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Effect of structural animal health planning on antimicrobial use and animal health variables in conventional dairy farming in the Netherlands

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ABSTRACT

Widespread veterinary use of antimicrobials might contribute to the increasing burden of antimicrobial resistance. Despite many successful efforts to reduce veterinary antimicrobial use in the Netherlands, antimicrobial use on a substantial number of farms has remained relatively high over the past few years. Farm-specific solutions are required to further lower antimicrobial use on these farms. Reducing the burden of animal diseases at the farm level by means of a structured approach to animal health planning could be promising. This intervention study aimed to evaluate the main effects of an animal health planning program developed by an advisory team consisting of a dairy farmer, his veterinarian, and his feed adviser under the guidance of a professional facilitator. During an initial farm visit, the advisory team developed a farm-specific animal health planning program with support from the facilitator. After 1 yr, the effects of this program on animal health, production parameters, and antimicrobial use were evaluated and compared with control farms that did not have a facilitated animal health planning program. Antimicrobial use on intervention farms was significantly reduced between the start and the end of the study period; however, no significant differences in the rate of reduction between the intervention and control groups could be observed (−19% and −14%, respectively). Reduced antimicrobial use did not result in negative effects on animal health and production parameters during the study period in both groups. On intervention farms, a significant positive relationship was found between the percentage of completed action points at farm level and the percentage reduction in antimicrobial use. The level of compliance with action points and the quality of collaboration between farmer and advisers were positively associated with the accomplishment of corresponding objectives. However, the total number of objectives was negatively associated with the level of compliance with action points and tended to be negatively associated with the percentage reduction in antimicrobial use at farm level. Gradually reducing antimicrobial use without adverse effects on animal health and productivity is possible by adjusting management practices in a team effort. Fostering good collaboration among farmer, veterinarian, and feed adviser and focusing on a limited number of objectives have positive effects on the outcomes of the animal health planning program and antimicrobial use.
Key words: facilitated animal health planning, antimicrobial use, implementation, continuous improvement

INTRODUCTION

In recent decades, it has become apparent that extensive antimicrobial use (**AMU**) in food-producing animals might contribute to the increasing burden of antimicrobial resistance (WHO, 2012; Van Boeckel et al., 2015). Recent evidence shows that reducing AMU in livestock is associated with reducing antimicrobial resistance levels in farm animals (Dorado-García et al., 2016). Lowering AMU in farm animals therefore can be an effective strategy for containing the increasing burden of antimicrobial resistance (Agersø and Aarestrup, 2013). Several countries have introduced successful policy measures over recent decades to reduce AMU in farm animals (Grave et al., 2006; WHO, 2012; MARAN, 2015). In the Netherlands, measures include strict mandatory reduction targets set by the national

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government combined with private initiatives to accomplish this objective (Speksnijder et al., 2015c). However, there is great variation in AMU between farms in the Netherlands, indicating that there is room for further improvement on farms with higher than average AMU (Stichting Diergeneesmiddelen Autoriteit, 2014).

Many animal health problems are still highly prevalent in modern farming systems. Thus, focusing on the prevention of (infectious) diseases could be an effective approach in AMU reduction (Speksnijder et al., 2015a; Tremetsberger and Winckler, 2015; WHO, 2015). Major advances in understanding animal diseases allow us to substantially reduce or prevent animal diseases (LeBlanc et al., 2006). The challenge, however, is to correctly identify risk factors for animal health, develop and consistently implement the required management practices, and thoroughly evaluate these in a structured animal health planning process (LeBlanc et al., 2006; Vaarst et al., 2006; Green et al., 2007; Ivemeyer et al., 2012; Postma et al., 2015; Speksnijder et al., 2015a; Tremetsberger and Winckler, 2015). Crucial herein is that animal health planning is farm specific, warrants high involvement of the farmer during the development and implementation phases, and includes clear action points that are unambiguous for those involved (Kristensen and Jakobsen, 2011; Ivemeyer et al., 2012).

Veterinarians increasingly are seen as animal health advisers and potentially play an important role in both the animal health planning process and the reduction of AMU. The success of veterinarians in this role relies on their abilities to elicit farmers' opinions and values, communicate information clearly to farmers in a context of goal setting and regular evaluation, and encourage farmers in the implementation of agreed action points in a continuous cycle of improvement. This is challenging and often fails in practice (Clark et al., 2001; Jansen et al., 2010; Kristensen and Jakobsen, 2011; Derks et al., 2012; Main et al., 2012; Whay et al., 2012; Speksnijder et al., 2015a; Tremetsberger and Winckler, 2015).

Several recent studies have tried, with varying degrees of success, to improve animal health parameters through the development and implementation of farm-specific animal health plans, especially in dairy farming. Most of these studies focused on only one health problem (e.g., udder health, claw health), and most did not include control farms. To a great extent in these studies, external technical specialists (e.g., academic staff, disease specialists) performed risk assessments and formulated the animal health plans (Green et al., 2007; Bell et al., 2009; Ivemeyer et al., 2012; Whay et al., 2012; Tremetsberger et al., 2015; Tremetsberger and Winckler, 2015). Although the outcomes of these studies are useful for assessing the effectiveness of specific interventions on certain animal health indicators, ultimately the farm veterinarian, farmer, and other farm advisers should collaborate in a structured approach to animal health planning. Therefore, we conducted a pragmatic randomized controlled trial over a 1-yr period to test the main effects of an animal health planning program conducted by an advisory team consisting of a dairy farmer, his veterinarian, and his feed adviser under the guidance of a professional facilitator. Our aim was to evaluate this facilitated approach to animal health planning and its effects on animal health, production parameters, and AMU compared with control farms.

MATERIALS AND METHODS

More details of the study protocol are described in the Supplemental Material (https://doi.org/10.3168/jds.2016-11924).

Farm Selection

The study named Samen Beter Boeren ("Better Farming Together") was conducted between March 2014 and June 2015 in the Netherlands. Dairy farmers, as well as their veterinarian and feed adviser, were voluntarily recruited through advertisements on popular farming websites and through extension officers of the biggest dairy company in the Netherlands. Farmers were eligible for participation if they had an average yearly AMU within the signaling zone at that time (between 3 and 6 defined daily dose animal, **DDDA**; Stichting Diergeneesmiddelen Autoriteit, 2014). Being in the signaling zone was a warning for farmers with a higher than average AMU but did not require immediate additional measures. This AMU criterion was chosen because there was room for improvement in AMU on these farms and because relatively few farms had moved to a lower benchmarking zone over the past few years. After randomization, 20 farms were assigned to the intervention group and 19 farms were assigned to the control group. An introductory meeting was held before the start of the study to explain the background of the study to all participants in both the intervention and control groups. The farms in the intervention group were enrolled in the intervention activities, whereas on the control farms only data were gathered during the study period. After the study ended, farms in the control group were enrolled in the intervention. During the study period, all participants received 2 newsletters describing general affairs related to the project (without details on the content of the intervention) and