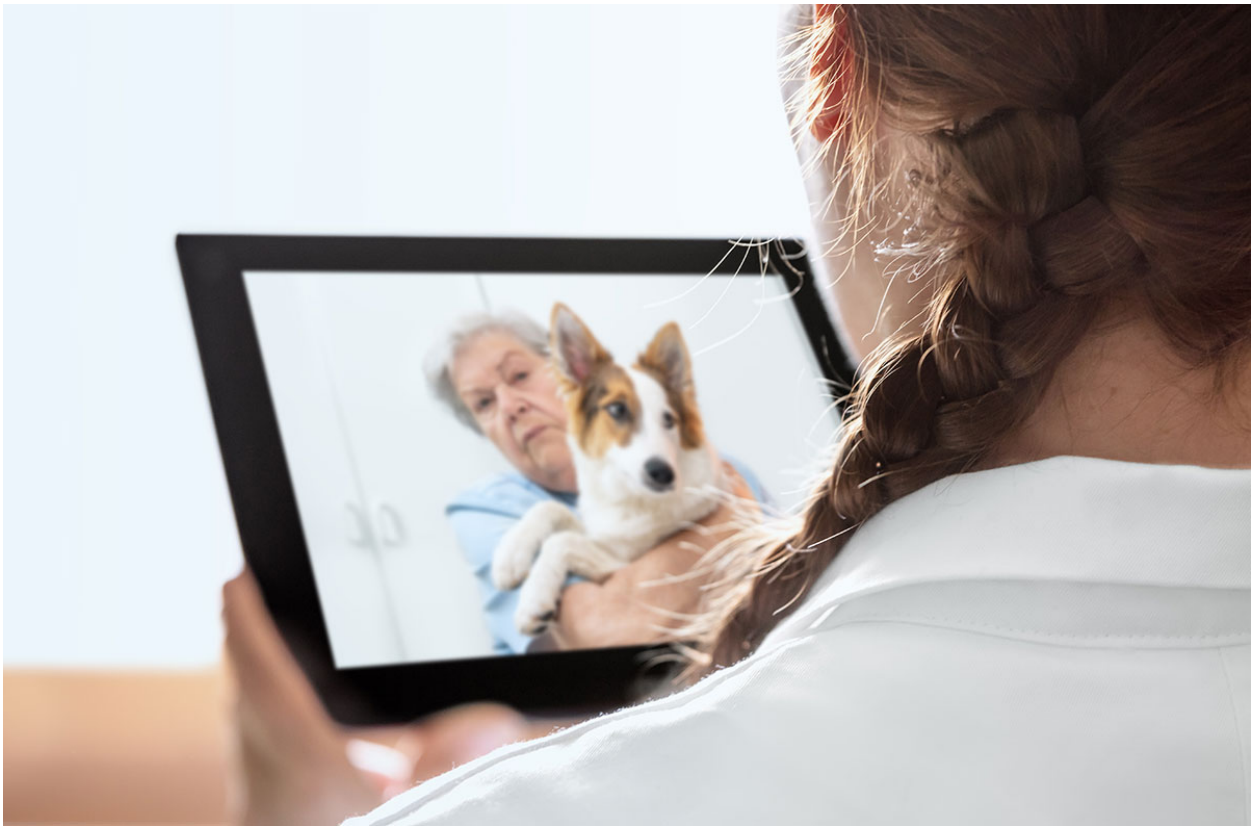
Veterinary Telemedicine Perception & Utilization Intention



Chancellor's Honors Thesis – Chandler Hawk

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EXECUTIVE SUMMARY

Objectives

This study was designed by Chandler Hawk to investigate consumer and veterinarian perception and utilization intention of Veterinary Telemedicine. The results of this study will offer insights that can influence the marketing efforts of Veterinary Telemedicine companies and influence veterinarian trial, adoption, and use of the technology.

Methods

The researcher conducted the study via an online survey created in Qualtrics. The resulting survey data was then analyzed using SPSS. The participants of the study were pet owners, veterinarians, and veterinary students 18 years or older who were recruited to participate in the survey through self-selection by clicking a link which was shared via Facebook. The total number of survey respondents is 176. Survey participants were asked the participants a variety of questions using nominal, ordinal, interval, and ratio measures designed to assess the participants' familiarity with veterinary telemedicine, their attitudes toward the technology, their attitudes toward trying, adopting, and using the technology for emergency cases, the price range at which they are willing to pay for the technology/service, and their intention of trying, adopting, and using the technology. Demographic information of the participants was also gathered for the purpose of identifying trends in the data.

Highlights of Findings

- The top three most important aspects for pet owners when dealing with veterinary practices are: 1) Humane Treatment of Pets; 2) Ease of Scheduling; and 3) Timely Response
- The participant population was neither familiar nor unfamiliar with telemedicine prior to the survey.
    - Participants who are between 30 – 44 years of age were significantly more familiar than participants of other age groups.
- The participants' attitudes toward veterinary telemedicine technology is significantly positive.
- The participant population's attitude toward using veterinary telemedicine technology for emergency cases is significantly positive.

    - The two younger age groups (ages 18-29 and 30-44) have a significantly more positive attitude toward using veterinary telemedicine for emergency cases than the two older age groups (ages 45-59 and 60-75).
- On average, pet owners are willing to pay $40 per use of the veterinary telemedicine technology.
- The majority of participants have some degree of likelihood to adopt and utilize veterinary telemedicine technology.

Marketing Recommendations

- Veterinary telemedicine companies should design marketing campaigns that highlight how the humane treatment of pets, ease of scheduling, and timely response are achieved by the use of the technology.
- Because of the willingness to adopt the technology found and the low level of familiarity with telemedicine prior to this study, it is recommended that veterinary telemedicine companies aggressively market their product/service.
- Veterinary telemedicine companies should design a marketing campaign devoted to the use of the technology in emergency cases. However, this campaign should be aimed at the younger target audiences.

I. INTRODUCTION

Study Purpose

The use of telemedicine technology in the veterinary field is a growing topic of discussion. This research study's aim is to evaluate consumer, veterinarian, and veterinary student opinions of telemedicine technology, such as their familiarity of the technology, their attitudes toward it, and their utilization intentions of the technology in order for telemedicine companies to adapt their current marketing strategy to optimize their telemedicine service adoption rate. This study serves as the first step in Veterinary Telemedicine companies' quests to market their telemedicine technology and integrate it into more veterinary practices.

Background

Telemedicine is defined as the remote diagnosis and treatment of patients by means of telecommunications technology. Telemedicine technology has recently been introduced into the field of veterinary medicine. Due to the nature of telecommunications, a veterinarian would utilize telemedicine technology as a means of triaging a patient and giving advice. To do this however, a Veterinarian-Client-Patient-Relationship is required per law. Despite this limitation, veterinary telemedicine has the potential to be widely used in the near future. In fact, as of September 2018, the Association of American Veterinary State Boards has approved a comprehensive policy opening the door to the use of telemedicine for animal care in the United States.

Research Objectives

The purpose of this study is to discover pet owner, veterinarian, and veterinary student perceptions of veterinary telemedicine by assessing their familiarity with veterinary telemedicine, their attitudes toward the technology, their attitudes toward utilizing the technology for emergency cases, the price range at which they are willing to pay for the technology/service, their utilization intention of the technology, and any demographic trends thereof. More specifically, this study seeks to achieve the following objectives:

Objective 1: Assess consumer participants' perceived importance of different aspects of veterinary practices.

- The results of this objective will allow telemedicine companies to improve their technology and marketing efforts based off of what the consumer deems is most important about taking their pet/s to the veterinarian.

Objective 2: Assess participants' familiarity with telemedicine.

- Telemedicine companies can get a feel for how widely known this technology is to veterinarians and consumers and what percentage are already utilizing the technology from the results of this objective.

Objective 3: Assess participants' attitudes toward the technology.

- The results for this objective will give insight into the opinions of consumers, veterinarians, and veterinary students regarding telemedicine technology. Analyzing these data could prove to be valuable to telemedicine companies when they choose a segment to market to and how to market to them.

Objective 4: Assess participants' attitudes toward utilizing the technology for emergency cases.

- Veterinary telemedicine has been a recent topic of discussion amongst veterinarians and pet owners. It would be beneficial to gain first-hand insight into the attitudes toward using or not using telemedicine for emergency cases and why. This would allow telemedicine companies to modify the technology in a way to better suit consumer and veterinarian needs if possible.

Objective 5: Assess participants' range of price they are willing to pay for the technology/service.

- The results for this objective will allow veterinary telemedicine companies and veterinarians to see the average price that consumers are willing to pay per use of the technology. From the results of this objective, telemedicine companies can determine what price to set the technology at for veterinarians to purchase, and in turn, will allow veterinarians insight into where they should set their practices' prices at per client use of the service.

Objective 6: Assess participants' utilization intention of the technology.

- Telemedicine companies need to understand the likelihood of consumers, current veterinarians, and future veterinarians each to adopt this technology and any demographic trends thereof. In turn, veterinarians need to know the likelihood of their clients to want to utilize telemedicine technology to decide whether or not to integrate the technology into their practices.

II. METHODS

Data Collection Method

The researcher utilized the online survey tool Qualtrics. A link to the survey was made available to potential participants via Facebook in order to voluntarily and anonymously respond to the survey. The link to the survey was available between October 24, 2018 and November 26, 2018. Each participant was limited to one survey submission. After the data collection was completed, the data was downloaded to SPSS software for analysis.

Questionnaire Layout & Design

The survey began with screening questions to determine if the participants were eligible to partake in the rest of the study. The participants who answered "Yes" to owning a device with video chat capabilities, "Yes" to owning a pet, and "Yes" to taking the pet to a veterinarian were then asked questions regarding their experiences with veterinarian practices. These questions gauged the pet owners' level of importance they place on different aspects of a veterinary visit.

All eligible participants, including those who answered "Yes" to either being an enrolled veterinary student or being a licensed veterinarian were then asked questions regarding veterinary telemedicine. These were various questions that measured participants' familiarity with veterinary telemedicine, attitudes toward the technology, attitudes toward using the technology for emergency cases, the price participants are willing to pay to use the technology, and the adoption intention of the technology.

These questions were followed by a set of demographic questions asked to identify any trends in the data during analysis.

Sample Design & Size

Sample size was based upon voluntary participation of pet owners and veterinarians who were recruited to participate in the survey via a link provided on Facebook. The sample size consisted of a total of 176 people. Of these 176, 155 were pet owners and 7 were veterinarians or veterinary students. The sample size of veterinarians and veterinary students is too small a sample to derive any hard findings; however, the results are still provided and discussed below (see "Results").

Statistical Analysis

The statistical analyses were done using SPSS software.

III. RESULTS

Profile of Sample

The survey was completed by a convenience sample of 176 participants. However, due to the convenient nature of the study's sampling – i.e. a link to the survey only being provided on Facebook – the results of this study may not be representative of all pet owners and/or veterinarians and veterinary students.

The survey included the following demographic categories:

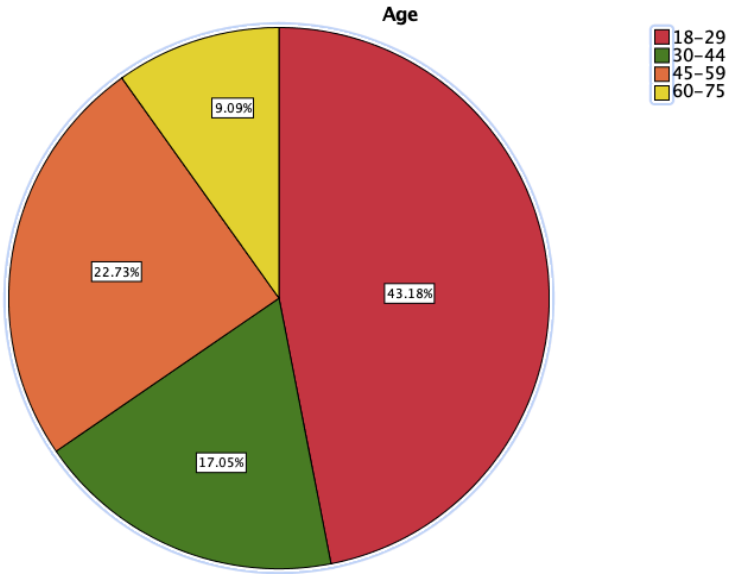
- Age
- Level of Education (Pet Owners only)
- Average Annual Salary
- Marital Status
- State of Residence
- State of Practice in which the Veterinarian Works (Veterinarians only)
- Ethnicity
- Type of Pet Owned (Pet Owners only)
- Pet Owners vs Veterinarians/Veterinary Students

Age

Participants were asked to specify their age. As shown in Figure 1 below, the majority of respondents (43.18%) are between 18 and 29 years old.

Figure 1

Age

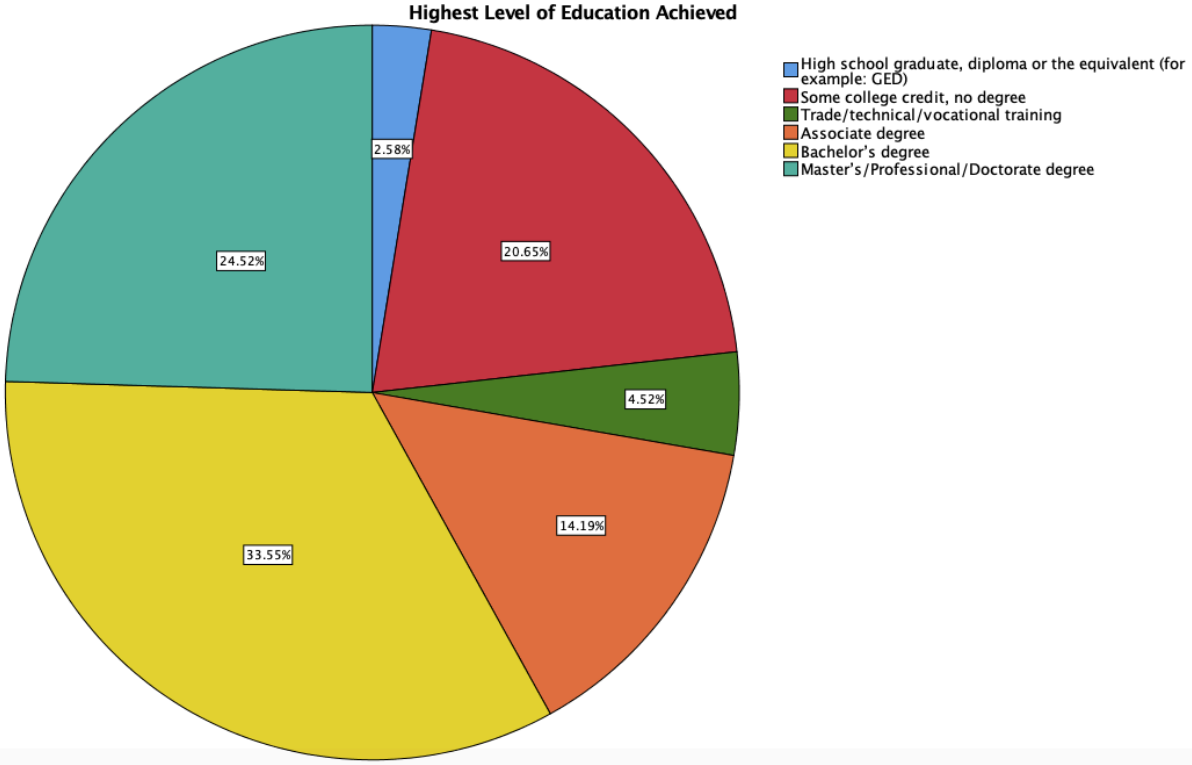


Level of Education

Participants identified as 'pet owners' were asked to report their education level. Figure 2 below illustrates that the pet owners' educational levels ranges from some high school with no diploma to doctorate degrees. The majority of the pet owners' (33.55%) education level categorizes as 'bachelor's degree'.

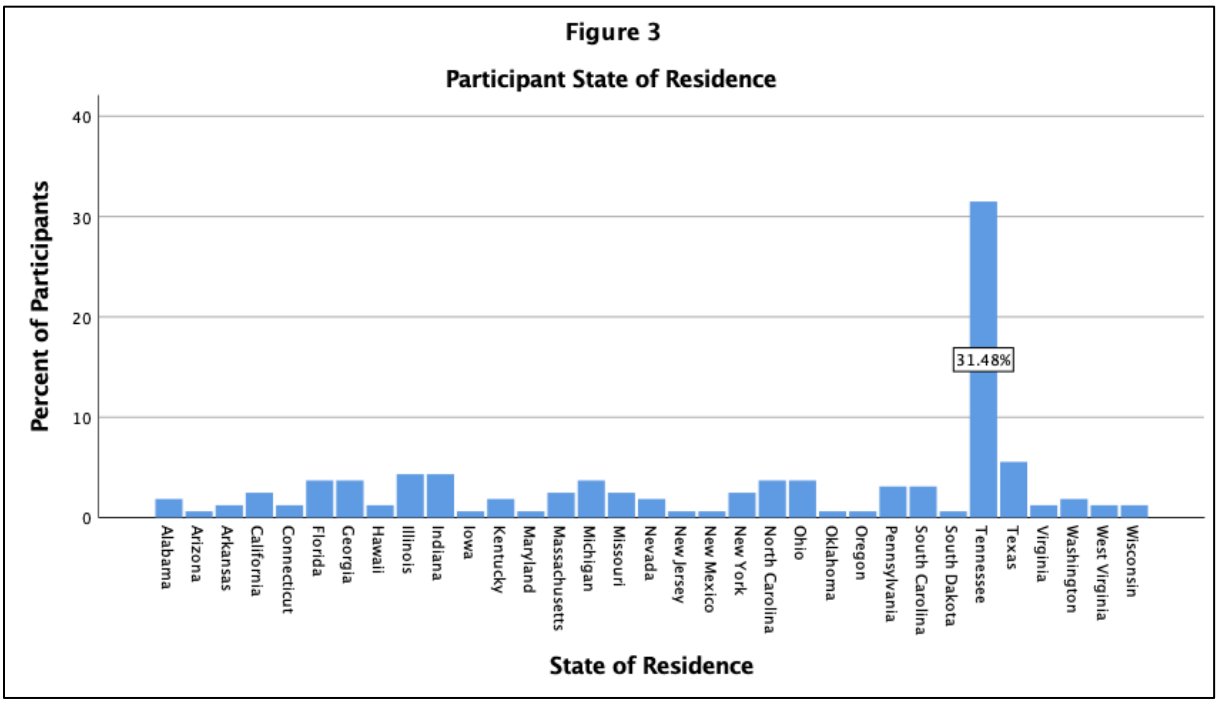
Figure 2

Highest Level of Education Achieved



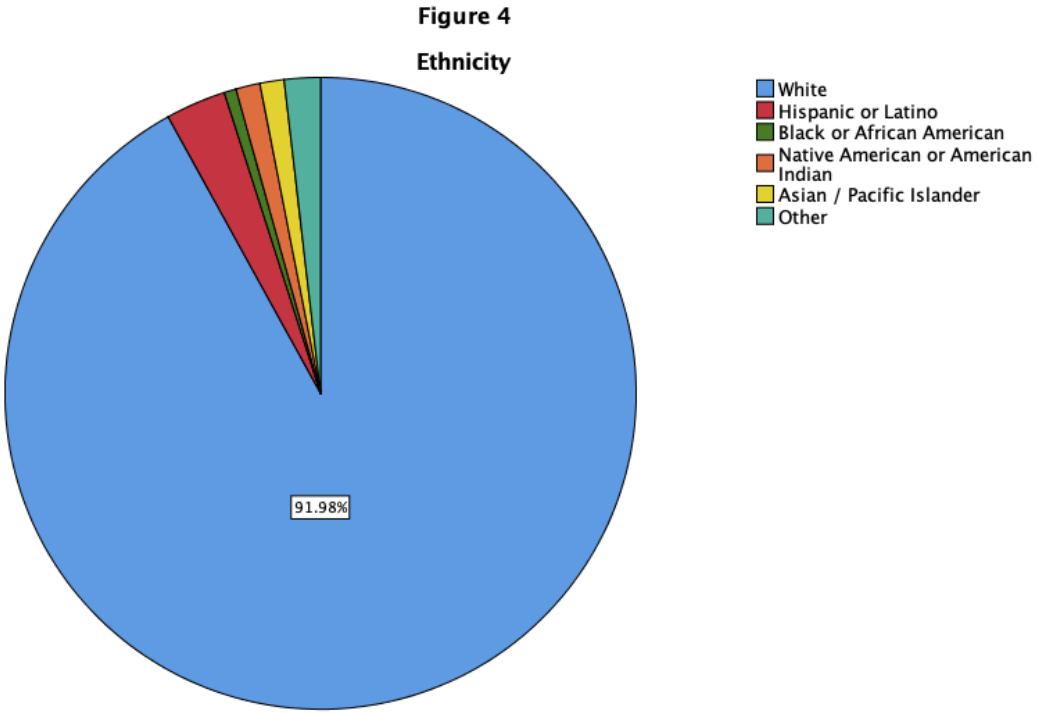
State of Residence

Participants were asked to select their state of residence. Figure 3 shown below shows that participants of the study are geographically diverse. However, Tennessee has the highest percentage of participants as residents at 31.48%.



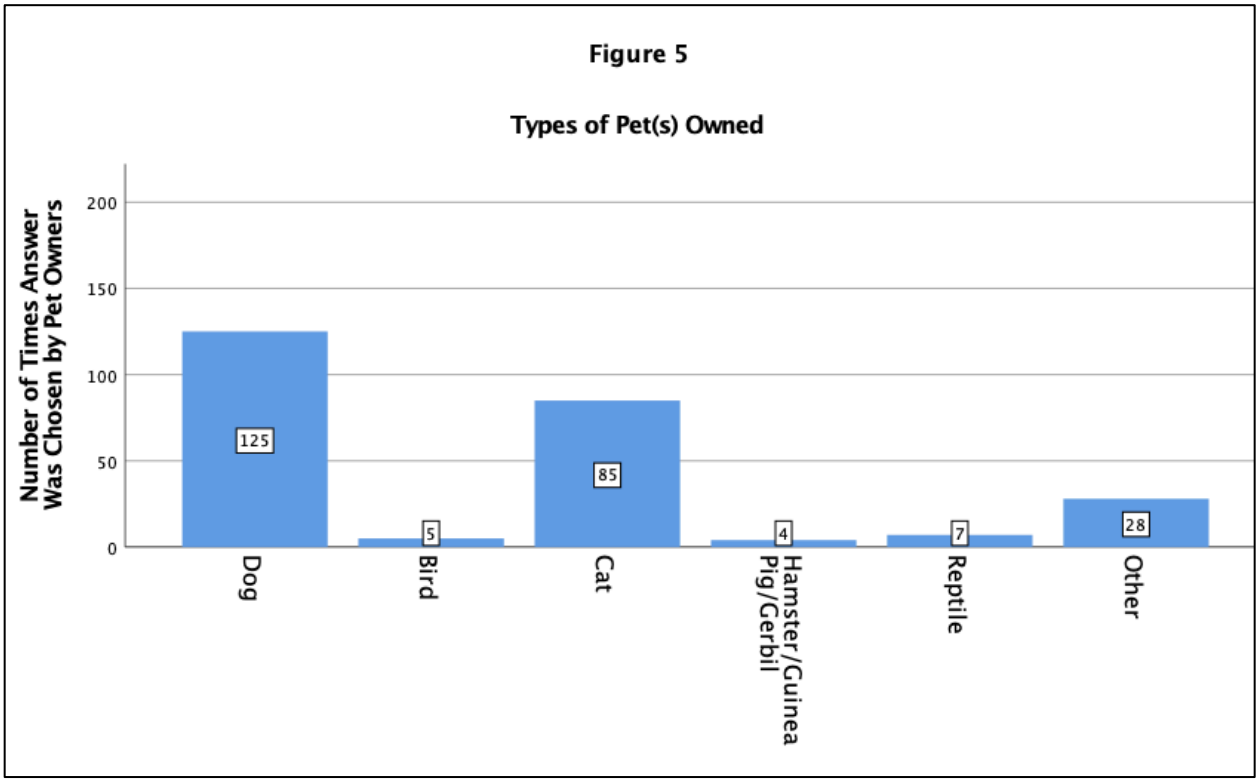
Ethnicity

Participants were asked to identify their ethnicity. As shown in Figure 4 below, the vast majority of the participants' ethnicity is white (91.98%). Although, each ethnic category is represented by the study sample.



Type of Pet Owned

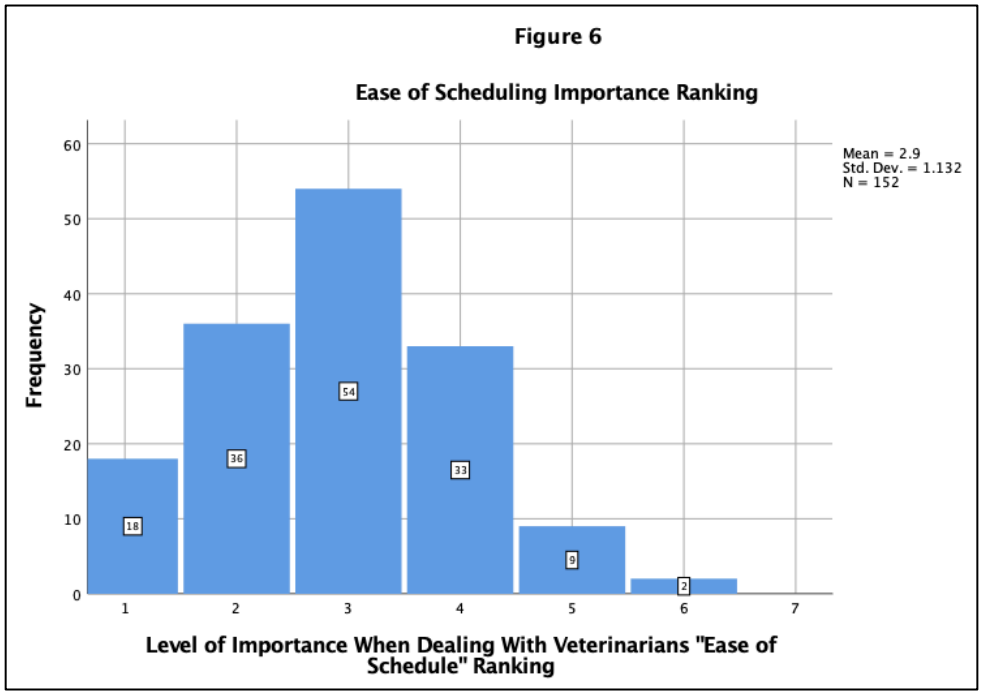
Participants identified as 'pet owners' were asked to specify what kind(s) of animal(s) they own. As shown in Figure 5 below, 'pet owner' participants recorded owning a dog more often than any other category of animal (125). Participants were able to select more than one type of animal if applicable.

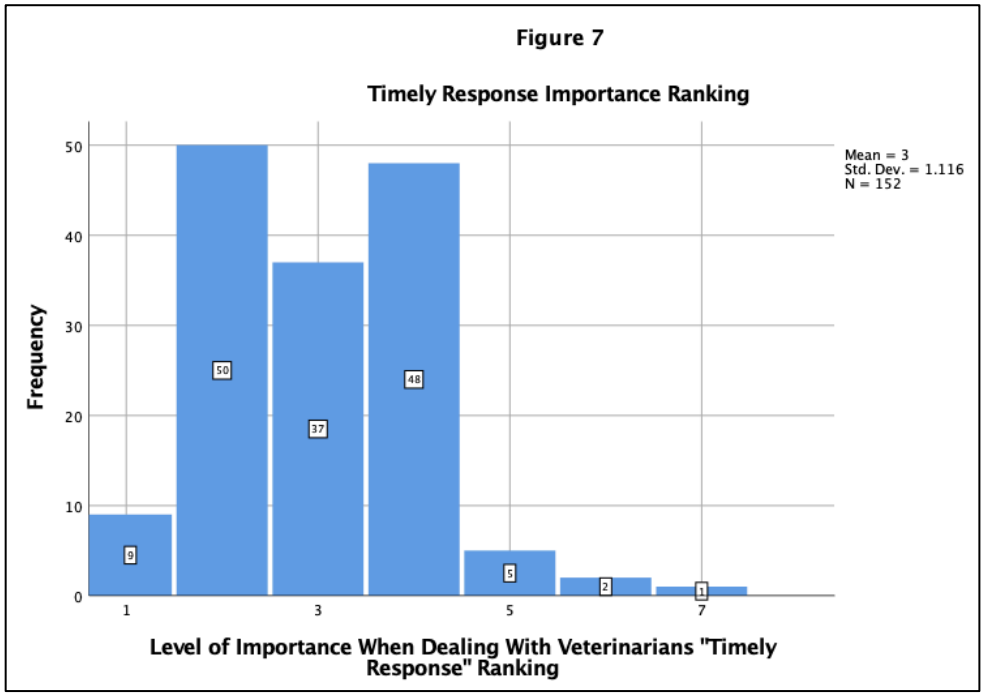


Objective 1: Assess consumer participants' perceived importance of different aspects of veterinary practices.

Participants identified as 'pet owners' were first asked if they take their pet(s) to a veterinarian. Those who responded 'yes' (152/155) were asked to rank the following aspects of dealing with a veterinarian practice in order of importance (1 = Most Important and 9 = Least Important): "Ease of Scheduling"; "Timely Response"; "Price"; "Humane Treatment of Pets"; "Social Media Presence"; "Use of Mobile Technology"; "Community Service"; and "Other". A mean response significantly smaller than 4 indicates that the ranking choice in question is of importance to pet owners when dealing with a veterinary practice. The results show that pet owners deem "Ease of

Scheduling", "Timely Response", "Price", and "Humane Treatment of Pets" to be important when dealing with a veterinary practice. The three choices with the lowest average – meaning they were ranked highly important on average – were "Humane Treatment of Pets" (mean = 1.66), "Ease of Scheduling" (mean = 2.90), and "Timely Response" (mean = 3.00). Figures 6 – 13 below illustrate the ranking of importance for each aspect of a veterinary practice.





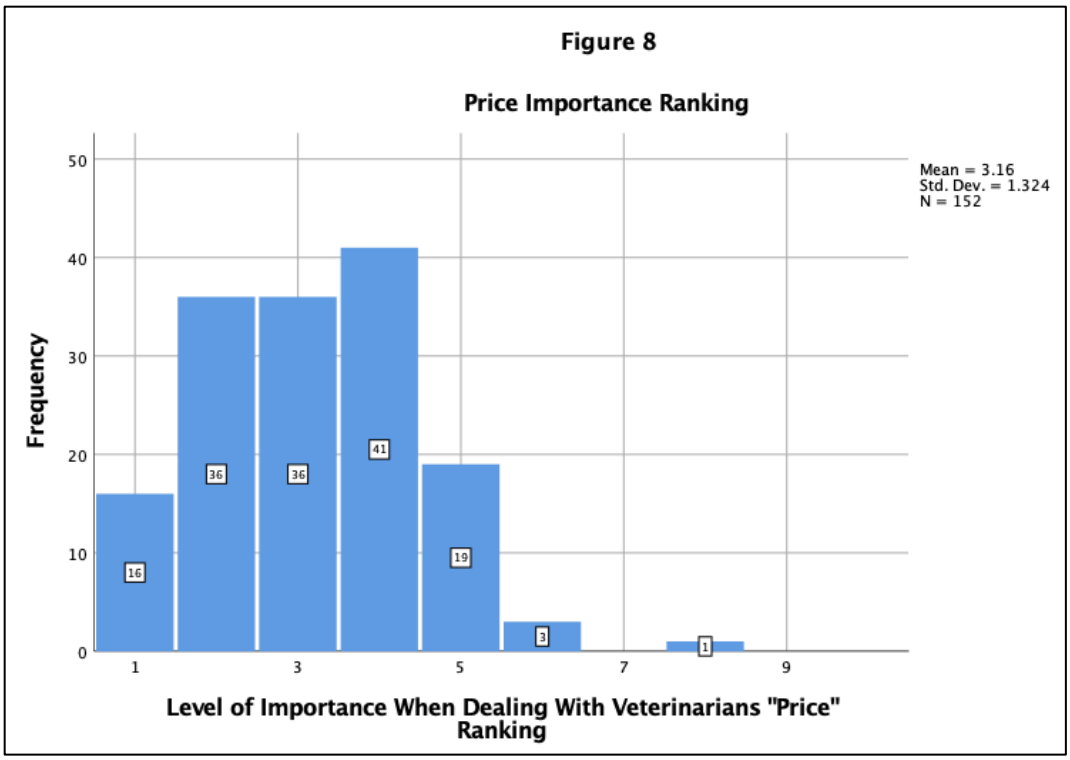


Figure 8
Price Importance Ranking
Mean = 3.16
Std. Dev. = 1.324
N = 152
Frequency
50
40
30
20
10
0
16
36
36
41
19
3
1
1
3
5
7
9
Level of Importance When Dealing With Veterinarians "Price" Ranking

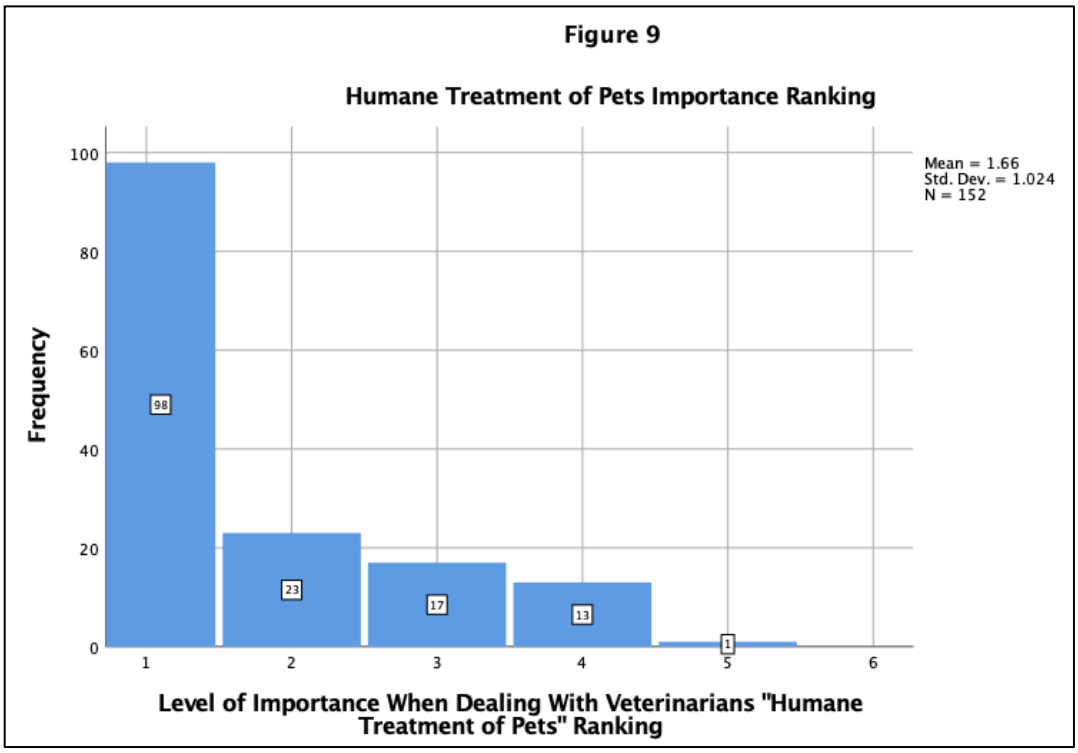


Figure 9
Humane Treatment of Pets Importance Ranking
Mean = 1.66
Std. Dev. = 1.024
N = 152
Frequency
100
80
60
40
20
0
98
23
17
13
1
1
2
3
4
5
6
Level of Importance When Dealing With Veterinarians "Humane Treatment of Pets" Ranking

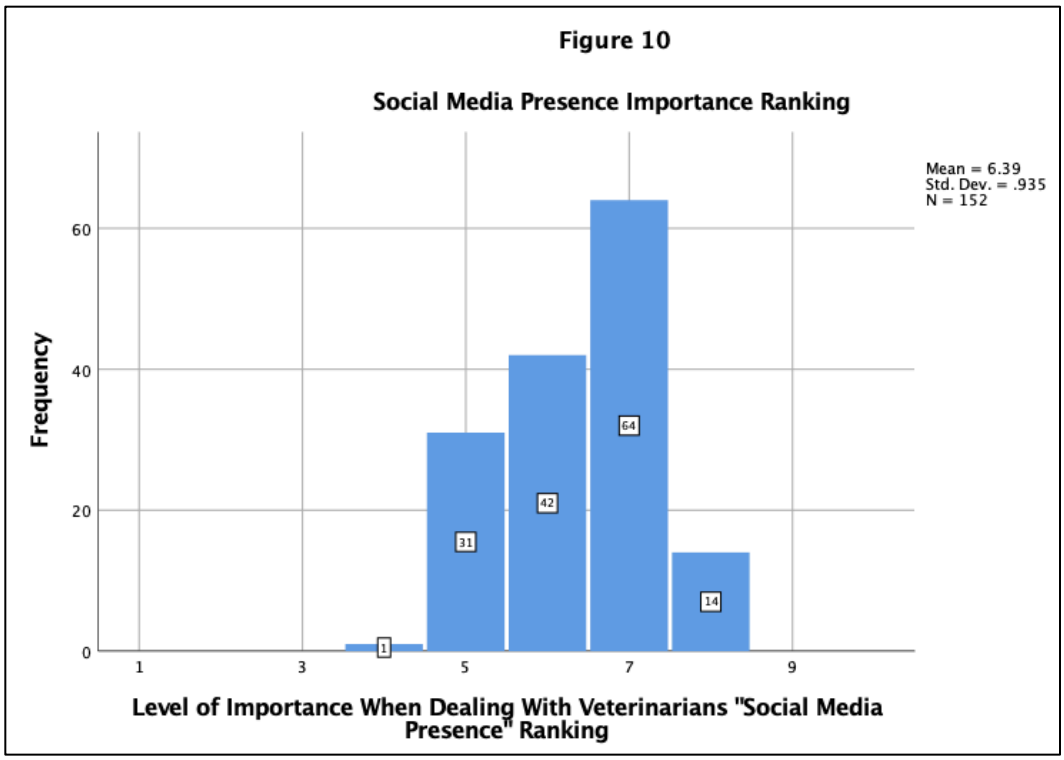


Figure 10
Social Media Presence Importance Ranking
Mean = 6.39
Std. Dev. = .935
N = 152
Frequency
0
20
40
60
1
3
5
7
9
1
31
42
64
14
Level of Importance When Dealing With Veterinarians "Social Media Presence" Ranking

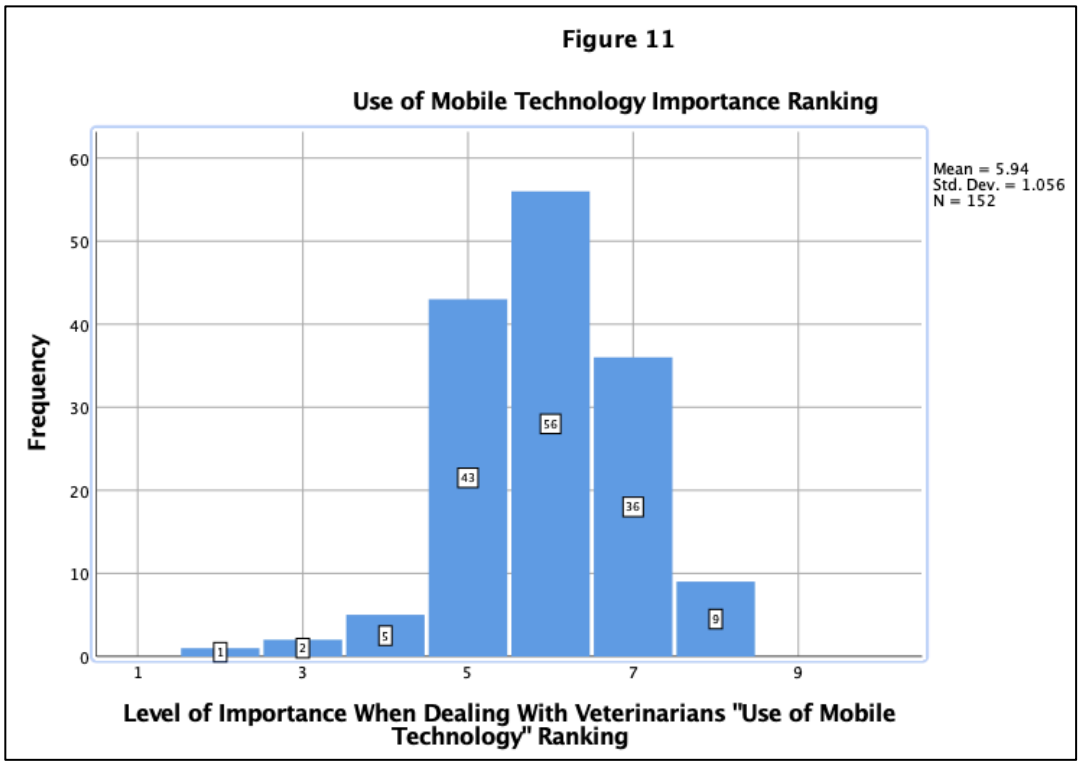
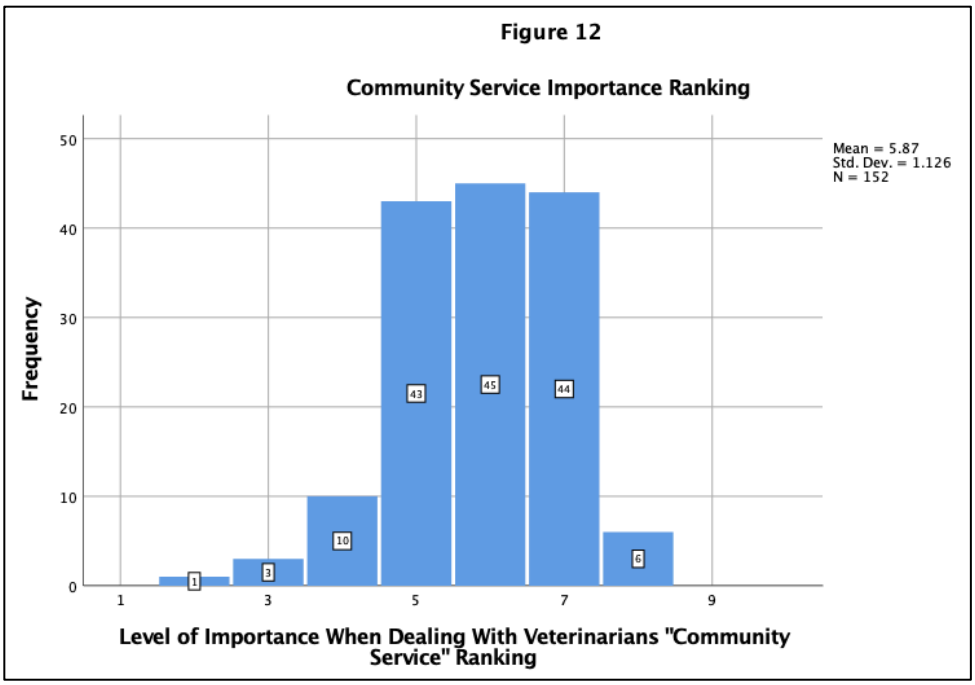
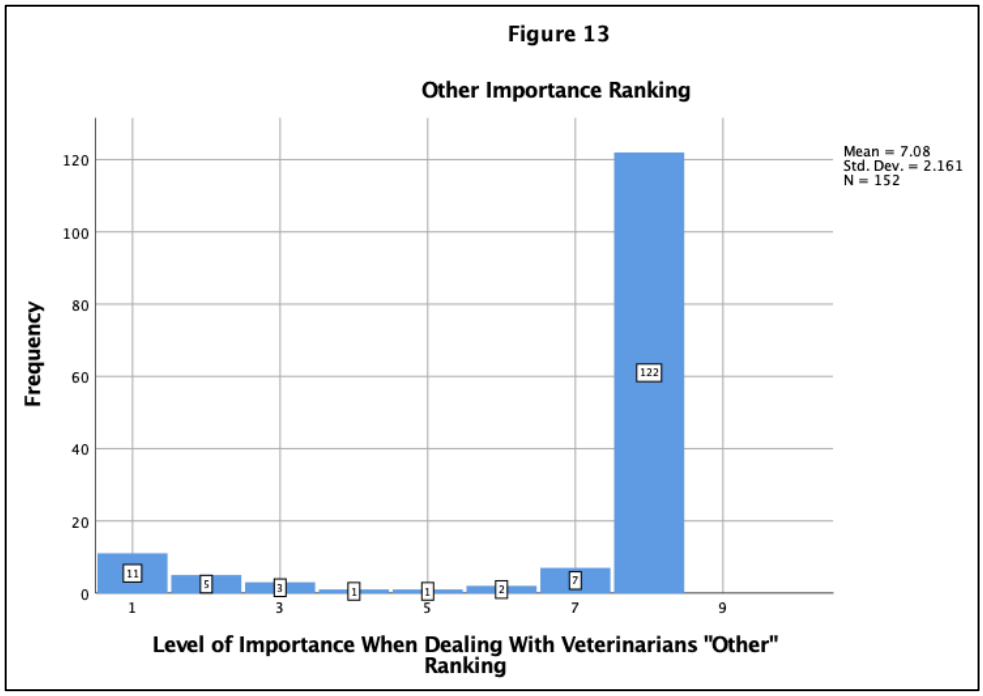


Figure 11
Use of Mobile Technology Importance Ranking
Mean = 5.94
Std. Dev. = 1.056
N = 152
Frequency
0
10
20
30
40
50
60
1
3
5
7
9
1
2
5
43
56
36
9
Level of Importance When Dealing With Veterinarians "Use of Mobile Technology" Ranking

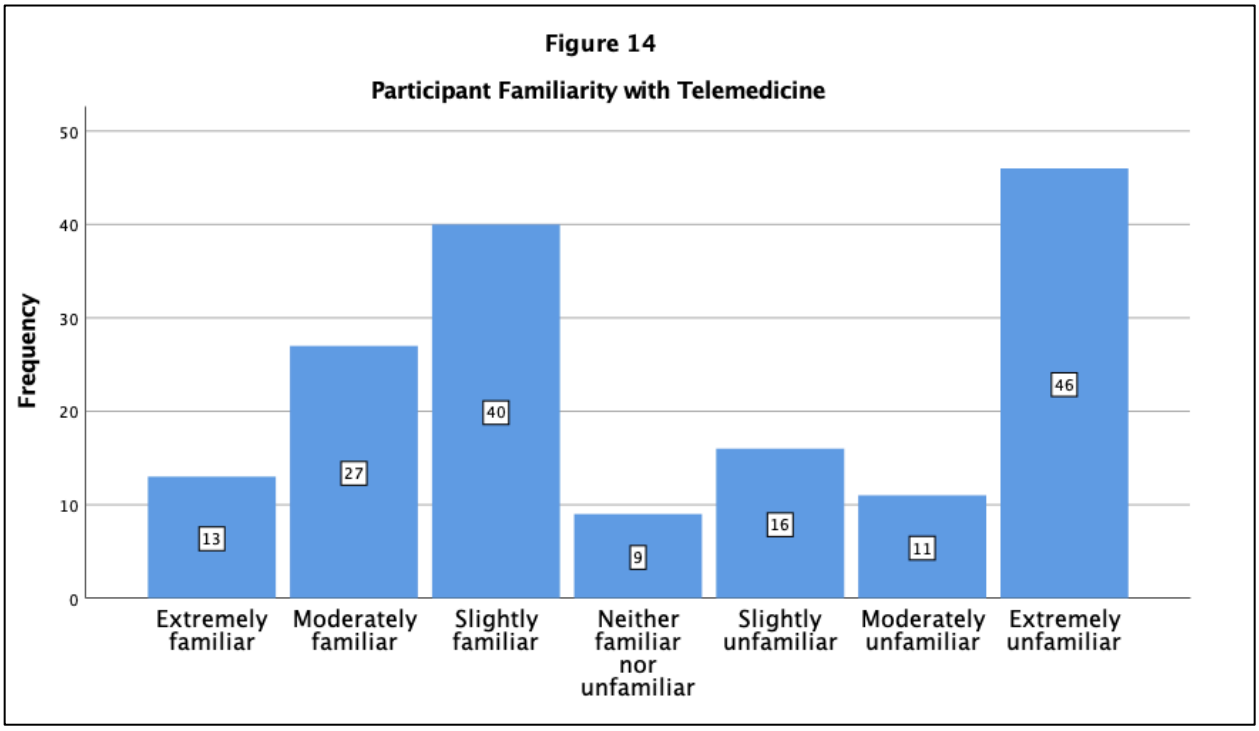




Objective 2: Assess participants' familiarity with telemedicine.

Participants were asked about their familiarity with telemedicine prior to this survey. Participants' familiarity of telemedicine was measured on a 7-point scale, with 1 = "Extremely Familiar" and 7 = "Extremely Unfamiliar". A One-sample T-test was performed and a p-value

less than or equal to 0.05 is considered significant. The results showed that participants were neither familiar nor unfamiliar with telemedicine prior to the survey, reporting p-values of 0.018 and mean approximately equal to 4. Figure 14 below depicts the frequency of each level of familiarity with telemedicine that was chosen by participants. The One-sample T-test can be found in Appendix B.

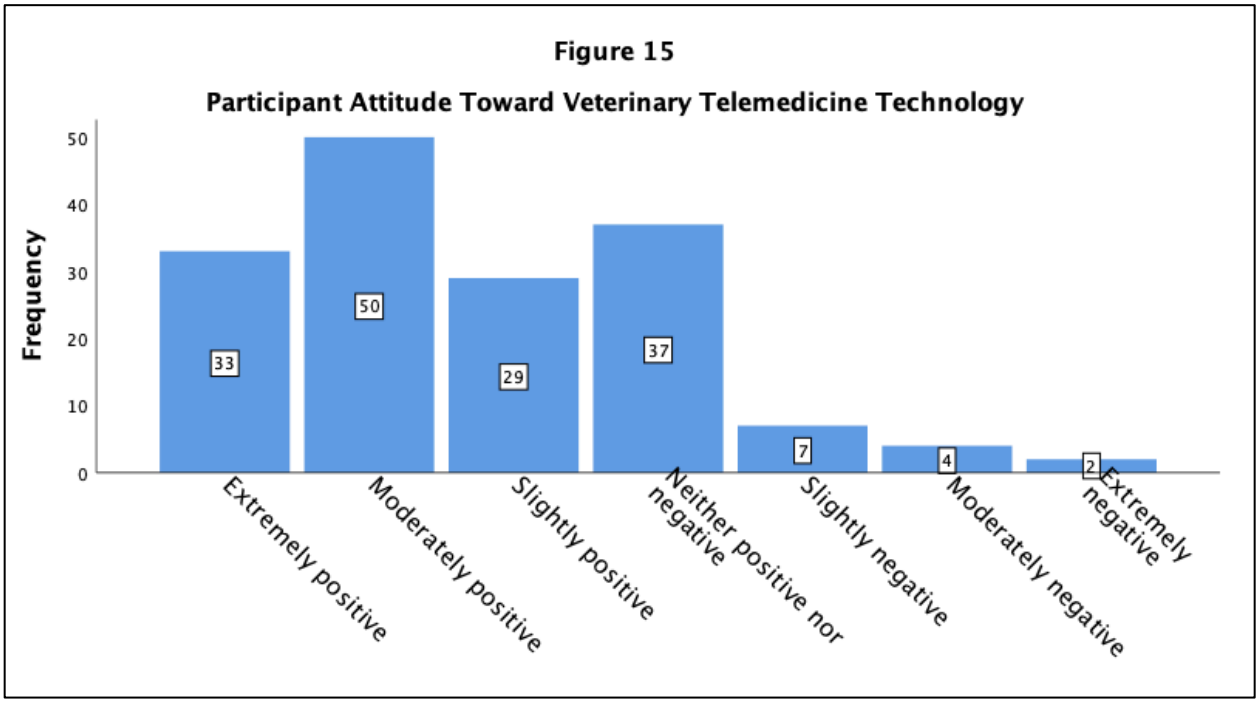


A follow-up analysis was then conducted to see whether there is a significant difference in familiarity with telemedicine between different age groups by running a One-Way ANOVA test. The results showed that there is a significant difference in familiarity with telemedicine. Participants who are between 30 – 44 years of age were significantly more familiar than participants of other age groups. The One-way ANOVA output can be found in Appendix B.

Objective 3: Assess participants' attitudes toward the technology.

Participants were asked their attitudes toward veterinary telemedicine technology. This question was measured on a 7-point scale, with 1 = "Extremely Positive" and 7 = "Extremely Negative" and was analyzed by conducting a One-sample T-test (see Appendix B). A p-value less than or equal to 0.05 is considered significant. The resulting mean was 2.72 with a p-value of 0.000. These values indicate that the participant population's attitude toward veterinary telemedicine technology is significantly positive. The figure below, Figure 15, illustrates the frequency of

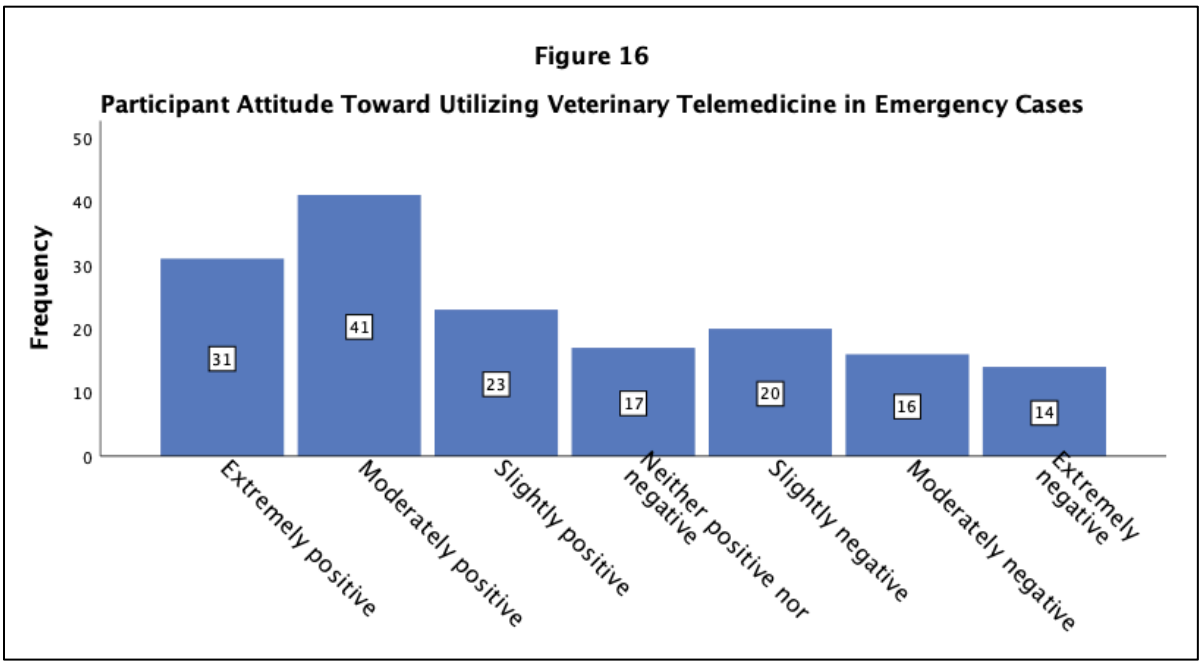
each level of attitude that was chosen by participants.



A follow-up analysis using a One-way ANOVA test was conducted to see whether there was a significant difference in the participant attitude toward veterinary telemedicine technology between age groups. The results showed that there is not a significant difference in attitude toward the technology between age groups. The One-way ANOVA output can be found in Appendix B.

Objective 4: Assess participants' attitudes toward utilizing the technology for emergency cases.

Participants were asked what their attitudes are toward utilizing veterinary telemedicine technology for emergency cases. This question was measured on a 7-point scale, with 1 = "Extremely Positive" and 7 = "Extremely Negative". The data collected from this question was analyzed via a One-sample T-test (see Appendix B) in which a p-value less than or equal to 0.05 is considered significant. The resulting mean was 3.36 with a p-value of 0.000. This indicates that the participant population's attitude toward using veterinary telemedicine technology for emergency cases is significantly positive. Figure 16 portrays the frequency in which each level of attitude was selected by participants.



A follow-up analysis was conducted to determine whether there is a significant difference in the attitude toward implementing veterinary telemedicine in emergency cases between age groups. The One-way ANOVA results (see Appendix B) indicate that the two younger age groups (ages 18-29 and 30-44) have a significantly more positive attitude toward using veterinary telemedicine for emergency cases than the two older age groups (ages 45-59 and 60-75) do.

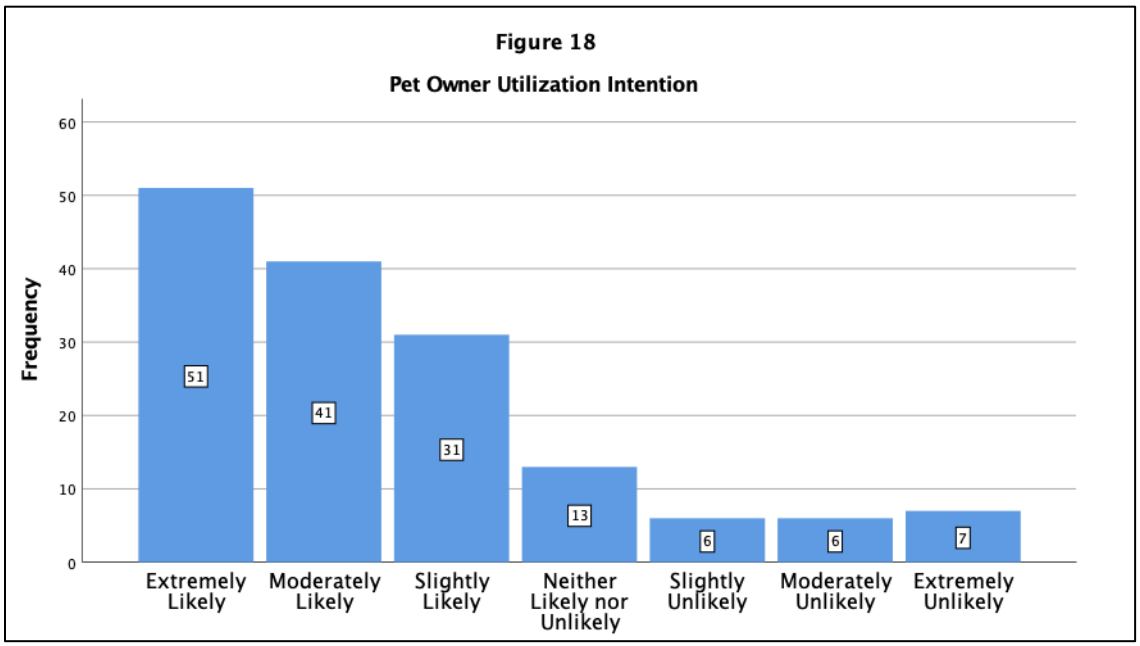
Objective 5: Assess participants' range of price they are willing to pay for the technology/service.

Participants were asked what price they would be willing to pay for a single use of veterinary telemedicine technology in an open-ended answer style question. The results show that on average, participants are willing to pay $40 per use of the veterinary telemedicine technology. Figure 17 displays the frequency in which participants reported the price they are willing to pay in ranges of $13.

Price Participants are

Objective 6: Assess participants' utilization intention of the technology.

Participants were asked to specify how likely they are to utilize the veterinary telemedicine technology. Only this question asked to pet owners was analyzed due to the small sample size of veterinarians/veterinary students. The question was measured on a 7-point scale, with 1 = "Extremely Likely" and 7 = "Extremely Unlikely", and a mean response significantly smaller than 4 is considered to indicate that consumers have intentions to adopt and use veterinary telemedicine technology. The results of the One-sample T-test (see Appendix B for output) show that participants have intentions to adopt and utilize the technology with a p-value of 0.000 and a mean of 2.54. The following figure, Figure 18, shows the frequency in which pet owner participants chose each level of utilization intention.



A follow-up study via a One-way ANOVA test was conducted to determine whether the level of utilization intention is significantly different between age groups. The results (see Appendix B) showed that there is no significant difference in utilization intention between age groups with a p-value of 0.202.

IV. LIMITATIONS OF STUDY

Time, money, size of sample, and sample collection were all limitations when conducting this research project. The time frame for conducting the survey was under thirty-five days. The budget for the research was $0. We could only conduct the research via methods already available to us (i.e. Qualtrics and SPSS). The sample size was limited to the people that had access to the survey link. There was also too small of a sample size for the veterinarian/veterinary student population to conduct any analyses. Only individuals who are on Facebook and were within the Facebook Ad's targeted population had access to the survey, making it a convenience sample. This indicates that the results of this study may not be100% representative of the pet owner or veterinarian/veterinary student population.

V. CONCLUSIONS & MARKETING RECOMMENDATIONS

From the results of this study, all six objectives were achieved. The results from these objectives, conclusions about these findings, and recommendations for veterinary telemedicine companies are discussed. It is important to note that veterinary telemedicine companies can benefit from marketing to not only veterinarians, but pet owners as well. Pet owners can influence their veterinarians to adopt and use the technology.

The study found that the top three most important aspects for pet owners when dealing with veterinary practices are: 1) Humane Treatment of Pets; 2) Ease of Scheduling; and 3) Timely Response. These aspects are things that veterinary telemedicine can improve and/or help a veterinary practice achieve. Therefore, veterinary telemedicine companies should design marketing campaigns that highlight how each of these three aspects are achieved by the use of the technology.

Prior to the survey, the participant population was neither familiar nor unfamiliar with telemedicine. This is probably due to the relative newness of the industry but should not be taken lightly. Veterinary telemedicine companies are urged to interpret this finding as evidence for the necessity of running an aggressive marketing campaign.

Attitudes toward the technology is significantly positive according to the study results. It was also found that participants' attitudes toward using veterinary telemedicine technology for emergency cases is significantly positive. However, the two younger age groups (ages 18-29 and 30-44) have a significantly more positive attitude toward using veterinary telemedicine for emergency cases than the two older age groups (ages 45-59 and 60-75). This suggests that veterinary telemedicine companies should market their technology as a useful tool in emergency situations but gear the target audience of this particular marketing campaign toward the younger pet owner population.

The study discovered that on average, pet owners are willing to pay $40 per use of the technology. This information can be used by veterinary telemedicine companies and by veterinarians when determining their product and service prices, respectively.

The research concludes that the majority of participants have some degree of likelihood to adopt and utilize veterinary telemedicine technology. The implication of this is that the market for veterinary telemedicine is interested and willing to pay for and use this technology.

APPENDICES

Appendix A: *Data Analysis Plan*

Research Objective 1: Assess consumer participants' perceived importance of different aspects of veterinary practices.

Research Question 1: Which of the following aspects when dealing with a veterinary practice do pet owners deem most important?

- Ease of Scheduling
- Timely Response
- Price
- Humane Treatment of Pets
- Social Media Presence
- Use of Mobile Technology
- Community Service
- Other

Data Analysis Plan: To examine this research question, a frequency analysis was conducted to determine the average ranking of each answer choice.

Research Objective 2: Assess participants' familiarity with telemedicine. (1 = "Extremely Familiar", 7 = "Extremely Unfamiliar")

Research Question 2: Does level of familiarity differ significantly from the action standard or critical value?

Data Analysis Plan: To examine this research question, a one sample t-test was conducted to compare the mean of familiarity to the critical value (4) at the 95% confidence level. If the p-value is equal to or smaller than 0.05 and the mean of attitude is lower than 4, the results show that participants are significantly familiar with telemedicine. If the p-value is equal to or smaller than 0.05 and the mean of attitude is higher than 4, the results show that participants are significantly unfamiliar with telemedicine. If p-value is bigger than 0.05, the results show that participant familiarity is not significantly different from being neutral.

Research Question 2b: Does the familiarity level of telemedicine vary significantly between age groups?

Data Analysis Plan: To examine this research question, a one-way ANOVA was conducted to compare the mean of familiarity between age groups of the participants. If the p-value is equal to or smaller than 0.05, the results show that there is a significant difference in level of familiarity

between age groups. If the p-value is greater than 0.05, the results show that participant familiarity is not significantly different across age groups.

Research Objective 3: Assess participants' attitudes toward the technology. (1 = "Extremely Positive", 7 = "Extremely Negative")

Research Question 3: Does level of attitude differ significantly from the action standard or critical value?

Data Analysis Plan: To examine this research question, a one sample t-test will be conducted to compare the mean of attitude to the critical value (4) at the 95% confidence level. If the p-value is equal to or smaller than 0.05 and the mean of attitude is lower than 4, the results show that participants have a significantly positive attitude toward the technology. If the p-value is equal to or smaller than 0.05 and the mean of attitude is higher than 4, the results show that participants have a significantly negative attitude toward the technology. If p-value is bigger than 0.05, the results show that participant attitude is not significantly different from being neutral.

Research Question 3b: Does the attitude level toward the technology vary significantly between age groups?

Data Analysis Plan: To examine this research question, a one-way ANOVA was conducted to compare the mean of attitude level between age groups of the participants. If the p-value is equal to or smaller than 0.05, the results show that there is a significant difference in attitude between age groups. If the p-value is greater than 0.05, the results show that participant attitude toward the technology is not significantly different across age groups.

Research Objective 4: Assess participants' attitudes toward utilizing the technology for emergency cases. (1 = "Extremely Positive", 7 = "Extremely Negative")

Research Question 4: Does level of attitude differ significantly from the action standard or critical value?

Data Analysis Plan: To examine this research question, a one sample t-test will be conducted to compare the mean of attitude to the critical value (4) at the 95% confidence level. If the p-value is equal to or smaller than 0.05 and the mean of attitude is lower than 4, the results show that participants have a significantly positive attitude toward using the technology for emergency cases. If the p-value is equal to or smaller than 0.05 and the mean of attitude is higher than 4, the results show that participants have a significantly negative attitude toward using the technology for emergency cases. If p-value is bigger than 0.05, the results show that participant attitude is not significantly different from being neutral.

Research Question 4b: Does the attitude level toward the technology vary significantly between age groups?

Data Analysis Plan: To examine this research question, a one-way ANOVA was conducted to

compare the mean of attitude level between age groups of the participants. If the p-value is equal to or smaller than 0.05, the results show that there is a significant difference in attitude between age groups. If the p-value is greater than 0.05, the results show that participant attitude toward the technology is not significantly different across age groups.

Research Objective 5: Assess participants' range of price they are willing to pay for the technology/service.

Research Question 5: What is the average price participants are willing to pay for the technology?

Data Analysis Plan: To examine this research question, an average of all recorded responses to the question was determined.

Research Objective 6: Assess participants' utilization intention of the technology. (1 = "Extremely Likely", 7 = "Extremely Unlikely")

Research Question 6: Does level of utilization intention differ significantly from the action standard or critical value?

Data Analysis Plan: To examine this research question, a one sample t-test will be conducted to compare the mean of attitude to the critical value (4) at the 95% confidence level. If the p-value is equal to or smaller than 0.05 and the mean of attitude is lower than 4, the results show that participants have a significantly likely intention of utilizing the technology. If the p-value is equal to or smaller than 0.05 and the mean of attitude is higher than 4, the results show that participants have a significantly unlikely intention of utilizing the technology. If p-value is bigger than 0.05, the results show that participant utilization intention is not significantly different from being neutral.

Appendix B: *SPSS Outputs*

Objective 1

NONE

Objective 2

One Sample T-test

One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
How familiar are you with telemedicine?	162	4.27	2.126	.167

One-Sample Test

	Test Value = 3					
					95% Confidence Interval of the Difference	
	t	df	Sig. (2-tailed)	Mean Difference	Lower	Upper
How familiar are you with telemedicine?	7.576	161	.000	1.265	.94	1.60

One-Way ANOVA

ANOVA

How familiar are you with telemedicine?

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	44.820	3	14.940	3.457	.018
Within Groups	682.767	158	4.321		
Total	727.586	161			

Post Hoc Tests

Homogeneous Subsets

How familiar are you with telemedicine?

Duncan[a,b]

		Subset for alpha = 0.05	
Groups	N	1	2
2.00	30	3.23	
3.00	40		4.30
1.00	76		4.50
4.00	16		5.00
Sig.		1.000	.223

Means for groups in homogeneous subsets are displayed.

Objective 3

One Sample T-test

One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
How innovative or "ground-breaking" do you feel the features of the new MacBook Pro are?	146	3.10	1.506	.125

One-Sample Test

	Test Value = 5					
					95% Confidence Interval of the Difference	
	t	df	Sig. (2-tailed)	Mean Difference	Lower	Upper
How innovative or "ground-breaking" do you feel the features of the new MacBook Pro are?	-15.282	145	.000	-1.904	-2.15	-1.66

One-Way ANOVA

ANOVA

Please indicate your attitude toward telemedicine technology.

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	8.531	3	2.844	1.528	.209
Within Groups	293.969	158	1.861		
Total	302.500	161			

Post Hoc Tests

Homogeneous Subsets

Please indicate your attitude toward telemedicine technology.

Duncan[a,b]

Groups	N	Subset for alpha = 0.05
		1
2.00	30	2.37
3.00	40	2.58
4.00	16	2.69
1.00	76	2.95
Sig.		.137

Means for groups in homogeneous subsets are displayed.

Objective 4

One Sample T-test

One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
Please indicate your attitude toward utilizing telemedicine for emergency cases.	162	3.36	1.945	.153

One-Sample Test

	Test Value = 4					
					95% Confidence Interval of the Difference	
	t	df	Sig. (2-tailed)	Mean Difference	Lower	Upper
Please indicate your attitude toward utilizing telemedicine for emergency cases.	-4.200	161	.000	-.642	-.94	-.34

One-way ANOVA

ANOVA

Please indicate your attitude toward utilizing telemedicine for emergency cases.

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	33.605	3	11.202	3.075	.029
Within Groups	575.629	158	3.643		
Total	609.235	161			

Post Hoc Tests

Homogeneous Subsets

Please indicate your attitude toward utilizing telemedicine for emergency cases.

Duncan[a,b]

		Subset for alpha = 0.05	
Groups	N	1	2
4.00	16	2.31	
3.00	40	3.03	3.03
2.00	30		3.37
1.00	76		3.75
Sig.		.151	.169

Means for groups in homogeneous subsets are displayed.

Objective 5

NONE

Objective 6

One Sample T-test

One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
Utilization	155	2.5355	1.64071	.13178

One-Sample Test

	Test Value = 4					
					95% Confidence Interval of the Difference	
	t	df	Sig. (2-tailed)	Mean Difference	Lower	Upper
Utilization	-11.113	154	.000	-1.46452	-1.7249	-1.2042

One-way ANOVA

ANOVA

Utilization

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	138.827	45	3.085	1.220	.202
Within Groups	275.728	109	2.530		
Total	414.555	154			

Appendix C: *Survey*

Honors Thesis – Veterinary Telemedicine Utilization Intention

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Start of Block: Introduction Block

INTRODUCTION
This survey was designed by Chandler Hawk, honors student at The University of Tennessee, for a research study. All participants must be 18 years old or older to participate. Please contact Chandler at 865-771-2466 or chawk3@vols.utk.edu or Edwin Armbrister, the Faculty Advisor for this research study, at 276-728-8017 or earmbris@utk.edu if you have any questions regarding this research study.

PURPOSE
The purpose of this research study is to determine and analyze familiarity, perception, and utilization intention of veterinary telemedicine.

PROCEDURE
This study involves answering a series of questions and should take about 10 minutes to complete. All data derived from this study will then be analyzed to determine any trends in familiarity, perception, and utilization intention of veterinary telemedicine.

FORESEEABLE RISKS
There are no foreseeable risks associated with this research study.

BENEFITS
You may not directly benefit from your participation in this research study. The results of this research study would allow veterinarians and veterinary telemedicine companies with information regarding if and where veterinary telemedicine should be introduced.

CONSENT
Your participation in this research study is voluntary and if you choose to not participate or to stop participating at any time, your decision will not result in a penalty or affect your rights.

CONFIDENTIALITY
All responses submitted are completely anonymous. This research study does not request any private

information such as your name or health records. Raw data collected for this research study will remain strictly confidential.

If you have questions or concerns about your treatment in this research or your rights as a research participant, please contact the University of Tennessee IRB Compliance Officer at 865-974-7697 or utkirb@utk.edu.

Page Break

End of Block: Introduction Block

Start of Block: Screening and Veterinarian Visit Block

Q1 Do you own a computer/phone with video chat capabilities?

- ○ Yes (1)
- ○ No (2)

Skip To: End of Survey If Do you own a computer/phone with video chat capabilities? = No

Q2 Are you a licensed veterinarian?

- ○ Yes (1)
- ○ No (2)

Skip To: Q11 If Are you a licensed veterinarian? = Yes

Q3 Do you own a pet?

- ○ Yes (1)
- ○ No (2)

Skip To: Q11 If Do you own a pet? = No

Page Break

Q4 How many pets do you have? (please answer in number-form; i.e. 4)

_____

Q5 What kind of pet do you own? Select all that apply.

- ☐ Dog (1)
- ☐ Cat (2)
- ☐ Bird (3)
- ☐ Hamster/Guinea Pig/Gerbil (4)
- ☐ Reptile (5)
- ☐ Other (6) _____

Q6 Do you take your pet to a veterinarian?

- ○ Yes (1)
- ○ No (2)

Skip To: Q11 If Do you take your pet to a veterinarian? = No

Page Break

Q7 On average, how often do you take your pet to the veterinarian in any given year?

- ○ Once per month (1)
- ○ Once every 3 months (2)
- ○ Once every 6 months (3)
- ○ Once every year (4)

Q8 How satisfied were you with your most recent veterinarian experience?

- ○ Extremely satisfied (1)
- ○ Moderately satisfied (2)
- ○ Slightly satisfied (3)
- ○ Neither satisfied nor dissatisfied (4)
- ○ Slightly dissatisfied (5)
- ○ Moderately dissatisfied (6)
- ○ Extremely dissatisfied (7)

Page Break

Q9 Please list the following aspects in order of importance to you when dealing with a veterinarian practice.

_____ Ease of Scheduling (1)
_____ Timely Response (2)
_____ Price (3)
_____ Humane Treatment of Pets (4)
_____ Social Media Presence (5)
_____ Use of Mobile Technology (6)
_____ Community Service (7)
_____ Other (8)

Q10 What is your biggest complaint when dealing with a veterinarian practice?

_____

Page Break

Q11 How familiar are you with telemedicine?

- ○ Extremely familiar (1)
- ○ Moderately familiar (2)
- ○ Slightly familiar (3)
- ○ Neither familiar nor unfamiliar (4)
- ○ Slightly unfamiliar (5)
- ○ Moderately unfamiliar (6)
- ○ Extremely unfamiliar (7)

Page Break

Display This Question:

If How familiar are you with telemedicine? = Extremely familiar

Or How familiar are you with telemedicine? = Moderately familiar

Or How familiar are you with telemedicine? = Slightly familiar

Q12 How have you heard about telemedicine?

_____

_____

_____

_____

_____

End of Block: Screening and Veterinarian Visit Block

Start of Block: Telemedicine Block

The following part of this survey is related to Veterinary Telemedicine. Telemedicine is defined as the remote diagnosis and treatment of patients by means of telecommunications technology (video chat, Skype, etc.). Veterinary Telemedicine is currently utilized for non-emergent consultations with veterinarians about the condition of pets. In order for a pet owner to utilize Veterinary Telemedicine, a Veterinarian-Client-Patient Relationship must already be established.

Page Break

Display This Question:

If Are you a licensed veterinarian? = Yes

Q13 Do you/does your practice already utilize telemedicine?

- ○ Yes (1)
- ○ No (2)

Page Break

Display This Question:

If Do you/does your practice already utilize telemedicine? = Yes

Q14 Why did you adopt this technology?

_____

_____

_____

_____

_____

Display This Question:

If Do you/does your practice already utilize telemedicine? = No

Q15 Why did you not adopt this technology?

_____

_____

_____

_____

_____

Page Break

Display This Question:

If Are you a licensed veterinarian? = Yes

Q16 How valuable do you believe this technology is/would be for **your practice**?

- ○ Extremely valuable (1)
- ○ Moderately valuable (2)
- ○ Slightly valuable (3)
- ○ Neither valuable nor not valuable (4)
- ○ Slightly not valuable (5)
- ○ Moderately not valuable (6)
- ○ Extremely not valuable (7)

Display This Question:

If Are you a licensed veterinarian? = Yes

Q17 How valuable do you believe this technology is/would be for **your clients**?

- ○ Extremely valuable (1)
- ○ Moderately valuable (2)
- ○ Slightly valuable (3)
- ○ Neither valuable nor not valuable (4)
- ○ Slightly not valubale (5)
- ○ Moderately not valuable (6)
- ○ Extremely not valuable (7)

Q18 Please indicate your attitude toward telemedicine technology.

- ○ Extremely positive (1)
- ○ Moderately positive (2)
- ○ Slightly positive (3)
- ○ Neither positive nor negative (4)
- ○ Slightly negative (5)
- ○ Moderately negative (6)
- ○ Extremely negative (7)

Q19 Please indicate your attitude toward utilizing telemedicine for **emergency cases.**

- ○ Extremely positive (1)
- ○ Moderately positive (2)
- ○ Slightly positive (3)
- ○ Neither positive nor negative (4)
- ○ Slightly negative (5)
- ○ Moderately negative (6)
- ○ Extremely negative (7)

Page Break

Display This Question:

If Please indicate your attitude toward utilizing telemedicine for emergency cases. = Extremely positive

Or Please indicate your attitude toward utilizing telemedicine for emergency cases. = Moderately positive

Or Please indicate your attitude toward utilizing telemedicine for emergency cases. = Slightly positive

Q20 Briefly describe why your attitude towards utilizing telemedicine for emergency cases is positive.

_____

_____

_____

_____

_____

Display This Question:

If Please indicate your attitude toward utilizing telemedicine for emergency cases. = Slightly negative

Or Please indicate your attitude toward utilizing telemedicine for emergency cases. = Moderately negative

Or Please indicate your attitude toward utilizing telemedicine for emergency cases. = Extremely negative

Q21 Briefly describe why your attitude toward utilizing telemedicine for emergency cases is negative.

_____

_____

_____

_____

_____

Page Break

Display This Question:

If Do you/does your practice already utilize telemedicine? = No

Q22 How likely are you to adopt the use of telemedicine for your practice?

- ○ Extremely likely (13)
- ○ Moderately likely (14)
- ○ Slightly likely (15)
- ○ Neither likely nor unlikely (16)
- ○ Slightly unlikely (17)
- ○ Moderately unlikely (18)
- ○ Extremely unlikely (19)

Display This Question:

If Do you own a pet? = Yes

Q23 How likely are you to use telemedicine for your pet if applicable?

- ○ Extremely likely (13)
- ○ Moderately likely (14)
- ○ Slightly likely (15)
- ○ Neither likely nor unlikely (16)
- ○ Slightly unlikely (17)
- ○ Moderately unlikely (18)
- ○ Extremely unlikely (19)

Page Break

Display This Question:

If How likely are you to adopt the use of telemedicine for your practice? = Slightly unlikely

Or How likely are you to adopt the use of telemedicine for your practice? = Moderately unlikely

Or How likely are you to adopt the use of telemedicine for your practice? = Extremely unlikely

Q24 Please indicate why it is unlikely that you would utilize telemedicine for your practice.

_____

Display This Question:

If How likely are you to use telemedicine for your pet if applicable? = Slightly unlikely

Or How likely are you to use telemedicine for your pet if applicable? = Moderately unlikely

Or How likely are you to use telemedicine for your pet if applicable? = Extremely unlikely

Q25 Briefly indicate why it is unlikely that you would utilize telemedicine for your pet if it were applicable.

_____

Display This Question:

If How likely are you to use telemedicine for your pet if applicable? = Extremely likely

Or How likely are you to use telemedicine for your pet if applicable? = Moderately likely

Or How likely are you to use telemedicine for your pet if applicable? = Slightly likely

Or How likely are you to use telemedicine for your pet if applicable? = Neither likely nor unlikely

Q26 What is the average price you would be willing to pay for a Veterinary Telemedicine consultation? (Please answer in number-form; i.e. "40" for $40)

_____

End of Block: Telemedicine Block

Start of Block: Demographic Block

Display This Question:

If Are you a licensed veterinarian? = No

Q27 What is the highest level of education that you have achieved?

- ○ Some high school, no diploma (1)
- ○ High school graduate, diploma or the equivalent (for example: GED) (2)
- ○ Some college credit, no degree (3)
- ○ Trade/technical/vocational training (4)
- ○ Associate degree (5)
- ○ Bachelor's degree (6)
- ○ Master's/Professional/Doctorate degree (7)

Q28 What is your age?

_____

Q29 What is your average annual salary?

- ○ Less than $10,000 (1)
- ○ $10,000 to $19,999 (2)
- ○ $20,000 to $29,999 (3)
- ○ $30,000 to $39,999 (4)
- ○ $40,000 to $49,999 (5)
- ○ $50,000 to $59,999 (6)
- ○ $60,000 to $69,999 (7)
- ○ $70,000 to $79,999 (8)
- ○ $80,000 to $89,999 (9)
- ○ $90,000 to $99,999 (10)
- ○ $100,000 to $149,999 (11)
- ○ $150,000 or more (12)

Q30 What is your marital status?

- ○ Single, never married (1)
- ○ Married or domestic partnership (2)
- ○ Widowed (3)
- ○ Divorced (4)

Q31 Please specify your state of residence.

▼ Alabama (1) ... Wyoming (50)

Display This Question:

If Are you a licensed veterinarian? = Yes

Q32 Please specify the state in which you work.

▼ Alabama (1) ... Wyoming (50)

Q33 Please specify your ethnicity.

- ○ White (1)
- ○ Hispanic or Latino (2)
- ○ Black or African American (3)
- ○ Native American or American Indian (4)
- ○ Asian / Pacific Islander (5)
- ○ Other (6)

End of Block: Demographic Block