

## 1.2 Economic loss

Economic losses through BVD are high. They depend on a variety of different factors, such as herd structure, the percentage of susceptible (seronegative) animals in the various age groups, the risk of exposure, the magnitude of loss caused by the infection of a susceptible animal...

### Studies abroad

A number of different studies have focused on calculating the costs by BVD at the herd level. The majority of these studies relate to specific regions or countries and are therefore only of limited value when applied to the conditions prevailing in Switzerland. Different herd sizes, climatic conditions, types of agriculture, market prices, types of breed, etc., inevitably lead to different economic consequences. The examples listed below, nevertheless, aim to provide a rough estimate of possible losses:

In 1990, Wentink and Dijkhuizen investigated the financial losses incurred by BVD in the Netherlands. The study included 14 farms involved in BVD outbreaks that suffered losses caused by spontaneous abortions, stillbirths, birth defects, hoof lesions, MD and PI animals. The authors calculated the financial loss per milk cow to be on average 136 guilders (around 94 SFr), whereby this amount varied from farm to farm, ranging between 42 to 285 guilders (29 – 197 SFr) [15].

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In a case study in 1998, Stelwagen and Dijkhuizen investigated a BVD outbreak on a Dutch milk farm (around 100 cows). PI calves on this farm caused an overall loss of 96'000 guilders (around 66'000 SFr) [16].

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Note: find more studies on that subject in the information software

Difficult to calculate...The economic losses caused by BVD are considerable even though the extent of these losses is quite difficult to calculate as it has to be assumed that a number of BVD infections remain undiagnosed or the losses associated with those infections are not recognized as being caused by the virus. Additionally, the real losses depend on a variety of different factors, such as herd structure (percentage of calves, heifers and cows at different stages of pregnancy), the percentage of susceptible (seronegative) animals in the various age groups, the risk of exposure, the magnitude of loss caused by the infection of a susceptible animal (virulence of the virus, co-factors) or the cost of every loss category [14]. The focus is not on Mucosal Disease (although this may well be the factor most accurately calculated) but on losses caused by reduced fertility and milk production of the animals. Costs caused by BVD in Switzerland...The owner's incurred financial losses include abortions, poor growth of young animals, birth defects, animal losses (MD), reduced milk production, diarrhoea in young animals (medical treatment), etc. In Switzerland alone these costs amount to around 6 – 12 million Swiss Francs per year. This includes only the direct losses, indirect losses (such as medical treatment) are not included in this figure. It is only for this reason that the losses in Switzerland appear to be relatively modest in comparison with costs published in other countries. The loss caused by a PI animal amounts to around SFr 800. Economic loss - how does it come about?

Infection of seronegative non-pregnant Animals Viral Diarrhoea can produce heavy symptoms. At the worst, affected animals will die from VD (departure losses). Although there is no causal therapy for BVD, considerable costs for veterinary services may arise in these cases (testing, diagnosis, symptomatic therapy). BVD has an immunosuppressive effect, which favours secondary diseases. Examinations have shown that BVD frequently smoothes the way for *Pasteurella multocida* and *Mannheimia haemolytica*. In a Swedish survey, increased susceptibility to mastitis and a tendency toward Retentio Placentae when giving birth to pi animals was observed [23]. BVD reduces the milk yield: while the milk production is normal in seropositive (immune) animals [24], milk losses in the course of epidemic outbreaks have been estimated at up to 30% [25].

Infection of seronegative pregnant animals Reduced fertility: an acute infection of a pregnant animal can lead to early embryonic death, deformities or to abortions. Indeed, the influence of BVD determined by experimental infection may exceed that under field conditions. A Swiss study [26] could neither find an increased return rate (infection at the beginning of gestation) nor malformations due to BVD (infection during the second half of gestation). However the abortion rate during the middle third of gestation (infection between days 46 and 210) was significantly increased. Calves BVD causes calf scours: Studies indicate that BVDV triggers diarrhoea in calves in two different ways. On the one hand it directly causes a villus atrophy in the duodenum and an inflammation in the intestinal submucosa. On the other hand it is able to enhance the pathogenic effect of Rotavirus [27]. Persistently infected animals Pi animals: Pi animals not only shed virus during their entire lifetime (a fact that already justifies culling), but they also tend to be poor doers (however, infected non-pi animals may also be poor doers). First year-of-life mortality in pi animals is about 50%. 6 out of 12 known pi calves on a British farm died, 4 of them were poor doers and only 2 grew up "normally" [28]. Moreover, pi animals are prone to Mucosal Disease. In Switzerland, 172 cases of MD have been recorded officially in 2004 [29], the number of unreported cases is probably significantly higher. Although PI animals are of vital epidemiological importance, one has to be aware that the main share of the economical losses is caused by problems like reduced fertility or immunosuppression rather than PI animals directly.