# THE QUALITY MILK ALLIANCE: BUILDING THE SCIENCE CLASSROOM

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The U.S. dairy industry is rapidly intensifying; farms with fewer than 100 cows accounted for 49 percent of the country's 9.7 million milk cows in 1992, but just 17 percent of the 9.2 million milk cows in 2012. In contrast, farms with at least 1,000 cows accounted for 49 percent of all cows in 2012, an increase from just 10 percent in 1992 (MacDonald and Newton, 2014). Additionally, 63% of the milk supply is produced by herds with more than 500 cows (von Keyserlingk et al., 2013). However, the percentage of herds with less than 100 cows only decreased marginally, from 83% to 77% (USDA:NAHMS, 2007).

Dairy farms are also becoming more diverse in terms of employment practices and organization (Jackson-Smith and Barham, 2001). Increasing numbers of Latino workers are being employed on many farms that had previously hired relatively few foreign-born laborers (Jenkins et al., 2009). Recent reports have estimated that about half of U.S. dairy farms depend on Spanish-speaking foreign labor and 62% of milk is produced from farms employing immigrant labor (Baker and Chappelle, 2012; von Keyserlingk et al., 2013). As the role of immigrant labor increases in the U.S. dairy industry, cultural and communication barriers complicate management–employee relationships as Spanish-speaking workers are increasingly seen in jobs traditionally held by individuals whose first language is English (Cross, 2006; Stack et al., 2006; Jenkins et al., 2009).

To address this potential cultural and language barrier, education, training and translation tools have been developed by land grant universities, consultants and agricultural agencies (Fuhrmann, 2002; Chase et al., 2006, Stack et al., 2006; Jenkins et al., 2009). However, these programs were developed from a management-directed perspective with minimal input from employees and the effectiveness of employee training, or education programs, relative to farm protocols and productivity, has not been evaluated for short or long term success. Additionally, many dairy managers have limited human resource knowledge and experience, this often leads to frustration with protocol drift and a sense that employees are not motivated to engage in the success of the farm beyond prescribed instructions. These and other workplace conditions can contribute to employee turnover, which has been attributed to relationships with management and co-workers (Billikopf and Gonzalez, 2012). Taken together, these gaps in the nation's dairy farms constitute a form of cultural lag. That is, there is a gap between the human resource needs arising within the industry's labor force and the capacity of producers and managers to address them.

Although somatic cell counts (**SCC**) continue to decrease among U.S. dairy herds (USDA:NAHMS, 2013), poor protocol compliance may contribute to variability in mastitis control among herds (Fuhrmann, 2002; Brasier et al., 2006). We contend that ineffective training of employees and ensuing protocol drift may prevent some herds from attaining their milk quality goals. This is particularly relevant for mastitis control protocols as Latino laborers are heavily concentrated in entry level positions on dairy farms that include milking,

maintenance of housing and administration of therapies such as intramammary infusions of antimicrobial drugs (Valentine, 2005; Stack et al., 2006). A recent survey of 628 herd owners and managers from Florida, Michigan, and Pennsylvania revealed that herds that offered quality incentives for employees, or ensured strict compliance of milking protocols had lower bulk tank somatic cell counts (**BTSCC**) than herds that did incorporate these management practices. Conversely, herds that responded that mastitis was a problem in their herd, or had difficulty with compliance of milking or treatment protocols, were more likely to have higher BTSCC (Schewe et al., 2015). Thus, issues of employee management and training, as well as producer values and attitudes regarding mastitis, are related to BTSCC.

In an attempt to enhance engagement on the part of dairy employees, we are developing an on-farm evaluation, the Quality Milk Alliance (**QMA**) that incorporates a unique aspect of assessing milk quality opportunities on a dairy farm, the management culture. Beyond identifying traditional opportunities for improving milk quality (e.g., improved bedding quality), the QMA evaluation can also serve as a platform for employee training and teaching.

What Do Employees Tell Us?

While there is a considerable body of research that links dairy producer beliefs and attitudes with the prevalence of mastitis and antimicrobial drug use (Barkema et al.; Vaarst et al., 2002; Wenz et al., 2007; Sato et al., 2008; Jansen et al., 2009), employee knowledge and attitudes as they relate to quality milk are not well documented (Stup et al., 2006). In a study of 14 farms from four states, employees received a paper copy of a 29 question survey (bi-lingual) and then were instructed to call a bi-lingual interviewer who asked the employees to respond to each question (Durst and Moore, unpublished). The responses were anonymous and a total of 174 employees participated. Owners and managers were also surveyed to determine how they thought their employees would respond. Employees overwhelmingly want to go beyond their current level of knowledge; rating their interest in learning as 4.73 on a scale of 1 to 5 where they were told that "1" corresponded with "I already know enough to do my job" and "5" corresponded to "I am interested in dairy and I want to keep learning". This is an opportunity to be seized by dairy owners (who ranked employee interest in learning as 3.27), rather than squandered.

In a pilot study in 12 Michigan dairies, when herd owners or managers were asked, "Who trains new employees how to milk cows?", 11 of the 12 management teams responded that they perform the training. However, when the employees were asked the same question, only 29% stated they learned how to milk from the managers or owners; 71% said they learned from other employees, or they just "learned on the job". Employee responses examined by language (Spanish-speaking and English-speaking) showed that only 14% of Latino workers said they learned the milking protocols from managers or owners, which was lower than English-speaking workers (42%; Erskine et al.,2015).

As part of a field trial to develop the QMA evaluation, we have started to gather more extensive information about employee training and communication that will ultimately have over 120 participating herds from Michigan, Pennsylvania, and Florida. Preliminary results suggest that communication and training barriers are similar to those found in our pilot study; on average

about half or the employees on farms know the SCC goals for the herd, and a majority rely on training from someone other than a herd manager, or state that team meetings among farm personnel only occur if there is a problem, or not at all (Table 1). Likewise, about half of employees in each herd believe the lag time between teat stimulation and unit attachment should be about a minute, with a variety of responses accounting for the remainder of respondents. Perhaps most intriguingly, when the proportion of employees within each herd was correlated to the percent of employees that were aware of herd SCC goals, there was virtually no association (Figure 2; coefficient of variation = 0.0337). This suggests that herds that offer incentives for milk quality don't have a greater proportion of employees who are aware of herd goals than herds that do not pay an incentive.

## Discussion

Taken together, there are misperceptions among many herd owners and managers as to the effectiveness of employee training efforts. This may be exacerbated on farms that lack prescribed communication opportunities among personnel, for example, the high proportion of employees that responded that there was a lack of regular team meetings, or only met when there was a problem, could be perceived as a punitive management style among employees. Especially considering that on many farms, employee turnover is considered a problem (Erskine, personal observation), the need for effective and consistent communication, training, and education is critical for the prevention and control of mastitis.

To date, our studies suggest that employees lag behind the understanding of mastitis prevention and control, even though they are performing a greater role in the critical work of milking, cleaning barns, observing the health of cows, etc. From an extension education standpoint, we have possibly lagged behind the cultural changes brought about by the demographic changes in the labor force in the dairy industry. In a separate question from the pilot study, 36/74 (49%) of the employees stated that they receive no education regarding mastitis control and management, and only 12/74 (16%) stated they receive education (videos, consultant or veterinary visits, workshops, etc.) on a regular basis. Thus, a new approach for enhancing the education for dairy employees may be needed to augment extension education models by enlisting and facilitating "education amplifiers", who spend considerable time on individual dairy farms, develop professional relationships with employees, and apply their expertise in employee training and education.

During the course of our pilot project, we developed learning resources (lessons, learning objectives, metrics of farm goals) for use by veterinarians on each of the 12 farms. The learning resources varied by farm depending on the particular observations and deficiencies that were determined during the course of the milk quality evaluation. Additionally, we provided visual aids in the form of a "Quality Milk Corner" that included a poster board for employees to serve as a focal point for learning about herd goals, metrics, and educational materials. In effect, we tested the ability of veterinarians to serve as "on-farm science teachers" for the employees to

help promote better understanding of the protocols on the farm, and ultimately to attain more consistent and sustained practice of mastitis control protocols.

During focus group discussions at the completion of the demonstration project, employees strongly expressed their appreciation for the education program, which helped them better understand why they do their tasks and the importance of those tasks. The education program also instilled a sense of respect, to which one employee added, "Without understanding why we do things, it's like being told as a kid 'Not to touch the hot stove' but never being told why you shouldn't do it." Dairy producers also noted the positive attitude of employees brought about by veterinarian-initiated education activities and cited several examples of improved interest and team effort on the part of the employees in the work they performed. Additionally, producers expressed interest in continuing this program and believed it held economic value for their operation. One of the critical comments brought forth by veterinarians was the need for support in educating Latino employees, both for interpretation and comprehension of learning materials, and to help navigate cultural differences (e.g., ensuring employees believe that the veterinarian is there to build a relationship with them and not to report back to the owner and get them in trouble).

We believe that engaged employees take the initiative and work to get the desired result for the dairy operation, beyond just "doing the job." Engaged employees understand the goals of the farm, how things must get done to achieve those goals, and why they should follow protocols to attain those goals. We further believe that in order to close the gap between employee knowledge and dairy farm production, extension personnel should build capacity to support "on-farm education" and facilitate "science teachers," be they veterinarians, herd managers, or other professionals who can make a more durable impact on employee engagement and thereby improve productivity on dairy operations in the context of the major changes in the industry. Employees who work long hours may not be fully receptive to learning after travelling to attend structured education programs such as a three-hour-long workshop. Additionally, literacy and education levels can be problematic for some employees, and the application of what has been learned on farm sites generally relies on the herd owners or managers, many of whom are not trained or inclined to serve in the role of educator. Our preliminary results indicate that there are considerable training and communication barriers between herd owners and managers and their employees, especially Spanish-speaking employees. These barriers provide opportunities for further research and implementation.

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Table 1- Mean percent of employees within herds (n=37 herds) that responded to questions regarding training and herd goals. Responses were attained anonymously from 194 employees (mean of 5.3 employees per herd) with remote response technology. Range of responses among herds was 0 to 100% for all questions.

| Do you know the somatic cell count goals for this dairy farm? | Yes | No |
|---|---|---|
| | 51 | 49 |
| Who trains you to milk the cows? | Owners/Managers | Other Employees or Self-taught |
| | 23 | 77 |
| How often do you have team meetings with other employees and managers? | At least once per year | Only when there is a problem or never |
| | 28 | 72 |

Figure 1 - Mean percent of employees within herds (n=37 herds) that responded to the question "When should units be attached after teat stimulation"? Responses were attained anonymously from 194 employees (mean of 5.3 employees per herd) with remote response technology.

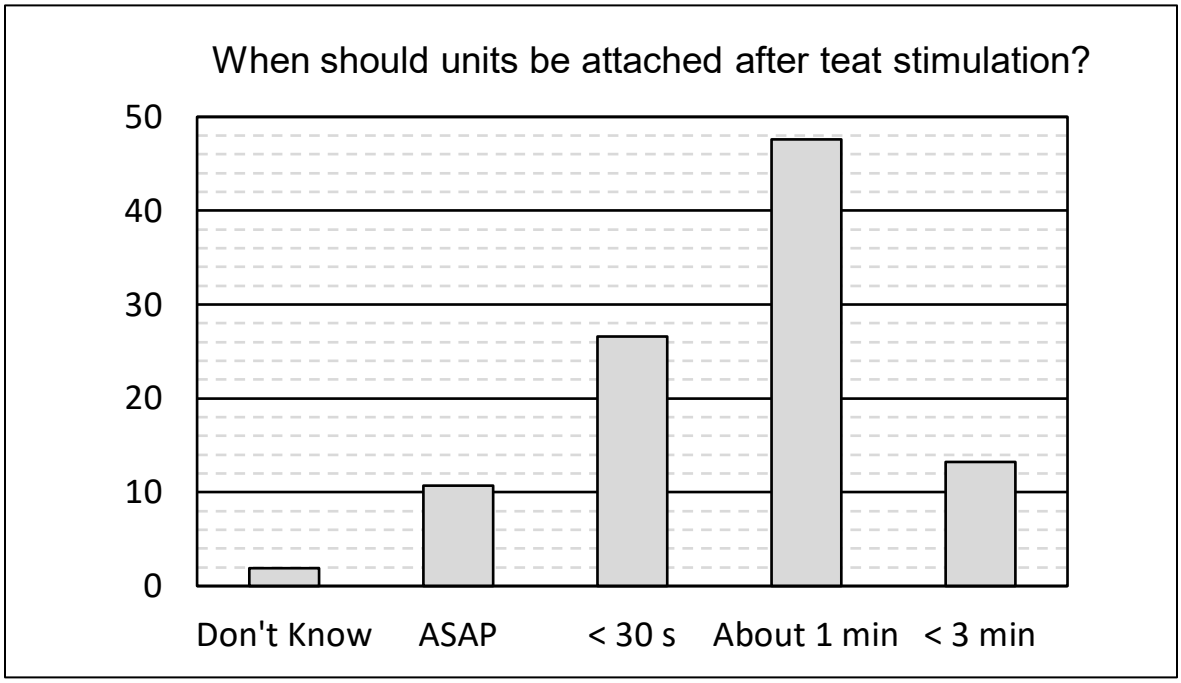


Figure 2- Relationship between the percent of employees that knew herd somatic cell count goals and percent of employees receiving a milk quality incentive within 37 herds.