

Compassion Fatigue in Laboratory Animal Personnel during the COVID-19 Pandemic

Sarah E Thurston,^{1,2,*} Goldia Chan,¹ Lisa A Burlingame,¹ Jennifer A Jones,¹ Patrick A Lester,¹ and Tara L Martin^{1,2}

Compassion Fatigue (CF) is commonly observed in professions associated with human and animal care. The COVID-19 pandemic compelled laboratory animal research institutions to implement new work practices in order to maintain essential animal care operations. These modifications ranged from shift changes to last-resort measures, such as culling animal colonies, to accommodate reduced staffing. Such changes could cause personnel to experience increased stress, isolation, and helplessness—all of which can increase CF risk. In the current study, 200 persons involved with animal research completed an online survey to gauge whether CF among laboratory animal personnel had increased during the pandemic. The survey examined professional quality of life, self-assessed levels of CF, institutional changes, perceived changes in animal welfare, and institutional measures intended to alleviate CF. A total of 86% of participants had experienced CF at some point in their career, with 41% experiencing a CF event (new or worsening symptoms of CF) during the pandemic. In addition, 90% of participants who reported a CF event also reported subsequent effects on their personal or professional lives. Health, employment, and animal-related stress that arose due to the pandemic were all found to influence CF scores significantly. Although 96% of respondents were considered essential workers, 67% did not feel as valued for their work as other essential personnel. Furthermore, 88% of personnel responsible for the euthanasia of healthy animals who experienced a CF event reported that CF also affected their personal life, professional life, or both, and 78% responded that interventions from internal CF programs or leadership did not help to alleviate symptoms of CF. The COVID-19 pandemic and resultant institutional changes will likely have lasting effects on persons and organizations. By determining and subsequently mitigating sources of CF, we can better assist the laboratory animal community during future crises.

Abbreviations: CF, compassion fatigue; CS, compassion satisfaction; ProQOL, Professional Quality of Life Scale; STS, secondary traumatic stress

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Although compassion fatigue (CF) is a widely recognized problem in human healthcare and other care-related professions,^{5,36,43} it has only recently been validated as a serious issue in laboratory animal care.^{9,17,26,28,32} CF refers to a state of physical and emotional exhaustion that can affect caregivers and those in related professions over time, depleting the feelings of care and empathy that drew them to these professions.^{11,26} If left unchecked, CF can have devastating effects on a person, including diminished self-worth, poor morale, hypersensitivity to situations, depression, guilt, self-medication and addiction, and many other distressing effects.^{10,26,33,36} From an animal welfare perspective, the most disturbing symptom of CF is a loss of empathy, leading to an ambivalent or—worse—uncaring and insensitive attitude toward animals that can reduce the quality of life of the animals under the care or management of a person with CF.^{1,10,32} In addition to effects on persons and the animals they directly care for, CF can permeate an organization, leading to large-scale detrimental effects. For example, CF has been linked to higher staff turnover rates, employee absenteeism, mistakes, diminished productivity, negativity toward management, the introduction of scientific variables into research studies, safety protocol breaches, and more.^{26,36} The inverse of

CF is Compassion Satisfaction (CS), the feelings of fulfillment and gratification that a person gets from their work, often from caring for laboratory animals.¹⁰ CF and CS are often depicted as a balance, with CF on one side and CS on the other.

CF is associated with 2 other closely related disorders: burnout and secondary traumatic stress (STS).³⁷ Although these conditions share many of the same symptoms, they are separate and unique.²⁶ Burnout results from a person's long-term, unrelieved exposure to occupational, mental, or physical exhaustion and stress and tends to occur gradually over time.^{11,33,40} It is not associated with the underlying emotional trauma related to CF and STS. Often, time away from work can help to alleviate burnout but not CF or STS. STS is a syndrome, also called 'vicarious trauma,' in which persons experience stress by witnessing distress, such as animals may experience in research.^{33,36} Although the exposure to trauma is indirect with STS, the effect can be profound, in some cases even leading to posttraumatic stress disorder.¹¹ Although CF, burnout, and STS are different conditions, they can have similar symptoms and be caused by similar stressful working conditions.

CF has been well studied and validated in persons who work with animals, such as in veterinary medicine,^{6,18,23} with one study reporting that 87% of North American veterinary care professionals have experienced CF.¹⁴ Given the elevated risks of suicide and decreases in mental wellbeing in the veterinary profession,^{3,25,30,31} CF, burnout and STS should not be taken lightly by veterinary schools or employers.

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¹Unit for Laboratory Animal Medicine and ²Refinement and Enrichment Advancements Laboratory, University of Michigan, Ann Arbor, Michigan

*Corresponding author. Email: sarahthurston7986@gmail.com

CF can affect people across the laboratory animal research field, not just those directly working with animals.^{12,24,26} Because CF may be discussed less often in reference to positions such as administration or regulatory compliance, associated signs may not be readily attributed to CF. However, any role in the laboratory animal research field can potentially be subject to the moral stress that causes CF. Moral stress can occur when a person is conscious of their moral ideals but cannot fulfill them due to external factors.²⁶ Any employee can feel this internal conflict with regard to animal research in general or specific job duties such as euthanasia, and this internal conflict can lead to feelings of CF. In our experience, personnel often describe feelings of internal conflict because while they feel animal research is valid and necessary to advance scientific progress, including in human and animal medicine, staff also feel guilt when they think about or directly see negative effects on the animals themselves. This cognitive dissonance, in which a person holds 2 opposing beliefs simultaneously, can have additional negative emotional effects.⁹

The COVID-19 pandemic has increased stress for everyone, but especially for essential employees,^{8,20} such as laboratory animal care personnel. The pandemic has forced many institutions to enact measures ranging from restricted in-person interaction between staff to last-resort measures, such as the culling of healthy animals.^{13,27} Culling of healthy animals is a measure that may be enacted as part of a wider management plan during large-scale emergencies, such as a pandemic or zoonotic disease outbreaks, natural disasters, or other states of emergency.² For example, during the COVID-19 pandemic, wide-scale on-farm culling of pigs in agricultural settings was reported due to closures and lack of personnel at meat-packing plants.¹⁹ In most settings, wide-scale depopulation or culling are considered last-resort measures and enacted only when no alternatives are available.² Such extreme measures could intensify existing CF or create new CF symptoms in personnel who were not previously experiencing them. Furthermore, there was a worldwide effort to honor essential employees and highlight their valuable contributions to society, but these typically did not include laboratory animal care personnel in their public displays.⁴¹ Due to negative or inaccurate perceptions of animal research,¹⁶ the general public may not support animal research³⁴ or have empathy for laboratory animal care professionals and their work. This attitude can lead to increased feelings of isolation among these professionals, further exacerbating CF.³³

The main objectives of the current study were to evaluate 1) the effect of the COVID-19 pandemic on the morale of the laboratory animal care population and their self-reported level of CF; 2) perceptions by laboratory animal care workers of the effect of the COVID-19 pandemic on laboratory animal welfare; and 3) whether staff felt that current internal institutional CF programs effectively mitigated or managed CF symptoms during the COVID-19 pandemic. We hypothesized that the COVID-19 pandemic would increase levels of CF in laboratory animal personnel, contribute to perceptions of decreased welfare in the laboratory animal population, and that most current CF programs were not prepared to handle a widespread crisis of this nature.

Materials and Methods

Overview and ethics approval. All procedures and informed consent protocols were reviewed and determined to be exempt from ongoing review by the University of Michigan Medical School Institutional Review Board (protocol HUM00181791).

Survey participation and recruitment. Participants were recruited through widespread online promotion designed to maximize sample size. Methods of recruitment included on-line community bulletins (for example, AALAS Community Exchange, Laboratory Animal Refinement and Enrichment Forum), direct emails to known laboratory personnel, and list serves (for example, Canadian Association for Laboratory Animal Science, training program alumni). The survey was administered by using Qualtrics software (Qualtrics XM Software Company, Provo, UT) and was open for participation July 6 to August 11, 2020. Postings encouraged participants to disseminate the survey to any relevant contacts in order to create a snowball effect. No monetary compensation was provided upon completion of the survey.

Participation was voluntary and anonymous. Consent was collected online prior to beginning the survey, and participants had the option to provide their email to participate in a potential follow-up survey. To provide anonymity, contact information was collected separately from survey results and could not be correlated with survey responses. Participants could abstain from answering any question and had the option to stop the survey at any time without consequence. Resources for assistance with CF were presented at the end of the survey for use at the participant's discretion.

Inclusion criteria required participants to be at least 18 y old (youngest responder was age 20) and working with laboratory animals in some capacity at the time of completion of the survey.

Survey development and description. The survey was aimed at identifying and characterizing the prevalence of CF in animal care and research staff before and during the COVID-19 pandemic. The survey included questions developed by the research team after they consulted relevant literature to allow self-assessment of CF by participants^{14,17,28,32} and a validated scale of CF³⁷ for comparison with self-assessed CF.

The first section of the survey collected demographic data regarding the participant's age, location, gender, and general employment history, including job role, institution type, and time in the field.

The second section of the survey was designed to evaluate levels of CF in the participants and was broken into 2 components. The first was to ask participants to respond to specific questions to allow self-assessment of their current level of CF. To help them in doing this, they were given a definition and list of common symptoms of CF. The definition of CF stated "Compassion fatigue can be defined as 'the emotional residue or strain of exposure to working with those suffering from the consequences of traumatic events.' It can also be called 'secondary trauma' and is very common to people working in the care fields, including animal care. Compassion fatigue can produce symptoms such as loss of morale, changes in sleep patterns, difficulty controlling emotions, anger, depression, loss of hope, decreased cognitive ability, and increased emotional intensity, among other signs."¹¹ The second component evaluated respondent's levels of self-care. This section used the Professional Quality-of-Life (ProQOL) Scale,³⁷ a validated scale designed to assess and score burnout, STS, and CS. The ProQOL Scale asked participants to respond to 30 statements related to their experiences as a caregiver during the last 30 d. Statements ranged from "I am happy" to "I feel depressed because of the traumatic experiences of the animals I help." Participants scored each statement with a value between 1 (never) and 5 (very often). The experimenters used a key to tally the scores for burnout, STS, and CS; the CF score was equal to the sum of the burnout and STS scores. On each of the 3 scales, the lowest possible score was 10, highest possible score was 50.

The third section of the survey characterized participants' feelings toward both societal and workplace changes that had been made due to the COVID-19 pandemic as well as their satisfaction with available social support. This section also included open text questions to collect suggestions for how employees' needs could have been better met. Furthermore, questions in the third section asked about animal health during the pandemic to investigate staff perceptions of potential effects of human CF and workplace stress on animal wellbeing. A full copy of all survey questions can be obtained by contacting the study authors.

Data analysis. Only participants who had completed at least 50% of questions were included for analysis in order to ensure the accuracy of a participant's descriptive profile and burn-out score before comparisons were made. Statistical analysis was performed by using GraphPad Prism 8.0.0 for Windows (GraphPad Software, San Diego, CA). The Kruskal–Wallis test was used for questions that had 3 or more answers, and the Mann–Whitney test was performed for all other tests to test for associations with ProQOL scores. These tests were chosen due to the nonparametric nature of the ProQOL scoring system. Open text responses were evaluated via thematic analysis. Mean responses were not reported in this study. A $p < 0.05$ was used to indicate statistical significance.

The evaluations in this study were not undertaken by mental health professionals and are not intended to diagnose mental health conditions but rather to act as a screening tool for use in a specific stress-related situation.

Results

Demographics. A total of 200 persons responded to the survey, but removal of participants who answered 50% or fewer of the survey questions left 170 participants. Because some participants abstained from various questions, the number of participants that answered each question is listed in each table. Demographic and work information are found in Table 1. The average respondent was working in the United States (97%); female (78%); employed at a university, college, or medical school (82%); and had worked in the field for 6 y or longer (62%). Ages ranged from 20 to 65, with the largest age group being 30 to 39 y (35%). Many job roles were represented, with the largest number of participants working as husbandry technicians or animal caretakers (29%), husbandry supervisors or managers (22%), veterinarians (20%), and veterinary technicians (13%).

CF and work stress. A total of 86% of respondents reported having CF during their careers, and 41% experienced a CF event (experiencing CF for the first time, new CF symptoms, or worsening CF symptoms) during the pandemic. In addition, 90% of participants who reported a CF event during the pandemic also reported an effect on their personal lives, professional lives, or both due to their CF symptoms. When asked whether their current work stressors had been significant work stressors prior to the pandemic, 77% of respondents reported no. The most commonly reported work stressor was a concern for the employees' own health and that of their loved ones due to being an essential worker (74%). An evaluation of ProQOL scores showed that CF (i.e., burnout + STS) scores differed significantly ($P = 0.0195$) between participants who indicated that "Worrying about the health of myself or loved ones as an essential worker" was a significant stressor and those that did not. Respondents who reported one or more management-related stressor ("Unpredictable work schedule," "Lack of communication from leadership," and "Worrying about job security or potential job loss") showed significantly higher CF scores ($P = 0.0227$) than those who did

Table 1. Demographics of qualifying study participants ($n = 170$)

	<i>n</i>	(%)
Country ($n = 170$)		
United States	164	97
Canada	4	2
Other	2	1
Age (y ; $n = 163$)		
20–29	39	24
30–39	57	35
40–49	35	21
50–59	22	13
60–69	10	6
Gender ($n = 170$)		
Female	133	78
Male	32	19
Nonbinary	3	2
Transgender man	1	<1
Prefer not to answer	1	<1
Job role ($n = 170$)		
Husbandry technician or animal caretaker	49	29
Husbandry supervisor or manager	38	22
Veterinarian	34	20
Veterinary technician	22	13
Behaviorist	5	3
Laboratory member	5	3
Veterinary resident	5	3
Trainer	4	2
Administrative staff	4	2
Enrichment coordinator	2	1
Regulatory compliance	2	1
Institution ($n = 169$)		
University, college, or medical school	139	82
Nonprofit organization	12	7
Government	6	4
Contract research organization	4	2
Research	2	1
Pharmaceutical	2	1
Industry	1	<1
Hospital	1	<1
Commercial breeder	1	<1
Biomedical research	1	<1
Time in field (y ; $n = 170$)		
<1	8	5
1–3	30	18
3–6	26	15
≥6	106	62

not report management-related stressors. Those who reported animal-related stressors ("Euthanasia of animals" and "Concerns about the impact of COVID-19 on the health or welfare of the animals that I care for") had significantly higher CF scores ($P = 0.002$). The majority of employees were concerned about

Table 2. Most reported work stressors during the pandemic ($n = 163$)

What have you personally found to be most difficult during the COVID-19 pandemic in regard to your work stressors?	<i>n</i>	(%)
Worrying about my own health and the health of my loved ones by being an essential worker	120	74
Loss of face-to-face interactions with coworkers	72	44
Worrying about job security and/or potential job loss	56	34
Feeling helpless	51	31
Lack of communication from leadership	49	30
Euthanasia of animals	48	29
Unpredictable work schedule	48	29
Concerns about the impact of COVID-19 on the health or welfare of the animals that I care for	42	26

Participants could choose multiple responses, so the total count and percentage exceed the total number of participants and 100%.

several of these stressors. A detailed list of the most reported work stressors during the pandemic are found in Table 2.

Social distancing. Social isolation from coworkers was a concern for many employees. A loss of face-to-face interaction with coworkers was the second most reported work stressor (44%) and 54% reported that social distancing measures enacted at their workplace had affected morale (30% were unsure).

CF and euthanasia. Personnel responsible for euthanizing healthy animals reported higher levels of CF events during the pandemic (54%) than did personnel who were not responsible for euthanasia (37%). Of the 54% who experienced a CF event, 88% reported that the CF symptoms were intense enough to cause disruption in either their personal life or professional life, or both. ProQOL scales showed no significant difference in STS scores between institutions that performed more euthanasia and those that did not ($n = 161$, $P = 0.0672$). However, significantly higher overall CF was found in personnel at institutions that had increased euthanasia as compared with those that did not ($n = 161$, $P = 0.0381$). No significant difference was found in STS or CF scores between those who were or were not personally responsible for euthanasia ($n = 107$, $P = 0.7582$ and 0.6417 , respectively).

Comparisons with other essential personnel. 96% of respondents self-identified as essential personnel. However, 67% of respondents said that they did not feel as valued or supported as other essential workers (for example, grocery workers, health care workers) during the pandemic. Evaluation of ProQOL scores revealed that those who felt valued had significantly ($n = 161$, $P = 0.0005$) lower CF scores than those who did not feel valued. Participants who felt valued also had significantly ($n = 160$, $P = 0.0004$) higher CS scores.

CF and ProQOL scales. Scores were tallied for the ProQOL STS, CS, and Burnout scales. On all scales, the lowest possible score was 10, and the highest possible score was 50.

ProQOL STS Scale results. Scores ranged from 10 to 38, with an average score of 21 (SD) = 20). 41% of responses had moderate scores on the STS Scale. No high scores (scores above 42) were reported. Of the moderate scores, 44% self-reported that they had experienced a CF event during the pandemic and 40% self-reported that their CF symptoms affected either their professional life or personal life or both. Among respondents with low scores, 38% self-reported that they had experienced a CF event during the pandemic and 54% self-reported that their CF symptoms had influenced either their professional life or personal life or both (Figure 1).

ProQOL Burnout Scale results. Scores ranged from 11 to 40, with an average of 25 (SD=21). Results showed that the majority of responses (62%) scored in the moderate range for burnout, and 38% scored in the low range, with no high scores.

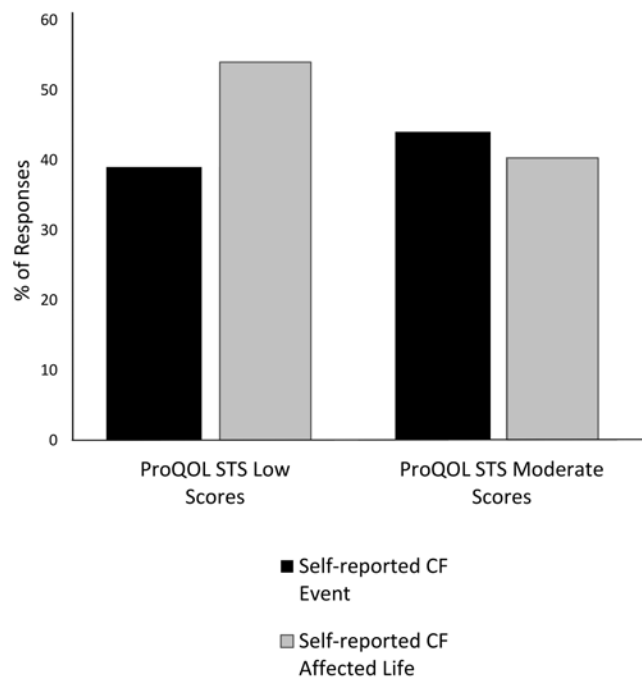


Figure 1. Self-reported levels of compassion fatigue compared with Professional Quality-of-Life Secondary Traumatic Stress Scale scores.

ProQOL CS Scale results. Scores ranged from 14 to 50, with an average of 38 (SD 25). Only 3% had a low score for CS. The majority of responses reached a moderate score (65%); 32% reported a high score for CS. Of the 42% of participants who self-reported a CF event during the same time period, 23% still had a high score on the ProQOL assessment, with one participant reaching 50, the highest possible score for CS.

Perceived changes in animal welfare. Although the actual percentage of respondents reporting perceived changes in animal health or welfare was relatively low (18% noted changes in behavior, 7% noted more health issues), some noteworthy issues were reported in the survey (Table 3). Perception of changes in animal behavior was associated with significantly higher STS scores ($n = 159$, $P = 0.0036$). A perceived change in animal health issues, whether increased or decreased, was not associated with significant differences in STS scores ($n = 158$, $P = 0.0523$).

Efficacy of institutional CF programs. A total of 78% of survey respondents felt that their current institutional CF program or offered support measures did not help to mitigate or manage symptoms of CF during the pandemic. In fact, institutions that offered internal CF programs had one of the lower scores (21%) for effectively helping employees manage symptoms of

Table 3. Perceived animal behavioral or health issues observed during the COVID-19 pandemic ($n = 23$ responded 'yes')

Based on your own <i>personal experience</i> , do you believe that the animals you cared for showed changes in behavior or health issues during the COVID-19 pandemic?	<i>n</i>	(%)
Increased stress behaviors	6	26
Increases in stereotypic behaviors or development of new behaviors	4	17
Miscellaneous health/behavior issues	4	17
Increased breeding issues (increased litter mortality, increases in self-mutilation and aggression)	3	13
Aggressive behaviors	2	9
Inappetence	2	9
Boredom/lethargic behaviors	2	9

Table 4. Efficacy of institutional compassion fatigue (CF) programs or internal support measures ($n = 163$)

Type of CF program or CF support measures	% of institutions that offer this program or support measure	Employee-reported effectiveness at managing CF symptoms
Does not offer support measures	6.7%	0%
Don't know/unsure	10.4%	7.1%
Access to counseling or mental health services for employees	22.0%	21.2%
Internal CF support group + other resources	23.9%	21.2%
Access to CF information (lectures, handouts, webinars); access to counseling or mental health services for employees	36.8%	29.7%

Table 5. Suggestions from survey participants on what institutions could have done to better support mental and emotional needs during the COVID-19 pandemic ($n = 72$)

What could your institution have done to better support your mental and emotional needs during the COVID-19 pandemic?	<i>n</i>	(%)
Better and more communication by institutional leadership	19	26
Signs of gratitude for laboratory animal personnel by institutional leadership	14	19
Suitable compensation (hazard pay, time off, food, etc.)	11	15
Not applicable/unsure	9	13
Better scheduling (for example, staggered shifts) and more flexible schedules	6	8
On-site counseling	4	6
Acknowledgment of compassion fatigue by institutional leadership	2	3
Better enforcement of mask-wearing/social distancing policies	2	3
Providing online compassion fatigue resources via email	2	3
Personal 1-on-1 check-ins with staff from leadership	1	1
Implementing earlier interventions	1	1
Providing entertainment to techs to replace socialization	1	1

CF. More employees (30%) rated institutions with no internal CF program but with access to information about CF (lectures, handouts, webinars) and to counseling or mental health services for employees as being effective. Approximately 21% of employees at institutions that only offered access to counseling or mental health services for employees rated their workplace as effective at helping manage symptoms of CF. Evaluation of ProQOL scores revealed that counseling and mental health services with or without additional forms of support did not significantly affect CF scores as compared with scores at institutions that offered other types or combinations of CF support ($n = 136$, $P = 0.1483$). In contrast, institutions that offered internal support groups and/or information about CF did significantly influence CF ($n = 136$, $P = 0.0002$ and 0.0115 , respectively; Table 4).

Survey participant suggestions. The survey included an open text question that solicited their opinions about what they felt that institutional leadership could have done to better support staff during the pandemic. The 2 areas that received the most comments were calls for increased communication and increased demonstrations of gratitude from leadership (Table 5).

Prevalence of self-care. Approximately 68% of survey participants reported that they used resources to cope with CF, such as participating in a support group, initiating self-care, and speaking to a professional. ProQOL scores showed that CF scores were similar between those who used self-care and those who did not ($n = 170$, $P = 0.1811$). Of the 32% who did not use any resources to cope with CF, 60% reported no plans to initiate any self-care in the next 6 months. An important aspect of self-care is communication with loved ones¹, and 81% of survey respondents felt that they could talk to family and friends outside of the laboratory animal community about their work stressors during the COVID-19 pandemic.

Discussion

Research shows young female veterinarians are at high risk for mental health difficulties, including depression, burnout, and suicidal ideation.³¹ Previous work also shows that young women were more depressed during the COVID-19 pandemic⁴⁴ and that female laboratory animal professionals tend to be more likely than males to report CF symptoms.³² The majority of our survey respondents were young (59% under 40) females (78%).

Although prior research shows that women may be at increased risk of CF and burnout, our data cannot differentiate between a higher prevalence of CF in women in the laboratory animal care field compared with a higher likelihood of women to participate in our study. Another demographic limitation of this study was that the majority of respondents were working in the United States (97%), and different working conditions across countries may limit applicability to the broader laboratory animal care field. However, surveys of Canadian populations have yielded similar findings regarding CF.³²

Results from the current survey demonstrate that CF is an ongoing, pervasive problem among laboratory animal personnel, with 86% of survey participants experiencing CF at some point during their career. Over 40% of that number self-reported a CF event during the pandemic, and their CF symptoms affected their mental wellbeing during an already stressful time.⁴⁴ The majority of CF sufferers did not self-report an event during the pandemic, potentially because staff with a history of CF had previously developed resiliency and self-care skills. Among all survey participants, the majority were struggling with new work stressors that had not been sources of significant work stress before the pandemic. This finding implies that respondents were dealing with both preexisting work stressors and these new sources of significant stress. General population studies during the pandemic have found that those with work-related stress and stress related to health fears were at a higher risk of developing depressive symptoms during the COVID-19 pandemic.⁴⁴ Although health concerns related to status as an essential worker was the most common stressor, respondents frequently commented about the wellbeing of team members. These included concerns about “staff morale,” “[their] team’s mental health”, management of “stressed out” staff while oneself is stressed, and the burden of empathy for “very stressed animal care techs.” Comments like these are indicative of the caring, empathetic nature of laboratory animal staff—traits that increase susceptibility to CF even outside of a pandemic^{12,26}—and further support the need for robust CF prevention methods. An overall workplace culture that focuses on building emotional resiliency and CS can be an effective method to help prevent and mitigate CF.^{24,40}

Euthanizing healthy animals is a last-resort measure that, as anticipated, caused distress to employees at institutions that employed this strategy. Euthanasia is a significant source of stress for personnel.^{26,35,42} Previous surveys of laboratory animal personnel have shown that those with less control over euthanasia reported higher levels of CF than personnel who had some measure of control.¹⁷ In our survey, those responsible for euthanasia of healthy animals seemed to experience deep internal conflict. Respondents characterized such euthanasia as “heartbreaking”, “overwhelming”, and “exhausting.” Respondents stated that euthanasia of healthy animals “triggered [their] depression and anxiety”, that they “felt like [they were] betraying the animals,” and stated “these mice did not get to live for a purpose.” Many of the comments from personnel responsible for euthanasia spoke about guilt and depression. Staff required to perform euthanasia of any animals, but especially those euthanizing healthy animals, should be given additional support measures to mitigate these negative effects. According to our ProQOL data, staff working at institutions that must unexpectedly cull healthy animals may experience increased CF even when they are not personally responsible for euthanasia. More data is needed to examine the effects of culling healthy animals on staff who are not responsible for euthanasia. However, prudent measures for mitigating CF in these circumstances could include transparency in helping staff to understand why animals

must be euthanized, and increased CF mitigation resources for all staff working with animals.

One of the most significant outcomes of survey participants was that they did not feel as valued or supported as other essential personnel during the pandemic. The nature of animal research is partially responsible for this attitude, because confidentiality may be necessary to facilitate security or trade secrets. During the COVID-19 pandemic, signs with messages supporting essential workers (such as “Heroes Work Here”) were common in hospitals, grocery stores, and factories, but to our knowledge, such public attestations were rarely seen in front of animal research facilities. Although much of the important work being done to develop the vaccines against COVID-19 used animals,⁴ those caring for the animals received little or no public recognition. In addition, many members of the general public still openly oppose animal research, which contributes to a sense of stigma among laboratory animal care professionals. A recent survey of national voters found that 30% of respondents strongly or somewhat opposed the humane use of animals in research even when that research supports treatments and vaccine developments for COVID-19.³⁴ These factors may contribute to a sense of marginalization of members of the laboratory animal care community, leading to feelings of low self-esteem and shame.²⁴ Our survey results show that the COVID-19 pandemic compounded these feelings of isolation and lack of appreciation. Furthermore, survey results found that those persons who did feel valued had significantly higher feelings of CS, which is essential to combat the negative emotions of CF. Therefore, finding ways to publicly promote the vital work performed by laboratory animal care workers could decrease the CF they experience.

ProQOL scales were developed to provide a validated measure to assess the 2 main components of professional quality of life: CS and CF.³⁷ For the purposes of this scale, STS and burnout scores are a collective measure of overall CF. The majority of responses for STS and burnout were in the moderate range, suggesting a moderate CF score. However, approximately half of respondents that scored low or moderate on the STS scale self-reported either a CF event or CF symptoms that affected their professional life or personal life or both (Figure 1). This outcome indicates that CF symptoms were a significant factor in respondents’ lives, even though this was not always reflected on their ProQOL scores. The other influence on the professional quality of life, CS, also showed incongruous results. The overwhelming majority of survey participants scored moderate or high on the CS scale, despite the finding that those same participants self-reported experiencing a CF event during the same time period. Some of these conflicting results could be due to lack of a thorough understanding of CF and its underlying symptoms by survey respondents. Although the survey included a definition of CF, it is still a relatively new concept in the laboratory animal community. Many people may not fully understand how CF can affect their lives, and this incomplete understanding might have skewed their self-assessments. Whereas some had no prior knowledge of CF, others may have had a strong background in CF and been knowledgeable about the topic. Therefore, evaluation of both the self-assessment and the ProQOL scores, which is a validated scale,³⁷ may provide a more accurate picture of actual CF, burnout and CS levels. Another possible reason for contradictory results may be the dedication that highly empathetic workers have to the animals in their care. Some of the statements evaluated on this portion of the assessment include “I get satisfaction from being able to help animals” and “I have happy thoughts and feelings about

those I help and how I could help them". Laboratory animal care workers may feel affection toward the animals in their charge and answer 'yes' to these questions even though they are experiencing stress themselves, thus scoring higher on the CS portion of the assessment while also suffering from CF. In addition, many of the survey participants with the highest scores on the CS assessment self-reported that not only had they experienced a CF event but that it was severe enough to affect their personal life or professional life or both. Previous studies have reported similar findings in which personnel that display high levels of human-animal interactions report high levels of CS and STS.¹⁷

Because of the compassionate nature and attentiveness required by laboratory animal care workers in their jobs, we predicted that caretakers would perceive animal behavior changes during the pandemic, whether actually present or due to caretakers' anticipating stress in the animals after pandemic-mitigation efforts. Animals can be sensitive to the moods and anxiety levels of human caretakers^{21,39} so research animals could sense the stress felt by personnel during the pandemic, contributing to behavioral changes. Furthermore, due to staffing changes, unfamiliar caretakers may have performed routine husbandry procedures, which can cause animal stress.^{7,22,29,38} However, the majority of caretakers did not note stress-associated signs, such as breeding issues or increased stereotypic behaviors, in their animals (Table 3). Laboratory animal facilities are designed to maintain consistent care, even in the face of staffing changes or shortages (such as during typical weekends or holidays), and so changes to the day-to-day lives of laboratory animals may have been minimal during the pandemic. A minority of respondents noted increases in stress-associated behaviors, indicating that some animals could have experienced higher levels of stress during the pandemic. However, because our study did not assess animals directly, we cannot differentiate between animals actually showing increased signs of stress or the caretakers perceiving behavioral changes when none were present. Those who did perceive a change in behavior among the animals in their care had significantly higher STS scores than caretakers who did not. The effects of caretaker stress and pandemic-associated management changes on animal behavior are important avenues for future study.

In recent years, some institutions have organized formal CF programs or implemented institutional CF support measures to help personnel cope with the mental health challenges presented by CF in our field. The COVID-19 pandemic may have been the first time that these programs were truly challenged in a long-term uncertain crisis and, unfortunately, according to our data, they seem to be unsuccessful. Pre-pandemic studies have shown that internal CF programs also struggled at relieving feelings of CF for employees,²⁸ and most were no better during the pandemic. Only 21% of respondents in institutions with internal CF support groups felt these programs helped with CF symptom management. Considering the high rates of CF reported, both during the pandemic and throughout workers' careers, the laboratory animal community must implement more effective programs to aid our personnel. In particular, 7% of survey respondents reported that their institution does not offer any type of CF program or CF support measures, and 10% reported that they didn't know or were unsure what programs were offered. More research is needed to develop targeted CF mitigation measures for the laboratory animal care community, especially in light of the potentially devastating effects of the pandemic compounded with work-related CF. Given the high

rates of self-reported CF, failure to provide support to staff should be considered unacceptable in this profession.

Survey respondents were given space to provide general feedback about their experience as laboratory animal care employees during the COVID-19 pandemic. Multiple comments reflected participants' desire to leave the field, with 2 noting that they were already in the process of doing so as a result of pandemic related stress. Other comments reflected seriously affected personnel, such as "I just want the hurt to stop", "I feel unseen", and "I'm very sad and overwhelmed and feel abandoned by my institution." One comment summed up CF succinctly: "Caring so deeply for [laboratory animals] is the easiest thing and the hardest thing I could ever have imagined." When asked what institutions could do to better support staff's mental and emotional needs during this time, more respondents wanted signs of gratitude and better communication from institutional leadership than wanted increased compensation or additional time off. Surveys conducted on CF before the pandemic reflected similar sentiments.²⁸ This finding is a strong indication of the vital role leadership plays in the everyday morale of laboratory animal professionals. ProQOL data also highlight the significant effects that management can have on the wellbeing of staff, with higher CF found in respondents experiencing management-related stressors. One area that could benefit animal care workers is providing training and resources for management on topics such as contributors to CF and improved communication. Management-related factors that may contribute to CF and the effects of CF on employee retention should be studied further.

A detailed guide for building a CF program is beyond the scope of the current study, but the following recommendations can be drawn from our survey results and relevant literature.^{1,15,24,26,28,42} First, a needs assessment should be performed at each institution or site to assess the needs of a given group of staff. This assessment should be done before initiating a CF program and should be repeated as changes to the work performed occur. Second, leadership must commit to a culture of openness and communication. This commitment includes a formal acknowledgment of CF, with policies in place to safeguard the emotional integrity of personnel, such as adding CF to the list of workplace occupational hazards and to disaster-planning resources. Third, CF educational materials should be provided as part of the formal training program for all staff and a review of materials or training provided routinely. All laboratory animal personnel, including leadership, should be required to take this training. Fourth, CF information and free educational materials (lectures, handouts, webinars) should be provided in easily accessible virtual and physical formats to all employees. Fifth, when available, counseling and mental health services should be provided to all employees at free or reduced cost. When unavailable, information should be provided on how to access these services. Sixth, institutions should develop an internal CF/resiliency program to help mitigate the effects of CF, build resiliency skills, and develop CS among staff. Finally, institutions must accept and acknowledge the formation of human-animal bonds in the workplace as a tool to build CS. For example, personnel may wish to honor and memorialize animals they have bonded with which were euthanized.¹⁵ A CF program should continuously evolve to meet the needs of the staff.

Moving past the COVID-19 pandemic to create workplaces that foster emotional wellbeing will require considerable effort

from all parties, including institutional leadership. Personnel should not be expected to recover from the damaging effects of CF or the pandemic quickly or on their own. Workplaces should implement or expand on programs to build and support emotional resilience and CS. By learning lessons from the past, we can be better prepared for future crises.

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