



J. Dairy Sci. 100:1–10
<https://doi.org/10.3168/jds.2017-12750>
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Management practices for male calves on Canadian dairy farms

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ABSTRACT

Morbidity, mortality, and antimicrobial use and resistance are major concerns in the rearing of male dairy calves, so information to support disease prevention is important. The objective of this cross-sectional study was to describe management practices associated with the care of male calves during their first days of life on Canadian dairy farms. A survey was completed by dairy producers across Canada between March 1 and April 30, 2015. The survey included 192 questions covering producer background, farm characteristics, biosecurity practices, disease prevalence, calf health, animal welfare, lameness, milking hygiene, reproduction, and Internet and social media use. A total of 1,025 surveys were completed online, by telephone, or by mail, representing 9% of all dairy farms in Canada. Five percent of respondents ($n = 49$) answered that they had euthanized at least 1 male calf at birth in the previous year, and blunt force trauma was commonly used in these cases. The majority of respondents always fed colostrum to male calves; however, 9% ($n = 80$) did not always feed colostrum. Almost 40% ($n = 418$) of respondents reported always dipping the navels of male calves, 12% ($n = 123$) vaccinated male calves, and 17% ($n = 180$) did not provide the same quantity of feed to male calves as heifer calves. The care of male calves differed greatly depending on the geographical region of the respondents. However, some regional effects may be confounded by economic conditions and the logistics of marketing male dairy calves in different parts of the country. Herd size was another important variable in many aspects of the management of male calves on dairy farms. Larger herd sizes were more likely to use an appropriate method of euthanasia at birth but were less likely to always feed colostrum to their male calves or feed them the same as female calves. Familiarity with the Code of Practice for the Care and Handling of Dairy Cattle by respondents was associated with better care of male calves on dairy farms. The results of this

survey suggest that the treatment of male dairy calves on Canadian dairy farms varies and that there are opportunities to improve the health management of male calves on the farms of origin.

Key words: male calf, management, welfare

INTRODUCTION

Male calf health and welfare continue to be lingering issues in the dairy industry worldwide. New Zealand and Australia do not have well-established industries for raising male dairy calves, leading to the majority being transported long distances to be slaughtered within days of birth (Cave et al., 2005). Due to the effects of distance traveled and environmental stressors, male calves en route to slaughter plants experience high levels of mortality during transit (Cave et al., 2005). In Europe and North America, the majority of male dairy calves contribute to the red meat industry. The European Union has specifically addressed a significant number of public concerns regarding animal welfare through the implementation of strict animal housing and nutrition requirements for male calves being raised for meat production (European Union, 2008). The high level of importance placed on male calf welfare in the European Union has helped address some public criticism; however high levels of antimicrobial use and resistance have become major concerns for the veal industry (Pardon et al., 2014). In North America, little research on male calf health and welfare has been published over the past 2 decades. As antimicrobial resistance, mortality, and morbidity remain high among male dairy calf industries (Cook et al., 2011; Pardon et al., 2012; Winder et al., 2016), an increased focus on disease prevention needs to be a priority.

In heifer calves, many studies have highlighted the importance of neonatal calf management for both the short- and long-term survival of these calves (Weaver et al., 2000; Lombard et al., 2007; Windeyer et al., 2014). The highest risk for mortality occurs in the first 21 d following arrival to male calf housing (Pardon et al., 2012; Winder et al., 2016), suggesting that calf management on dairy farms also plays a key role in the prevention of mortality in male dairy calves.

Received February 17, 2017.

Accepted April 7, 2017.

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Providing a sufficient quantity of good-quality colostrum to newborn calves is an integral component of male calf management because failure of passive transfer in male calves is associated with an increased risk for many diseases (Postema and Mol, 1984; Pardon et al., 2015). Despite the known importance of feeding colostrum, failure of passive transfer is estimated to be common among male calves (Wilson et al., 2000; Schnepper, 2001; Pardon et al., 2015). It is interesting to note that a relatively recent study (Trotz-Williams et al., 2008) found no difference in failure of passive transfer between male and female calves, suggesting that poor colostrum management is widespread.

Another management practice that is used to increase host resistance to disease is the administration of vaccines. In young calves (3–8 d of age), the administration of an intranasal modified live vaccine against major viral pathogens of the bovine respiratory disease (BRD) complex has been proven to have a significant disease sparing effect, reducing clinical signs and pulmonary lesions (Xue et al., 2010). Despite the short duration of immunity induced by intranasal vaccination (Ellis et al., 2013), these vaccines may have utility in male calves raised for veal or dairy beef because pneumonia has been found to be the main reason for antimicrobial use and mortality in veal operations (Pardon et al., 2012; Lava et al., 2016).

Early-life nutrition also plays a role in increasing immune function and disease resistance. Malnourished calves have higher concentrations of blood cortisol and impaired lymphocyte function (Drackley, 2005) and take longer to recover from the effects of a *Cryptosporidium parvum* infection (Ollivett et al., 2012). Because male calves are often subjected to long transit times to their rearing site, during which they may experience cold or heat stress, adequate early nutrition is critical for their survival (Roland et al., 2016). The objective of this study was to describe management practices associated with the early rearing of male calves on Canadian dairy farms.

MATERIALS AND METHODS

Experimental Design

A national cross-sectional study (Belage et al., 2017) was conducted between March 1 and April 30, 2015, to collect data on management practices on Canadian dairy farms. A comprehensive questionnaire was developed by representatives from 4 veterinary schools, and questions were created to address key management and disease priorities (Bauman et al., 2016). These questions were then modified based on questions from other national surveys (USDA, 2008) and in consultation

with other Canadian dairy researchers. An advisory group consisting of dairy producers, government representatives, and veterinarians was created to provide feedback on the survey content. The final questionnaire consisted of 192 questions, which were divided into producer background information, farm characteristics, biosecurity practices, disease prevalence, calf health, animal welfare, lameness, milking hygiene, reproduction, and Internet and social media use.

Human ethics approval was received from each participating university: University of Calgary (Calgary, Alberta, Canada; REB no. 14–2481), University of Guelph (Guelph, Ontario, Canada; REB no. 14DC025), Université de Montréal (Montréal, Quebec, Canada; 15–007-CERES-D), and University of Prince Edward Island (Charlottetown, Prince Edward Island, Canada; REB no. 6006095). The questionnaire was available as an online platform (Qualtrics; <https://www.qualtrics.com/>) and as a Microsoft Word (Microsoft Corp., Redmond, WA) document for mailing out or for use as a script to allow administration over the telephone. To optimize the response rate, an incentive (\$20 gift card) was provided to the first 250 respondents.

Respondents were recruited through a letter of invitation that was mailed to every licensed dairy producer in Canada. The producer contact information was obtained through provincial milk marketing boards. To ensure that confidentiality was maintained, the marketing board provided a unique anonymous code to each producer. The letter of invitation outlined the scope of the study and presented the options for completing the survey. The methods made available were the website address for online completion of the questionnaire, a quick response code linked to the website, and a toll-free number with voicemail where requests could be made for completion over the telephone or on paper. In addition, a postage-paid reply card that contained the producer's unique code and contact information could be used to notify the researcher that the producer wished to have a paper version of the questionnaire mailed to them. In addition to the data obtained through the producer completion of the questionnaire, milk production and farm demographic data were obtained for every Canadian dairy farm from the respective provincial marketing boards. Belage et al. (2017) presents a more thorough description of the questionnaire design.

Statistical Analysis

All statistical analyses were conducted using Stata 14 (StataCorp, 2015). Data were imported from Microsoft Excel (Microsoft Corp.) into Stata 14 and checked for completeness. A causal diagram was created to evaluate the relationships between the potential exploratory

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