[O37] ANALYSIS OF THE BVDV CONTROL PROGRAM DATA IN GERMANY

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Summary
Bovine Viral Diarrhoea (BVD) is an infectious disease in cattle with horizontal and vertical spread. It causes major economic losses worldwide. Hence, in Germany a compulsory BVD control program has been established in 2011. The main aim of the program is to detect and remove persistently infected (PI) animals. All BVD test results are recorded in the German cattle database (HIT). We analysed the database regarding epidemiologically important parameters, e.g. temporal and spatial trends in prevalence, the age distribution of PI animals, and the time from detecting to removal of PI animals. As most German federal states started the program in 2010, we analysed the database for the years 2010 to 2020. Since 2010, more than 52.5 million animals were tested for BVD. Overall, the proportion of PI animals in the population decreased from 0.5 % in 2011 to 0.005 % in 2020. In the same period, the proportion of affected farms decreased from 0.481 % to 0.005 %. Although the median time from detection to removal of Bovine Viral Diarrhoea Virus (BVDV) positive animals in 2011 was 15 days, it decreased consistently over the subsequent years. Despite the known risks, in some instances, it took more than 100 days from detection to removal, even in 2020. The results demonstrate that BVD control in Germany has been highly successful, and that the database is an important tool to summarize and evaluate its progress. The database helps to identify critical control points in the system, such as the delayed removal of PI animals.

Introduction/background
Bovine viral diarrhoea (BVD) is an infectious disease in cattle caused by the Bovine viral diarrhoea virus (BVDV), which belongs to the genus Pestivirus of the family Flaviviridae and is divided into two genotypes: Pestivirus A (previously BVDV-1) and Pestivirus B (previously BVDV-2) (1). Although Pestivirus B is known to exist in Germany (2, 3), Pestivirus A is the predominant genotype in the country. In naive cattle, infection with BVDV leads in most cases to clinically inapparent infections or non-specific clinical signs such as fever, diarrhoea, reduced milk yield, haemorrhagic lesions, or pneumonia (4). In naïve pregnant cows, the infection may result in lower reproductive performance, including reduced conception ratio, abortion and increased calving intervals (5, 6). Furthermore, depending on the stage of pregnancy at the time of infection, vertical BVD transmission can result in abortion/stillbirth, congenital defects, growth retardation or the birth of persistently infected (PI) calves. Persistently infected animals are often small and unthrifty, have increased susceptibility to other diseases and may eventually die from mucosal disease (6). PI animals will shed high doses of BVDV during their whole life and therefore play a major role in BVD transmission by direct or indirect contact (7).

In January 2011, an obligatory control program entered into force on January 1st of 2011 (8). The major objective was the reduction of PI animals, and the establishment system whereby farms could be certified as housing only “BVD-unsuspicious” (=virus free) animals.
To detect PI animals, all animals were to be tested before trade or after birth by either blood test or ear notch testing.

According to the German regulations, a PI animal is defined as an animal that tests positive for a BVDV antigen or genome test, with or without confirmatory testing. Furthermore, the offspring of PI animals, and animals that develop MD are also regarded as PI. Cows give birth to a “BVD-unsuspicious” calf are declared likewise “unsuspicious” (=derived BVD status). The test results must be entered into the German cattle database (HIT). In this database, the status of all animals are calculated based on their test result, or on the test result of the mother (9).

The aim of this study was to analyse the current status of the BVD control program and identify areas for improvement.

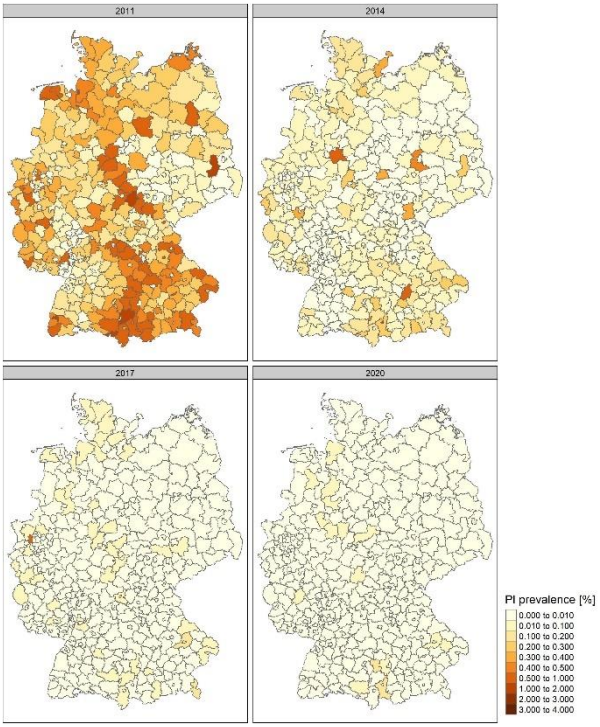

Figure 15: Evolution of PI prevalence in districts

Materials and Methods

In this analysis, we used the data stored in the National cattle database (HIT) from 01/01/2010 to 31/12/2020. From this database, we extracted three tables of information: one tabulating the number of animals per farm; a second with data on animal ID, birth date, date of death, type of death, id of last farm, BVDV classification, and date of classification; and lastly, a third listing individual test result for BVDV.

We stored a snapshot of the data in Microsoft SQL Server and analysed the data using R Statistical software (Version 4.03) (10).

Results

From 2010-2020, approximately 52.5 million animals were tested for BVD virus and received a BVDV status. Overall, 63 thousand animals were classified as PI animals and removed from farms. Most of the animals were tested only once, up to 18 tests were reported in a proportion of individual animals. Between 2011 and 2020, the prevalence at the animal level decreased from 0.481 % to less than 0.005 %, and the prevalence at the herd level from 3.44 % to 0.004 %.

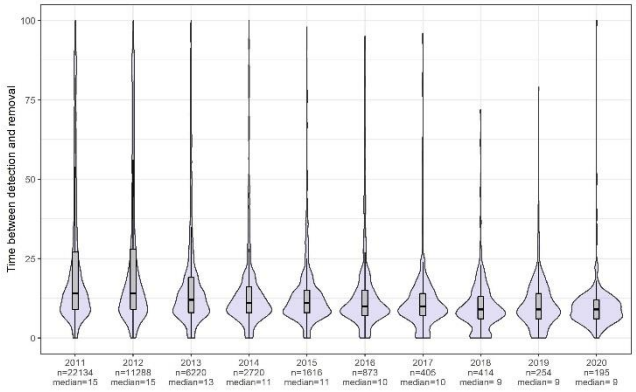

Figure 16: time between detection and removal of PI animals

In most of the districts, the PI prevalence decreased and many regions were free from PI animals by 2020 (figure 1).

The time between obtaining a positive test result for an animal and its removal decreased from a median of 15 days in 2011 to 9 days in 2020. Nevertheless, the maximum number of days between test and removal was still as high as 100 days in 2020.

Analysis of died animals showed that most BVDV test- positive animals died within the first six months of their lifes (about 87.7 %). Nevertheless, of all persistently infected animals identified, more than 3,500 were older than one year of age.

Discussion

The results of the analysis showed that the BVD control program in Germany has been very successful so far. There are still some weaknesses, e.g. the time between birth and first test and time between detection and removal are too long. To minimize risks, animals should be tested immediately after birth. Ideally, they ought to be removed as soon as possible after detection without confirmatory testing.
According to the Regulation (EU) 2016/429, in combination with Commission Delegated Regulation (EU) 2020/689, a status “free from bovine viral diarrhoea” can be granted, if vaccination against BVD is prohibited, if there has been no confirmed case of BVD during the past 18 months and if all animals are tested with a negative result of a BVDV antigen or genome test. Many districts of Germany fulfil these requirements.

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