Developing a model to promote caretaker confidence and communication in treatment decisions for dairy cattle through case studies

Lily Edwards-Callaway,* © Sage Mijares, © Claire Okoren, Corley Rogers, Paxton Sullivan, © Melissa Davis, © Catie Cramer, © and Noa Román-Muñíz ©

Department of Animal Sciences, Colorado State University, College of Agricultural Sciences, Fort Collins, CO 80523

ABSTRACT

The significant role of dairy caretakers in maintaining animal welfare on dairy farms emphasizes the necessity of appropriate training and education to ensure the implementation of practices that promote good animal welfare. This study explored the potential of case-based learning as a novel approach to training for dairy caretakers by investigating dairy caretakers’ perspectives on case study discussions. Additionally, this study sought to understand thoughts and feelings of caretakers during case study discussions to help identify information that caretakers use to evaluate cases and make decisions. Two case studies were developed and presented to participants, and thematic analysis of case study discussion transcripts was performed. Pre- and post-training questionnaires for 21 caretakers (n = 21) were summarized. The study found that caretaker reactions to case studies were generally positive. Thematic analysis revealed that caretakers use previous knowledge to make treatment decisions for cattle, and valued discussion with coworkers. The results of this study suggest the need for further investigation into the use of case studies and other activities that provide opportunities for critical thinking as training opportunities on dairy farms.

Key words: case-based learning, dairy cattle, dairy caretakers, euthanasia, worker training

INTRODUCTION

The dairy industry is a significant sector of the US agricultural economy, employing over 150,000 dairy workers on more than 27,000 licensed dairy farms (Adcock et al., 2015; USBLS, 2022; USDA, 2023). The majority of these workers are foreign-born, often of Hispanic or Latino descent, who may lack access to any type of formal education (Schenker and Gunder-son, 2013; Adcock et al., 2015). Dairy caretakers play a crucial role in maintaining animal welfare on dairy farms, highlighting the need for appropriate training and education to ensure they implement practices that promote good animal welfare. Extensive literature has documented the effect of human-animal interactions on both animal welfare and caretaker job satisfaction (Hemsworth et al., 2000; Chang and Hart, 2002; Hemsworth, 2003; Waiblinger et al., 2006; Mota-Rojas et al., 2020). Developing programs that acknowledge the challenges and needs of multicultural and multilingual work environments is essential to promote both animal and caretaker well-being (Wagner et al., 2022).

The dairy industry recognizes the importance of caretaker training within animal care programs. For example, the Farmers Assuring Responsible Management Program (FARM, 2020) requires annual training for individuals that work with animals. Numerous educational materials, including the FARM Program resources, university extension programs, associations, and allied industry groups, provide in-depth information about a variety of animal care topics such as euthanasia, fitness for transport, and treatment of sick animals, among others (AABP, 2019; Cornell University Cooperative Extension, 2020; Ollivett, 2019). Although these resources provide essential information, few formalized training opportunities provide a platform for applying this knowledge and encourage critical thinking and problem-solving among dairy workers, particularly in a collaborative setting.

Few studies have explored innovative ways to engage caretakers in applying basic principles to relevant on-farm problems. Mullins et al. (2018) created interactive computer-based training utilizing euthanasia case studies to train swine caretakers, which was later tested by Campler et al. (2020). Another previous study by Edwards-Callaway et al. (2022) reported that dairy caretakers are interested in experiencing continuing education opportunities that provide them with the opportunity to work through a variety of complex health and treatment problems so they can improve their decision-making skills.
Case-based learning is a successful teaching method used in various fields, including human and veterinary medicine, to promote critical thinking and problem-solving skills among learners (Anderson et al., 2021; Aguayo et al., 2022; Devine et al., 2022). Case-based teaching presents realistic scenarios that allow learners to develop a deeper understanding of the subject matter and apply knowledge to real-life situations (Thistlethwaite et al., 2012). Given the success of this approach in other fields, it is worth exploring the potential of case-based learning in dairy industry training programs for caretakers. The primary objective of this study was to investigate dairy caretakers’ perspectives on case study discussions as a novel training approach to promote confidence and communication among team members. The secondary objective of the study was to identify thoughts and feelings of caretakers during case study discussions to help identify information that caretakers use to evaluate cases and make decisions.

CASE STUDY DEVELOPMENT

Two case studies focusing on unique topics were created during a graduate student seminar course at Colorado State University in the Department of Animal Sciences by graduate students and faculty members specializing in veterinary medicine, calf health, and livestock behavior and welfare. The case studies consisted of relevant scenarios that dairy caretakers may encounter on a regular basis. One case study focused on a calf with chronic respiratory disease and the other on a fresh cow with hypocalcemia. These case studies were developed in Microsoft PowerPoint (Microsoft Office Professional Plus, 2006; Microsoft Corp., Redmond, WA) and included pictures and relevant text. The cases were written and presented in Spanish. The case studies did not specifically include details about treatments so that dairy farms of varying management styles (e.g., conventional vs. organic) could relate to the case. The studies provided information about the focal animal (e.g., weight, sex, age, production stage), a description of the environment and feeding regimen, and any physiological or behavioral parameters relevant to the scenario (e.g., droopy ears, nasal discharge, fever).

Both case studies encouraged the participants to discuss treatment decisions in a step-by-step manner (e.g., a decision was made and then more information was shared); information would be provided as described above, and then the employees would be asked what they thought about the focal animal’s condition, what additional information would be helpful to decision-making, what the next steps would be, and with whom they would speak. This type of questioning was kept consistent throughout both case studies and at both dairies.

MATERIALS AND METHODS

The study population consisted of dairy caretakers who participated in both decision-making and performance of euthanasia on 2 northern Colorado dairies (dairy 1, n = 14; dairy 2, n = 10). Caretakers were defined as employees and managers who were responsible for care and management decisions related to dairy cows and calves. All participants were over the age of 18, of Hispanic or Latino origin, and considered Spanish their primary language. Additionally, 23 of the 24 participants were male. Participating dairies were recruited by course instructors with whom relationships were previously established. Participants were asked to attend a training session where the case studies would be delivered and be willing to take pre- and post-training questionnaires. Three individuals chose not to complete one or both questionnaires but participated in the training sessions. Only participants who took both the pre- and post-training questionnaires were included in summary statistics of quantitative data (n = 21).

Case Study Delivery

A member of our research team (NRM, Veterinarian and Professor in Animal Sciences) facilitated these training sessions on each farm using the case studies. Training sessions were conducted in Spanish, and one session was held on each dairy for a total of 2 sessions. Case studies were presented in Spanish only as all participants were fluent Spanish speakers. The cases were presented in a private meeting room on the farm with no one else present but the researchers and the participants, and refreshments were served to create
Questionnaires

Caretakers were given pre- and post-training questionnaires with 4 and 6 questions, respectively (available at https://hdl.handle.net/10217/237514). A member of the research team and also the facilitator—a fully bilingual, native Spanish speaker with over 20 yr of experience conducting extensive research and outreach efforts within the Colorado dairy industry—validated the context and clarity of all survey questions before study implementation. The pretraining questionnaire was given before the training and the post-training questionnaire was given immediately after the discussion was completed. The pretraining questionnaire included one multiple choice question asking the respondent to indicate when their last euthanasia training was (i.e., in the last week, in the last month, in the last year, or never). Both pre- and post-training questionnaires included the same 3 Likert scale questions related to euthanasia; the questions were as follows: (1) I feel confident when deciding when an animal should be euthanized; (2) Discussing euthanasia with coworkers and supervisors helps me make better decisions, and (3) Discussing euthanasia with coworkers and supervisors helps me feel more confident when making euthanasia decisions. The post-training questionnaire had 3 additional questions, which included 2 Likert scale questions pertaining to the relatability and usefulness of the presented case studies and one free response question asking respondents to share what they would like to see in future training opportunities.

Statistical Analysis

Quantitative Analysis. Questionnaire responses were entered manually into Microsoft Excel (Microsoft Corp., Redmond, WA), and Likert scale questionnaire responses were summarized using descriptive statistics.

Qualitative Analysis. A fully bilingual member of the research team transcribed the training session recordings and translated the transcripts into English; to ensure that the translation captured the true meaning of the participants’ responses, the transcribed and translated transcripts were validated by a fully bilingual, Spanish-speaking native and senior member of the research team. Thematic analysis was performed on the transcripts from peer-group discussions. Methods described by Braun and Clarke (2006) were followed for thematic analysis of peer-group discussion transcripts. Six researchers reviewed all transcripts and identified initial themes. Three researchers then independently coded transcripts for the defined themes. The group met periodically to validate coding by discussing differences and agreement in assigned themes within the transcripts. Each of the 3 coders offered a different perspective, providing a holistic evaluation of the transcripts. The first coder completed her doctoral degree in dairy sciences and has published research in the area of dairy science, specifically calf and caretaker well-being. The second coder was a fourth-year veterinary student and has been involved in animal welfare research for many years. The third coder had earned her bachelor’s degree in animal science and was working on her master’s degree in the area of bison welfare and nutrition. Our research followed an interpretivist paradigm guided by a relativist ontological position and subjectivist epistemology.

RESULTS

Quantitative Results

Participants were asked when the last time that they received euthanasia training was, with specific options to choose from. One-third of the participants (33.3%, 7) selected “never,” 52.4% (11) selected “in the last year,” and 14.3% (3) selected “in the last month.” Table 1 shows the frequency of agreement levels for the 3 statements asked in both pre- and post-training questionnaires. The study population generally indicated that they “felt confident when deciding when an animal should be euthanized” in both the pre- and post-train-
ing questionnaires. When asked if they thought discussions with coworkers and supervisors about euthanasia helped participants “make better decisions” and “feel more confident when making euthanasia decisions,” all respondents either “agreed” or “strongly agreed” with the 2 statements on pre- and post-training questionnaires.

In the post-training survey, when asked the level of agreement with the statement, “the case study discussed today is relevant to my everyday experiences on the dairy,” 9.5% (2) of the participants selected “disagree,” and the remaining participants either selected “strongly agree” or “agree” (61.9% [13] and 28.6% [6], respectively). When asked the level of agreement with the statement “the case study discussed today was useful in improving my euthanasia decision-making skills,” all participants either selected “agree” (19.0% [4]) or “strongly agree” (81.0% [17]).

**Qualitative Results**

After multiple reviews of transcript data from the 2 training sessions, the study authors identified 9 reoccurring themes: (1) detection of disease, disease differentials, and diagnosis; (2) treatment; (3) time; (4) formal protocols; (5) communication; caretaker knowledge and experience; (7) animal welfare and compassion; (8) opportunities for learning and continual improvement; and (9) asking clarifying questions about the case study. Table 2 lists final themes and definitions used for coding.

**Detection of Disease, Disease Differentials, Diagnosis.** This theme included all discussion and comments regarding methods for detecting disease, diagnostics or diagnosis of disease, and disease differentials considered by the dairy caretakers. Comments such as, “We check for ketosis, to see if it has decreased with the treatment she was given, and to make sure it hasn’t turned into severe ketosis,” demonstrated caretaker familiarity with diseases present on dairies. Other comments, including “Pneumonia. We check the temperature…” demonstrated both caretaker familiarity with disease and demonstrated knowledge of how particular diseases were diagnosed (i.e., by checking the body temperature of the cow).

**Treatment.** The theme of treatment included discussion of medication or supplements administered to sick or injured animals, and also included euthanasia as a type of treatment. Additionally, this theme encompassed basic husbandry procedures (such as providing shelter, food, or water) as another form of treatment. Euthanasia was frequently discussed in the context of when euthanasia was appropriate, how it was chosen as the optimum outcome, and the proper timing of euthanasia. Examples of comments regarding euthanasia as a treatment included “… we would start thinking about euthanasia,” and “Euthanize her.” The treatment theme overlapped heavily with the time theme, particularly in the context of treatment being delayed or too late.

**Time.** This theme often occurred in conjunction with the treatment and disease detection themes, such as in the comment, “That’s the importance of detecting [disease] on time.” Many caretakers were concerned about too much time passing before treatment or euthanasia decisions were made, in the framework of the case studies provided. Time was also discussed regarding how long treatments should last, in comments such as, “[Wait] fifteen to thirty minutes” and regarding how long animals should be monitored for progression of disease, such as “24 hours [before euthanasia].”

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<thead>
<tr>
<th>Questionnaire statement</th>
<th>Level of agreement</th>
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<th>%</th>
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<tr>
<td>I feel confident when deciding when an animal should be euthanized.</td>
<td>Strongly Agree</td>
<td>81.0</td>
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<td>85.7</td>
<td>18</td>
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<td>Agree</td>
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<td>Discussing euthanasia with coworkers and supervisors helps me make better decisions.</td>
<td>Strongly Agree</td>
<td>85.7</td>
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<td>95.2</td>
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<td>Strongly Disagree</td>
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<tr>
<td>Discussing euthanasia with coworkers and supervisors helps me feel more confident when making euthanasia decisions.</td>
<td>Strongly Agree</td>
<td>85.7</td>
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Table 2. Themes, definitions, and sample quotations from case study training sessions

<table>
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<th>Theme</th>
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| Detection of disease, disease differentials, diagnosis | Comments about the process of identification of sick animals, differentials or possible diseases, or diagnosis or diagnostic tools | “If she’s already in the parlor we would ask if the calving was a dystocia, if there were any complications with her temperature or respiration, her gestation length, and her dry period.” “We check for ketosis, to see if it has decreased with the treatment she was given, and to make sure it hasn’t turned into severe ketosis.” “Pneumonia. We check the temperature and…” “… in that pen there are a couple of cows with milk fever.” “It’s just that everything depends on how the cow looks, if she’s eating, if she’s drinking water, the changes that you are seeing. If you see that she’s not getting better and that she’s getting worse every time, from experience we would know that we need to keep an eye on if she improves or not.”
| Treatment | Comments about treating animals or treatments, including euthanasia | “… we would start thinking about euthanasia.” “We would use Banamine.” “You would deflate her and start her on antibiotics.” “Euthanize her.”
| Time | Timeliness, or lack of timeliness, in disease detection, treatment, and/or euthanasia | “That’s the importance of detecting [disease] on time.” “And we aren’t going to wait…” “[Wait] fifteen to thirty minutes.” “24 hours [before euthanasia].”
| Formal protocols | Comments about using or following any standard operating procedures (treatment protocols, animal care protocols, etc.) specific to that farm | “We use the three days of treatment protocol.” “… you should follow the protocol and give her three to four days [of treatment].”
| Communication | Comments about discussing decisions and/or seeking advice from peers, supervisors, or any third party (e.g., veterinarian) | “… that would be the time to talk to a supervisor…” “We can talk about euthanasia only after getting opinions from coworkers, our supervisor, and monitoring the cow.” “You would talk about it with your supervisor and see what he decides and talk to the veterinarian to see if it is time…” “But they always tell us that the veterinarian is always the second or third opinion that you should get.” “Either in the office or on the dairy, it is helpful to talk to a coworker. Talking really helps make the decision.” “She’s going to have problems during calving because she’s too fat.” “So, if the cow continues being weak and staggering when she walks, we wouldn’t let her go into the dairy, we will leave her in her own pen with water and food.” “… because sometimes there’s instances when the calf is really big, and you have to pull it, which can cause the cow to get injured.” “You would try to bring her to the stalls, but she won’t get up because she has milk fever.” “If the cow she’s already in the parlor we would ask if the calving was a dystocia, if there were any complications with her temperature or respiration, her gestation length, and her dry period.”
| Caretaker knowledge and experience | Display of worker knowledge and/or prior experience, application of prior experiences, or discussion of common/informal procedures on the farm | “Because if she’s not standing, she’s suffering.” “If her temperature is elevated, she’s suffering.”
| Animal welfare, compassion | Comments about compassion toward animals, reducing pain and suffering, or using basic animal care/husbandry as a foundational component of treatment | “I think it would help all of us to learn about cases we haven’t had yet. As you gain experience there will always be new cases that come up that you haven’t experienced yet.” “If someone had that case that had never had it before, they would check everything and feel crazy that they could not find it. But someone who already has had this experience would know and could help you with it.” “[Would like to discuss] mastitis.” “[Would like to discuss] calves with bloat.” “She fell in the holding pen, right?” “Why didn’t they treat her?” “And they didn’t give her antibiotics?” “Was it a different employee?”
| Opportunities for learning, continual improvement | Comments about desire for future trainings that include applied learning or opportunities for discussion, comments about improving upon existing protocols and knowledge | 
| Asking clarifying questions about the case study | Questions directed at the facilitator about the case study in discussion | 

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Formal Protocols. Formal protocols were infrequently discussed on both dairy farms. Although workers often agreed on a consensus of informal protocols and what would likely happen in the scenarios presented, formal protocols established by the dairy were rarely mentioned. Two examples of discussion of formal protocols include “We use the three days of treatment protocol,” and “...you should follow the protocol and give her three to four days [of treatment].” Discussion regarding general caretaker consensus and informal protocols was coded as caretaker knowledge and experience.

Communication. The topic of communication was explored with regard to how workers interact with their coworkers, supervisors, and veterinarians while working on the dairy farm. Examples of this included “…that would be the time to talk to a supervisor…” and “But they always tell us that the veterinarian is always the second or third opinion that you should get.” This theme commonly overlapped with the euthanasia theme, as many caretakers agreed that making the decision to euthanize an animal should be communicated and decided with the consensus of multiple individuals, as demonstrated in the statement “You would talk about it with your supervisor and see what he decides and talk to the veterinarian to see if it is time…”

Caretaker Knowledge and Experience. Caretaker Knowledge and Experience was the most frequently coded theme in each case study on both dairies. Examples of caretaker knowledge include “She’s going to have problems during calving because she’s too fat” and “…sometimes there’s instances when the calf is really big, and you have to pull it which can cause the cow to get injured.” There was abundant overlap between this theme with the themes of Disease Detection and Treatment, including comments such as, “…we wouldn’t let her go into the dairy, we will leave her in her own pen with water and food” which demonstrates knowledge of the informal protocols of the dairy and mentions providing food and water as a form of treatment.

Animal Welfare, Compassion. Animal welfare was most often mentioned in regard to minimizing suffering or caring for the basic needs of the animal by providing food, water, or shelter. Examples of caretakers acknowledging animal suffering included “Because if she’s not standing, she’s suffering” and “If her temperature is elevated, she’s suffering.”

Opportunities for Learning, Continual Improvement. Dairy caretakers did not spontaneously discuss this theme during the case discussion; however, this theme became apparent after facilitators asked questions directly related to how the case studies were helpful or could be improved in the future. In general, caretakers seemed receptive to case studies as a learning tool and were largely positive about the experience, with comments including “I think it would help all of us to learn about cases we haven’t had yet. As you gain experience there will always be new cases that come up that you haven’t experienced yet” and “If someone had that case that had never had it before, they would check everything and feel crazy that they could not find it. But someone who already has had this experience would know and could help you with it.”

Asking Clarifying Questions About the Case Study

This theme included any comments that were directed at case study facilitators and were intended to gain clarity on the case study itself. Examples of this theme include “And they didn’t give her antibiotics?”, “Was it a different employee?”, and “She fell in the holding pen, right? In general, comments coded under this theme stood alone and did not overlap with other themes.

DISCUSSION

The purpose of this study was to use case studies as an innovative learning opportunity for dairy caretakers to promote confidence and communication between team members. Additionally, this study sought to identify thoughts and feelings of caretakers during case study discussions to help identify information that caretakers use to evaluate cases and make decisions. In a previous study by this research group exploring the impact of weekly peer discussion groups on feelings associated with euthanasia (Edwards-Callaway et al., 2022), dairy caretakers were eager to improve their euthanasia decision-making skills and suggested more learning opportunities. In that study, caretakers specifically mentioned that the evaluation of case studies as a mechanism to help prepare them for future scenarios they may encounter at work would be helpful. Numerous studies with livestock caretakers have demonstrated the desire for more training related to a variety of animal management areas, particularly focusing on in-person, experiential learning opportunities (Matthis, 1994; McGee et al., 2016; Menger et al., 2016; Simpson et al., 2020; Denis-Robichaud et al., 2023). Case studies provide a platform for coworkers to address real-life scenarios together by discussing solutions and learning from others’ experience and knowledge. Taking this idea, we designed 2 case studies related to health challenges that could be encountered in cows and calves on dairies, with the intent of using them to engage caretakers in a novel training opportunity.

Providing training materials and frequently training caretakers is a critical component of animal care programs for livestock operations (FARM, 2020; PQA,
Despite training being a required component of many industry animal care programs, there is a need for more educational resources that are accessible, relevant, engaging, and thus effective for the audience (i.e., predominantly Spanish-speaking adult learners; Arcury et al., 2010; Walker et al., 2019; Wagner et al., 2020a). Training is historically protocol-focused and covers basic information (i.e., the what, when, how, and who) related to performing a job task (e.g., performing euthanasia, handling of downer animals, or treating a specific illness); training for livestock caretakers is not often focused on problem-solving and critical group thinking (Román-Muñiz et al., 2006; Menger et al., 2016). The evaluation of case studies can build upon basic training by providing learners with an opportunity to connect with real-life scenarios and apply previous knowledge to gain a stronger understanding of the topic (Flynn and Klein, 2001; Nkhoma et al., 2017; Raza et al., 2019).

The training used in the current study is an example of case-based learning (CBL), a teaching modality in which students are presented with realistic clinical cases and asked to apply their prior knowledge using inquiry-based learning methods (Thistlethwaite et al., 2012). Case-based learning has been used in the medical field for many years (McLean, 2016), and there has been an increase in the adoption of CBL practices in veterinary medicine programs (Patterson et al., 2006; Malher et al., 2009) as it prepares students in these fields for clinical practice. Studies have shown that implementing CBL improves problem-solving (Bi et al., 2019), understanding and critical thinking (Zhao et al., 2020), engagement (Hazel et al., 2013; Raza et al., 2019), and communication skills (Hazel et al., 2013; Zhao et al., 2020).

The case study approach used in the current study included aspects of both CBL and problem-based learning (PBL) but followed the CBL approach in that caretakers were asked to apply current knowledge to a case with a facilitator guiding the discussion. Problem-based learning is a similar but distinct approach from CBL that has been described as a method of teaching that provides students with an opportunity to gain foundational knowledge in a subject area via researching a case, with the student taking charge of their learning (Srinivasan et al., 2007; Thistlethwaite et al., 2012; Ilgiy et al., 2014). To the authors’ knowledge, there has been no formal assessment of the effectiveness of these techniques in fostering learning in dairy caretakers. The utilization of CBL or PBL on dairies could be a helpful mechanism to reinforce the basic concepts imparted in training and solidify deeper learning beyond memorization and identification of protocols (Newman, 2005; Wittich et al., 2011; Ilgiy et al., 2014; McLean, 2016). Doing so would be beneficial to job performance, particularly in the areas of disease prevention, identification, and treatment. It was evident within the qualitative analysis in the current study that caretakers were applying their previous knowledge to the cases as they were presented. For example, particularly within the theme of detection of disease, disease differentials, and diagnosis, it was evident that the caretakers were referencing previous knowledge to try to identify the issue that was present in the case study (e.g., “It’s just that everything depends on how the cow looks, if she’s eating, if she’s drinking water, the changes that you are seeing. If you see that she’s not getting better and that she’s getting worse every time, from experience we would know that we need to keep an eye on if she improves or not.”). Additionally, another prominent theme was caretaker knowledge and experience; participants demonstrated within the group discussion that they were applying their foundational knowledge to understand the case studies presented, as demonstrated in the comment, “If (the cow) she’s already in the parlor we would ask if the calving was a dystocia, if there were any complications with her temperature or respiration, her gestation length, and her dry period.”

The majority of dairy caretakers would be considered adult learners, as the average age of hired farm labor in the United States was reported as 39.7 yr and is rising (USDA, 2021); this emphasizes the importance of integrating adult learning strategies into on-farm training programs. Menger et al. (2016) indicated that training methods should be varied in format, be comprehensive, and promote active participation. A CBL approach to providing training and continued education to dairy caretakers is in line with important characteristics of preferred and effective learning strategies that are active, experiential, and engaging for adult learners (Trede and Whitaker, 2000; Kistler and Briers, 2003, Downing and Finley, 2005; Edwards et al., 2013). Daborn et al. (2022) reported that adult learners are motivated by facilitative rather than instructive activities, which is characteristic of CBL. All participants agreed that the training experience was beneficial in improving euthanasia decision-making skills. Interestingly, the majority of caretakers participating in this study felt confident deciding when an animal should be euthanized before implementation of the case study discussion. Before the training was implemented, the current population had positive perceptions about both their confidence and the benefits of working with coworkers to make euthanasia decisions, evident through presurvey responses. One limitation of this work was not being able to capture variability in caretakers’ perceptions before participating in the case study discussion. As this study occurred on only 2 dairies, it would be beneficial to test
the effectiveness of this type of training opportunity with caretakers of varied experience and across dairies with different management styles.

Collaborative or team-based learning has been shown to be effective in veterinary programs to increase student engagement and promote communication and teamwork skills (Dale et al., 2005; Mills, 2003; Hazel et al., 2013). Often these teaching approaches are delivered to groups of individuals making it challenging to separate the benefits of the collaborative nature of the method from the benefits of the case evaluation itself. In the questionnaires from the current study, all participants agreed that discussing the case studies with others improved their decision-making skills and increased their confidence. During one of the trainings, a participant shared “Either in the office or on the dairy, it is helpful to talk to a co-worker. Talking really helps make the decision,” about making decisions about euthanasia or different forms of treatment. Similarly, both Edwards-Callaway et al. (2022) and Román-Muñiz et al. (2021) reported that dairy caretakers enjoyed discussion and communication between team members and indicated that seeing agreement among colleagues increased their confidence. In other contexts, negative feedback on collaborative group learning has been related to group dynamics, team member commitment, and time management (Pauli et al., 2008; Thurman et al., 2009; Mills, 2003). Although these challenges are relevant in higher education where most of the research has been conducted, the expected outcomes (i.e., completed assignments, course grades, and so on) in higher education are not the same as those of dairy caretakers, and therefore, perceptions may be different.

Communication was a key component of the case study evaluations in the current study. Interestingly, the qualitative results showed that although formal protocols are a component of decision-making, the informal processes and reliance on coworker experience and knowledge emerged as a critical component of this case discussion. A study including multiple dairies in Michigan reported that 71% of dairy caretaker participants indicated receiving training from coworkers or learning by doing the job (Erskine et al., 2015). Similarly, Sischo et al. (2019) found that the majority of calf caretakers in their study indicated that they were trained by following experienced coworkers. In the current study, it was clear within the group discussion that discussing protocols and options with coworkers, supervisors, or veterinarians was integral to the decision-making and learning process. For example, one participant shared: “We can talk about euthanasia only after getting opinions from co-workers, our supervisor, and monitoring the cow.” Erskine et al. (2015) reported that 77% of dairy caretakers in their study participated in team meetings only when something negative had happened, indicating that team discussion in that particular study population was infrequent and not used as a team building and learning opportunity. Formal protocols and treatment plans were mentioned in the group discussions but less frequently than some of the other themes; this is in line with what has been found in other studies indicating that the presence of written protocols for critical job tasks is highly variable across dairies (e.g., downer cow handling, McFarlane et al., 2022; treatment, Hoe and Ruegg, 2006; antibiotic use, Friedman et al., 2007). Written protocols are valuable to ensure proper procedures are followed consistently (Hoe and Ruegg, 2006). Perhaps dairies should consider capitalizing on the clear affinity and use of group learning between coworkers and create ways in which formal protocol development or discussion could be integrated into the caretaker collaborative culture.

Despite having generally positive feedback about the training experience, a few participants did not find the training relevant to their job. This sentiment could be attributed to the specific job responsibilities of the different caretakers that participated in the case study discussions; one case study focused on cows and the other on calves. Some of the caretakers were likely only responsible for working with one animal age group, and therefore, not all material shared in the case study may have been relevant to their specific job duties. Additionally, it is worth noting that almost one-third of the participants had never received euthanasia training, despite the fact that the invitation to participate identified that the case discussions were meant for individuals who either performed euthanasia or were involved in decision-making. Perhaps these individuals assisted with decisions but did not actually perform euthanasia and thus, were not formally trained. Additionally, although one inclusion criterion for participating in the case study discussion was being involved in euthanasia decision-making, without confirming their specific euthanasia duties in the survey, perhaps these individuals really were not involved in that process and thus, did not need training. Without prior training, participants may not have gleaned as much value from the technical information provided in the case studies.

It is clear that more relevant and engaging training is needed on dairy farms. It is also important to engage with veterinarians as they can be influential in educating caretakers about herd health challenges. Erskine et al. (2015) reported that dairy caretakers in their study appreciated participating in educational opportunities with veterinarians. Sischo et al. (2019) reported that veterinarians are a primary source of information re-
garding new approaches to improving calf health for dairy caretakers, herd managers, and owners. Similarly, other studies with livestock veterinarians have demonstrated a desire of the veterinarians themselves to conduct more training on-farm (Edwards-Callaway et al., 2020; Wagner et al., 2020b). Additionally, veterinarians would be ideal facilitators to work through case studies with caretakers related to cattle health and welfare, as they have the health expertise to do so.

Dairy industry stakeholders need to create more continuing education opportunities that adapt to the needs of the dairy caretaker population (Rovai et al., 2016; Arcury et al., 2010), which means providing hands-on activities that provide both technical knowledge and practical skills training (Chase et al., 2006). It has consistently been reported that understanding the “why” of job tasks is critical for employee understanding and engagement (Román-Muñiz and Van Metre, 2011; Erskine et al., 2015) and perhaps this has been a missing piece in some of the current available resources. Several participants in the current study shared that they would like to be exposed to more cases from different dairies or situations they haven’t seen before, with one participant stating, “I think it would help all of us to learn about cases we haven’t had yet. As you gain experience there will always be new cases that come up that you haven’t experienced yet.” Other participants suggested additional training regarding very specific ailments, such as mastitis, calves with boloat, cows with pneumonia, and calves with clostridium. The findings in this study support more exploration of how case studies could be used as an effective training tool on dairy farms. Additionally, it may be beneficial to have a resource library of different cases from a variety of dairies to expand learning opportunities and application of knowledge to new challenges.

CONCLUSIONS

Dairy workers are uniquely positioned to influence animal care, and training programs are necessary to prepare them to make appropriate and timely treatment decisions. The case studies were viewed positively by caretakers and allowed coworkers to engage in discussions and apply prior knowledge to make treatment decisions. Robust training methods, such as case study discussion, can foster skills in dairy workers that prepare them to make important treatment decisions for animals and could be considered for a variety of topics on the dairy. Future research should evaluate how on-farm role (e.g., manager vs. caretaker), experience, and other demographic factors (e.g., age and gender) may influence perceptions of this type of training.

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REFERENCES


Chase, L. E., L. O. Ely, and M. F. Hutjens. 2006. Ma...


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ORCIDs

Lily Edwards-Callaway ♦️ https://orcid.org/0000-0002-0737-9899
Sage Mijares ♦️ https://orcid.org/0000-0002-6114-3246
Paxton Sullivan ♦️ https://orcid.org/0000-0001-7715-2828
Melissa Davis ♦️ https://orcid.org/0000-0002-1966-7144
Catie Cramer ♦️ https://orcid.org/0000-0002-6391-2387
Noa Román-Muñiz ♦️ https://orcid.org/0000-0001-6266-4839