

The surveillance programme for bovine virus diarrhoea (BVD) in Norway 2014

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The surveillance programme for bovine virus diarrhoea (BVD) in Norway 2014

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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 2950 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 2014 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 2014. Bulk milk samples from the dairy herds were provided by the dairies, while beef cattle older than 24 months were sampled at 17 slaughterhouses, with a maximum of five animals per herd and day of sampling.

In 2014, bulk milk samples from 1489 randomly selected dairy herds were collected. A total of 3093 individual blood samples from 937 beef cattle herds were tested in pools. The sampled herds represented 18% of all Norwegian cattle herds (Table 1).

All samples were tested for antibodies against BVDV using a commercial indirect enzyme-linked immunosorbent assay (ELISA; Boehringer Ingelheim Svanova, 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 in pools. Seropositive or inconclusive results from beef cattle herds were also followed-up by testing pooled blood samples from young stock. Table 2 shows the numbers of tested herds and individual cattle during the years 1993 to 2014.

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 would be 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 2014.

Herd category	Total no. of cattle herds*	No. of herds tested	% tested of the total no. of herds
Dairy herds**	9103	1489	16
Beef herds***	4132	937	23
Total	13235	2414	18

* Based on data from the Register of production subsidies as of 31 July 2014.

** Cattle herds delivering milk to dairies.

***Sampling performed at slaughterhouses.

Results

From the 1489 sampled dairy herds in 2014, bulk milk samples from 1478 herds were negative for antibodies against BVDV, while 11 herds had weak positive results (classification 1) (0.7%). Pooled samples of young stock from ten of these herds were seronegative.

Of the 937 sampled beef cattle herds, a pooled blood sample from one herd was seropositive for BVDV (0.1%). Individual samples representing this pooled herd sample was also seropositive. The beef cattle herd was followed-up with individual blood samples from young stock which were found seronegative. Table 2 shows the results of the testing during the period from 1993 to 2014.

Table 2. Numbers of 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 >24 months ¹	Pooled milk samples from primiparous cows	Pooled blood samples from young stock ²	Individual blood samples		No. of virus positive	
	No. of herds	No. of herds	No. of herds	No. of herds	No. of herds	Samples	Herds	Ind. blood samples
1993	26 424		5 031	5 000	NA	46 000 ²	NA	1 300 ³
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	-	0	5	44	0	0
2012	1 190	1 179	-	0	4	19	0	0
2013	1 042	1 167	-	0	2	10	0	0
2014	1 489	937	-	11	4	20	0	0

¹A small number of blood samples collected at slaughterhouses could originate from dairy herds.

²Prior to 2009, this no. included surveillance in beef cattle.

³Approximate numbers

NA=Data not available

Discussion

Bovine virus diarrhoea virus was not detected in any of the herds sampled in 2014. Individual blood samples from young stock from one of the 11 dairy herds with a weak positive bulk milk sample were not available. The herd will be followed up in 2015.

In Norway, no infected farm was found and no restrictions were imposed on any farm due to BVD since 2005. In 2006, bulk milk from all dairy herds and blood samples from 20% of the beef cattle herds were tested. No farm with recent infection was identified. Since then, more than 10% of all dairy and beef cattle farms have been tested every year and none was found infected by BVD. Using scenario tree modelling, the probability of freedom from BVDV in Norway at the end of 2011 was calculated to 99.6% (7). The results of the surveillance and control programme from 2012 to 2014 support that the Norwegian cattle population is free of BVD.

Although Norwegian livestock is currently free from the disease, import of infected animals and animal products of bovine origin may pose a 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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