

The Internet and health information: differences in pet owners based on age, gender, and education

Lori R. Kogan, PhD; Regina Schoenfeld-Tacher, PhD; Ann R. Viera, MSLIS

See end of article for authors' affiliations.

DOI: <http://dx.doi.org/10.3163/1536-5050.100.3.010>

Objective: The research assessed the attitudes and behaviors of pet owners pertaining to online search behavior for pet health information.

Methods: A survey was conducted with a random sample of pet owners drawn from two US metropolitan areas and surrounding cities. Participating clinics were chosen randomly, and each participating clinic was asked to distribute 100 surveys to their clients until all surveys were disbursed.

Results: Although some perceptions and behaviors surrounding the use of the Internet for pet health

information differ based on gender, age, or education level of pet owners, there are many aspects in which there are no differences based on these demographics.

Conclusions: Results of the study suggest that closer examination of the common perception that gender, age, or education level has an effect on Internet behavior as it relates to veterinary medicine is required. Recommendations are made pertaining to the growing presence of the Internet and its impact on veterinary medicine.

INTRODUCTION

As of June 2010, more than 266,000 million (77%) North Americans had access to the Internet, representing a 146% growth rate from 2000–2010 [1]. Of this population, 80% have searched online for health information [2]. The Internet is the most widely used source for health information: 59% of adults report accessing health information online, compared to 55% who visit their health care provider and 29% who talk to relatives, friends, or coworkers [3].

Although much has been written regarding the use of the Internet in providing human health care information, very few studies to date have investigated pet owners' use of the Internet for veterinary health information. The limited studies that have been done in the area have found results similar to those of human medicine. A study by Hofmeister et al. found veterinary clients ranked the Internet as the third most likely source of information about pet health, behind general practitioners and veterinary specialists, but ahead of family or friends and other media sources [4]. A recent poll of veterinarians found that 39% reported that the availability of online information had improved animal care, and 67% reported that their clients frequently brought Internet information to their visits [5].

People are assuming more active roles in making health care decisions for themselves as well as family members [6, 7]. It has been suggested that patients' ability to discuss information found online with their doctors can increase confidence in their ability to manage their illness, make them more willing to ask questions, and lead to greater sense of responsibility, accountability, and self-efficacy [8].

For more in-depth background on Internet usage for human health information, as well as Internet usage for pet health information by pet owners in

Highlights

- Younger participants were more likely to use the Internet to obtain pet health information. No differences were found in the use of the Internet to obtain pet health information based on gender or education level.
- No demographical statistical differences were found in reasons for viewing online pet health information.
- Owners are most likely to check accuracy of online information by consulting their veterinarians.
- No demographic differences were found in participants' ability to locate pet health information online or their level of understanding.
- Most owners would likely follow through on professional recommendations for specific websites.

Implications

- Veterinarians can help clients by directing them to accurate, trustworthy sources of online pet health information.
- Veterinarians should consider collaborating with librarians who can provide expertise in identifying credible, reliable websites for pet health information.

general, the authors refer readers to a previously published study on the topic [9]. This study found that a majority of clients reported using the Internet for pet health information. Clients' use of the Internet was viewed primarily as an addition to traditional veterinary care, and most clients reported positive experiences when they discussed information they had found online with their veterinarians.

It is important, however, to explore whether these results differ based on pet owner demographics. Because Internet usage has been shown to differ based



Supplemental Appendixes A and B are available with the online version of this journal.

on age and education level [10], it was hypothesized that these aspects might influence pet owners' Internet usage for pet health information. This paper is, therefore, an exploration of these variables. Knowledge pertaining to differences in Internet usage based on demographics could help guide veterinarians as to how best to help specific client populations.

Results from this exploration should be important to librarians as well. Given their training as researchers and educators, librarians are in a unique position to offer veterinarians help in assisting clients with use of the Internet to locate information. This alliance between veterinarians and librarians is a natural extension of the relationship that currently exists between librarians and medical providers for humans. The desire for a closer relationship between the medical community and librarians has been voiced by both the Medical Library Association and the Consumer and Patient Health Information Section [11]. As stated by Seigel et al. [12], librarians as part of their outreach activities welcome the opportunity to collaborate with medical health providers. Extending these services to include veterinary medicine can provide benefits to veterinarians, as well as their clients and patients.

METHODS

A random sample of veterinarians and clients from 2 US metropolitan areas (and surrounding cities, selected for convenience) were surveyed for this study for approximately 3 months: January–March 2009. The clinics were chosen by selecting every 5th clinic in the telephone book from each city. This included all types of veterinary clinics (i.e., large animal, small animal, mixed, and exotics). No clinics were eliminated from this initial search. Each clinic that agreed to participate in the study was asked to distribute 100 surveys to their clients until all surveys were disbursed. Each participating clinic was given a total of 100 surveys, 50 of client survey form A and 50 of client survey form B (Appendixes A and B, online only). The client survey was divided into 2 parts to glean the most information from clients without creating too long a survey instrument and thereby reducing return rates. The client surveys A and B were alternated in the pile of surveys given to each clinic. To prevent selection bias, clinic staff members were instructed to ask all clients if they would like to participate in the study and to give the next available form to each client interested in completing the survey. All clients who frequented the clinics were asked to participate. No criteria for inclusion in the study were created except the willingness to complete the survey. The anonymous surveys could be returned via self-addressed stamped envelopes, so that clients could take them with them, or they could be left in sealed envelopes at the clinic. Surveys left at the clinic were returned in bulk after all surveys had been distributed. Each clinic was also asked to distribute the veterinarian survey to all their veterinarians. The number of veterinarian surveys sent to

each clinic was determined by the number of veterinarians at that clinic.

These surveys were created by the authors with input from community veterinarians, pet owners, and veterinarians at Colorado State University. After implementing initial feedback, soliciting further comments, and making additional changes, finalized versions of the surveys were constructed for the current study. An earlier analysis of survey findings was published in 2010 [9].

This study was approved by the Research Integrity & Compliance Review Office at Colorado State University and the Institutional Review Board at the University of Tennessee Knoxville. Statistics used in the study included: descriptive statistics, factor analyses (extraction method of principal component analysis and rotational method of varimax with Kaiser normalization), and one-way analyses of variance (ANOVAs). Three questions were assessed through factor analysis: pet health topics researched, reasons for accessing online pet health information, and feelings associated with viewing online pet health information. All other questions were analyzed through one-way ANOVAs. SPSS, version 16.0.1, was used for data analysis, and statistical significance level was set at $P < 0.05$.

RESULTS

Respondents

Thirty-one clinics from Knoxville, Tennessee, agreed to participate (from a total of 62 clinics contacted) and were sent a total of 3,100 client surveys (100 to each clinic; 50 of client survey A and 50 of client survey B). The researchers received 645 surveys (20.8%) from 28 clinics, 330 of survey A and 315 of survey B. Three clinics that originally indicated they would participate withdrew from the study.

Forty-three clinics from Denver, Colorado, and adjacent areas agreed to participate (from a total of 78 clinics contacted). Clinics that declined to participate most frequently cited reasons of lack of time or available resources. A total of 4,600 surveys were sent to these clinics (3 clinics indicated they would take an additional 100 client surveys due to their large size). The remainder of clinics received 100 surveys: 50 of client survey A and 50 of client survey B. A total of 1,042 client surveys (22.7%) were returned, 537 of survey A and 505 of survey B. There were no differences in demographics of participants based on location.

Demographics

A total of 867 client surveys A and 820 client surveys B were analyzed. The sample for survey A consisted of 641 (73.9%) female respondents and 206 (23.8%) males; 20 (2.3%) did not answer. Participants' reported ages were: 162 (18.7%) were 20–30 years of age; 158 (18.2%) were 31–40; 212 (24.5%) were 41–50; 196 (22.6%) were 51–60; 128 (14.8%) were over 60; and 11 (1.3%) did not answer. When asked about education level, 97 (11.2%) had some high school or general

educational development (GED); 276 (31.8%) had some college or a 2-year degree; 248 (28.6%) had a 4-year degree; 231 (26.6%) had a graduate degree; and 15 (1.7%) did not answer.

For survey B, respondents included 642 (78.3%) females and 167 (20.4%) males; 11 (1.3%) did not answer. Participants were asked about their age: 133 (16.2%) were 20–30 years of age; 173 (21.1%) were 31–40; 193 (23.5%) were 41–50; 204 (24.9%) were 51–60; 109 (13.3%) were over 60; and 8 (1.0%) did not answer. When asked about education level, 86 (10.5%) had some high school/GED; 239 (29.1%) had some college or a 2-year degree; 264 (32.2%) had a 4-year degree; 217 (26.5%) had a graduate degree; and 14 (1.7%) did not answer.

There were no statistical differences in demographics of respondents for survey A and survey B. These demographics are similar to those of US pet owners in terms of gender, age, and education level. In the United States, females are more likely to own pets than males (69% versus 55%). People age 35–46 are more likely to own a pet (70%) than other age brackets [13]. One difference in our population from the general pet owning population is education level. Our sample had a higher education level than the national average. Although pet ownership has been found to negatively correlate with education level, this was not felt to create any difficulties in the current study, because all participants were pet owners.

Participants' use of the Internet for pet health information

Among participants who reported using the Internet (815, 94.4%), the number of participants who reported using the Internet for pet health information at least weekly was 109 (13.4%); at least monthly was 197 (24.2%); less than once a month was 316 (38.8%); not at all 188 (23.1%); and 5 participants (0.6%) did not answer the question. There was a significant difference in reported use of the Internet for pet health information based on age ($F(4,1)=4.05, P=0.018$), in which younger participants (20–30) were more likely to use the Internet for this purpose than other age groups. There were no differences based on gender or education level. In contrast, differences were noted in reasons cited by participants for not using the Internet for pet health information based on their age and education level. Those over 60 were more likely to report being unfamiliar with the Internet than younger participants ($F(4,1)=6.64, P<0.000$). Participants with at least some college were more likely to report not having confidence in the Internet than those without some college ($F(3,1)=3.46, P=0.034$). To assess the behaviors and impact of the Internet on those using it to look for pet health information, only participants who reported using the Internet for pet health information were included in further analyses.

Pet health topics

Pet health topics were assessed by providing a checklist and asking pet owners to select any and all

Table 1
Factor analysis of pet health topics

Questionnaire item	Factors with Eigenvalues	
	Factor 1 (3.50)	Factor 2 (1.22)
Certain medical treatment or procedure	0.73	0.19
Alternative treatments or medicines	0.72	0.14
Specific disease or medical problem	0.69	0.24
Prescription or over the counter drugs	0.65	0.11
Experimental treatments or medicines	0.57	0.14
Exercise or fitness	-0.03	0.73
Wellness and prevention	0.17	0.69
Diet, nutrition, vitamins, and nutritional supplements	0.39	0.60
Behavioral issues	0.22	0.60
Vaccinations	0.21	0.58

Extraction method: principal component analysis. Rotational method: varimax with Kaiser normalization. Rotation converged in 3 iterations

pet health topics that they searched for online. The question read: "What pet health topics have you searched for online?" Options included specific disease or medical problem; certain medical treatment or procedure; experimental treatments or medicines; alternative treatments or medicines; diet, nutrition, vitamins, and nutritional supplements; exercise or fitness; wellness and prevention; prescription or over the counter drugs; vaccinations; behavioral issues; and information about a particular veterinarian or vet clinic.

Factor analysis with varimax rotation was conducted, resulting in 2 categories of pet health topics: disease and treatment (specific disease or medical problem, certain medical treatment or procedure, experimental treatments or medicines, alternative treatments or medicines, and prescription or over the counter drugs) and health and prevention (diet, nutrition, vitamins, and nutritional supplements; exercise or fitness; wellness and prevention; vaccinations; and behavioral issues) (Table 1). The variance explained was 46.02%. When assessing the pet health topics searched, there was a statistically significant difference for disease and treatment based on gender ($F(1,1)=5.77, P=0.017$) and education level ($F(3,1)=4.24, P=0.015$). Males were less likely to report searching for disease and treatment topics than females. Additionally, participants reported searching for disease and treatment more frequently as their education level increased. Those with some high school/GED were least likely and those with graduate degrees most likely to search for disease and treatment topics online. No differences based on age were found.

Search behaviors regarding the topics constituting health and prevention were not different based on gender or education, but were different based on age ($F(4,1)=8.64, P<0.000$) (no interactions between variables were significant). There was an inverse correlation between age and likelihood of searching for health and prevention topics, with the reported frequency of use declining as participants' age increased.

Table 2

Factor analysis of reasons to view pet health information on the Internet

Questionnaire item	Factors with Eigenvalues	
	Factor 1 (1.99)	Factor 2 (1.29)
	Factor loadings	
I want support from others with similar pet health issues or problems.	0.66	0.01
I want clarification or more information than that given to me by my veterinarian.	0.65	0.21
I am just curious about pet health information.	0.61	-0.14
To help me decide if I should schedule an appointment with my veterinarian.	0.58	0.04
I want a second opinion.	0.50	0.38
I do not agree with information provided by my veterinarian.	0.04	0.80
I do not believe information provided by my veterinarian.	0.00	0.78

Extraction method: principal component analysis. Rotational method: varimax with Kaiser normalization. Rotation converged in 3 iterations.

Reasons to view online pet health information

The reasons to access online pet health information were determined by asking participants to identify all that applied from a provided checklist. The question read: "Why do you look at pet health information on the Internet?" Potential answers included: I want a second opinion; I want clarification or more information than that given to me by my veterinarian; to help me decide if I should schedule an appointment with my veterinarian; I do not believe information provided by my veterinarian; I do not agree with information provided by my veterinarian; I am just curious about pet health information; and I want support from others with similar pet health issues or problems.

Factor analysis with varimax rotation was conducted, resulting in 2 categories pertaining to reasons why participants might view pet health information online were created (Table 2). The variance explained was 46.79%. The first category was labeled "more information" (I want a second opinion; I want clarification or more information than that given to me by my veterinarian; to help me decide if I should schedule an appointment with my veterinarian; I am just curious about pet health information; and I want support from others with similar pet health issues). The second category was labeled "disagree with veterinarian" (I do not believe information provided by my veterinarian; I do not agree with information provided by my veterinarian). No significant differences based on age, gender, or education were found for either category.

There were also no differences based on age, gender, or education on the frequency with which participants reported talking to their veterinarians about online information, how receptive they found their veterinarians to be regarding online information, or how frequently their veterinarians recommended Internet websites.

Likelihood of visiting recommended website

Participants were asked how likely they would be to visit a website recommended by their veterinarians. Most participants who use the Internet at all reported they would likely visit a website recommended by their veterinarians, whether told the name or address of a site (92.6%), given a written copy of the website name or address (95.3%), or shown the website home page on a computer at the veterinary clinic (85.4%). Significant differences based on gender ($F(1,1)=19.16$, $P<0.000$) and education ($F(3,1)=4.06$, $P=0.007$) were found when recommendations came in the form of veterinarians giving clients the name or address of the site. Females more frequently reported being very likely to visit recommended websites, as did participants with at least some college education. Pet owners with only a high school diploma/GED were less likely to visit recommended sites than those with higher levels of education. There was no difference based on age.

This same trend was found if veterinarians gave clients a written copy of the website name and address. Females ($F(1,1)=18.59$, $P<0.000$) and those with schooling beyond some high school/GED ($F(3,1)=3.80$, $P=0.010$) reported more frequently being very likely to visit the recommended sites (Table 3). These results remained constant, even if veterinarians were to show the website home page on a computer at the clinic. Females ($F(1,1)=8.01$, $P=0.005$) and higher educated clients ($F(3,1)=4.60$, $P=0.003$) more frequently reported being very likely to visit the website. Clients with some high school/GED were least likely to visit recommend sites (Table 4).

Emotions felt by pet owners while viewing online pet health information

Emotions felt by pet owners while viewing online pet health information were assessed by asking participants to indicate how frequently they experienced several common feelings. The list of emotions included: overwhelmed by the amount of information I found online, eager to share my new health or medical knowledge with others, confused by the information I found online, relieved or comforted by the information I found online, frustrated by a lack of information or an inability to find what I was looking for; confident to raise new questions or concerns about a health issue with my vet, frightened by the serious or graphic nature of the information I found online, and reassured that I could make appropriate health care decisions for my pet.

Factor analysis with varimax rotation resulted in 2 categories of emotions participants might experience when viewing pet health information online (Table 5). The variance explained was 43.18%. The first factor is negative emotions (overwhelmed, confused, and frustrated) and the second factor positive emotions (eager, relieved, confident, and reassured). There were no differences based on gender, age, or education for negative emotions or positive emotions felt while viewing online pet health information.

Table 3
One-way analysis of variance (ANOVA) for client compliance of website suggestions by gender

Options for website suggestions		Very likely		Likely		Neutral		Unlikely		Very unlikely		Don't know	
Told name or address of a particular website	Male	61	(48.0)	56	(44.1)	5	(3.9)	2	(1.6)	—		3	(2.4)
	Female	311	(66.9)	121	(26.0)	18	(3.9)	8	(1.7)	2	(0.4)	5	(1.1)
Given written copy of website name or address	Male	77	(61.6)	39	(31.2)	6	(4.8)	—		—		3	(2.4)
	Female	359	(77.7)	84	(18.2)	9	(1.9)	3	(0.6)	2	(0.4)	5	(1.1)
Shown website home page at clinic	Male	61	(50.8)	42	(35.0)	10	(8.3)	2	(1.7)	1	(0.8)	4	(3.3)
	Female	298	(65.1)	92	(20.1)	37	(8.1)	10	(2.2)	6	(1.3)	15	(3.3)

Ease of understanding and locating information online

When asked to rate how easy or difficult information online was to understand, no differences were found based on gender, age, or education. When asked how easy it was to find pet health information online, there was a statistical difference based on gender ($F(1,1)=4.63$, $P=0.032$), whereby female participants reported finding it easier to find online material than male participants. No differences were found for age or education.

Reliability and validity checks

When participants were asked how often they check the accuracy of the information they find online, 63.6% reported most of the time or almost always. The percentage of those who reported either hardly ever or never checking the accuracy was 14.4%. No differences based on age, gender, or education level were found. There were also no differences based on age, gender, or education level when participants were asked to indicate the ways in which they assess the accuracy of online information (e.g., discuss with veterinarian, compare information to other websites, compare information to non-Internet sources, and discuss with family or friends).

Potential Internet services offered by veterinarians

Inquiries pertaining to Internet services that pet owners would like to see offered by their veterinarian included the ability to make veterinary appointments, email short questions to their veterinarian, or have the opportunity for more extensive email contact with their veterinarian. There were no differences based on gender, age, or education for reported likelihood of using any of these Internet services. Most respondents reported "very likely" or "likely" to use advice from their veterinarian on how to effectively use the Internet to search for pet health information (74.5%), make appointments online (63.2%), consult with their veterinarian through email with short questions or topics (81.2%), or consult with their veterinarian through email regarding more extensive questions or topics (79.4%).

Sources of pet health information and trustworthiness

When participants were asked to rate how trustworthy they found several different sources of pet health

information, there were no differences in ratings based on age, gender, or education. All participants rated their veterinarian as the most trustworthy, followed by other pet owners with similar problems, family and friends, and then Internet websites. Blogs or discussion groups were rated lower than all other sources (i.e., television, magazines, newspapers, pamphlets or flyers, and radio).

DISCUSSION

This paper expands on the authors' previous publication [9] to explore differences in Internet usage for pet health information based on pet owners' gender, age, and education level. Although there are some differences, what is perhaps most striking are the similarities in behaviors and perceptions among respondents, regardless of age, gender, or education level.

Younger participants were more likely to report using the Internet for pet health information, yet 72.8% of participants over 30 years of age reported some usage of the Internet for pet health information. When the type of information searched for was assessed, women and those with more education were more likely to search for disease and treatment topics, and younger participants were more likely to report searching for health and prevention topics.

When determining why pet owners might view pet health information online, there were no differences found for the categories of more information or disagree with veterinarian. This provides some support for the hypothesis that Internet use for pet health information is not intended to undermine the veterinarian-client relationship. In fact, when asked about ways in which pet owners checked the accuracy of online pet health information, discussion with their veterinarian was selected most frequently, with more than 60% of respondents indicating they used their veterinarian-client relationships for this purpose.

There were also no differences based on age, gender, or education level found for frequency that participants reported talking to their veterinarians about online information and receptivity of their veterinarians to online information or frequency that they reported that their veterinarians recommended Internet websites. Additionally, no differences in emotions when viewing online pet health information, either positive emotions or negative emotions, were identified based on gender, age, or education

Table 4
One-way ANOVA for client compliance of website suggestions by education

Options for website suggestions		Very likely		Likely		Neutral		Unlikely		Very unlikely		Don't know	
Told name or address of a particular website F (3,1)=4.06, P=0.007	High school/GED	26	(51.0)	16	(31.4)	3	(5.9)	2	(3.9)	1	(2.0)	3	(5.9)
	Some college	116	(60.7)	60	(31.4)	9	(4.7)	2	(1.0)	1	(0.5)	3	(1.6)
	4-year degree	125	(68.3)	50	(27.3)	6	(3.3)	2	(1.1)	—	—	—	—
Given written copy of website name or address F (3,1)=3.80, P=0.010	Graduate degree	108	(62.1)	53	(30.5)	6	(3.4)	4	(2.3)	—	—	3	(1.7)
	High school/GED	30	(58.8)	12	(23.5)	5	(9.8)	—	—	1	(2.0)	3	(5.9)
	Some college	139	(73.5)	39	(20.6)	6	(3.2)	1	(0.5)	1	(0.5)	3	(1.6)
Shown website home page at clinic F (3,1)=4.60, P=0.003	4-year degree	138	(75.8)	41	(22.5)	3	(1.6)	—	—	—	—	—	—
	Graduate degree	132	(77.2)	33	(19.3)	2	(1.2)	2	(1.2)	—	—	2	(1.2)
	High school/GED	22	(44.9)	15	(30.6)	4	(8.2)	1	(2.0)	3	(6.1)	4	(8.2)
	Some college	120	(64.2)	40	(21.4)	12	(6.4)	5	(2.7)	2	(1.1)	8	(4.3)
	4-year degree	117	(65.4)	42	(23.5)	14	(7.8)	2	(1.1)	1	(0.6)	3	(1.7)
	Graduate degree	103	(60.9)	39	(23.1)	18	(10.7)	4	(2.4)	1	(0.6)	4	(2.4)

level, nor were any differences noted in behaviors surrounding checking for reliability and validity of sites. All participants rated their veterinarians as the most trustworthy source of information on pet health, while Internet sites came in a distant fourth.

Although female pet owners and those with more education were more likely to visit websites that their veterinarians recommended, the majority of all participants reported they would follow through on veterinary recommendations of this nature. When questioned about interest level in Internet services offered by their veterinarian, no differences in age, gender, or education were found. Most participants reported interest in online services that could be offered by their veterinarians.

CONCLUSION

Although there are some areas in which age, gender, and education appear to impact behavior surrounding online searches for pet health information, these differences seem to be the exception rather than the norm. Regardless of age, gender, or education level, most participants report using the Internet for pet health information in a similar fashion.

Just as it can be a disservice to make assumptions regarding clients' ability or willingness to pay for medical care based on perceptions or stereotypes, the

same is true when evaluating clients' use of the Internet. Results of this study indicate that most clients, with a few exceptions, are equally receptive to using the Internet to search for pet health information as well as online services provided by their veterinarian.

Because most clients report they would follow up on recommendations for specific websites, this provides an opportunity for veterinarians to take a more active role in directing clients toward valid, accurate online information. In addition to website referrals, veterinarians can benefit from expanding their online services to include the ability to make appointments online, answer short questions that do not necessitate an office visit, and learn more about how to effectively use the Internet to search for pet health information. It might also be helpful for veterinarians to provide a list of links to recommended Internet sites, known to contain accurate and reliable information (e.g., American Veterinary Medical Association website, Veterinary Partner, etc.). Clients could then be directed to these links either before or after appointments, as an adjunct form of client education that would enhance the information provided by practitioners. Collaboration with librarians could help veterinarians identify appropriate websites. Librarians, with their background as educators and experts in information gathering and sharing processes, are an often overlooked resource for

Table 5
Factor analysis of reported emotions while viewing pet health information on the Internet

Questionnaire item	Factors with Eigenvalues	
	Factor 1 (2.36)	Factor 2 (1.90)
	Factor loadings	
Confused by the information I found online.	0.83	0.03
Overwhelmed by the amount of information I found online.	0.76	0.07
Frightened by the serious or graphic nature of the information I found online.	0.65	0.12
Frustrated by a lack of information or an inability to find what I was looking for.	0.61	-0.03
Reassured that I could make appropriate health care decisions for my pet.	-0.19	0.77
Relieved or comforted by the information I found online.	-0.01	0.75
Confident to raise new questions or concerns about a health issue with my vet.	0.17	0.71
Eager to share my new health or medical knowledge with others.	0.19	0.64

Extraction method: principal component analysis. Rotational method: Varimax with Kaiser normalization. Rotation converged in 3 iterations

veterinarians. One option for collaboration might involve cohosting workshops for the general public on effective Internet search techniques for pet health information. This could be an effective practice-building tactic for veterinarians and would remind the general public of the role librarians play as information resources.

The fact that clients desire information from their veterinarians on how to be better online consumers is encouraging: it means that veterinarians can assume a more active role in driving online searching behavior of their clients. As recommended by Hofmeister et al. [4] and others [8, 14, 15], veterinarians should be prepared to discuss online information that clients bring to appointments, creating an opportunity to educate. In fact, veterinarians are urged to be proactive and encourage their clients to talk about the information they find online. Given the fact that the number of clients who come to veterinary appointments with Internet material can only be expected to increase, it is paramount that veterinarians take a leadership position in shaping these experiences and making them positive for everyone involved. This is especially true given the reported impact of the Internet in the Bayer health care study. The Bayer study was designed to assess the trends in the number of patient visits over time, identify factors responsible for these trends, and identify things that veterinarians could implement to increase veterinary visits [16]. This study reported that 15% of pet owners indicated that they relied less on their veterinarians with the use of the Internet [16]. While the current study did not replicate these findings, it should be noted that our sample consisted of pet owners at veterinary clinics, while the Bayer study sampled overall pet owners. Clearly, however, the Internet is changing the field of veterinary medicine and offers the opportunity for veterinarians to take an active role in shaping the future of the profession. As emphasized in the Bayer study, clients expect their veterinarians to embrace the Internet and use it in a multitude of ways to enhance animal health [16].

There are some limitations to this study that suggest generalizing these results should be done with caution. Two metropolitan areas and surrounding towns were surveyed, and this population might not represent all pet owners in the United States. Additionally, the survey was distributed by veterinary clinics, so our sample consisted of pet owners invested enough in their pets' health to seek out services. It is possible that pet owners who do not seek out veterinary care differ in their online pet health search behaviors as suggested by the Bayer health care study [16].

It is clear that the use of the Internet for health information, and pet health information in particular, will continue to grow. Veterinarians can take a proactive role in this process by helping clients obtain accurate information and, as a result, positively impact client-veterinarian relationships and pets' health. As the use of the Internet expands, it will behoove veterinarians to use practices to harness its

power for supplementing veterinary services and enhancing client education.

ACKNOWLEDGMENTS

The authors acknowledge the help of Allen Simon in data collection.

REFERENCES

1. World Internet Usage and Population Stats. Internet world stats [Internet]. Miniwatts Marketing Group; 2001–2011 [cited 31 May 2011]. <<http://www.Internetworldstats.com/stats.htm>>.
2. Fox S. The social life of health information, 2011 [Internet]. Pew Internet & American Life Project: A Project of the Pew Research Center; 12 May 2011 [cited 31 May 2011]. <<http://www.pewInternet.org/Reports/2011/Social-Life-of-Health-Info.aspx>>.
3. Elkin N. How America searches: health and wellness [Internet]. Scottsdale, AZ: ICrossing; Jan 2008 [cited 30 Apr 2010] <<http://www.icrossing.com/sites/default/files/how-america-searches-health-and-wellness.pdf>>.
4. Hofmeister EH, Watson V, Snyder LB, Love EJ. Validity and client use of information from the World Wide Web regarding veterinary anesthesia in dogs. *J Am Vet Med Assoc*. 2008 Dec 15;233(12):1860–4.
5. Digital clinic study [Internet]. Fleishman-Hillard International Communications; 18 Feb 2008 [cited 30 Apr 2010]. <http://www.avma.org/reference/digital_clinic_survey_report.pdf>.
6. Abrahamson JA, Fisher KE, Turner AG, Durrance JC, Turner TC. Lay information mediary behavior uncovered: exploring how nonprofessionals seek health information for themselves and others online. *J Med Lib Assoc*. 2008 Oct;96(4):310–23. DOI: <http://dx.doi.org/10.3163/1536-5050.96.4.006>.
7. Lee CJ. Does the Internet displace health professionals? *J Health Commun*. 2008 Jul–Aug;13(5):450–64.
8. Lo B, Parham L. The impact of Web 2.0 on the doctor-patient relationship. *J Law Med Ethics*. 2010 Spring; 38(1):17–26.
9. Kogan LR, Schoenfeld-Tacher R, Simon AA, Viera AR. The Internet and pet health information: perceptions and behaviors of pet owners and veterinarians. *Internet J Vet Med* [Internet]. 2010;8(1), [cited 31 May 2011]. <<http://www.ispub.com/journal/the-internet-journal-of-veterinary-medicine/volume-8-number-1/the-internet-and-pet-health-information-perceptions-and-behaviors-of-pet-owners-and-veterinarians.html>>.
10. Pew Research Center. Demographics of Internet users [Internet]. Pew Internet & Life Project: A Project of the Pew Research Center; 12 May 2011 [cited 2011 Dec 7]. <<http://www.pewInternet.org/Static-Pages/Trend-Data/Whos-Online.aspx>>.
11. MacDonald SL, Winter T, Luke R. Roles for information professionals in patient education: librarians' perspective. *Partnership: Canad J Lib Inform Pract Res* [Internet]. 2010;5(1) [cited 31 May 2011]. <<http://journal.lib.uoguelph.ca/index.php/perj/article/viewArticle/1153>>.
12. Siegel ER, Logan RA, Harnsberger RL, Cravedi K, Krause JA, Lyon B, Hajarian K, Uhl J, Ruffin A, Lindberg DA. Information Rx: evaluation of a new informatics tool for physicians, patients, and libraries. *Inf Serv Use*. 2006;(1), 26:1–10.
13. Marketing Charts. 3 in 5 Americans own pets [Internet]. Watershed Publishing Publications; 14 Jun 2011 [cited 7 Dec

- 2011]. <<http://www.marketingcharts.com/direct/3-in-5-americans-own-pets-17938/harris-pet-ownership-june-2011jpg/>>.
14. Trevejo RT. Public health for the twenty-first century: what role do veterinarians in clinical practice play? *Vet Clin North Am Small Anim Pract.* 2009 Mar;39(2): 215–24.
15. Bernardo TM. New technology imperatives in medical education. *J Vet Med Educ.* 2003 Winter;30(4): 318–25.
16. Bayer veterinary care usage study: the decline of veterinary visits and how to reverse the trend [Internet]. Bayer HealthCare, Animal Health; 2011 [cited 31 May 2011]. <<http://www.bayer-ah.com/nr/45.pdf>>.

AUTHORS' AFFILIATIONS

Lori R. Kogan, PhD, Lori.kogan@colostate.edu, Associate Professor; **Regina Schoenfeld-Tacher, PhD**, Regina.Schoenfeld@colostate.edu, Assistant Professor; Colorado State University, 1601 Campus Delivery Fort Collins, CO 80523; **Ann R. Viera, MSLIS**, annviera@utk.edu, Research Services Librarian for Veterinary Medicine, Pendergrass AG-VET MED Library, University of Tennessee, 2407 River Drive, Knoxville, TN 37996-4541

Received September 2011; accepted January 2012