Impact of Messaging on Veterinarians' Willingness to Implement Means Safety Protocols

By

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Abstract

Veterinarians exhibit an increased risk for suicide compared to the general population, which appears to be partially attributable to their access to and knowledge about pentobarbital – the most common drug used for humane euthanasia. One way to reduce suicide risk for veterinarians is increasing means safety. Storing pentobarbital in an additional lockbox has been demonstrated to be an acceptable and feasible means safety protocol for veterinarians, but additional research is necessary to investigate the best way to advertise this protocol. The current study investigated how messaging influenced veterinarians' willingness to implement an extra lockbox and their acceptability ratings of the advertisement by randomizing 444 veterinarians to view one of four graphics across two messaging factors: preventing participants' own suicide versus preventing suicide among their coworkers, and DEA regulations versus empirical data supporting means safety protocols. For willingness, those randomized to the empirical data conditions exhibited a greater increase than those randomized to the DEA conditions. For acceptability, we found statistically significant main effects for both factors, such that those randomized to the coworker or empirical data conditions reported higher acceptability of messaging than those randomized to self or DEA conditions, respectively. Additionally, we tested three moderators (i.e. belief in means substitution; reported likelihood of the participant or a coworker attempting suicide) and found mixed evidence of their impact. Finally, we collected qualitative data from participants on their suggestions for the graphics. Overall, our study demonstrates that means safety advertisements for veterinarians should emphasize both empirical data and protecting coworkers.

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Veterinarians are at an elevated risk for suicide in comparison to the general population (Platt et al., 2010; Skipper & Williams, 2012; Tomasi et al., 2019; Witte et al., 2019). Specifically, veterinarians are between one and a half to three times as likely to die by suicide compared to the general population (Tomasi et al., 2019; Witte et al., 2019). Although there could be multiple risk factors at play that result in a higher suicide rate for veterinarians, one reason for this elevated risk may be due to their access to pentobarbital, which is a drug commonly used for humane euthanasia.

Self-poisoning is a more commonly utilized suicide method for veterinarians in comparison to the general population (Miller & Beaumont, 1995; Tomasi et al., 2019), and barbiturates are the category of substances most commonly used by veterinarians for suicide (Bartram & Baldwin, 2010; Blair & Hayes, 1982). Witte et al. (2019) were able to further narrow this category and illustrated that pentobarbital is the barbiturate most commonly utilized by veterinarians who die by self-poisoning. Witte et al. (2019) analyzed veterinarian suicides from 2003 through 2014 using the National Violent Death Reporting System (NVDRS). Pentobarbital accounted for over 25% of all suicides in the sample investigated by this study, and while the standardized mortality ratio (SMR) was elevated above the general population for veterinarians, this was no longer true after pentobarbital deaths were removed from the sample. Although it had been the subject of much speculation (Bartram & Baldwin, 2010; Fink-Miller & Nestler, 2018; Milner et al., 2015), this study provided the most concrete evidence to date that veterinarians' access to pentobarbital may account for their elevated suicide rate. Additionally, in veterinary students, more experience with companion animal euthanasia is associated with greater fearlessness about death, which is empirically associated with a higher risk of a suicide attempt

(Witte et al., 2013). Fearlessness about death is a risk factor for suicide derived from the interpersonal-psychological theory of suicide (IPTS; Joiner, 2005; Van Orden et al., 2010). According to the IPTS, one must develop suicidal desire and capability in order to attempt suicide (Joiner, 2005; Van Orden et al., 2010). For someone to be capable of a lethal suicide attempt, one must have sufficient physical pain tolerance and fearlessness associated with death, both of which can be acquired through Painful and Provocative Experiences (PPE; Joiner, 2005; Van Orden et al., 2008, 2010). While there are many experiences which qualify as PPEs, such as getting piercings, playing contact sports, and shooting firearms (Bender et al., 2011), a unique PPE experienced by veterinarians is experience with euthanasia. Witte et al. (2013) was the first to establish a relationship between suicide risk factors as outlined by the IPTS and euthanasia experience.

Additional research has been completed by Houtsma et al. (2022) to expand on Witte et al.'s (2013) study by further investigating the relationship between euthanasia via pentobarbital and veterinarian capability for suicide. Houtsma et al. (2022) focused on the Three-Step Theory of suicide (3ST; Klonsky & May, 2015). As Klonsky and May (2015) describe, the 3ST hypothesizes that suicide ideation results from the combination of psychological pain and hopelessness. For those experiencing pain and hopelessness, the 3ST hypothesizes that feeling connected to others is a key factor protecting against suicide ideation becoming elevated to suicidal action. Lastly, the 3ST hypothesizes that the progression from suicide ideation to action is facilitated by dispositional, acquired, and practical capability for suicide. Under this theory, the first two types of capability mirror capability as described by the IPTS; dispositional capability is a biological predisposition for high physical pain tolerance and fearlessness about death, and acquired capability is the development of high physical pain tolerance and

fearlessness about death through exposure to PPES. An important additional factor outlined in the 3ST, however, is practical capability, or access to and comfort with lethal means. Houtsma et al. (2022) describe that, although fearlessness about death is related to euthanasia experience (Witte et al., 2013), it has not been shown to be significantly higher in veterinarians compared to the general population Glaesmer et al., 2021). Thus, it seems that euthanasia-related acquired capability may not entirely account for elevated suicide risk in veterinarians. Houtsma et al (2022) found that method of lethal medication storage in the workplace during business hours significantly moderated the relationship between past-week suicide ideation and reported likelihood of making a suicide attempt in the future such that easier access to lethal medications may significantly increase veterinarians' belief that they may attempt suicide in the future. The body of evidence showing a relationship between pentobarbital or pentobarbital use and suicide risk indicate that pentobarbital is an important focus for suicide prevention in veterinarians.

Additionally, research has shown that compared to the general population (Nett et al., 2015; Volk et al., 2018) and other veterinary professionals (Witte et al., 2019), veterinarians are less likely to have a history of non-lethal suicide attempts, although research has also shown that veterinarians are also significantly more likely to report suicide ideation (Nett et al., 2015; Volk et al., 2018) or planning a suicide attempt than the general population (Volk et al., 2020). This suggests that veterinarians may be more likely to die on their first attempt and emphasizes the importance of creating interventions for suicide in the veterinary population that are implementable prior to an initial suicide attempt. As reviewed by Nett et al. (2020) and Waitz-Kudla et al. (2023), means safety is one of the most promising possible methods of suicide intervention for the veterinary profession.

Means Safety

Means safety interventions involve creating barriers between suicidal individuals and lethal means to reduce the likelihood of suicide using the targeted lethal means (Anestis et al., 2017; Hawton, 2007; Jin et al., 2016; Leenaars et al., 2000; Mann et al., 2005). A review of existing literature by Hawton (2007) suggests that means safety is an effective way to prevent suicide when someone is acutely suicidal, and other research suggests that it is effective when targeting means that are especially lethal or commonly used (Anestis et al., 2017; Jin et al., 2016; Leenaars et al., 2000; Mann et al., 2005). Unlike other suicide interventions, Anestis et al. (2017) argue that means safety shows increased effectiveness by addressing capability for suicide. Additionally, unlike other suicide prevention tactics, which are enacted on an individual level, means safety is an intervention that may be most effective at a population level, allowing for suicide prevention on a wider scale (Anestis et al., 2017).

One common critique of means safety is the risk of means substitution, or that individuals will attempt suicide utilizing an alternate method if thwarted from their method of choice (Daigle, 2005). To the contrary, research has shown that means substitution does not occur when means safety measures are taken, as evidenced by the overall suicide rate decreasing in these studies, rather than only the suicide rate for the targeted lethal means (Anestis & Anestis, 2015; Leenaars et al., 2000; Nordentoft, 2007; Yip et al., 2010). Additionally, even if means substitution does occur, any substituted lethal means are less likely to be lethal when means safety interventions are put into place for the most lethal and common methods of suicide (Jin et al., 2016; Pirkis et al., 2015) Despite the evidence that means substitution is unlikely, individuals' belief in means substitution may influence their likelihood of supporting means safety interventions. Although federal law contains guidelines for the storage of controlled

substances, the variation in storage practices illustrated in research suggests that the storage of controlled substances is ultimately decided by practice owners or individual veterinarians (Houtsma et al., 2022; Waitz-Kudla et al., 2023). Thus, if veterinarians believe that means safety interventions will not be effective, whether due to belief in means substitution or due to the messaging associated with means safety, they may be less willing to implement means safety protocols.

Although relative to other means there has been less research on means safety interventions for medications, Nordentoft's (2007) review of the literature found support for means safety interventions for drugs used in suicide attempts. Specifically, this review described that doctors will prescribe medications less often as they become more prevalent in suicide attempts. This results in individuals being unable to acquire large amounts of potentially lethal medication at any given time, making it more difficult to use those medications for suicide. Importantly, as medications were prescribed less often, thus creating a barrier to accessing these medications, Nordentoft noted that the self-poisoning and overall suicide rates decreased in the reviewed studies.

Another foundational study that showed the effectiveness of means safety was conducted in Hong Kong (Yip et al., 2010). In Hong Kong, as noted by Yip et al (2010), a commonly used method for suicide is carbon monoxide poisoning via burning charcoal. Yip et al. (2010) conducted a study in which they investigated how means safety measures impacted suicide via charcoal burning in two districts. In one district, the guidelines for purchasing charcoal were unchanged and charcoal was able to be purchased off store shelves. In the second district, guidelines were changed such that customers needed to ask cashiers to purchase charcoal. This study found that this modest barrier to purchasing charcoal resulted in a significantly lower

suicide rate utilizing charcoal. Similar to what was suggested by Nodentoft (2007)'s review, the overall suicide rate in this study also decreased, indicating that means substitution did not occur such that it offset the effect of the means safety intervention.

There is also a strong foundation for means safety within firearm research. Firearms result in more suicide deaths than any other lethal means in the United States because of their lethality (Butterworth et al., 2018; Elnour & Harrison, 2008; Houtsma et al., 2018; Shenassa et al., 2003). Laws reducing access to firearms are associated with reduced firearm and overall suicide rates (Anestis & Anestis, 2015; Leenaars et al., 2000). While some of these laws do strictly limit firearm access (e.g., firearm restrictions outside of the United States tend to put strict limitations on firearm ownership), laws typically enacted in the United States increase the time and effort necessary to either purchase firearms or access firearms in specific situations through waiting periods, universal background checks, restriction of open carrying of handguns, or requiring gun locks in certain situations also relate to lower rates of firearm suicide. Anestis and Anestis (2015) additionally examined how states implementing or repealing laws restricting firearm access historically impacted suicide rates. States that implemented firearm legislation related to means safety saw a decreased suicide rate in following years, while the suicide rate increased in one state where a law requiring a waiting period for purchasing firearms was repealed. These findings along with Yip et al. (2010) and Nordentoft (2007) suggest that means safety can be effective in reducing suicide rates with commonly used and highly lethal means as well as overall suicide rates.

Given pentobarbital's high degree of lethality and the fact that pentobarbital is the most common substance used by veterinarians whose suicide is due to overdose, pentobarbital would be a good target for means safety intervention (Nett et al., 2020; Tomasi et al., 2019; Witte et al.,

2019). Veterinarians are also specifically trained in how to use pentobarbital expressly for the purpose of enacting death and have more autonomy regarding the use and storage of controlled substances than other medical professionals (Bartram & Baldwin, 2010). Although federal law requires that controlled substances be stored in a "securely locked, substantially constructed cabinet," (Drug Enforcement Administration, 2023), the law is not clear regarding how this is defined. Research in this area illustrates that a large proportion of veterinarians keep the cabinet in which controlled substances are stored unlocked during business hours (Houtsma et al., 2022, Waitz-Kudla et al., 2023), and that a minority of veterinarians leave controlled substances in an unlocked location all the time (Waitz-Kudla et al., 2023). This suggests that veterinarians would have easy and quick access to pentobarbital during a suicidal crisis, which could be reduced through the implementation of means safety protocols. This also further emphasizes the potential importance of means safety protocols. Individuals are generally poor at predicting future emotions (affective forecasting; Loewenstein, 2007), and they are particularly poor at forecasting their future emotions or mood in response to specific events (Doré et al., 2016; Kaplan et al., 2016; Levine et al., 2012, 2013). Thus, although veterinarians may not anticipate feeling suicidal in the future, implementing means safety protocols may be more important than they currently believe. However, it is critically important to discuss means safety in a meaningful and impactful way to make suicide prevention through means safety more salient and important to veterinarians.

Messaging

Language and messaging can influence the way individuals interpret presented information (Bauer & Capron, 2020; Haasz et al., 2022; Stanley et al., 2017, 2020). Specifically, messaging can result in information being interpreted as more acceptable to a specific group of

people. Stanley et al. (2017) investigated how describing interventions as *means safety* rather than the historically utilized term of *means restriction* influenced the acceptability of means safety recommendations in a sample of firearm owners. Participants were randomized to read a vignette describing a clinical scenario in which firearm ownership and access was discussed using either the term *means safety* or *means restriction*. They found that participants rated the term *means safety* as significantly more preferable and acceptable, and that participants randomized to the *means safety* condition had greater intentions to adhere to means safety recommendations than participants randomized to the *means restriction* condition. This study illustrates the importance of messaging in increasing the acceptability of means safety interventions, as well as the influence of messaging on willingness to implement recommendations.

Another study by Stanley et al. (2020) investigated participants' willingness to adhere to clinician recommendations regarding means safety for firearms. In this study, participants all reported at least a lifetime history of suicide ideation and familiarity with firearms. This study utilized two levels of two different factors related to messaging and collected data at pre-test, post-test, and one-month follow-up. The first factor was high fear versus low fear. High fear involved including fear appeals (i.e., gruesome content related to danger associated with firearms) while low fear consisted of normalizing firearm ownership and not highlighting the lethality of firearms. The second factor was high temporariness versus low temporariness. High temporariness highlighted the temporariness associated with means safety during times of crisis (i.e., means safety protocols would only be implemented during the crisis and then could be reduced) while low temporariness did not explicitly focus on temporariness of means safety protocols. Although the authors only found a main effect of the temporariness factor and not the

fear factor, they also found that the low fear / high temporariness resulted in significantly higher reported intention to follow clinician recommendations at one-month follow-up than any other combination of factor levels. They speculated this interaction may be because this messaging was most aligned with firearm owners' beliefs about firearm ownership. However, this study also found that all conditions showed similar increases in intention to encourage a loved one to adhere to clinician recommendations related to means safety and actual increase in engagement in means safety thoughts and behaviors related to firearms from preintervention to one-month follow-up. Additionally, all four versions of messaging were rated as similarly acceptable. This study illustrates that messaging may be important for individuals to show willingness to implement means safety protocols; however, information about means safety recommendations can also increase safety behaviors more generally.

These studies provide a foundation for investigating how different ways of describing means safety protocols may affect veterinarians' willingness to implement protocols in their workplace. Similar to firearm owners, veterinary practice owners have some autonomy over the degree to which they comply with legal requirements for storage of controlled substances. Thus, it is especially important for them to be intrinsically motivated to implement means safety protocols.

Means Safety and Messaging for Veterinarians

Regarding means safety for veterinarians, although means safety has been identified as a suicide prevention strategy that should be studied in veterinarians (Nett et al., 2020; Witte et al., 2019), relatively little research has been done in this area. However, a recent mixed methods study by our research group (Waitz-Kudla et al., 2023) illustrates key points regarding how veterinarians perceive means safety, as well as what kind of means safety protocol would be

acceptable to veterinarians and feasible to implement in veterinary practices. We conducted ten focus groups with veterinarians to discuss means safety and suicide risk, with the goal of identifying means safety protocols that would be acceptable and feasible for this population. A variety of means safety protocols were discussed, such as utilizing automated drug storage containers (e.g., CUBEX) and needing two people to access pentobarbital. However, these means safety protocols emerged as not feasible for the majority of veterinarians. Specifically, participants noted that automated drug storage containers are often too expensive to afford, too large for the available physical space, and that two people are not always available to assist with opening pentobarbital storage containers in emergency situations. We found that adding an extra lock or lockbox specifically for pentobarbital in addition to existing storage methods for controlled substances was perceived as the most acceptable and feasible to implement protocol across veterinary specialties (large animal, mixed animal, small animal, and other), with nearly half of all participants (48.8%) reporting that they would implement this mean safety protocol at post-test. Additionally, we found that participants' general willingness to implement additional means safety protocols for pentobarbital (i.e., *How willing would you be to use additional locking mechanisms [e.g., combination lock] for pentobarbital in your workplace?*) significantly increased after participating in the focus group. This suggests that, similar to what was found by Stanley et al. (2020), discussing means safety as a suicide prevention method increased willingness to implement means safety protocols.

However, the next step in developing means safety protocols for veterinarians is to investigate how to best present this protocol so veterinarians are likely to implement it in their practice. Relevant to this aim, Waitz-Kudla et al. (2023) found that, veterinarians reported preventing another person's suicide attempt (e.g., coworkers) as a more important motivator for

changing storage protocols than preventing their own suicide attempt. Additionally, the focus group facilitator observed that, during focus group discussion, veterinarians were particularly receptive to empirical evidence for means safety's effectiveness. Specifically, during focus groups, a number of veterinarians demonstrated skepticism about means safety practices as effective in preventing suicide, but voiced willingness to implement means safety practices after they were presented with empirical data illustrating means safety's effectiveness (Waitz-Kudla et al., 2023). Both of these points may be important when attempting to increase veterinarians' willingness to implement such protocols.

The decision for how to adhere to DEA guidelines is ultimately made by practice owners and individual veterinarians. Thus, willingness to implement protocols is vital to ensure that safety protocols are regularly and routinely utilized in practice. Additionally, messaging will be important to facilitate means safety protocol implementation on an organizational level (e.g., implemented by hospitals, corporations, veterinary medical colleges) in that organizations may be more likely to implement means safety protocols if they know they are acceptable to their employees. Under the CDC National Institute for Occupational Safety and Health's (NIOSH) hierarchy of controls for limiting exposure to occupational hazards (CDC, 2023), redesign controls are the highest type of control on the hierarchy that would be feasible for the storage of pentobarbital in veterinary practice, This type of control involves redesigning the workplace environment on an organizational level for safety, health, and well-being. Investigating effective messaging for means safety protocols may provide incentive for organizations to implement change.

Elaboration Likelihood Model and Decision Making. Further support for testing the best messaging strategies for means safety protocols in the veterinary population lies in previous

research regarding decision making and persuasion. Veterinarians may not see implementing means safety protocols as necessary if they do not anticipate themselves or their coworkers feeling suicidal. Waitz-Kudla et al. (2023) observed that, while veterinarians tended to see suicide prevention as important, workplace stressors and veterinarians' mental health and well-being were more salient in relation to suicide risk. Because of this, implementing means safety protocols was not initially perceived as an effective decision to prevent suicide. However, the focus group facilitator's observation that empirical data in support of means safety protocols enhanced willingness to discuss this topic is consistent with the Elaboration Likelihood Model (ELM; El Hedhli & Zourig, 2022; Petty & Cacioppo, 1984). This model from Petty & Cacioppo (1984) proposes that a variety of individual and situational factors determine how a person makes decisions based on messaging. If elaboration likelihood is high, a person is motivated and able to engage in thinking about the issue presented. If elaboration likelihood is low, a person more often relies on source factors (i.e., the cited source of information, such as news sources, research manuscripts, etc.) when deciding how to perceive and respond to a message. Motivation to engage with an issue can also be influenced by how relevant it is to an individual's situation. In Waitz-Kudla et al. (2023), when first discussing suicide risk, mental health difficulties were more salient to veterinarian participants during focus group discussion. However, once the focus group facilitator discussed empirical data supporting means safety, participants expressed more willingness to utilize means safety protocols. Because mental health difficulties such as burnout may be more salient than means safety, veterinarians may initially experience low motivation to discuss means safety as a way to prevent suicide and may rely more heavily on source factors (e.g., empirical data supporting means safety's effectiveness) when deciding whether or not means safety protocols are meaningful to implement. This suggests that, when discussing means

safety with veterinarians, source factors (i.e. empirical data) may be especially important to increase willingness to implement means safety protocols.

Additionally, as described in Waitz-Kudla et al. (2023), veterinarians must make a cost-benefit analysis regarding the benefit of implementing any means safety protocol versus the risk that it may increase animal suffering. In the firearm means safety literature, individuals' willingness to implement means safety interventions is influenced by the salience of suicide risk (Butterworth et al., 2020). Within the veterinary population, although it is well-documented that veterinarians are at a higher risk for suicide than the general population (Platt et al., 2010; Skipper & Williams, 2012; Tomasi et al., 2019; Witte et al., 2019), veterinarians' experience with performing euthanasia with pentobarbital may make animal suffering a more salient consideration for pentobarbital storage. Thus, increasing the salience of means safety as a suicide prevention tool may make it more appealing to veterinarians.

Present Study

The current study investigated how messaging impacted veterinarians' willingness to implement means safety protocols and their reported acceptability of messaging regarding protocols. Specifically, we assessed the impact of two different components of messaging regarding adding an extra lockbox for pentobarbital in public service announcement (PSA) style graphics (see Appendix). We used a 2x2 factorial design, with the first factor being DEA regulations versus empirical data supporting means safety protocols, and the second factor being preventing participants' own suicide versus preventing suicide risk among their coworkers. These two factors were organized into four conditions to which participants were randomly assigned: 1) participant's own suicide risk and DEA regulations; 2) coworkers' suicide risk and

DEA regulations; 3) participant's own suicide risk and empirical data; and 4) coworkers' suicide risk and empirical data.

This study had four aims. Aim 1 of the study was to investigate whether, from pre- to post-test, individuals reported a greater increase in willingness to implement an extra lockbox for pentobarbital if PSA graphics prioritized coworkers' suicide risk versus the participant's own suicide risk, and if they were presented with empirical data supporting means safety versus DEA regulations. Aim 2 of the study was to investigate what messaging, own suicide risk versus coworkers' suicide risk and DEA regulations versus empirical data, was rated as most acceptable by veterinarians. Aim 3 was to investigate whether the effect of messaging on veterinarians' willingness to implement an extra lockbox and acceptability of messaging was moderated by the degree to which veterinarians agree with a statement relating to means substitution (i.e. to what extent do you agree with the statement *If someone wants to die by suicide and you prevent them from using a specific method, they will simply find another way to die*), as well as their reported likelihood that they or their coworkers will attempt suicide in the future (i.e. How likely is it that you/one of your coworkers will attempt suicide someday?). Aim 4 was to qualitatively analyze how graphics can be improved upon to be more impactful to veterinarians.

The hypotheses for this study were pre-registered on Open Science Framework (https://osf.io/dpkve/?view_only=10b231e64eb94486800ed064897276b0). Based on the findings of Waitz-Kudla et al. (2023), we hypothesized for Aim 1 that there would be main effects of each factor such that participants presented with information about reducing their coworkers' suicide risk would report a greater increase in willingness to implement an extra lockbox for pentobarbital than those presented with information about reducing their own suicide risk, and participants presented with empirical data would report higher willingness to implement

an extra lockbox for pentobarbital than those presented with DEA regulations (H1). We also hypothesized that there would be an interaction effect such that participants randomized to the coworkers' suicide risk and empirical data condition would exhibit a greater increase in willingness to implement an extra lockbox for pentobarbital from pre- to post-test than those randomized to the other three conditions (H2).

For Aim 2, we hypothesized that there would be main effects of each factor on acceptability ratings, with participants presented with information about reducing coworkers' suicide risk and empirical data reporting higher acceptability of messaging than those presented with information about reducing their own suicide risk and DEA regulations, respectively (H3). We also hypothesized that we would observe an interaction for acceptability consistent with the interaction anticipated for willingness, in that participants randomized to the coworkers' suicide risk and empirical data condition would report higher acceptability of messaging than those randomized to the other three conditions (H4).

For Aim 3, we hypothesized that the effect of messaging regarding participants' willingness to implement an extra lockbox and acceptability of messaging would be moderated by participants' belief in means substitution as illustrated by their response to the question "on a 5-point scale, to what extent do you agree with the statement *If someone wants to die by suicide and you prevent them from using a specific method, they will simply find another way to die*." Specifically, we hypothesized that participants who reported weaker belief in means substitution would exhibit enhanced effects of the factors compared to those with stronger belief in means substitution (i.e. this variable would interact with both factors such that those with the weakest belief in means substitution randomized to the coworkers' suicide risk and empirical data

conditions would have the greatest increase in willingness to implement an extra lockbox for pentobarbital and highest reported acceptability of messaging; H5).

We also hypothesized that the effect of messaging on participants' willingness to implement an extra lockbox and acceptability of messaging would be moderated by their reported likelihood that they or their coworkers will attempt suicide in the future as illustrated by their responses to the questions "*How likely is it that you/one of your coworkers will attempt suicide someday?"* Regarding both participants' own and coworkers' reported likelihood of a suicide attempt, we hypothesized that participants who reported a higher likelihood of a suicide attempt would exhibit enhanced effects of the factors compared to those who reported a lower likelihood of a suicide attempt (i.e. this variable would interact with both factors such that those with the highest likelihood of attempt randomized to the coworkers' suicide risk and empirical data conditions would have the greatest increase in willingness to implement an extra lockbox for pentobarbital and highest reported acceptability of messaging; H6).

For Aim 4, participants were asked at post-test "What, if anything, would make this graphic more helpful and impactful to you?" and were given an opportunity to provide written feedback on the graphic they observed. They were also asked "If this graphic were utilized, where and how do you see it being distributed in order to have maximum impact (e.g., displayed in practice buildings, above lockboxes, via social media, etc.)?". These responses were qualitatively analyzed to evaluate how the PSA graphics can be improved to be more acceptable to veterinarians and to inform dissemination efforts.

Methods

Participants

Our sample was composed of veterinarians at least 19 years of age, currently working in the United States, who utilize pentobarbital in their workplace. We had originally intended to recruit 252 participants based on a power analysis, with at least 33% (n = 84) of the sample consisting of men and at least 33% (n = 84) of the sample consisting of veterinarians with a specialty aside from small animal practice, in order to be representative of the veterinary population (AVMA, 2022). However, through our data collection efforts, we were able to recruit many more participants than necessary for analyses to be sufficiently powered, and we ultimately recruited 444 eligible participants, of whom 107 were male and 103 had a specialty aside from small animal practice. The mean age of the sample was 40.0 (SD = 8.9, range: 25-70), and most participants were White (n = 406; 91.4%) and not Hispanic or Latine (n= 422; 95.0%). See Tables 1 and 2 for additional demographic information and information about participants' veterinary practices.

Measures and Procedures

Participants were recruited via social media and veterinary listservs, utilizing advertisements describing the study as an examination of veterinarians' perceptions and opinions on public service announcement graphics related to controlled substance storage. Participants initially responded to a Qualtrics screener survey, containing questions about age, gender, whether the participant is currently working as a veterinarian in the United States, their veterinary specialty area, and whether they currently utilize pentobarbital for euthanasia purposes in their workplace. If eligible to continue the study, they were directed to an electronic consent form. This consent form walked participants through study procedures and allowed them to

indicate their consent by signing the form electronically. The consent form clearly outlined how to contact the principal investigator with any questions regarding their commitment to participate or the nature of the study. They were reminded that they could elect to discontinue the study at any point without the risk of retribution. After participants completed the consent form, they were re-directed to a pre-test Qualtrics survey asking about demographics, veterinary practice (specialization, location, number of employees, etc.), whether they work alone or with other veterinarians, and current euthanasia storage methods. They answered a question on a 100-point rating scale regarding their willingness to change pentobarbital storage practices in their workplace, based on an item from Waitz-Kudla et al. (2023; i.e., *How willing would you be to use additional locking mechanisms [e.g., a lockbox separate from or inside the storage container for other controlled substances, which would remain locked except when performing euthanasia] for pentobarbital in your workplace?*). They answered a question on a 5-point rating scale regarding their belief in means substitution, also from Waitz-Kudla et al. (2023) and derived from Daruwala et al. (2020; i.e. *To what extent do you agree with the statement,* "*If someone wants to die by suicide and you prevent them from using a specific method, they will simply find another way to die"?*). They answered two questions on a 7-point rating scale regarding how likely it is that they or their coworkers will attempt suicide in the future, adapted from the Suicidal Behaviors Questionnaire - Revised (SBQ-R; Osman et al., 2001; i.e. *How likely is it that you [one of your coworkers] will attempt suicide someday?*). We also assessed previous depression diagnoses (*Have you ever had a significant problem with clinical depression?*), suicidal ideation (*Have you ever seriously considered suicide?*), and suicide attempt (*Have you ever attempted suicide?*), using identical items to those used by Nett et al. (2015). For descriptive purposes, we assessed previous anxiety diagnoses (*Have you ever had a significant problem with*

anxiety?) and post-traumatic stress disorder diagnoses (*Have you ever had a significant problem with post-traumatic stress disorder (PTSD)?*).

After completing the pre-test survey, participants were randomized to view one of four PSA graphics. In order to ensure our conditions were similar with regards to proportion of female-identifying veterinarians versus other genders and small animal veterinarians versus other specialties, participants were randomized within these groups. Specifically, they were randomized within the following demographic groups: female small animal veterinarians, female non-small animal veterinarians, non-female small animal veterinarians, and non-female non-small animal veterinarians. The four graphics presented to participants encompassed each combination of levels of our two factors (i.e. own suicide risk versus coworker suicide risk and DEA regulations versus empirical evidence for means safety). These four conditions are identified as follows: 1) Participant's own suicide risk and DEA regulations (self/DEA); 2) Coworker suicide risk and DEA regulations (coworker/DEA); 3) Participant's own suicide risk and empirical data (self/empirical data); and 4) Coworker suicide risk and empirical data (coworker/empirical data). Copies of these graphics can be found in the Appendix.

After viewing the PSA graphic to which they were randomly assigned, participants completed a post-test survey. They were first asked three manipulation check questions to assess attention to the graphic: a color observed in the graphic (i.e. *Select a color that you observed in the graphic*) with options of *Blue, Yellow, and Pink*; whom the graphic is meant to protect (i.e. *In the graphic, whom does it say the storage protocol will protect?*) with options of *Myself, Clients, Coworkers, and Animals*; and who supports the storage protocol (i.e. *In the graphic, who does it say supports the storage protocol?*) with options of Other veterinarians, DEA guidelines, Research, or No one. They were also asked to rate on a 10-point rating scale how they perceived

the graphic on a number of attributes. Specifically, they were asked *I found the messaging in this graphic to be* _____ on the following continua: *Harmful – Helpful, Confusing – Easy to Understand, Boring – Interesting, Superficial – Reflective, Inappropriate – Appropriate, Lacking – Comprehensive, Unoriginal – Novel, Unimportant – Important, and Unacceptable – Acceptable*. This acceptability measure was modeled after one used by Brydon et al. (2023), which was derived from the ADAPT-ITT model (Wingood & DiClemente, 2008). The total score on these rating scale items were summed to examine overall acceptability of the graphic. Participants were also asked *What, if anything, would make this graphic more helpful and impactful to you?* and were given an opportunity to give qualitative feedback on the graphic they observed. We next administered questionnaire items from the PROMIS scale (Hays et al., 2009) as an extra measure to distract from primary study aims. Last, we asked the same willingness to change question as the pre-test (i.e., *How willing would you be to use additional locking mechanisms [e.g., a lockbox separate from or inside the storage container for other controlled substances, which would remain locked except when performing euthanasia] for pentobarbital in your workplace?*).

Participants who completed the study had the option to enter their name and e-mail address to be entered into a drawing to win one of ten $50 electronic Amazon gift cards, and one of two $100 electronic Amazon gift cards. Gift cards were sent after all data were collected.

Data Analytic Approach

To address Aim 1 (H1 and H2), we conducted a 3-way mixed model ANOVA with two between-subjects factors (self/coworker and DEA/empirical data) and one within-subject factor (time). We first examined the time by condition effects for each factor (i.e. own versus coworker risk messaging as well as DEA regulations versus empirical data) on willingness from pre- to

post-test to evaluate which level of each factor results in a greater increase in willingness. Then, we examined interaction effects of these two factors across timepoints to test our hypothesis that the combination of empirical data and coworker risk would result in the greatest increase in willingness from pre- to post-test.

For Aim 2 (H3 and H4), we conducted a 2-way ANOVA. Within this ANOVA, we first examined the main effects for each factor on acceptability of messaging. Then, we examined the interaction between the two factors to test our hypothesis that the combination of empirical data and coworker risk would be rated most acceptable by participants.

For Aim 3 (H5 and H6), to examine possible moderation effects of belief in means substitution or belief that the participant or one of their coworkers will attempt suicide in the future, we conducted six ANOVAs. We first conducted three 4-way mixed model ANOVAs with three between-subjects factors (self/coworker, DEA/empirical data, moderator) and one within-subjects factor (time) to test whether these three variables moderated the effects of each factor (DEA versus empirical and own versus coworker risk) and/or their interaction on willingness to implement means safety protocols across time points. Second, we conducted three 3-way ANOVAs to test whether these three variables moderated the effects of each factor (DEA versus empirical and own versus coworker risk) and/or their interaction on acceptability of messaging for study PSA graphics.

For Aim 4, we utilized Dedoose^{TM}, an online software application used for qualitative data analysis, to analyze responses to the question *What, if anything, would make this graphic more helpful and impactful to you?* We used thematic analysis to identify themes that arose in these open-ended responses. Thematic analysis is a foundational qualitative method for identifying themes in a dataset (Braun & Clarke, 2006). Two graduate students in clinical

psychology independently read these responses and generated codes for the data. These codes denote patterns that emerged in responses regarding what would give the graphics a more positive impact for participants. The data codes were allocated by the students individually into broader themes, and then students collaborated to generate a final list of themes for responses to this question. Disagreements on codes were resolved through discussion between the two graduate students and a supervising professor.

Power Analysis. Utilizing the *F*-test for an ANOVA allowing for main effect and interaction analyses, small, medium, and large effect sizes correspond to values of $f = 0.10$, $f = 0.25$, and $f = 0.40$, respectively (Cohen, 1988, 1992). A power analysis for an ANOVA with two two-level between-subjects factors and one two-level within-subjects factor in *MorePower* (Campbell & Thompson, 2012) indicated that in order to have adequate power (.80) to detect a medium effect size ($f = 0.25$), a sample of 128 participants was required. However, to have sufficient power for our analysis in Aim 3, ANOVAs including an additional five-level between-subjects factor of belief in means substitution and additional seven-level between-subjects factors of reported likelihood of the participant or one of their coworkers attempting suicide, *G*Power* indicated that a sample of 225 participants would be required. To account for approximately 10% missing or inadequate data, we aimed to recruit 252 participants (63 participants in each condition). We ultimately recruited 444 participants.

Response Screening. To evaluate responses for quality, we reviewed the information provided by a constellation of validity indicators and then examined each individual record to make a final determination of its validity. Responses were considered for exclusion from the study for the following reasons: 1) the survey duration was less than 300 seconds, as it was expected that it would take respondents more than five minutes to complete the survey

thoughtfully; 2) the response was submitted along with other responses with start times that were almost identical (i.e. less than 60 seconds between the start of each response), which was unlikely to happen by chance (Storozuk et al., 2020); 3) a RelevantIDFraudScore[1] of ≥ 30 which Qualtrics has determined likely indicates a response was provided by a bot; 4) the response had a reCAPTCHA score of less than 0.5 out of 1.0, which is the default threshold for responses to be flagged by Qualtrics as potentially provided by a bot; and 5) open-text fields that were duplicated across multiple responses or demonstrated a lack of awareness of the question asked (e.g., in response to the question *"If this graphic were utilized, where and how do you see it being distributed in order to have maximum impact (e.g., displayed in practice buildings, above lockboxes, via social media, etc.)?"* a participant answered "*No*"). Any responses that were deemed potentially fraudulent based on any of the above criteria were examined for evidence within the open-text prompts as well as in response to other questions that the survey had been answered thoughtfully. If we were unable to confirm the quality of the entry, the participant was excluded from the study prior to data analysis. In total, 724 survey responses were removed due to being potentially fraudulent.

Additionally, we utilized manipulation check questions to ensure that participants were attentive to the graphics presented to them, and specifically the factors of interest (DEA/empirical data and self/coworker). If participants failed any of these manipulation check questions, they were considered to have failed the manipulation check (see Table 3). As seen in Table 3, nearly all participants were able to correctly identify the color of the graphic, suggesting

[1] Qualtrics employs an algorithm, RelevantID®, to detect responses when multiple email accounts are being accessed from the same computer utilizing geo-location, time, language, IP address and other data (Imperium, n.d.). A fraud profile score, RelevantIDFraudScore, is then generated (Min Value = 0, Max Value = 130). According to Qualtrics, a RelevantIDFraudScore of ≥ 30 indicates a high likelihood that the response is fraudulent.

that they were attending sufficiently to the graphic. However, participants randomized to either of the self conditions were disproportionately likely to be excluded based on their response to question 2, which asked about who the protocol was meant to protect. This may suggest that the PSA's emphasis on protecting the self versus coworkers was not sufficiently obvious to override participants' default assumption that means safety is intended to protect people other than themselves. It could also suggest that the wording of the manipulation check question was not sufficiently clear. Regarding question 3, which asked about who supports the protocol, those who were randomized to the self/DEA condition failed this question significantly less often than those randomized to the coworker/empirical data condition. There were no other differences between conditions.

Results

Preliminary Analyses

As can be seen in Tables 1 and 2, conditions did not differ on any demographic or practice-related variables, except for marital status. Z-score follow-up tests showed statistically significant differences for proportions of *married* and *in a committed relationship but not married participants* across conditions (see Table 1). As such, we ran all of our analyses with marital status as a covariate. Because this did not change the statistical significance of any analyses, we report our primary analyses without this covariate for the sake of simplicity. Results with the marital status covariate are available upon request.

Additionally, based on one-way ANOVA analysis, conditions did not differ on willingness to implement an additional lockbox at pre-test (F [3, 439] = 2.00, p = .113, partial η^2 = .01). Further, based on Kruskal-Wallis H tests, conditions did not differ at pre-test on belief in means substitution (H[3, n = 444] = 5.05, p = .168), reported likelihood that the participant will

attempt suicide in the future ($H[3, n = 444] = 0.52$, $p = .914$), and reported likelihood that one of the participant's coworkers will attempt suicide in the future ($H[3, n = 443] = 3.65$, $p = .302$).

All statistical analyses for Aims 1-3 are reported both for all participants ($N = 444$) and for only participants who passed manipulation check questions ($N = 250$). For both sets of results, participants with missing data were removed from analyses (i.e. we used listwise deletion), as no analysis had more than two participants with missing data.

Notably, for all analyses with willingness as the dependent variable, Box's *M* Test was statistically significant. However, Box's *M* Test is relatively sensitive, and this can sometimes result in a significant Box's *M* when covariance matrices are equivalent (Cohen, 2008). As such, when the sample size is large and cell sizes are relatively similar within ANOVA analyses, a significant Box's *M* is acceptable (i.e. Aim 1 analyses). However, when there is a large amount of variance between cell sizes and Box's *M* is significant (i.e. Aim 3 analyses), results should be interpreted with caution.

For half of the analyses with acceptability as the dependent variable, Levene's Test was significant. Specifically, Levene's test was not statistically significant for analyses with all participants included except the moderation analysis including belief in means substitution. Levene's test was statistically significant for analyses with the subset of participants who passed manipulation check questions except the moderation analysis including reported likelihood that the participant will attempt suicide. Similar to our approach with Box's *M*, Keppel (1991) suggests that if sample sizes are equal, then ANOVA analyses are robust to a statistically significant Levene's Test. Thus, analyses for Aim 2 are robust, but analyses for Aim 3 should be interpreted with caution. More details regarding Box's and Levene's Tests in Aim 3 are provided below.

Aim 1

Aim 1 of our study was to test our hypotheses that, from pre- to post-test, individuals would exhibit a greater increase in willingness to implement an extra lockbox for pentobarbital if PSA graphics prioritized coworkers' suicide risk versus the participant's own suicide risk, and if they were presented with empirical data versus DEA regulations (see Tables 4 and 5). We hypothesized that there would be time by condition interaction effects of each factor such that participants presented with graphics discussing their coworkers' suicide risk would report a greater increase in willingness to implement an extra lockbox than those presented with graphics discussing their own suicide risk, and participants presented with empirical data graphics would report a greater increase in willingness to implement an extra lockbox than those presented with DEA regulations graphics. We also hypothesized that there would be a three-way interaction between time and the two factors such that participants randomized to the coworkers' suicide risk and empirical data condition would exhibit a greater increase in willingness than those randomized to the other three conditions. The total *N* for this analysis with all participants was 443, and the total *N* with participants who failed manipulation check questions removed was 249, as one participant who did not answer the question about willingness at pre-test was removed.

When all participants were included (Table 4), our hypotheses were partially confirmed. There was a statistically significant time by condition interaction effect of the DEA/empirical data factor with a small effect size, such that those randomized to the empirical data conditions (pre-test $M = 67.31$, SD = 29.85, post-test $M = 71.18$, SD = 27.79) had a greater increase in willingness than those in the DEA conditions (pre-test $M = 68.44$, SD = 30.07, post-test $M =$ 69.64, SD = 29.57). However, there was no statistically significant time by condition interaction

effect with the self/coworker factor and no three-way interaction between time and the two factors.

When participants who failed manipulation check questions were removed (Table 5), there was only a statistically significant main effect of time with a small effect size such that participants, on average, reported higher willingness to implement an extra lockbox for pentobarbital at post-test (M = 70.80, SD = 28.63) than at pre-test (M = 68.94, SD = 29.80).

Aim 2

Aim 2 of our study was to test our hypotheses that messaging about coworkers' suicide risk would be rated as more acceptable than participant's own suicide risk and empirical data messaging would be rated as more acceptable than DEA regulations messaging, and (see Tables 6 and 7). We had complete data for these analyses. We hypothesized that there would be main effects of each factor such that participants presented with information about reducing their coworkers' suicide risk would report greater acceptability of messaging than those presented with information about reducing their own suicide risk, and participants presented with empirical data graphics would report greater acceptability of messaging than those presented with DEA regulations graphics. We also hypothesized that there would be an interaction effect such that participants randomized to the coworkers' suicide risk and empirical data condition would report greater acceptability of messaging than those randomized to the other three conditions. Notably, acceptability of the graphics were rated as generally acceptable overall on a 90-point scale (Total M = 65.42, SD = 13.28; self/DEA M = 61.62, SD = 13.29; coworker/DEA M = 65.64, SD = 12.89; self/empirical data M = 65.41, SD = 14.25; coworker/empirical data M = 69.14, SD = 11.61).

When all participants were included (Table 6), our hypotheses were partially confirmed. There were statistically significant effects for both of our factors with small effect sizes, such that those randomized to the coworkers' suicide risk conditions (M = 67.42, SD = 12.35) reported the graphic as more acceptable than those randomized to the self conditions (M = 63.48, SD = 13.87), and those randomized to the empirical data conditions (M = 67.28, SD = 13.10) reported the graphic as more acceptable than those randomized to the DEA regulations conditions (M = 63.55, SD = 13.22). There was, however, no statistically significant interaction between the two factors.

When participants who failed manipulation check questions were removed (Table 7), the main effects of each factor persisted, also with small effect sizes, and there was no statistically significant interaction between factors. Specifically, those randomized to the coworker conditions (M = 68.14, SD = 11.66) reported the graphic as more acceptable than those randomized to the self conditions (M = 62.57, SD = 14.18), and those randomized to the empirical data conditions (M = 67.77, SD = 13.12) reported the graphic as more acceptable than those randomized to the DEA regulations conditions (M = 63.77, SD = 12.95).

Aim 3

Aim 3 of our study was to investigate whether the effects of messaging on veterinarians' willingness to implement an extra lockbox and acceptability of messaging was moderated by three variables: the degree to which veterinarians agree with a statement relating to means substitution (i.e. to what extent do you agree with the statement *If someone wants to die by suicide and you prevent them from using a specific method, they will simply find another way to die?*); the likelihood that they will attempt suicide someday (*i.e. How likely is it that you will attempt suicide someday?*); and the likelihood that one of their coworkers will attempt suicide

someday (*i.e. How likely is it that one of your coworkers will attempt suicide someday?*). We hypothesized that the effect of messaging regarding participants' willingness to implement an extra lockbox and acceptability of messaging would be moderated by participants' answers to all three questions. Specifically, we hypothesized that participants who reported weaker belief in means substitution and higher likelihood of a suicide attempt for themselves or coworkers would exhibit enhanced effects of the factors on the dependent variables compared to those with stronger belief in means substitution and lower likelihood of suicide attempt for themselves or coworkers, respectively.

Belief in Means Substitution

For analyses regarding belief in means substitution (see Tables 8 – 11), the total *n* for willingness analyses with all participants was 443, and the total *n* with participants who failed manipulation check questions removed was 249, as one participant who did not answer the question about willingness at pre-test was removed. For analyses concerning acceptability, no participants were removed due to missing data.

Regarding willingness with all participants included (Table 8), as hypothesized, belief in means substitution moderated the relationship between our factors and willingness with a small effect size, resulting in a four-way interaction between time, the self/coworker factor, the DEA/empirical data factor, and belief in means substitution. Notably, however, Box's Test of Equality of Covariance was found to be statistically significant (Box's M [54, 9768.42] = 351.92, $F = 6.06$, $p < .001$). Box's test remained statistically significant even after transforming the data via a log, natural log (ln), or reciprocal transformation to reduce skew (Garcia-Alvarado, 2019). Unlike the previous analyses, for this analysis there was a large range of group sizes (smallest $n = 2$; largest $n = 202$). As such, these results should be interpreted with caution because ANOVAs

are less robust to variance measured by Box's *M* when group sizes are small or largely disparate (Cohen, 2008).

This four-way interaction was probed, and contrary to our hypothesis, the observed pattern did not suggest stronger effects of the factors at weaker levels of belief in means substitution. More specifically, there were no main effects or significant interactions between variables for participants with weaker means substitution belief levels 0 (*strongly disagree*; *n* = 17, 3.8%), 1 (*somewhat disagree*; *n* = 65, 14.6%), 2 (*neither agree nor disagree*; *n* = 60, 13.5%), and 3 (*somewhat agree*; *n* = 202, 45.5%). However, for those with the strongest belief in means substitution (i.e. *strongly agree*; *n* = 100, 22.5%), there was a statistically significant three-way interaction between time, the self/coworker factor, and the DEA/empirical data factor with a small effect size, $F(1, 96) = 4.59$, $p = .035$, partial $\eta^2 = .05$. As such, this interaction was also probed, and these results showed that for those who were randomized to the self conditions, there was a statistically significant interaction between time and the DEA/empirical data factor such that those randomized to the empirical data condition (pre-test M = 61.00, SD = 7.69, post-test M = 70.22, SD = 7.51) reported a greater increase in willingness than those randomized to the DEA condition (pre-test M = 52.88, SD = 6.66, post-test M = 50.71, SD = 6.50) with a medium effect size, $F(1, 40) = 5.20$, $p = .028$, partial $\eta^2 = .12$. However, for those randomized to the coworker conditions, there was no significant effect of the DEA/empirical data factor, $F(1, 56) = 3.87$, $p = .054$, partial $\eta^2 = .07$ (DEA pre-test M = 72.39, SD = 5.86, post-test M = 70.84, SD = 5.72; empirical data pre-test M = 69.85, SD = 6.28, post-test M = 70.30, SD = 6.13). Regarding willingness with those who failed manipulation check questions removed (Table 9), this analysis showed no statistically significant effects.

Regarding acceptability with all participants included (Table 10), similar to previous analyses examining belief in means substitution as a moderator, Levene's Test of Equality of Error Variances was statistically significant (Levene Statistic based on Mean [19, 424] = 2.20, p = .003), Levene's test remained statistically significant after transforming the data, and there was a large amount of variance in group sizes (smallest n = 2, largest n = 109). As such, these results should also be interpreted with caution. Belief in means substitution was not a statistically significant moderator of any effect, and there were no significant interactions. Belief in means substitution did have a significant main effect on acceptability with a small effect size, such that those with a stronger belief in means substitution reported lower levels of acceptability than those with weaker beliefs in means substitution (strongly disagree M = 69.00, SD = 11.18, somewhat disagree M = 68.43, SD = 11.09, neither agree nor disagree M = 63.38, SD = 12.81, somewhat agree M = 67.10, SD = 12.39, strongly agree M = 60.67, SD = 15.52). Specifically, Tukey's Honestly Significant Difference post-hoc tests (Tukey's HSD) illustrated that those who answered *strongly* agree reported significantly lower acceptability than those who answered *somewhat disagree* or *somewhat agree*. There were no other significant differences across groups; however, it is important to acknowledge the very small number of participants who endorsed *strongly disagree* (n = 17).

The analysis examining the moderating effects of belief in means substitution on acceptability when participants who failed manipulation check questions were removed (Table 12) resulted in similar effects as when all participants were included. Like previous analyses examining belief in means substitution as a moderator, Levene's Test of Equality of Error Variances was statistically significant (Levene Statistic based on Mean [17, 230] = 1.73, p = .039), Box's test remained statistically significant after data transformation, and there was a

large amount of variance in group sizes (smallest $n = 1$, largest $n = 63$). As such, these results should also be interpreted with caution. Belief in means substitution had a statistically significant main effect on acceptability with a small effect size. However, although the omnibus test was significant, Tukey's HSD post-hoc tests illustrated that there were no statistically significant pairwise comparisons, which is likely due to small sample sizes within groups.

Reported Likelihood of Participant Suicide Attempt

As seen in Tables 14-17, there were no statistically significant main effects or interactions for reported likelihood of the participant attempting suicide in the future, for either willingness or acceptability. This was true regardless of whether all participants were included or participants who failed manipulation check questions were excluded.

Reported Likelihood of a Coworker Suicide Attempt

As seen in Tables 18-21, there were no statistically significant main effects or interactions for reported likelihood of a coworker attempting suicide in the future for either willingness or acceptability, with one exception. For acceptability with all participants included (Table 20), reported likelihood of a coworker attempting suicide in the future moderated the effect of the DEA/empirical data factor with a small effect size. Importantly, for this analysis, Levene's Test of Equality of Error Variances was not statistically significant (Levene Statistic based on Mean (25, 415) = 1.43, $p = .084$), resulting in this statistic being reliably interpretable. This interaction was probed, and at reported likelihood of a coworker attempting suicide in the future levels 1 (*no chance at all)*, 2 (*rather unlikely)*, 3 (*unlikely)*, 4 (*likely*), and 5 (*rather likely)*, there was no statistically significant main effect for the DEA/empirical data factor. However, at reported likelihood of a coworker attempting suicide levels 0 (*Never*; $n = 10$, 2.3%*)* and 6 (*Very*

likely; *n* = 15, 3.4%), there were statistically significant main effects of the DEA/empirical data factor, both with a large effect size (i.e. for *Never* $F[1, 6] = 11.90$, $p = .014$, partial $\eta^2 = .67$; for *Very likely* $F(1, 11) = 6.13$, $p = .031$, partial $\eta^2 = .36$). More specifically, those randomized to the empirical data conditions reported higher acceptability of messaging (i.e. for *Never M* = 73.86, SD = 12.50; for *Very likely M* = 64.75, SD = 16.35) than those randomized to the DEA regulations conditions (i.e. for *Never M* = 61.33, SD = 17.95; for *Very Likely* M = 47.86, SD = 11.89).

Aim 4

Aim 4 was to qualitatively analyze how graphics can be improved to be more impactful to veterinarians and where veterinarians envision the graphics should be displayed.

Ways to Make Graphics More Helpful and Impactful

The first open-ended question participants were asked was *What, if anything, would make this graphic more helpful and impactful to you?* Although all participants answered this question, it is important to note that they answered based on the graphic to which they were randomized (self/DEA, coworker/DEA, self/empirical data, coworker/empirical data). We wanted to collect global feedback on the graphics and identify whether certain levels of factors resulted in different themes. Although many themes were consistent across conditions, some arose more often for specific levels of the self/coworker and DEA/empirical data factors, discussed in more detail below. Frequencies for how often themes arose are in Table 22 for each of the four conditions and overall.

The most common feedback across conditions was a desire for more research and empirical data to be included in the graphic. Specifically, although there were a handful of

participants in all four conditions who noted a desire for more statistics describing the effectiveness of means safety, more often they requested information regarding the prevalence of suicide in veterinarians (e.g., suicide rates for veterinarians, suicide rates utilizing pentobarbital), which was not contained in any of the four graphics. Some examples of these suggestions are, "Statistics on how often pentobarbital is used in suicide," and "Might be helpful to be more up front about suicide [statistics]."

Additionally, although there was some variation in the frequencies across conditions regarding the type of data participants requested, the general desire for more empirical data to be contained in the graphic was fairly consistent. On the other hand, participants also noted a desire for graphics to be more concise or contain fewer words (e.g., "Keeping it simpler and less text."). Although this was reported across conditions, it was more often noted in the empirical data conditions (n = 25) than in the DEA conditions (n = 9).

Another important theme to note was that participants reported that they wanted the graphic to discuss protecting themselves and their coworkers, rather than only one or the other. Notably, as we anticipated, this did arise more often in the self conditions (n = 24) than in the coworker conditions (n = 4), reflecting our earlier findings that coworker messaging was preferred to self messaging.

The next most common theme was participants noting that they would not change the graphic or that they were unsure how they would change it. This code was reserved for participants who responded to the question indicating that they did not have feedback or were unsure; participants who left the question blank are not included in this theme, as we cannot be certain whether they had feedback.

Some participants also gave feedback regarding the appearance of the graphic. Most often, this feedback noted a desire for different, often brighter, colors, and different graphics or pictures (e.g., photos of animals). Participants noted that this would make the graphic more visually appealing and eye-catching and would allow it to be more noticeable. As one participant noted, "Use of brighter colors so it doesn't blend in with the color scheme of many hospitals (blue/green)."

Next, participants noted that it would be helpful for the graphic to contain a link to more information. They noted that this would be helpful both for mental health resources (e.g., the suicide hotline number) and logistical information (e.g., a QR code or link to purchase a lockbox for their practice).

Lastly, some participants noted that the graphic will not be effective, because means safety for pentobarbital will not be effective. Notably, however, this was most true for our self/DEA condition (n = 10), while this theme arose very little in the coworker/DEA condition (n = 2) or self/empirical data condition (n = 1), and no responses contained this theme in the condition that we predicted would be most effective (coworker/empirical data). The pattern observed for this theme aligns with our earlier hypotheses, in that participants were less likely to give feedback dismissing means safety as an effective way to prevent suicide if they were randomized to a graphic with messaging regarding protecting coworkers from suicide and empirical data supporting means safety.

Locations the Graphic Should be Displayed

The second open-ended question participants were asked was *If this graphic were utilized, where and how do you see it being distributed in order to have maximum impact (e.g.,*

displayed in practice buildings, above lockboxes, via social media, etc.)? This question was also answered based on the graphic participants viewed. However, unlike the previous question, responses to this question did not seem to be influenced by the condition to which participants were randomized. Frequencies for how often themes arose are in Table 23 for each of the four conditions and overall.

Participants most often agreed with examples proposed in the question (i.e. displayed in practice buildings, above lockboxes, via social media). Most responses specifically agreed that this graphic should be displayed in veterinary practices and should be above, on, or near lockboxes. Although other locations in veterinary practices were also proposed and are listed in the table, these locations were mentioned much less often than the last example from the question, social media. Participants specifically proposed that the graphic be disseminated via social media, through veterinary websites, and through online veterinary suicide prevention networks such as Not One More Vet (NOMV).

After social media, the most common response was that it would be helpful for veterinary organizations such as the American Veterinary Medical Association (AVMA), state Veterinary Medical Associations (VMAs), and the DEA to send out the graphic in mailers, via e-mail, or in magazines they sponsor. Next, they noted that it could be presented at continuing education (CE) events, veterinary conferences, and other events such as trade shows. Participants also noted that it may be helpful for the graphic to be disseminated alongside pentobarbital information (e.g., on distributor websites, sent out with pentobarbital orders).

Lastly, a number of participants did not have recommendations for where the graphic should be displayed or how it should be disseminated, but rather they had recommendations for

the graphic to be created using specific media. This included recommending stickers, magnets, or "e-mail" with no specification regarding who should send out the e-mail.

Discussion

As recent research has elucidated the growing concern of pentobarbital's role in veterinarian suicide (Witte et al., 2019), there is a need for research investigating the feasibility of implementing means safety protocols for pentobarbital in veterinary practices. In this study, we sought to build upon the foundation laid by Waitz-Kudla et al. (2023) through testing the most effective way to advertise means safety protocols to veterinarians. Importantly, this is the largest study to date to empirically analyze veterinarians' willingness to implement an extra lockbox for pentobarbital in their practices.

Specifically, we tested how self versus coworker messaging and DEA versus empirical data messaging influenced change in willingness to implement an extra lockbox for pentobarbital from pre- to post-test (Aim 1), how these two messaging factors influenced reported acceptability (Aim 2), and how the effects of both factors were moderated by belief in means substitution, reported likelihood that the participant will attempt suicide in the future, and reported likelihood that one of the participant's coworkers will attempt suicide in the future (Aim 3). Lastly, we qualitatively analyzed how graphics can be improved upon to be more impactful to veterinarians and where participants envision the graphic being displayed (Aim 4). Overall, we found that the specific content of messaging had an impact on veterinarians' attitudes toward pentobarbital storage, in a way that mostly aligned with our hypotheses.

Regarding Aim 1, when all participants were included, our finding that those randomized to the empirical data conditions exhibited a greater increase in willingness than those randomized to the DEA conditions is consistent with our hypothesis (H1) and previous research illustrating

the importance of messaging in increasing willingness to implement means safety protocols (Stanley et al. 2017, 2020). The finding that the empirical data messaging resulted in a greater increase in willingness to implement an extra lockbox when compared to DEA messaging is also consistent with the Elaboration Likelihood Model (ELM; Petty & Cacioppo, 1984). Specifically, as found in Waitz-Kudla et al. (2023), means safety may not be initially salient to veterinarians as a way to prevent suicide. In this case, elaboration likelihood would be low, and so veterinarians may rely more strongly on source factors in order to make a judgement about implementing an extra lockbox as a means safety protocol. Research has already shown that existing DEA regulations are not sufficient to result in all veterinarians ensuring their pentobarbital is locked at all times (Houtsma et al., 2022; Waitz-Kudla et al., 2023). As shown in our results, research supporting means safety, and specifically research indicating that means safety is effective because it increases the time necessary to access lethal means (Houtsma et al., 2018; McClurg, 2000; Nordentoft, 2007), may be more impactful as a source to persuade veterinarians to implement an extra lockbox as a means safety protocol. However, given that participants requested additional empirical data in their feedback for the graphics, it will be beneficial for future iterations of the graphic to include QR codes or information on where to find additional data that would lend support to means safety more generally and specifically for veterinarians.

On the other hand, contrary to hypothesis (H1), we did not find that the self/coworker factor had a statistically significant interaction effect with time for willingness, which contradicts findings from Waitz-Kudla et al. (2023) that veterinarians are more likely to report preventing coworkers' suicide as opposed to preventing their own suicide as a reason to implement means safety protocols. There are multiple reasons why this may have occurred. First, this could have

occurred because the messaging of our graphic was not salient enough to override the participant's initial thought that means safety would protect coworkers rather than themselves. Alternatively, it is possible that self versus coworker messaging would not affect willingness regardless of how it was phrased. These two reasons would be consistent with our finding that, when answering manipulation check questions, participants randomized to the self conditions were more likely to incorrectly answer that an extra lockbox would protect coworkers from suicide. This finding may also suggest that self versus coworker messaging may not be as important as empirical data messaging for increasing willingness to implement an extra lockbox as a means safety protocol. Also contrary to hypothesis (H2), we did not find an interaction between our two factors and time for willingness. Within our study, the lack of interaction effects for this and other analyses may indicate that, for our specific intervention, the self/other and DEA/empirical data factors have effects that are independent of each other. Lastly, when participants who failed the manipulation check questions were removed, there was only an effect of time illustrating an increase in willingness from pre- to post-test. This is consistent with the finding in Waitz-Kudla et al. (2023) that participants reported significantly higher willingness to implement means safety practices after focus group participation compared to before, regardless of the specific focus group topics. Given that our manipulation check questions may not have sufficiently measured participant attentiveness, this result should be interpreted with caution, but it is important to consider that addressing the topic of means safety may increase willingness to implement an extra lockbox as a means safety protocol regardless of specific messaging factors.

Regarding Aim 2, aligned with hypothesis (H3), those randomized to the coworker (versus self) conditions or empirical data (versus DEA) conditions reported higher acceptability of messaging, and this was true when the analysis included all participants or only individuals

who passed the manipulation check questions. This result is consistent with Waitz-Kudla et al.'s (2023) findings that messaging discussing protecting coworkers from suicide and utilizing empirical data to support for means safety seemed to be most appealing to veterinarians. Thus, although this factor did not have an effect on willingness, its effect on acceptability suggests that it is still important to consider when implementing any future PSA's. Although, contrary to (H4), we did not find an interaction effect, these effects still suggest that messaging focused on the impact of means safety on coworkers and providing empirical data supporting the effectiveness of means safety are both important for acceptability. Additionally, similar to our Aim 1 findings, the statistically significant main effects for each factor, but no interaction effect, indicate that the effects of our factors are independent of each other. Ultimately, these findings add to growing support for the idea that simple changes in messaging can have an important influence on message acceptability for means safety (Stanley et al. 2017, 2020).

Regarding Aim 3, consistent with hypothesis (H5), we found that belief in means substitution moderated the effect of time and both factors on willingness. However, the nature of this moderation effect did not directly align with our hypothesis in that only those with the strongest belief in means substitution exhibited a statistically significant three-way interaction between time and both factors. Probing this interaction revealed that those with the strongest belief in means substitution who were randomized to the self and empirical data condition reported a greater increase in willingness than those randomized to the self and DEA condition. In contrast, those who were randomized to the coworker conditions exhibited no effect of the empirical data/DEA factor. On the one hand, this pattern suggests that empirical data is especially impactful in increasing willingness for veterinarians who previously held a strong belief that means safety would not be effective (i.e. because individuals would attempt suicide

utilizing an alternate method; Daigle, 2005). However, this is only the case for individuals who were randomized to the self conditions, and this interaction effect was lost when individuals who failed the manipulation check questions were removed. This result, unlike the analyses examining willingness with no moderators, is consistent with Stanley et al. (2020). Specifically, this suggests that, for individuals who hold the strongest belief in means substitution, the impact of messaging is primarily driven by the DEA/empirical data factor, and that utilizing empirical data messaging has a weaker effect when coupled with coworker messaging as opposed to self messaging. Interestingly, this is contradictory to what we anticipated, that coworker and empirical data messaging would have more of an impact when coupled together. This may indicate further that more strongly relying on empirical data to influence willingness to implement an extra lockbox for pentobarbital may be more effective than self versus coworker messaging, as reflected in our results from Aim 1, and in fact that for those with strong beliefs in means substitution, coworker messaging may reduce the impact of empirical data in influencing willingness. Moreover, a large proportion of our sample identified that they *strongly agree* with the idea of means substitution, and the majority of our sample indicated that they *strongly agree* or *somewhat agree* with the idea of means substitution. This may be reflective of the political beliefs of veterinarians, as previous research that examined means safety beliefs among firearm owners (Daruwala et al., 2020) found that those who identify with conservative social policy beliefs also hold stronger belief in means substitution. Given that we did not collect information on social policy political beliefs, however, more research may be necessary to fully elucidate the reason why many veterinarians hold these beliefs about means substitution. Regardless of the reason for these beliefs, our finding that many veterinarians hold strong beliefs in means substitution indicates that it may be important to provide additional information to veterinarians

regarding research indicating that means substitution does not often occur (Anestis & Anestis, 2015; Leenaars et al., 2000; Nordentoft, 2007; Yip et al., 2010).

It is also important to note this finding alongside the main effect of belief in means substitution on acceptability. For acceptability analyses, also in line with hypothesis (H5), those with the strongest belief in means substitution reported lowest acceptability across conditions, which was true for analyses with all participants and only those who passed the manipulation check questions. This suggests that, although those with the strongest belief in means substitution rated graphics as least acceptable across conditions, empirical data seems to be most impactful in increasing willingness to implement an extra lockbox for pentobarbital for these same individuals.

Contrary to hypothesis (H6), reported likelihood that the participant would attempt suicide in the future did not show any main effects or interactions related to willingness or acceptability. This lack of an effect is still important in that it supports the finding from Waitz-Kudla et al. (2023) that veterinarians did not see their own suicide risk as an important consideration when deciding whether or not to implement means safety protocols. Additionally, this suggests that future iterations of the graphic would benefit from predominantly focusing on veterinarians preventing coworker suicide. This is also reflected in the qualitative data, where participants most often noted wanting coworker-focused language in addition to self-focused language. However, future research may benefit from investigating how results may differ for veterinarians who believe they will attempt suicide using pentobarbital in the future versus those who believe they will attempt suicide using other lethal means, because means safety for pentobarbital may be more salient for veterinarians who strongly believe they will attempt suicide in the future utilizing that specific means.

Also contrary to hypothesis (H6), reported likelihood of a coworker attempting suicide in the future did not exhibit main or interaction effects regarding willingness. However, in line with hypothesis (H6), reported likelihood of a coworker attempting suicide in the future did moderate the effect of the DEA/empirical data factor on acceptability such that, for those who reported the likelihood of coworker suicide as being extremely low or extremely high, those randomized to empirical data conditions reported higher acceptability than those randomized to the DEA conditions. On the one hand, this finding suggests that empirical data may be particularly important in persuading veterinarians for whom coworker suicide risk has very low or very high salience, although we believe the reason for this may differ between these two groups of participants. Specifically, for veterinarians who rated the likelihood of coworker suicide extremely low, empirical data may have been persuasive because it provided a reason to implement means safety when they did not have another reason in mind (i.e., coworker suicide risk). For veterinarians who rated the likelihood of coworker suicide as extremely high, empirical data may have been persuasive because it provided a reason to implement means safety when, as reflected in Waitz-Kudla et al. (2023), veterinarians might have seen means safety as less important compared to improving the mental health of coworkers. On the other hand, however, the number of participants who fell into the extremely low or extremely high categories was very small, which limits the power of this finding. As such, future research should investigate this variable to determine the stability and replicability of this finding.

Regarding Aim 4, although participants rated the graphics as generally acceptable across conditions, there were also some suggestions made for improvements. Participants most often reported wanting additional empirical data in the graphic and wanting the graphic to be more concise. Specifically, a number of participants noted that the graphic would benefit from

statistics regarding pentobarbital suicide prevalence in the veterinary community. However, there were a few participants across conditions who noted a desire for more empirical data regarding the effectiveness of means safety, even in the empirical data conditions. This suggests that, although the amount of empirical data provided resulted in significant effects relative to DEA regulations, veterinarians desire even more. This may be because the comment in the graphic about empirical data supporting means safety is relatively brief (see Appendix). Notably, however, the comment that the graphic would benefit from being more concise was present more often in responses from participants randomized to the empirical data conditions. Given that these are somewhat contradictory to one another (i.e. wanting more information while also wanting more conciseness), future iterations of the graphic will need to balance including additional empirical data with brevity. This may mean providing some information in the graphic and providing additional links to empirical data outside of what is presented in the graphic. Given that participants also noted wanting suicide hotline or mental health resource information in the graphic, future iterations may benefit from an accompanying webpage with links to additional research as well as mental health resource information.

Additionally, participants reported wanting brighter colors and better photos (e.g., higher quality, photos of animals) in the graphic. Importantly, one note from participants was that veterinary hospitals often utilize blue and green colors on their walls, which would cause the graphics to blend in if they are also blue and green. This feedback will be useful for future iterations of the graphic so that it will draw veterinarians' attention rather than being easily ignored.

For those randomized to the self conditions, participants often reported wanting the graphic to discuss protecting coworkers as well as self. This qualitative finding is important

especially given that quantitative findings tended to illustrate that the DEA/empirical data factor more often had an effect on willingness than the self/coworker factor. Specifically, this finding illustrates that, while the self/coworker factor may not have held as much of an influence in quantitative measures, participants still qualitatively see more value in graphics discussing the suicide risk of coworkers as well as themselves. This qualitative finding is also reflective of the findings in Waitz-Kudla et al. (2023) that veterinarians are more likely to report preventing coworker suicide as a reason to implement means safety practices than preventing their own suicide. However, contrary to the findings in Waitz-Kudla et al. (2023), there were also multiple participants in the coworker/empirical data condition who reported wanting the graphic to discuss protecting against one's own suicide risk as well as coworkers'. Thus, it may be beneficial for future iterations of the graphic to predominantly discuss preventing coworker suicide, but protecting oneself from suicide should not necessarily be omitted.

Lastly, participants most often envisioned the graphic being displayed above, on, or near lockboxes, on social media or vet websites, or sent out by veterinary organizations. These distribution and display methods from veterinarians will be important when considering where to disseminate future iterations of the graphic.

Our study had a few notable limitations. First, our study sample lacked diversity regarding race and ethnicity, as well as sexuality and gender. Future studies would benefit from recruiting a more diverse sample in each of these demographics, although we do want to note that our sample is reflective of the lack of racial and ethnic diversity of the veterinary population as a whole (AVMA, 2021, 2022; Greenhill and Carmichael, 2014). Relatedly, although we were able to acquire the number of male-identifying and non-small animal veterinarians that we desired, our sample did contain proportionally more female-identifying and small-animal

specialty veterinarians than the veterinary population. As such, future studies would benefit from recruiting a larger proportion of male-identifying and non-small animal veterinarians. Another limitation is that we were unable to examine how messaging in our graphics influenced actual pentobarbital storage behaviors. However, we hope that this study will provide a foundation for future longitudinal research. Additionally, regarding our measures used, although our question regarding the likelihood of the participant or one of their coworkers attempting suicide in the future was derived from a standardized measure (SBQ-R; Osman et al., 2001), some of the response choices may have been confusing. Specifically, the two lowest response choices of *Never* and *No chance at all* may not have been easily differentiable from one another. Because of this, it may be beneficial for future studies to utilize an alternate question for examining likelihood of attempting suicide in the future.

Another limitation to our study was the manipulation check questions utilized to measure attentiveness to the graphics. Throughout our findings, effects either remained unchanged or were lost when participants who failed manipulation check questions were removed. Guidance from Kazdin (2022) describes that one reason why effects may be lost when a manipulation check is used is because the manipulation check measure lacks face validity. We acknowledge that this may be the case for our questions. The majority of participants who failed manipulation check questions failed either questions two (*In the graphic, who does it say the storage protocol will protect?*; $n = 85$), and/or question three (*In the graphic, who does it say supports the storage protocol?;* $n = 132$). For those who failed question two, the vast majority ($n = 78$) were randomized to the self conditions and answered *coworkers*. This may have occurred because, although the graphics discussed protecting *yourself* and *your life*, some participants may have still perceived that they would implement the storage protocol with the intention of protecting

their coworkers. For those who failed question three, the most common answer given regardless of which factor participants were randomized to was *no one* (*n* = 74), followed by *other veterinarians* (*n* = 29). Unlike question two, in which most participants incorrectly answered *coworkers* when they were randomized to a self condition, participants who failed this manipulation check question most often responded with answers that would align with neither level of the DEA/empirical data factor. This response may be reflective of participants being skeptical of means safety as a suicide prevention tactic, as evidenced by the large number of participants who strongly believe in means substitution.

The possibility that our manipulation check questions were not face valid aligns with our results. For Aim 1, there was an effect for the DEA/empirical data factor. For Aim 3 analyses regarding willingness to implement an extra lockbox with belief in means substitution as a moderator, we found a four-way interaction between time, each factor, and belief in means substitution. For Aim 3 analyses regarding acceptability of messaging with reported likelihood of a coworker suicide as a moderator, we found a two-way interaction between reported likelihood of a coworker attempting suicide and the DEA/empirical data factor. All three of these effects were lost when those who failed manipulation check questions were removed. On the one hand, this may suggest that participants did perceive the self/coworker and DEA/empirical data messaging, but the manipulation check questions were not face valid in measuring this attention, and inappropriately removed individuals who had actually attended to the graphic. However, we also acknowledge it is possible that, for these analyses, the lack of an effect with the smaller sample is due to power lost when those who failed the manipulation check question were removed. If the manipulation check questions were face valid, however, we would have anticipated no effect or a much smaller effect when all participants were included, and a stronger

effect when those who failed manipulation check questions were removed. Thus, in future research, it will be important to more effectively check the effects of manipulations and ensure face validity of instruments used.

Another limitation of our study is that, when conducting moderation analyses, some groups within analyses were especially small, and for many of these analyses either Box's *M* Test or Levene's Test was significant. Because of this, these findings need to be interpreted with caution. This is especially true for our finding regarding reported coworker suicide risk moderating the effect of the DEA/empirical data factor on acceptability, given that the groups driving the moderation effect were extremely small. Although our study overall had a large sample size relative to what was required for analyses, future studies may benefit from larger sample sizes or stratified recruitment so that this limitation may be reduced.

Our study had some notable strengths. First, although some cell sizes were small within moderation analyses, our study had a large sample size and ample statistical power overall. Second, this is the first study to experimentally investigate veterinarians' willingness to implement and acceptability of messaging for a specific means safety protocol, adding an extra lockbox for pentobarbital. Overall, this study builds upon previous research regarding means safety and suicide prevention in the veterinary population. Specifically, this study provides important evidence for ways to increase the likelihood that veterinarians would be willing to implement an extra lockbox for pentobarbital as a means safety protocol to prevent suicide in their workplace.

Our findings provide an important building block for future research in veterinarian suicide prevention, in that they can be utilized to improve the PSA graphics used in this study to then be disseminated on a large scale. This will provide information to veterinarians about an

implementable means safety protocol, using messaging that is most likely to be impactful to them. Moreover, however, the results of this study can aid future research in exploring ways to implement means safety protocols, and specifically an extra lockbox for pentobarbital, on a practical level.

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Appendix

PSA Graphics

Self/DEA

Pentobarbital Storage

Keep Your Coworkers Safe

Keep your coworkers safe from suicide

DEA regulations require that pentobarbital be stored in a securely locked, substantially constructed cabinet

Adding an additional lockbox for pentobarbital that stays locked at all times could save a coworker's life

ADD A LOCK, SAVE A LIFE


Pentobarbital Storage
Keep Yourself Safe
Stay safe from suicide
Research has shown that any additional time necessary to access lethal means can prevent a suicide attempt
(Houtsma et al., 2018; McClurg, 2000; Nordentoft, 2007)
Adding an additional lockbox for pentobarbital that stays locked at all times could save your life
ADD A LOCK,
SAVE YOUR LIFE

Coworker/empirical data

Table 1

Sample Characteristics

Demographic	Self/DEA Mean (*SD*)	Coworker/DEA Mean (*SD*)	Self/empirical data Mean (*SD*)	Coworker/empirical data Mean (*SD*)	*df*	*F*	*p*	Total Mean (*SD*)
Age	39.9 (8.4)	39.9 (9.1)	39.4 (9.1)	41.0 (9.0)	3	0.65	.584	40.0 (8.9)
Demographic	Self/DEA *n* (%)	Coworker/DEA *n* (%)	Self/empirical data *n* (%)	Other/empirical data *n* (%)	*df*	χ^2	*p*	Total *n* (%)
Gender†					3	0.97	.808	
Female	83 (72.2)	82 (76.6)	85 (76.6)	81 (73.0)				331 (74.5)
Male	30 (26.1)	24 (22.4)	25 (22.5)	28 (25.2)				107 (24.1)
Do not identify as male or female (gender non-conforming, gender	0 (0)	1 (0.9)	1 (0.9)	1 (0.9)				3 (0.7)
Prefer not to answer	1 (0.9)	0 (0)	0 (0)	1 (0.9)				2 (0.5)
Trans woman	1 (0.9)	0 (0)	0 (0)	0 (0)				1 (0.2)
Race‡					3	3.16	.367	
White	109 (94.8)	97 (90.7)	98 (88.3)	102 (91.9)				406 (91.4)
Asian	3 (2.6)	4 (3.7)	5 (4.5)	3 (2.7)				15 (3.4)
Multi-racial	1 (0.9)	1 (0.9)	6 (5.4)	2 (1.8)				10 (2.3)
None reported	1 (0.9)	4 (3.7)	1 (0.9)	2 (1.8)				8 (1.8)
Black or African	1 (0.9)	0 (0)	0 (0)	1 (0.9)				2 (0.5)
American Indian / Alaska Native	0 (0)	1 (0.9)	0 (0)	1 (0.9)				2 (0.5)
Native Hawaiian or Other Pacific Islander	0 (0)	0 (0)	1 (0.9)	0 (0)				1 (0.2)

† Because expected responses for some cells were < 5, responses for non-Female genders were combined for χ^2 analysis. ‡ Because expected responses for some cells were <5, responses for non-White genders were combined for χ^2 analysis.

(con't.)

Demographic	Self/DEA *n* (%)	Coworker/DEA *n* (%)	Self/empirical data *n* (%)	Coworker/empirical data *n* (%)	*df*	χ^2	*p*	*n* (% of Total)
Ethnicity					6	3.51	.743	
Not Hispanic/Latine	109 (94.8)	102 (95.3)	107 (96.4)	104 (93.7)				422 (95.0)
Hispanic/Latine	6 (5.2)	5 (4.7)	4 (3.6)	6 (5.4)				21 (4.7)
None reported	0 (0)	0 (0)	0 (0)	1 (0.9)				1 (0.2)
Sexual Orientation†					3	6.19	.103	
Straight/Heterosexual	102 (88.7)	94 (87.9)	91 (82.0)	103 (92.8)				390 (87.8)
Bisexual	6 (5.2)	5 (4.7)	12 (10.8)	1 (0.9)				24 (5.4)
Lesbian/Gay	7 (6.1)	5 (4.7)	5 (4.5)	4 (3.6)				21 (4.7)
Other (unspecified)	0 (0)	2 (1.9)	3 (2.7)	3 (2.7)				8 (1.8)
None reported	0 (0)	1 (0.9)	0 (0)	0 (0)				1 (0.2)
Marital Status					9	19.31	.023	
Married	62_{a} (53.9)	$61_{a, b}$ (57.0)	$73_{a, b}$ (65.8)	82_{b} (73.9)				278 (62.6)
Never married	21_{a} (18.3)	16_{a} (15.0)	17_{a} (15.3)	16_{a} (14.4)				70 (15.8)
In a committed relationship but not legally married	23_{a} (20.0)	22_{a} (20.6)	$12_{a, b}$ (10.8)	5_{b} (4.5)				62 (14.0)
Divorced / Separated / Widowed	9_{a} (7.8)	7_{a} (6.5)	8_{a} (7.2)	8_{a} (7.2)				32 (7.2)
Not reported	0 (0)	1 (0.9)	1 (0.9)	0 (0)				2 (0.5)
Suicide Ideation History					3	0.12	.989	
No	77 (67.0)	71 (66.4)	73 (65.8)	72 (64.9)				293 (66.0)
Yes	38 (33.0)	36 (33.6)	38 (34.2)	39 (35.1)				151 (34.0)

† Because expected responses for some cells were < 5, responses for non-Straight/Heterosexual orientations were combined for χ^2 analysis. For marital status, each subscript letter denotes columns whose proportions do not differ significantly from each other.

(con't.)

Demographic	Self/DEA *n* (%)	Coworker/DEA *n* (%)	Self/empirical data *n* (%)	Coworker/empirical data *n* (%)	*df*	χ^2	*p*	*n* (% of Total)
Suicide Attempt History†					3	2.36	.501	
No attempts	107 (93.0)	104 (97.2)	104 (93.7)	106 (95.5)				421 (94.8)
One attempt	8 (7.0)	3 (2.8)	7 (6.3)	3 (2.7)				21 (4.7)
Two attempts	0 (0)	0 (0)	0 (0)	1 (0.2)				1 (0.2)
Five or more attempts	0 (0)	0 (0)	0 (0)	1 (0.9)				1 (0.2)
Depression History					3	1.99	.575	
No	70 (60.9)	68 (63.6)	62 (55.9)	62 (55.9)				262 (59.0)
Yes	45 (39.1)	39 (36.4)	49 (44.1)	49 (44.1)				182 (41.0)
Anxiety History					3	.193	.979	
No	52 (45.2)	47 (43.9)	47 (42.3)	49 (44.1)				195 (43.9)
Yes	63 (54.8)	60 (56.1)	64 (57.7)	62 (55.9)				249 (56.1)
PTSD History					3	6.69	.082	
No	102 (88.7)	91 (85.0)	89 (80.2)	85 (76.6)				367 (82.7)
Yes	13 (11.3)	16 (15.0)	22 (19.8)	26 (23.4)				77 (17.3)

† Because expected responses for some cells were < 5, responses for *One*, *Two,* and *Five or more* attempts were combined for χ^2 analysis.

Table 2

Practice Information

Demographic	Self/DEA *n* (%)	Coworker/DEA *n* (%)	Self/empirical data *n* (%)	Coworker/empirical data *n* (%)	*df*	χ^2	*p*	*n* (% of Total)
Years Practicing					15	12.22	.663	
1-4 years	23 (20.0)	21 (19.6)	22 (19.8)	15 (13.5)				81 (18.2)
5-9 years	27 (23.5)	34 (31.8)	29 (26.1)	30 (27.0)				120 (27.0)
10-19 years	44 (38.3)	30 (28.0)	37 (33.3)	43 (38.7)				154 (34.7)
20-29 years	18 (15.7)	16 (15.0)	19 (17.1)	15 (13.5)				68 (15.3)
30 or more years	3 (2.6)	5 (4.7)	4 (3.6)	8 (7.2)				20 (4.5)
No answer	0 (0)	1 (0.9)	0 (0)	0 (0)				1 (0.2)
Specialty†					3	.33	.954	
Small animal	90 (78.3)	83 (77.6)	84 (75.7)	84 (75.7)				341 (76.8)
Large animal	0 (0)	2 (1.9)	1 (0.9)	2 (1.8)				5 (1.1)
Equine	6 (5.2)	5 (4.7)	6 (5.4)	3 (2.7)				20 (4.5)
Mixed animal	8 (7.0)	10 (9.3)	6 (5.4)	9 (8.1)				33 (7.4)
Academia	2 (1.7)	4 (3.7)	3 (2.7)	3 (2.7)				12 (2.7))
Laboratory animal	0 (0)	0 (0)	0 (0)	2 (1.8)				2 (0.5)
Exotics	1 (0.9)	0 (0)	1 (0.9)	2 (1.8)				4 (0.9)
Zoo	0 (0)	1 (0.9)	0 (0)	1 (0.9)				2 (0.5)
Government	1 (0.9)	0 (0)	0 (0)	0 (0)				1 (0.2)
Scientific research	1 (0.9)	0 (0)	0 (0)	0 (0)				1 (0.2
Shelter	3 (2.6)	1 (0.9)	6 (5.4)	3 (2.7)				13 (2.9)
Other (industry, specialty, emergency)	3 (2.6)	1 (0.9)	4 (3.6)	2 (1.8)				10 (2.3)
Solo veterinarian					3	1.85	.605	
Yes	15 (13.0)	15 (14.0	16 (14.4)	10 (9.0)				56 (12.6)
No	100 (87.0)	92 (86.0)	95 (85.6)	101 (91.0)				388 (87.4)

† Because expected responses for some cells were < 5, non-small animal specialty responses were combined for χ^2 analysis.

(con't.)

Demographic	Self/DEA *n* (%)	Coworker/DEA *n* (%)	Self/empirical data *n* (%)	Coworker/empirical data *n* (%)	*df*	χ^2	*p*	*n* (% of Total)
Geographic Location‡					6	8.19	.224	
Urban	27 (23.5)	24 (22.4)	20 (18.0)	31 (27.9)				102 (23.0)
Suburban	75 (65.2)	61 (57.0)	68 (61.3)	66 (59.5)				270 (60.8)
Rural	11 (9.6)	22 (20.6)	17 (15.3)	13 (11.7)				63 (14.2)
Other (unspecified)	2 (1.7)	0 (0)	6 (5.4)	1 (0.9)				9 (2.0)
Full-time/part-time‡					3	1.30	.728	
Full-time (30+ hours/week)	105 (91.3)	97 (90.7)	96 (86.5)	101 (91.0)				399 (89.9)
Part-time (1-29 hours/week)	10 (8.7)	10 (9.3)	14 (12.6)	10 (9.0)				44 (9.9)
Other (unspecified)	0 (0)	0 (0)	1 (0.9)	0 (0)				1 (0.2)

‡ Because expected responses for some cells were < 5, and because *Other* responses were unspecified, these responses were excluded for χ^2 analysis.

Table 3

Participants who Failed Manipulation Check Questions by Condition

Condition	Self/DEA $n = 115$	Coworker/DEA $n = 107$	Self/Empirical data $n = 111$	Coworker/Empirical data $n = 111$	*df*	χ^2	*p*
Failed Q1 (*Select a color that you observed in the graphic*)	$n = 0$ (0%)	$n = 0$ (0%)	$n = 4$ (3.6%)	$n = 1$ (0.9%)	n/a[a]	n/a	n/a
Failed Q2 (*In the graphic, who does it say the storage protocol will protect?*)	$n = 39_{a}$ (33.9%)	$n = 2_{b}$ (1.9%)	$n = 40_{a}$ (36.0%)	$n = 5_{b}$ (4.5%)	3	72.01	<.001
Failed Q3 (*In the graphic, who does it say supports the storage protocol?*)	$n = 21_{a}$ (18.3%)	$n = 36_{a, b}$ (33.6%)	$n = 35_{a, b}$ (31.5%)	$n = 40_{b}$ (36.0%)	3	10.31	.016

Note. [a] Chi-square was unable to be calculated due to some cells containing fewer than 5 participants. Each subscript letter denotes columns whose proportions do not differ significantly from each other.

Table 4

Mixed Model ANOVA Testing Effects of Condition and Time on Willingness for All Participants (N = 443)

Factor	SS (df)	F	*p*	η_p^2
Intercept	4238760.45 (1)	2568.59	<.001	.85
Time	1417.03 (1)	24.44	<.001	.05
Self/coworker	8582.56 (1)	5.20	.023	.01
DEA/empirical data	1.93 (1)	0.00	.973	.00
Self/coworker x DEA/empirical data	212.49 (1)	0.13	.720	.00
Time x self/coworker	59.71 (1)	1.03	.311	.00
Time x DEA/empirical data	399.47 (1)	6.89	.009	.02
Time x self/coworker x DEA/empirical data	10.65 (1)	0.18	.668	.00

Table 5

Mixed Model ANOVA Testing Effects of Condition and Time on Willingness for Participants who Passed Manipulation Check Questions (N = 249)

Factor	SS (df)	F	*p*	η_p^2
Intercept	2347091.15 (1)	1437.60	<.001	.85
Time	467.52 (1)	8.82	.003	.04
Self/coworker	10195.59 (1)	6.25	.013	.03
DEA/empirical data	32.30 (1)	0.02	.888	.00
Self/coworker x DEA/empirical data	0.04 (1)	0.00	.996	.00
Time x self/coworker	79.83 (1)	1.51	.221	.01
Time x DEA/empirical data	111.05 (1)	2.10	.149	.01
Time x self/coworker x DEA/empirical data	40.58 (1)	0.77	.382	.00

Table 6

Two-Way ANOVA Testing Effects of Condition on Acceptability for All Participants (N = 444)

Factor	SS (df)	F	*p*	η_p^2
Intercept	1900894.63 (1)	11163.14	<.001	.96
Self/coworker	1664.73 (1)	9.78	.002	.02
DEA/empirical data	1480.13 (1)	8.69	.003	.02
Self/coworker x DEA/empirical data	2.31 (1)	2.31	.907	.01

Table 7

Two-Way ANOVA Testing Effects of Condition on Acceptability for Participants who Passed Manipulation Check Questions (N = 250)

Factor	SS (df)	F	*p*	η_p^2
Intercept	1047643.19 (1)	6426.52	<.001	.96
Self/coworker	1751.94 (1)	10.75	.001	.04
DEA/empirical data	771.23 (1)	4.73	.031	.02
Self/coworker x DEA/empirical data	20.44 (1)	0.13	.724	.00

Table 8

Mixed Model ANOVA Testing Belief in Means Substitution as a Moderator for the Effects of Condition and Time on Willingness for All Participants (N = 443)

Factor	SS (df)	F	*p*	η_p^2
Intercept	2107545.24 (1)	1278.76	<.001	.75
Time	836.77 (1)	14.84	<.001	.03
Self/coworker	5336.22 (1)	3.24	.073	.01
DEA/empirical data	1438.29 (1)	0.87	.351	.00
Belief in means substitution	7996.71 (4)	1.21	.305	.01
Self/coworker x DEA/empirical data	551.04 (1)	0.33	.563	.00
Self/coworker x belief in means substitution	2814.16 (4)	0.43	.789	.00
DEA/empirical data x belief in means substitution	10824.97 (4)	1.64	.163	.02
Self/coworker x DEA/empirical data x belief in means substitution	6799.31 (4)	1.03	.391	.01
Time x self/coworker	5.07 (1)	0.09	.764	.00
Time x DEA/empirical data	29.48 (1)	0.52	.470	.00
Time x belief in means substitution	99.91 (4)	0.44	.777	.00
Time x self/coworker x DEA/empirical data	110.62 (1)	1.96	.162	.01
Time x self/coworker x belief in means substitution	384.77 (4)	1.71	.148	.02
Time x DEA/empirical data x belief in means substitution	431.89 (4)	1.92	.107	.02
Time x self/coworker x DEA/empirical data x belief in means substitution	643.56 (4)	2.85	.023	.03

Table 9

Mixed Model ANOVA Testing Belief in Means Substitution as a Moderator for the Effects of Condition and Time on Willingness

Participants who Passed Manipulation Check Questions (N = 250)

Factor	SS (df)	F	*p*	η_p^2
Intercept	969902.08 (1)	607.07	<.001	.73
Time	191.34 (1)	3.63	.058	.02
Self/coworker	11170.89 (1)	6.99	.009	.03
DEA/empirical data	8.16 (1)	0.01	.943	.00
Belief in means substitution	7503.63 (4)	1.17	.323	.02
Self/coworker x DEA/empirical data	3.03 (1)	0.00	.965	.00
Self/coworker x belief in means substitution	7701.71 (4)	1.21	.309	.02
DEA/empirical data x belief in means substitution	17447.15 (4)	2.73	.030	.05
Self/coworker x DEA/empirical data x belief in means substitution	3942.12 (4)	0.62	.651	.01
Time x self/coworker	.24 (1)	0.01	.947	.00
Time x DEA/empirical data	13.93 (1)	0.26	.608	.00
Time x belief in means substitution	324.65 (4)	1.54	.191	.03
Time x self/coworker x DEA/empirical data	10.86 (1)	0.21	.650	.00
Time x self/coworker x belief in means substitution	65.12 (4)	0.31	.872	.01
Time x DEA/empirical data x belief in means substitution	138.06 (4)	0.66	.624	.01
Time x self/coworker x DEA/empirical data x belief in means substitution	333.01 (4)	1.58	.180	.03

Table 10

Three-Way ANOVA Testing Belief in Means Substitution as a Moderator for the Effects of Condition on Acceptability for All Participants (N = 444)

Factor	SS (df)	F	*p*	η_p^2
Intercept	921094.03 (1)	5632.72	<.001	.11
Self/coworker	990.40 (1)	6.06	<.001	.93
DEA/empirical data	738.13 (1)	4.51	.014	.01
Belief in means substitution	4065.65 (4)	6.22	.034	.01
Self/coworker x DEA/empirical data	284.38 (1)	1.74	<.001	.06
Self/coworker x belief in means substitution	163.15 (4)	0.25	.188	.00
DEA/empirical data x belief in means substitution	494.51 (4)	0.76	.910	.00
Self/coworker x DEA/empirical data x belief in means substitution	1017.65 (4)	1.56	.554	.01

Table 11

Tukey's HSD Post-Hoc Test for ANOVA Testing Belief in Means Substitution as a Moderator for the Effects of Condition on Acceptability for All Participants (N = 444)

Belief in means substitution (*N,* %)	Belief in means substitution (*N*, %)	Mean difference	Standard error	*p*
Strongly agree (100, 22.5%)	Strongly disagree (17, 3.8%)	-8.33	3.35	.096
	Somewhat disagree (65, 14.6%)	-7.76	2.04	.001
	Neither agree nor disagree (60, 13.5%)	-2.71	2.09	.692
	Somewhat agree (202, 45.5%)	-6.43	1.56	<.001
Somewhat agree (202, 45.5%)	Strongly disagree (17, 3.8%)	-1.90	3.23	.977
	Somewhat disagree (65, 14.6%)	-1.33	1.82	.949
	Neither agree nor disagree (60, 13.5%)	3.72	1.88	.279
Neither agree nor disagree (60, 13.5%)	Strongly disagree (17, 3.8%)	-5.62	3.51	.499
	Somewhat disagree (65, 14.6%)	-5.05	2.29	.180
Somewhat disagree (65, 14.6%)	Strongly disagree (17, 3.8%)	-0.57	3.48	1.000

Table 12

Three-way ANOVA Testing Belief in Means Substitution as a Moderator for the Effects of Condition on Acceptability for Participants who Passed Manipulation Check Questions (N = 250)

Factor	SS (df)	F	*p*	η_p^2
Intercept	422257.00 (1)	2631.22	<.001	.92
Self/coworker	1255.92 (1)	7.83	.006	.03
DEA/empirical data	31.71 (1)	0.20	.657	.00
Belief in means substitution	1904.38 (4)	2.97	.020	.05
Self/coworker x DEA/empirical data	124.21 (1)	0.77	.380	.00
Self/coworker x belief in means substitution	230.48 (4)	0.36	.838	.01
DEA/empirical data x belief in means substitution	618.88 (4)	0.96	.428	.02
Self/coworker x DEA/empirical data x belief in means substitution	665.90 (4)	1.04	.389	.02

Table 13

Tukey's HSD Post-Hoc Test for ANOVA Testing Belief in Means Substitution as a Moderator for the Effects of Condition on Acceptability for Participants who Passed Manipulation Check Questions (N = 250)

Belief in means substitution (*N*, %)	Belief in means substitution (*N*, %)	Mean difference	Standard error	*p*
Strongly agree (61, 24.4%)	Strongly disagree (8, 3.2%)	-8.35	4.76	.403
	Somewhat disagree (40, 16.0%)	-6.23	2.58	.114
	Neither agree nor disagree (29, 11.6%)	-1.64	2.86	.979
	Somewhat agree (112, 44.8%)	-5.40	2.02	.060
Somewhat agree (112, 44.8%)	Strongly disagree (8, 3.2%)	-2.96	4.64	.969
	Somewhat disagree (40, 16.0%)	-0.83	2.33	.997
	Neither agree nor disagree (29, 11.6%)	3.76	2.64	.613
Neither agree nor disagree (29, 11.6%)	Strongly disagree (8, 3.2%)	-6.71	5.06	.675
	Somewhat disagree (40, 16.0%)	-4.59	3.09	.574
Somewhat disagree (40, 16.0%)	Strongly disagree (8, 3.2%)	-2.13	4.91	.993

Table 14

Mixed model ANOVA Testing Reported Likelihood that Participant will Attempt Suicide in the Future as a Moderator for the Effects of Condition and Time on Willingness for All Participants (N = 443)

Factor	SS (df)	F	*p*	η_p^2
Intercept	682009.30 (1)	410.74	<.001	.49
Time	583.55 (1)	10.18	.002	.02
Self/coworker	725.54 (1)	0.44	.509	.00
DEA/empirical data	753.95 (1)	0.45	.501	.00
Likelihood of participant attempt	12064.78 (6)	1.21	.299	.02
Self/coworker x DEA/empirical data	736.17 (1)	0.44	.506	.00
Self/coworker x likelihood of participant attempt	6463.95 (4)	0.97	.422	.01
DEA/empirical data x likelihood of participant attempt	4931.65 (5)	0.59	.705	.01
Self/coworker x DEA/empirical data x likelihood of participant attempt	3343.47 (4)	0.50	.733	.01
Time x self/coworker	71.12 (1)	1.24	.266	.00
Time x DEA/empirical data	18.16 (1)	0.32	.574	.00
Time x likelihood of participant attempt	536.66 (6)	1.56	.157	.02
Time x self/coworker x DEA/empirical data	45.57 (1)	0.80	.373	.00
Time x self/coworker x likelihood of participant attempt	319.87 (4)	1.40	.235	.01
Time x DEA/empirical data x likelihood of participant attempt	146.58 (5)	0.51	.768	.01
Time x self/coworker x DEA/empirical data x likelihood of participant attempt	280.80 (4)	1.23	.300	.01

Table 15

Mixed model ANOVA Testing Reported Likelihood that Participant will Attempt Suicide in the Future as a Moderator for the Effects of Condition and Time on Willingness for Participants who Passed Manipulation Check Questions (N = 249)

Factor	SS (df)	F	*p*	η_p^2
Intercept	467264.47 (1)	285.97	<.001	.56
Time	272.17 (1)	5.23	.023	.02
Self/coworker	1788.83 (1)	1.10	.297	.01
DEA/empirical data	263.65 (1)	0.16	.688	.00
Likelihood of participant attempt	4312.82 (6)	0.44	.852	.01
Self/coworker x DEA/empirical data	312.06 (1)	0.19	.663	.00
Self/coworker x likelihood of participant attempt	6210.36 (4)	0.95	.436	.02
DEA/empirical data x likelihood of participant attempt	12747.47 (4)	1.95	.103	.03
Self/coworker x DEA/empirical data x likelihood of participant attempt	6706.30 (4)	1.03	.395	.02
Time x self/coworker	36.35 (1)	0.70	.404	.00
Time x DEA/empirical data	41.33 (1)	0.79	.374	.00
Time x likelihood of participant attempt	621.36 (6)	1.99	.068	.05
Time x self/coworker x DEA/empirical data	121.08 (1)	2.33	.129	.01
Time x self/coworker x likelihood of participant attempt	46.16 (4)	0.22	.926	.00
Time x DEA/empirical data x likelihood of participant attempt	124.55 (4)	0.60	.664	.01
Time x self/coworker x DEA/empirical data x likelihood of participant attempt	169.36 (4)	0.81	.518	.01

Table 16

Three-Way ANOVA Testing Reported Likelihood that Participant will Attempt Suicide in the Future as a Moderator for the Effects of Condition on Acceptability for All Participants (N = 444)

Factor	SS (df)	F	*p*	η_p^2
Intercept	322030.21 (1)	1863.04	<.001	.82
Self/coworker	1450.42 (1)	8.39	.004	.02
DEA/empirical data	475.25 (1)	2.75	.098	.01
Likelihood of participant attempt	665.93 (6)	0.64	.697	.01
Self/coworker x DEA/empirical data	2.51 (1)	0.01	.904	.00
Self/coworker x likelihood of participant attempt	839.95 (4)	1.22	.304	.01
DEA/empirical data x likelihood of participant attempt	158.08 (5)	0.18	.969	.00
Self/coworker x DEA/empirical data x likelihood of participant attempt	541.09 (4)	0.78	.537	.01

Table 17

Three-Way ANOVA Testing Reported Likelihood that Participant will Attempt Suicide in the Future as a Moderator for the Effects of Condition on Acceptability for Participants who Passed Manipulation Check Questions (N = 250)

Factor	SS (df)	F	*p*	η_p^2
Intercept	206645.14 (1)	1285.58	<.001	.85
Self/coworker	1073.94 (1)	6.68	.010	.03
DEA/empirical data	1024.47 (1)	6.37	.012	.03
Likelihood of participant attempt	1439.07 (6)	1.49	.182	.04
Self/coworker x DEA/empirical data	13.97 (1)	0.09	.768	.00
Self/coworker x likelihood of participant attempt	659.06 (4)	1.03	.395	.02
DEA/empirical data x likelihood of participant attempt	802.75 (4)	1.25	.291	.02
Self/coworker x DEA/empirical data x likelihood of participant attempt	742.08 (4)	1.15	.332	.02

Table 18

Mixed model ANOVA Testing Reported Likelihood that a Coworker will Attempt Suicide in the Future as a Moderator for the Effects of Condition and Time on Willingness for All Participants (N = 442)

Factor	SS (df)	F	*p*	η_p^2
Intercept	1252099.76 (1)	766.23	<.001	.65
Time	342.96 (1)	5.83	.016	.01
Self/coworker	55.50 (1)	0.03	.854	.00
DEA/empirical data	1188.75 (1)	0.73	.394	.00
Likelihood of coworker attempt	18689.14 (6)	1.91	.079	.03
Self/coworker x DEA/empirical data	0.26 (1)	0.00	.990	.00
Self/coworker x likelihood of coworker attempt	10592.41 (6)	1.08	.373	.02
DEA/empirical data x likelihood of coworker attempt	9456.31 (6)	0.96	.449	.01
Self/coworker x DEA/empirical data x likelihood of coworker attempt	5316.02 (6)	0.54	.776	.01
Time x self/coworker	64.72 (1)	1.10	.295	.00
Time x DEA/empirical data	95.12 (1)	1.62	.204	.00
Time x likelihood of coworker attempt	99.05 (6)	0.28	.946	.00
Time x self/coworker x DEA/empirical data	.02 (1)	0.00	.987	.00
Time x self/coworker x likelihood of coworker attempt	308.75 (6)	0.87	.514	.01
Time x DEA/empirical data x likelihood of coworker attempt	323.90 (6)	0.92	.482	.01
Time x self/coworker x DEA/empirical data x likelihood of coworker attempt	90.17 (6)	0.26	.957	.00

Table 19

Mixed model ANOVA Testing Reported Likelihood that a Coworker will Attempt Suicide in the Future as a Moderator for the Effects of Condition and Time on Willingness for Participants who Passed Manipulation Check Questions (N = 249)

Factor	SS (df)	F	*p*	η_p^2
Intercept	842956.37 (1)	522.89	<.001	.70
Time	174.91 (1)	3.30	.071	.02
Self/coworker	902.09 (1)	0.56	.455	.00
DEA/empirical data	1941.26 (1)	1.20	.274	.01
Likelihood of coworker attempt	7088.23 (6)	0.73	.624	.02
Self/coworker x DEA/empirical data	281.45 (1)	0.18	.676	.00
Self/coworker x likelihood of coworker attempt	16568.61 (6)	1.71	.119	.04
DEA/empirical data x likelihood of coworker attempt	19445.54 (6)	2.01	.065	.05
Self/coworker x DEA/empirical data x likelihood of coworker attempt	1818.93 (4)	0.28	.889	.01
Time x self/coworker	164.79 (1)	3.11	.079	.01
Time x DEA/empirical data	26.24 (1)	0.50	.483	.00
Time x likelihood of coworker attempt	204.66 (6)	0.64	.695	.02
Time x self/coworker x DEA/empirical data	23.80 (1)	0.45	.504	.00
Time x self/coworker x likelihood of coworker attempt	152.71 (6)	0.48	.823	.01
Time x DEA/empirical data x likelihood of coworker attempt	354.21 (6)	1.11	.355	.03
Time x self/coworker x DEA/empirical data x likelihood of coworker attempt	180.46 (4)	0.85	.494	.02

Table 20

Three-Way ANOVA Testing Reported Likelihood that a Coworker will Attempt Suicide in the Future as a Moderator for the Effects of Condition on Acceptability for All Participants (N = 443)

Factor	SS (df)	F	*p*	η_p^2
Intercept	508143.61 (1)	3077.07	<.001	.88
Self/coworker	523.52 (1)	3.17	.076	.01
DEA/empirical data	1134.41 (1)	6.87	.009	.02
Likelihood of coworker attempt	1659.32 (6)	1.68	.126	.02
Self/coworker x DEA/empirical data	43.04 (1)	0.26	.610	.00
Self/coworker x likelihood of coworker attempt	1648.53 (6)	1.66	.128	.02
DEA/empirical data x likelihood of coworker attempt	2175.89 (6)	2.20	.043	.03
Self/coworker x DEA/empirical data x likelihood of coworker attempt	1415.48 (6)	1.43	.202	.02

Table 21

Three-Way ANOVA Testing Reported Likelihood that a Coworker will Attempt Suicide in the Future as a Moderator for the Effects of Condition on Acceptability for Participants who Passed Manipulation Check Questions (N = 250)

Factor	SS (df)	F	*p*	η_p^2
Intercept	347344.72 (1)	2189.67	<.001	.91
Self/coworker	1017.83 (1)	6.42	.012	.03
DEA/empirical data	1139.12 (1)	7.18	.008	.03
Likelihood of coworker attempt	1671.22 (6)	1.76	.109	.05
Self/coworker x DEA/empirical data	.00 (1)	0.00	.998	.00
Self/coworker x likelihood of coworker attempt	470.88 (6)	0.50	.812	.01
DEA/empirical data x likelihood of coworker attempt	1161.39 (6)	1.22	.297	.03
Self/coworker x DEA/empirical data x likelihood of coworker attempt	923.27 (4)	1.46	.217	.03

Table 22

Qualitative Responses for "What, if anything, would make this graphic more helpful and impactful to you?"

Parent Code	Child code (Grandchild code) [Great grandchild code]	Description	Self/DEA	Other/DEA	Self/ empirical data	Other/ empirical data	Total
Message		Feedback relates to the graphic's message	55	35	41	43	174
	Research/empirical data	Add information from research literature regarding suicide prevention, provide empirical data, etc.	20	14	7	18	59
	(Numbers/Statistics)	Use numbers or statistics	19	14	7	12	52
	[Related to suicide prevalence]	Use numbers or statistics regarding prevalence of suicide in veterinarians	9	8	3	3	23
	[Effectiveness of means safety]	Use numbers or statistics regarding the effectiveness of means safety	2	4	2	3	11
	More concise	Should use fewer words / be more concise	3	6	11	14	34
	Talk about protecting self and others	Discuss protecting others and self, rather than only one or the other	12	0	12	4	28
Nothing/Unsure		"Nothing," "unsure," "I don't know," or no recommendations for improvement	20	28	24	30	102

(con't.)

Parent Code	Child code (Grandchild code) [Great grandchild code]	Description	Self/DEA	Other/DEA	Self/ empirical data	Other/ empirical data	Total
Appearance		Feedback focuses on the appearance of the graphics	13	13	14	13	53
	Different colors	Use bolder, brighter, or different colors	9	5	6	6	26
	Add/change graphics	Add higher-quality photos, better graphics, or additional graphics (e.g., of animals)	5	7	5	6	23
Link, QR code, or phone number for more information or mental health support		Add link, QR code, or phone number for more information, mental health support, or lockbox resources	12	12	8	10	42
	Hotline information / mental health resources	Suicide hotline information or link to mental health resources	10	10	6	8	34
	Logistical information	QR code or link to more information regarding how to implement (e.g., where to get a lockbox)	2	2	2	2	8
Means safety would not be effective		Graphic will not be effective, because adding an extra lockbox for pentobarbital will not prevent suicide	10	2	1	0	13

Table 23

Qualitative Responses for "If this graphic were utilized, where and how do you see it being distributed in order to have maximum impact (e.g., displayed in practice buildings, above lockboxes, via social media, etc.)?"

Parent Code	Child code	Description	Self/DEA	Other/DEA	Self/ empirical data	Other/ empirical data	Total
In veterinary practices		In veterinary practice space	79	69	73	71	292
	Above/on/near lockboxes	Above, on, or near lockboxes	66	55	64	59	244
	Break room/ bathroom / office	In break rooms, bathroom, personnel offices	6	5	6	4	21
	In treatment areas	Should be displayed in veterinary treatment areas	2	0	3	1	6
	Meetings / trainings	Should be discussed at meetings for veterinary office or as part of training protocols (e.g., handbook)	1	2	0	1	4
Social media / vet websites		Should be distributed via social media and through veterinary websites and online veterinary suicide prevention networks (NOMV)	43	39	38	41	161

(con't.)

Parent Code	Child code	Description	Self/DEA	Other/DEA	Self/ empirical data	Other/ empirical data	Total
Sent out by veterinary organizations/ associations (AVMA, VMA, DEA)		Sent out in mailers, via e-mail from veterinary associations, in magazines, etc.	9	11	14	11	45
CE events/ conferences/ other events		CE events, veterinary conferences, other events (e.g., trade shows)	5	3	9	7	24
Pentobarbital suppliers		Should be presented with pentobarbital information online, or sent with pentobarbital orders	6	1	8	6	21
Specific medium recommendation		No specific location, but desire for stickers, magnets, e-mail, or other specific form of media	0	11	5	3	19