

Risk factors for suicide, attitudes toward mental illness, and practice-related stressors among US veterinarians

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Objective—To evaluate the prevalence of suicide risk factors, attitudes toward mental illness, and practice-related stressors among US veterinarians.

Design—Cross-sectional survey.

Sample—11,627 US veterinarians.

Procedures—Between July 1 and October 20, 2014, a Web-based questionnaire was made available through the Veterinary Information Network (VIN), VIN News Service, JAVMA News, and email messages to US veterinarians sent by a veterinary medical association, agriculture or livestock department, or health department of each state (except Maine) and Puerto Rico.

Results—Of 11,627 respondents, 3,628 (31%) were male. Modal age category was 30 to 39 years, and modal range for years practicing veterinary medicine was 10 to 19 years. There were 7,460 (64%) respondents who primarily practiced small animal medicine, and 4,224 (36%) who were practice owners. There were 1,077 (9%) respondents with current serious psychological distress. Since leaving veterinary school, 3,655 (31%) respondents experienced depressive episodes, 1,952 (17%) experienced suicidal ideation, and 157 (1%) attempted suicide. Currently, 2,228 (19%) respondents were receiving treatment for a mental health condition. Only 3,250 of 10,220 (32%) respondents somewhat or strongly agreed that people are sympathetic toward persons with mental illness. The most commonly reported practice-related stressor was demands of practice.

Conclusions and Clinical Relevance—In this survey, approximately 1 in 11 veterinarians had serious psychological distress and 1 in 6 experienced suicidal ideation since leaving veterinary school. Implementing measures to help veterinarians cope with practice-related stressors and reducing barriers veterinarians face in seeking mental health treatment might reduce the risk for suicide among veterinarians. (*J Am Vet Med Assoc* 2015;247:945–955)

Veterinarians in multiple countries are estimated to be at higher risk for suicide, compared with the suicide risk for the general population.^{1–7} Veterinarians from the United Kingdom and 2 western states in Australia had a risk of death by suicide that was 4 times as high as the risk of death by suicide for the general population.^{1,4} A review of US veterinarian deaths during 1947 to 1977 estimated that white male veterinarians had a risk of death by suicide that was 1.7 times as high as the risk of death by suicide for the general pop-

ABBREVIATIONS	
CI	Confidence interval
VIN	Veterinary Information Network

ulation.² An analysis of California veterinarian deaths during 1960 to 1992 determined that they had a risk of death by suicide that was 2.6 times as high as that for the general population.³ Similar to other populations,

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The findings and conclusions of this report are those of the authors and do not necessarily represent the official position of the CDC.

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these data potentially underestimate the risk of death by suicide among veterinarians because the reliability of suicide statistics is uncertain.⁸

Major depression is an established risk factor for suicide.^{9,10} Nearly 20% of surveyed UK veterinarians reported symptoms consistent with a possible or probable case of depression.¹¹ Australian veterinarians were found to have higher rates of moderate, severe, and extremely severe depression than those of the general population.¹² Although studies^{13–17} have been conducted to investigate the psychological well-being of US veterinary students, data for assessing the prevalence of depression among US veterinarians are more limited.⁶ A survey of 701 veterinarians licensed in Alabama during 2008 revealed that 66% of respondents had experienced clinical depression since beginning veterinary school.¹⁶

The stigma associated with mental illness often prevents people from seeking effective mental health treatment and is a risk factor for suicide.^{18,19} Similar to other health professionals,²⁰ veterinarians might perceive high levels of stigma associated with mental illness.¹ Unfortunately, data for assessing how US veterinarians perceive the stigma of mental illness or mental health treatment are scarce.

Work-related stressors can lead to job burnout, which is a prolonged psychological response to ongoing emotional and interpersonal occupational stressors associated with exhaustion, cynicism, and a sense of ineffectiveness.²¹ A current understanding of work-related stressors experienced by US veterinarians is important because occupational stress has been associated with depression,^{22,23} and psychosocial factors in the workplace can influence suicidal behaviors.^{11,24} A cross-sectional survey of 572 US female veterinarians conducted in the early 1990s revealed that two-thirds of respondents experienced at least the beginnings of burnout syndrome.²⁵ During 2008, 21 of 22 executive directors of state veterinary medical associations believed increased stress had been placed on veterinarians in the previous 10 years and that there is a serious problem with burnout.¹⁶

The purpose of the study reported here was to assess the prevalence of risk factors for suicide, attitudes toward mental illness, and practice-related stressors among US veterinarians. These data were needed to further characterize the proportion of US veterinarians who might be at higher risk for suicide, identify potential barriers to seeking mental health treatment among veterinarians, and describe common practice-related stressors so that appropriate and targeted prevention measures can be developed.

Materials and Methods

From July 1 to October 20, 2014, a Web link to an electronic, anonymous, and voluntary questionnaire was made available to US veterinarians through the VIN webpage, a VIN News article

describing the survey,²⁶ a JAVMA News article describing the survey,²⁷ and monthly email messages or other communications from 49 states (Maine did not send out such communications) and Puerto Rico via each organization's veterinary medical association, department of agriculture or livestock, or health department. Invitations to potential respondents described the study as a survey investigating veterinarians and their mental health. Veterinarian respondents were excluded from the survey if they were never employed as a veterinarian, their primary practice location was outside the United States, or they had an unknown practice location and accessed the survey via an invitation from VIN, VIN News, or JAVMA News.

The questionnaire^a was targeted at veterinarians and contained questions concerning demographics (other than race and ethnicity data, which were not collected), practice setting, history of depression and mental health treatment, attitudes toward mental illness and mental health treatment, stressors related to veterinary practice, and satisfaction related to practicing veterinary medicine. Standardized questions from the Kessler-6 psychological distress scale that assess the presence of serious mental illness were also included.^{28,29} Contact information for available mental health resources and the National Suicide Prevention Lifeline was included at the end of the questionnaire. The Web-based questionnaire was administered with a software program.^b The Auburn University Institutional Review Board approved the study protocol.

Data analysis was completed with statistical software programs.^{30,c,d} Respondents with Kessler-6 scores ≥ 13 (range of possible scores, 0 to 24) were characterized as having serious psychological distress.³¹ The

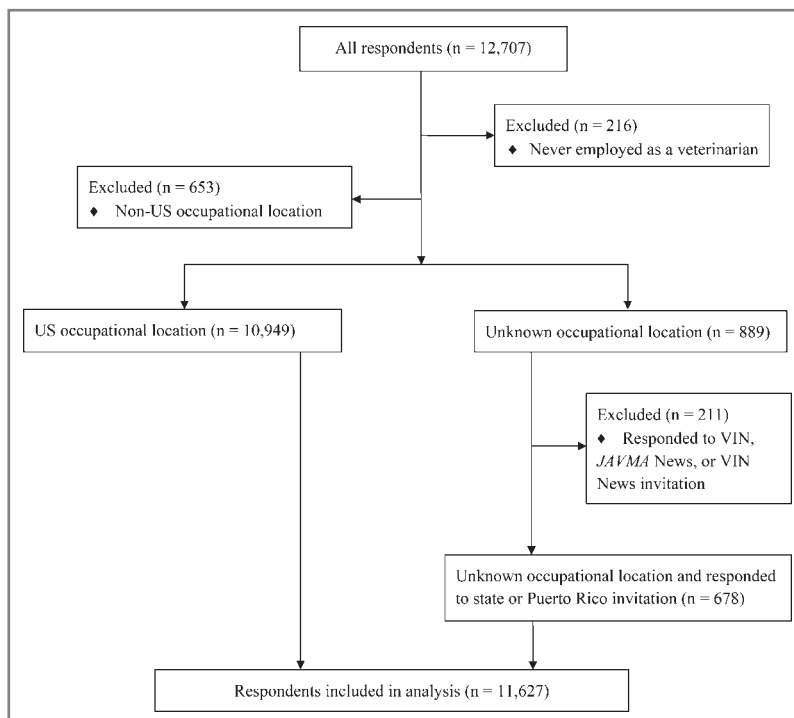


Figure 1—Chart depicting disposition for US veterinarian respondents to a survey on risk factors for suicide, attitudes toward mental illness, and practice-related stressors.

percentage of respondents for questions used to assess current serious psychological distress, previous depressive episodes, previous depression treatment, current mental health treatment, previous suicidal ideation, and previous suicide attempts was calculated by including all respondents in the denominator (even those with missing responses) to provide the most conservative estimates for the prevalence of these risk factors. A 1-sample test for binomial proportions was used to generate proportions with 95% CIs. Prevalence estimates for suicide risk factors among veterinarian respondents were compared with estimates for US adults.^{31–34} Study questions used to assess serious psychological distress, attitudes toward mental health treatment, and perceived stigma toward those with mental illness were identical to questions used in national surveys of US adults.^{31,34} Study questions used to assess the prevalence of a previous diagnosis of depression (“Has a doctor or other health care provider ever told you that you have a depressive disorder including depression, dysthymia, or minor depression?”), suicidal ideation (“During that time when your mood was at its lowest/you enjoyed or cared the least about things, did you think about committing suicide?”), and suicide attempt (“During that time when your mood was at its lowest/you enjoyed or cared the least about things, did you attempt suicide?”) differed slightly from those used in national surveys of US adults.^{31,32} Results for the study question used to assess the prevalence of previous depressive episodes were compared with results for the National Comorbidity Survey Replication that used the multiquestion World Health Organization Composite International Diagnostic Interview tool to establish a lifetime history of major depressive episodes.³³ A χ^2 analysis was used to calculate ORs for categorical variables. Values were considered significant at $P < 0.05$.

Results

Demographics—A total of 12,707 respondents participated, of which 11,627 were included in the analysis (Figure 1). Of those, 10,553 (91%) completed the entire survey. Among all 11,627 veterinarian respondents, 3,628 (31%) were male and 5,638 (48%) were 30 to 49 years old (Table 1). To be included in the analysis, it was required that respondents were currently or previously employed as a veterinarian. In this survey, 10,319 (89%) respondents reported that they were currently employed as a veterinarian, which represented approximately 10% of the current 102,583 US veterinarians.³⁵ Most (7,460 [64%]) respondents reported that their primary practice was small animal medicine. There were 4,811 (41%) practice associates and 4,224 (36%) practice owners.

Respondents were located in each of the 50 states, the District of Columbia, and Puerto Rico. In addition, 2 respondents in other US territories (1 in Guam and 1 in the US Virgin Islands) also completed the survey. The number of respondents was comparable among US regions (671 to 1,820 respondents), except for Puerto Rico and other US territories, which had only 81 respondents (Table 2).

Risk factors for suicide—Of the 11,627 respondents for the survey, 1,077 (9%) were classified as

having serious psychological distress (Table 2). Mean Kessler-6 score was 6.0 (95% CI, 5.9 to 6.1). Prevalences of current serious psychological distress, previous depressive episodes, previous depression treatment, previous suicidal ideation, and previous suicide attempts among selected demographic and work-related characteristics were summarized (Table 3). On the basis of 95% CIs, several demographic characteristics were associated with a significantly higher prevalence of serious psychological distress, compared with the prevalence for all respondents. These characteristics included female sex; age of 20 to 49 years old; marital status of separated, divorced, or not previously married; and no children. Additionally, several work-relat-

Table 1—Characteristics for US veterinarian respondents to a survey on risk factors for suicide, attitudes toward mental illness, and practice-related stressors.

Variable	No. (%) of respondents
Total No. of respondents	11,627
Method of accessing survey	
State- or Puerto Rico–based communications*	8,949 (77)
VIN	1,295 (11)
JAVMA News	753 (6)
VIN News Service	630 (5)
Male sex	3,628 (31)
Age (y)	
20–29	1,079 (9)
30–39	3,133 (27)
40–49	2,505 (22)
50–59	2,627 (23)
60–69	1,504 (13)
≥ 70	422 (4)
Marital status	
Legally married or in a committed relationship	8,469 (73)
Separated	112 (1)
Divorced	822 (7)
Widowed	119 (1)
Never married	1,746 (15)
≥ 1 children	6,468 (56)
Practice of veterinary medicine (y)	
1–4	1,899 (16)
5–9	1,769 (15)
10–19	2,638 (23)
20–29	2,330 (20)
≥ 30	2,333 (20)
Currently employed as veterinarian	10,319 (89)
Primary practice type	
Small animal	7,460 (64)
Mixed animal	1,238 (11)
Academia	505 (4)
Equine	321 (3)
Large animal	261 (2)
Government	215 (2)
Shelter	158 (1)
Laboratory animal	136 (1)
Regulatory	84 (1)
Research	68 (1)
Zoo	45 (0)
Exotics	42 (0)
Other	442 (4)
Primary role in veterinary practice	
Associate	4,811 (41)
Owner	4,224 (36)
Relief	489 (4)
Other	1,061 (9)
Works with other veterinarians	8,375 (72)
Member of a veterinary medical association (local, state, regional, or national)	10,551 (91)

Within a variable, values may not sum to 11,627 because of missing responses.

*Excludes Maine, which did not send out such communications.

Table 2—Number (percentage) of US veterinarian respondents reporting current serious psychological distress (score ≥ 13 on the Kessler-6 psychological distress scale [scale range, 0 to 24]), a previous depressive episode since leaving veterinary school, previous treatment for depression since leaving veterinary school, previous suicidal ideation since leaving veterinary school, and a previous suicide attempt since leaving veterinary school, by geographic area and region of workplace.

Variable	No. of respondents*	Current serious psychological distress	Previous depressive episode	Previous treatment for depression	Previous suicidal ideation	Previous suicide attempt
United States	11,627	1,077 (9)	3,655 (31)	2,557 (22)	1,952 (17)	157 (1)
New England	920	58 (6)	286 (31)	214 (23)	138 (15)	12 (1)
Connecticut	218	13	61	45	32	3
Maine†	38	3	19	10	8	0
Massachusetts	385	24	127	101	56	7
New Hampshire	94	9	22	15	13	0
Rhode Island	73	0	25	23	11	1
Vermont	112	9	32	20	18	1
Mid Atlantic	926	112 (12)	339 (37)	225 (24)	183 (20)	30 (3)
New Jersey	209	20	78	51	31	8
New York	288	46	115	72	75	14
Pennsylvania	429	46	146	102	77	8
East North Central	1,357	153 (11)	466 (34)	335 (25)	257 (19)	16 (1)
Illinois	184	28	70	52	50	1
Indiana	220	13	64	42	28	3
Michigan	527	50	175	133	89	3
Ohio	256	38	97	65	56	5
Wisconsin	170	24	60	43	34	4
West North Central	1,820	134 (7)	497 (27)	337 (19)	262 (14)	24 (1)
Iowa	146	14	31	17	21	2
Kansas	229	29	70	48	44	3
Minnesota	835	59	257	185	112	10
Missouri	326	19	91	55	46	4
Nebraska	98	6	13	9	8	1
North Dakota	68	5	17	10	14	2
South Dakota	118	2	18	13	17	2
South Atlantic	1,262	150 (12)	450 (36)	316 (25)	270 (21)	16 (1)
Delaware	22	3	7	5	6	0
District of Columbia	9	3	2	1	3	0
Florida	214	37	85	60	52	7
Georgia	218	23	78	53	47	3
Maryland	264	21	79	53	41	0
North Carolina	145	24	63	49	38	3
South Carolina	47	6	21	15	11	1
Virginia	273	29	97	66	62	1
West Virginia	70	4	18	14	10	1
East South Central	671	57 (8)	202 (30)	150 (22)	95 (14)	5 (1)
Alabama	113	5	30	22	17	1
Kentucky	140	11	46	29	14	0
Mississippi	244	16	71	59	35	1
Tennessee	174	25	55	40	29	3
West South Central	1,098	94 (9)	348 (32)	246 (22)	172 (16)	8 (1)
Arkansas	86	9	27	19	14	0
Louisiana	176	15	52	40	24	0
Oklahoma	170	13	44	28	27	3
Texas	666	57	225	159	107	5
Mountain	1,008	104 (10)	319 (32)	219 (22)	166 (16)	18 (2)
Arizona	312	33	110	79	51	6
Colorado	183	19	76	52	40	5
Idaho	71	5	16	12	10	1
Montana	88	9	19	15	9	0
Nevada	38	8	16	12	9	0
New Mexico	40	5	18	12	4	0
Utah	122	16	32	20	23	5
Wyoming	154	9	32	17	20	1
Pacific	1,806	185 (10)	708 (39)	490 (27)	383 (21)	25 (1)
Alaska	29	2	12	9	7	0
California	795	93	316	217	186	11
Hawaii	19	2	9	6	2	0
Oregon	403	35	140	96	74	6
Washington	560	53	231	162	114	8
Territories	81	10 (12)	11 (14)	7 (9)	5 (6)	1 (1)
Guam	1	0	0	0	0	0
Puerto Rico	79	10	10	6	4	1
US Virgin Islands	1	0	1	1	1	0
Unknown‡	678	20 (3)	29 (4)	18 (3)	21 (3)	2 (0)

*Includes missing responses for the denominator. †Maine did not send out communications inviting participation. ‡Did not indicate a geographic area for their workplace but responded to an invitation from the veterinary medical association of a state or Puerto Rico and participated in the survey.

Table 3—Results for US veterinarian respondents reporting current serious psychological distress (score ≥ 13 on the Kessler-6 psychological distress scale [scale range, 0 to 24]), a previous depressive episode since leaving veterinary school, previous treatment for depression since leaving veterinary school, previous suicidal ideation since leaving veterinary school, and a previous suicide attempt since leaving veterinary school, by selected characteristics.

Variable	No.*	Male	Current serious psychological distress	Previous depressive episodes	Previous treatment for depression	Previous suicidal ideation	Previous suicide attempt
		No. (%)	% (95% CI)	% (95% CI)	% (95% CI)	% (95% CI)	% (95% CI)
All respondents	11,627	3,628 (31)	9.3 (8.7–9.8)	31.4 (30.6–32.3)	22.0 (21.3–22.8)	16.8 (16.1–17.5)	1.4 (1.2–1.6)
Sex							
Male	3,628	—	6.4 (5.6–7.2)	24.0 (22.7–25.5)	16.2 (15.0–17.4)	14.1 (13.0–15.3)	1.1 (0.8–1.5)
Female	7,642	—	11.0 (10.4–11.8)†	36.4 (35.3–37.5)†	25.8 (24.8–26.8)†	18.9 (18.0–19.8)†	1.5 (1.3–1.8)
Age (y)							
20–29	1,079	141 (13)	11.7 (9.9–13.7)†	20.5 (18.2–23.0)	10.1 (8.4–12.0)	9.0 (7.4–10.8)	0.6 (0.2–1.2)
30–39	3,133	513 (16)	12.2 (11.1–13.3)†	33.8 (32.2–35.5)	21.0 (19.6–22.5)	18.6 (17.2–20.0)	1.1 (0.8–1.5)
40–49	2,505	597 (24)	11.6 (10.4–12.9)†	38.1 (36.2–40.0)†	28.5 (26.8–30.3)†	19.9 (18.4–21.5)†	1.8 (1.4–2.4)
50–59	2,627	996 (38)	8.3 (7.3–9.4)	36.0 (34.2–37.9)†	27.3 (25.6–29.0)†	19.1 (17.6–20.7)†	1.8 (1.4–2.4)
60–69	1,504	1,000 (66)	3.9 (3.0–4.9)	27.9 (25.7–30.2)	21.5 (19.5–23.6)	16.4 (14.6–18.4)	1.3 (0.8–2.0)
≥ 70	422	379 (90)	1.2 (0.4–2.6)	12.3 (9.4–15.7)	8.5 (6.1–11.5)	5.9 (4.0–8.5)	0.7 (0.2–1.9)
Marital status							
Legally married or in a committed relationship	8,469	3,114 (37)	8.1 (7.6–8.7)	30.0 (29.0–30.9)	21.0 (20.1–21.9)	15.2 (14.5–16.0)	1.1 (0.9–1.3)
Separated or divorced	934	257 (28)	13.8 (11.7–16.1)†	47.9 (44.7–51.1)†	36.2 (33.2–39.3)†	30.3 (27.4–33.3)†	4.3 (3.1–5.7)†
Widowed	119	46 (39)	8.4 (4.3–14.5)	35.3 (27.1–44.2)	24.4 (17.3–32.7)	26.1 (18.8–34.5)†	5.0 (2.1–10.2)†
Never married	1,746	210 (12)	14.3 (12.7–16.0)†	35.9 (33.7–38.2)†	23.5 (21.6–25.6)	20.0 (18.2–21.9)†	1.2 (0.8–1.8)
Children							
None	4,783	688 (14)	13.0 (12.1–14.0)†	36.2 (34.9–37.6)†	23.8 (22.6–25.1)	20.3 (19.2–21.5)†	1.6 (1.3–2.0)
≥ 1	6,468	2,932 (45)	7.0 (6.4–7.6)	29.6 (28.5–30.8)	21.9 (20.9–22.9)	15.1 (14.3–16.0)	1.2 (1.0–1.5)
Currently employed as veterinarian							
Yes	10,319	3,238 (31)	9.6 (9.0–10.2)	32.8 (31.9–33.7)	22.8 (22.0–23.6)	17.7 (16.9–18.4)	1.3 (1.1–1.6)
No	790	355 (45)	10.9 (8.9–13.2)	33.8 (30.6–37.2)	26.1 (23.1–29.2)†	16.5 (14.0–19.2)	2.5 (1.6–3.8)
Practice type							
Small animal	7,460	2,093 (28)	10.3 (9.6–11.0)	35.6 (34.8–37.0)†	25.7 (24.8–26.7)†	19.0 (18.1–19.9)†	1.6 (1.4–1.9)
Mixed animal	1,238	591 (48)	7.4 (6.0–8.9)	22.6 (20.4–25.0)	13.8 (12.0–15.8)	12.2 (10.5–14.1)	0.8 (0.4–1.4)
Academia	505	179 (35)	10.9 (8.4–13.8)	34.5 (30.4–38.7)	21.6 (18.2–25.3)	16.6 (13.6–20.1)	0.8 (0.3–1.9)
Equine	321	132 (41)	8.7 (6.0–12.2)	27.7 (23.0–32.8)	15.6 (11.9–19.9)	15.0 (11.4–19.2)	0.6 (0.1–2.0)
Large animal	261	167 (64)	5.4 (3.1–8.6)	15.7 (11.7–20.5)	9.2 (6.1–13.2)	10.0 (6.8–14.1)	0.8 (0.1–2.5)
Government	215	96 (45)	7.9 (4.8–12.1)	20.5 (15.5–26.3)	14.9 (10.6–20.1)	13.5 (9.4–18.6)	0.5 (0.0–2.3)
Shelter	158	17 (11)	17.7 (12.4–24.3)†	48.1 (40.4–55.9)†	35.4 (28.3–43.1)†	30.4 (23.6–37.9)†	1.3 (0.2–4.1)
Laboratory animal	136	46 (34)	9.6 (5.4–15.4)	35.3 (27.6–43.6)	24.3 (17.6–32.0)†	18.4 (12.5–25.6)	2.9 (0.9–6.9)
Regulatory	84	47 (56)	4.8 (1.5–11.1)	30.9 (21.8–41.4)	25.0 (16.6–35.1)†	13.1 (7.1–21.6)	1.2 (0.1–5.7)
Research	68	34 (50)	5.9 (1.9–13.6)	26.5 (17.0–37.9)	20.6 (12.2–31.4)	8.8 (3.7–17.5)	0 (0.0–4.3)
Zoo	45	10 (22)	6.7 (1.7–17.1)	22.2 (11.9–36.1)	15.6 (7.1–28.4)	6.7 (1.7–17.1)	0 (0.0–6.4)
Exotics	42	18 (43)	14.3 (6.0–27.4)	42.9 (28.6–58.1)	23.8 (12.8–38.4)†	38.1 (24.4–53.4)†	7.1 (1.8–18.2)†
Other	442	146 (33)	6.1 (4.1–8.6)	30.3 (26.1–34.7)	21.9 (18.3–26.0)	16.5 (13.3–20.2)	1.4 (0.6–2.8)
Practice role							
Associate	4,811	767 (16)	11.1 (10.3–12.1)†	35.2 (33.9–36.6)†	24.1 (22.9–25.4)†	17.8 (16.7–18.9)	1.4 (1.1–1.7)
Owner	4,224	2165 (51)	7.5 (6.7–8.3)	29.9 (28.5–31.3)	21.2 (20.0–22.4)	16.9 (15.8–18.1)	1.3 (1.0–1.6)
Relief	489	120 (25)	11.2 (8.7–14.3)	44.4 (40.0–48.8)†	34.4 (30.2–38.7)†	24.3 (20.7–28.3)†	3.9 (2.4–5.9)†
Other	1,061	344 (32)	12.1 (10.2–14.1)	32.6 (29.8–35.5)	22.6 (20.2–25.2)	18.0 (15.8–20.4)	1.4 (0.8–2.3)
Practice of veterinary medicine (y)							
1–4	1,899	261 (14)	13.3 (11.8–14.9)†	28.1 (26.1–30.2)	14.4 (12.9–16.1)	13.0 (11.5–14.5)	0.6 (0.3–1.1)
5–9	1,769	272 (15)	12.2 (10.7–13.7)†	35.2 (33.0–37.5)†	23.2 (21.3–25.2)	18.9 (17.1–20.8)	1.5 (1.0–2.2)
10–19	2,638	625 (24)	12.1 (10.9–13.4)†	39.4 (37.6–41.3)†	29.1 (27.4–30.8)†	21.9 (20.4–23.6)†	1.8 (1.3–2.3)
20–29	2,330	822 (35)	7.9 (6.8–9.0)	35.5 (33.6–37.5)†	27.2 (25.4–29.0)†	18.0 (16.5–19.6)	1.9 (1.4–2.5)
≥ 30	2,333	1,590 (68)	3.8 (3.1–4.7)	26.3 (24.6–28.2)	19.9 (18.4–21.6)	15.5 (14.1–17.0)	1.1 (0.7–1.6)
Works with other veterinarians§							
Yes	8,375	2,484 (30)	9.6 (9.0–10.3)	32.4 (31.4–33.4)	22.6 (21.7–23.5)	17.1 (16.3–17.9)	1.3 (1.1–1.5)
No	1,872	732 (39)	9.3 (8.0–10.7)	34.8 (32.6–37.0)†	23.9 (22.0–25.9)	20.0 (18.2–21.8)†	1.4 (1.0–2.1)
Member of a veterinary medical association							
Yes	10,544	3,439 (33)	9.3 (8.8–9.9)	32.6 (31.7–33.5)	22.8 (22.0–23.6)	17.4 (16.7–18.1)	1.3 (1.1–1.6)
No	548	152 (28)	17.5 (14.5–20.9)†	39.2 (35.2–43.4)†	27.2 (23.6–31.0)†	21.5 (18.2–25.1)†	2.9 (1.7–4.6)†

Within a variable, values may not sum to 11,627 because of missing responses.

*Includes missing responses in the denominator. †Numerator includes only respondents who indicated a previous depressive episode since leaving veterinary school. ‡Within a column, value differs significantly ($P < 0.05$) from the value for the overall response. §Among those currently employed as a veterinarian.

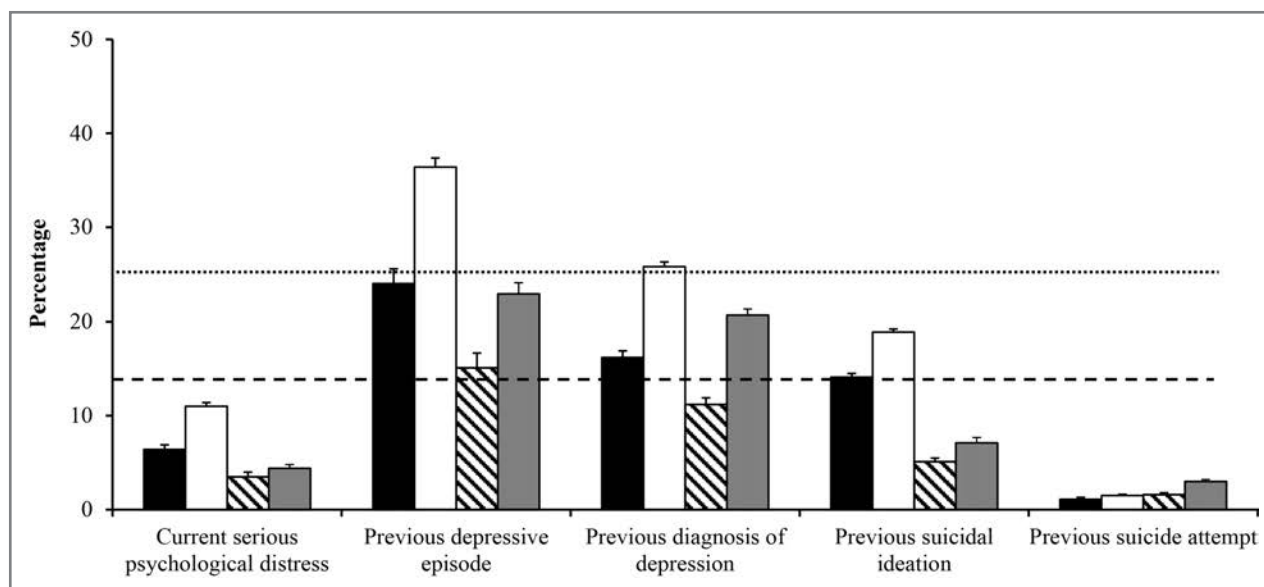


Figure 2—Percentage (95% CI) of veterinarians (males [black bars] and females [white bars]) reporting current serious psychological distress (score ≥ 13 on the Kessler-6 psychological distress scale [scale range, 0 to 24]), a previous depressive episode since leaving veterinary school, a previous diagnosis of depression since leaving veterinary school (veterinarians reporting that they had received treatment for depression), previous suicidal ideation since leaving veterinary school, and a previous suicide attempt since leaving veterinary school, compared with results for US adults (males [diagonal-striped bars] and females [gray bars]). Data for US adults were obtained from other sources for current serious psychological distress,³¹ previous depressive episodes,³³ previous diagnosis of depression,³¹ previous suicidal ideation,³² and previous suicide attempts.³² The number of male (dashed line) and female (dotted line) veterinarian respondents currently receiving mental health treatment is indicated; no data for US adults currently receiving mental health treatment were available for comparison.

ed characteristics were associated with a significantly higher prevalence of current serious psychological distress, compared with the prevalence for all respondents. These included the work role of practice associate, practicing for < 20 years, practicing shelter animal medicine, and not being a member of any veterinary medical association. Other work-related characteristics associated with a higher (but not significantly so) prevalence of current serious psychological distress included not currently employed as a veterinarian, working as a relief veterinarian, other work role (ie, other work role not included on the list of choices), working in academia, and practicing exotic animal medicine.

Respondents reported that they had previous depressive episodes (3,655 [31%]) or suicidal ideation (1,952 [17%]) or had attempted suicide (157 [1%]) since graduating from veterinary school (Figure 2).^{31–33} Among those who had attempted suicide, the median number of attempts was 1.0. A total of 2,228 (19%) respondents reported that they were currently receiving treatment for a mental health condition or emotional problem. Of the 1,077 respondents classified as having current serious psychological distress, 633 (59%) were not currently receiving mental health treatment.

Among the 4,038 respondents who had ≥ 1 of several problems (previous depressive episodes, suicidal ideation, or had attempted suicide) since graduation from veterinary school, several reported the following mental health concerns for before and during veterinary school, respectively: depressive episodes (1,449 [36%] and 1,443 [36%]), suicidal ideation (525 [13%] and 532 [13%]), and attempted suicide (130 [3%] and

56 [1%]). Of the 6,297 respondents who were known to not have depressive episodes or suicidal ideation and had not attempted suicide since graduating from veterinary school (ie, those without missing responses to those questions), the following mental health concerns were reported for before and during veterinary school, respectively: depressive episodes (728 [12%] and 353 [6%]), suicidal ideation (141 [2%] and 94 [1%]), and attempted suicide (50 [1%] and 6 [$< 1\%$]).

Attitudes toward mental illness—In general, veterinarian respondents appeared to have less positive attitudes toward mental health treatment and mental illness, compared with attitudes of US adults. Specifically, compared with 93.0% of US adults,³⁴ 89.4% (95% CI, 88.8% to 89.9%) of veterinarian respondents somewhat or strongly agreed that treatment helps persons with mental illness lead normal lives. Additionally, compared with 60.2% of US adults,³⁴ only 31.8% (95% CI, 30.9% to 32.7%) of veterinarian respondents somewhat or strongly agreed that people are caring toward persons with mental illness. Notably, there were significant differences in respondent attitudes toward mental illness between those with and without serious psychological distress, and this pattern was also true when comparing veterinarian respondents and US adults³⁴ (Figure 3). Those experiencing serious psychological distress were less likely to somewhat or strongly agree that mental health treatment helps people lead normal lives and that people are caring toward persons with mental illness.

A total of 8,506 of 10,214 (83%) respondents somewhat or strongly agreed that mental health treatment

was accessible. In contrast, the 1,708 (17%) respondents who were unsure or who disagreed or strongly disagreed about accessibility of mental health treatment were more likely to have current serious psychological distress (OR,

2.7; 95% CI, 2.3 to 3.1), less likely to currently be receiving mental health treatment (OR, 0.5; 95% CI, 0.4 to 0.5), and more likely to have experienced prior suicidal ideation (OR, 1.6; 95% CI, 1.4 to 1.8).

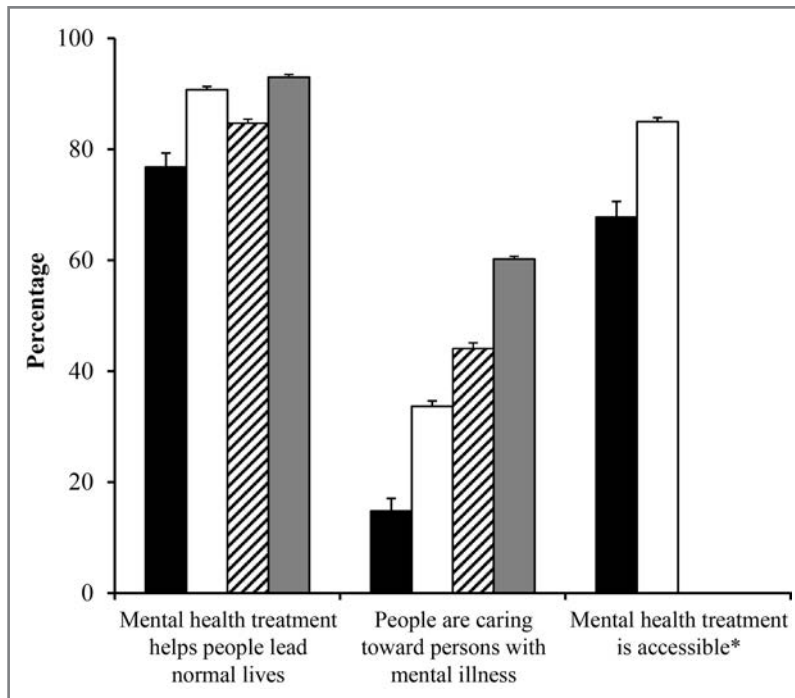


Figure 3—Percentage (95% CI) of veterinarian respondents with (black bars) and without (white bars) current serious psychological distress (score ≥ 13 on the Kessler-6 psychological distress scale [scale range, 0 to 24]) and US adults with (diagonal-striped bars) and without (gray bars) current serious psychological distress who agreed somewhat or strongly with statements regarding mental illness and mental health treatment. Data for US adults were obtained from another source.³⁴ *Data for US adults were not available for level of agreement with mental health treatment accessibility statement.

Stressors—The most commonly reported stressful factor associated with veterinary medicine was demands of practice (Figure 4). A higher percentage of practice owners than associate or relief veterinarians reported practice management responsibilities and competition with other veterinary practices as stressful factors, whereas a higher percentage of associate and relief veterinarians than practice owners reported that professional mistakes, educational debt, unclear management and work role, and lack of participation in decision making were stressful factors.

A total of 5,588 of 10,142 (55%) respondents agreed or strongly agreed that coping with feelings of grief related to veterinary medicine was easy. A total of 7,032 of 10,140 (69%) respondents agreed or strongly agreed that they have the same sense of satisfaction about helping animals as they did before entering veterinary school. A total of 7,436 of 10,142 (73%) respondents agreed or strongly agreed that they made the right career choice to enter veterinary medicine, and 8,129 of 10,137 (80%) respondents agreed or strongly agreed that they were happy being a veterinarian. Only

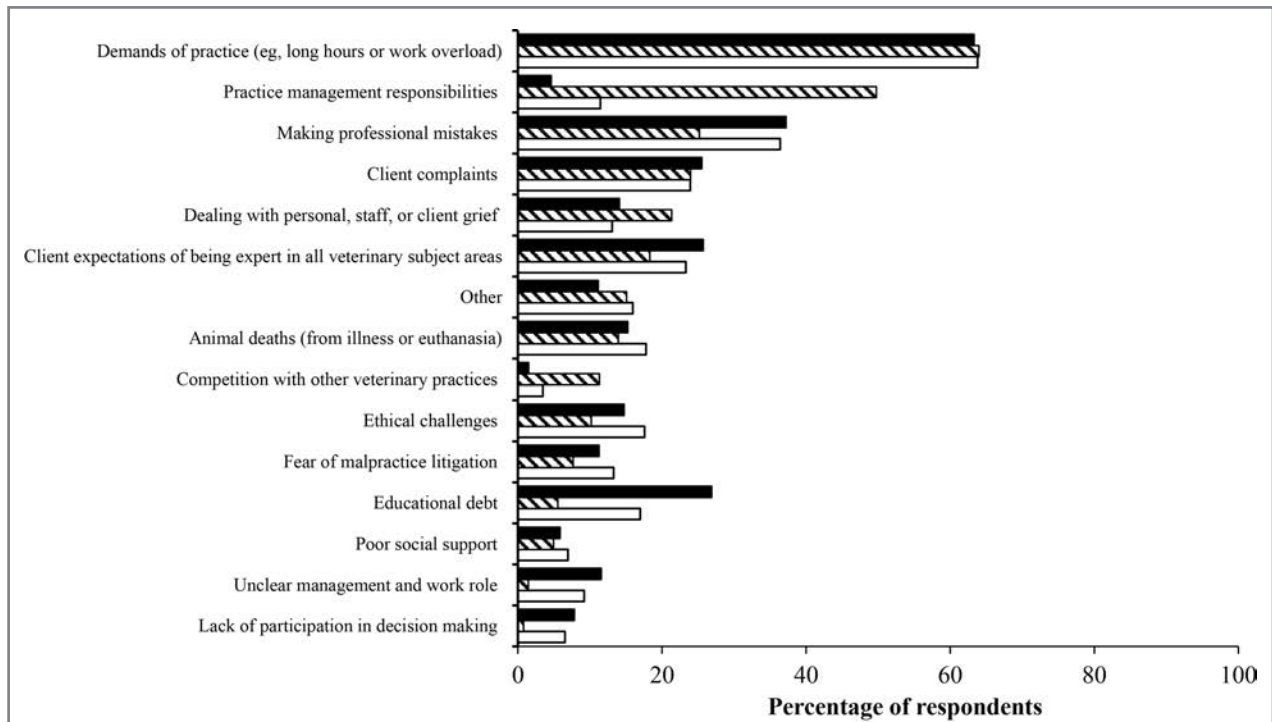


Figure 4—Most stressful factors identified by veterinarian respondents who were practice associates (black bars), practice owners (diagonal-striped bars), or relief veterinarians (white bars).

1,298 of 10,118 (13%) respondents agreed or strongly agreed that they were planning to leave veterinary medicine. Among these, the most commonly cited reasons for leaving were demands of practice (956 [74%]), other reason not listed (646 [50%]), practice management responsibilities (374 [29%]), and client complaints (289 [22%]). A total of 207 (16%) respondents planning to leave veterinary medicine were classified as having current serious psychological distress, compared with 794 of 8,820 (9%) respondents not planning to leave veterinary medicine who were classified as having current serious psychological distress.

Compared with respondents who reported practicing veterinary medicine for ≥ 10 years ($n = 7,301$), those practicing for < 5 years (1,899) were less likely (OR, 0.6; 95% CI, 0.6 to 0.7) to somewhat or strongly agree that they have the same sense of satisfaction about helping animals as they did before entering veterinary school, less likely (OR, 0.4; 95% CI, 0.4 to 0.5) to agree or strongly agree that they made the right career choice to enter veterinary medicine, and less likely (OR, 0.6; 95% CI, 0.5 to 0.6) to agree or strongly agree that they were happy being a veterinarian.

Discussion

When categorized on the basis of sex, veterinarian respondents had higher rates of serious psychological distress, depression, and suicidal ideation, compared with rates for US adults of other studies.^{31–33} The present study provided conservative estimates because veterinarian nonresponders were included in the denominator when calculating prevalence estimates. Similarly, comparisons with results for US adults also were conservative, considering that veterinarian respondent experiences with depression and suicidal behaviors only since graduation were included, whereas comparison surveys^{31–33} of US adults provided results for lifetime prevalence of depression and suicidal behaviors. Veterinarian respondents were less likely than US adults to believe mental health treatment helps people lead normal lives and that people are caring toward persons with mental illness.³⁴ The most commonly reported practice-related stressor was the demands of practice.

Comparisons made between veterinarian respondents and US adults regarding suicidal behaviors must be interpreted with caution because differences in survey methods and questions can influence prevalence estimates.³⁶ However, estimates of poor psychological health for US veterinarians in the study reported here were similar to survey results for suicidal behaviors for veterinarians in Australia, France, New Zealand, and the United Kingdom.⁶ A survey³⁷ of New Zealand veterinarians found that approximately 16% had previous suicidal ideation and 2% had attempted suicide, which were similar to results of the present survey of US veterinarians. These data provide further evidence that compared with the US population, US veterinarians likely have higher rates of depression and suicidal ideation. A complex interaction between personality traits associated with becoming a veterinarian and a stressful work environment could explain the higher levels of depression among veterinarian respondents.^{1,11}

Achieving a better understanding of the risk factors for depression and suicidal ideation within the veterinary community is important because both are risk factors for suicide, and suicidal ideation is a key precursor to death by suicide.^{9,10}

The proportion of females who participated in the survey reported here was approximately 12% higher than the proportion of females in the US veterinary workforce.³⁵ Because females in the general population, compared with their male counterparts, have a higher prevalence of serious psychological distress, depression, and suicidal behavior,^{31–33} the overall results of the present survey might have been skewed toward higher rates of these measures. Indeed, female respondents had higher rates than those of male respondents for each of the measured suicide risk factors. These results are similar to those for veterinarians in the United Kingdom, where higher rates of depression and suicidal behaviors were found for female veterinarians,^{1,11} and for veterinarians in Australia, where higher rates of high to very high psychological distress and mild to extremely severe depression were observed among female veterinarians.¹² In contrast to the general population, for which the suicide rate among males is 3 times as high as that of females,³⁶ female veterinarians have a suicide rate similar to that of male veterinarians.¹ These data suggest important implications for veterinary medicine in the future, considering that females have comprised most enrollees at US veterinary medical colleges since 1987 and $> 70\%$ of enrollees since 2000.³⁸

Although a high rate of suicidal ideation was reported, veterinarian respondents had lower rates of nonfatal suicide attempts, compared with rates for US adults.³² A possible explanation is that veterinarians who attempted suicide might have been less likely to survive a suicide attempt because of their knowledge about euthanasia procedures and access to lethal drugs.⁶ Consistent with the notion that access to and knowledge about lethal drugs might increase the likelihood of a fatal suicide attempt, veterinarians who died by suicide were more likely to be a result of self-poisoning, compared with results for the general population.^{2,5} The authors are aware of no available data regarding factors that prevented US veterinarians who contemplated suicide from proceeding to a suicide attempt. In a study^{6,e} of 94 veterinarians in France, the belief about the need to cope with suicidal thoughts, family responsibilities, and concern for children were the most commonly reported factors that would prevent a suicide attempt. Conversely, a study³⁹ in the United Kingdom that involved 9 veterinarians who had attempted suicide and 12 veterinarians who had considered suicide during the previous 12 months was conducted on work-related factors that contributed to suicidal ideation and behavior. Workplace relationships (13/21 [62%]), concerns about career (13/21 [62%]), patient issues (13/21 [62%]), and number of hours worked (13/21 [62%]) were the most commonly cited work-related contributing factors. Further research is needed to understand the reasons that some veterinarians who consider suicide do not attempt suicide and to identify preventive measures to minimize the number of suicide attempts among veterinarians experiencing psychological distress.

Although most respondents agreed that mental health treatment was accessible, those who did not agree were more likely to currently have serious psychological distress, less likely to be currently receiving mental health treatment, and more likely to previously have experienced suicidal ideation. The reasons for these discrepancies in perceptions among the accessibility of mental health treatment remain unknown but are likely to include stigma about receiving treatment or availability of mental health treatment providers in a community. Because prevention of suicide relies on the effective treatment of mental illness,⁴⁰ further measures are needed to improve veterinarian access to and use of mental health services.

The data provided here suggested that veterinarians often perceive stigma toward those with mental illness and are potentially related to the perception among veterinarians that mental illness is a weakness.¹ Similarly, physicians frequently perceive stigma toward those with mental illness, and this stigma is a barrier to physicians seeking mental health treatment.²⁰ Perceived stigma against those with mental illness could prevent some veterinarians from seeking mental health treatment.¹ Indeed, only 149 of 1,008 (15%) veterinarian respondents with serious psychological distress somewhat or strongly agreed that people are caring toward those with mental illness, compared with 3,101 of 9,212 (34%) veterinarian respondents without serious psychological distress who agreed or strongly agreed with that statement. These estimates were significantly lower when compared with results for US adults,³⁴ which suggested that veterinarians more often perceive stigma toward those with mental illness, compared with the perception for the general population. It is unclear whether stigma contributed to the 633 of 1,077 (59%) respondents with serious psychological distress who were not currently receiving mental health treatment. Furthermore, it is uncertain whether stigma and the potential fear of identification might have contributed to the 678 respondents who accessed the questionnaire through a state- or US territory-based invitation and failed to report a state that was their primary workplace. Concerted efforts are needed beginning early in veterinary medicine education through the continuum of practice to dramatically reduce a perceived stigma toward those with mental illness.

Demands of practice was the most commonly reported practice-related stressor and might have contributed, at least in part, to the high prevalence of serious psychological distress among respondents because the demands of work is associated with worsening of psychological health.⁴¹ Social support is a protective factor for psychological health related to occupational stressors.⁴¹ In the survey reported here, characteristics associated with poorer psychological health included not being married or in a committed relationship, being separated or divorced, not having children, and not being a member of a veterinary medical association. Each of these factors was potentially associated with weaker social support than for other corresponding characteristics.

Analysis of results of the present survey suggested that less experienced veterinarians have poorer psychological health than do their more experienced col-

leagues. A total of 252 of 1,889 (13%) respondents who reported practicing veterinary medicine for < 5 years had serious psychological distress and were less likely than respondents who had worked for ≥ 10 years to have the same satisfaction of helping animals, to be as satisfied with their career choice, or to be happy as a veterinarian. Similarly, a survey of Australian veterinarians revealed that respondents who had recently graduated from veterinary school had higher levels of psychological distress and more often experienced personal, work, and client burnout, compared with results for veterinarians who had graduated less recently.¹² A similar survey of New Zealand veterinarians determined that younger veterinarians reported significantly more stress related to the number of hours worked, client expectations, communication with clients, resources, unexpected outcomes, and lack of support from senior staff.³⁷ Furthermore, a survey of UK veterinarians identified difficulties with senior veterinarians helping recent graduates transition into veterinary practice settings.⁴² These findings suggest that the transition from veterinary school, where high degrees of social support likely exist, to a veterinary practice setting, which can be more professionally and socially isolating and technically demanding, is challenging for less experienced and younger veterinarians. Findings for the present study might also represent a cohort effect whereby those who have pursued a career in veterinary medicine in recent years might be more vulnerable to psychological distress and stressors related to veterinary medicine, compared with the vulnerability of previous cohorts. This could have been caused by a number of factors, including selection criteria, greater competition, increased educational costs, and other changes in the field of veterinary medicine. Another potential explanation is that older veterinarians might be less willing to discuss or admit to psychological distress. Additional studies are needed to identify practical and effective tools that can be used to ease the transition from veterinary school to a practice setting, to determine whether less experienced veterinarians have reduced distress as they gain experience, and to determine whether less experienced veterinarians who have serious psychological distress leave the profession more often than do veterinarians who do not have serious psychological distress.

The present study had limitations. First, it was not possible to calculate a response rate, and the possibility exists for substantial nonresponse bias and overestimation or underestimation of the true prevalence of suicide risk factors, attitudes toward mental illness, or practice-related stressors. It is unclear whether veterinarians with serious psychological distress were more likely to complete the questionnaire because of their interest in the subject or less likely to complete the questionnaire because of a lack of interest or energy, social withdrawal, or concerns about anonymity. Second, the questionnaire relied on self-reported data and might have been subject to responder or recall bias, although the questions used to assess current serious psychological distress, mental illness stigma, and mental health treatment were identical or similar to those used in other national surveys.^{31,34} Additionally, it is possible respondents underreported a history of suicidal ide-

ation because investigators of a previous study⁴³ found that lifetime suicidal ideation is underreported. Third, the study might have been biased toward younger veterinarians because recruitment was predominantly through electronic sources, although 4,553 of 11,270 (40%) respondents were ≥ 50 years old. Finally, the questionnaire did not include questions for use in assessing alcohol or drug abuse, personality type, family history of mental illness, or other factors with a potential influence on mental health.¹

Analysis of responses for the survey reported here suggested that compared with results for the general population, US veterinarians have a higher prevalence of depression and suicidal ideation and perceive greater stigma for mental illness. Additionally, veterinarians frequently experience health-threatening stress related to the demands of practicing veterinary medicine. Further studies are needed to better elucidate potential causal factors (eg, alcohol and drug abuse or difficulties with interpersonal relationships) of suicidal behaviors among veterinarians. Studies are also needed to evaluate measures aimed at reducing barriers veterinarians face when seeking mental health treatment, decreasing perceived stigma among veterinarians associated with mental illness, and lessening stressors associated with veterinary practice.

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- The questionnaire is available from the author on request.
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- SAS Enterprise Guide, version 5.1, SAS Institute Inc, Cary, NC.
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