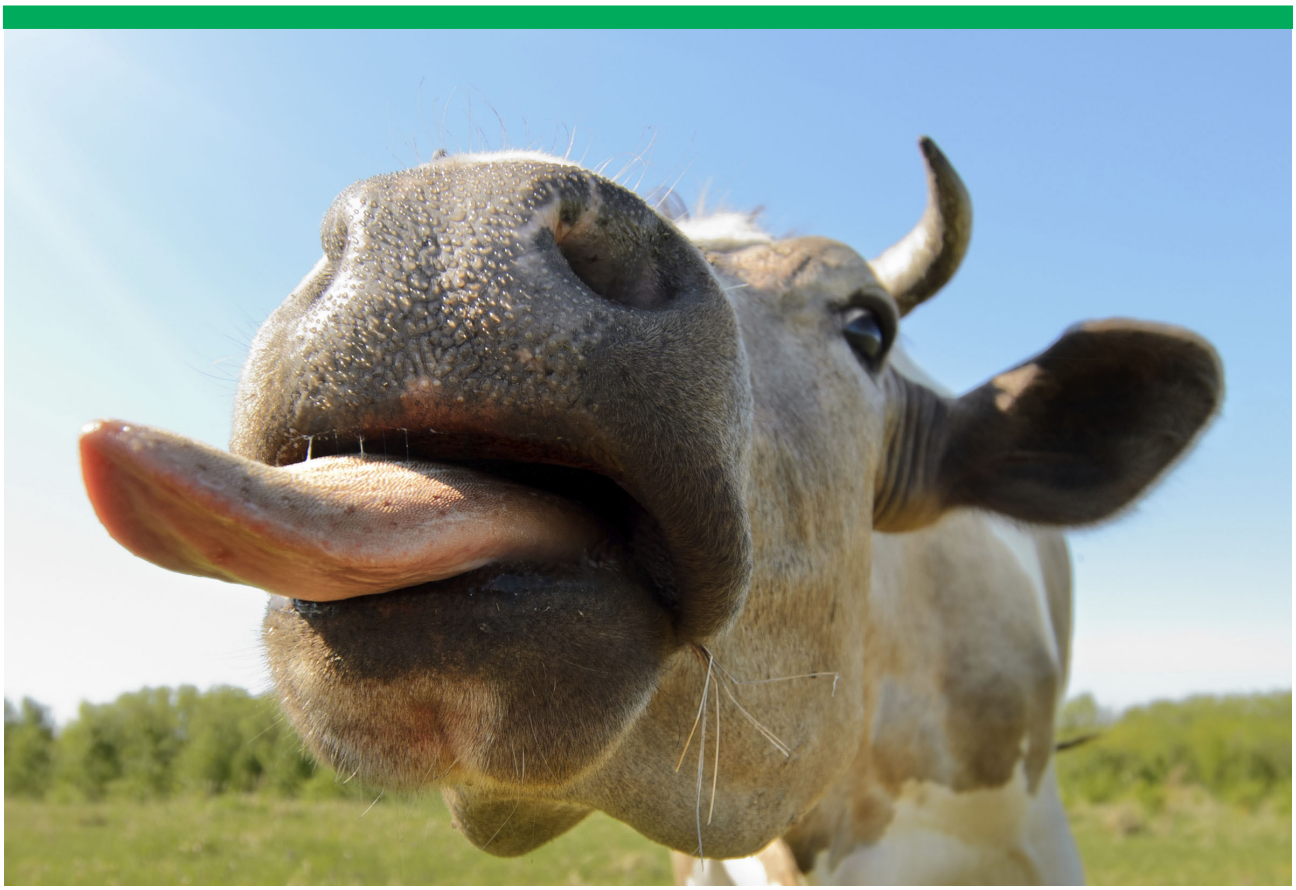
Annual Report

# The surveillance programme for bovine virus diarrhoea (BVD) in Norway 2017



Veterinærinstituttet
Norwegian Veterinary Institute

Mattilsynet

# The surveillance programme for *bovine virus diarrhoea* (BVD) in Norway 2017

## Content



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## Summary

Bovine virus diarrhoea virus was not detected in any of the herds sampled in 2017.

## 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 (list B) 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 aims of the programme have been surveillance and control (4).

The Norwegian Food Safety Authority was responsible for carrying out the surveillance 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 programme for BVD in 2017 was to document freedom from the infection in Norwegian livestock and to contribute to the maintenance of this favourable situation.

## Materials and methods

The surveillance programme included both dairy and beef herds. The target population of dairy herds consisted of all cattle herds delivering milk to dairies during the sampling period. The target population of beef herds was all herds delivering cattle to slaughter in 2017.

Twelve and a half per cent of the dairy herds were randomly selected for sampling. Bulk milk samples were provided by the dairies. From the beef herds, individual blood samples from animals older than 24 months were collected at 16 slaughterhouses, with a maximum of five animals per herd and day of sampling. Bulk milk samples from 1,107 randomly selected dairy herds were collected. A total of 4,283 individual blood samples from 1,448 beef cattle herds were collected and tested in pools. The sampled herds represented 20% of all Norwegian cattle herds (Table 1).

**Table 1.** Numbers of dairy herds and beef herds sampled within the frame of the Norwegian surveillance programme for BVD in 2017.

| Herd category | Cattle herds (total no.[1]) | Sampled herds (no.[2]) | Sampled herds (%) |
|---|---|---|---|
| Dairy herds[3] | 8 311 | 1 107 | 13 |
| Beef herds[4] | 5 731 | 1 448 | 25 |
| Total | 12 841 | 2 532 | 20 |

[1]Based on data from the Register of production subsidies as of 31 July 2017.
[2]Combined beef cattle and dairy farms could be sampled under both herd categories. Number of unique farms is given as total number of sampled herds.
[3]Cattle herds delivering milk to dairies.
[4]Sampling performed at slaughterhouses.

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 were collected and tested. Seropositive or inconclusive results from beef cattle herds were also followed-up by testing blood samples from young stock. Table 2 shows the numbers of tested herds and individual cattle during the years 1993 to 2017.

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 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 |
| 2015 | 1 178 | 1 206 | - | 0 | 6 | 32 | 0 | 0 |
| 2016 | 1 181 | 1 334 | - | 0 | 1 | 5 | 0 | 0 |
| 2017 | 1 107 | 1 448 | - | 0 | 2 | 20 | 0 | 0 |

[1]Sampling performed in the herds prior to 2011. A small number of blood samples collected at slaughterhouses could originate from dairy herds.
[2]Prior to 2009, this number included surveillance in beef cattle.
[3]Approximate numbers
NA=Data not available

## Results

From the 1,107 sampled dairy herds in 2017, bulk milk samples from all herds were negative for antibodies against BVDV.

Of the 1,448 sampled beef cattle herds, pooled blood samples from two herds were seropositive for BVDV. Individual samples representing the pooled herd samples were also seropositive. The two herds were 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 2017.

## Discussion

Bovine virus diarrhoea virus was not detected in any of the herds sampled in 2017.

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 to be 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 programme from 2012 to 2017 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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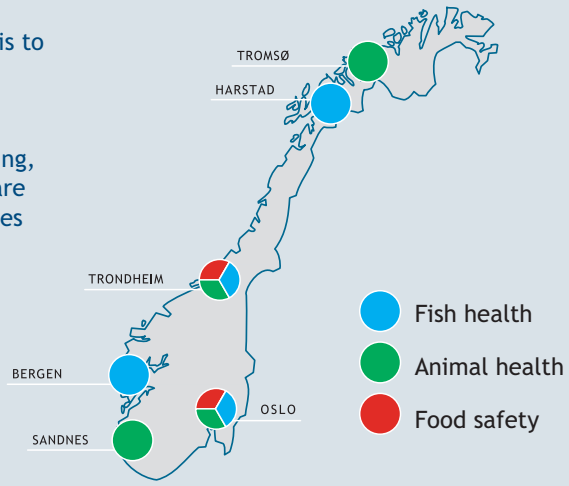


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