

Interactive euthanasia training program for swine caretakers; a study on program implementation and perceived caretaker knowledge

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Summary

Implementing timely and humane euthanasia on-farm is of key importance for safeguarding animal welfare. Equally important is the skill, attitude, and knowledge among caretakers to successfully perform euthanasia on-farm. This study investigated the potential of an interactive euthanasia training program in conjunction with a survey designed

to investigate attitudes and perceived knowledge of the Common Swine Industry Audit euthanasia guidelines. The survey results showed that caretakers self-reported improved knowledge of industry expectations immediately post training compared to their perceived knowledge pre-training. This study provides insight regarding interactive training programs and

identifies variation in perceived euthanasia knowledge within swine caretaker demographics.

Keywords: swine, timely euthanasia, swine welfare, caretaker training, interactive training program

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Resumen - Programa interactivo de capacitación sobre la eutanasia para los encargados de los cerdos; un estudio sobre la implementación del programa y la percepción del conocimiento del personal

La implementación oportuna y humana de la eutanasia en la granja es de vital importancia para proteger el bienestar animal. Igualmente importante es la habilidad, actitud y conocimiento de los responsables de los cerdos para realizar con éxito la eutanasia en la granja. Este estudio investigó el potencial de un programa interactivo de capacitación sobre eutanasia junto con una encuesta diseñada para investigar las actitudes y la percepción del conocimiento de los lineamientos de eutanasia en la Auditoría de la Industria Porcina Común. Los resultados de la encuesta mostraron que los responsables de los cerdos reportaron una mejora en el conocimiento de las expectativas de la industria

inmediatamente después de la capacitación en comparación con su percepción antes de la capacitación. Este estudio proporciona una visión de la relación de los programas de capacitación interactivos e identifica la variación en el aparente conocimiento sobre la eutanasia entre la demografía del personal responsable de los cerdos.

Résumé - Programme de formation interactif sur l'euthanasie pour les animaliers porcins; une étude sur l'implantation du programme et les connaissances perçues des éleveurs

La réalisation d'une euthanasie humanitaire et en temps opportun à la ferme est d'importance primordiale pour préserver le bien-être animal. Tout aussi important est l'habileté, l'attitude et la connaissance parmi les animaliers pour réaliser une euthanasie réussie à la ferme. La présente étude a examiné le potentiel d'un programme de formation interactif sur l'euthanasie

en conjonction avec un sondage visant à investiguer les attitudes et connaissance perçues des directives sur l'euthanasie du Common Swine Industry Audit euthanasia guideline. L'étude a démontré que les animaliers ont auto-rapporté une connaissance améliorée des attentes de l'industrie immédiatement post-formation comparativement à leur connaissance perçue pré-formation. La présente étude fournit une connaissance concernant des programmes de formation interactifs et identifie des variations dans les connaissances perçues sur l'euthanasie parmi les données démographiques relatives aux animaliers.

The ability to identify compromised animals and perform timely euthanasia of food animals is a skill often acquired by caretakers after receiving substantial on-farm work experience. Frequently, an on-farm euthanasia standard operating protocol

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is implemented after consultation with a farm's veterinarian. However, veterinarians are unlikely to be on-farm daily to ensure that farm protocols are followed or to train inexperienced caretakers. Moreover, not all veterinary students or veterinarians have extensive euthanasia experience or feel comfortable performing euthanasia.^{1,2} Although national standards on timely euthanasia have been developed, success of the euthanasia process relies heavily upon the decision-making process and skillset of individual caretakers.^{3,4} A commonly overlooked factor about timely euthanasia is an individual caretaker's attitude and willingness to perform the act. Early work has shown that caretakers' attitudes can affect their behavior towards animals and that among veterinary professionals, 78% of participants felt that they lacked euthanasia training and the ability to deal with feelings associated with conducting euthanasia.⁵⁻⁷ A more recent survey study found that insufficient perceived knowledge about euthanasia was significantly linked to the indecisiveness and avoidance to perform euthanasia and caretakers feeling guilty about performing euthanasia.⁸ Additionally, previous survey studies found that negative attitudes towards euthanasia may influence willingness to perform euthanasia.^{9,10} It was also reported that among caretakers working in swine systems in North Carolina, 87% of participants understood the welfare aspects of euthanizing sick pigs, but 46% of respondents said they wished to never have to carry out euthanasia again.⁹ One approach to improving attitudes towards euthanasia is to implement training programs for veterinarians and caretakers regarding euthanasia decision-making. In a recent US survey representing 175 swine caretakers in 8 states, only half of participating swine caretakers were trained in euthanasia techniques.¹¹ Given this opportunity for training, it is critical to develop euthanasia training that provides essential information to guide those making euthanasia decisions while accounting for the education and experience levels of swine caretakers.³ Thus, the aim of this study was to investigate the potential of an interactive training program on swine caretakers' knowledge and attitudes towards timely euthanasia. We hypothesized that caretakers' self-report on their ability to detect compromised pigs, ability to determine when compromised pigs needed to be euthanized, and their perceived euthanasia skills, would increase post training.

Materials and methods

This study was reviewed and approved by The Ohio State University Institutional Review Board (IRB:2017E0106) for Human Subjects Research.

Caretakers from 8 Ohio swine farms were invited to receive timely euthanasia training using an interactive, computer-based multimedia software program and to take part in this study. Invitations to participate in this study were conducted by email correspondence to farm managers, owners who had previously enrolled staff in educational workshops, or those with involvement in previous studies with this research group. All surveys and training for caretakers working in breeding and gestation farms were conducted on-farm and any caretaker present at the time of the visit was eligible to participate. For nursery and finishing farms, caretakers were invited to join the training program at one centralized location. The participating caretakers had to complete all available modules in the training program and the pre- and post-training surveys to be included in the study. All caretakers in this study were part of a larger 2017 training study.^{8,12} Caretaker participation for all farm systems was voluntary and caretakers were free to take part in the program as much or as little as they wished and could end training at any time. Eighty-two of 84 participating caretakers from 8 different farms with mixed production stages/classes of pigs finished the required training modules and the pre- and post-training surveys.

Instrument selection

The survey instrument was based on a previously developed framework by Rault and colleagues¹³ who used 2 assembled focus groups of 13 swine caretakers and 12 farm supervisors to discuss timely euthanasia opinions, problems, and experiences. A subsequent questionnaire was sent to 120 caretakers from 10 commercial swine herds of varying sizes (50 to 4754 sows). The questionnaire was carefully designed to properly assess caretaker attitudes towards euthanasia, factors related to decision making, such as inadequate knowledge, knowledge seeking, and confidence by self-assessment, and to obtain various caretaker demographics. The outcomes of these survey studies are important to reveal local caretaker attitudes, experience with euthanasia, and confidence levels performing euthanasia. Knowledge regarding the local

caretaker population may help with the development of euthanasia training practices and improve the quality of euthanasia practices. Thus, using the initial work of Rault and colleagues¹³ as a foundation, the authors developed a pre- and post-training survey in collaboration with an internationally renowned swine expert with extensive experience of caretaker training and survey study development. The 7 key statements specifically targeted and analyzed for this study were selected by the authors in consultation with the swine expert as important indicators of caretakers' perceived knowledge of, and attitudes about, euthanasia practices. The 7 statements were:

1. I can determine when a pig needs to be euthanized.
2. I understand how to make good euthanasia decisions.
3. I can evaluate sick or injured pigs to decide if euthanasia is needed.
4. I am not aware of euthanasia guidelines in the Common Swine Industry Audit.
5. I know that pigs with certain conditions must be euthanized immediately.
6. I am confident I can make good euthanasia decisions when needed.
7. I am aware of the importance of timely euthanasia.

The training program did not save individual caretakers' performance scores or navigation history throughout the training modules (eg, number of incorrect choices, number of attempts, or time to completion) as anonymity, confidentiality, and flexibility were key components to ensure participation. This also enabled the training program to be completely functional on a standard USB flash drive without the complications of securely storing data for individuals offline or through internet-based databases or cloud services.¹² Additionally, this training platform served as a case study of how computer-based interactive training could be implemented for training swine caretakers on-farm without any requirements for computer hardware, software, or internet access.

Data collection

Immediately prior to participating in the interactive euthanasia training program caretakers signed a consent form and completed a survey containing questions about age, gender, work experience, herd size, previous euthanasia experience, and main work area or production type. Additionally, caretakers responded to 7 key

statements regarding their confidence and knowledge in relation to timely euthanasia as previously described.

These key statements established a baseline for individuals prior to the training session, allowing for comparison of the responses to the same questions post training. The questions were answered on a 5-point scale: 1) strongly disagree, 2) disagree, 3) neither agree nor disagree, 4) agree, or 5) strongly agree. The post-training survey was taken approximately one hour after the completed training program session.

Training program

The training program was interactive using computer-based multimedia software designed to function on any laptop or workstation with or without internet access (Figure 1).¹² The use of an interactive computer-based software enabled the caretakers to interact with a series of case studies across 3 swine production stages: breeding stock, piglets, and wean to grow-finish pigs. Each production stage contained 5 different case studies based on 5 specific criteria defined in the Common Swine Industry Audit (CSIA) and each case study provided information about treatment history, clinical signs, and the severity of the particular condition of the pig.^{12,14} Feedback was provided after each decision to ensure that caretakers understood the appropriateness of their decisions based on industry guidelines; alternative treatment

options were also included, if available, for a particular case study. Case studies were designed to allow for different levels of caretaker engagement; they included multiple-choice questions and scenarios where an active choice had to be made by caretakers to move forward through the program (Figure 2). The estimated time to complete all case studies for all production stages was 30 to 45 minutes. Each case study provided caretakers with a digital certificate of completion to confirm caretakers completed the case study correctly.

Statistical analysis

Basic descriptive analyses were conducted using descriptive plots and statistics (mean, SD, and range). Data were initially checked for recording errors and missing data. Statement or demographic answers left blank by caretakers were considered missing (pre-training statement 3 and 5; $n = 1$) and excluded from analyses using those parameters. To analyze effects of training sessions on caretaker knowledge, pre- and post-training survey answers were compared for each of the 7 statements (Table 1) using the Wilcoxon signed rank test. The effect of predictors of interest including caretaker age, gender, work experience, farm herd size, and farm production type were tested on score improvement (yes or no) for each statement using mixed effect logistic regression models. All analyses were conducted using Stata/IC 14.1 (StataCorp LP). Model-building steps

included first checking for linearity between continuous variables and the log odds of the outcome. Because the linearity assumption was not met for predictors of interest, age was divided into 2 categories (< 30 years [$n = 44$] and ≥ 30 years [$n = 38$]); pig experience was divided into 2 categories (< 2 years [$n = 41$] and ≥ 2 years [$n = 41$]); and farm size (number of pigs) was divided up into 3 categories (≤ 1500 [$n = 3$], 1501-3000 [$n = 3$], and > 3000 [$n = 2$]). A mixed effect logistic regression model was built for each statement using farm as a random effect to account for clustering of caretakers within farms. A final statistical significance was declared at $P < .05$ and tendency at $.05 < P < .10$.

Results

Of the 84 caretakers completing all training modules in the study, 2 caretakers failed to complete the post-training survey, resulting in a 97.6% response rate. The median age of the remaining 82 caretakers was 29 years (range, 18-59 years; first quartile = 24 years; third quartile = 42 years); 44 (53.7%) were 29 years or younger and 38 (46.3%) were older than 30. Of the remaining 82 caretakers, 71 (86.6%) self-identified as male and 11 (13.4%) as female. The mean work experience with pigs was 8.5 years (median = 2.25 years; range, 2 weeks to 52 years) with 41 (50.0%) caretakers having less than 2 years of work experience. Thirty-four (41.5%) caretakers primarily worked in

Figure 1: Screen capture from the timely euthanasia training application showcasing A) the starting page and B) the option menu to choose case studies for breeding stock, piglets, or wean to grow-finish pigs. This feature enables caretakers to learn about their production system but also to get additional useful information of other parts of the production system.

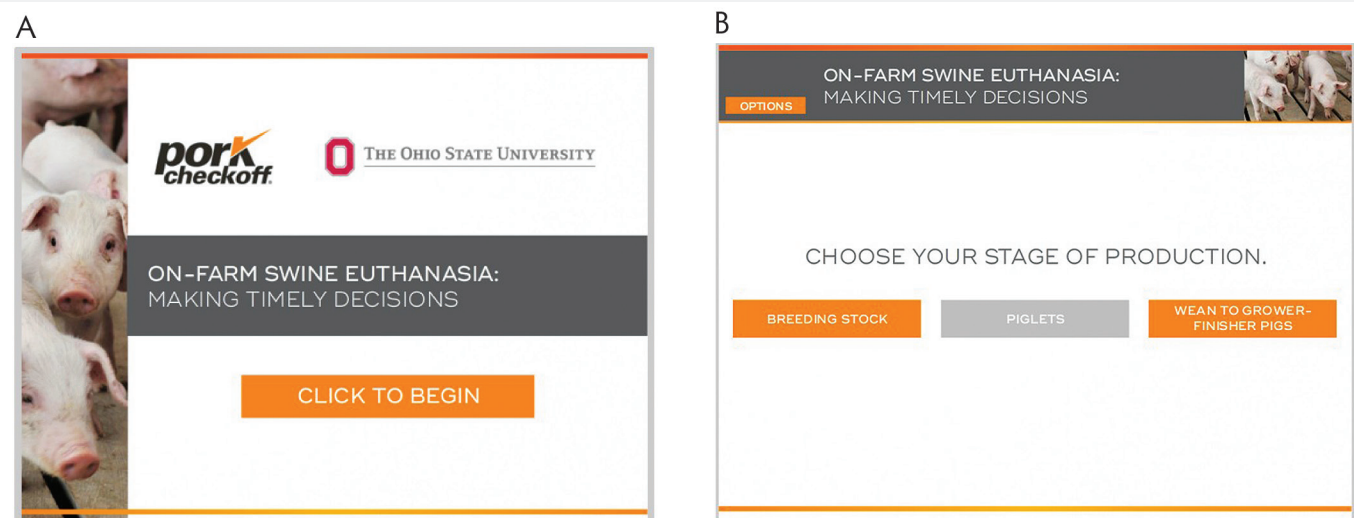


Figure 2: Screen capture from the timely euthanasia training application showcasing A) a multiple choice question for a piglet case study and B) the correct answer screen after choosing one or more correct answers.

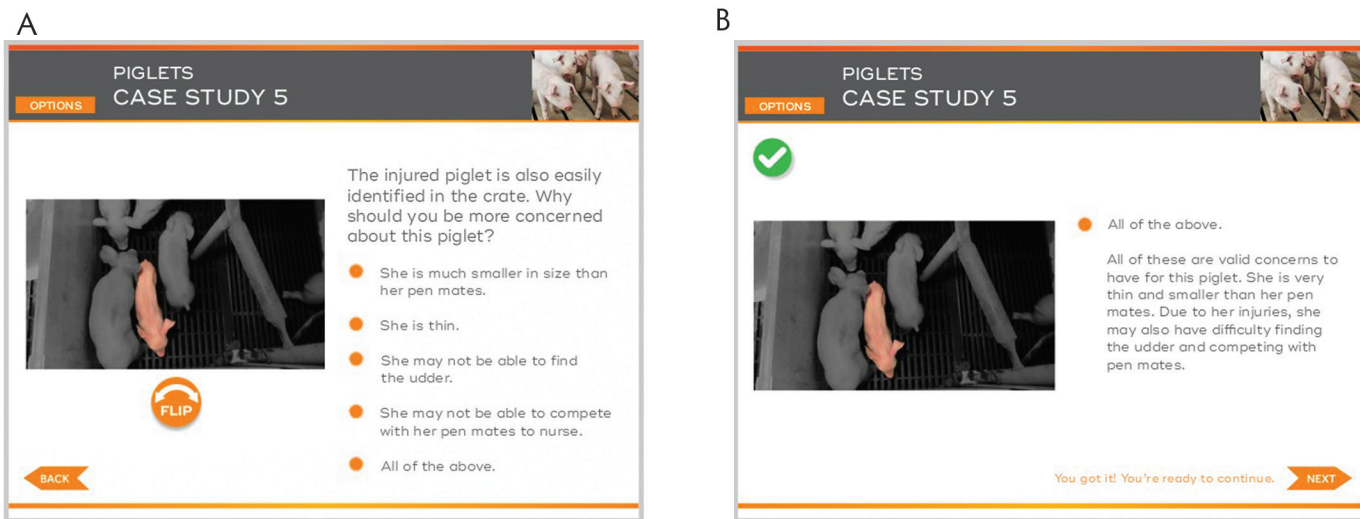


Table 1: Five conditions requiring immediate euthanasia based on the Common Swine Industry Audit standards

1.	Pigs which have shown no response after two days of intensive care or which have no prospect for improvement unless otherwise recommended by a veterinarian
2.	Severely injured or non-ambulatory* pigs with the inability to recover
3.	Any non-ambulatory* pig with a body condition score of 1
4.	Pigs with hernias that are perforated or hernias that touch the ground while the pig is standing, impede movement, and are ulcerated
5.	Pigs with uterine prolapses or any untreated necrotic prolapses

* The 2015 Common Swine Industry Audit defined a non-ambulatory animal as one which cannot rise, or which can stand with support but cannot bear weight on two or more legs.¹⁴

farrowing, 27 (32.9%) in breeding/dry sow, and 21 (25.6%) in weaner/nursery. The mean size of farm on which survey caretakers worked was 3100 pigs with a range from 1300 to 7000 head. The number of participants that cared for > 100 pigs on a daily basis was 7 (8.5%), while 19 (23.2%) participants cared for 100 to 500 pigs, 5 (6.1%) cared for 501 to 1000 pigs, 18 (22.0%) cared for 1001 to 2500 pigs, 31 (37.8%) cared for > 2500 pigs, and 2 participants did not answer (2.4%). Twenty-seven (32.9%) caretakers reported previous experience with euthanasia before starting to work with pigs, while 41 (50.0%) caretakers had their first euthanasia experience when they started working with pigs and 14 (17.1%) had not euthanized any animal to date. Of the caretakers that did not report any euthanasia experience, 3 caretakers had 3, 5, and 10 years of

experience working with pigs, respectively, while the remaining 11 caretakers had a mean work experience with pigs of 5 weeks.

Wilcoxon signed rank test

The Wilcoxon signed rank test revealed a decrease in agreement score for statement 4 (I am not aware of euthanasia guidelines in the Common Swine Industry Audit; $P = .007$; Table 2) indicating that caretakers reported increased knowledge of these guidelines after the training session. No other statistically significant differences were found for caretakers' perceived knowledge for all other statements (Table 2).

Mixed effect logistic regression

For statement 1 (I can determine when a pig needs to be euthanized), the mixed effect

logistic regression models revealed the odds (reported as odds ratio) of younger caretakers improving their agreement score tended to be higher compared to older caretakers (0.28; 95% CI, 0.06-1.27; $P = .099$; Table 3). Similarly for statement 3 (I can evaluate sick or injured pigs to decide if euthanasia is needed), the odds of younger caretakers improving their score tended to be higher compared to older caretakers (0.3; 95% CI, 0.07-1.19; $P = .087$; Table 3). No other statistically significant predictors were found for models about statements 2 and 4 through 7. ($P > .10$; Table 3).

Discussion

The results of this survey reveal participation in the training program increased caretakers' self-report of improved knowledge of the

Table 2: Wilcoxon signed rank test and descriptive values for pre- and post-training survey scores

Statement	Pre-training survey score		Post-training survey score		Num Diff	Min*	Max*	No. of respondents	P
	Median	IQR	Median	IQR					
1) I can determine when a pig needs to be euthanized	4	1	4	1	0.04	2	5	82	.97
2) I understand how to make good euthanasia decisions	4	1	4	1	0.08	2	5	82	.44
3) I can evaluate sick or injured pigs to decide if euthanasia is needed	4	1	4	1	0.07	1	5	81	.99
4) I am not aware of euthanasia guidelines in the Common Swine Industry Audit [†]	2	2	2	1	-0.39	1	5	82	.007
5) I know that pigs with certain conditions must be euthanized immediately	5	1	4.5	1	-0.06	2	5	81	.16
6) I am confident I can make good euthanasia decisions when needed	4	1	4	1	0.08	1	5	82	.27
7) I am aware of the importance of timely euthanasia	5	1	5	1	-0.10	1	5	82	.16

* Minimum and maximum values represent the lowest and highest score given for each statement in either the pre- or post-training survey.

[†] Due to negation in statement, a lower score is better.

IQR = interquartile range; Num Diff = numerical difference.

CSIA timely euthanasia guidelines.¹⁴ In addition, younger caretakers were more likely to report having learned how to determine when a pig needs to be euthanized after participating in this computer-based interactive training program compared to older caretakers.

Developing training materials capable of educating all levels of employees is important to ensure a high standard of on-farm animal welfare. For instance, previous research found swine caretakers retained information better if training was conducted using a computer program compared to traditional textbook learning.¹⁵ Interactive training programs and computer-based learning games have shown to increase learning and understanding of material by helping trainees or caretakers focus and participate in the learning activity.¹⁶⁻¹⁸ Although improvement was seen for all caretakers for statement 4 (I am not aware of euthanasia guidelines in the Common Swine Industry Audit), no improvement was noted for the other statements. The overall rate of agreement was high for the perceived level of knowledge, decision-making, confidence, and awareness of timely euthanasia during

the pre-training survey, making a significant increase in agreement difficult to achieve post training. It was hypothesized that experienced caretakers were already knowledgeable and had dealt with most of these case study examples previously and therefore did not gain knowledge from the training program.¹⁹ Overall, caretakers in this study scored high in agreement for all statements prior to training except the one about CSIA, suggesting caretakers perceived themselves knowledgeable and experienced in dealing with euthanasia but not with official CSIA guidelines. The fact that younger, and possibly more inexperienced, caretakers tended to be more likely to improve their scoring for statements 1 (I can determine when a pig needs to be euthanized) and 3 (I can evaluate sick or injured pigs to decide if euthanasia is needed) compared to older caretakers could be explained by lack of experience. However, it is possible younger caretakers may be more familiar and comfortable with computer-based training compared to older colleagues and therefore felt more engaged and able to learn from a relatively short (30 to 45 minutes) multimedia-based training session. Furthermore, 50% of caretakers had less than

2 years of work experience which may not be enough time to receive proper on-farm training, first-hand experience, confidence, or the opportunity or trust to act upon a multitude of scenarios including euthanizing compromised pigs. Work experience did not influence any training statements in this study, highlighting the challenges in how to reach caretakers of all ages and experience levels. Moreover, farm size, gender, and farm production type did not have a significant effect on responses to training statements suggesting other factors such as individual motivation to learn, ability to process and apply training material, or attitude towards participating in training programs may play a larger part in caretaker training. Results from our study suggest future training programs should be refined to account for entry-level caretakers with little to no experience and more senior experienced caretakers. The flexibility inherent when using computer-based training allows for training programs or individual modules to be updated or customized to facilitate and accommodate training based on varying caretaker background factors such as education level or linguistic skills. However, improving the degree of caretaker comfort in

Table 3: A univariable regression model analysis between improvements on scores and predictors of interest for each of the 7 survey statements

Statement	Two-level variables*								
	Age			Work experience			Gender		
	OR	95% CI	P	OR	95% CI	P	OR	95% CI	P
1) I can determine when a pig needs to be euthanized	0.28	0.06-1.27	.099	0.38	0.11-1.36	.14	0.48	0.06-4.14	.51
2) I understand how to make good euthanasia decisions	0.29	0.06-1.33	.11	0.99	0.28-3.45	.98	0.53	0.06-4.67	.57
3) I can evaluate sick or injured pigs to decide if euthanasia is needed	0.3	0.07-1.19	.087	0.53	0.15-1.95	.34	1.18	0.22-6.33	.85
4) I am not aware of euthanasia guidelines in the Common Swine Industry Audit	0.74	0.29-1.88	.53	0.71	0.28-1.81	.48	2.8	0.77-10.2	.12
5) I know that pigs with certain conditions must be euthanized immediately	0.88	0.18-4.29	.87	0.35	0.06-2.11	.25	NA [†]	NA [†]	NA [†]
6) I am confident I can make good euthanasia decisions when needed	0.75	0.20-2.81	.67	0.64	0.18-2.28	.49	0.44	0.05-3.86	.46
7) I am aware of the importance of timely euthanasia	0.51	0.08-3.25	.48	0.51	0.09-3.28	.47	4.00	0.56-28.45	.17

Statement	Three-level variables*								
	Farm size, No. of pigs	OR	95% CI	P	Production type	OR	95% CI	P	
1) I can determine when a pig needs to be euthanized	0-1500	1	-	-	Farrowing	1	-	-	
	1501-3000	1.6	0.29-8.86	.59	Breeding	0.81	0.21-3.23	.77	
	> 3000	1.74	0.30-10.1	.54	Wean-to-finish	0.78	0.17-3.51	.74	
2) I understand how to make good euthanasia decisions	0-1500	1	-	-	Farrowing	1	-	-	
	1501-3000	0.56	0.13-2.43	.44	Breeding	2.19	0.40-12.10	.37	
	> 3000	0.42	0.08-2.15	.30	Wean-to-finish	1.40	0.25-7.80	.70	
3) I can evaluate sick or injured pigs to decide if euthanasia is needed	0-1500	1	-	-	Farrowing	1	-	-	
	1501-3000	0.56	0.13-2.43	.44	Breeding	1.71	0.44-6.68	.44	
	> 3000	0.58	0.13-2.71	.49	Wean-to-finish	0.62	0.11-3.59	.59	
4) I am not aware of euthanasia guidelines in the Common Swine Industry Audit	0-1500	1	-	-	Farrowing	1	-	-	
	1501-3000	1.15	0.31-4.20	.83	Breeding	0.48	0.14-2.65	.25	
	> 3000	1.7	0.40-7.23	.47	Wean-to-finish	1.52	0.46-5.05	.49	
5) I know that pigs with certain conditions must be euthanized immediately	0-1500	1	-	-	Farrowing	1	-	-	
	1501-3000	NA [†]	NA [†]	NA [†]	Breeding	2.78	0.46-16-65	.26	
	> 3000	NA [†]	NA [†]	NA [†]	Wean-to-finish	0.77	0.06-10.15	.84	
6) I am confident I can make good euthanasia decisions when needed	0-1500	1	-	-	Farrowing	1	-	-	
	1501-3000	1.22	0.25-5.88	.81	Breeding	1.21	0.27-5.31	.80	
	> 3000	0.83	0.15-4.63	.83	Wean-to-finish	0.74	0.15-3.54	.70	
7) I am aware of the importance of timely euthanasia	0-1500	1	-	-	Farrowing	1	-	-	
	1501-3000	0.23	0.02-2.7	.24	Breeding	NA [†]	NA [†]	NA [†]	
	> 3000	0.96	0.14-6.39	.97	Wean-to-finish	NA [†]	NA [†]	NA [†]	

* Reference categories were age (< 30 years and ≥ 30 years); work experience (< 2 years and ≥ 2 years); gender (male and female); farm size (≤1500 pigs, 1501-3000 pigs, and > 3000 pigs); and production type (farrowing, breeding, and wean-to-finish).

† Model did not converge.

OR = odds ratio; NA = not applicable.

performing euthanasia by computer training programs may require multiple training sessions, more in-depth structured learning modules, or sessions taught in parallel with hands-on training to ensure a high skill level in swine caretakers. Additionally, trained and confident caretakers will be more comfortable conducting complex decision making, such as qualitative euthanasia decisions about pigs with certain conditions or performing timely euthanasia, ensuring a high animal welfare standard on US swine farms. With continuous advancements in computer technology and increased availability of mobile platforms in mind, the use of interactive training may still be a promising way to both standardize and improve on-farm education to ensure well-educated, confident, and capable caretakers.

Strengths and limitations

The main strength of this study is its diverse participant demographics, which represent a wide range of ages, experience levels, and perceived skill levels regarding timely euthanasia, often found in the swine industry. Furthermore, the study highlights the challenge in providing effective training for a vast population of caretakers with different backgrounds, work assignments, experience, and skill levels. The authors acknowledge that this was a limited study with a short survey and a limited number of participants over a short period of time, which limits the data analysis and interpretation of caretakers' perceived and true knowledge. We also recognize that, because the survey was taken shortly after the training session, no time was allowed for transferring any new knowledge into practice, which would help with skill improvement. For these reasons, the authors acknowledge the main limitation of this study is the lack of validation of individuals' true performance on specific modules during training. Therefore, analyses for this project were focused on caretakers' perceptions of their knowledge change regardless of their training performance. Since caretakers only performed one training session, a test of knowledge retention was not conducted. Thus, these results should be interpreted carefully and not extrapolated to the entire swine industry, but rather be considered a focused timestamp of swine caretaker attitudes for a small part of the eastern corner of the Midwest. Finally, the postulated hypotheses could not be

confirmed by the results derived from the study. Overall, caretakers did not self-report an increased ability to detect compromised pigs, how to determine when to euthanize compromised pigs, or increased euthanasia skills post training. We suggest that the acknowledged limitations from this study should be incorporated into a more detailed expansion of the training software and training platform to investigate the long-term efficacy of the program.

Implications

Under the conditions of this study:

- Interactive modules may facilitate young or inexperienced caretaker training.
- Perceived knowledge should be accounted for in future training concepts.
- Caretaker demographics may dictate training stratification and success rate.

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Conflict of interest

None reported.

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