An Integrated Extension and Education Program to Reduce Mastitis and Antimicrobial Use

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Introduction
Mastitis continues to be the most common disease and biggest cause of antimicrobial use in adult dairy cattle in the United States. Despite considerable scientific knowledge regarding the prevention and therapy of mastitis, many farms continue to struggle with the adoption of mastitis control practices. Additionally, the U.S. dairy industry is increasingly diverse in terms of herd size, housing, labor, and management models. The Quality Milk Alliance, a five-year project funded by USDA-NIFA, is dedicated to reducing mastitis and antibiotic use in dairy cows. Project investigators include veterinarians, dairy scientists, sociologists, economists, media and education specialists, and extension educators from four institutions (Michigan State University, The Pennsylvania State University, Mississippi State University, and Florida Agricultural and Mechanical University). We will achieve our goals by developing a system (Aim 1, QMA Farm Evaluation) that will not only assess traditional key areas of a herd quality milk programs (e.g. milking proficiency and equipment) but also provide understanding of the management culture that will help dairy producers and their veterinarians become better employee “coaches”. The QMA system will be used as the basis for a combined online and hands-on educational program to certify specialists (Aim 2), who will be familiar with and can apply the QMA evaluation on dairy farms. Additionally, the QMA system will be tested as an intervention (Aim 3) in dairy herds to determine if this approach can reduce mastitis and antibiotic use. This presentation describes preliminary results from the first objective, a survey disseminated to dairy producers in three states to determine the behavioral and attitude barriers that may impede progress in reducing mastitis and antibiotic use on dairy farms.

Objectives

**Aim 1** Develop and test an assessment system (Quality Milk Alliance Farm Evaluation) to evaluate mastitis control and antimicrobial use in dairy operations

**Aim 2** Develop and test a Quality Milk Specialist Certification program for resident and extension education

**Aim 3** Evaluate the impact of QMA Farm Evaluation interventions on dairy farms

Methods
The primary goal of Aim 1 is to develop the QMA Farm Evaluation as a novel tool to identify critical behavioral, attitudinal, and communication deficiencies in mastitis control and antibiotic use practices within dairy herds. A combination of a mail survey and focus groups were used to ensure that we captured a diversity of farms and individuals and generated an in-depth understanding of employee input.

The first sub-aim was to send a survey to a random sample of 752 dairy herds in Michigan, 820 herds in Pennsylvania, and 128 herds in Florida. This sample size was calculated to deliver a survey response from 5% of the total Grade A herds in Michigan and Pennsylvania, assuming a 30% response. Because of the smaller number of herds within Florida, the sample size represents all permitted herds. The survey was administered through the Woolf Froese Survey Research Laboratory at the Social Science Research Center (Mississippi State University) and used “five points of contact by mail” 1) an initial letter, 2) the first copy of the survey, 3) a reminder letter, and 4 and 5) a second and third copy of the survey if needed.

**Aim 1: Develop QMA Farm Evaluation System**

**Producer Surveys**

**Producer and Employee Focus Groups**

**Advisory Panel**

**QMA Evaluation System - For education program (Aim 2) and On-farm evaluation (Aim 3)**

Results
Descriptive statistics from the herds participating in the survey are presented in Table 1. An overall response rate of 41% was attained and the average herd size was 107 cows, although there were significant differences between states. Three-month average bulk tank Somatic Cell Count (BTSCC) for all herds was 191,000 cells/mL, which is about equal to the milk-weighted BTSCC reported by the USDA-APHIS for 2012 (194,000 cells/mL).

**Table 1: Descriptions of Herds Participating in Survey**

<table>
<thead>
<tr>
<th>State</th>
<th>Herd Size</th>
<th>Number of Herds</th>
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<tbody>
<tr>
<td>Florida</td>
<td>119</td>
<td>23 (21%)</td>
</tr>
<tr>
<td>Michigan</td>
<td>737</td>
<td>281 (36%)</td>
</tr>
<tr>
<td>Pennsylvania</td>
<td>765</td>
<td>324 (41%)</td>
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<tr>
<td>Mean (all states)</td>
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Discussion
At least 86% of the farms reported practicing pre- and post-milking teat disinfection and drying teats. Likewise, 80% or greater of the herds reported ‘always or frequently’ using alcohol pads before teat infusions, dry cow therapy, and cleaning the alleys and gutters in barns at each milking. However, critical behaviors that are believed to reduce the use of unproductive antibiotic therapy for mastitis, such as recording all treatments (47%), review of records to identify previous treatments (42%) and bacterial culture milk from clinical mastitis cases (15%) were less frequently reported as ‘always or frequently’ done. 73% of herds reported that ‘always or frequently’ assure strict compliance of milking protocols, but only 63% reported to train employees.

When asked to rank the importance of mastitis management practices from a list provided in the survey, 80% of the herds ranked use of dry cow therapy in the top three choices, 51% compliance of milking procedures, and 43% cleaning the barn environment. However, when asked to rank the top three choices for reducing antibiotic use on a dairy farm, the use of bacterial culture of milk samples from clinical mastitis cases all were ranked by less than 20% of the farms.

Preliminary results from this survey suggest that more consistent employee training may be an opportunity for improvement. Additionally, significant barriers remain for producer use of treatment records and bacterial culture of milk in therapeutic decision making. Subsequent analysis of the focus group results will help augment the survey data and identify significant management culture barriers, especially as pertaining to employees. This information will be incorporated into the final phase of Aim 1: Testing of the Quality Milk Alliance Farm Evaluation in 12 pilot herds for practicability and logistics.