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A multidisciplinary approach to determine factors associated with calf rearing practices and calf mortality in dairy herds

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ABSTRACT

In the Netherlands, an increase in ear-tagged calf mortality (3 days to 1 year of age) in dairy farms was observed. The aim was to determine why calf mortality increased and how to reduce calf mortality in herds with structural high rates.

A multi-disciplinary approach was chosen to study this phenomenon. First analysis of census data revealed that the majority of the calves died in the first month of life. In addition, a panel of 236 farmers indicated that the increase in calf mortality might be related to priority, time management and the mind-set of farmers. For that reason a questionnaire was carried out to detect risk factors for mortality among young calves (<1 month) in 100 dairy farms with increased calf mortality compared to 100 dairy farms with stable and below average calf mortality. The results showed that, besides management factors such as IBR and BVDV control, and purchase of cattle, also the answers to statements giving an indication on the farmers' mind-set, were associated with calf mortality. Therefore, a qualitative sociological study on the farmers' identity was conducted by performing in-depth interviews among 30 farmers with structurally high calf mortality rates. Afterwards, the results were communicated with a veterinary advisor who visited the farmers and gave tailored advice. Most of the interviewed farmers believed to have sufficient knowledge and skills regarding calf rearing. The farmers did not share their calf rearing problems with colleagues and advisors but they mentioned to be open to receive advice if not communicated in a reproaching or pedantic way. The sociologist distinguished three different phases of awareness concerning calf mortality among the farmers: (1) farmers who were only partly, or not at all, aware of high calf mortality; (2) farmers who felt powerless because of their inability to find a solution to their problems; and (3) farmers who knew they can be inaccurate when it comes to rearing calves, but were reluctant to change this. With the background information of the farmers' identity it was easier for the veterinary advisor to provide tailored advice resulting in a higher probability of following up. A first evaluation in which calf mortality rates in the six months after providing the advice were monitored, indicated that the advice resulted in reduced mortality. The combination of census data, epidemiological and qualitative sociological research revealed that advisors should be aware of the attitude and mind-set of the farmer and adapt their approach and advice accordingly.

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1. Introduction

Calf rearing is an essential part of dairy herd management and is a prerequisite for a productive lifetime of dairy cows (Hultgren and Svensson, 2009). Calf mortality is one of the parameters that give an indication of the quality of rearing and the welfare of the calves (Ortiz-Pelaez et al., 2008) and is an important cause of economic loss in dairy production (Meyer et al., 2001; Østerås et al., 2007; Mee et al., 2008). Higher mortality rates in calves may enhance the need to purchase replacement heifers, which further increase costs and the probability of introducing new infections into the herd (Nielsen et al., 2010). Mortality of young calves cannot completely be prevented but it should be the goal to reduce this rate as much as possible.

In other European countries, many papers have been published that studied mortality in calves of varying ages. In those studies, the calf mortality rate varied between 2% and 8% in varying age-classes ranging from the first four months of age (Bleul, 2011), the first 6 months of age (Raboisson et al., 2013; Ortiz-Pelaez et al., 2008) to the first year of age (Guliksen et al., 2009). Nevertheless, the calf mortality rates between studies are difficult to compare because reporting systems and definitions of mortality rates in calves differ. Although these mortality rates are not completely comparable, several studies have reported an increase in calf mortality between 2002 and 2007 (Mee et al., 2008; Bleul, 2011).

Dutch calves have to be ear-tagged resulting in registration in the Identification and Registration (I&R) system within three days after birth. In 2009 and 2010, an increase in calf mortality (3 days to 1 year of age) in dairy herds in the Netherlands was observed after a period of several years in which calf mortality rates remained stable. The exact cause of this increase was unknown. However, this increased mortality rates resulted in an unwanted situation and stakeholders desired knowledge on how to reverse this increase. Because there was no clear cause for the increase, the hypothesis was that the increase was not only caused by management factors but might also be related to a changing attitude and priority of farmers. A Danish study revealed that knowledge on the daily routine of a farmer is essential to understand and solve problems regarding calf mortality (Vaarst and Sørensen (2009). Furthermore, it is known that aspects such as self-confidence, social environment, valour and ambitions play a role in the farmers' decision making (Jansen and Lam, 2012; Vaarst and Sørensen, 2009; Leeuwis, 2004). Changes in the decision making process of the farmer may lead to changes in rearing practices which may be associated with calf mortality. In addition, with a sociological qualitative methodology, a better understanding of the attitude and motivations for the actions of farmers can be obtained (Strauss and Corbin, 1990). However, there was no information available on studies in which a qualitative approach was combined with a quantitative approach when studying calf mortality.

Therefore it was decided to perform a study in which a multifactorial approach was conducted. The aim of this study was to determine factors that are associated with increased calf mortality in Dutch dairy herds, gain insight in the identity of farmers with structural high calf mortality rates and how to influence these farmers to improve their rearing practices.

2. Material and methods

In this study the definition of a calf is an animal between 3 days, which is the age at which the farmer is obliged to ear-tag the calf, and 1 year of age.

The complete study consisted of five parts that were conducted sequentially. In the first part of the study, routinely available data on calf mortality were analyzed to determine the characteristics of calves and herds on which the study should focus (referred to as census data). In addition, a short questionnaire was send to a panel of 400 dairy farmers to determine possible hypothesis for the increased mortality in calves (referred to as inventory). Based on the results of the census data and the inventory, a case–control study was conducted to determine both management factors and the attitude of farmers associated with increased calf mortality in their herds (referred to as case–control). In the fourth part of the project, a sociological study focussing on the identity of farmers with structurally high calf mortality in their herds was conducted (referred to as sociological qualitative study). In the final part of the project, a veterinary advisor on calf rearing used the farmer specific background information that was provided by the sociologist to revisit the farmers of the sociological study and provide them with a tailored advise on ways to improve calf rearing (referred to as tailored advise).

2.1. Census data

For the analyses on census data, all 18,387 Dutch dairy herds were included. Census data on calf mortality was available from the identification and registration system (I&R). Dutch farmers are obliged to register all ear tagged calves and the reason for removal (e.g. death, sold, exported) in I&R. The complete I&R dataset comprises information from approximately 612,500 ear-tagged calves present on dairy farms per year and was used to select the herds for the case–control and sociological study. In addition, based on these data, it was determined at what age calves are at highest risk to die and in which period in the life of a calf the mortality increased most between 2009 and 2010.

2.2. Inventory

The inventory was carried out on a group of 400 out of all 18,387 dairy farmers that voluntarily participated in a marketing panel of GD Animal Health. For this inventory the farmers were contacted by mail with the request to cooperate to a short on-line questionnaire that contained only six questions. This questionnaire focussed on possible factors that could be associated with calf mortality in dairy herds and comprised questions on herd size, the number of dead calves in 2010 and whether this number was equal/higher/lower compared to 2009, the age at dying of these calves. In addition we asked the farmers on their opinion of (1) the main cause of calf mortality in their own herd (based on their own observation, open question) and