

## ANIMAL WELFARE

**Title:** Development of an interactive training app for timely and humane on-farm euthanasia – NPB #15-042

revised

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**Industry Summary:** Euthanasia is a necessary act for any operation keeping live animals. However, science-based guidance for pig producers on proper on-farm decision criteria for euthanasia in piglets is deficient. Scientific knowledge about the effects of various euthanasia methods on piglet and pig welfare is growing; nevertheless, the act of euthanasia on-farm involves a decision-making process from the stockperson, with the responsibility to perform the procedure itself. In fact, public outcry and negative publicity about euthanasia and slaughter arise when poor decisions are made by stock people, rather than because of the method of euthanasia per se. Hence, equipping the stockperson with the most relevant and up-to-date knowledge that leads to good decision making and skills to competently perform the procedure is crucial to avoid undesirable welfare outcomes. To assist veterinarians and other industry professionals in training both new and seasoned caretakers, an interactive computer-based training program was created. Three modules covering three production stages (breeding, pre-wean, and nursery and grower-finisher pigs) were developed, each consisting of 5-6 individual case studies. Case study development was based off of five specific euthanasia criteria defined in the 2015 Common Swine Industry Audit (CSIA), a nationally recognized auditing program utilized in the United States. This innovative tool represents the first interactive euthanasia-specific training program in the swine industry and offers the potential to reduce the incidence of untimely euthanasia decisions, and thus poor pig welfare.

**Keywords:** swine, euthanasia, training, humane, timely

### Scientific Abstract:

With extensive knowledge and training in the prevention, management, and treatment of disease conditions in animals, veterinarians play a critical role in ensuring good welfare on swine farms by training caretakers on the importance of timely euthanasia as a means to end pain and suffering in severely compromised pigs. To assist veterinarians and other industry professionals in training both new and seasoned caretakers, an interactive computer-based training program was created. Three modules covering three production stages (breeding, pre-wean, and nursery and grower-finisher pigs) were developed, each consisting of 5-6 individual case studies. Case study development was based off of five specific euthanasia criteria defined in the 2015 Common Swine Industry Audit (CSIA), a nationally recognized auditing program utilized in the United States. Case studies provides information regarding treatment history, clinical signs, and condition severity of the pig and then prompts participants to utilize this

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information to make management decisions on treatment and care of those individuals. Once a decision is made, feedback regarding the appropriateness of the decision is provided to allow participants the opportunity to learn how their decision compared to current industry guidelines. This program may also be a valuable resource if incorporated into veterinary, graduate, and continuing education curriculum to equip those that work within the swine industry with information and training on appropriate euthanasia decision-making. This innovative tool represents the first interactive euthanasia-specific training program in the swine industry and offers the potential to reduce the incidence of untimely euthanasia decisions, and thus poor pig welfare.

## **Introduction:**

Under the veterinarian's oath, veterinarians are expected to protect the health and welfare of all animals and prevent and relieve animal suffering. Swine veterinarians are one professional group that plays a key role in training swine caretakers and other swine farm personnel in the identification, clinical assessment, and treatment of compromised pigs. Part of this process includes how to make timely euthanasia decisions when animals become too sick or injured to recover. Although euthanasia training is primarily conducted by veterinarians, it is common in the United States [U.S.] that euthanasia decisions made and euthanasia performance is conducted by swine caretakers in the absence of direct veterinary oversight. Therefore, ensuring confidence within swine caretakers to identify, evaluate and make appropriate decisions to treat or euthanize compromised pigs is imperative in preventing or eliminating unnecessary suffering in situations where an animal's recovery is highly unlikely (NPB & AASV, 2008; AVMA, 2013; Fraser et al., 2013).

Training can improve a caretaker's willingness and ability to euthanize a compromised animal (Reeve et al., 2004), hence it is a high priority for the U.S. swine industry to create robust and effective educational tools on timely and humane euthanasia. The ultimate goal of these educational programs is to effectively train swine veterinarians, producers, and caretakers on euthanasia and reduce the incidence of untimely euthanasia on-farm. When designing euthanasia-specific training materials for the swine industry, veterinarians and other educators generally utilize industry guidelines as a means to objectively and consistently teach caretakers to identify candidates for immediate euthanasia. Though the American Veterinary Medical Association (AVMA) Guidelines for the Euthanasia of Animals describe appropriate euthanasia method and techniques, specific guidelines or conditions which make a pig a candidate for immediate euthanasia are not indicated (AVMA, 2013). The American Association of Swine Veterinarians (AASV) has identified three conditions which warrant immediate euthanasia (NPB & AASV, 2008), and these conditions have been adopted and expanded upon in the 2015 Common Swine Industry Audit (CSIA; Table 1), a nationally recognized auditing program utilized in the United States (NPB 2015).

Therefore, there is a clear need for the development of a euthanasia training program that compliments the expectations of industry guidelines and effectively trains the demographic population of U.S. swine industry employees. Factors to be considered during the development of such a program include caretaker experience, employee turn-over rate, and technical proficiency.

A person's attitudes towards euthanasia and the associated mental and emotional distress felt by some when having to euthanize animals also contribute to delayed decision-making. For seasoned swine industry stakeholders—including veterinarians, caretakers, and others—reducing the incidence of untimely euthanasia decision-making on-farm depends on more than just increasing technical competence. Inducing behavioral change for those with established habits can present additional challenges and must target a wider set of underlying beliefs to

realize improvements in appropriateness and timeliness of euthanasia decision-making. Despite this knowledge of the need for behavioral change for some caretakers, this program only focuses on communicating and expanding technical skills for those tasked with making euthanasia decisions.

To address this need for comprehensive and specific euthanasia training, this paper will discuss the development and implementation of an interactive computer-based training program targeted to educate veterinarians, caretakers, and other swine industry professionals on timely and humane euthanasia utilizing an objective training tool that is consistent with industry guidelines.

### **Objectives:**

The objectives of this study are to:

1. Identify quantitative and qualitative decision criteria for on-farm euthanasia of pigs.
2. Develop a Proof of Concept Training App to deliver educational material on timely decisions for euthanasia of pigs to employees.
3. Identify via the Proof of Concept Training App, stockman characteristics that influence the euthanasia decision-making process

### **Materials & Methods:**

On-farm training and management for swine caretakers can involve many tools and exist in many mediums. For example, informal job shadowing of experienced caretakers (English et al., 2002); farm-specific educational programs (English et al., 1999); and national educational programs such as the U.S. Pork Quality Assurance Plus<sup>®</sup> program (PQA Plus<sup>®</sup>; Cleary, 1990; NPB, 2013) are all used on a regular basis. Additionally, on-farm training programs may employ standardized company literature, hands-on experience, farm-specific standard operating procedures, and multimedia tools including Microsoft PowerPoint, photographs, and video recordings. Although many training methods exist, the mode of delivery in which material is provided to learners can have an impact on its likeability and efficacy in material retention. Previous work conducted has demonstrated the value of multimedia training in both the medical (Mehrabi et al., 2000) and veterinary fields (Trace et al., 2012; Klupiec et al., 2014). For example, the use of multimedia in training programs improves clinical decision-making skills by allowing material to be “brought to life” utilizing a more realistic interface compared to other methods (Garrett & Callear, 2001, p384). In addition, the use of multimedia materials can promote greater satisfaction with training (Coleman et al., 2001), overall credibility (Hemsworth et al., 2002), and, for certain groups of learners (e.g. those with low prior knowledge or individuals with poor literacy), increase information retention (Najjar, 1996; Coleman et al., 2001).

In addition to the delivery mode, the intended audience has to be carefully considered. Since the beginning of the 20<sup>th</sup> century, the population of Americans living on a farm has decreased (Dimitri et al., 2005), and hired farmworkers represent less than 1% of the total number of U.S. salary and wage employees (USDA ERS, 2016). As a consequence, the likelihood of employing an experienced animal caretaker is declining; training programs must be designed to educate learners with little to no production animal experience. In the U.S. agricultural industry, approximately half of all farm laborers are Hispanic, and a third of these farm workers have less than a 9<sup>th</sup> grade education (USDA ERS, 2016). Therefore, recognizing that communication challenges may exist, utilizing training materials that do not inhibit understanding by caretakers with reading or writing limitations is important. Acknowledging these particular challenges for U.S. swine industry caretakers, the development of this computer-based training program focused on providing information via photographs and video recordings with accompanying audio narration and limited text. Given that veterinary terminology is not frequently used among caretakers on-farm, the accessibility of information afforded by a multimedia-based interactive format allows caretakers and other farm personnel to understand the material and be able to refer to the program in the absence of a veterinarian, if needed.

In addition to the demographic characteristics and population-specific experiences among swine farm caretakers, three additional factors were taken into consideration during the development of the training program: 1) technological capacity; 2) work day schedule; and 3) audience participation. When considering technological capacity, swine farms are most often located in rural areas with limited or no Internet connectivity. In addition, computers available on-farm may not remain up-to-date with modern software applications; therefore, it was important that this training program was able to operate without requiring Internet access; could function on multiple platforms and systems; and did not incur a significant cost to the farm through a required purchase of new equipment or software upgrades. To meet these criteria, the training program is entirely contained on an USB flash drive which can accommodate at least 1 GB. Secondly, completion of the program by learners needed to be flexible to accommodate the typical swine farm work day schedule which includes frequently switching between different tasks throughout the day. Therefore, the interactive computer-based training program was organized into three discrete modules with self-contained case studies to allow learners to complete the program in segments. This approach also enables veterinarians who are facilitating on-farm training to only work through the module(s) which are relevant for the caretakers they are training. Such a structure also accommodates the adult learning style which emphasizes the importance of regular and adequate breaks (Backes, 1997). Third, understanding the audience demographics for the program played a large role in its development. Because the program must cater to diverse education and experience levels (i.e., veterinarians, farm managers, caretakers, and other swine industry professionals), the program needed to utilize non-technical language which would permit understanding by those who did not have formal or comprehensive training in animal health or welfare. Parts of the program, including media, text, and spoken narrative, were provided to current sow farm managers as well as members of the National Pork Board Animal Welfare committee to assess terminology and phrasing to ensure the language would be understood by learners. Based on feedback received, colloquialisms proved more useful in the current application.

In addition, because euthanasia decision-making is complex and euthanasia is a sensitive topic, the program allows learners to complete case studies individually in a non-threatening and private environment to avoid making decisions based on peer pressure. This design also enables learners to work through case studies at their own pace and redo case studies or entire modules for additional review.

## **Data Collection**

All work was approved by The Ohio State University Institutional Animal Care and Use Committee (ID# 2015A00000116) based on guidelines provided by the Guide for the Care and Use of Agricultural Animal in Research and Teaching. Animal interventions were limited to video recording, photography, and measuring basic vital signs on sows, gilts, piglets, and nursery and finishing pigs by trained research team members. Data to develop 15 individual case studies was collected on one 2,500 commercial sow farm, two 5,000-head nursery farms, and three 2,400-head wean-to-finish farms in the Midwest of the United States. Video recordings and photographs were collected by trained personnel from both the farms and from The Ohio State University Animal Welfare and Behavior laboratory using a digital still camera (Sony Cyber-shot DSC-W810, 20.1 MP, 6x optical zoom, 26 mm wide-angle lens, Sony Corporation of America, New York, NY) and camcorder (Canon Vixia HF R600; 1080p HD; 35 Mbps, Melville, NY) over four months. Video recordings and photographs were collected in a way that mimicked the caretaker or veterinarian viewpoint when walking down the alley or through pens. This approach helps maximize the program's realism, thus improving the caretaker's ability to transfer knowledge from the training program to real-world application (Kim et al., 2006).

## Case Studies Design

The design of the program and case studies was carefully considered to maximize learner relevance and utility. A case study has been defined as “an account of a situation or the study of a topic that raises issues or problems for analysis” (Davis & Wilcock, 2005, p59) or which utilizes stories as educational tools (Herreid, 2011). The use of individual pig case studies enables learners to draw analogies between case studies and general conditions which require euthanasia, thus encouraging adult learner engagement (Richards et al., 1995; Backes, 1997). Furthermore, the emphasis on individual pig evaluation most closely parallels caretakers’ daily responsibilities when they address ill or injured pigs, and this contextual similarity improves learners’ retention of information (Cook & Triola, 2009; Herreid, 2011) and ability to transfer knowledge gained during training to new situations (Richards et al., 1995; Herreid, 1997; Crowther & Baillie, 2016). Case studies encourage learners to take an active role in the learning process (Dolmans et al., 1997) thereby enabling them to fulfill their need to be self-directed learners and apply new practical skills immediately in their daily tasks (Knowles, 1972; Knowles, 1990).

The case study format emphasizes the importance of individually evaluating pigs, by recognizing that differences in treatment history and clinical signs have an impact on what management or euthanasia decisions may be pursued. In addition to video recordings and photographs, information including, but not limited to, age, parity, body condition score, injuries, duration of clinical signs, and production records are provided. Case studies are organized into one of three modules based on pig production stage; 1) breeding stock, 2) piglets, and 3) wean to grower-finisher pigs. Within each production phase are five case studies. Learners are able to move between modules without completing all case studies, and the program does not require learners to complete all three modules, thereby permitting flexibility in allowing learners to focus on their production area. Thus, the case study format both complements the adult learning style while allowing for in-depth exploration of specific examples of pigs which are euthanasia candidates.

Figure 1. General schematic of the interactive computer-based training program related to timely on-farm swine euthanasia

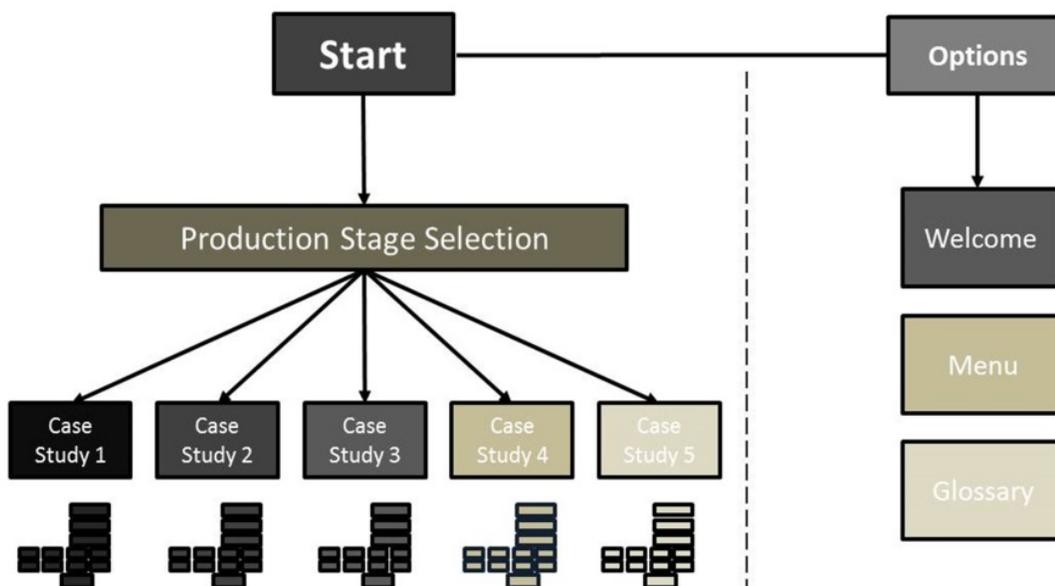
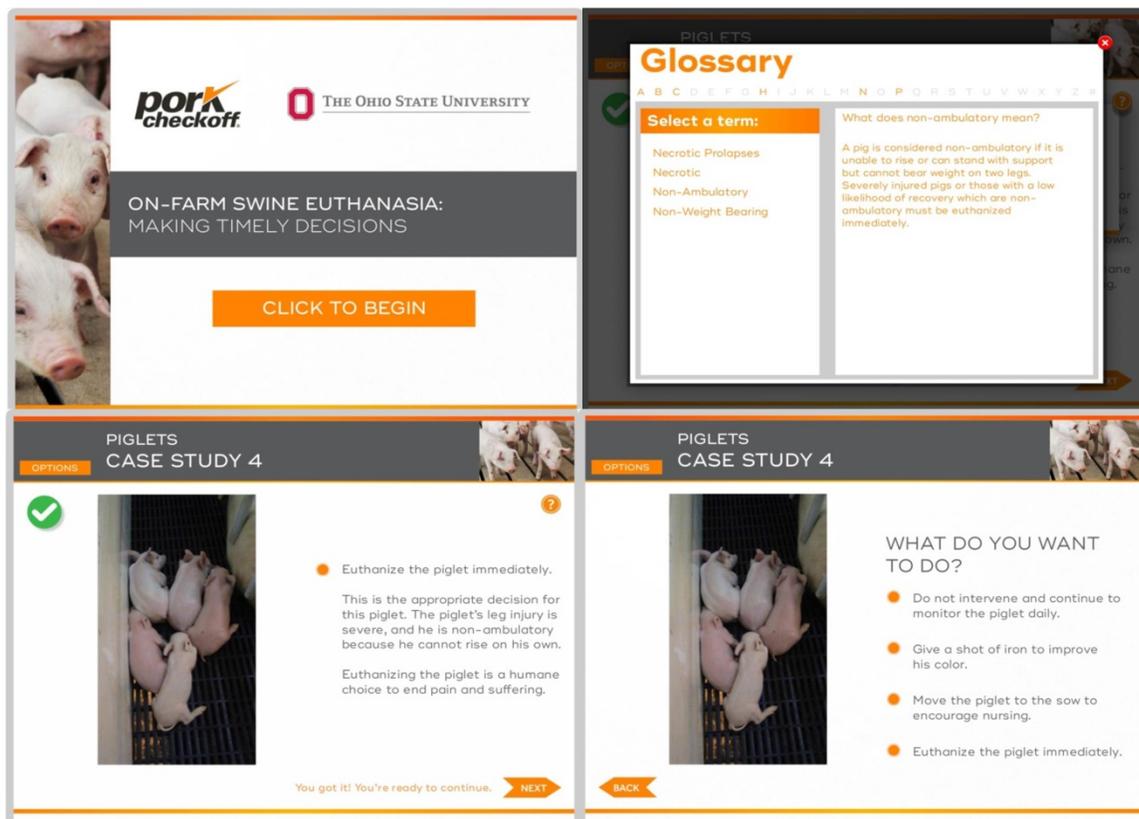


Figure 1. Clockwise, from top left: 1) Welcome page of the program; 2) Glossary image of the non-ambulatory page; 3) Decision page from Piglet Case Study 4; and 4) One of four feedback pages from Piglet Case Study 4



Learners using the interactive computer-based training program are asked to utilize the provided information to make management decisions for each case study. Most case studies present the learner with three choices and ask them to make a selection: 1) do not intervene and continue to monitor the pig or piglet; 2) euthanize the pig or piglet within a particular timeframe; or 3) provide treatment or make management changes (e.g., pharmacological intervention, segregating the pig into a hospital pen, providing additional feed, etc.). Different iterations and combinations of choices are used to increase the complexity and perceived difficulty of the case study decision. After a learner selects a management option, the program provides a short explanation on the appropriateness of the decision using CSIA guidelines as the conceptual basis. In case studies where immediate euthanasia is warranted, the program explains why each of the other treatment and monitoring options are inappropriate and emphasizes the clinical signs and health history which indicate immediate euthanasia. In case studies in which a pig does not meet the immediate CSIA euthanasia criteria (NPB, 2015), multiple correct options may be presented to recognize and provide positive reinforcement to the learner that multiple appropriate options exist. Such an approach enhances the richness and complexity of the program (Kim et al., 2006), and is critical to the program’s efficacy in increasing competency to identify and assess compromised pigs.

To facilitate training of multiple learners, a fillable PDF ‘Completion Checklist’ is provided as supplementary material on the flash drive for use in recording training completion (Figure 3.3).

Additionally, after successful completion of each individual case study, a PDF ‘Certificate of Completion’ can be saved to the computer or printed, with the learner’s name and date of completion.

Figure **Error! No text of specified style in document.** The ‘Completion Checklist’ provided as supplementary material on the flash drive

**ON-FARM SWINE EUTHANASIA:  
MAKING TIMELY DECISIONS**

## Completion Checklist

EMPLOYEE NAME \_\_\_\_\_

SIGNATURE \_\_\_\_\_

PRINT \_\_\_\_\_

DATE \_\_\_\_\_

NOTES \_\_\_\_\_

**Breeding Stock**  
DATE COMPLETED: \_\_\_\_\_

Case Study 1	DATE COMPLETED:	_____
Case Study 2	DATE COMPLETED:	_____
Case Study 3	DATE COMPLETED:	_____
Case Study 4	DATE COMPLETED:	_____
Case Study 5	DATE COMPLETED:	_____

**Piglets**  
DATE COMPLETED: \_\_\_\_\_

Case Study 1	DATE COMPLETED:	_____
Case Study 2	DATE COMPLETED:	_____
Case Study 3	DATE COMPLETED:	_____
Case Study 4	DATE COMPLETED:	_____
Case Study 5	DATE COMPLETED:	_____

**Wean to Grower-Finisher Pigs**  
DATE COMPLETED: \_\_\_\_\_

Case Study 1	DATE COMPLETED:	_____
Case Study 2	DATE COMPLETED:	_____
Case Study 3	DATE COMPLETED:	_____
Case Study 4	DATE COMPLETED:	_____
Case Study 5	DATE COMPLETED:	_____

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### Caretaker attitudes

The third objective of this proposal was to identify stockman characteristics that influence the euthanasia decision-making process. As participants used the training program, we collected anonymous demographic data to study the influence of pre-dispositional factors (attitudes, background, and knowledge) on euthanasia decision-making process to further enhance the effectiveness of the training program and identify possible barriers, challenges or beliefs that influence the decision to euthanize. Survey questions were designed to assess caretakers’ attitudes and attributes (empathy affect, empathy attribution, attitudes toward pigs, feeling bad about euthanizing pigs, and assumptions about pigs’ emotional capabilities), decision-making skills (confidence in identifying compromised pigs or relying on coworkers to make decisions), and euthanasia skillset.

## Results and Discussion:

It is important for swine farms to provide and/or facilitate appropriate and sufficient timely euthanasia training to caretakers to reduce the incidence of poor welfare outcomes for compromised pigs. Veterinary training in the principles and practices of making timely euthanasia decisions can help bridge the gap between existing euthanasia-specific training resources and needed on-farm education for caretakers. Familiarizing veterinarians with the case studies will allow them to guide training for on-farm personnel which continues to represent a significant opportunity for caretakers to gain confidence in identifying and managing compromised pigs. Presence of veterinarians during training allows caretakers to practice good decision-making under supervision. In this role, veterinarians play an important part in ensuring caretakers and farm managers are competent in making appropriate and timely euthanasia decisions.

At the present time, the CSIA and PQA Plus<sup>®</sup> documents are foremost in the swine industry, and equipping veterinarians with knowledge of those standards can help ensure they are well-prepared to provide needed guidance to producers. Similar multimedia-based training programs have been developed to provide education on specific topics, and these fit within the existing veterinary curriculum to supplement learning on current issues in animal agriculture and veterinary medicine (Gordoncillo et al., 2011; Trace et al., 2012; Klupiec et al., 2014).

Recognizing that swine farms and companies often vary in their approaches to economic decisions, management oversight, veterinary guidance, and daily on-farm schedules, several limitations are associated with the current design of the program. Euthanasia decisions often consider a pig's economic value on-farm (Morrow et al., 2006), but this training program does not address this component for two primary reasons. Firstly, individual farms follow different protocols regarding euthanasia of pigs which are not meeting expected performance standards or which are not obviously compromised but are believed to have low viability (e.g., the low birthweight piglet which is structurally smaller than its littermates but is not a body condition score of 1). Secondly, while veterinarians may make suggestions to the producer about euthanasia decisions related to economic value, their foremost role is as a protector of animal health. Thus, to ensure the program is applicable to the widest range of veterinarians and on-farm caretakers, the economic component of decision-making was excluded from the program. An additional limitation focuses on the competing priorities that caretakers face associated with euthanasia decision-making and implementation. The time to administer treatment or euthanize compromised animals is one of many logistical obstacles which often influence management decision-making; however, recognizing the great deal of variance between farms in daily schedules, availability of equipment, etc., simulating time constraints in the program was avoided.

Though this program can increase competency related to identifying compromised pigs, it must be recognized that inducing behavioral change in animal caretakers requires changing established behaviors and beliefs, a task that often is more difficult than simple skills training (Coleman & Hemsworth, 2014). Addressing these barriers may require more extensive intervention where attitudes towards euthanasia are explored and challenged (Rault et al., in press). Past studies have shown that cognitive-behavioral intervention strategies have proven effective in modifying caretaker attitudes and resulting behavior directed at handling pigs on both small (Hemsworth et al., 1994) and large farms (Coleman et al., 2000). Since euthanasia is a core component of swine husbandry, similar intervention strategies may prove useful in changing behavior and willingness to perform euthanasia when necessary. Survey questions developed in objective 3 showed that empathy attribution was strongly correlated with empathy affect ( $r = 0.571$ ,  $P < 0.01$ ) and that empathy affect and empathy attribution were higher in female caretakers compared with male caretakers ( $P < 0.05$ ). This study provides important information about variability in caretaker experience as well as their attitudes toward pigs and timely euthanasia.

Despite these limitations, the potential benefits to the swine industry in utilizing this training program for swine farm managers, caretakers, and other industry personnel are significant. Accustoming veterinarians with the training program will allow them to continue to serve as valuable educational resources and provide guidance regarding compliance with industry standards. Utilizing interactive case studies which more closely mimic caretaker and veterinarian duties offers an opportunity to more fully engage learners, encourage meaningful discussion, and enhance material retention. This innovative method to increase both caretaker and veterinarian competency in the clinical identification and assessment of sick or injured pigs may prove to have significant positive impacts for the swine industry in the continual effort to reduce instances of unnecessarily poor animal welfare.

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