

## **Introduction**

According to the United States Department of Agriculture Economic Research Service (2016), there were 787,000 hired farm workers in the United States in 2012. Approximately 346,280, or 44%, of these workers were employed on livestock farms. For these workers, injury events due to animals were the most frequent source of injury on dairy farms and the second most costly (Doupbrate, Rosecrance, Stallones, Reynolds, & Gilkey, 2009; Roman-Muniz et al., 2006). On dairy farms specifically, the injury claim rate is 8.6 claims per 100 workers, and 28.9% of claims come as a result of animal handling activities (Doupbrate et al., 2013).

Low stress animal handling, or stockmanship, can reduce animal-related worker injuries, improve worker well-being, and increase production. According to animal scientist Temple Grandin (1989), “An understanding of the behavior of livestock will facilitate handling, reduce stress, and improve both handler safety and animal welfare. Large animals can seriously injure handlers and/or themselves if they become excited or agitated.” Stockmanship is the knowledgeable and skillful handling of livestock in a safe, efficient, effective, and low-stress manner. Stockmanship education for dairy producers is a crucial part of reducing animal-involved injuries and increasing overall farm safety. As Rushen and de Passillé (2010) write, “Of all farm animals, dairy cows have the closest contact with people because of regular milking. Good handling practices, then, are particularly important for dairy and much research has shown that the way dairy cows are handled can have a large impact on their productivity.”

Despite the connection to increased productivity and decreased injury, changing animal handling practices can be difficult, and scholars argue it might be easier to convince producers to purchase new, expensive equipment rather than make simple, low-cost modifications to long-established behaviors (Grandin, 2003; Rushen & de Passillé, 2010; Hemsworth, 2003). There is a need to identify the knowledge, attitudes, and beliefs among farm workers that influence behavior change and adoption, and increase engagement with stockmanship practices, farm safety information, and worker training materials. The purpose of this research was to examine values and barriers that might influence dairy producers’ behavioral intentions towards stockmanship, and in turn, to make recommendations that can guide more effective communication strategies for health and safety organizations interested in spurring additional conversations on the farm about safe animal handling practices.

## **Literature Review**

This research examines how to encourage farmer’s voluntary adoption of safe farm practices. Previous research on the adoption of health, safety and environmental practices has relied on frameworks useful for influencing and understanding decision-making and behavior change, including the theory of reasoned action (Fishbein & Ajzen, 1975; Ajzen & Fishbein, 1980; Azjen 1985), and the subsequent theory of planned behavior (Ajzen, 1991) and the integrated model of behavior prediction (Fishbein, 2000). These theories described how behavior change connects to attitudinal, normative, and efficacy beliefs that individuals hold about that behavior. The theory of planned behavior (Ajzen, 1991) classified intention as the cause of performing a behavior and explained how extrinsic factors cause action from intention. Petrea (2001) nicely summed it up, “the components underlying intention include attitude, subjective norm (the individual’s perception of social pressures to perform the behavior), and perceived control” (p.9).

Theories of communication and behavior change have had application in farm safety and health programming (Petrea, 2001). For example, Ellis-Iverson et al. (2009) described motivators and influencers using Azjen's (1985) theory of planned behavior. Ellis-Iverson et al. (2009) found three main extrinsic factors that influenced intent to act in their research of cattle producers: community and industry, culture and society, and knowledge, skills, and ability. Using theory of planned behavior, researchers predicted these factors could inhibit or provoke action if intent was already present (Ellis-Iverson et al., 2009).

Theories of communication and behavior change have also had application in work to engage farmers in environmental management (Mills et al., 2016). Mills et al. (2016) combined the theory of planned behavior and the value-belief-norm theory, developed by Stern et al. (1999), which looks at the influence of values and moral, or personal, norms on behavior. Mills et al. (2016) writes, "personal norms influence behavioural change because people wish to be morally responsible and maintain positive self-concepts" (p. 286, 2016). Mills et al. (2016) work on engaging farms in environmental practices is especially relevant to this project. In a survey of scholarship that used both the theory of planned behavior and value-belief-norm theory, they found eight common constructs that may influence farmers' behavior change: personal beliefs/personal attitudes, subjective norms/social influences, perceived behavioral control, response efficacy, self-identity, personal norms, moral obligations, and social/group norms. This scholarship led Mills et al. (2016) to argue there is a close relationship between farmers' *willingness to adopt* different practices, *ability to adopt* behaviors, and *engagement with advice* and support networks, which influences decision-making with environmental practices (Mills et al., 2016). They suggest future research should continue to help clarify appropriate engagement strategies for adoption of voluntary behaviors. The current study reported here was guided by insights from Mills et al. (2016) and previous scholarship using theory of planned behavior and value-belief-norms theory, as researchers examined what values and moral norms might help encourage farmers' *willingness to adopt* safe animal handling practices, what barriers might prevent their *ability to adopt* these practices, and what sources of information and networks might be helpful in encouraging farmers' *engagement with advice* about safe animal handling topics. Before discussing methods, researchers review additional literature on engagement with credible advice and networks, focusing on the context of a specific audience and topic: dairy producers and farm safety behaviors.

### **Engagement with Credible Advice and Networks**

As mentioned above, credible sources of information, including a person, an organization, or a piece of media, have the potential to influence decision-making and increase engagement by producers. Oreszczyn, Lane, and Carr (2010) looked deeper into this possible influence on producers, and introduced the concept of webs of influencers on practice. This concept, for farmers, is a "...network of practice, characterised by a weak organisational framework but with a relatively stable network of other communities of practice they interact with" (Oreszczyn et al., 2010, p. 404). Influencers included individuals such as agronomists and farm employees, and organizations including government groups and research institutions. Influencers were listed as foreground, midground, or background influencers. Oreszczyn et al. (2010) wrote, "...a wider group of people and organisations are influencing farmers' practices rather than only influencing their views and attitudes" (p. 410).

It is not uncommon for livestock producers to seek out information from non-media sources. The work of Allen, Naile, Vestal, and Dozier (2014) revealed that local cattlemen most commonly sought out their local or consulting veterinarian for information. Other popular choices

for this group were livestock associations, the internet, magazines, and other livestock producers. Allen et al. (2014) also asked survey participants what they perceived as reliable and trustworthy sources. The sources with the highest perceived reliability were veterinarians, livestock associations, county extension offices, and other livestock producers. The sources with the highest perceived trustworthiness were veterinarians, livestock associations, county extension offices, and state land-grant institutions. Reliable and trustworthy communication over time with farmers helps build organization credibility (Kasperson & Stallen, 1991).

The ways dairy farmers seek out information are varied and depend upon many factors. There is limited literature available on the topic, but what has been written supports common themes. For farm safety topics, producers typically turn to newspapers and magazines (Chiu, Cheyney, Ramirez, & Gerr, 2015). Evans and Heiberger (2015) further supported this with their research, finding that the studies conducted about where farmers get information always rank agricultural media high, as well as being well-trusted. Publications and media are a popular choice among farmers. Chiu et al. (2015) noted because of this, even though web-based communication methods are gaining in popularity, traditional media should still be used.

Most literature has found traditional media like publications to be the first choice of farmers, however the Internet and/or social media does still appear as a top choice. According to Evans and Heiberger (2015), “Electronic newsletters, websites with blogs and a variety of other social media, and mobile phones and applications serve as examples of the dynamic expansion of information channels used by...commercial agricultural media” (p. 94). Chiu et al. (2015) supported the same notion in writing, “traditional media channels remain highly used despite increasing use of digital media” (p. 266). According to Gualtieri (2012), Internet access and social media use has grown in rural areas since the early 2000s. The same research lists the many benefits of social media use, like tailored messaging to groups and greater engagement. This research specifically mentioned farmers seeking out YouTube videos, Facebook, and Twitter for education. While traditional media is an effective way to reach farmer audiences, expanding to include digital formats and social media can be a way to diversify that reach.

There is a need for researchers to continue to explore how to engage farmers with credible sources on farm safety topics, specifically those connected to safe animal handling, and factors that might encourage farmer’s willingness to adopt advice from their channels. Evans and Heiberger (2016) echo this gap in scholarship, as they point to the expanding amount of information channels available to producers, and a need to explore the credibility and effectiveness of new channels in engaging producers. They also point to a need for more research on effects on actions, especially ones that might influence or support educational interventions about farm safety (Evans & Heiberger, 2016, p. 99). This research set out to conduct qualitative research to start to fill some of these gaps. Specifically, this research focused on factors, such as values and norms, that might encourage dairy producers’ willingness to adopt new safety practices, barriers might prevent their ability to adopt practices, and influences or sources that could encourage their engagement with advice.

### **Research Questions**

The goal for this research was to identify factors that support the adoption of new behaviors around low-stress animal handling, and ultimately to offer guidance for health and safety programs communicating about these topics. Guided by the literature reviewed above, the specific goal was to identify potential values and moral norms about low-stress animal handling among dairy

producers, to examine potential barriers to implementing safe practices, and to explore strategies for motivating producer's engagement with credible sources.

The research questions associated with this project were:

*RQ1: What values and moral norms might support dairy farmers willingness to adopt safe animal handling practices?*

*RQ2: What barriers might prevent producers' ability to adopt safe farm practices, specifically safe animal handling techniques?*

*RQ3: What key sources of information or potential influencers do farmers seek on animal handling topics that might encourage their engagement with safety advice?*

## **Methods**

To answer the research questions above, researchers gained direct access to producers on-site and on multiple occasions. The method of data collection included three parts: in-depth interviews conducted in person and on farm, a qualitative, open-ended survey, and follow-up phone interviews with survey respondents. This research was approved by the Institutional Review Board, and all participants were given a consent form and agreed to participate in the research prior to data collection.

Each stage of research built upon one another, gave researchers multiple methods and data sources for insights, allowed researchers to engage with producers in different ways, and offered more prolonged contact with data and members of the target audience. Researchers felt in-depth interviews would provide a good place to start gathering information and understanding farmer opinions on the topic. The initial in-person and on farm interviews helped researchers frame questions for the survey that was distributed to farmers. Following survey data collection, follow-up phone interviews were conducted with select respondents to clarify and confirm major themes. The use of mixed-modes to gather data allowed researchers to share key insights and interpretations with research participants along the way, and follow recommended practices to improve the credibility and validity of qualitative research data, such as triangulation and member checking (Lincoln & Guba, 1985; Creswell & Miller, 2000).

### **In-depth interviews with dairy producers**

In-depth interviews were selected for this research as they are an effective way to gain understanding of one's experiences (deMarras, 2004). In-depth interviews were conducted in person and on-farm with eight producers, representing five distinct farms. The researchers recruited volunteers to participate in research through a state-level dairy industry association's communication channels and using a sign-up sheet at a state dairy conference and expo. Target farms were those that were mid-size (up to 1,000 cows) and employed non-family workers. These farmers were contacted by the researchers and agreed to on-farm interviews that were conducted in December 2015 and January 2016. In some cases, interviews were recorded, when participants granted permission.

The producers were asked approximately 15 open-ended questions that had been prepared by the researchers about stockmanship, employee training, communication practices, and attitudes towards farm safety. The questions were designed to understand producers' general challenges, concerns and motivations for adopting safe cattle handling practices and employee training procedures. For example, producers were asked exploratory questions like, "Do you have concerns for yourself or employees when handling cattle? Please explain your response," and "How is worker training handled on your farm? Any challenges with your current practices?" Producers

were also asked a group of basic informational and introductory questions. Additional probing questions were asked to ensure clarity between the producers and researchers. Answers from all interviews were transcribed and reviewed several times. To analyze the data, open coding, as introduced by Strauss and Corbin (1998) in their grounded theory approach, was used. Researchers independently immersed themselves in the data, examined responses for major topics and trends, and then came together to discuss patterns and summarize data into major themes. Once initial themes were refined, the researchers reviewed data again to make sure themes accurately represented participants' intention and response. These themes informed our next phase of research and aided in the development of our survey questions.

## **Survey**

A survey was developed based on findings from the in-depth interview phase, and with input from a team of extension educators, which work closely with dairy producers in the state. Some questions were adaptations of interview questions to better probe topics, others were new questions designed to better explore insights that surfaced in the initial interviews and visits, such as the influence of farmer-to-farmer communication. Researchers felt the survey could help confirm patterns and offer additional insights on potential subthemes. The survey included 27 open and closed ended questions about attitudes towards stockmanship and farm safety, communication with other producers, media and expert sources, opinions about the benefits of and challenges with worker training and education, and how important different topics related to safety and training were to producers. The survey also gave producers the option to provide demographic information and contact information. The survey was sent to midsize dairy producers. Farmers were selected to receive the survey using the list of registered dairy farms that is maintained by the state department of agriculture. The list was narrowed from 3,393 to 418 by sorting for producers who had reported their cow numbers, and had cow numbers between 150 and 1,000. This herd size was used because farms larger than this often have a systematic way of onboarding employees, which is usually done by someone appointed to that role. The hope was to capture farms where it is the farmer's responsibility to handle cattle and train employees. The survey was sent via mail to the 418 identified farms in April of 2016. There was an option given on the survey to complete it online via Qualtrics or to complete the paper copy and return via mail. Recipients were given approximately six weeks to complete the survey and were sent a reminder postcard two weeks before the survey was due. A drawing for a \$100 gift card was used as an incentive for completing the survey. The 61 survey responses (14.6% response rate) gathered provided a solid base of data to qualitatively analyze for emerging themes and patterns.

## **Follow-Up Interviews with Survey Respondents**

To further probe insights from the survey, researchers conducted in-depth phone interviews with producers who had responded to the survey in fall of 2016 and winter of 2017. Phone interviews were a viable tool as they allow for easy access to hard-to-reach participants and the quality of data remains virtually the same as a face-to-face interview (Sturges & Hanrahan, 2004). Respondents to the mail survey were asked if they would be interested in participating in a phone interview follow-up. Out of 61 survey respondents, 37 indicated that they would be willing to participate in follow-up interviews. After trying to reach producers who shared viable contact information on the survey, researchers were successful in reaching 24 producers for follow-up interviews via phone calls. Questions were developed to further explore areas briefly addressed in the survey responses that required more rich information, confirmation, and explanation. Major

topics of the questions continued to include farm safety, stockmanship, employee training, motivators, and sources of information. For example, during the phone interviews, researchers shared some key experts, practices, and influencers that had surfaced within survey data, and asked producers to confirm if themes were consistent with their experience, and to provide more detail about how interactions happened, the information sought from different sources, and how experts factored into farm decision-making processes. Researchers also asked producers about values, norms and challenges identified in the survey and initial interviews data and asked for more detail about how these relate to the producer's experience on the farm with animal handling, training, and safety. Researchers also included additional questions about how producers can build stronger cultures of safety on the farm and what support they would find valuable. Phone interviews centered around approximately 12 open-ended questions and required an average of 45 minutes to complete. Interviews were recorded, transcribed, and analyzed by the researchers for major themes.

Researchers coded all of the qualitative data, using Strauss and Corbin's (1998) axial coding process, an open coding process described above, in which the emergent themes were sorted into groups by topic and compared with major themes. Researchers separately immersed themselves in the data, looked for common responses and themes in each data set, then met together to discuss commonalities and develop patterns and themes. Once the initial categories were solidified and refined, researchers reviewed content again to make sure it accurately reflected the intention of participants. To increase reliability of findings, researchers then compared themes and supporting codes across the data sets. All three of the data collection methods described above offered valuable insight into answering the research questions.

### **Findings**

Findings are organized by major values, barriers, and channels of communication that were identified as main insights from the data. First, several key values and moral norms identified to answer research question one are discussed.

#### **RQ1: "What values and moral norms might support dairy farmers willingness to adopt safe animal handling practices?"**

*Value and moral norm 1: Pride and confidence in own expertise.* Data from respondents revealed that most producers were confident in their ability to implement best stockmanship practices. One producer responded, "I feel we do a good job and have a good setup for how we handle our animals." Another producer said, "Our experience over the years working with dairy cattle gives us insight into what to expect when working with cows and youngstock." Because producers are already confident in their own abilities, they reported low interest in seeking out stockmanship information and training for themselves. A portion of respondents expressed that while they feel they do a good job with stockmanship and aren't in need of training materials, they do think there is room for improvement and are open to learning more to benefit or pass on to their employees. For example, when asked to indicate confidence in their own expertise in safe animal handling practices on a 4-point scale from low to high confidence, and then to explain why they selected that confidence rating, one producer said, "I believe I am very good but not sure my employees have the training they need."

*Value and moral norm 2: Desire to protect employees.* Farmers report feeling a responsibility and moral obligation to keep their farms and employees safe. When asked why farm safety was important, one farmer answered, "First and foremost is to keep everybody safe and

healthy. That's the main priority. Everybody should have a fun time at work and not have to worry about getting hurt." As mentioned above, dairy farmers feel they are already highly knowledgeable in best practices in farm safety and animal handling, yet they are highly concerned with worker safety and training. A major motivator for keeping employees safe is avoiding insurance claims, workman's compensation, and OSHA investigations that happen when an accident occurs, according to participants in initial interviews. Most survey respondents agreed that stockmanship and farm safety were important to everyone who works on their farm, and they were less confident in workers' ability to implement low-stress handling techniques than their own.

Concern for employee safety was expressed many times. As one farmer put it, "I want to be sure that nobody gets hurt producing dairy products on my farm." Another phone interviewee said, "we care about the employees more than the cows or the machinery." Farmers described safe handling techniques as a priority when training new workers. Stockmanship is an example of a farm safety topic that is intended to keep both people and animals safe. When asked if stockmanship principles are important on their farm, one producer said, "Yes, on the employee side, so they don't get injured."

***Value and moral norm 3: Being a good role model and teacher.*** Farmers described themselves as role models on their farms. In the initial interviews, respondents described how a good farmer was a good leader, who modeled proper behaviors and thoroughly explained procedures to workers. Data from survey respondents found most agreed with the statement, "I see myself as a leader and teacher in making sure farm safety practices are followed on the farm." When probed as a follow-up in phone interviews most respondents explained it is their responsibility to make sure employees and family members are trained in safe animal handling practices. As one farmer said, "It is important to handle animals appropriately and to have employees trained to do so." Another producer answered, "if we don't exhibit stockmanship and safety being important to us, they won't either. So, we have to exhibit it ourselves." Yet, many producers admitted they could do a better job at encouraging safety procedures by "being a better role model" at all times.

Many producers said they currently train new employees by having them observe and shadow employees in a similar position. When asked what topics they would like additional information or training for, many producer respondents selected "worker training." Additionally, respondents were asked for specific topic or content ideas and one replied, "train the trainer" while another said, "how to teach better." It's clear that many farmers recognize their role in training workers on their farm and are searching for information to improve their role as teacher and motivator. As one producer summed it up, "the biggest thing for me has been being a better role model on how things should be done."

Research participants were asked what support they need to improve low-stress animal handling among employees. Farmers report searching for ways to be better teachers as well as motivators. Farmers described a need for farm safety materials that explain what to do, and why. When producers were asked why it might be difficult to improve farm safety and stockmanship practices, they reported it was difficult to get employee buy-in, as well as for everyone to commit to working on it. Beyond materials that share the how-to for a task, employee motivation and the "why" of the task are also important to receptiveness of the message, according to research participants, as sharing with employees why something matters and why it is important may help increase buy-in. One respondent put it well, saying, "The same thing motivates all of us: actually knowing why. If you know why we're asking you to do a certain thing a certain way, it's easier to understand. Teach people the why, and engage in that, and they'll always be good help." One

producer responded that they needed, “Ideas to motivate employees to want to do better and realize it isn’t ‘stupid.’” Additionally, many producers in our sample have already found that motivating employees through rewards can also be effective. Producers mentioned using food, such as having a monthly pizza party if certain goals are met, but many reported a need for better ideas for programs that would motivate and reward workers.

***Value and moral norm 4: Protecting investment and business interests.*** For respondents, farm safety was about keeping people on the farm safe, and keeping the animals safe as well. As one farmer put it, “If the person working is not safe, then the animal can’t be safe either.” Additionally, another producer said, “It’s crucial for us to make sure that our animals are not being abused and are being handled in the safest way possible just for their own welfare.” Nearly all farmers said stockmanship, low stress animal handling, farm safety, animal well-being and welfare, farm production and efficiency, labor management, and employee training were important to them. When asked why those topics were important, respondents cited several reasons, including that of these areas are important to a successful business, and the handling of animals is a key piece of animal productivity. One respondent said, “Handling cows will make your job easier and help with production.” Another farmer put it bluntly, “Handle them good, they’ll produce good.”

While each of these values is important to producers, there were also several barriers to achieving them identified in the research. Next, findings that help answer research question two are discussed.

## **RQ2: “What barriers might prevent producers’ ability to adopt safe farm practices, specifically safe animal handling techniques?”**

***Language as barrier.*** The language barrier is a common obstacle in employee training for producers in the sample. A remark that was made several times was the need for materials to be in both English and Spanish. As one producer put it, “the language barrier is one problem.” Another said, “My employees speak a different language so sometimes that can be a little bit...difficult.” One farmer put it well, “when you have operations now that have multiple languages, it’s getting things interpreted or having interpreters in to conduct training sessions that is a challenge.” Farmers indicated if materials provided by health and safety organizations were not in English and Spanish, they weren’t as likely to be used or be effective in safety training of employees on the farm.

***Time and apathy as barrier.*** Producers were asked about potential barriers in engaging farmers with information about stockmanship, farm safety, and training. Many farmers commented on time being a bottleneck to midsize producer’s own training efforts and a disadvantage to attending farm safety and stockmanship events. As one farmer put it, “most farmers don’t have HR departments to do this.” Several respondents mentioned the busy workday and how hard it was to carve out additional space for engaging employees when you are just trying to keep up with work. “It’s a time factor, you know. Just time to find the time to do it and especially if you want to do a hands-on safety training,” shared one producer. When it comes to planning training events, producer said that their advice was, above all else, to “make it convenient” for producers and employees. Additionally, one producer offered, “Dairy farmers tend to be busy and your dream day off isn’t spent on more dairy work.” Throughout the research, a number of respondents mentioned some sort of apathy towards learning the topics for themselves as a barrier. One producer described a “‘don’t tell me how to farm’ syndrome” among most peer producers. Another producer said a barrier to training was farmers are “not open to new ideas” about their own

practices. In all of our research, this surfaced as a major theme: producers described a resistance to training sessions or materials on safe animal handling practices that could be interpreted as telling them what to do or how to farm better; however, as mentioned above, producers reported a strong interest in the same materials positioned as employee training resources.

***Terminology as barrier.*** A common question that was raised by respondents was the use of the term “stockmanship.” Most farmers admitted to never using the term. When asked if he ever used the term, one farmer said, “No, I just don’t.” Another producer mentioned they felt the term was wider-used in the beef industry. It seemed that using the term “stockmanship” without any supporting context may cause some confusion. Many of the people interviewed said they would prefer the phrase “cattle handling,” or something similar, be used. One producer commented that they would never use the term as “it is a big, scary word” and they were concerned their employees wouldn’t understand what it meant.

***Turnover as barrier.*** Respondents also described a need for more resources to improve consistency and efficiency of workforce development due to high worker turnover. Producers expressed frustration with workers coming in with previous training and developed bad habits, such as handling animals in a way that was not in accordance with their new employer’s policies. As one producer said, “we do not tolerate sloppiness,” and many mentioned that correcting and retraining bad habits would be easier with a more consistent training plan. When asked what challenges frequently surface when training employees, one farm responded, “a lot of us dairy guys don’t value that [taking time to connect with employees]—what’s common sense to us is not common sense to them.” Producers expressed a need to formally teach techniques to workers that were second nature to them, and it was difficult to know where to start, to have training be easily integrated into the workday, and it make it happen clearly and consistently for all employees, since turnover is high.

In addition to values and barriers, many key findings emerged about the channels of communication farmers use and the influencers they trust on the topic of safe animal handling, which are associated with research question three.

### **RQ3: What key sources of information or potential influencers do farmers seek on animal handling topics that might encourage their engagement with safety advice?**

There is a strong need to focus on agricultural media and interpersonal channels in order to encourage producers to engage with advice and communication about farm safety. The research revealed preferences in communication sources, channels, and strategies.

***Influencers as source to support engagement with advice.*** Respondents mentioned they value influencers who visit the farm, including veterinarians, nutritionists, consultants, Extension Educators, cooperative field representatives, insurance agents, agricultural lenders, equipment companies, and other vendors. Respondents in all three phases of research also mentioned individuals that are evaluators with the National Dairy FARM Program. [FARM stands for Farmers Assuring Responsible Management. It is a program open to all dairy farmers, cooperatives and processors across the U.S. that sets high standards for animal care and welfare. Participating farms are evaluated at least once every three years by certified evaluators. Evaluators are veterinarians, extension educators, university personnel, cooperative field staff or other qualified evaluators that have completed the training. Producers can voluntarily participate independently or may need to participate through their cooperative or processor.]

***Agricultural media as source to support engagement with advice.*** When it comes to stockmanship, farm safety, and employee training information, producers in this study look to a

variety of resources as credible sources of information. When producers were asked how they prefer to learn new information, agricultural media publications were the single most popular answer. Publications mentioned by name included *Hoard's Dairyman*, *Progressive Dairyman*, and the *Dairy Star*.

When asked who they look to for information on specific topics, dairy producers said extension most often for farm safety, veterinarians for stockmanship, and agricultural magazines and websites for farm safety, stockmanship, and employee training. Some producers mentioned they have received safety handbooks and training materials from their insurance companies, and have utilized them or at least kept them on hand. Many producers also said they prefer in-person events such as workshops and tours held by agricultural media, extension agents, feed companies, and other groups and one-on-one meetings with agricultural professionals or fellow producers. Some respondents also indicated interest in e-learning opportunities, including live webinars, online learning modules, and videos, which were commonly hosted by extension educators and agricultural companies.

***Farmer-to-farmer communication to support advice engagement.*** This research also revealed strong lines of communication among dairy farmers. Most producer respondents said they have passed information they have learned on to fellow producers. Common ways of sharing were by word of mouth and one-on-one conversations, social media, and peer groups. Additionally, many respondents said they have had other farmers pass information to them, through one-on-one conversations, email, social media, and at events. Popular social media outlets for exchanging information include Facebook groups like *Dairy Girl Network* and *The Milk House*. Producers were asked how likely they were to take several actions related to engaging with farm safety content, and many respondents said they would talk with friends and family about farm safety and worker training.

***Video as important format for advice.*** The dairy producers in this study were receptive to video formats of messages and likely to leverage electronic communication channels. Many producers said they would read or watch content about farm safety and safe animal handling techniques, especially if geared towards employees. The majority of interviewees said they would share content about farm safety and click on links about farm safety with workers or others on the farm. One respondent said, "I wish there were more or better training videos, because sometimes what I say isn't always what they understand." Another mentioned that having employees get the message from someone outside of the farm would be helpful. Most producers said they would be interested in using videos as a training tool for new employees. When asked if they would use stockmanship videos for training new employees, one producer responded, "if they're available, I would like to use them." Another said, "a video that we can watch on the computer...would probably be the best for them." Some also said they would use them as a "refresher" for longtime employees at group meetings.

When asked about online learning tools, many respondents had participated in a webinar and some had viewed pre-recorded videos. When asked how they would like to receive videos about farm safety, many said some online format such as email or YouTube and/or a portable device such as a DVD, CD, or USB jump drive, since computers available for worker training in break areas and other facilities are usually older models, sometimes without internet access.

## **Discussion**

This research identified some common moral norms, values and barriers important when engaging dairy producers with messages about farm safety and stockmanship. Pride in producers'

own expertise, a strong desire to protect employees, interest in being a good teacher and role model, and a need to protect business investments are important values and norms that might influence dairy producers' *willingness to adopt* new safety practices and behaviors. Barriers like language, time, apathy, terminology and turnover are important considerations when seeking to understand what might prevent dairy producers' *ability to adopt* farm safety procedures, like safe cattle handling practices. Finally, this research also identified potential influencers and sources of information that might encourage farmers to *engage with safety advice*. The theory of planned behavior and the value-belief normalcy theory, especially work by Mills et al. (2016), help researchers align this study with other scholarship on environmental and health practices and add insights specific to dairy producers and farm safety behaviors. From those insights, several recommendations emerged, which are applicable to agricultural communicators, farm influencers, and farmers.

### **Recommendation 1: Use a train the trainer educational model to improve farmer's willingness and ability to adopt farm safety practices**

One research goal was to identify effective communication strategies that support the implementation of stockmanship techniques. Findings – specifically, insights about values and moral norms like desire to protect employees, pride in their own expertise, and interest in being viewed as a good role model and teacher – offered support for a train the trainer model communication strategy, where dairy producers receive teaching resources and act as trainers to workers on their farms. Orfaly et al. (2005) argued the model provides trainers with “education, instructional tools, and programmatic guidelines that enable them to, in turn, provide specific training to target audiences” (p. S124). Previous research identified concerns with this model, including information being diluted because trainers act as intermediaries that receive information from an expert organization and then share it with workers (Orfaly et al., 2005). There has been a low rate of follow through among trainers, typically only 50% (Orfaly et al., 2005). However, the direct connection of mid-size farmers to their employees, producer's desire to protect workers, and farmers' need to protect their own business interests may decrease these instances, as it is in producer's best interest to provide high quality worker training.

Framing communication and advice using a train the trainer model would commit producers to learning the material themselves, and seeing a committed employer may help strengthen employee buy-in. Secondly, producers become better role models, as they will be more aware of current best practices, as they must review or learn the material before teaching it. This strategy also enhances the overall quality of onboarding. Currently, respondents rely on informal methods like observation and shadowing. A more consistent train the trainer approach will both reduce discrepancies between employees and improve farmer efficacy.

Positioning the farmer as the expert supports their personal values of being confident in their abilities and providing them an opportunity to be a formal teacher to employees. It applies to the construct of self-identity outlined by Mills et al. (2016), “the extent to which a certain behavior is considered to be a part of the self” (p. 287). Farmers already view themselves as teachers and role models; equipping them with knowledge through a train the trainer model would appeal to that self-identity and could be empowering. Putting farmers in this position may help reduce apathy, an identified barrier described in the findings section when health and safety materials are positioned as for the producers' own education. A train the trainer model also appeals to the farmers' desire to protect their business interests and investment, a value identified in the findings above. Stressing improved welfare, reduced risks and lower costs in communication materials

could be an effective way to grab farmer's attention, as well as make them see the value in stockmanship resources. This idea of protection aligns with another construct proposed by Mills et al. (2016), that of personal moral obligations. Essentially, this is how much regret a person may feel by not practicing a certain behavior.

A train the trainer session is also a place where proper terminology can be established. The research found that terminology, especially confusion or lack of understanding with the term "stockmanship," was also a potential barrier in farmers ability to adopt or implement safe practices. Ensuring those conducting the training have prepared the materials with the preferred terminology and use it in the training can help avoid that barrier, reduce apathy, improve learning, and generate interest in the topic.

### **Recommendation 2: Use influencers and farmer-to-farmer communication to improve farmers' willingness to adopt farm safety practices and engage with farm safety advice**

It's clear that interpersonal communication plays a huge role in farmer education, according to the findings. Leveraging the influence of agricultural professionals as champions of farm safety could increase farmer engagement with advice and lead to big impacts among dairy producers. This could also appeal to the construct of subjective norms/social influences from Mills et al. (2016), which is "the perceived social pressure felt from significant others to perform certain behavior" (p. 287). Many farmers view influencers as instrumental to their farms success and usually respond positively to their suggestions. Providing these professionals with informational flyers and brochures, posters, and digital media resources can easily integrate into the work they are already doing on these farms and efficiently get those materials into the hands of farmers. Influencers that could be targeted for this would be veterinarians, nutritionists, Extension staff, cooperative field representatives, evaluators for the FARM program, and various other vendors and consultants.

Having an already-trusted source visit the farm to assess animal welfare could be a good gateway to introducing stockmanship resources. Specifically, for producers required to be in the FARM program, FARM evaluators and the program itself is viewed as critical to maintaining a market for milk, and protecting their investment. In addition, a program like FARM appeals to the construct of social/group norms, as presented by Mills et al. (2016), which focuses on perceptions of whether people in a group perform a certain behavior, as well as the pressure from people in that group to adopt a certain behavior. Knowing other farms are enrolled in a program and adhering to its rules and the recommendations of its evaluators can help convince other farms to do the same.

This research also found that farmer-to-farmer contact is a strong communication channel. It makes sense, as no one understands the values and challenges of farmers better than their peers. Communicators should explicitly encourage farmers to make use of word of mouth (WOM) communication and share farm safety content with their peers. WOM communication takes place between individuals with a social connection, and has expanded to include other direct methods of contact like text messages and emails (Dougherty & Green, 2011). Brown and Reingen (1987) looked at the strength of ties and their ability to impact WOM communication. They found, "strong ties were shown to be important at the micro level of referral behavior" (Brown & Reingen, 1987, p. 360). Depending on the strength of one farmer's bond with another, it is likely that they would pass information to one another via WOM; this information could include a broad range of topics, including farm safety and animal handling. WOM communication and farmer-to-farmer contact overcomes the barriers of time and apathy as farmers are comfortable talking with one another and

do so normally. This idea also appeals to farmers' pride and confidence in their own abilities; they are likely to share advice about the topics they feel they are good at.

### **Recommendation 3: Leverage videos to engage farmers with safety advice and improve their ability to adopt new practices**

Using videos as a resource for farmers gives them access to an on-demand resource. Having videos available on a storage device as well as online would be beneficial. Online videos would be attractive to this audience as they are easy to access and share with others, and can be delivered directly to producers without requiring additional travel or meetings off farm. The ease of using videos overall complements the Mills et al. (2016) construct of perceived behavioral control, which is connected to how difficult a behavior is perceived to be as well as how much control a person feels over performing it. As a static source of education, farmers are in full control over their decision to consume the media and likely perceive watching a video as extremely easy.

Videos also integrate well into a train the trainer model, where they can be provided to producers at the completion of training for use on their own farms, and supplemented with consistent and reinforcing supporting materials like handouts and posters. This also avoids a concern shared by Orfaly et al. (2005) of the fidelity of implementation. Producers using these videos would have a consistent tool and would be able to adhere to the training protocol as the resource would remain static. Orfaly et al. (2005) mention that effectiveness is improved when the information is distributed by a trusted source. For dairy producers, utilizing videos might help them overcome time and consistency barriers mentioned above. It also provides a teaching tool for producers who may struggle with the topic.

The researchers recommend a series of short videos that are 2-3 minutes in length. The general consensus from the research was shorter videos would be the most effective tool. It seemed hands-on managers preferred shorter, 2-3 minute videos in order to discuss them. Managers with less focus on training preferred one long, 20-minute video. With shorter videos, farmers have more flexibility and can choose different ways to present videos, such as with discussion or short quizzes after each video.

Use of videos and supplementing materials also addresses the language barrier. For farms that don't have access to a translator, videos provide a training resource that can be done in both English and Spanish, and thus, better utilized by all employees. Supplementing materials like handouts, posters, and brochures could also be available in Spanish to help boost comprehension and learning by Spanish-speaking employees that may not otherwise understand this information.

Overall, these recommendations might be helpful for communication practitioners of health and safety organizations as they work to "nudge" farmers towards certain actions. Barnes, Toma, Willock, and Hall (2013) researched the differences between "budging" and "nudging." Barnes et al. argued budging is tied to complying with a regulation. A nudge was defined by Thaler and Sunstein (2008) as, "... any aspect of the choice architecture that alters people's behaviour in a predictable way without forbidding any options or significantly changing their economic incentives." Budes are forced, whereas nudges are viewed as voluntary. Barnes et al. (2013) found producers in the EU respond more positively to nudges. Campaign content from health and safety organizations that considers the recommendations above can be a useful way to nudge farmers to action, and address factors that might improve farmer's willingness and ability to adopt farm safety practices and better engage them with safety advice.

### **Future Research**

Future research should be conducted with communicators at health and safety organizations across the country to see what strategies, channels, and formats they are currently leveraging and if there are challenges to implementing the aforementioned recommendations. Future research related to this topic could continue to explore the impact of word of mouth communication and specifically how it influences farmers' behavior. Additionally, more research on video formats and their effectiveness could aid in the creation of materials that best suit a farmer audience. Further research on farmers' willingness to participate in a train the trainer model could help influencers and other groups interested in creating safety programs for farmers. Some limitations to this research include the use of mid-size farms in the sample and a lack of contact with farm employees. Future additional research should discover if the moral norms and barriers extend to a larger sample and different types of farms, likely using more quantitative methods, and include employees in the sample.

### **Conclusion**

In conclusion, this research helped identify themes in communicating with farmers about safety topics. To best reach dairy producers and get farm safety education onto their farms, a train the trainer model is recommended. Additionally, leveraging word-of-mouth communication can help spread farm safety messages even further. To keep messages constant and concise, videos can be used in several contexts. In addition, understanding the barriers that can hold farmers back from implementing farm safety practices can aid in the development of useful farm safety tools and resources for farmers. Key channels of communication for and influencers of dairy farmers should be used to target safety messaging. Communications such as agricultural publications, meetings and workshops, and even online videos all show promise in being effective tools to share messages. It is vital for both researchers and communicators to understand the moral norms and beliefs of farmers in relationship to practicing farm safety. Understanding how farmers learn new information and who they seek as information sources can aid communicators and others in properly nudging farmers and increasing their level of engagement with farm safety information. The ultimate goal is to work in partnership with farmers, influencers, and communicators to champion a safer farm.

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Emily Wilmes is an Extension Educator at the University of Minnesota.

Rebecca Swenson is an Assistant Professor of Food, Agricultural and Natural Resource Communication at the University of Minnesota.