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Survey on management practices related to the prevention and control of bovine viral diarrhea virus on dairy farms in Indiana, United States

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ABSTRACT

The objective of this cross-sectional study was to describe the application of management practices known to be associated with the prevention of bovine viral diarrhea virus (BVDV) infection on Indiana dairy farms and to determine the extent of BVDV vaccine use within Indiana dairy herds. The population in this study was Indiana dairy producers enrolled under the Indiana Premise ID list by the Indiana State Board of Animal Health ($n = 1600$). During the fall of 2008 a questionnaire was mailed to Indiana dairy producers. Returned questionnaires were entered into a database and descriptive statistics were performed. A total of 208 questionnaires were found useful for analysis. Small herds (<100 head) constituted 60% of the sample population, 33% farms were categorized as medium herds (100–499 head) and finally 7% were large herds (>500 head). Most of the herds (68%) acquired their replacements from external sources (open herds); however, preventive measures against the introduction of BVDV into the farm such as purchased animal history, quarantine and BVDV testing were not commonly performed. Even though producers commonly reported the use of BVDV vaccines, not all animals groups were vaccinated within herds. This study highlights the aspects of management practices of BVDV control on Indiana dairy farms that need reinforcement. In particular, dairy producers should be made aware that vaccination should be complementary to a comprehensive biosecurity program.

1. Introduction

Bovine viral diarrhea virus (BVDV) is a Pestivirus within Flaviridae family first described in New York in 1946 by Olafson (Olafson and Rickard, 1947) mainly as affecting cattle's GI system. However, clinical signs are non-specific ranging from asymptomatic or mild transient signs to severe acute disease with signs from enteric, hematopoietic, reproductive or respiratory organ systems (Baker, 1995; Houe, 1995).

The main risk factor of BVDV introduction into any cattle herd is by acquiring new animals with unknown BVDV status (Houe, 1999; Valle et al., 1999; Luzzago et al., 2008). This can occur not only by acquiring persistently infected (PI) animals but also by purchasing acutely infected animals that shed the virus transiently (Houe and Palfi, 1993). Other common risk factors associated with BVDV infection are grazing on common pastures, and contact with other domestic species like sheep and goats (Valle et al., 1999; Luzzago et al., 2008). Even more, recent findings suggests that, following direct contact with infected animals, BVDV may spread from wildlife to cattle and vice versa (Passler et al., 2009; Raizman et al., 2011).

Application of biosecurity measures and vaccination practices along with detection and removal of PI animals are the hallmarks of BVDV prevention (Houe, 1999). Pre-

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vious reports, however, suggest that most producers do not have adequate biosecurity in addition to vaccines not used properly, increasing the risk of introducing BVDV into the herd (Carruthers and Petrie, 1996; Rauff et al., 1996). As a consequence, BVDV constitutes a substantial economic burden in the United States and in other parts of the world (Houe, 2003). The economic impact of BVDV varies between 20 and 57 million dollars loss per million calves depending on disease incidence (Houe, 1999). Production losses in dairy farms are attributed mainly to reduced milk production, decreased conception rate, respiratory disorders, abortions and removal of persistently infected (PI) calves (Houe, 2003).

Several countries from the European Union have included BVDV as part of their list of notifiable diseases. In the United States, several professional associations like the Academy of Veterinary Consultants and the American Association of Bovine Practitioners have called for the establishment of BVDV control programs and eventual eradication of BVDV in the US (Driskell and Ridpath, 2006). In order to establish successful control programs, we must address those particular areas that represent a potential source of BVDV infection to the farms.

The objectives of this study were: to evaluate the application of management practices associated with prevention of BVDV infection, on dairy farms of Indiana and to determine the distribution of BVDV vaccine use within Indiana dairy herds.

2. Materials and methods

The study population included all dairy producers enrolled in the Indiana State Board of Animal Health's Premise ID program. Indiana state law requires the enrollment of all sites involved in the purchase, sale or exhibition of livestock in the state of Indiana (Indiana State Board of Animal Health, Premise ID) (IBAH, 2009). Information provided included: name, address and phone number of nearly 1600 dairy producers. However, by the time of the study the real number of active dairy farms and the average herd size was unknown. In order to increase participation in our study, dairy practitioners received letters promoting our study and asking for their collaboration.

During the fall of 2008, an introductory letter along with a questionnaire and a postage-paid return envelope was mailed to all producers under the list ($n = 1600$) (questionnaire is available upon request). During the spring of 2009, a second questionnaire was sent to those producers that failed to reply the first time.

The questionnaire included a total of 40 questions, with a combination of open and closed-ended questions divided into six categories: producer information, herd size, animals other than dairy cattle, management, reproduction and disease control/vaccination practices. Farms were classified based on their herd size using the classification used in the USDA NAHMS study (APHIS, NAHMS Dairy, 2007). Dairy herds were categorized into 3 groups: small (less than 100 head), medium (100–499 head), large (more than 500 head). In addition, herds were classified as open (replacements acquired from external sources) or closed (all replacements come from the farm). In some situations, herds categorized as closed were re-classified as open if in subsequent questions producers reported acquiring their breeding bulls from external sources. Other questions addressed topics such as physical contact with other animals (domestic, farmed exotic animals or wild ruminants). Physical contact was described as nose-to-nose contact or sniffing/touching/licking each other, including through a fence. For BVDV vaccine information, producers were asked to list the name of the vaccines they were currently using in their farm. Subsequently, vaccine names were categorized into either killed or modified live vaccine for the analysis. Also, information was obtained for those participating farms of whether or not they were DHIA members.

Returned questionnaires were then manually checked for inconsistencies and entered into a database.[1] Epi info[2] was used to code the questionnaire and to run basic descriptive analysis.

3. Results

From the 225 questionnaires returned by producers (13.4%), 208 (12.3%) were eligible for further analysis and 17 were discarded because either herd owners were no longer active in the dairy business or questionnaires were not filled out. Additionally, 47 questionnaires (2.8%) were returned by the post office due to wrong mailing addresses. Not all questions were answered by respondents, either because they did not apply or were left blank. Of all responses, 37% were from only two counties (Elkhart 19% and Lagrange 18%). The geographical distribution of the dairy producers respond can bee seen in Fig. 1.

Herds with less than 100 head comprised 60% of the surveyed producers followed by herds with 100–499 head (33%) and herds with more than 500 head (7%) (Fig. 2).

Sixty-two percents of farms (135 herds) reported an outside source of replacements, whereas the rest reported that they raised their own replacements (closed herd) (Fig. 2). Only 68 (50%) producers with open herds answered the questions regarding biosecurity measures when introducing new animals. Out of 68 responses, 69% (46) of the producers did not ask for BVDV history and/or vaccination programs of herds from which they acquire new animals, 10% producers purchased animals regardless of farm history and 21% did not purchase animals if they are unaware of their origin. Out of 68 responses, only 13% quarantined new additions for at least 30 days. Only 2 out of 66 producers (3%) tested new additions for BVDV prior introduction to the farm.

Goats and beef cattle were the two most common domestic animals present on dairy farms (10% and 8% respectively) and there were no reports of farmers keeping exotic ruminants such as llamas, alpacas, elk and farmed deer on their premises. Most producers (56%) never observed wild deer grazing with their cattle or around farm premises.

[1] Microsoft Office Access™, 2007.

[2] Epi info 3.5.1™, Center for Disease Control and Prevention (CDC), Georgia USA.