The Impact of Unusually Distressing Events on Veterinary Professionals

by

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Abstract

Previous studies have catalogued safety hazards and frequency of workers' compensation claims in the veterinary workplace. However, distressing events other than workplace injuries have not been collected and analyzed, and the psychological consequences of these events have not previously been studied. First, in this study of 359 veterinary professionals, we determined that 62.2% (n=224) reported exposure to an unusually distressing event at work. Using grounded theory analysis to code the event narratives, we determined that the events mentioned most frequently were procedure-related complications, difficult interactions with clients, being bitten, and exposure to pain and suffering of animals. Second, we determined that 21.1% ($n = 76$) of the sample reported exposure to a work-related event that qualified as traumatic according to the Diagnostic and Statistical Manual of Mental Disorders 5th Edition (DSM-5); a larger proportion (39.3%; $n = 141$) qualified if the *DSM-5* definition were expanded to include animals as victims. Next, we estimated that between 3.6% (n=13) and 13.9% (n=50) of veterinary professionals screened positive for PTSD on the Primary Care PTSD screener (PC-PTSD), using different methods of interpreting the criteria for PTSD. Last, we determined that exposure to distressing events at work was correlated with suicidal ideation, distress, and burnout as well as decreased job satisfaction, and that the number of exposures reported by respondents was positively correlated with depression, suicidal ideation, distress, and burnout. In conclusion, our study suggests that veterinary professionals are commonly exposed to distressing events at work that are associated with a variety of negative mental health outcomes. Future research should consider strategies to prevent exposure to these events and mitigate their negative consequences when exposure is unavoidable.

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Introduction

Multiple studies have demonstrated that veterinarians experience elevated rates of negative mental health outcomes, including depression, psychological distress, suicidal ideation, and substance use (Bartram et al., 2009a; Gardner & Hini, 2006; Harling et al., 2009; Mellanby, 2005; Nett et al., 2015; Perret et al., 2020; Platt et al., 2010) and that they are at a higher risk for death by suicide than the general population (Tomasi et al., 2019; Witte et al., 2019). Less is known about negative mental health outcomes for support team members such as veterinary technologists, technicians, and assistants; however, nearly three-quarters of veterinary technicians report high levels of occupational stress (Foster & Maples, 2014), and support team members are also at a higher risk for death by suicide than the general population (Witte et al., 2019). Stressors in the work environment, such as working long hours, making professional mistakes, and interactions with clients, may contribute to negative mental health outcomes (Bartram, Yadegarfar, & Baldwin, 2009b; Figley & Roop, 2006; Gardner & Hini, 2006; Nett et al., 2015; Vande Griek et al., 2018). Beyond these top stressors, veterinary professionals[1] are also exposed to distressing events in the workplace, such as the threat of injury, as evidenced by a high rate of insurance claims (Fowler et al., 2016; Mishra & Palkhade, 2020; Nienhaus et al., 2005; United States Department of Labor, 2017). Despite the evidence that veterinary professionals experience an elevated level of exposure to threats in their workplace, there is a

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[1] For the purposes of this paper, veterinarians and veterinary support team members such as technologists, technicians, and assistants will collectively be referred to as veterinary professionals. Veterinary technology is a bachelor-level degree, and technologists perform imaging procedures (e.g., ultrasounds). Certified veterinary technicians complete an associate degree and pass a professional exam. Their responsibilities are wide-ranging and include assisting with surgery, drawing blood, and frequent animal-handling duties. Veterinary assistants receive on-the-job training to support veterinarians and veterinary technicians. Their responsibilities differ from state to state, based on legislature enacted by each state's licensing board, but generally include frequent animal-handling duties.

scarcity of research focused on the psychological consequences of these potentially distressing events.

Some researchers have proposed that performing euthanasia, an occupational responsibility not often encountered in other professions, could partially explain the elevated rates of negative mental health outcomes among veterinarians (Bartram & Baldwin, 2010; Scotney, McLaughlin, & Keates, 2015). However, studies of veterinarians have demonstrated that performing euthanasia is not related to chronic stress at work (Wallace, 2017) nor does it contribute to depressed mood at work (Tran et al., 2014). Also, when asked to identify occupational stressors, veterinarians ranked animal deaths (from illness or euthanasia) lower than stressors related to client interactions and demands of practice (Nett et al., 2015). Moreover, a study of veterinary nurses in Australia reported that general workplace demands accounted for more variance in levels of job-related psychological strain than exposure to animal suffering and euthanasia (Deacon & Brough, 2017). Thus, while there may be individual instances of euthanasia that are particularly distressing for veterinary professionals, there appear to be more salient stressors than euthanasia.

One type of distressing event to which veterinary professionals are regularly exposed is the threat of direct danger or injury that results from interactions with animal patients. Between 34% to 71% of veterinarians and up to 98% of veterinary technicians report sustaining a major injury at work (Fowler et al., 2016; Fritschi et al., 2006; Hill et al., 1998; Landercasper et al., 1988; Langley et al., 1995; Mishra & Palkhade, 2020; Nienhaus et al., 2005; Phillips et al., 2000; Poole et al., 1998, 1999; Soest & Fritschi, 2004). The U.S. Department of Labor reported that individuals employed in veterinary services have the fourth-highest incidence rate of injuries and illness at 9.8 claims for every 100 full-time employees (United States Department of Labor,

2017). Injuries include bites, scratches, animal kicks, boring, head butting, and being crushed. Veterinarians and support staff are also at risk for zoonotic infections, self-inflicted scalpel wounds, lacerations, needle sticks, exposure to radiation, and exposure to anesthetic gases. Compared to their counterparts in human medicine, veterinarians file 2.9 times more work-related injury claims than physicians (Nienhaus et al., 2005), and injury claims for support staff outnumber those for veterinarians because their job responsibilities involve more animal handling (Fowler et al., 2016). Frequent exposure to direct danger or injury in the workplace may contribute to negative mental health outcomes, including depression, psychological distress, suicidal ideation, substance use, and posttraumatic stress disorder (PTSD).

However, while rates of depression, psychological distress, suicidal ideation, substance use, and death by suicide have previously been estimated for veterinarians (Bartram et al., 2009b; Deacon & Brough, 2017; Fritschi et al., 2009; Gardner & Hini, 2006; Harling et al., 2009; Mellanby, 2005; Nett et al., 2015; Perret et al., 2020; Platt et al., 2010; Rivera et al., 2021; Tomasi et al., 2019; Witte et al., 2019), only one small study ($N = 21$) of healthcare professionals serving in the military has estimated the prevalence of PTSD in veterinary professionals. The authors of that study determined that 1 out of 21 (5%) veterinary professionals were considered at risk for PTSD (Penix et al., 2019). The small number of cases assessed in the study combined with the specificity of the military environment limits the conclusions that can be drawn regarding the application of these results to non-military veterinary professionals.

To qualify for a diagnosis of PTSD, according to the fifth edition of the *Diagnostic and Statistical Manual of Mental Disorders* (*DSM-5*; American Psychiatric Association, 2013), individuals must report a qualifying traumatic event (i.e., meet Criterion A for PTSD). Then, they must endorse the requisite number of symptoms from each of the following symptom

clusters (i.e., Criteria B through E): (1) intrusive symptoms such as nightmares or flashbacks, (2) avoidance symptoms in which the individual avoids situations that might remind them of the event, (3) negative alterations in mood such as feeling guilty or numb, and (4) alterations in reactivity where the individual feels "on guard" or is easily startled (APA, 2013). Finally, the PTSD symptoms need to be directly linked to the traumatic event, persist for more than one month, result in clinically significant distress and/or impairment, and cannot be explained by other causes, such as a medication (Criteria F through H; APA, 2013).

The *DSM-5* provides specific guidelines to determine if an event meets Criterion A for PTSD. First, the event must involve exposure to "actual or threatened death, serious injury, or sexual violence," (APA, 2013, p. 271). Additionally, the event must be categorized as one of the following four types of exposure: (1) direct experience of an event, (2) witnessing an event, (3) learning that a violent or accidental event occurred to a close family member or friend, or (4) repeated or extreme exposure to details of an event, (APA, 2013). It is important to note that although approximately 75% of the population will be exposed to an event that meets Criterion A (Breslau & Kessler, 2001), only an estimated 6.8% of individuals develop PTSD over their lifetime (Kessler et al., 2005). A Criterion A event is therefore necessary, but not sufficient, for a PTSD diagnosis because not every person who experiences a traumatic event will develop a sufficient number of symptoms. Conversely, individuals can develop a cluster of PTSD-like symptoms (i.e., meet Criteria B through H) after experiencing an event that does not meet Criterion A (Franklin et al., 2019; Rosen & Lilienfeld, 2008). Neither of these instances results in a diagnosis of PTSD according to the *DSM-5*.

Since the inclusion of PTSD in the *DSM-III* (American Psychiatric Association, 1980), there has been debate as to the construct validity of the disorder and how to define a traumatic

event (Franklin et al., 2019; Rosen & Lilienfeld, 2008). It is valuable to acknowledge this controversy when considering the experiences of veterinary professionals because they are likely to encounter distressing events that do not fit neatly into Criterion A as currently defined in the *DSM-5*. Two types of Criterion A exposure - direct experience of an event (e.g., being mauled by a dog) and witnessing an event (e.g., watching a coworker be kicked by a horse) - may be common types of exposure among veterinary professionals because of the frequency of their interactions with animals. However, the other two types of exposure listed in the *DSM-5* were developed with human victims in mind, whereas veterinary professionals may frequently be exposed to traumatic events that involve animal victims. For instance, a strict interpretation of the third event type requires learning about a violent event that happened to a "close family member or close friend," (APA, 2013, p. 271). It is conceivable in veterinary medicine that it may be more common but similarly distressing to learn about a violent event or death happening to an animal victim rather than a human one (e.g., losing a long-term client to a violent death, such as being hit by a car or killed by another animal). Likewise, under the fourth event type, a strict interpretation would require that any victim of the event be human (e.g., human remains or child abuse), but veterinary professionals may experience similar events that involve animal remains or animal abuse. Frequency of exposure may vary, but veterinary professionals in clinical practice are likely to be asked to treat animals who have been the victims of neglect, cruelty, abuse, or gruesome accidents, such as being hit by a car or attacked by another animal.

There is some evidence in the literature that exposure to an extreme event involving animal victims can result in a cluster of PTSD symptoms. In two separate samples of individuals forced to cull livestock due to foot and mouth disease, a majority of workers endorsed clinical levels of PTSD symptoms (Olff et al., 2005; Park et al., 2020). However, the slaughter of healthy

animals does not qualify under Criterion A, so those front-line workers would not technically meet criteria for PTSD according to the *DSM-5*. Likewise, veterinary professionals who encounter distressing events that involve animals as victims may experience clinical levels of PTSD symptoms (Criteria B through E), but they would not be diagnosed with PTSD due to a non-qualifying traumatic event (Criterion A).

With the exception of the aforementioned Penix et al. (2019) study, a literature search resulted in no other published research estimating symptoms or prevalence of PTSD in veterinary professionals. However, there are estimates for physicians and nurses who treat human patients. For comparison, in the general population, the estimated 12-month prevalence of PTSD is 3.6%, and the estimated lifetime prevalence for PTSD is 6.8% (Kessler et al., 2005). A review of literature estimating PTSD prevalence among nurses reported a range from 8.5% to 20.8% of nurses of various specialties potentially meeting criteria for PTSD (Schuster & Dwyer, 2020). Estimates for trauma surgeons and non-trauma surgeons were 15% and 18%, respectively (Jackson et al., 2019). Despite the range in estimated rates of PTSD, overall, the rates are consistently higher than the prevalence of PTSD in the general population.

Reviewing the types of events that emergency department (ED) nurses deem most distressing may provide insight into the types of events that veterinary professionals may report as distressing. According to a study of 248 nurses (Adriaenssens et al., 2012), the most distressing work-related events include: a) sudden death of a young person or baby, b) handling victims of car crashes or other physical trauma, and c) dealing with aggression, violence, and threat. As previously stated, veterinary professionals are frequently exposed to aggression, violence, and threats in the workplace, and these events may potentially meet Criterion A for a PTSD diagnosis in veterinary professionals, just as they would for nurses. Veterinary

professionals may also be exposed to situations analogous to the first two event categories with the substitution of animal patients for humans (e.g., sudden death of a puppy or kitten; handling an animal who has been hit by a car). However, under a strict interpretation of Criterion A, these distressing events would not qualify for a diagnosis of PTSD in veterinary professionals although they would for nurses. Nurses also list *inability to deliver good quality of care* and *inability to help chronically ill patients* as distressing events in the workplace (Adriaenssens et al., 2012). It is probable that veterinary professionals experience similar types of events in their medical practice, although these events would be unlikely to meet Criterion A for a PTSD diagnosis for either group. Thus, some of the most distressing events that are encountered in veterinary medicine may not result in a diagnosis of PTSD because they do not meet Criterion A, even though the individual meets the remaining criteria for the disorder.

One limitation of studies estimating prevalence of PTSD within healthcare occupations is that the measures typically focus exclusively on symptoms that develop as a result of work-related events and fail to account for exposure to traumatic events outside of work. For instance, the introduction to the assessment instructs participants to reflect on work-related traumatic events for the past 6 months (Adriaenssens et al., 2012; Somville et al., 2016); or it defines exposure to trauma as a number of critical cases (Joseph et al., 2014); or the authors include a cover letter that states the study is about events that happen in a critical care environment (Mealer et al., 2007). Respondents who indicate that they have not been exposed to work-related events are relegated to the non-PTSD condition and are not given the opportunity to endorse PTSD symptoms. However, it is possible that some respondents who answer negatively may have experienced a Criterion A event outside of work and may endorse clinical levels of symptoms about the non-work-related event if asked, but this information is not captured. The

result is that estimates of PTSD prevalence that only address work-related events may underestimate the true prevalence of PTSD symptoms in a sample.

Although research into the prevalence of PTSD for veterinary professionals has been sparse, there has been some research into which categories of distressing events may contribute to other work-related negative consequences such as feelings of burnout. Burnout is defined as energy depletion related to chronic stress at one's place of work and is related to decreased productivity and decreased job satisfaction (Maslach et al., 2001). Wallace (2017) reported that demands of practice, unrealistic client expectations, and exposure to the suffering of animals were the best predictors of burnout for veterinarians. More critically, Wallace (2017) demonstrated that burnout has been positively associated with suicidal thoughts in veterinarians employed in clinical practice. Veterinary professionals may experience many distressing events that involve unrealistic client expectations or the suffering of their animal patients, so it would be valuable to understand the connection between these events and burnout and level of job satisfaction.

The Current Study

The goal of this study was to describe, for the first time, how unusually distressing events encountered by veterinary professionals may contribute to negative mental health outcomes. There were six aims for the current study. The first aim was to determine the proportion of veterinary professionals who reported exposure to the following categories of unusually distressing events: 1) events related to work as a veterinary professional that involve direct danger or injury to themselves (DT = direct threat; e.g., being kicked in the head by a horse); 2) events related to work as a veterinary professional that do not involve direct danger or injury to themselves (NDT = non-direct threat; e.g., witnessing a colleague being attacked by a dog); and

3) events outside of work in the veterinary profession (OUT = outside of work; e.g., natural disaster, physical or sexual assault). Because more than half of veterinarians and almost all veterinary technicians reported sustaining a work-related injury (Fowler et al., 2016; Fritschi et al., 2006; Hill, Langley, & Morrow, 1998; Landercasper, Cogbill, Strutt, & Landercasper, 1988; Langley, Pryor Jr., & O'Brien, 1995; Phillips, Jeyaretnam, & Jones, 2000; Poole, Shane, Kearney, & Rehn, 1998; Poole, Shane, McConnell, & Kearney, 1999; Soest & Fritschi, 2004), we expected that most of the sample would report at least one event that belongs in category 1 or 2. However, because the job responsibilities of veterinary technologists, technicians, and assistants include more animal handling tasks than veterinarians, and because a larger proportion of veterinary technicians report injury claims than veterinarians do (Fowler et al., 2016), we expected that veterinary professionals who are not veterinarians would be more likely to report events that belong to category 1 than veterinarians. On the other hand, given the limited research for all types of veterinary professionals on distressing events that would fit into category 2, we did not make a specific hypothesis about whether one type of veterinary professional would have higher rates of exposure than others.

The second aim was to conduct a qualitative analysis describing the types of events that veterinary professionals experience as "unusually horrible or traumatic" in the workplace. Participants' narratives of these events were coded to determine the type of distressing events that are most frequently encountered by veterinary professionals. As an exploratory aim, we also examined whether veterinarians are exposed to certain types of events more frequently than veterinary technicians, veterinary technologists, and veterinary assistants.

The third aim of this study was to determine the proportion of veterinary professionals who had been exposed to unusually distressing events that meet Criterion A for PTSD. Previous

research demonstrated that veterinary professionals are likely to encounter distressing events that expose them to direct danger and injury in the workplace (Fowler et al., 2016; Fritschi et al., 2006; Hill, Langley, & Morrow, 1998; Landercasper, Cogbill, Strutt, & Landercasper, 1988; Langley, Pryor Jr., & O'Brien, 1995; Phillips, Jeyaretnam, & Jones, 2000; Poole, Shane, Kearney, & Rehn, 1998; Poole, Shane, McConnell, & Kearney, 1999; Soest & Fritschi, 2004), but there has not been any research to determine whether those events would qualify as potentially traumatic by DSM-5 standards. To accomplish this aim, we evaluated events that occurred both inside and outside the workplace. Each event was evaluated against the four types of events listed under Criterion A in the *DSM-5* (i.e., direct experience, witnessing, learning an event happened to a loved one, and repeated exposure), and only events that met a strict interpretation of Criterion A were coded as positive.

However, we anticipated that veterinary professionals would report being highly affected by distressing events that do not meet the qualifications for Criterion A due to an animal being the victim, and that exposure to these events could still be related to negative mental health outcomes. While the goal of this paper is not to propose changes to Criterion A for PTSD, we believed that there would be value in documenting whether an expanded interpretation of Criterion A would significantly impact the proportion of individuals in veterinary medicine who could potentially be diagnosed with PTSD. To capture these instances, each event narrative went through a second evaluation under an alternate definition of Criterion A that considered animals as potential victims. Similar to Kilpatrick, Resnick, and Acierno (2009), we referred to this category as High Magnitude Stressor-Animal (HMS-A). HMS-A events were assessed according to criteria identical to the *DSM-5* definition of Criterion A, except the criteria were expanded to also include witnessing a violent event involving an animal victim or being exposed to repeated

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or extreme details of an event that involved animal victims. For example, witnessing a dog being hit by a car qualified as an HMS-A event because witnessing a person being hit by a car would qualify. In contrast, low-magnitude stressors such as learning of a terminal diagnosis for an animal (e.g., cancer) did not qualify as meeting HMS-A because learning of a terminal diagnosis for a person would not qualify. This coding process resulted in six categories of distressing events: a) work-related DT event that met guidelines for Criterion A; b) work-related DT event that met guidelines for HMS-A c) work-related NDT event that met guidelines for Criterion A; d) work-related, NDT event that met guidelines for HMS-A; e) non-work-related event that met guidelines for Criterion A; and f) non-work-related event that met guidelines for HMS-A. The HMS-A categories subsumed the Criterion A categories (i.e. if a narrative was determined to meet Criterion A, it was automatically considered to meet guidelines for the broader HMS-A guidelines).

The fourth aim of this study was to estimate the prevalence of veterinary professionals who might screen positive for PTSD (i.e., endorse three or more symptoms on the Primary Care PTSD Screen for DSM-5 [PC-PTSD-5]; Prins et al., 2016). To accommodate exposure to multiple traumatic events, prevalence was estimated using two methods: a *Same Event* method and a *Composite Event* method (Kilpatrick et al., 2013). In the Same Event method, an individual was only coded as positive for a potential diagnosis of PTSD if they endorsed three or more symptoms related to the same event, and that event met either Criterion A or HMS-A. For example, a respondent who reported a DT event that was coded as a Criterion A event in Aim 3 (e.g., being kicked in the head by a horse) and who reported symptoms of flashbacks, avoidance, and hypervigilance associated with that DT event, would qualify as screening positive for PTSD under the Same Event method. Likewise, a respondent whose NDT narrative was coded for

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exposure to an HMS-A event (e.g., witnessing gruesome trauma) and who reported at least three symptoms related to that NDT event qualified as screening positive for PTSD symptoms under the Same Event method. Individuals who met the qualifications for exposure to a Criterion A event under the Same Event method most closely approximated the guidelines set forth in the *DSM-5*.

In the Composite Event method, individuals could endorse three or more symptoms across multiple events to screen positive for PTSD. For example, a respondent would screen positive for PTSD if they reported a DT Criterion A event (e.g., getting kicked in the head by a horse) and a Criterion A event outside of work (e.g., sexual assault) with flashbacks attributed to getting kicked by a horse and avoidance and hypervigilance attributed to being sexually assaulted. The results of Aim 4 were four categories of individuals who screened positive for PTSD: a) Criterion A exposure and symptoms from the Same Event; b) HMS-A exposure and symptoms from the Same Event; c) Criterion A exposure and symptoms from Composite Events; and d) HMS-A exposure and symptoms from Composite Events.

One hypothesis for this aim was that the prevalence rate for screening positive for PTSD in the first category (i.e., Criterion A exposure/Same Event) would be greater than the general population based on research in other healthcare professions (Adriaenssens et al., 2012; Jackson et al., 2019; Joseph et al., 2014; Mealer et al., 2007; Schuster & Dwyer, 2020; Somville et al., 2016). In addition, we hypothesized that the estimated PTSD prevalence for the HMS-A categories would be greater than the first category because we increased the range of eligible events to include those that may be specific to veterinary professionals. One last hypothesis for Aim 4 was that utilizing a Composite Event method to sum symptoms across multiple events would increase the proportion of respondents who would screen positive for PTSD. Thus, the

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highest estimated prevalence of PTSD would be found among those who were exposed to HMS-A events under the Composite Event method.

The fifth aim was to explore the relationship between unusually distressing events that veterinary professionals experience and seven measures of mental health and job satisfaction: 1) history of clinical depression; 2) history of suicide ideation; 3) past suicide attempt(s); 4) substance use; 5) job satisfaction; 6) current psychological distress; and 7) burnout. First, we examined whether there was a relationship between four of the variables created in Aim 3 [a) exposure to a Criterion A event at work, b) exposure to an HMS-A event at work, c) exposure to a Criterion A event outside of work, and d) exposure to an HMS-A event outside of work] and these seven measures of mental health and work satisfaction. Then, we investigated whether there was a relationship between the variables created in Aim 4 [a) positive for Same Event plus meets Criterion A; b) positive for Same Event plus meets HMS-A; c) positive for Composite Event plus meets Criterion A; and d) positive for Composite Event plus meets HMS-A] and the seven measures of mental health and work satisfaction listed above. This was an exploratory aim since this is the first study to evaluate events in the veterinary workplace as meeting Criterion A or HMS-A and then calculate whether there is a correlation between that exposure and mental health and work satisfaction outcomes.

The sixth aim was to determine whether there is a relationship between the number of exposures to distressing events in the workplace and the PTSD-related variables created in Aims 3 and 4, as well as the seven non-PTSD mental health and job satisfaction outcomes. There is a lack of consensus about whether or not number of exposures is predictive of the development of PTSD or other negative mental health outcomes. Breslau et al., (2008) reported some evidence that exposure to an earlier traumatic event can increase the likelihood an individual will develop

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PTSD after a subsequent traumatic event, provided the individual developed PTSD after the first event. On the other hand, number of exposures was not found to be a significant factor in development of symptoms of PTSD for firefighters or military nurses and ambulance personnel (Declercq et al., 2011; Pinto et al., 2015). Thus, this aim is exploratory for this population because existing literature failed to provide clear expectations. However, since we hypothesize that veterinary professionals are faced with the potential for multiple exposures within their workplace, it is worthwhile to explore this further.

Method

Participants

Data collection for the present study began in January 2016 and was completed in June 2016. Detailed demographic characteristics are available in Table 1. Participants ($N = 359$) were recruited via email from professional veterinary organizations in Alabama and Tennessee, but responses were received from additional states, and those responses were also included in our sample. Individuals completed an online, 30-minute Qualtrics survey, and no compensation was provided. No identifying information was collected to ensure anonymity. The institutional review board (IRB) at Auburn University reviewed and approved these procedures.

Most respondents were female (69.4%, n=249), heterosexual (95.3%, n=342), white (96.4%, n=346), and non-Hispanic (97.5%, n=350) with a mean age of 46.5 *(SD* = 12.88; range 23-82). Responses were included for individuals who indicated they were at least 18 years old and that they were employed as a veterinarian (78.3%, n=281) or as a veterinary technician, veterinary technologist, or veterinary assistant (21.7%, n=78). Most were employed in small-animal practice (59.6%, n=214), mixed-animal practice (12.0%, n=43), or academia (11.1%,

n=40). Over half (54.4%, *n*=153) of veterinarians reported being in practice for 20 or more years

compared to 23.1% (*n*=18) of non-veterinarians.

Because the data have been collected for this study, we conducted a post hoc power

analysis in G*power version 3.1 (Faul et al., 2009). Aims 1 through 4 consisted of computing

descriptive statistics; as such, we did not perform a power analysis for these Aims. For Aims 5

and 6, we determined that we had 99.9% power to detect a medium effect size of *r*=0.30 (J.

Cohen, 1992) where α=0.05.

Measures

  Demographics. Demographic data collected included race, ethnicity, gender, age, sexual

orientation, marital status, practice type, years in practice, and geographic location (see Table 1).

  Primary Care PTSD Screen for DSM-5. The web-based survey included a modified

version of the Primary Care PTSD Screen for DSM-5 (PC-PTSD-5). The PC-PTSD-5 was

designed to be used in primary care settings to identify individuals at risk for PTSD (Prins et al.,

2016). In the standard format, the examinee is first asked whether he or she has been exposed to

a potential traumatic event; if the answer is affirmative, then the examinee is asked five yes/no

questions regarding the presence of the following symptoms over the past month: nightmares,

avoidance, hypervigilance, numbness, and guilt. A cut-point of three *yes* answers has been

reported as being optimally sensitive for detecting individuals with probable PTSD (Prins et al.,

2016).

  In our modified version, the initial prompt was edited to be specific to veterinary

professionals (i.e., *Sometimes individuals in the veterinary profession encounter events in their*

work that are unusually horrible or traumatic. Here, we are referring to events that are

unusually distressing that may have stuck with you or even haunted you afterward). In addition,

to satisfy the aims of this study, we modified the conditional branching of the PC-PTSD-5 to

accommodate follow-up questions for three different event types: 1) an event at work as a

veterinary professional that involved direct danger or injury to the respondent (e.g., getting

kicked by a horse or bitten by a dog); 2) an event at work that did not involve direct danger or

injury to the respondent (e.g., a medical procedure going wrong); and 3) an event outside of

work (e.g., physical or sexual assault or abuse, natural disaster, seeing someone be killed, having

a loved one die through homicide or suicide). Respondents who answered affirmatively that they

had experienced an unusually distressing event under any of the three event types were also

asked to describe each distressing event in a couple of sentences. Therefore, each respondent

could have up to three affirmative responses with accompanying narratives. The flow chart in

Figure 1 visually represents the modified conditional branchings.

Respondents who endorsed an affirmative answer to either of the work categories (i.e.,

DT or NDT) were also asked the following question about their overall work exposure, *How*

many times altogether have you experienced a similar event as stressful or nearly as stressful as

the worst event described above, through your work in the veterinary profession? Their answers

reflected a total number of distressing events – both DT and NDT – that they recalled from work.

Respondents could specify *just once* or *more than once*; those who specified *more than once*

were asked to provide a total number of exposures. The reported number of exposures were then

recoded into the following categories: 0 = no exposure reported; 1 = 1 exposure; 2 = 2 exposures;

3 = 3 to 10 exposures; 4 = 11 or more exposures. Some respondents did not provide an exact

number, but their response suggested between 3-10 exposures (e.g., *2-3 times*, or *a few*) so was

categorized as 3. Other responses were not an exact number but implied more than 10 exposures

(e.g., *once a week*, *monthly*, or *too many to count*) and were categorized as 4. The first author

performed the recoding process, then the supervising professor reviewed the process, and a

consensus was reached.

Participants who did not endorse any distressing events continued to the next assessment

measure (i.e., did not complete the remaining PC-PTSD items). Individuals who responded

affirmatively to any of the three event types were then asked to answer five yes/no questions

about whether they had experienced a particular symptom over the past month related to any of

the previously described events. For each symptom question (e.g., *Have you had nightmares*

about the event?), the respondents were asked to specify which event type(s) were related to that

symptom (i.e., was the symptom related to exposure to a work-related direct event, exposure to a

work-related non-direct event, or exposure to a non-work-related event?). Respondents could

select more than one option for each symptom.

Mental Health Items. Respondents were asked to answer questions regarding their

mental health history with a yes or no answer, consistent with Nett et al., (2015). These questions

included *Have you ever had a significant problem with clinical depression?*; *Have you ever*

seriously considered suicide?; and *Have you ever attempted suicide?* (Table 2). Individuals who

endorsed a suicide attempt were also asked *How many suicide attempts have you had?*

CAGE Adapted to Include Drugs (CAGE-AID; Brown & Rounds, 1995). The

CAGE-AID is a brief, 4-item ($\alpha=0.74$) survey designed to screen for alcohol and drug abuse;

respondents are asked to consider their use of illegal drugs and any use of prescription drugs for

non-medical purposes. The acronym is derived from the four yes or no questions in the survey:

*Have you ever felt that you ought to **Cut** down on your drinking or drug use; Have people*

***Annoyed** you by criticizing your drinking or drug use; Have you ever felt bad or **Guilty** about*

your drinking or drug use; Have you ever had a drink or used drugs first thing in the morning

*(**Eye-opener**) to steady your nerves or get rid of a hangover.* The CAGE-AID variable was

recoded into a dichotomous *yes/no* variable with a cut-point of 1 or more endorsements

indicating potentially problematic substance use behavior (Brown & Rounds, 1995; Table 2).

Job Satisfaction. Three items from Hackman and Oldham's Job Diagnostic Survey

(1975) were selected to measure overall job satisfaction. The three items (α=.83) were rated on a

Likert scale from 1 (*Disagree Strongly*) to 7 (*Agree Strongly*). They included: *Generally*

speaking, I am very satisfied with my job; I frequently think of quitting my job (reverse scored)*;*

and *I am generally satisfied with the kind of work I do in my job.* The three items were summed

for a total score ranging from 3-21 (see Table 3 for descriptive statistics).

Kessler Psychological Distress Scale (K6; Kessler et al., 2003). The K6 is a brief self-

report measure that measures levels of nonspecific psychological distress. It was designed to

discriminate cases of serious mental illness from non-cases. It consists of 6 questions (α=.90)

rated on a 5-point Likert scale, from *none of the time* (0) to *all the time* (4), for a total score

ranging from 0-24 (see Table 3 for descriptive statistics).

Maslach Burnout Inventory Emotional Exhaustion Scale. Burnout was assessed by

administering the 9-item (α=.95) emotional exhaustion subscale from the Maslach Burnout

Inventory (Maslach & Jackson, 1981). These items depict feelings related to being overworked

and emotionally overextended. Example items are *I feel burned out from my work* and *I feel I'm*

working too hard on my job. Items were rated on a 7-item Likert scale from 0 = *Never* to 6 =

Every Day (see Table 3 for descriptive statistics).

Data Analysis

Frequency counts, proportions, and chi-square tests, and bivariate correlations were completed in IBM SPSS version 24. Chi-square tests were performed for Aim 1 (i.e., determining the proportion of veterinary professionals who reported exposure to each type of distressing event), using two variables: a categorical variable for exposure to an event type (Yes/No/Missing) and a dichotomous variable for professional title (veterinarian or non-veterinarian). For the two work-related exposure variables (i.e., exposure to DT and exposure to NDT), an observed value of *No* was assigned for each individual who had responded *No* to the initial prompt (i.e., *Sometimes individuals in the veterinary profession encounter events in their work that are unusually horrible or traumatic. Here, we are referring to events that are unusually distressing that may have stuck with you or even haunted you afterward. Have you ever experienced an event like this in your work as a veterinary professional*?) rather than leaving it as blank or missing data. However, if a respondent answered *Yes* that they had been exposed to an event but then left the corresponding narrative field blank, then that field was considered missing data for this portion of the analysis. Respondents who did not answer (i.e., left blank) either the initial prompt about exposure at work or the prompt about exposure outside of work were considered to have missing data. When statistically significant chi-square differences were detected, we used follow-up *z* tests for proportions.

For Aim 2, we utilized grounded theory analysis to categorize the DT and NDT event narratives. Grounded theory analysis is an inductive methodology in which researchers engage in an iterative process of data collection followed by analysis, each time constructing and refining categories until theoretical saturation is produced (Charmaz, 2014). According to Charmaz (2014), theoretical saturation occurs when any new data can be accounted for by the established categories. For this study, our two datasets (i.e., one for DT event narratives [*n*=96] and one for

NDT event narratives [n=213]) were randomly divided into subsets; we created three subsets for the DT narratives (n=32 in each subset) and four subsets for the NDT narratives (n=30, 50, 69, and 64).

Starting with one subset of DT narratives, two graduate students in clinical psychology independently coded the narratives in the subset and then collaborated to develop a common list of categories which were documented in a codebook. We completed the coding using Dedoose™(*Dedoose*, 2018), an online software application that was designed for the analysis of qualitative data, such as text narratives. Consensus was reached through discussion between the two graduate students and a supervising professor regarding the development of the categories and subcategories that were included in the codebook and the consistent application of those codes to narratives. The codebook that emerged from coding the first dataset was applied to the second dataset; consensus was again reached regarding modifications to the codes and their application, and updates to the codebook were made as needful. Then the third dataset was coded in the same manner. A final codebook was produced through this iterative process which was then reapplied to all three DT datasets to ensure that all narratives had been evaluated using the same codes. We executed the same procedure for the NDT event narratives. To calculate inter-rater agreement of the categories, a third graduate student unfamiliar with the narratives and uninvolved in developing the codebooks applied the final codes to all narratives (Tinsley & Weiss, 1975). Inter-rater agreement was 98.8% for DT narratives and 97.9% for NDT narratives.

For the exploratory portion of Aim 2 (i.e., determining whether veterinarians are exposed to certain types of events more frequently than veterinary technicians, veterinary technologists, and veterinary assistants), chi-square tests were calculated similarly to Aim 1. That is, two variables were created: one dichotomous variable for professional title (veterinarian or non-

veterinarian), and one categorical for *X* code applied (Yes/No/Missing) where *X* is the name of a code (e.g., Bitten) that was generated during the grounded theory analysis. Only narratives provided in response to the prompt about DT in the workplace and NDT in the workplace were evaluated for Aim 2; if the narrative that was provided did not have a *Yes* for *X* code, an observed value of *No* was entered. If an individual provided a response of *No* to the initial prompt about work-related exposure, then an observed value of *No* was carried through and assigned rather than being left as blank or missing data. Respondents who endorsed *Yes* to either follow-up prompt (i.e., direct danger or non-direct danger at work) but did not provide a narrative and respondents who did not answer (i.e., left blank) the initial prompt about exposure at work were considered to have missing data.

One of the assumptions for performing a chi-square test of independence is that each cell should have at least five expected or observed values (McHugh, 2013). Therefore, our analysis was limited to tests wherein there were five or more veterinarians and five or more non-veterinarians who had provided a narrative that was assigned *X* code.

For Aim 3, two graduate student raters reviewed each event narrative and determined whether it met Criterion A or HMS-A using a coding procedure developed in consultation with a leading expert in trauma assessment (see Appendix 2). Because these trauma narratives were specific to the veterinary workplace, the guidelines were likewise specific. For example, we found it necessary to define *severe injury* and to develop guidelines for determining whether a respondent was responsible for causing death or serious injury to an animal. Disagreements between raters were resolved through discussion between the students and a supervising professor and inter-rater agreement was determined (Tinsley & Weiss, 1975). During our coding procedures, any response that was coded as meeting Criterion A was also coded as meeting

HMS-A. Inter-rater agreement for DT narratives was 92% for Criterion A and 89% for HMS-A events. For NDT narratives, inter-rater agreement was 97% for Criterion A events and 83% for HMS-A events. For OUT events, inter-rater agreement was 88% for Criterion A events and 87% for HMS-A events. The new variables created for Aim 3 were dichotomous (e.g., exposure to event type = 1; no exposure to event type = 0).

The first step to derive the variables for Aim 4 (i.e., estimating the prevalence of PTSD under Same Event and Composite Event methods) was to sum the number of symptoms a respondent endorsed associated with each event type (i.e., DT, NDT, OUT). For the Same Event method, the second step was to identify respondents whose narrative had been coded positive for either Criterion A or for HMS-A and had a sum of 3 or more symptoms associated with the same event type. For the Composite Event method, the second step was to sum across different event types, and then identify the respondents who were positive for Criterion A or HMS-A and had a cumulative sum of 3 or more symptoms across the event types. The result was four groups of individuals who screened positive for PTSD: a) Criterion A exposure and symptoms from the Same Event; b) HMS-A exposure and symptoms from the Same Event; c) Criterion A exposure and symptoms from Composite Events; and d) HMS-A exposure and symptoms from Composite Events. Effect sizes for the bivariate correlations in Aims 5 and 6 were determined using guidelines outlined by Cohen, (1992) for small (r=.20), medium (r=.30), and large (r=.50).

Results

Aim 1: Calculating Frequency of Exposure to Distressing Events

For Aim 1, we determined the proportion of veterinarian and non-veterinarian respondents who reported exposure to each event type (DT, NDT, or OUT; see Table 4).

Consistent with the hypothesis that most of the veterinary professionals in this sample would report exposure to at least one distressing event in the workplace, 62.2% of respondents endorsed experiencing an unusually horrible or traumatic event at work. Although we had not made a specific hypothesis about the initial prompt (i.e., *Have you ever experienced an event like this in your work as a veterinary professional?*), post-hoc testing revealed that veterinarians endorsed a response of *No* to this question more frequently than non-veterinarians. Thus, although individuals from both groups were similarly prone to report exposure to work-related distressing events, veterinarians were more likely than non-veterinarians to report not having exposure to distressing events at work.

More than one-quarter of the participants reported exposure to a DT event, and over half reported exposure to an NDT event. However, for the second hypothesis that non-veterinarians would report exposure to DT events more frequently than veterinarians, a chi-square test determined that there were no statistically significant differences between the two groups (χ^2= 3.55, df=2, *n*=359, *p* =0.17). No hypothesis was formulated regarding group differences for NDT events but performing a chi-square test revealed no statistically significant differences (χ^2= 3.43, df=2, *n*=359, *p* =0.18).

Aim 2: Developing categories of direct and non-direct event exposure at work

For our second aim, categorizing the direct and NDT events veterinary professionals report experiencing at work, two fully saturated theoretical models were developed (Charmaz, 2014). Once the models were finalized, the first author grouped the codes into themes, which are indicated in bold font in Tables 5 and 6. It should be noted that when asked to describe an unusually distressing event, many individuals endorsed multiple instances of the same kind of event (e.g., *Multiple bad cat bites*) or listed more than one event (e.g., *Gored by a bull; bitten by*

a dog; kicked by a horse). Thus, each narrative could have multiple codes applied to it. Moreover, a handful of individuals wrote in events better described as a DT when asked about NDT events and vice versa. These narrative responses were evaluated using both the DT and the NDT codebook. As an example, one individual wrote, "1) had a client threaten to shoot up the clinic if his dog didn't live, 2) treated and/ or euthanized several animals injured when a plane crashed into a field" for their response to the NDT prompt. When we coded NDT narratives, this response was coded using the NDT codebook for the second event (i.e., the plane crash) but was also coded with the DT codebook for the first event (i.e., threat of violence).

Direct threat categories. In response to the question, *You have said that you have experienced an unusually distressing event in your work as a veterinary professional that has stuck with you or haunted you afterward. Have any of these events involved direct danger or injury to you? (e.g., getting kicked by a horse, bitten by a dog)*, 96 participants responded *yes*. Eight narratives were blank, so a subset of 88 DT narratives were coded; in addition, six non-DT narratives in which respondents described events that were better described as a DT were coded with the DT codebook. The resulting 31 categories and seven subcategories were listed in order from most to least frequent along with frequency counts for veterinarians and non-veterinarians (Table 5). Three narratives contained irrelevant responses and have not been reported in the table.

The most common DT events veterinary professionals reported as unusually distressing were events related to interacting with animals, such as being bitten by a canine or feline, being kicked by a bovine or equine, or being attacked by an animal without specifying the method of attack. Narratives[2] that were typical of responses in these categories were, "Dog bite that hit an

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[2] Spelling and grammar corrections were made to improve readability without changing the underlying meaning of the typed statements.

artery," "Kicked in the head by a horse," or "Dog attack from a cage directly at my mid-section."

Although both veterinarians (n=33, 11.7%) and non-veterinarians (n=8, 10.3%) reported bite events, veterinarians alone reported being kicked by a bovine (n=2, 0.7%) or equine (n=17, 6.1%) or being trampled, stomped, or run over by a bovine or equine (n=8, 2.9%) because, within this sample, zero non-veterinarians reported being employed in large animal or equine-only practices. Ten out of the 11 responses that included a non-specific animal attack were reported by veterinarians and one was reported by a non-veterinarian.

Sometimes veterinary professionals cited the body part where they had received an injury related to the event, as in "tip of finger lost by dog bite." Ten narratives (3.6%) from veterinarians described receiving medical care (e.g., surgery, hospitalization, physical therapy), such as a respondent who reported that "while talking to the owner the pet lunged at me and attacked my face. I had to undergo surgery to repair the damage." Eight respondents (six veterinarians [2.1%] and two non-veterinarians [2.6%]) disclosed that they had permanent damage that resulted from DT events, as in "bitten by a German Shepherd that caused permanent damage to the hand."

Moreover, eight (2.2%) veterinary professionals reported being threatened by a client with death or violence; seven of these threats were reported by veterinarians. An example of a narrative coded for a death threat or threat of violence was, "had a client threaten to come kill everyone at the clinic after their pet died under anesthesia." Less frequently, respondents described work-related accidents such as chemical exposure or a scalpel injury (n=4, 1.1%), and a few veterinarians listed near-miss events, such as almost being bitten (n=3, 0.8%) or almost being kicked (n=2, 0.6%) as being unusually distressing.

As an exploratory aim, we sought to determine whether veterinarians or non-veterinarians reported exposure to certain DT events with greater frequency. Only the code *Bitten* contained five or more observed values for both veterinarians and non-veterinarians, and there was not a statistically significant difference between the two groups (χ^2= 5.147, df=2, *n*=359, *p* =0.08).

Non-direct threat categories. In response to the question, *You have said that you have experienced an unusually distressing event in your work as a veterinary professional that has stuck with you or haunted you afterward. Have any of these events NOT involved direct danger or injury to you? (e.g., medical procedure going very wrong, any other shocking or disturbing event)*, 213 participants responded *yes*. Eighteen narrative responses were blank so a subset of 195 NDT narratives were coded; in addition, we coded four DT narratives with the NDT codebook because respondents reported events that were better described as an NDT event. The resulting 32 categories and 24 subcategories were listed in order from most to least frequent along with frequency counts for veterinarians and non-veterinarians (Table 6). Four narratives contained irrelevant responses and are not reported in the table. The categories were grouped into the following headings: events related to case management; events related to interacting with clients; events related to coworker interactions; events related to business management; events related to professional competence; exposure to violence or danger in the workplace; and respondents who learned of the suicide or homicide of a colleague, classmate, student, client, or coworker.

Codes for events related to case management included 66 (19.2%) descriptions of procedures that resulted in complications or death such as, "A patient that I was monitoring during anesthesia died." This thematic grouping also included 33 (8.9%) narratives that were coded for exposure to the pain and suffering of animals, typified by comments like "traumatic

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injuries and neglect of pets" or "The patient's state was excruciatingly painful, and the visual memory of the patient is horrifying." Twenty-three participants (6.4%) mentioned distress related to specific cases of euthanasia, such as "A dog in my care was inadvertently euthanized." Twenty-one (5.8%) participants disclosed distress related to medical errors, as in "Picked up wrong med & resulted in patient's death," and seven participants (1.9%) reported distress from administering an ineffective treatment. Finally, the case management grouping included events in which veterinary professionals reported distress related to treating their own animal or the animal of someone close to them (n=7, 1.9%) or they cited length of care as a factor of their distress after the death of a patient (n=6, 1.7%), as reflected by the response, "Losing patients with whom you have spent a lot of time is always stressful." The last code that was grouped into case management was accidental animal injuries in the hospital (n=2, 0.6%), such as "cat hung self while tethered in tub."

Another thematic grouping of codes reported by veterinary professionals was related to interactions with clients. Forty-eight (13.4%) respondents mentioned client difficulties, stating, for example, "Just multiple cases where everything was done that was possible to save a pet unsuccessfully and owner ends up blaming you." It is important to note that almost every individual who mentioned client difficulties (i.e., 47 of 48; 97.9%) was a veterinarian. Under the main code for client difficulties, there were several subordinate codes, including exposure to the emotional distress of clients (n=11; 3.1%), being unfairly blamed for treatment outcomes (n=11; 3.1%), being confronted by clients who are demanding refunds or refusing to pay for services (n=8; 2.2%), having clients attempt to discredit them (n=7; 1.9%), being accused of greed (n=4; 1.1%), and collaborating on treatment plans with human clients who may be under the influence of drugs (n=2; 0.6%).

Moreover, eight (2.2%) veterinary professionals reported experiencing harassment by phone or mentioned receiving threats without specifying the nature of the threat. This code was applied to narratives that included non-specific language such as "threatened by a client," which did not provide enough information to determine whether the respondent was threatened with loss of the client's business or violence. Narratives in which respondents clarified that they were threatened with death or violence were coded with the DT codebook and had the death threat/threat of violence code applied. Two more main codes that were grouped as events related to client interactions were delivering bad news (*n*=5; 1.4%; all veterinarians) and witnessing irresponsible care by clients (n=4; 1.1%). One participant provided the following example of irresponsible client care: "A client attempted to treat a bad colic that I had just finished treating and resulted in the death of the horse."

A third thematic grouping of codes consisted of concerns about professional competence. This included 14 (3.9%) respondents – mostly veterinarians (*n*=13) - who mentioned feeling inadequate or incompetent, such as being distressed by the "poor outcome of a case resulting in the death of an animal that caused me to question my medical skills." Four (1.1%) veterinary professionals wrote about practicing outside of their skillset, and four (1.1%) wrote about being wrongfully accused of negligence or abuse. One individual who recalled being accused of negligent care clarified that "The distressing event was the reaction of the practice owner. He suggested that I had been negligent in my care (I can I assure you, I was not)." Distress related to having a physical or mental health concern was reported by three (0.8%) veterinarians.

Interactions with coworkers that involved interpersonal difficulties, witnessing and performing unethical practices, experiencing lack of support, and feeling concerned about a coworker's physical or mental well-being were grouped together. Ten respondents (2.8%)

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mentioned interpersonal difficulties with coworkers and colleagues, and three reported (1.1%) that the difficulties escalated to verbal aggression, pushing, or shoving. One participant noted, "Veterinarian was verbally abusive (name calling) to me in the presence of clients. Co-workers have pushed and shoved me, while Veterinarian watched." Ten veterinary professionals (2.8%) reported exposure to unethical practices in the workplace, including observing the use of excessive force on animal patients, witnessing neglect perpetrated by coworkers, or being coerced to lie or falsify records. One respondent wrote, "I watched a patient die because the clinic owner forbid me from treating it because it was just a feral cat. It was something totally fixable. An easy fix. I could have saved the cat."

Codes related to business management formed another thematic grouping. Unsurprisingly, the narratives were predominantly provided by veterinarians, given that these codes are more relevant to their job responsibilities than those of non-veterinarians. Ten veterinarians (2.79%) cited lawsuits and threats of legal trouble with statements such as, "Was sued by a client." Moreover, ten veterinarians (2.79%) disclosed experiences of being reported to the licensing board, being threatened with being reported to the licensing board, or undergoing peer review. Five respondents (1.4%) listed workplace theft, robbery, or embezzlement as a distressing event, and four (1.1%) alluded to struggling with work/life balance or burnout, like the individual who wrote that they experienced "periods where there seemed to be an endless parade of demanding cases and emergencies, including clients, family members, neighbors and friends to whom I was unable to say 'no.'" Four narratives (1.1%) listed other business management difficulties, such as declaring bankruptcy, terminating an employee, or drug abuse by employees.

Some veterinarians listed witnessing attacks initiated by animals or by humans as distressing events, and these were grouped together. Six veterinarians (1.7%) reported witnessing an attack by an animal. In one example, the participant wrote, "Dog bit off a technician's ear in front of me," and in another example, the participant reported that they "saw an owner get kicked in chest by own horse and become nonresponsive temporarily." One veterinarian (0.3%) wrote that they had seen a "staff member physically assaulted while working."

Finally, four individuals (1.1%) mentioned learning that a colleague, classmate, student, or client had died by suicide as a distressing event. Two veterinarians (0.6%) reported experiences learning about the death of a coworker by homicide, sharing, for example, about a "very good friend murdered on the job."

For our exploratory aim of investigating whether certain types of NDT events are more frequently reported by veterinarians compared to non-veterinarians, we performed chi-square tests on four codes that had five or more observed values in each cell: 1) procedure-related complication, 2) exposure to pain and suffering of animals, 3) euthanasia, and 4) exposure to unethical practices. For procedure-related complications, although there was a statistically significant difference between groups (χ^2=11.11, df=2, p=.004), post hoc tests revealed that there was no significant difference in the likelihood of veterinarians (18.9%, n=53) versus non-veterinarians (16.7%, n=13) reporting procedure-related complications as a distressing event. Rather, one significant difference was that non-veterinarians were more likely than veterinarians to have missing data (29.5% [n=23] of non-veterinarians; 13.5% [n=38] of veterinarians). Also, veterinarians were significantly more likely to be coded *No* for procedure-related complications (67.6%, n=190) than non-veterinarians (53.8%, n=42).

A similar pattern recurred for the second code, exposure to pain and suffering of animals. The chi-square test was statistically significant (χ^2=11.93, df=2, p=.003), but post hoc analysis revealed that there was no difference between veterinarians (8.5%, n=24) and non-veterinarians (10.3%, n=8) reporting this experience. As in procedure-related complications, the difference can be attributed to narratives from veterinarians (77.9%, n=219) being significantly more likely to be coded *No* for exposure to pain and suffering of animals than non-veterinarians (60.3%, n=47).

For the euthanasia code, non-veterinarians (11.5%, n=9) were significantly more likely (χ^2=17.30, df=2, p<.001) to report a distressing experience with euthanasia than veterinarians (5.0%, n=14). The follow-up analysis demonstrated again that narratives from veterinarians (81.5%, n=229) were more likely to be coded *No* for distress resulting from experiences with euthanasia than narratives from non-veterinarians (59.0%, n=46).

Finally, there was also a statistically significant difference for the fourth category, exposure to unethical practices (χ^2=17.09, df=2, p<.001). Non-veterinarians (6.4%, n=5) were significantly more likely to report exposure to unethical practices than veterinarians (1.8%, n=5). Also, narratives from veterinarians (84.7%, n=238) were more likely to be coded *No* for exposure to unethical practices than non-veterinarians (64.1%, n=50).

Aim 3: Calculating Frequency of Criterion A and HMS-A Exposure

For Aim 3, all DT, NDT, and OUT narratives were evaluated to determine whether each met the threshold for Criterion A as outlined in the *DSM-5*, and then the frequency was calculated (Figure 2). Sixty-seven (18.7%) out of the 359 respondents reported exposure to at least one DT event at work that qualified as a Criterion A event, and 18 (5.0%) of the 359 respondents reported exposure to at least one NDT event at work that qualified as a Criterion A

event. Ninety-six (26.7%) of the 359 respondents described exposure to at least one OUT event that qualified as a Criterion A event.

Next, we evaluated each narrative to determine whether it met the threshold for HMS-A, wherein the definition of victim (e.g., of abuse, neglect, or gruesome injury) was expanded to include animals. Then, the frequency was calculated for each event type. Sixty-eight (18.9%) respondents reported exposure to one or more events at work that qualified as an HMS-A event, which is an increase of one respondent when compared to Criterion A exposure at work. However, for work-related NDT events, 118 (32.9%) individuals described one or more events that would qualify as HMS-A, which is an increase of 100 individuals when compared to the strict definition of Criterion A exposure. A sample narrative that was coded positive for HMS-A but negative for Criterion A would be "Bad surgical judgment that resulted in the death of an animal." Being responsible for serious injury or death to an animal does not qualify as a Criterion A event according to the *DSM-5*, but it did qualify as an HMS-A event because if the animal patient had been a human patient, the event would have qualified as Criterion A. Regarding OUT events, 101 (28.1%) out of 359 respondents reported exposure to one or more events that qualified as an HMS-A event, which was an increase of five individuals compared to the strict definition of Criterion A exposure.

Aim 4: Estimating Prevalence of PTSD

Our fourth aim was to estimate the prevalence of PTSD for veterinary professionals (Figure 2). Using the variables created in Aim 3 to code exposure to Criterion A and HMS-A events, we calculated new variables to capture whether each respondent had reported three or more PTSD symptoms using a Same Event method (e.g., they reported a DT event and symptoms related to a DT event) and a Composite Event method (e.g., they reported one

symptom related to a DT event and two symptoms related to an OUT event; Kilpatrick et al., 2013). As hypothesized, the prevalence of those screening positive for PTSD increased when we broadened the range of eligible events from Criterion A exposures to HMS-A exposures. Under the strictest definition of PTSD (i.e., Criterion A/Same Event), the estimated prevalence was 3.6% ($n = 13$) of the sample; the next largest estimated prevalence was 5.8% ($n=21$) for HMS-A/Same Event, which is an increase of 8 individuals. Also as predicted, there was an increase in estimated prevalence when symptoms were included from multiple exposures to distressing events, from 11.4% ($n=41$; Criterion A/Composite Event) to 13.9% ($n=50$; HMS-A/ Composite Event).

Aims 5 and 6: Investigating the Relationship Between Exposure to Distressing Events and Mental Health and Job Satisfaction

Bivariate correlations were conducted with the variables created in Aim 3 for Criterion A and HMS-A exposure, the variables created in Aim 4 for Same Event and Composite Event methods of screening for PTSD, and seven measures of mental health and job satisfaction. The outcomes are displayed in Table 3. There were differences in the pattern of correlations depending on how PTSD was defined. For example, under the strictest definition of PTSD (i.e., exposure to Criterion A event under Same Event method), there was a positive correlation with small effect sizes for three variables: suicidal ideation ($r=.18$), distress ($r=.16$), and burnout ($r=.13$). By comparison, applying the Composite Event method to individuals who reported being exposed to Criterion A events resulted in more robust positive correlations for those three variables (suicidal ideation [$r=.28$], distress [$r=.37$], and burnout [$r=.31$]), plus small effect sizes for depression ($r=.19$), suicide attempt ($r=.12$), and problematic alcohol or drug use (CAGE-AID; $r=.13$). Job satisfaction was negatively correlated with a small effect size ($r=-.23$).

A similar pattern emerged when comparing the results for HMS-A exposure. Under the Same Event method, three variables exhibited a positive correlation with a small effect size for HMS-A exposure (suicidal ideation [r=.20], distress [r=.27], and burnout [r=.22]), and job satisfaction was negatively correlated with a small effect size (r=-.12). Using the Composite Event method, all seven mental health and job satisfaction variables were correlated with either medium (suicidal ideation [r=.34], job satisfaction [r=-.30], distress [r=.43], and burnout [r=.39]) or small (depression [r=.19], suicide attempt [r=.13], problematic alcohol or drug use [CAGE-AID; r=.13]) effect sizes. In general, the variables that resulted from applying the Composite Event method were more likely than the Same Event method variables to be correlated with the mental health and job satisfaction measures and with stronger effect sizes. Exposure to OUT events demonstrated positive correlation with a small effect size only for suicidal ideation (Criterion A exposure, r=.15; HMS-A exposure, r=.16).

For Aim 6, we ran a bivariate correlation between the number of exposures reported in the workplace and seven measures of mental health and job satisfaction. Number of exposures was positively correlated with a small effect size for suicidal ideation (r=.20) and depression (r=.25), and a medium effect size for distress (r=.37), and burnout (r=.41). Number of exposures demonstrated a negative correlation with a small effect size for job satisfaction (r=-.29).

Discussion

Veterinary professionals are exposed to distressing events in their workplace, including the threat of serious injury. Thirty-five percent of veterinary professionals consider their job "dangerous" even in workplaces that espouse a culture of safety (Fowler et al., 2016). One purpose of the present study was to determine how frequently veterinary professionals were

exposed to distressing events at work and to categorize the types of events that veterinary

professionals reported as being distressing. Our results reinforced evidence from previous studies

of both workplace stressors (Nett et al., 2015) and workplace injuries (Fowler et al., 2016; Gabel

& Gerberich, 2002; Landercasper et al., 1988) that exposure to distressing events at work is

common among veterinary professionals. Moreover, we discovered that the distressing events

mentioned most frequently were not necessarily related to direct danger of injury or harm on the

job. Instead, veterinary professionals were just as likely to cite distress related to causing serious

injury or death during procedures or witnessing animals' pain and suffering from abuse, neglect,

and traumatic injury.

Another goal of this study was to estimate the prevalence of PTSD within this population

and determine whether there was a relationship between exposure to distressing events, negative

mental health outcomes, and job satisfaction. The results suggested that there may be a

connection between exposure to events in the veterinary workplace and negative mental health

and job satisfaction outcomes. However, there are many psychologically distressed individuals in

veterinary medicine who would not qualify for a diagnosis of PTSD either because the type of

exposure is not currently included in the *DSM-5's* current definition of Criterion A or because

they have symptoms that cannot all be traced back to the same event.

Aim 1: Calculating Frequency of Exposure to Distressing Events

Based on previous studies that reported that 34 to 71% of veterinarians and up to 98% of

veterinary technicians reported being injured in the workplace (Fowler et al., 2016; Fritschi et al.,

2006; Hill et al., 1998; Landercasper et al., 1988; Langley et al., 1995; Mishra & Palkhade, 2020;

Nienhaus et al., 2005; Phillips et al., 2000; Poole et al., 1998, 1999; Soest & Fritschi, 2004), we

hypothesized that more than half of our sample would report exposure to distressing events at work and that non-veterinarians would be more likely to report exposure to DT events than veterinarians because their job responsibilities provide a higher risk of being bitten, scratched, etc. There was support for the first hypothesis with 61.6% of veterinarians and 65.4% of non-veterinarians reporting workplace exposure. Although the proportion of veterinarians who reported distressing events at work is comparable to the proportion in the literature who have reported injuries at work, the proportion of non-veterinarians who reported distressing events at work in our sample was lower than previous estimates of veterinary technicians who reported injuries at work. This might be due to the difference between an injury and a *distressing* event; perhaps the non-veterinarians have been injured many times at work, but they do not consider every injury a *distressing* event, resulting in a lower proportion of individuals reporting exposure to distressing events versus injuries.

The second hypothesis was disconfirmed. Veterinarians were equally likely to report exposure to DT events at work when compared to non-veterinarians, despite the data that non-veterinarians file more workers' compensation claims (Fowler et al., 2016). Again, these findings could indicate that among veterinary technicians, technologists, and assistants, even workplace injuries that result in a compensation claim (e.g., seeking treatment for a work-related scratch or bite), are common and expected and were therefore not considered *distressing* enough to report for this study.

An exploratory portion of Aim 1 was calculating the frequency of distressing NDT events and testing for differences between the two groups. More than twice as many veterinary professionals endorsed exposure to NDT events at work (59.3%; *n*=213) when compared to DT events (26.7%; *n*=96), and there was no significant difference between the two groups. These

suggested indicated that there are many events in the veterinary workplace that cause distress even though they do not involve threat to life and limb.

Less than half (42.9%, *n*=154) of our sample reported exposure to one or more distressing OUT events. This is a smaller percentage than the number who reported exposure to distressing events in the workplace (62.2%, *n*=224). It is possible that there was a priming effect that prompted easier recall of work-related events over OUT events since the survey was associated with a professional group and the majority of the questions referenced the workplace. Altogether, the results of Aim 1 suggested that veterinary professionals experience distressing events at work more frequently than OUT and that NDT work events occur more frequently than DT events.

Aim 2: Developing Categories of Unusually Distressing Event Exposure at Work

One contribution of this study was the development of a codebook that reflected the work experiences that cause distress for veterinary professionals. A previous survey of U.S. veterinarians had identified their top four workplace stressors as: 1) demands of practice, 2) practice management responsibilities, 3) making professional mistakes, and 4) client complaints (Nett et al., 2015). In a follow-up, mixed-methods analysis of written-in responses from that same survey, Vande Griek et al., (2018) determined that financial insecurity and coworker issues were cited most frequently as practice-related stressors. Rather than concentrating again on those chronic, continuous conditions, our data gave us the opportunity to highlight the particular workplace events that haunt veterinary professionals afterwards (i.e., that they view as unusually distressing).

For this study, the four codes applied most frequently were 1) procedure-related complications, 2) client difficulties, 3) being bitten, and 4) exposure to pain and suffering of animals. There is some overlap between practice-related stressors and distressing events; the

frequency with which some of these events happen would make them a chronic workplace stressor. For example, our code "procedure-related complications" is similar to categories identified by Nett et al. (2015) and Vande Griek et al. (2018), and "clients" or "client complaints" were frequently cited in both surveys. On the other hand, there was no comparable category listed by Nett et al., (2015) for being bitten; "risk of injury" was listed under the category "stress from animals" as a subcategory with only seven out of 1,422 responses (0.5%; Vande Griek et al., [2018]). Likewise, there was no analogous category for "exposure to pain and suffering of animals" in Nett et al. (2015), and the code for "suffering or owner mistreatment" in Vande Griek et al. (2018) was only applied to 9 out of 1,422 responses (0.6%). These differences suggest that there are some distinctions between the type of events that veterinary professionals consider *distressing* and the workplace conditions that veterinarians consider *stressors*.

It is noteworthy that many of the most frequently used codes did not involve the direct threat of danger or injury to the respondent. Across the two types of events (DT and NDT), only one (being bitten) of the top four codes that were most frequently applied in Aim 2 involved direct danger or injury. This reinforces the initial evidence from Aim 1 that the events that haunt veterinary professionals have more to do with unintentionally causing harm to patients (i.e., procedure-related complications); handling difficult interpersonal situations (i.e., client difficulties); and witnessing gruesome trauma, abuse, or neglect of their patients (i.e., exposure to pain and suffering of animals). In the following paragraphs, those top four codes will be reviewed in greater depth; they are listed in order of descending frequency. This discussion will also consider the two codes which non-veterinarians endorsed significantly more than veterinarians, euthanasia and exposure to unethical practices.

Procedure-related complications. In this study, we identified 66 respondents who mentioned procedure-related complications, 24 respondents who mentioned general unexpected patient death, and 21 respondents who mentioned a medical error. While each veterinary professional may treat or handle thousands of animals during their career, mistakes are inevitable in the practice of medicine, so it is likely that each professional will encounter at least one distressing instance of patient death as a result of either an inadvertent error or for no discernible reason. As one participant in our study recounted, "A patient died from a medical procedure gone wrong and not only was I upset about the patient, but also the pain I had caused the family. I had trouble sleeping and cried for days." It may be the rarity of these events that lead to elevated levels of distress. In a study of adverse incidents (N=560) across three different animal hospitals, less than 2 percent of the incidents resulted in permanent harm or death (Wallis et al., 2019). Veterinary professionals are trained to perform medical procedures, and they experience mostly successful outcomes which builds a sense of safety and confidence in their skillset. On the rare occasion that those same skills do not suffice to prevent terrible outcomes, the veterinary professional's sense of safety and competence is ruptured. In addition to having doubts about their skills, the effect of each incident can ripple outward to affect employees, the client, and the reputation of the hospital (Wallis et al., 2019).

Learning how to cope with procedure-related complications, unexpected deaths, and medical errors is part of practicing medicine. Likewise, debriefing after incidents by participating in internal or peer reviews after incidents is a necessary responsibility, but can be a distressing event for the individual being questioned. Although there will be no satisfactory explanation for some patient deaths, there may be methods of reducing the risk of patient death due to a medical error. Calls for change within human healthcare have included moving from placing the

emphasis on an individual to assessing the contributions of the system (Robertson & Long, 2017). Addressing failures within the system can relieve the burden of blame on any one individual for unexpected outcomes or medical errors. Oxtoby (2019) synthesized similar information for practitioners of veterinary medicine. She recommended four risk reduction behaviors. The first item is to be aware of one's own weaknesses and actively build systems to strengthen them, for example, by writing down information that might otherwise be forgotten. The second is to forecast worst-case scenarios and plan for them. The third is to utilize clear communication skills and avoid making assumptions. The fourth behavior is to examine existing systems and procedures for flaws and implement changes as needed.

Client difficulties. Although we could not perform a Chi-square test on the client difficulties code due to the low number of observed values for non-veterinarians, there was a noticeable difference between the groups since veterinarians provided 47 of the 48 mentions of client difficulties. Moreover, veterinarians reported more examples of death threats or threats of violence than non-veterinarians did. Other studies have also identified interactions with clients as a top stressor for veterinarians (Nett et al., 2015; Vande Griek et al., 2018). This problem is not limited to the U.S. A study of veterinarians in western Canada reported that 60% of those surveyed had been exposed to verbal abuse in the past five years (Gabel & Gerberich, 2002). Although support staff employees (i.e., technicians, technologists, assistants, receptionists) in an animal hospital have contact with clients, these individuals are often allowed to pass on serious client complaints to more senior staff, such as veterinarians, practice managers, and practice owners. Veterinarians and practice owners are the ones who are ultimately held responsible for care, so they become a target for clients who are upset about treatment costs, poor treatment outcomes or other concerns. Therefore, it follows that veterinarians are more likely to report

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distressing client interactions than other veterinary professionals, who may be buffered by their status. Post-graduate programs in veterinary social work have been specifically developed to respond to the demand for support for both the human client and veterinary professionals, but this resource is not currently available to most hospitals or veterinary professionals (Cima, 2020).

Although the American Association of Veterinary Medical Colleges (AAVMC) has recommended that veterinary students be provided a competency-based education which includes developing skills to communicate effective with clients (Salisbury et al., 2019), the main emphasis of post-graduate training at colleges of veterinary medicine is learning how to practice medicine, not learning how to regulate clients' emotions. Then, in clinical practice, veterinarians realize that they are regularly called on to manage their clients' emotions as well as their own during discussions about quality of care and treatment costs (Dow et al., 2019). There are resources available that focus on developing communication skills with difficult clients, and some are tailored to veterinary medicine. For example, Morrisey and Voiland (2007) described a group of skills with the acronym ADOBE for working with challenging clients in veterinary medicine. ADOBE incorporates five activities: Acknowledge problems, Discover meaning, Opportunities for compassion, Boundaries, and Extend the system. Of course, accessing these training opportunities and putting the skills into practice is often left to each individual.

Being bitten. Based on the number of claims filed for injuries in the veterinary profession (Fowler et al., 2016; Nienhaus et al., 2005), it seemed likely that direct threats of injury (e.g., being bitten, kicked, trampled) would be frequently described as distressing to veterinary professionals. As mentioned previously, though, even injuries that require medical care or time off from work may not be considered *distressing* to the recipient. A few participants

provided "worst case" examples, such as "the most distressing was getting bit after hours when I was the only person present, and I almost passed out due to the severity of the bite." Others provided information about the lasting effects, such as "Bitten on arm by 120 lb Rott. Worried about permanent nerve and tendon damage," or "cat bites that required medical care and temporary nerve damage, arterial blood from my hand painting the ceiling!" Others simply wrote, "Dog bite, cat bite." Because the participants in this sample were prompted to disclose *events that are unusually distressing that may have stuck with you or even haunted you afterward*, we inferred that the bites, scratches, and kicks disclosed were particularly memorable and distressing to the participant.

According to the Centers for Disease Control (CDC), "Most bite, scratch, kick, and crush injuries from animals can be prevented by using appropriate restraint and following established procedures" (*CDC*, 2018). Restraint techniques vary across species; safely handling livestock is different from safely handling wildlife or small mammals, therefore training should be species appropriate. There are, however, some commonalities across circumstances. For example, it is important to be familiar with how a species displays signs of stress and to understand how that animal may respond in stressful situations. In addition, individuals should have the proper tools (e.g., muzzles, nets, rope for halters, squeeze chutes) easily available plus training in their correct use. Finally, animal handling and restraint should be approached in a calm, alert state without anger. Attempting to handle or restrain animals while angry can be counterproductive or dangerous, as animals acting on instinct to protect themselves from a perceived threat can quickly harm a human. See *Animal Handling and Restraint*, (n.d.) for more about restraining small animals or Bean, (2008) for safely working with livestock.

Exposure to pain and suffering of animals. Veterinary professionals report frequent exposure to trauma cases (e.g., hit-by-car, evisceration, attack by a wild animal) as well as abuse or neglect cases. As Figley and Roop (2006) point out that "animal caregivers enter the profession because they love animals," but then they "are subject to ongoing exposure to trauma and suffering" of their patients (p. 48). Participants in our study provided numerous examples of witnessing the pain and suffering of animals. For example, regarding distressing cases of euthanasia (e.g., euthanasia delayed by owners), one respondent wrote:

I … have had to watch several patients suffer for prolonged periods of time because their owners are not ready or not able to make the decision to euthanize and we are doing all we can for them. The worst of those are cases where the animal is struggling to breathe.

A few participants in our study also noted that they experienced distress related to providing ineffective treatment for their patients. From these narratives, we can infer that the wellbeing of the individuals who care for animals might be connected to their ability to provide that care (Hanrahan et al., 2018). Figley and Roop (2006) emphasized this, stating, "The ability to help the patient is all-important to the practitioner," and proposed that being unable to alleviate pain and suffering may be detrimental (p. 53). There is additional support in human healthcare that the mental health of care providers is affected by the quality of care they can provide; ER nurses listed "inability to deliver good quality of care" and "inability to help chronically ill patients" in the top ten traumatic events in their workplace (Adriaenssens et al., 2012).

Cases of abuse and neglect were also particularly distressing to veterinary professionals. One participant provided the following description of an abuse/neglect case:

Upon examination the patient had maggots infesting the dermis of the patient extending from the base of the skull down and into its rectum. I spent the majority of a workday

focusing on this patient which ultimately went into shock and died before the end of the

day. The patient's state was excruciatingly painful, and the visual memory of the patient

is horrifying.

The term *compassion fatigue*, sometimes referred to as *secondary trauma stress (STS),* has been

applied to caretakers who are repeatedly exposed to details of the trauma and suffering of those

for whom they provide care (Hanrahan et al., 2018). Cohen (2007) proposed that compassion

fatigue in the veterinary workplace is the result of "persistent stress" that accumulates over time

and that is comprised of symptoms such as dissociation, numbness, isolation, hypervigilance,

sleep problems, tearfulness, and avoidance and/or obsession (p. 126). Multiple researchers have

suggested that veterinary professionals are vulnerable to compassion fatigue through the

combination of attachment to their animal patients plus their exposure to trauma cases (S. P.

Cohen, 2007; Figley & Roop, 2006; Hanrahan et al., 2018). The impact that attachment to a

patient has on the practitioner was also present in narratives wherein respondents described

experiencing distress from treating their own animals or the animals of friends, family, and

coworkers. The AVMA has acknowledged both the existence and the importance of the human-

animal bond to veterinarians, stating that:

> The human-animal bond is a mutually beneficial and dynamic relationship between
>
> people and animals that is influenced by behaviors essential to the health and wellbeing
>
> of both. This includes, among other things, emotional, psychological, and physical
>
> interactions of people, animals, and the environment.

This reinforces the idea that the wellbeing of the patient influences the wellbeing of the care

provider.

Significantly, the complementary concept to compassion fatigue is compassion satisfaction, and veterinarians have reported that they derive the highest amounts of compassion satisfaction from their ability to help their patients (Figley & Roop, 2006). Although an investigation of the connection between patient wellness and provider wellness was out of the scope of this project, there may be opportunities for future research to explore whether the human-animal bond moderates the relationship between exposure to pain and suffering of animal patients and mental health in veterinary professionals or other animal care providers.

Euthanasia. As previously discussed, performing euthanasia is not generally regarded by veterinary professionals as a distressing event, yet some participants did identify specific experiences as being especially distressing. For example, one participant wrote, "I've had at least two disturbing euthanasias which I would not like to discuss in length." Interestingly, non-veterinarians listed euthanasia events that haunted them significantly more often than veterinarians did. One possible hypothesis to explain this is that there is a difference between the education and coursework received by veterinarians and the education and training received by non-veterinarians that may play a role in preparing veterinarians for the effects of performing this clinical procedure.

Examining the subcategories more closely, veterinarians alone specified that cases where the patient is resistant to the euthanasia solution or where the animal is being euthanized due to financial constraints as distressing while only non-veterinarians endorsed owners delaying a euthanasia as distressing. One non-veterinarian provided the following example:

I work in an ICU and have had to watch several patients suffer for prolonged periods of time because their owners are not ready or not able to make the decision to euthanize and

we are doing all we can for them. The worst of those are cases where the animal is

struggling to breathe.

Job responsibilities may affect the contact that each individual plays in performing this service

and in the type of exposure they experience. This may explain why veterinarians reported being

distressed about euthanizing an animal that they would rather treat while non-veterinarians

reported distress related to spending time with an animal that is suffering while the owner

struggles to make a decision.

Exposure to unethical practices. The examples of unethical practices ranged from

excessive use of force to providing negligent care or falsifying records. A veterinarian provided

this example: "The veterinarian I worked for provides negligent care to animals and wanted me

to lie to the clients." Narratives provided by non-veterinarians were significantly more likely to

have this code applied than narratives from veterinarians. One non-veterinarian recalled

transferring an animal patient by car to emergency care, and that a medical error during surgery

was causing complications,

> but the veterinarian made it clear that my job would be at risk if I were to reveal this
>
> pertinent information to the emergency center. For job security at the time, I obeyed the
>
> veterinarian, but was haunted by my moral and ethical obligations to the patient and to
>
> the client.

The power differential between veterinarians and non-veterinarians may have affected who

reported these events. For example, veterinarians may exhibit behavior, such as excessive force,

around non-veterinarians that they would not enact around their peers because their peers may be

more aware of ethical standards within the profession and more likely to hold them accountable

to those standards. Veterinary technicians, technologists, and assistants may fear retaliation and,

therefore, find themselves at a disadvantage when witnessing unethical practices or being coerced by individuals who have more authority in the workplace into committing unethical acts.

Categorizing narratives of distressing events as reported by veterinary professionals provided some nuance into who was affected by what type of event and what it is about that event that connected to the experience of distress. For instance, we discovered that veterinarians and non-veterinarians alike are affected by procedure-related complications. Although these events are objectively rare compared to the number of successful outcomes, when asked to recall a distressing event that haunts them, veterinary professionals most frequently recall a case that had a negative outcome. Job responsibilities also affected the type of exposure that was reported. Veterinarians reported distress from their exposure to difficult clients much more frequently than non-veterinarians which is probably because they bear the final responsibility for medical care. All veterinary professionals were equally likely to report instances of being bitten, and they were all affected by their exposure to the pain and suffering of animals, but non-veterinarians were more likely to report distress related to particular cases of euthanasia and exposure to unethical practices in the workplace. Again, this exposure may be linked to their assigned job responsibilities and the distress may be a result of their lower status in veterinary medical environments when compared to veterinarians.

Aims 3 and 4: Calculating Frequency of Criterion A and HMS-A Exposure and Estimating Prevalence of PTSD

Aim 3 involved calculating how frequently the sample of veterinary professionals reported exposure to Criterion A events and then to HMS-A events. Next, for Aim 4, we used the six variables from Aim 3 (e.g., DT+CRITA, DT+HMS-A, NDT+CRITA, NDT+HMS-A, OUT+CRITA, and OUT+HMS-A), and summed the number of symptoms for each event type

under both a Same Event method and Composite Event method. This allowed us to determine how many individuals in this sample may screen positive for PTSD using various methods. Those PTSD prevalence estimates can then be compared to the general population.

Exposure to work-related events. Approximately one in five (21.1%, n=76; Figure 2) veterinary professionals reported exposure to either a DT or a NDT Criterion A event at work. Unsurprisingly, a larger proportion of DT event narratives qualified for exposure to a Criterion A event than NDT events. Events from the DT narratives that were coded positively for Criterion A included statements such as, "I have been kicked in the head by a horse twice and had my arm broken by a cow once," or "bitten in face by large dog. Underwent 2 plastic surgeries to correct. Permanent scar." An example of NDT narrative that was coded positive for Criterion A was: "a senior citizen dressed as a veteran pulled a gun in the exam room, threatened to kill himself, during a euthanasia."

When coding DT narratives for HMS-A, the initial expectation was that none would qualify as HMS-A events because it would be unlikely for an animal who was the victim of a gruesome trauma or abuse or neglect to pose a direct threat. However, because participants listed multiple events in one response, and some events did not match the prompt, there was one narrative that a participant mistakenly reported under the DT prompt that met criteria for HMS-A: "multiple dogs with bear attack wounds; trying to treat without further trauma to patient." In this example, the respondent did not provide evidence of a direct threat but treating an animal patient with gruesome wounds did qualify as an HMS-A event. Overall, approximately 18.9% (*n*=68) of respondents reported a DT event that qualified as either a Criterion A or HMS-A event.

Evaluating the NDT narratives for HMS-A resulted in an increase from the 5.0% (*n*=18) that qualified as being exposed to Criterion A events to 32.9% (*n*=118) of individuals. This almost doubles the number of veterinary professionals in our sample would qualify as experiencing a traumatic event according to *DSM-5* criteria from 18.7% (*n*=67) under the strictest interpretation of Criterion A to 33% (*n*=118) if we were able to consider their exposure to animals as victims. In addition to exposure to trauma cases, abuse, and neglect, many respondents mentioned being responsible for the serious injury or death of a patient resulting from complications or medical error which is an event that would qualify as Criterion A for practitioners in human medicine but does not qualify in veterinary medicine. Examples of NDT narratives that were coded positive for HMS-A but not Criterion A were: "sudden death of a case that I had worked on for months and the horse was near recovery," "Seeing animals get away from an owner and run over on the highway in front of the clinic," or "Death of my personal dog during very routine procedure that I was in charge of."

Since this was the first attempt to estimate the rates of exposure to potentially traumatic workplace events for veterinary professionals, literature from human healthcare providers was the best source to look to for context. Unfortunately, there were two limitations within that body of work. One was that there has been wide variability in the measures used to collect data about work-related traumatic events which complicates any comparisons. For instance, within a meta-analysis of studies written about nurses and symptoms of PTSD, some research studies assessed for an index event in a manner consistent with *DSM* criteria but others focused mainly on assessing PTSD symptoms, leaving it unclear how or whether they had determined exposure to an index traumatic event (Schuster & Dwyer, 2020). For another example, in a study of PTSD and burnout in trauma and non-trauma surgeons, a version of the PC-PTSD was modified to ask

symptom questions first, then listed seven experiences associated with those symptoms, including "Criticism/bullying from colleagues." The event inclusion criteria were clearly presented, but they listed events which would not have been considered a Criterion A event in either the *DSM-5* or the *DSM-IV* (Jackson et al., 2019). This variability in determining exposure to a traumatic event led to wide variability in results, which means it could be misleading to compare our percentages to those of other medical professionals.

The second limitation was that studies that estimated prevalence for PTSD in human healthcare providers seldom disclosed the rate of exposure to either *traumatic* or Criterion A events for their sample; they tended to exclusively focus on the prevalence of PTSD, so there were few studies to select for comparison. Within those selections, there was a study of 70 nurses who served a psychiatric ward for humans with severe behavioral problems. Sixty-seven (95.7%) nurses met Criterion A exposure under *DSM-IV*, however none of the respondents qualified for a diagnosis of PTSD (Lauvrud et al., 2009). In a study of 248 ED nurses, 87% reported exposure to one or more "traumatic events" in the previous six months, although this study's authors did not utilize an assessment tool to define "traumatic event" that was consistent with the *DSM* criteria (Adriaenssens et al., 2012).

Compared to these two studies, a smaller percentage of our sample of veterinary professionals reported exposure to Criterion A (18.9%, *n*=68) or HMS-A (32.9%, n=118) events at work. One explanation for this difference is that veterinary professionals encounter fewer "dangerous" patients during a shift versus nurses on a psychiatric ward and fewer traumas than ED nurses. The workplace activities of these two groups of healthcare practitioners may not correspond well to those of veterinary professionals, for whom the majority of their work is providing preventive care (e.g., vaccinations, deworming, treating minor lacerations and

infections), and most client and patient interactions go smoothly. On the other hand, these data may reflect a numbing effect that is a result of training and peer modeling. Concerns have been raised that colleges of veterinary medicine acclimate students to animal suffering and, for example, become less likely to treat animals with pain medications (Capaldo, 2004). It is possible that veterinary professionals report fewer events because they have become inured to both DT events, such as bites, and NDT events, such as causing a patient death. However, there is no evidence to believe that this would be more true for veterinary professionals than it would be for human healthcare practitioners.

Exposure to events outside of work. Only 26.7% (*n*=96) of our respondents reported exposure to a Criterion A event outside of work. When the narratives were re-evaluated for HMS-A, there was a small increase of five individuals (28.1%). These proportions are lower than expected when compared to studies such as Kilpatrick et al. (2013) in which 89.7% of the general population reported lifetime exposure to one or more Criterion A events. There could be many possible explanations for this difference. For example, the discrepancy may be related to the use of different measures to assess for PTSD. Kilpatrick et al. (2013) utilized 25 close-ended questions that explored exposure to a list of potentially traumatic events, plus three open-ended questions to capture additional exposures, and this may have ensured a more rigorous recall of lifetime events as opposed to our use of one open-ended prompt. In addition, it is possible that participants were subject to a recall bias because the survey was promoted through a professional organization, and the majority of the survey questions were work-related. Participants may have more easily recalled work-related events than OUT events because they were primed by the contents of the rest of the survey. It also may be that the routine exposure to distressing events at work somehow inured this sample to potentially distressing OUT events. Perhaps participants

were reluctant to discuss personal events, even anonymously, or they chose not to revisit the memories of these incidents. Another possible explanation is that respondents may have self-selected such that those who have the highest levels of trauma exposure or trauma symptoms may have chosen not to participate so the responses we gathered are from those who had the time and emotional bandwidth to complete the survey.

One final reason veterinary professionals may report fewer Criterion A events outside of work compared to the general population is that the resources that are required to succeed in being admitted to and completing veterinary school (e.g., financial stability, education, resilience) offer some protection from trauma exposure. Individuals whose childhoods are marked by stressors such as discrimination or persistent economic hardship are less likely to have access to the material and non-material supplies required to attend veterinary school (Pearlin et al., 2005). It may be that individuals who meet the rigorous standards of veterinary school, what Zenner et al. (2005) referred to as 'elite performers,' are less likely than the general population to have been exposed to traumatic events in life because that exposure would have derailed them from performing at that elite level.

Prevalence of PTSD among veterinary professionals. We hypothesized that rates of PTSD would be higher for this population than the general population based on evidence from human healthcare providers (Jackson et al., 2019; Schuster & Dwyer, 2020). Previous research on PTSD estimates in healthcare providers did not incorporate exposure to events outside of work but focused only on work-related events and symptoms, and this could potentially result in missing cases of PTSD. We addressed this in two ways. First, we inquired about exposure to events outside of work and evaluated those narratives for Criterion A and HMS-A exposure. Second, we incorporated both a Same Event and a Composite Event method of estimating PTSD

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to accommodate the intricacy of multi-trauma exposure. In other studies, 30% of the general population has reported exposure to six or more lifetime Criterion A events (Kilpatrick et al., 2013), so we expected a proportion of our sample to report exposure to multiple events both at work and outside of work. Utilizing the Same Event and Composite Event methods allowed us to accommodate exposure to multiple events for a more nuanced estimate of PTSD prevalence.

When completing the modified PC-PTSD, respondents were prompted to endorse symptoms they were currently having, which aligns with point-in-time prevalence estimates. We determined that 3.6% (*n*=13) of respondents met the symptom threshold for a Criterion A event under the Same Event method, which is approximately the same as the 3.8% reported by Kilpatrick et al. (2013) for six-month prevalence under the Same Event method using *DSM-5* criteria. However, using the Composite Event method, 11.4% (*n*=41) of our respondents met Criterion A and the symptom threshold across multiple event types compared to 4.2% (Kilpatrick et al., 2013). There was also an increase in the percentage of respondents who reported HMS-A events and would screen positive for PTSD from 5.8% when employing the Same Event method to 13.9% under the Composite Event method. Thus, when we used a method that most closely approximated the criteria for PTSD in the *DSM-5*, our estimate for veterinary professionals resembled that of the general population, but using a method that included exposure to multiple Criterion A events resulted in a much higher proportion of respondents potentially screening positive for PTSD. In addition, evaluating the narratives for HMS-A resulted in an increase in estimated prevalence of PTSD for veterinary professionals over the general population.

These findings illustrated the complexity involved in assessing for PTSD in individuals who have been exposed to multiple Criterion A events. By considering symptoms from multiple events and combining them, more than three times the number of individuals screened positive

for PTSD. It is important to be able to identify all of these individuals because they may need intervention, even if they do not qualify for a PTSD diagnosis. Also, these data provided more evidence that Criterion A-like experiences unique to veterinary medicine are not being captured or reflected in the present *DSM-5* criteria. Finally, these results point to the importance of assessing for exposure to all types of traumatic events when estimating prevalence of PTSD; narrowly focusing on work-related events may not accurately depict the true prevalence within a population.

Aims 5 and 6: Investigating the Relationship Between Exposure to Distressing Events and Mental Health and Job Satisfaction

The PTSD variables computed using the Composite Event method were more strongly correlated with the mental health and job satisfaction variables than the PTSD variables computed using the Same Event method. This suggests that even though many individuals would not qualify for a PTSD diagnosis, they have experienced symptoms of distress related to events in the workplace. One caveat to interpreting these findings is that there may have been a restriction of range using the Same Event method; only a small number of individuals met the strict criteria for PTSD, which means there was lower variability that may have made it more difficult to detect statistically significant relationships.

Job satisfaction, distress, and burnout were more robustly correlated to exposure to HMS-A events (e.g., procedure-related complications resulting in death, gruesome trauma, abuse, neglect) than exposure to Criterion A events, and this was true for both the Same Event and Composite Event variables. This suggests that exposure to HMS-A events may have a greater impact on those workplace mental health variables than exposure to Criterion A events. Moreover, a similar pattern was observed for suicidal ideation (SI), which was positively

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correlated with both Criterion A and HMS-A events, but with larger effect sizes for Composite Event variables than Same Event variables. Prior research suggested that there is a relationship between job demands, burnout, and suicidal ideation (SI), such that, "Clients who have unrealistic expectations for their animal's care are emotionally exhausting for veterinarians, and this in turn may foster suicidal thoughts" (Wallace, 2017, p. 112).

This is congruent with the discovery in Aim 2 that three of the most frequently applied codes were procedure-related complications, client difficulties, and exposure to pain and suffering of animals. Under this explanation, exposure to these specific, unusually distressing events would be correlated with burnout, distress, and SI, and it seems reasonable to believe that an individual experiencing those symptoms would report low job satisfaction. Non-veterinarians have also reported that exposure to patient suffering and death contributes to burnout at work (Deacon & Brough, 2017). Other researchers have reported that a veterinary team that works well together is positively correlated with job satisfaction and negatively associated with burnout (Moore et al., 2014), suggesting that the work environment may moderate the effects of distressing events.

Another notable result is that the two PTSD variables produced using the Composite Event method and the variable for number of exposures were also correlated with depression, SI, job satisfaction, distress, and burnout. This may indicate that cumulative exposures in the workplace are a risk factor for veterinary professionals. On the other hand, a study of Australian veterinarians reported that burnout decreased as time spent in practice increased, although it still remained elevated when compared to the general population of Australia (Hatch et al., 2011). Overall, the results of the bivariate correlations suggest that exposure to HMS-A events that are

commonly reported in the veterinary workplace is related to SI, distress, burnout, and decreased job satisfaction.

Limitations and Future Directions

Overall, the sample in this study was reflective of the larger population of veterinary professionals. Our participants were mostly female (veterinarians = 61.9%; non-veterinarians = 96.2%) which approximates the population of employed veterinarians (61.7%; AVMA, 2018) and veterinary technicians, technologists, and assistants (89.3%; U.S. Department of Labor, 2019). Working with large animals places individuals at higher risk for injury (Mishra & Palkhade, 2020; Nienhaus et al., 2005) and could have affected the number or type of exposures reported, but the proportion of veterinarians working in equine practice (5.3%) for our sample is similar to the 3.5% reported nationally (AVMA, 2018). Sixty percent of veterinarians in our sample reported working in a small animal practice, which is greater than the 45.8% reported by the AVMA, and a large percentage of veterinarians in this sample (82.5%) reported being in private practice, including small animal, mixed animal, equine, shelter, and large animal practice types (60.8%; AVMA, [2018]). Therefore, our sample may more accurately depict the experiences of veterinarians in small animal private practice than those in other positions. Our sample was also predominantly from the southeastern U.S., and that may have affected the frequency or type of exposures to distressing events. As such, additional research is needed to determine whether our results generalize throughout the United States.

One variable that may affect exposure to distressing events is an individual's length of time in employment. There is evidence that burnout is related to earlier stages of one's career (Hatch et al., 2011; Maslach & Jackson, 1981), but completing an analysis of the relationship

between length of time in practice and PTSD for veterinary professionals was not within the scope of this project. For nurses in human healthcare, Schuster & Dwyer (2020) noted that there seemed to be a relationship between years in practice and PTSD but the direction of the relationship was unclear. In our sample, the veterinarians who responded to the survey reported being in practice longer than non-veterinarians, so they may have had more opportunities to be exposed to Criterion A events. Conversely, being in practice longer might mean that an individual becomes habituated over time to the cumulative effect of distressing events, so we might see an effect similar to burnout with higher likelihood of PTSD in early career stages that decreases over time. Moreover, the survey did not ask participants to specify event recency. It might be worth exploring in a future study whether early-career veterinary professionals are more likely to report an event as distressing compared to late-career veterinary professionals. In other words, we might explore whether there are changes over time for which events practitioners consider *distressing* as they gain more job experience.

A limitation of this study is that, although we asked respondents to indicate whether their symptoms were attributable to a DT, NDT, or OUT event, if the respondent listed multiple DT Criterion A events, for example, we were unable to attribute the development of PTSD symptoms to one specific event. For example, if a respondent listed being kicked in the head by a horse and losing the tip of a finger from a dog bite as DT events and endorsed three or more PTSD symptoms they attributed to a DT, we could not be sure if the symptoms were related to the kick, the bite, or a combination of both events. Isolating one triggering event was not a focus of the present study, but future research to investigate whether there are specific work-related events that are more likely to act as risk factors may be valuable.

In a future study, it may be worthwhile to determine whether there is a difference between prevalence of PTSD in veterinarians versus non-veterinarians. Veterinarians in our sample were more likely to be exposed to certain Criterion A events, such as direct injury from large animals, and they also reported exposure to threats of harm or death more frequently than non-veterinarians, but there was an insufficient number of responses from non-veterinarians to perform further analysis. Also, the prevalence estimates may have been affected by the type of assessment used to determine a positive screen for PTSD. Investing the time to use a gold-standard interview-based measure, such as the Clinician-Administered PTSD Scale for *DSM-5* (CAPS-5), might provide different results.

Other next steps based on the conclusions of this study would be to develop or implement interventions for the workplace based on the types of events that veterinary professionals reported as distressing. Interventions at various levels – college, hospital, corporate, professional organization - are required since many practitioners are in solo practice or otherwise isolated from the support system of their peers. Interventions to consider include: learning how to cope with patient loss; practicing how to handle challenging client interactions; applying safe animal handling techniques; and considering changes in procedures that would allow support staff to report ethics violations without fear of retaliation. Building on the results of the categories developed in our grounded theory analysis, a new survey that addresses workplace exposures specific to veterinary medicine could be developed. This might help identify individuals who are at risk for a variety of negative mental health outcomes, such as burnout, SI, and PTSD. In addition, it could lead to targeted prevention, such as implementing critical event stress debriefing for individuals who have been exposed to distressing events. Debriefing after stressful

events with compassionate, supportive coworkers can be restorative (Mitchener & Ogilvie, 2002).

Conclusion

Veterinary professionals experience many types of distressing events in the workplace. Although some of these distressing events are connected to being injured, veterinary professionals more frequently cited events that involved procedure-related complications or client difficulties. There are distressing events that are specific to this profession, such as being responsible for the death of a patient, witnessing gruesome trauma cases, and treating abuse or neglect cases, that do not qualify as Criterion A events but had an impact on up to one-third of this sample. Under the strictest interpretation of the *DSM-5* criteria, the prevalence estimate for PTSD within this sample was similar to that of the general public, but when we accounted for PTSD-like symptoms across multiple events and included HMS-A events, the prevalence increased to 14%. Veterinary professionals reported job dissatisfaction, distress, burnout, and SI related to the events they encounter in their workplace. Put succinctly, "People continue in the field because they love their work; however, this love causes them terrible pain" (Figley & Roop, 2006).

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Appendix 1: Figures and Tables

Prompt: *Sometimes individuals in the veterinary profession encounter events in their work that are unusually horrible or traumatic. Here, we are referring to events that are unusually distressing that may have stuck with you or even haunted you afterward.*

Have you ever experienced an event like this in your **WORK** as a veterinary professional?

No   Yes

Have any of these events involved **DIRECT** danger or injury to you?

Yes → Provide Narrative

No

Have any of these events **NOT** involved **DIRECT** danger or injury to you?

Yes → Provide Narrative

No

*Individuals who answer "No" to both **WORK** and **OUTSIDE** of work event types proceed to the next assessment measure.

OUTSIDE of your work in the veterinary profession, have you ever experienced any events that were unusually or especially frightening, horrible, or traumatic?

Yes → Provide Narrative

No*   No**

Proceed to Next Measure

Proceed to Symptom Questions

Individuals who answer "Yes" to a **WORK event but "No" to an **OUTSIDE** of work event proceed to the symptom questions.

Figure 1. Flow chart depicting the conditional branchings for the modified PC-PTSD-5 screener.
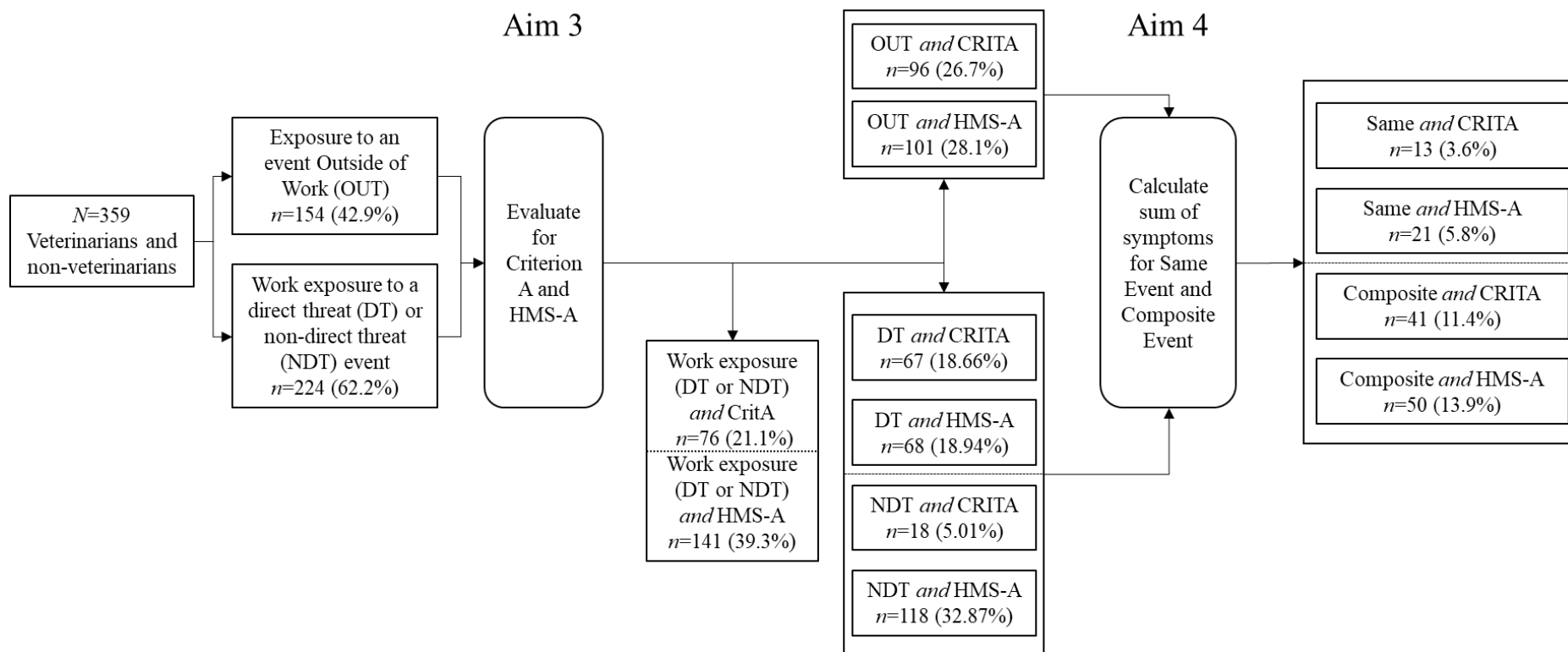
Figure 2. Results from calculating frequency of Criterion A and HMS-A exposure (Aim 3) and estimating the prevalence of PTSD (Aim 4). DT = direct threat; NDT = non-direct threat; OUT = outside of work; CRITA = Criterion A; HMS-A = high-magnitude stressor where animals are considered victims

Table 1

Demographic characteristics of participants

	n (%)	Veterinarians (%)	Non-veterinarians* (%)
Total *N*	359	281	78
Race†			
White	346 (96.4%)	269 (95.7%)	77 (98.7%)
American Indian/Alaska Native	7 (1.9%)	5 (1.8%)	2 (2.6%)
Asian	5 (1.4%)	4 (1.4%)	1 (1.3%)
Black	5 (1.4%)	5 (1.8%)	0 (0%)
Ethnicity			
Not Hispanic or Latino	350 (97.5%)	275 (97.9%)	75 (96.2%)
Hispanic or Latino	8 (2.2%)	6 (2.1%)	2 (2.6%)
No Information Available	1 (0.3%)	0 (0%)	1 (1.3%)
Gender Identity††			
Female	249 (69.4%)	174 (61.9%)	75 (96.2%)
Male	110 (30.6%)	107 (38.1%)	3 (3.8%)
Age			
20-29	32 (8.9%)	13 (4.6%)	19 (24.4%)
30-39	94 (26.2%)	69 (24.6%)	25 (32.1%)
40-49	76 (21.2%)	60 (21.4%)	16 (20.5%)
50-59	92 (25.6%)	80 (28.5%)	12 (15.4%)
60-69	53 (14.8%)	48 (17.1%)	5 (6.4%)
70+	11 (3.1%)	11 (4.0%)	0 (0%)
No Information Available	1 (0.3%)	0 (0%)	1 (1.3%)
Sexual Orientation			
Straight/Heterosexual	342 (95.3%)	270 (96.1%)	72 (92.3%)
Lesbian/gay	10 (2.8%)	6 (2.1%)	4 (5.1%)
Bisexual	5 (1.4%)	4 (1.4%)	1 (1.3%)
Asexual	1 (0.3%)	1 (0.4%)	0 (0%)
No Information Available	1 (0.3%)	0 (0%)	1 (1.3%)
Marital Status			
Married	249 (69.4%)	207 (73.7%)	42 (53.8%)
Never Married	47 (13.1%)	30 (10.7%)	17 (21.8%)
Divorced	29 (8.1%)	23 (8.2%)	6 (7.7%)
Committed relationship, not married	27 (7.5%)	15 (5.3%)	12 (15.4%)
Widowed	4 (1.1%)	4 (1.4%)	0 (0%)
Separated	3 (0.8%)	2 (0.7%)	1 (1.3%)
Practice type			
Small Animal	214 (59.6%)	169 (60.1%)	45 (57.7%)
Mixed Animal	43 (12.0%)	38 (13.5%)	5 (6.4%)
Academia	40 (11.1%)	23 (8.2%)	17 (21.8%)
Equine	15 (4.2%)	15 (5.3%)	0 (0%)
Shelter	8 (2.2%)	5 (1.8%)	3 (3.8%)

Government	6 (1.7%)	6 (2.1%)	0 (0%)
Lab Animal	6 (1.7%)	3 (1.1%)	3 (3.8%)
Scientific Research	6 (1.7%)	5 (1.8%)	1 (1.3%)
Large Animal	5 (1.4%)	5 (1.8%)	0 (0%)
Regulatory	2 (0.6%)	2 (0.7%)	0 (0%)
Other	14 (3.9%)	10 (3.6%)	4 (5.1%)
Years in practice			
1-4 years	43 (12.0%)	27 (9.6%)	16 (20.5%)
5-9 years	49 (13.6%)	34 (12.1%)	15 (19.2%)
10-19 years	91 (25.3%)	62 (22.1%)	29 (37.2%)
20-29 years	74 (20.6%)	66 (23.5%)	8 (10.3%)
30+ years	92 (25.6%)	87 (31.0%)	5 (6.4+)
No Information Available	10 (2.8%)	5 (1.8%)	5 (6.4%)
Region §			
Alabama	103 (27.9%)	86 (30.6%)	17 (21.8%)
Tennessee	189 (52.6%)	133 (47.3%)	56 (71.8%)
South/Southeast (FL, GA, KY, LA, MS, SC, TX)	34 (9.5%)	33 (11.7%)	1 (1.3%)
Atlantic/Northeast (MD, MA, PA, VT, VA)	12 (3.3%)	12 (4.3%)	0 (0%)
Pacific/Mountain (CA, CO, OR)	9 (2.5%)	8 (2.8%)	1 (1.3%)
Midwest (IL, OH, WI)	5 (1.4%)	4 (1.4%)	1 (1.3%)
Outside of the U.S.	2 (0.6%)	2 (0.7%)	0 (0%)
No Information Available	5 (1.4%)	3 (1.1%)	2 (2.6%)

Notes. *This includes veterinary technicians (*n*=59, 16.4%), veterinary assistants (*n*=13, 3.6%), and veterinary technologists (*n*=6, 1.7%). †Participants were able to select more than one race. ††Participants were able to select from *Male*, *Female*, *Transgender MTF*, *Transgender FTM*, *Do not identify as male or female (gender non-conforming, gender queer)*, or *Prefer not to answer*. §These are states from which we had at least one participant; 30 states were not represented in our sample.

Table 2
Frequency counts for mental health variables.

Measure	Number of Respondents (%)		
	All (*N*=359)	Veterinarians (*n*=281)	Non-veterinarians (*n*=78)
Have you ever had a significant problem with clinical depression?			
Yes	100 (27.9%)	77 (27.4%)	23 (29.5%)
No	218 (60.7%)	177 (63.0%)	41 (52.6.%)
Missing	41 (11.4%)	27 (9.6%)	14 (17.9%)
Have you ever seriously considered suicide?			
Yes	80 (22.3%)	63 (22.4%)	17 (21.8%)
No	238 (66.3%)	191 (68.0%)	47 (60.3%)
Missing	41 (11.4%)	27 (9.6%)	14 (17.9%)
Have you ever attempted suicide?			
Yes	17 (4.7%)	12 (4.3%)	5 (6.4%)
No	301 (83.8%)	242 (86.1%)	59 (75.6%)
Missing	41 (11.4%)	27 (9.6%)	14 (17.9%)
How many suicide attempts have you had?			
1	6 (1.7%)	5 (1.8%)	1 (1.3%)
2	8 (2.2%)	6 (2.1%)	2 (2.6%)
3 or more	3 (0.8%)	1 (0.4%)	2 (2.6%)
CAGE-AID*			
0	220 (61.3%)	173 (61.6%)	47 (60.3%)
1 or more	77 (21.4%)	65 (23.1%)	12 (15.4%)
Missing	62 (17.3%)	43 (15.3%)	19 (24.4%)

Notes. *The CAGE-AID variable was recoded into a dichotomous yes/no variable with a cut point of 1 or more endorsements indicating potentially problematic substance use behavior.

Table 3

Results bivariate correlations for Aims 5 and 6: the impact of exposure to distressing events on mental health and job satisfaction

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1	Exposure at work to Criterion A																
2	Exposure at Work to HMS-A	.62**															
3	Exposure Outside of Work to Criterion A	.12*	.11														
4	Exposure Outside of Work to HMS-A	.13*	.12*	.96**													
5	Same Event qualified as Criterion A	.25**	.16**	.17**	.16**												
6	Same Event qualified as HMS-A	.23**	.24**	.09	.10	.78**											
7	Composite Event qualified as Criterion A	.39**	.26**	.24**	.25**	.54**	.54**										
8	Composite Event qualified as HMS-A	.31**	.31**	.17**	.19**	.48**	.61**	.89**									
9	Number of exposures at work	.43**	.60**	.11	.14*	.16**	.25**	.35**	.41**								
10	Depression	.08	.10	.06	.08	.06	.06	.19**	.19**	.25**							
11	Suicidal ideation	.20**	.21**	.15*	.16**	.18**	.20**	.28**	.34**	.20**	.51**						
12	Suicide attempt	.00	.07	.06	.05	.09	.11	.12*	.13*	.04	.35**	.41**					
13	CAGE-AID	.10	.07	.00	.03	.02	.05	.13*	.13*	.10	.18**	.18**	.03				
14	Job Satisfaction	-.11	-.15*	.06	.04	.00	-.12*	-.23**	-.30**	-.29**	-.15*	-.21**	-.10	-.13*			
15	Kessler Psychological Distress Scale	.19**	.21**	-.01	.01	.16**	.27**	.37**	.43**	.37**	.40**	.40**	.28**	.16**	-.54**		
16	Maslach Burnout Inventory Emotional Exhaustion Scale	.24**	.27**	-.02	-.02	.13*	.22**	.31**	.39**	.41**	.30**	.30**	.18**	.12	-.72**	.74**	
	Number of respondents	295	295	303	303	296	296	296	296	303	318	318	318	318	297	317	319
	Mean score	.26	.48	.32	.33	.04	.07	.14	.17	1.71	.31	.25	.05	.26	15.67	5.83	24.16
	SD	.44	.50	.47	.47	.21	.26	.35	.38	1.43	.47	.43	.23	.44	4.61	5.17	14.30

* Correlation is significant at the 0.05 level (2-tailed). ** Correlation is significant at the 0.01 level (2-tailed).

Table 4

Results of Aim 1: Calculating frequency of exposure to distressing events

	Number of respondents (%)			
	All (*N*=359)	Veterinarians (*n*=281)	Non-veterinarians (*n*=78)	χ^2 (df), *p*
Have you ever experienced an event that is unusually horrible or traumatic in your work as a veterinary professional?				6.23 (2), *p* = 0.04
Yes	224 (62.2%)	173 (61.6%)[a]	51 (65.4%)[a]	
No	92 (25.6%)	79 (28.1%)[a]	13 (16.7%)[b]	
Missing	43 (12.0%)	29 (10.3%)[a]	14 (17.9%)[a]	
Have any of these events involved ***direct danger or injury*** to you? (e.g., getting kicked by a horse, bitten by a dog)				3.55 (2), *p* = 0.17
Yes	96 (26.7%)	78 (27.8%)	18 (23.1%)	
No	220 (61.3%)	174 (61.9%)	46 (59.0%)	
Missing	43 (12.0%)	29 (10.3%)	14 (17.9%)	
Have any of these events ***NOT involved direct danger or injury*** to you? (e.g., medical procedure going very wrong, any other shocking or disturbing event).				3.43 (2), *p* = 0.18
Yes	213 (59.3%)	169 (60.1%)	44 (56.4%)	
No	103 (28.7%)	83 (29.5%)	20 (25.6%)	
Missing	43 (12.0%)	29 (10.3%)	14 (17.9%)	
Outside of your work in the veterinary profession, have you ever experienced any events that were unusually or especially frightening, horrible, or traumatic?				3.22 (2), *p* = 0.20
Yes	154 (42.9%)	121 (43.1%)	33 (42.3%)	
No	161 (44.8%)	130 (46.3%)	31 (39.7%)	
Missing	44 (12.3%)	30 (10.7%)	14 (17.9%)	

Notes. [ab]Values in a row with different superscript letters were significantly (*p*<0.05) different from one another.

Table 5
List of categories of distressing events veterinary professionals reported experiencing at work
that involved the threat of direct danger or injury to the respondent

	Number of times code applied (%)		
Categories and Subcategories	All (*N*=359)	Veterinarians (*n*=281)	Non-Veterinarians (*n*=78)
Animal-initiated events			
Bitten	41(11.4%)	33 (11.7%)	8 (10.3%)
By canine	33 (9.2%)	25 (8.9%)	8 (10.3%)
By feline	11 (3.1%)	9 (3.2%)	2 (2.6%)
Kicked	18 (5.0%)	18 (6.4%)	0 (0.0%)
By bovine	2 (0.6%)	2 (0.7%)	0 (0.0%)
By equine	17 (4.7%)	17 (6.0%)	0 (0.0%)
General/Unspecified animal attack	11 (3.1%)	10 (3.6%)	1 (1.3%)
By bovine	2 (0.6%)	2 (0.7%)	0 (0.0%)
By canine	7 (1.9%)	7 (2.5%)	0 (0.0%)
By equine	2 (0.6%)	2 (0.7%)	0 (0.0%)
Trampled/Stomped/Run over by bovine or equine	8 (2.2%)	8 (2.8%)	0 (0.0%)
Charged/Chased/Cornered by bovine, canine, feline (i.e., "big cat"), porcine, ursine	8 (2.2%)	7 (2.5%)	1 (1.3%)
Crushed/Dragged/Gored by bovine, canine, or equine	7 (1.9%)	5 (1.8%)	2 (2.6%)
Scratched (species not specified)	2 (0.6%)	2 (0.7%)	0 (0.0%)
Bucked/Fell off equine	1 (0.3%)	1 (0.4%)	0 (0.0%)
Body part injured			
Hand/Fingers	13 (3.6%)	11 (3.9%)	2 (2.6%)
Arm/Shoulder	11 (3.1%)	11 (3.9%)	0 (0.0%)
Face/Head	11 (3.1%)	11 (3.9%)	0 (0.0%)
Thorax	8 (2.2%)	8 (2.8%)	0 (0.0%)
Legs/Feet	5 (1.4%)	5 (1.8%)	0 (0.0%)
Eyes	1 (0.3%)	0 (0.0%)	1 (1.3%)

Person-initiated events			
Death threat/Threat of violence	8 (2.2%)	7 (2.5%)	1 (1.3%)
Stalking/Sexual harassment	2 (0.6%)	1 (0.4%)	1 (1.3%)
Combat/Military experience	1 (0.3%)	1 (0.4%)	0 (0.0%)
Event descriptors			
Received medical care	10 (2.8%)	10 (3.6%)	0 (0.0%)
Coworker present	9 (2.5%)	7 (2.5%)	2 (2.6%)
Client present	8 (2.2%)	8 (2.8%)	0 (0.0%)
Permanent damage	8 (2.2%)	6 (2.1%)	2 (2.6%)
Alone	5 (1.4%)	5 (1.8%)	0 (0.0%)
Mistakes due to improper restraint	4 (1.1%)	3 (1.1%)	1 (1.3%)
Respondent distressed by others' indifference to event	3 (0.8%)	3 (1.1%)	0 (0.0%)
Work-related accident			
Chemical exposure, pathogen exposure, needlestick, or scalpel injury	4 (1.1%)	2 (0.7%)	2 (2.6%)
Automobile accident	2 (0.6%)	2 (0.7%)	0 (0.0%)
Fell down stairs	1 (0.3%)	1 (0.4%)	0 (0.0%)
Near-miss events			
Almost bitten	3 (0.8%)	3 (1.1%)	0 (0.0%)
Almost kicked	2 (0.6%)	2 (0.7%)	0 (0.0%)
Almost trampled/run over/stomped	2 (0.6%)	2 (0.7%)	0 (0.0%)
Almost gored	1 (0.3%)	1 (0.4%)	0 (0.0%)

Notes. 9.2% (n=33) of the 359 respondents reported exposure to multiple direct threat (DT) events, so the sum of the subcategories may not equal the category total.

Table 6
List of categories of distressing events veterinary professionals reported experiencing at work
that did not involve the threat of direct danger or injury to the respondent

| | Number of times code applied (%) | | |
Categories and Subcategories	All (*N*=359)	Veterinarians (*n*=281)	Non-Veterinarians (*n*=78)
Events related to case management			
Procedure-related complication	66 (18.4%)	53 (18.9%)	13 (16.7%)
Resulted in patient death	47 (13.1%)	38 (13.5%)	9 (11.5%)
Resulted in patient death under anesthesia	17 (4.7%)	10 (3.6%)	7 (9.0%)
Resulted in patient death while recovering	11 (3.3%)	10 (3.6%)	2 (2.6%)
Exposure to pain and suffering of animals	32 (8.9%)	24 (8.5%)	8 (10.3%)
Animal abuse or neglect	17 (4.7%)	10 (3.6%)	7 (9.0%)
Gruesome event	18 (5.0%)	14 (5.0%)	4 (5.1%)
Hit by car (HBC) cases	6 (1.7%)	4 (1.4%)	2 (2.6%)
HBC: escaped and hit by car	3 (0.8%)	3 (1.1%)	0 (0.0%)
HBC: resulted in patient death or euthanasia	3 (0.8%)	1 (0.4%)	2 (2.6%)
Euthanasia	23 (6.4%)	14 (5.0%)	9 (11.5%)
Euthanasia: resistant to medication	4 (1.1%)	4 (1.4%)	0 (0.0%)
Euthanasia delayed by owners	2 (0.6%)	0 (0.0%)	2 (2.6%)
Euthanasia related to financial constraints	2 (0.6%)	2 (0.7%)	0 (0.0%)
Euthanasia performed without owner approval	2 (0.6%)	0 (0.0%)	2 (2.6%)
General unexpected patient death	24 (6.7%)	20 (7.1%)	4 (5.1%)
Medical error	21 (5.8%)	19 (6.8%)	2 (2.6%)
Medical error committed by respondent resulted in patient death or euthanasia	14 (3.9%)	13 (4.6%)	1 (1.3%)
Medical error committed by a colleague or coworker resulted in patient death	3 (0.8%)	3 (1.1%)	0 (0.0%)
Ineffective treatment	7 (1.9%)	6 (2.1%)	1 (1.3%)
Distress from treating one's own animal, a coworker's animal, or a family member's animal	7 (1.9%)	7 (2.5%)	0 (0.0%)

Distress from patient death due to respondent's bond with the animal	6 (1.7%)	4 (1.4%)	2 (2.6%)
Accidental injury in the hospital (e.g., strangulation in kennel)	2 (0.6%)	2 (0.7%)	0 (0.0%)
Events related to client interactions			
Client difficulties	48 (13.4%)	47 (16.7%)	1 (1.3%)
Exposure to emotional distress of clients	11 (3.1%)	9 (3.2%)	2 (2.6%)
Unfairly blamed for treatment outcomes	11 (3.1%)	11 (3.9%)	0 (0.0%)
Finances (demanding refund, refusal to pay, unable to afford care)	8 (2.2%)	7 (2.5%)	1 (1.3%)
Harassment by phone and other non-specific threats	8 (2.2%)	8 (2.8%)	0 (0.0%)
Client attempted to discredit respondent/Loss of reputation	7 (1.9%)	7 (2.5%)	0 (0.0%)
Client accused respondent of greed	4 (1.1%)	4 (1.4%)	0 (0.0%)
Drug abuse by client	2 (0.6%)	2 (0.7%)	0 (0.0%)
Delivering bad news	5 (1.4%)	5 (1.8%)	0 (0.0%)
Irresponsible care provided by client resulted in patient death	4 (1.1%)	3 (1.1%)	1 (1.3%)
Events related to professional competence			
Feeling inadequate or incompetent	14 (3.9%)	13 (4.6%)	1 (1.3%)
Practicing outside of skillset (self or witnessing others)	4 (1.1%)	3 (1.1%)	1 (1.3%)
Wrongfully accused of negligence or abuse	4 (1.1%)	4 (1.4%)	0 (0.0%)
Physical or mental health concern affected ability to work	3 (0.8%)	3 (1.1%)	0 (0.0%)
Events related to coworker interactions			
Coworker of colleague interpersonal difficulties	10 (2.79%)	8 (2.8%)	2 (2.6%)
Interpersonal difficulties included verbal aggression or pushing/shoving	3 (1.11%)	2 (0.7%)	1 (1.3%)
Exposure to unethical practices	10 (2.8%)	5 (1.8%)	5 (6.4%)
Excessive force or neglect of animals perpetrated by coworkers	8 (2.2%)	5 (1.8%)	3 (3.8%)

Coerced to lie to clients or colleagues	2 (0.6%)	1 (0.4%)	1 (1.3%)
Lack of support in the workplace from employer, management, or colleagues	7 (1.9%)	6 (2.1%)	1 (1.3%)
Concern about coworker's well-being	5 (1.4%)	4 (1.4%)	1 (1.3%)
Events related to business management			
Legal trouble (incl. lawsuit or threat or lawsuit)	10 (2.8%)	10 (3.6%)	0 (0.0%)
Reported or threatened to be reported to licensing board/Peer review	10 (2.8%)	10 (3.6%)	0 (0.0%)
Theft, robbery, or embezzlement	5 (1.4%)	4 (1.4%)	1 (1.3%)
Work-life balance or burnout	4 (1.1%)	3 (1.1%)	1 (1.3%)
Business or practice management difficulties (e.g., bankruptcy, terminating an employee, drug abuse by employee)	4 (1.1%)	4 (1.4%)	0 (0.0%)
Witnessed attack on others in the workplace			
Witnessed attack by canine or equine	6 (1.7%)	6 (2.1%)	0 (0.0%)
Witnessed attack by person	1 (0.3%)	1 (0.4%)	0 (0.0%)
Learned about suicide or homicide			
Learned about work-related suicide (e.g., colleague, classmate, student, client)	4 (1.1%)	3 (1.1%)	1 (1.3%)
Learned about homicide of coworker	2 (0.6%)	2 (0.7%)	0 (0.0%)

Notes. 23.12%(n=83) of respondents reported multiple non-direct threat (NDT) events, so the sum of the subcategories may not equal the category total.

Appendix 2: Guidelines for Coding Criterion A and HMS-A Events

Coding Criterion A Traumatic Events

<u>Overview of DSM-5 Criterion A</u>

Exposure to actual or threatened (**realistic/imminent threat**) death, **serious injury**, or sexual violence in one (or more) of the following ways:
1. Directly experiencing the traumatic event(s)
2. Witnessing, in person, the event(s) as it occurred to others.
3. Learning that the traumatic event(s) occurred to a close family member or close friend. In cases of actual or threatened death of a family member or friend, the event(s) must have been violent or accidental.
4. Experiencing repeated or extreme exposure to aversive details of the traumatic event(s) (e.g., first responders collecting human remains, police officers repeatedly exposed to details of child abuse)

<u>Traumatic Events According to DSM-5</u>:
- Directly experienced traumatic events include (but are not limited to):
  o Exposure to war (combatant or civilian)
  o Threatened or actual physical assault (e.g., physical attack, robbery, mugging, childhood physical abuse)
  o Threatened or actual sexual violence (e.g., forced sexual penetration, alcohol/drug-facilitated sexual penetration, abusive sexual contact noncontact sexual abuse, sexual trafficking)
  o Being kidnapped
  o Being taken hostage
  o Terrorist attack
  o Torture
  o Incarceration as a POW
  o Natural/human-made disasters
  o Severe motor vehicle accidents

<u>Note:</u> A life-threatening illness or debilitating medical condition is not necessarily a traumatic event. Medical incidents that qualify as traumatic events involve <u>sudden</u>, <u>catastrophic</u> <u>events</u> (e.g., waking during surgery, anaphylactic shock).

- **<u>Witnessed events</u>** include (but are not limited to) observing:
  o Threatened or serious injury
  o Unnatural death
  o Physical or sexual abuse of another person due to violent assault, domestic violence, accident
  o War or disaster
  o Medical catastrophe in one's child (e.g., life threatening hemorrhage)

- **<u>Indirect exposure</u>** through learning about an event is limited to experiences affecting <u>close relatives or friends</u> and experiences that are <u>violent or accidental</u> (e.g., death due to natural causes does not qualify). Such events include violent personal assault, suicide,

serious accident, and serious injury. i.e. Learning about the suicide of someone who is not a <u>close relative or friend</u> would not qualify as a Criterion A event.

Coding Criterion A

- Each coder independently rates whether the narrative includes one or more Criterion A events for Direct Threat (DT), Non-Direct Threat (NDT) and outside of work (OUT) events
    - For animal-initiated attacks, bites, kicks, etc → must be life-threatening or have had potential for serious injury
- Enter 0=no Criterion A event or 1=Criterion A event(s)
- Many narratives list multiple events. Consider each event separately to determine if the respondent qualifies as being exposed to a Criterion A event. Bottom line: from the information provided, has this individual been exposed to a Criterion A event?
    - <u>Example 1</u>: "Being bitten by two cats and one dog."
    - Although 3 events are listed, the lack of detail associated with each one prevents us from being able to definitively say this individual has been exposed to a Criterion A event, so **Crit A=0**.
    - <u>Example 2</u>: "Been the witness to numerous car wrecks at the site of my clinic-4 of which had fatalities-in one, I was the first to the vehicle"
    - Multiple events are listed in this excerpt; one or more of these events would qualify for Criterion A, so **Crit A=1**.

Coding Multiple Criterion A Events

- For Mult_CritA, enter 0=zero or one Criterion A event or 1=two or more Criterion A events
- Bottom line, from the information provided, has this individual likely been exposed to more than one Criterion A event?
    - <u>Example</u>: "witness of physical abuse with threat of physical abuse, attempted suicide of both siblings, me and a friend chased out of my house by family member with a gun in drunken rage"
    - Multiple events are listed in this excerpt; more than one of these events would qualify for Criterion A, so **Mult_CritA=1**.

Coding Criterion HMS-A (aka High-magnitude stressor-animal; HMS-A)

- <u>First, if you entered 1 (Yes) for Criterion A event, then enter 1 for HMS-A event</u>
- Otherwise, if you entered 0 (No) for Criterion A event, then rate whether the narrative includes one or more HMS-A events for Direct Threat (DT), Non-Direct Threat (NDT) and outside of work (OUT) events
- Defining an HMS-A event:
    - If you substitute a human victim rather than the animal victim in the narrative, would this become a Criterion A event? If yes, then this is an HMS-A.
        - Example: "Several times I have witnessed terrible trauma to animals, hit by car…" or "I witnessed an owner physically abusing their dog in the hospital parking lot."
        - In both examples, if the patient were a human instead of an animal, it could meet Criterion A

- ▪ NOTE that causing serious harm, injury, or death can count as a Criterion A event. See below for further explanation of coding for Medical Procedures Resulting in Complications or Death.
- ▪ NOTE that performing a euthanasia is not the same as 'causing serious harm, injury, or death,' and is not considered distressing or traumatic on its own. See below for further explanation of coding for Euthanasia narratives.

Coding Multiple HMS-A (Criterion HMS-A) Events
- If there are zero HMS-A events in the narrative, then carry over the Mult_CritA code to Mult_HMSA
- If CritA=0 AND there are one or more HMS-A events in the narrative, then code Mult_HMSA for the number of HMS-A events
- If CritA=1 and Mult_CritA=0 or 1, AND there are one or HMS-A events in the narrative, then Mult_HMSA=1
- Bottom line, from the information provided, has this individual likely been exposed to more than one event that is either Criterion A or HMS-A?
  - o Example: "A boyfriend with PTSD attempted suicide in my presence, and my dog was killed in front of me."
  - o Multiple events are listed in this narrative; one of these events would qualify for Criterion A, and one would qualify as HMS-A, so **Mult_HMSA=1**.

Coding Confidence Level (high/low) for Criterion A
- **Criterion A/High Confidence**: If you are highly confident that the narrative describes a Criterion A event, enter 1 for High Confidence
- **Criterion A/Low Confidence:** If you are only somewhat confident (vague story, multiple possibilities) that the narrative describes a Criterion A event, enter 0 for low confidence
- **NOT Criterion A/High Confidence**: If you are highly confident that the narrative does not describe a Criterion A event, enter 1 for High Confidence
- **NOT Criterion A/Low Confidence**: If you are only somewhat confident that the narrative does not describe a Criterion A event (vague narrative), enter 0 for low confidence

Coding Confidence Level (high/low) for HMS-A (Criterion HMS-A)
- Apply the guidelines above to evaluate any HMS-A events, BUT
- If CritA=1 and there is NOT an HMS-A event in the narrative, then carry the Criterion A Confidence level over to HMS-A Confidence
- If CritA=0 or 1 and there IS an HMS-A event in the narrative, then enter the higher code for HMS-A Conf
  - o If CritA_Conf is 1(high) but your confidence for the HMS-A event is either 1(high) or 0(low), enter 1 for high confidence
  - o If CritA_Conf is 0(low) and your confidence for the HMS-A event is 0(low), enter 0 for low confidence
  - o If CritA_Conf is 0(low) and your confidence for the HMS-A event is 1(high), enter 1 for high confidence

- Bottom line: how confident do we feel based on this narrative that this respondent has been exposed to at least one event that would meet either Criterion A OR HMS-A?

Serious Injury or Threat of Serious Injury

- "Serious injury" is a vague phrase, and there are a number of factors to consider when evaluating whether an injury or threatened injury is serious.
  - One factor to consider is the **type of medical intervention required** by the injury. Typically, an injury that would be considered serious would require a visit to the emergency room, admittance to a hospital, and/or surgery
    - Example: "The bite did not appear to be serious at first, but surgery, hospitalization with IV fluids and antibiotics, and physical therapy were all required before I was able to make a full recovery and return to work." This would be considered a serious injury.
  - Injuries that require first aid but no visit to a physician or a visit to a physician but not to the emergency room or hospital do not qualify as "serious."
  - Many narratives that mention an injury do not provide detail about how the injury was cared for; in this instance, code for what a reasonable individual would do to care for that injury.
    - Example: "tip of finger lost by dog bite" Although the respondent does not provide information about medical care, it is reasonable to assume this person went to an emergency room and/or had surgery, rendering this a serious injury that would qualify as a Criterion A event. This also involves permanent disfigurement (discussed below), which would be another reason to consider it serious injury.
    - Example: "I had no broken skin nor lacerations - but had (remarkably) extreme deep bruising around my wrist and hand from the dog's jaw pressure." This respondent may have seen a physician, but it is less likely that a reasonable person would go to an emergency room or hospital for bruising, so this was probably not a Criterion A event. Moreover, we do not have enough information to conclude that this injury would lead to permanent disability or disfigurement.
  - It is also worth considering whether the injury leads to **permanent disability/disfigurement,** which would generally be considered more serious than an injury that does not cause permanent disability/disfigurement. Note that permanent disability/disfigurement is not a requirement for considering an injury serious (e.g., being crushed by a bovine and breaking several ribs would be considered serious due to the need for emergency medical treatment, even though the ribs are likely to heal at a later point in time). But, if information from the narrative suggests permanent disability/disfigurement, this would lean toward the injury being considered serious and therefore meeting criterion A. **Scars?**
  - Additionally, consider the **body parts affected** by the injury. An injury that impacts vital organs (e.g., heart, brain) and the face would generally be considered more serious than an injury affecting extremities (e.g., fingers). This doesn't mean that a finger injury can never be considered serious (e.g., a loss of a

finger would likely be considered a serious injury given the permanent disfigurement and need for emergency medical treatment), or that an injury to the face is always serious (e.g., a housecat scratching your cheek should not be considered criterion A). But, in the absence of other details, a bite to the finger would be considered less serious than a bite to the face, and would be less likely to be coded criterion A.

- o Finally, consider the **species involved** in an event that involves an animal attack. Generally speaking, larger and more powerful animals have higher likelihood of causing serious injury than smaller animals. In the absence of other details, being attacked by a horned bull is going to be considered more serious than being attacked by a house cat, and you would probably need fewer details about that attack to confirm criterion A status than you'd need about an attack by a housecat. For events involving canine attacks, consider the breed of the dog; events with breeds that are large or have an exceptionally strong bite (e.g., pit bulls, Rottweilers, German shepherd dogs, chow chows) are more likely to cause serious injury due to the strength and power of their bite.

- Narratives that imply an injury (i.e. "got kicked") without specifying what was injured or how severely will require a judgment call.
  - o Example: "Approximately 6-7 German shepherd dogs have tried or have actually attacked me, resulting in three mild bites." Because this respondent used the word *mild* to describe the bites, this excerpt would not qualify as a Criterion A event.
  - o Example: "Gored by a bull; bitten by a dog; kicked by a horse." Despite a lack of specificity, it is likely that this individual would have required emergency medical treatment for at least one of these events, so this narrative would qualify as a Criterion A event.

- Narratives that involve threat of serious injury (i.e. near misses) can be coded as a Criterion A event if there is enough information available to reasonably conclude that a **serious** injury would have occurred. Use the criteria described above to consider how serious the potential injury would have been and also, if possible, take into account how close the event was to occurring. Since by definition, in these cases, no actual injury occurred, the rater will need to exercise judgment in terms of how *likely* a serious injury would have been to occur, given the details provided. This judgment should take into account the likelihood of need for emergency treatment (e.g., housecat bites are less likely to require emergency care than tiger bites), likelihood of death/disability/dismemberment, body parts affected (e.g., almost getting kicked in the head is more serious than almost getting kicked in the leg), and species involved (e.g., a horned bull is more likely to inflict serious damage than a housecat).
  - o Example: "A draft horse kicked at my head and missed it by about two inches as its hoof slammed against the stall wall. I would have died for sure." This narrative provides enough information to determine that threat of serious injury was involved (e.g., there was a possibility of death, the injury would have been to the head, a large/powerful animal was involved), so this would qualify as a Criterion A event.
  - o Example: "almost gored by horned cow when working at stockyard testing, almost hit by rearing horse striking out." This narrative also involves large

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powerful animals and a high likelihood for emergency care being needed, should the attack have been carried out, so this would qualify as Criterion A.

- If a narrative lacks enough specificity to reasonably conclude that a **serious** injury would have occurred, consider applying the **low confidence** code.
  - o Example: "The scariest for me was a police dog who the police officer was not properly trained to handle/restrain-- he actually didn't do anything, just tried, but it scared the pants off of me. Close call." The animal in question (likely a German Shepherd Dog, Belgian Malinois, or similar breed) would be considered large and powerful, however there's no information here about body parts involved, and it's unclear that any damage from the attack would have led to permanent disability/disfigurement. Because the animal involved could have caused serious injury had the attack been carried out, we can conclude this event would qualify as Criterion A, but because of the ambiguity regarding the damage that might have been sustained, this would be **low confidence**.
- **"Being cornered"** or a **non-specific "attack."** Similar to events that involve threat of serious injury, raters should consider type of medical intervention required, likelihood of death/disability/dismemberment, body parts affected, and species involved. Because of the lack of specificity in many of these types of narratives, consider whether the **low confidence** code applies.
  - o Example: "Cornered by big cat in zoo setting." Given the species and high likelihood of serious injury or death, this would generally be considered to meet Criterion A with a **high confidence**.
  - o Example: "Attacked by Rottweiler." Although the breed of canine would be considered large/powerful, no information is available regarding need for medical treatment, body parts affected, so this would be considered to meet Criterion A with **low confidence**.
  - o Example: "Being bitten multiple times by a dog and not being able to get away." Although no information is available regarding need for medical treatment, body parts affected, and the breed of canine is unknown, being bitten multiple times by any kind of canine while being unable to get away would likely require emergency medical assistance and would be considered to meet Criterion A with **high confidence**. Moreover, although the breed is unknown, details of the story suggest a strong and powerful animal, which would also point toward this being considered a serious injury.

Medical Procedures Resulting in Complications or Death

- Many events mention procedures that have complications or that result in the patient's death. Most of these will be NDT events that will be evaluated for Criterion HMS-A (An exception would be: an equine patient wakes up during surgery and falls onto the respondent, injuring the respondent).
  - o Consider: <u>Does this event describe serious injury, harm, or death the respondent caused to an animal</u>? If yes, then it qualifies as a Criterion HMS-A event.
    - ▪ Example: "Pets dying due to my own error of medication administration." The respondent indicates that their actions unintentionally caused the death of an animal patient, so this would qualify as a Criterion HMS-A event.

- Example: "In short, case gone bad." There is so little information in this example that it is unclear what role the respondent played nor do we know what the result was. This would not qualify as a Criterion HMS-A event.
- NOTE: See below for more instructions related to euthanasia unrelated to procedural complications.
  - o Another aspect to consider is: <u>Was the death or negative outcome unexpected</u>? Events involving sudden, unexpected deaths will most likely qualify as Criterion HMS-A events. It may be unexpected because it was a routine, and therefore low-risk, procedure (e.g., spay, neuter, or dental cleaning) or because of the patient's young age.
    - Example: "Routine surgical procedure resulted in death of the patient unexpectedly." Even though it is unclear what the respondent's role was, it can be inferred that they played a part in this death and, because it was an unexpected death during a routine procedure, this would qualify as a Criterion HMS-A event.
    - Keep in mind that the respondent would need to be somehow involved in the serious injury, harm, or death. Witnessing the event could qualify for a Criterion HMS-A event, but learning about the event does not qualify.
    - Being able to determine whether an outcome is "unexpected" can be difficult because there is risk involved in all treatments or procedures. If the respondent indicates that they implemented that there were temporary complications but the case ultimately turned out well (i.e., not death, euthanasia, or serious injury), this would not qualify as a Criterion HMS-A event.
      - Example: "I have instituted treatment for a patient that I thought was the best course of treatment at the time that later resulted in severe complications. The patient has since recovered well, and I would have recommended the same care in a similar case." In this case, the respondent indicates that complications resulted from the chosen course of treatment, but there was a good outcome, so this would not qualify as a Criterion HMS-A event.
  - o If a narrative fails to provide enough information to determine that the respondent witnessed or played a role in the serious injury, harm or death of the patient, then the event does not qualify as a Criterion HMS-A event.
    - Example: "2 veterinary interns left to do a complicated surgery on their own and there was a poor outcome." There is no indication that the respondent directly witnessed or participated in this event, and there is not enough evidence of serious injury, harm, or death. Thus, this would not qualify as a Criterion HMS-A event.
- **Medical Errors** – Use the same guideline above: <u>Does this event describe serious injury, harm, or death the respondent caused to an animal</u>?
  - o Example: "An exploratory surgery that seemed to uncover cancer that later proved to be a foreign body. The other two vets in the clinic confirmed my thoughts on cancer, but after euthanasia a partially eaten toy was found in the colon. This misdiagnosis continues to haunt me." The misdiagnosis in this case resulted in death, so this

respondent caused the death of an animal whose life may have been saved with correct treatment, so this event qualifies as a Criterion HMS-A event.

Euthanasias

- In veterinary medicine, euthanasia is not routinely experienced as abnormally distressing or traumatic, and in fact is often viewed as a humane solution. That being said, some narratives include distressing euthanasia events. To evaluate these narratives for Criterion HMS-A, look for wording that the euthanasia was exceptional to the respondent in some way. In particular, you should consider whether there was something that went wrong during a standard euthanasia procedure that led to additional suffering of the animal or that made a euthanasia especially gruesome.
  - Example: "When I went into the exam room, the cat was swaddled in a towel and very lethargic. Upon beginning to administer the euthanasia solution to the hind limb catheter – the cat jumped out of the owner's arms and began screaming horrifically." Euthanasia procedures are generally painless; a cat 'screaming horrifically' indicates that the cat was suffering and that the respondent could have been perceived as causing **serious harm** rather than the relief that euthanasia generally delivers to the animal and the owner. This would be considered a Criterion HMS-A event.
- Another factor to consider is whether the respondent indicates feeling pressured or coerced to perform euthanasia against their better judgment or values.
  - Example: "Putting healthy animals to sleep for feline urinary tract disease or aggression." This respondent reported being distressed specifically by demands to euthanize animals that have treatable conditions, and it would qualify as a Criterion HMS-A event.
- In contrast, sometimes there is a grief response when veterinarians euthanize animals they have known a long time or whom they tried very hard to save, but couldn't. Although these incidents are distressing, they would not qualify as "traumatic" per DSM-5 guidance and should not be coded as Criterion HMS-A events.
  - Example: "Some euthanasia cases are worse than others." This is a statement that does not refer to an exceptional event. It does not qualify as a Criterion HMS-A event because of the lack of specificity about an exceptional case.
  - Example: "Needed to euthanize a stallion because surgical attempts to address rear leg injury were ultimately unsuccessful." There's no evidence of anything exceptional happening nor does the respondent indicate feeling pressured to perform a euthanasia against their values, so this would not qualify as a Criterion HMS-A event. This event is a sad outcome, but euthanasia would generally be considered the most humane option, consistent with veterinary practice guidelines.

Exposure to Gruesome or Aversive events, including abuse and neglect

- Many NDT narratives mention abuse or neglect cases. The DSM-5 lists "Experiencing repeated or extreme exposure to aversive details of the traumatic event(s)" as a qualified Criterion A event but specifics that it is exposure to human remains or exposure to details of abuse to humans. Narratives that mention gruesome events or the abuse and neglect of

animals can be evaluated as potential Criterion HMS-A events. For abuse and neglect cases, because respondents have been asked to reflect on "an unusually distressing event in your work as a veterinary professional that has stuck with you or haunted you afterward," we will err on the side of believing that any case categorized as abuse or neglect by a veterinary professional would meet the threshold for severe harm, based on their occupational expertise.

- o Example: "Seeing a sheep that died after being eviscerated by the owner who was attempting to resolve a dystocia." This event is both gruesome and could also be considered abuse. It would meet the threshold of experiencing extreme exposure to aversive details of an event, and it would qualify as a Criterion HMS-A event.
- o Example: "Horrible abuse of animals." Although there is little detail in this narrative, it would meet the threshold of experiencing repeated exposure to aversive details, and it would qualify as a Criterion HMS-A event.
- o Example: "dog run over by lawnmower, who survived but upset me." Some narratives mention gruesome events that are unrelated to abuse or neglect. This would qualify as extreme exposure to aversive details of an event, so it would qualify as a Criterion HMS-A event.

Learning About Events
- For "learning about" events/indirect exposure, follow the above procedure with this additional step: participant must specify closeness in the narrative by stating "best," "close," or other language that suggests a close relationship with the victim. As a general rule, parents, siblings, or children are assumed to be "close" to the individual. For other relatives (e.g., cousins, aunts/uncles, grandparents, etc.) the individual must specify a close relationship with this individual.
  - o General rule: it must be *close* to know *for sure*, even if the event is Criterion A (i.e., if the individual does not mention closeness in their narrative, code low confidence)
- If the index event is having a heart attack/dying suddenly of a natural cause (not prolonged illness, not old age, not cancer)
  - o If the individual WITNESSED: Criterion A
  - o If the individual LEARNED ABOUT: NOT Criterion A

Coding Natural Disasters
- **Criterion A, High Confidence**
  - o Tornados/hurricanes hitting the individual's house while they are home
  - o Disaster causing damage to individual's house and mom/dad/sister/close family or friend was home
  - o Individual saw the disaster happen to their house or to other people/feared for their life as it was approaching
- **NOT Criterion A, High Confidence**
  - o Learned about tornado/hurricane/natural disaster in general, did not happen to anyone they knew or their area e.g., "hurricane hit my state, but no one I knew was affected," learned about "Hurricane Katrina"
- General mention of a natural disaster (e.g., "tornado") is NOT enough to qualify for criterion A, there must be some specific mention that the individual experienced the event

or learned about it happening to someone else who was there. There must be some specific mention of threat/danger. The following (or similar) would be coded **NOT criterion A, low confidence**:

- o General mention of natural disaster in their neighborhood, street, general city/area with no written indication of threat level directly to the person e.g., "A bad tornado came through my city;" "Tornado in my neighborhood," "Hurricane Katrina damaged my city"
- o General mention of a natural disaster that participant marked "witnessed" but did not provide a narrative of how they witnessed it other than e.g., "Hurricane Harvey"
- Evacuating and returning to a damaged home: e.g., "A tornado destroyed my beach house," "It was really stressful – we evacuated and didn't know what the damage would be until we got home"
  - o If there is direct threat during evacuation: criterion A
  - o Coming back and witnessing gruesome details (e.g., dead bodies still being recovered): criterion A
  - o Coming home to property damage, with no mention of life threat or serious injury: NOT criterion A

Coding MVAs

- For an MVA to be Criterion A you should look for buzzwords such as: T-bone, head on, high speed, the car flipped, major accident, mention of someone being killed/seriously injured, life flight, totaled, etc.
- Non-Criterion A accidents likely include words like: minor accident, fender bender, another car tapped us, etc.

Coding Trauma Types

- Below is a list of events and their most likely Criterion A (yes or no) category. Note that there are exceptions to the Criterion A status; the categories listed below are simply the *most likely*.

Crit. A?	Event
1	Natural disaster
1	Fire or explosion
1	Transportation accident
1	Serious accident at work, home, or during recreational activity
1	Exposure to toxic substance
1	Physical assault
1	Assault with a weapon
1	Sexual assault
1	Other unwanted or uncomfortable sexual experience
1	Combat or exposure to a war-zone
1	Captivity
1	Life-threatening illness or injury (not cancer or heart problems)

IMPACT OF DISTRESSING EVENTS ON VET PROFESSIONALS

1	Severe human suffering
1	Suicide
1	Sudden, violent death (doesn't fit in any of above categories)
1	Violent or accidental death of someone close to you (doesn't fit in any of above categories)
1	Serious injury, harm, or death you caused to someone else
1	Any other very stressful event or experience (Crit A that doesn't fit in any other category)
0	Death (expected) due to serious illness/Serious illness/Medical problems
0	Cancer
0	Heart problems
0	Learning of death of a grandparent
0	Divorce
0	Family relationship problems
0	Romantic relationship problems
0	Racism, harassment, teasing, bullying
0	Bad grades
0	Moving/Transferring schools
0	Any other stressful event or experience (non Crit A that doesn't fit in any other category)
0	Money problems
0	Arrest

Examples: Criterion A + Confidence Level

	Crit A (Y/N)	Conf (Hi/Lo)	Reason
1) Direct Threat Event			
a. Having medicine sprayed into my eyes (a non-lure lock syringe detached during injection). I thought I'd lose my vision.	Y	High	Loss of vision could have been considered a serious injury.
b. Being bitten multiple times by a dog and not being able to get away.	Y	High	Could have resulted in serious or life-threatening injury
c. Being bitten by a cat as it tried to escape.	N	High	No evidence of serious or life-threatening injury

	d. Being chased by a bear after she was tranquilized.	Y	High	Could have resulted in serious or life-threatening injury
	e. Being bitten multiple times by a dog and not being able to get away. Being bitten by a cat as it tried to escape. Being chased by a bear after she was tranquilized.	Y	High	Two of these events could be considered Criterion A, so the whole narrative is Criterion A.
	f. Kicked in the head by a horse	Y	High	Could have resulted in serious or life-threatening injury
	g. I have had my life threatened by the wife of a convicted murderer.	Y	Low	Having ones life threatened qualifies as Crit A, but it is unclear if the threat was imminent (was the convicted murderer present?), so low confidence
2) Non-Direct Threat Event				
	a. A dog in my care was inadvertently euthanized.	N	High	Euthanasia would not be a Crit A event, but need to consider for Crit HMS-A
	b. Dog bit off a technician's ear in front of me.	Y	High	Witnessed a serious injury
	c. A client getting upset due to patient worsening.	N	High	Does not meet Crit A or Crit HMS-A
3) Outside of Work Event				
	a. Brother was in a serious car accident	Y	High	Brother qualifies as "close" plus "serious car accident" means this qualifies as Crit A
	b. First to arrive at a fatal automobile accident	Y	High	Witnessing human suffering and death qualifies as Crit A
	c. Dealt with tornadoes and earthquakes.	N	Low	General mention of natural disaster does not qualify as Crit A, but it is low confidence due to lack of detail
	d. Watched the long slow death of my grandmother suffering from lymphoma.	N	High	Expected death does not meet Crit A
	e. Death of a close friend in a very unexpected tragic accident	Y	High	Sudden, unexpected death of someone close to you meets Crit A

f. My sister committed suicide. She shot herself in the head. It has been many years, but still affects my siblings, parents, and me to this day.	Y	High	Suicide of a close relative meet Crit A
g. Injury involving hospital time	Y	High	Being hospitalized does not qualify as Crit A, but an injury that requires hospitalization is considered serious enough to meet Crit A
h. I was the victim of sexual molestation. Witnessed a man beating a woman with a baseball bat. Have been homeless several times while growing up.	Y	High	As before, consider each event separately, then rate the narrative for the event that is most likely to meet Crit A=Y

Examples: Criterion HMS-A + Confidence Level
(Hint: Replace the animal victim with a human victim and re-assess for Crit A)

	Crit HMS-A (Y/N)	Conf (Hi/Lo)	Reason
4) Direct Threat HMS-A Event			
(All victims are human)			
5) Non-Direct Threat HMS-A Event			
a. A patient (dog) died on the surgery table while doing a routine dental.	Y	High	Being responsible for death/injury of an animal would meet Criterion HMS-A
b. Multiple events involving fatal traumatic accidents with horses -- broken legs, broken necks, lacerations etc.	Y	High	Exposure to severe suffering or gruesome or aversive events would meet Criterion HMS-A
c. Horrible abuse of animals.	Y	Low	Exposure to suffering and abuse of animals would meet Criterion HMS-A
6) Outside of Work HMS-A Event			
a. Barn fire involving the death of 30 horses.	Y	Low	Being exposed to the death of 30 horses who were killed in a barn fire would be a Criterion HMS-A event because being exposed to the deaths of 30

			people killed in a barn fire would be a Crit A event.
b. saw my pet killed by another dog	Y	High	Witnessing a pet being killed by a dog would qualify as a Criterion HMS-A event because witnessing a human being killed by a dog would qualify as a Crit A event.
c. Own animals dying suddenly (no kids of own!). One hit by truck in front of me.	Y	High	Witnessing a pet die by being hit by a truck would be a Criterion HMS-A event because watching a human die from being hit by a truck would be a Crit A event.