



The surveillance programme for *enzootic bovine leukosis* (EBL) in Norway 2021



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Summary

All milk and blood samples tested in 2021 were negative for antibodies against bovine leukemia virus (BLV).

Introduction

Enzootic bovine leukosis (EBL) is caused by bovine leukemia virus (BLV), in the genus retrovirus. Most infections are subclinical. Approximately one third of infected cattle older than three years of age develop persistent lymphocytosis. A smaller proportion of animals develop lymphosarcomas in various internal organs. EBL is classified as a list 2 disease in Norway and is notifiable to the World Organisation for Animal Health (WOAH). The disease had never been reported in Norway until antibodies against BLV were detected in eight dairy herds in samples collected through the surveillance programme in 1995 (1). No new herds have tested positive since 1997 (2), except a single positive bulk milk sample in one herd in 2002, and one blood sample from one of the cows in that herd. After extensive follow up, it was concluded that the positive serological results were due to false positive reactions (3). Free status from EBL was granted Norway by the EFTA Surveillance Authority in 2007.

The Norwegian Food Safety Authority is responsible for implementing the surveillance programme for EBL. The Norwegian Veterinary Institute is in charge of planning the programme, collecting the bulk milk samples from the dairies, and performing the tests. Official inspectors from the Norwegian Food Safety Authority collected the blood samples from beef cattle at slaughterhouses.

Aim

The aim of the surveillance programme for EBL is to document freedom from the infection in Norway according to Council Directive 64/432/EEC as amended, 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 were all herds delivering cattle to slaughter in 2021.

Of the Norwegian dairy herds, 19.6% were randomly selected for sampling. From the beef herds, individual blood samples from animals older than 24 months were collected at 18 slaughterhouses, with a maximum of five animals per herd and day of sampling.

The dairies provided 1,406 bulk milk samples from 1,212 dairy herds. A total of 3,952 individual blood samples from 1,413 beef herds were received for analyses in pools (n =1,803). The sampled herds represented approximately 20.0% of the Norwegian cattle herds (Table 1).

Table 1: Numbers of dairy herds and beef herds and herds sampled within the frame of the Norwegian surveillance programme for EBL in 2021

| Herd category | Cattle herds (total no. ¹) | Sampled herds (no. ²) | Sampled herds (%) |
|--------------------------|--|-----------------------------------|-------------------|
| Dairy herds ³ | 6 905 | 1 212 | 17.6 |
| Beef herds ⁴ | 5 927 | 1 413 | 23.8 |
| Total | 12 875 | 2 581 | 20.0 |

¹Based on data from the Register of production subsidies as of 1 March 2021.

²Combined beef cattle and dairy farms could be sampled under both herd categories. Number of unique farms is given as a total number of sampled herds.

³Cattle herds delivering milk to dairies.

⁴Sampling performed at slaughterhouses

Bulk milk samples were analysed using an indirect ELISA, IDEXX Leukosis Milk Screening Ab test (IDEXX Laboratories, Maine, USA). Samples with inconclusive and positive reactions were retested in duplicates. In case of positive or doubtful serological results, new blood samples/bulk milk samples from the suspected herd were collected and tested.

Blood samples (pooled or individual samples) were analysed using a competitive ELISA kit for Enzootic Bovine Leukosis Virus, ID Screen® BLV Competition (ID.Vet, Grabels, France). In case of positive or inconclusive reactions in pooled blood samples, individual samples were retested. Individual samples with inconclusive or positive results were retested in duplicates. In case of positive or doubtful results, new blood samples from the suspected herd were collected and tested.

Results

When screening the 1,406 bulk milk samples from dairy herds, five (<0.1%) were positive and three were doubtful, while the remaining samples were negative. By retesting the positive and doubtful samples, six remained positive or doubtful, and two were negative. New bulk milk samples were collected from the six herds from which the doubtful and positive samples originated, and these were all negative. Thus, all 1,212 dairy herds were negative for antibodies against EBL.

Out of 1,803 pooled blood samples from beef herds, one was positive (<0.1%) and two were doubtful, while the remaining bulk milk samples were negative. After retesting the positive or doubtful samples, one sample was negative, while two remained doubtful. New blood samples were collected from the two herds from which the doubtful samples originated, and all tested negative. In conclusion, all 1,413 beef herds sampled were negative for antibodies against EBL.

Table 2 shows the results of the testing during the period from 1995 to 2021.

Table 2: Numbers of samples and positive results of antibody testing in the surveillance programme for EBL in the Norwegian cattle population during the period 1995-2021.

| Year | Dairy herds | Beef herds | | No. of positive samples |
|------|----------------------|-----------------------------------|--|-------------------------|
| | No. of herds sampled | No. of herds sampled ¹ | No. of individuals tested ² | |
| 1995 | 25 131 | 1 532 | 9 354 | 8 (bulk milk) |
| 1996 | 2 278 | 303 | 1 523 | 1 (bulk milk) |
| 1997 | 26 903 | 2 214 | 16 741 | 0 |
| 1998 | 23 581 | 2 191 | 17 095 | 0 |
| 1999 | 19 933 | 2 382 | 18 274 | 0 |
| 2000 | 1 590 | 340 | 2 892 | 0 |
| 2001 | 2 564 | 434 | 3 453 | 0 |
| 2002 | 2 308 | 462 | 3 693 | 1 (bulk milk) |
| 2003 | 1 845 | 449 | 3 901 | 0 |
| 2004 | 1 573 | 402 | 3 364 | 0 |
| 2005 | 1 919 | 484 | 4 766 | 0 |
| 2006 | 1 673 | 479 | 4 624 | 0 |
| 2007 | 1 575 | 412 | 4 241 | 0 |
| 2008 | 1 422 | 444 | 4 616 | 0 |
| 2009 | 1 315 | 435 | 5 038 | 0 |
| 2010 | 1 265 | 507 | 4 020 | 0 |
| 2011 | 1 226 | 1 278 | 4 758 | 0 |
| 2012 | 1 189 | 1 178 | 4 306 | 0 |
| 2013 | 1 042 | 1 167 | 4 079 | 0 |

| | | | | |
|------|-------|-------|-------|---|
| 2014 | 1 489 | 935 | 4 132 | 0 |
| 2015 | 1 176 | 1 206 | 3 704 | 0 |
| 2016 | 1 180 | 1 337 | 4 241 | 0 |
| 2017 | 1 107 | 1 448 | 4 285 | 0 |
| 2018 | 1 131 | 1 341 | 4 153 | 0 |
| 2019 | 1 071 | 1 328 | 4 124 | 0 |
| 2020 | 1 169 | 1 258 | 3 709 | 0 |
| 2021 | 1 212 | 1 413 | 3 952 | 0 |

Discussion

The EU requirement for granting an EBL-free status is that the herd prevalence must be lower than 0.2%, which represents a maximum of 25 herds out of the total number of 12.875 herds.

No new cases have been reported after 1997, and the continuous surveillance since 1997 shows that the Norwegian cattle population is free from EBL according to the requirements (2, 3). Initially, all cattle herds were tested annually. Since 2000, a minimum of 10% of dairy and beef herds have been tested each year. Using scenario tree modelling, the probability of freedom from EBL in Norway at the end of 2014 was calculated to 99.0% (5). The results of the surveillance programme from 2021 support that the Norwegian cattle population is free of EBL.

Together with the possible isolation period of six months and the testing protocol for imported animals, the surveillance programme for EBL should be an effective measure to detect introduction of a new infection.

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