood samples, the individual samples were tested.

Depending on the level of antibodies in bulk milk, dairy herds were divided into four groups (3, 6). In herds with low to high levels of antibodies (classification 1 to 3), individual blood samples from young stock should be collected and tested. Seropositive or inconclusive results from beef cattle herds were followed-up by testing blood samples from young stock. Table 2 shows numbers of tested herds and individual cattle during the years 1993 to 2011.

In case of seropositive young stock, identification of persistently infected animals would be done by testing blood samples for antibodies from every individual in the relevant herd. Animals with weak positive or negative serological results were tested for the presence of virus using an antigen-capture ELISA (IDEXX Laboratories, Inc., Westbrook, Maine, USA). Positive reactions in newly infected herds would be verified with the polymerase chain reaction (PCR) and sequence analysis.

**Table 1.** Numbers of dairy herds and beef herds tested within the frame of the Norwegian surveillance and control programme for BVD in 2011

Herd category	Total no. of cattle herds*	No. of herds tested	% tested of the total no. of herds
Dairy herds**	10,500	1,226	11.7
Beef herds***	4,200	1,278	30.4
<b>Total</b>	<b>14,700</b>	<b>2,504</b>	<b>17.0</b>

\* Based on data from the Register of production subsidies as of 31 July 2011.

\*\* Cattle herds delivering milk to dairies.

\*\*\*Sampling performed at slaughterhouses.

## Results

From the 1,226 sampled dairy herds in 2011, bulk milk from 1,223 herds were negative for antibodies against BVDV, while three herds had weak positive results (classification 1) (0.2%).

Of the 1,278 sampled beef cattle herds, pooled blood samples from ten herds were seropositive for BVDV (0.8%). Individual samples representing these pooled herd samples, were tested. In one herd all individual samples were seronegative. Thus, the result of the pooled sample was concluded to be negative, i.e. false positive. In the other nine farms with positive pooled samples, individual blood samples from ten animals were found seropositive. Seven of the samples came from cattle born before 2008. For the other three seropositive animals the age was not given when submitting the samples.

From five beef cattle herds with seropositive animals, 44 individual blood samples from young stock were tested and found seronegative. From the other four farms with seropositive results, additional samples of slaughter animals were negative for antibodies against BVDV (Table 2).



Table 2. Numbers of Norwegian cattle herds and individual cattle tested for antibodies against BVDV, and numbers of herds and individual cattle positive for BVDV (antibody results not shown).

Year	Bulk milk samples	Pooled blood samples from beef cattle older than 24 months <sup>1</sup>	Pooled milk samples from primiparous cows	Pooled blood samples from young stock	Individual blood samples		No. of virus positive	
					No. of herds	Samples	Herds	Individual blood
1993	26,424		5,031	5,000	NA	46,000 <sup>2</sup>	NA	1,300 <sup>3</sup>
1994	26,148		3,228	4,107	NA		NA	
1995	25,577		3,191	5,347	NA	36,065	NA	1,180
1996	25,167		1,849	3,163	NA	21,437	NA	685
1997	24,862		1,297	3,292	1,515	16,023	265	525
1998	24,038		1,415	3,407	780	7,091	98	198
1999	23,584		924	3,060	648	7,619	92	224
2000	21,796		100	1,610	423	6,947	72	129
2001	19,910		53	4,198	386	6,287	56	174
2002	18,771		-	2,854	284	3,962	28	43
2003	17,549		-	2,100	149	1,135	9	22
2004	7,365		-	1,351	84	1,017	2	6
2005	7,481		-	1,230	48	356	1	4
2006	14,620		-	997	28	113	0	0
2007	1,575		-	387	8	20	0	0
2008	1,424		-	423	8	34	0	0
2009	1,315	435	-	10	7	31	0	0
2010	1,328	507	-	47	11	63	0	0
2011	1,226	1,278	-	NA	5	44	NA	NA

<sup>1</sup>Before 2009, pooled sample from young stock was examined.

## Discussion

No herds had restrictions because of BVD at the beginning of 2007. Testing bulk milk from all dairy herds and a 20% representative sample of all beef cattle herds was performed in 2006 with no findings of new infected herds. This indicated that the goal of eradicating BVD in Norway was achieved. The results of the surveillance and control programme from 2007 to 2011 confirm this conclusion. No new infected farm has been found and no restrictions have been imposed on any farm due to BVD.

Although Norwegian livestock is currently free from the disease, import of infected animals and unknown wildlife reservoirs may pose a continuous threat to the present status. For the rapid detection of a potential reintroduction and consecutive control of spreading, a surveillance system has to make efficient use of the competence and awareness existing among farmers and local veterinarians.

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