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Evaluating the effect of Focus Farms on Ontario dairy producers' knowledge, attitudes, and behavior toward control of Johne's disease

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ABSTRACT

This study evaluated a participatory-based, experiential learning program, Ontario Focus Farms (FF), which aimed to change dairy producer behavior to control Johne's disease (JD) in Ontario, Canada. The goals were to (1) assess the effect of FF on participating dairy producers' knowledge, attitudes, and behavior with regard to JD control; (2) compare changes in these factors among FF participants to changes among a group of nonparticipating dairy producers; and (3) describe the characteristics of producers who made at least one on-farm management change. Pre- and post-FF intervention questionnaires collected data on respondents' knowledge, attitudes, behavior, herd production, and demographic information; before and after JD-risk assessments were used to assess respondents' on-farm risk of JD transmission. Overall, 176 dairy producers participated in the FF process; 39.8% (70/176) of FF and 14.6% (52/357) of control participants responded to both the pre- and postintervention questionnaires. Upon comparison, FF respondents were more likely to be younger, have larger herds, and have higher management scores. The proportion of FF participants who reported making at least one on-farm change (81%) was significantly higher than that of control respondents (38%). Overall, FF respondents significantly changed their risk score in 4 out of 5 risk areas and had an average reduction of 13 points in their overall risk score between before and after risk assessments. Control respondents' risk-assessment scores did not significantly change during the study period. In a JD-knowledge assessment, FF and control respondents exhibited a moderate knowledge score before the intervention period, with median scores of 75.9% (22/29) in each group. The FF respondents significantly increased their score at the postintervention assessment, with a median of 82.8% (24/29); control-respondent scores did not significantly change. Both FF and control respondents held strong positive attitudes toward JD control and felt a moderate amount of social pressure from veterinarians and industry organizations to make on-farm changes. However, they questioned their ability to effectively control JD on the farm. Last, participating in FF, having a moderate herd-management score, having a positive perception about the practicality of on-farm recommendations, and having a singular learning preference were associated with increased odds of making an on-farm change. Overall, the FF process appears to be effective at influencing producer behavior toward implementing on-farm management practices for JD control. Future JD control programs should consider implementing peer-learning extension processes, such as FF, in combination with other extension approaches, to influence producer behavior.

Key words: Johne's disease, behavior change, attitude, agricultural extension

INTRODUCTION

The prevention and control of dairy cattle diseases are keys to producing safe, high-quality milk products for consumers. Johne's disease (**JD**), an enteric disorder caused by *Mycobacterium avium* ssp. *paratuberculosis* (**MAP**), is an important production-limiting disease, affecting cattle in many countries worldwide (Sweeney et al., 2012). In Canada, 32% of dairy herds have at least 2 seropositive cows (Tiwari et al., 2009). Of increasing concern is the evidence suggesting that MAP plays a role in Crohn's disease (Chiodini et al., 2012; Sweeney et al., 2012). A causal link between MAP and Crohn's disease, or even consumer perception that dairy products pose a health risk, could be devastating for the Canadian dairy industry.

With no cost-effective treatment available, JD control is recommended through periodic testing of cows and implementing management changes to improve farm biosecurity (Sweeney et al., 2012). As a result, many national JD control programs use veterinarian-administered risk assessments (**RA**) to identify high-risk on-farm management practices and influence producer behavior to adopt JD control practices (Ken-

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nedy and Allworth, 2000; Groenendaal et al., 2003; Nielsen, 2007; Collins et al., 2010; Barker et al., 2012). Although RA-based JD control programs have been widely implemented, their efficacy is largely dependent on the veterinarian's ability to communicate with his or her clients and the producer's willingness to adopt the recommended on-farm management practices for JD control (Sorge et al., 2010b). Several studies examining the uptake of on-farm management practices to control JD have reported poor producer uptake (Wraight et al., 2000; Jubb and Galvin, 2004; Ridge et al., 2005; Sorge et al., 2010b). This is likely due to the inability of the RA, and the veterinarian administering the RA, to address the factors associated with behavioral change (Sorge et al., 2010b). Social psychological theories suggest that behavior is influenced by a complex set of internal (i.e., attitude, perception, knowledge, beliefs, learning preferences, skills) and external (i.e., economics, penalties, mandates, incentives) factors (Boxelaar and Paine, 2005). One such theory is the theory of planned behavior (**TPB**), which identifies a set of psychological constructs (i.e., latent concepts or factors) that influence behavioral intentions and actual behavior (Ajzen, 2006). Several studies have applied this theory to understand and measure the factors influencing farmer behavior (Kuiper et al., 2005; Jansen et al., 2010a; Garforth et al., 2013), providing evidence of the fact that changes in TPB factors influence different behaviors. The TPB suggests that behavior is influenced by 3 key constructs, each of which is composed of 2 interacting components: (construct 1) attitudes toward the behavior, consists of "behavioral beliefs" (i.e., beliefs about the consequences of the behavior) and an "outcome evaluation" (i.e., the positive or negative judgments about each behavioral belief); (construct 2) subjective norms (i.e., perceived social pressure to perform the behavior), consists of "normative beliefs" (i.e., the positive and negative judgments of the social pressure an individual receives from other individuals they perceive as important) and "motivation to comply" (i.e., the strength of motivation to change their behavior resulting from each source of social pressure); (construct 3) perceived behavioral control (i.e., perceived ability to perform the behavior), consists of "control beliefs" (i.e., beliefs about factors that inhibit or facilitate performing the behavior) and "power to control behavior" (i.e., the individual's perception of the power each factor has on performing the behavior) (Francis et al., 2004). As outlined by the TPB, these 3 constructs combine to influence an individual's intention to perform a given behavior and ultimately his or her behavior (Francis et al., 2004; Ajzen, 2006). Therefore, to effectively influence dairy producer behavior, these factors, or antecedents of behavioral change (i.e., knowledge, attitudes, perceptions), need to be addressed.

In Canada, JD control is coordinated nationally; however, each province is responsible for creating and administering their own control program (Barker et al., 2012). Beginning in 2010 Ontario implemented a 3-year, voluntary JD control program, called the Ontario Johne's Education and Management Assistance Program (**OJEMAP**) (OJEMAP, 2009). The program was composed of an education component, a veterinarian-administered on-farm RA, and voluntary, whole-herd testing. The education component of OJEMAP focused on the development of an extension model to improve the adoption of on-farm management practices to control JD. The resulting model, Ontario Focus Farms (**FF**), is an agricultural extension approach that aims to influence producer behavior by addressing their knowledge and attitudes (Roche, 2014). Conceptually, FF uses the principles of adult education and experiential and participatory learning theory and follows 4 key principles: (1) participatory, self-directed, and collaborative, based on group-identified priorities; (2) honest communication and trust; (3) planning, action, and implementation; and (4) reflection. Practically, FF is implemented as a series of meetings, with group sizes between 7 and 12, which are facilitated by professionally trained veterinary practitioners.

The first objective of this study was to evaluate the effect of FF on participating dairy producers with respect to their knowledge and attitudes (i.e., thoughts, opinions, feelings) about, and behavior toward, JD control. The second objective was to compare changes in these factors among FF participants to changes among a group of nonparticipating Ontario dairy producers. The final objective was to investigate and describe the characteristics (i.e., demographic factors, knowledge, and attitudes) of producers who made at least one on-farm management change to control JD.

MATERIALS AND METHODS

Ontario FF

Roche (2014) provides a detailed overview of the implementation of the FF process. Briefly, 8 regions of Ontario were used for FF establishment (Kirkton, Seaforth, Listowel, Tavistock, New Liskeard, Napanee, Winchester, Navan) to address issues surrounding JD control. Two separate cohorts of the FF approach were implemented, which took place between November 2010 and November 2011 (cohort 1) and December 2011 and December 2012 (cohort 2). Cohort 1 consisted of 8 groups and 105 dairy producers, and cohort 2 included