

# Veterinarians' Use and Perceptions of Information and Communication Technologies

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## Abstract

In order to better understand how information and communication technologies (ICT) are used in veterinary practice settings, 967 veterinarians were surveyed through VIN (Veterinary Information Network). The most commonly used ICTs were the telephone and e-mail. Younger participants were more comfortable using text messaging, Skype, Facebook and blogging than older veterinarians. Most participants reported that their clinic requires a physical exam prior to electronic or phone consultations, and stated that they spent 1-5 hours per week providing these consultations, which are usually not billed to clients. Veterinarians under 39 years of age were least likely to report engaging in consultations after hours or on weekends. Veterinarians over 60 years of age were more likely to endorse the use of electronic or phone consultations for common clinical scenarios than their younger counterparts. Older veterinarians also endorsed the use of remote sensing devices to monitor patient health more frequently than their younger counterparts.

**Keywords:** veterinary practice, telemedicine, remote sensing devices, alternate modes of communication.

## 1. Introduction

Communication within health care is a critical determinant of quality of care, health outcomes and patient satisfaction (Lee et al., 2015). Communication skills in veterinary medicine have been a topic of ever growing focus and attention, in part initiated by the KPMG study reporting that veterinarians felt underprepared in the areas of management and communication upon graduating from veterinary school (Brown & Silverman, 1999). Yet, this awareness has been slow to translate into improved practice outcomes. Russell (1994) reported, for example, that most client complaints to regulatory bodies are related to poor communication.

Communication and the need to be able to clearly express oneself only continue to increase in complexity as types, modes and frequency of communication are all rapidly changing. Due to the prevalence of pet health information online (Kogan, 2010, 2012) veterinary clients today are increasingly informed and want to be actively involved in their pets' care; they have different expectations than in the past, when medicine was less of a collaborative team effort. These changes add to the responsibilities veterinarians have in addressing questions and providing adequate client education (Blackwell, 2001). It has been suggested that today's fast-paced, highly technical medical world no longer lends itself to the traditional hierarchical approach to veterinary practice, in which a content expert, the veterinarian, unilaterally

dispensed information and treatment to a passive animal owner (Burns, Ruby, Debowes, Seaman, & Brannan, 2006).

In an effort to better understand, teach and practice good communication skills, three broad types of communication skills have been identified: content skills, process skills, and perceptual skills (Kurtz, 2002). Content can be defined as the "what" doctors communicate, while process relates to the "how" doctors communicate - through both verbal and nonverbal means. Lastly, perceptual skills as they relate to communication include cognitive skills such as problem solving and critical reasoning as well as interpersonal skills (i.e., awareness of others, self-awareness, and personal attitudes and biases). All three of these areas - content, process, and perceptual skills - contribute to the overall efficacy of communication and are all impacted by changes in how we communicate with one another (Kurtz, 2002).

How we use each of these areas of communication is quickly changing, and perhaps nowhere is this more evident than in the medical field. Information and Communication Technology (ICT), which encompasses the tools that facilitate communication, processing and transmission of information by electronic means for the purpose of improving health, is rapidly evolving. ICT is seen by many as a powerful tool that plays an increasingly important role in improving health related access and quality of services for the public (Lindberg,

Nilsson, Zotterman, Söderberg, & Skär, 2013).

Telehealth is a component of ICT. Veterinarians have been practicing telehealth; which can be defined as the use of electronic information and communication technologies to assist practitioners in providing clinical care when separated by a distance – perhaps long before it was labeled as such. (Mars & Auer, 2006). The new world of connectivity enables most people to use readily available technological resources to increase medicine's reach beyond the confines of the doctor's office and the hospital, empowering patients and clients, and actually changing how health care is delivered (Landro, 2015).

Technological advances over the past few decades have opened more avenues through which patients and physicians can interact with one another; among them, email and social media are potential channels to enhance communication (Lee et al., 2015). Given the ubiquity of connectivity among most individuals in the US, is it perhaps not surprising that a large percentage of individuals use the internet and other tools to support and enhance their own health care as well as that of their family, including their pets. In 2015, 84% of all US adults used the Internet, with younger adults being the most common users. Yet, the rate of adoption is most rapidly increasing among older adults. (Perrin & Duggan, 2015).

Engaging in social media is now the most popular activity on the internet (Tassava, 2011). Social media platforms help facilitate communication and information sharing within a public forum, and are designed to make it easy to share content and communicate with family and friends (Boyd, 2007; Kogan, Hellyer, Stewart, & Dowers, 2015) and thereby provide another set of tools medical health providers can use to connect with clients and patients.

By far, the most popular social media outlet is Facebook. Facebook accounts for about 75% of the time people spend on social networking sites (Duggan & Smith, 2013; Duggan, Ellison, Lampe, Lenhart, & Madden, 2015a; Duggan, Ellison, Lampe, Lenhart, & Madden, 2015b; Nabi, Prestin, & So, 2013; Wilson, Gosling, & Graham, 2012).

Internet users are increasingly turning to the Web and social media for health related information. As of Sept 2013, 72% of Internet users reported using the Internet for health information within the past year (Pew Research Center, 2015). Kogan et al. (2012) found that 13.4% of Internet users who own pets use the Internet to search for pet health information at least weekly and an additional 24.2% search at least monthly. The most common reasons reported by clients for online pet health information searches are curiosity (47.4%) or the desire for clarification of information given by their veterinarian (33.6%) (Kogan, Schoenfeld-

Tacher, Simon, & Viera, 2010). Preliminary studies suggest that pet owners view the Internet as a supplement to their veterinarian's advice rather than a replacement (Kogan et al., 2010; Kogan et al., 2012; Kogan, Schoenfeld-Tacher, Gould, Viera, & Hellyer, 2014). In addition to the internet and social media, more people of all ages are using alternative forms of communication to access health information or communicate with their health care providers. For example, 62% of smartphone owners have used their phone to obtain health information in the past year (Anderson, 2015).

Although there continues to be debate about whether online communication through email, messaging, or social media has strengthened or weakened relationships, Internet users report feeling these tools have positively influenced their ability to stay connected with family and friends. Close to two thirds (67%) of internet users say their online communication with family and friends has generally strengthened those relationships, with no significant demographic differences based on gender, age, socioeconomic level, or education level (Fox & Rainie, 2014). It is not surprising then that many people have indicated they want these additional avenues of communication available from their veterinarian. An earlier study, (Kogan et al., 2010) found that the vast majority of clients reported that if given the option, they would likely email their veterinarian short

questions (81.2%); as part of their pets' treatment (79.4%), or make appointments (63.2%).

Email is nearly ubiquitous. A recent study evaluating how smartphone owners use their devices over the course of a week found that nearly all owners had used their phones for email (91% of those 18-29, 87% of those 30-49, and 87% of those 50 and older) (Smith, 2015). Yet, for some age groups, texting is quickly replacing email. Within a 7 day period, smart phone owners reported texting quite often, with younger owners reporting a slightly higher tendency to text at least once over the course of a week than older owners (100% of owners 18-29, 98% of owners 30-49, and 92% of those 50 and older) (Smith, 2015).

Physicians have long made the decisions on when and how to communicate with patients. Patients have traditionally had to wait for a callback to obtain their test results, or make another appointment to ask follow-up questions (McClintick, 2014). That model is quickly changing among forward-thinking clinicians who are increasingly communicating in ways that respond to patients' desire for quicker information, facilitated by new secure technology that allows healthcare providers to connect with patients by text message while complying with HIPAA (Health Insurance Portability and Accountability Act) regulations (McClintick, 2014).

In addition to email and texting, the use of mobile applications has increased dramatically in recent years, with adults 18-34 years of age spending approximately 74 hours per month using mobile apps, and older users not far behind (64 hours a month for those 35-54 and 50 for users age 55 and older) (Lella, 2014). Less common, but still used within medical settings is video conferencing, with Skype by far the most popular technology. Currently, 19% of American adults have used video conferencing, representing 23% of all internet users. Younger internet users are considerably more likely to conduct video calls, with 29% of internet users ages 18-29 reporting participation in video calls or chats or teleconferences, compared with 15% of internet users age 65 or older (Rainie & Zickuhr, 2010).

The world of clinical mobile applications in veterinary medicine is just beginning to expand. These apps can be individualized and often include: a hospital icon or picture, forms, information, ability to make appointments and order food and medicine, post pictures, and access to pet health information. Other commonly available features include lists of local pet friendly hotels, direct links to social media (e.g. Pinterest, Facebook, and Twitter) and the ability to check on hours and emergency information.

Lastly, one more common use of the internet is blogging, with more people choosing to blog about events and concerns

on a variety of topics, including pet related issues. Blogging is most commonly done by younger internet users: bloggers in the 21-to-35 year-old demographic group account for 53.3% of the total blogging population, followed by those 20 and under (20.2%), then 36-to-50 year-olds (19.4%) while those 51 and older only make up 7.1% (Levine, 2010).

Because of the proliferation and use of information online and the widespread use of the Internet and Web communication platforms, health care providers are facing new challenges on how to meet the demands of their patients and clients while also ensuring privacy and confidentiality of patient information and establishing appropriate boundaries. To protect individual patients while also promoting quality health care, it is critical to strike the proper balance between endorsement of new communication technologies and the need to proceed with caution to due to inherent challenges in using technology (Farnan et al., 2013).

Social media can be a powerful tool to motivate patients to be more active participants in their healthcare. However, because of confidentiality rules in the HIPAA and potential medical-legal repercussions, the medical community must be cautious when engaging with social media (Pillow et al., 2014). Healthcare is a profession that is dependent on establishing trust and credibility — yet social media has the potential to undermine trust or

professionalism almost immediately. It is partly for this reason that the Federation of State Medical Boards specifically discourages physicians from “interacting with current or past patients on personal social networking sites such as Facebook.” (Special Committee on Ethics and Professionalism, 2014, p.7). Additionally, the American Medical Association strongly suggests that physicians distinguish their public and professional digital identities (Song, 2014).

It is then perhaps not surprising that compared to other industries, the medical profession has been late in recognizing the many benefits of social media. Recent studies in human medicine have reported mixed views of the inclusion of new forms of communication (Lee et al., 2015). Veterinarians are experiencing many of the same pressures as physicians regarding clients' expectations about communication techniques and timing. Therefore, we felt it important to assess the current views of practicing veterinarians in regards to new technologies that are impacting how veterinary medicine is practiced.

## **2.1 Materials and Methods**

In collaboration with the Veterinary Information Network (VIN), an anonymous on-line survey was created to evaluate practicing veterinarians' perceptions and use of new ICT (compared to traditional methods such as the telephone) to

communicate and consult with clients. The survey was constructed by the research team of veterinarians and social scientists and piloted among veterinarians in private practice and academia to assess face validity. The survey was distributed to all VIN members from 6/1/2015-7/6/2015 and included questions about the type of practice and respondents' age as well as personal and clinic use of alternative forms of communication (e.g., email, texting, Facebook, mobile apps, teleconferencing, website postings, and blogging) to stay connected with clients or provide consultation. Participants were also asked to indicate their comfort level with these ICTs and how they feel they compare to the telephone.

Additional survey questions included views on the need to conduct a physical exam prior to electronic or phone consultation, the amount of time spent consulting, and whether participants feel electronic or phone consultations are appropriate for a variety of common scenarios. Lastly, participants were asked general opinion questions about the use of remote sensing devices to monitor patients' vitals, and their views about using new technologies in veterinary consultations.

## **2.2 Statistical Analysis**

Descriptive statistics and frequency distribution (reported in percentages) were performed using commercially available

software (IBM SPSS Statistical software, version 21). Age was stratified into 3 groups: 20-39, 40-59, and 60 and older. Chi Square was used to detect differences in responses based on age. Differences were considered significant when  $p < .05$ .

### 3.1 Results

The on-line survey was distributed to all VIN members (most residing in the United States ( $n = 46,481$ ) in 2 emails, sent 2 weeks apart; 967 veterinarians who indicated they were in private practice completed the survey. Not all survey questions received a response; therefore, the number responding to that particular question is indicated for each question in the text and tables. The majority of participants were in a small animal exclusive practice (706, 73%), followed by small animal predominant (116,

12.0%) and companion animal exclusive practice (80, 8.3%). The remainder were in mixed practice (30, 3.1%), companion animal predominant (18, 1.9%), exotics (11, 1.1%), or equine practice (6, 0.6%). Of those who reported age, 337 (35.4%) were 20-39; 501 (52.6%) were 40-59; and 129 (13.3%) were 60 or older.

### 3.2 Information and Communication Technologies (ICTs).

Participants were asked how often their clinics use a variety of ICTs to stay either *stay connected* or *consult* with clients. The most common responses for both functions were the telephone, followed by email, as shown in Table 1. Facebook and clinic websites were also frequently cited as methods to stay in contact with clients.

Table 1. ICT use by clinics.

		n	Less than weekly	At least weekly but less than daily	Daily or more
<b>To stay connected with clients</b>					
	Telephone	956	20 (2.1)	34 (3.6)	902 (94.4)
	E-mail	950	242 (25.5)	259 (27.3)	449 (47.3)
	Facebook	953	345 (36.2)	378 (39.7)	230 (24.1)
	Clinic website/blog	952	470 (49.4)	253 (26.6)	229 (24.1)

	Texting	952	568 (59.7)	199 (20.9)	185 (19.4)
	Clinic specific mobile app	950	863 (90.8)	37 (3.9)	50 (5.3)
	Electronic newsletters/announcements	952	910 (95.6)	39 (4.1)	3 (0.3)
	Skype	951	940 (98.8)	10 (1.1)	1 (0.1)
<b>To provide consultation with clients</b>					
	Telephone	954	168 (17.6)	133 (13.9)	653 (68.4)
	E-mail	949	508 (53.5)	233 (24.6)	208 (21.9)
	Skype	951	943 (99.2)	4 (0.4)	4 (0.4)
	Texting	954	767 (80.4)	120 (12.6)	67 (7.0)

When participants were asked to indicate their personal comfort level with a variety of ICTs, (other than the telephone) they reported feeling most comfortable with email and text messages. Table 2 describes significant differences in comfort level with

text messaging, Facebook, skype/videoconferencing, and blogging based on age with older participants reporting feeling less comfortable than younger participants.

Table 2. Communication modes: Comfort level.

	n	Uncomfortable	Neutral	Comfortable	Chi Square, p value (age)
Email	965	37 (3.8)	23 (2.4)	905 (93.8)	
Texting	964	81 (8.4)	44 (4.6)	839 (87.0)	14.14, p .007
Facebook	958	203 (21.2)	117 (12.2)	638 (66.6)	50.92, p <.000



Mobile applications	960	195 (20.3)	200 (20.8)	565 (58.9)	
Skype	957	278 (29.0)	246 (25.7)	433 (45.2)	29.69, $p < .000$
Website postings	956	321 (33.6)	233 (24.4)	402 (42.1)	
Blogging	959	427 (44.5)	322 (33.6)	210 (21.9)	27.77 $p < .000$

Participants were asked several questions related to consulting, including how often they charge for consultations. As

indicated in Table 3, most veterinarians reported never charging for consultations, regardless of modality used.

*Table 3. Charges for consultation: Users only.*

	<b>n</b>	<b>Never charge</b>	<b>Charge less than 10% of time</b>	<b>Charge 11-25% of time</b>	<b>Charge 26-50% of time</b>	<b>Charge 51-75% of time</b>	<b>Charge &gt;75% of time</b>	<b>Always charge</b>
Telephone	892	780 (87.4)	83 (9.3)	12 (1.3)	4 (0.4)	1 (0.1)	6 (0.7)	6 (0.7)
Email	834	783 (93.9)	30 (3.6)	11 (1.3)	3 (0.4)	3 (0.4)	1 (0.1)	3 (0.4)
Skype	645	638 (98.9)	3 (0.5)	--	1 (0.2)	--	--	3 (0.5)
Texting	741	725 (97.8)	10 (1.3)	4 (0.5)	--	--	--	2 (0.3)

When asked if their clinic requires a physical exam prior to electronic or phone consultation with an existing client (n=923) 283 (30.7%) reported yes, always; 430 (46.6%) reported yes, sometimes and 210 (22.8%) reported no. When asked the same question for new clients (n=926), 664 (71.7%) reported yes, always; 157 (17.0%)

reported yes, sometimes; and 105 (11.3%) reported no.

Participants were asked to indicate how appropriate they felt electronic or phone consultations would be after performing a physical exam, for several common scenarios. The scenarios felt to be most appropriate were immediate post-surgery follow up, follow up after routine

vaccinations, management of diabetic patients and nutritional counseling. Chi Square analyses, shown in Table 4, found that older participants were more likely to

report several scenarios as almost always or always appropriate for electronic or phone consultations when compared to younger participants.

*Table 4. Appropriateness of electronic or phone consultations for common scenarios (after a physical exam).*

	<b>n</b>	<b>Never/ seldom</b>	<b>Occasionally/ frequently</b>	<b>Almost always or always</b>	<b>Chi square, p value</b>
Immediate post-surgery follow up	908	23 (2.5)	202 (22.2)	683 (75.2)	
After routine vaccinations	903	65 (7.2)	363 (40.2)	475 (52.6)	10.78, <i>p</i> .029**
Management of diabetic patients	903	44 (4.9)	456 (50.5)	403 (44.6)	16.22, <i>p</i> .003*
Nutritional counseling	903	31 (3.4)	476 (52.7)	396 (43.9)	
Acute pain management	902	262 (29.0)	367 (40.7)	273 (30.3)	41.54, <i>p</i> .000*
Chronic pain management	904	64 (7.1)	537 (59.4)	303 (33.5)	18.03, <i>p</i> .001*
New puppy or kitten counseling	899	148 (16.5)	484 (53.8)	267 (29.7)	15.22, <i>p</i> .004*

Management of dermatological problems	903	214 (22.1)	473 (52.4)	216 (23.9)	26.64, <i>p</i> .000*
Behavior training/modification	899	126 (14.0)	535 (59.5)	238 (26.5)	17.38, <i>p</i> .002*
*those 60 and older more likely to feel electronic or phone consultations almost or always appropriate					
** those 60 and older less likely to feel electronic or phone consultations almost or always appropriate					

Veterinarians were asked to indicate how many hours they spend doing phone consultations in an average week (see Table 5). The largest percentage reported 1-5 hours (441, 49.2%). This result was similar for

those who reported using other methods (e.g., email, text messaging or skype) for consultations (1-5 hours reported by 538, 70.3%) no significant differences were found based on age.

Table 5. Hours per week spent conducting consultations.

	<b>Phone (n=896)</b>	<b>E-mail, texting or skyping (n= 765)</b>
None/NA	30 (3.3)	91 (11.9)
1-5	441 (49.2)	538 (70.3)
6-10	295 (32.9)	97 (12.7)
>10	130 (14.5)	39 (5.1)

The time frame for conducting consultations was assessed by asking what percentage are done after hours or on

weekends (n=897). The largest percentage reported 1-10% (336, 37.5%), followed by more than 20% (253, 28.2%), none (187,

20.7%), and 11-20% (121, 13.5%). There was a significant difference based on age ( $X^2 = 18.18, p = .006$ ). A larger number of younger veterinarians reported none, and fewer younger veterinarians reported more than 20%.

When participants were asked to indicate their level of agreement with several statements regarding consulting with new

technologies such as email, text, and video chat software, the only area with differences based on participants' age was the statement regarding whether these new technologies are consistent with the recent emphasis on preventive health care in dogs and cats (see Table 6). Participants between 20-39 years of age, and those 60 and older agreed with this statement more often than those 40-59 years old ( $X^2 = 10.97, p = .027$ ).

*Table 6. Agreement level with statements about consulting with new technologies.*

	<b>n</b>	<b>Disagree</b>	<b>Neutral</b>	<b>Agree</b>
They can be used to strengthen the veterinary-client-patient-relationship	864	32 (3.7)	89 (10.3)	743 (86.0)
They are in conflict with the veterinary practice act in my state	859	397 (46.2)	400 (46.6)	62 (7.2)
They are consistent with the recent emphasis on preventive health care in dogs and cats	858	49 (5.7)	259 (30.2)	550 (64.1)
They could be a valuable tool in small animal practice and consulting	861	42 (4.9)	114 (13.2)	705 (81.9)
They are valuable tools in large animal practice and consulting	844	22 (2.6)	429 (50.8)	393 (46.6)

Clients would be willing to pay for consultations and advice delivered electronically from their veterinarian	865	454 (52.5)	239 (27.6)	172 (19.9)
They are the wave of the future	864	88 (10.2)	272 (31.5)	504 (58.3)

When asked about their preference for alternative forms of communication compared to the phone, among those who did use these alternative sources, only email was viewed as better than the phone. Table 7 shows video conferencing and texting were

viewed less favorably than the phone. Email preference was significantly different though, based on age, with younger veterinarians more likely to say they like using email better than the phone ( $X^2 = 14.60, p = .006$ ) (see Table 8).

*Table 7. Preference for alternative forms of communication as compared to phone correspondence (users only).*

	<b>n</b>	<b>Like phone better</b>	<b>Same as phone</b>	<b>Like this form better than phone</b>
Email	903	330 (36.5)	134 (14.8)	439 (48.6)
Skype	167	131 (78.4)	28 (16.8)	8 (4.8)
Texting	665	332 (49.9)	91 (13.7)	242 (36.4)
Only email different based on age Chi square 14.60, p = .006				

*Table 8. Preference for alternative forms of communication as compared to phone correspondence divided by age (users only).*

<b>Email</b>	<b>n</b>	<b>Like phone better</b>	<b>Same as phone</b>	<b>Like this form better than phone</b>
20-39	306	96 (31.4)	49 (16.0)	161 (52.6)

40-59	477	176 (36.9)	64 (13.4)	237 (49.7)
60 older	120	58 (48.3)	21 (17.5)	41 (34.2)
Chi square 14.60, p = .006				

Users of alternative forms of communication were asked to indicate how much time they felt this requires, in comparison with phone conversations. As shown in Table 9 there were no differences

based on age. Email and texting were viewed as taking less time and teleconferencing as taking the same or more time.

*Table 9. Alternative forms of communication compared in amount of perceived needed time required (users only).*

	<b>n</b>	<b>Less time than phone</b>	<b>Same as phone</b>	<b>More time than phone</b>
Email	902	549 (60.9)	119 (13.2)	234 (25.9)
Texting	631	425 (67.4)	67 (10.6)	139 (22.0)
Skype	158	44 (27.8)	59 (37.3)	55 (34.8)

Lastly, participants were asked their views on using a remote sensing device on a neck collar to monitor a patient's activity level, vital signs, and location, and transmit this data to both client and veterinarian. Overall, younger veterinarians had a more

negative view of these devices than older veterinarians. Younger veterinarians were more likely to agree with statements such as: I think this could unnecessarily worry clients between veterinary visits; I think this could erode the veterinary-client-patient-

relationship; I think this could create a lot more work for the veterinarian and staff (see Table 10).

*Table 10. Opinions about a dog remote sensing device*

	<b>n</b>	<b>Disagree</b>	<b>Neutral</b>	<b>Agree</b>	<b>Chi square, p value</b>
I think this could be highly beneficial in delivering quality patient care	851	112 (13.2)	232 (27.3)	507 (59.6)	
I think this could strengthen the veterinary-client-patient-relationship	844	112 (13.3)	241 (28.6)	491 (58.2)	
I think this could unnecessarily worry clients between veterinary visits	851	156 (18.3)	190 (22.3)	505 (59.3)	37.37, <i>p</i> .000*
I think this could erode the veterinary-client-patient-relationship	835	475 (56.9)	225 (26.9)	135 (16.2)	9.72, <i>p</i> .045*
I think this could create a lot more work for the veterinarian and staff	853	82 (9.6)	123 (14.4)	648 (76.0)	11.88, <i>p</i> .018*
I think this could support annual wellness checks and preventive medicine	848	156 (18.4)	223 (26.3)	469 (55.3)	
* Younger veterinarians agreed more often than older veterinarians.					

#### 4.1 Discussion

This study was designed to better understand how veterinarians feel about information and communication technologies (ICTs) as well as the degree to

which they are using them to connect and consult with clients. Although the telephone is still used much more frequently than other modalities, it is clear that many veterinarians are utilizing other modes of communication

such as email, Facebook and clinic websites to connect with clients. In fact, 47% of respondents report using email at least daily to stay connected with clients. Although fewer veterinarians report frequent use of text messages, approximately 40% indicate they text clients at least weekly to stay connected. Other communication modes including mobile apps, electronic announcements and teleconferencing are used less frequently.

Online contact by physicians and veterinarians with their patients and clients is an area experiencing many changes, rapid growth, and subsequent challenges. Studies in human medicine have repeatedly found that patients would like more online services. For example, one study found that 77% of patients would like to be able to communicate with their physician online to ask questions, 71% would like to set up appointments, 71% would like to request prescription refills, 70% would like to receive medical test results and 37% of patients said they would be willing to pay for these services (Harris Interactive, 2002). Another study reported that 93% of patients are likely to select a physician who offers to communicate through email (Jayanthi, 2014). It has been suggested that a

preference for online communication is higher for patients when compared to health care providers (Katz, Nissan, & Moyer, 2004; Moubarak, Guiot, Benhamou, Benhamou, & Hariri, 2011; Singh, Fox, Petersen, Shethia, & Street, 2009; Weitzman, Cole, Kaci, & Mandl, 2011). Perhaps due to concerns about confidentiality, reimbursement or workload, physicians have been slow to respond (Neville et al., 2004). Yet, providers are beginning to change. For example, a study of U.S. primary care and specialist physicians found that 33% report emailing or texting patients (iHealthBeat, 2013) and an even more recent study of primary care providers found that 48% use email to communicate with patients, 22% use text messaging, and 5% use video conferencing (Modahl & Meinke, 2015).

While using the phone to communicate with patients is still the predominant method, connecting electronically is becoming more common in veterinary medicine, with a third of all practices communicating with patients by text or email (McClintick, 2014). In addition to email and texting, many veterinarians report using social media, and specifically, Facebook, to connect with clients. Results from the current study found



that 64% of veterinarians report using Facebook to connect with clients at least weekly. Yet, despite the benefits that social media platforms offer in increased communication and knowledge transfer, they also carry significant legal, ethical, personal, and professional risks. For example, even small acts like “friending” clients can be misinterpreted as violations of professional or personal boundaries (Pillow et al., 2014). So, although social media can be seen as a useful tool to stay connected with clients, it should be used with caution, and veterinary clinics need to establish clear guidelines and policies.

When asked about their personal comfort level using alternative forms of communication, over 50% of veterinarians in the current study reported feeling comfortable with email, texting, Facebook, and mobile apps. Fewer veterinarians reported feeling comfortable with teleconferencing, website posts or blogging. There were statistically significant age differences in comfort level with texting, Facebook, skype use, and blogging, whereby older veterinarians reported feeling less comfortable than younger veterinarians. This is not surprising when viewing the demographics of those who use these modes

of communication. Although older people are expanding their use of these technologies, younger people still use them more often (Duggan et al., 2015a; Lella, 2014; Levine, 2010; Rainie & Zickuhr, 2010).

Yet consumers of both human medicine and veterinary medicine express strong interest in the ability to communicate with their health care provider electronically (Baptist et al., 2011; Lee et al., 2015). Shields (2014) reported that 93% of adults would prefer to go to a doctor that offers email communication, and 25% of them said they would still prefer a doctor that uses email communication even if there was a \$25 fee per episode. In veterinary medicine, Kogan et al. (2010) found that most clients would prefer to use electronic methods to communicate with their veterinarian. There were no differences based on gender, age, or education for reported likelihood of using any of these Internet services. In contrast, Lee et al. (2015) found that patients younger than 45 use the web to contact their physicians at significantly higher rates than older patients. Regardless of age, fewer patients are using video conferencing. Only 14% report being interested in using a video chat to talk to a doctor after hours about a

health-related need. Interest also diminished with increased age (Shields, 2014).

One issue of concern when medical professionals explore the use of ICTs is the time needed and the perceived inability to charge for these services. Typically, physicians are not reimbursed for time spent communicating with patients electronically (Crotty, Tamrat, Mostaghimi, Safran, & Landon, 2014). Modahl and Meinke (2015) reported that family physicians currently spend about 4 hours/week on non-reimbursable phone or email communications, with every phone call estimated to cost \$20 of physician time. The current study found that nearly 50% of veterinarians spend between 1-5 hours in an average week engaging in phone consultations, yet 33% spend 6-10 hours and 14.5% spend over 10 hours each week conducting phone consultations. Currently, less time is spent consulting through email, text messaging or Skype; most (70.3%) veterinarians reported consulting through these alternative modes 1-5 hours each week, yet a substantial number (18%) reported doing so for at least 6 hours/week. Additionally, whether on the phone or with other modes of communication, many of these consultations are done in the evenings

or weekends, with 29% of participants reporting that over a fifth of their consultations are done after hours.

When analyzing trends in human medicine, it is clear that similar to veterinary medicine, time spent consulting via alternative methods of communication is increasing. One study tracking email communications between physicians and patients found these interactions almost tripled between 2000 and 2010 (Crotty et al., 2014). If indeed more time is needed to consult via email and text messaging, this is of no small concern, especially given that the majority of veterinarians do not charge for consultation, regardless of the mode used. This study found that 87% of veterinarians don't charge for phone consults, and even higher numbers report not charging for email, text or skype consults. Perhaps this is not surprising since only 20% feel that clients might be willing to pay for electronic consultations.

Yet, when asked to compare email, texting and teleconferencing with the telephone as modes for consultation, the majority of participants stated that they take less time than phone consultations (61% for email and 67% for texting). Only teleconferencing was not viewed as saving

time. Therefore, conducting more consultations by email or text messaging, might help veterinarians save time if appropriate boundaries are established. Additionally, ICTs may actually help with the time constraints felt by many health providers during in-person appointments. One recent study found that more than 33% of patients spend less than 10 minutes with their physician during an average visit, and 40% report feeling rushed during appointments (Leventhal, 2015). This is only compounded by the fact that people are taking a more active role in their health care.

It is possible that electronic consultations might help ease the time pressure for health care providers, both in human and veterinary medicine. When participating veterinarians were asked to identify scenarios that might be appropriate for phone or electronic consultations (after first seeing a patient), many felt several common concerns could be managed via phone or electronically. The scenarios viewed as most appropriate were immediate post-surgery follow up, after routine vaccinations, management of diabetic patients and nutritional counseling. It is worth noting that older participants were more likely to report several scenarios as

appropriate for electronic or phone consultations when compared to younger participants. The only exception was follow-up visits after routine vaccinations, where younger veterinarians were more likely to report feeling this type of case was appropriate for electronic or phone consultations.

One possible explanation for older veterinarians' comfort with electronic or phone consultations is illness scripts. The observed differences in veterinarian's levels of comfort with providing telephone consultations may be linked to their experience and self-confidence. As clinicians gain expertise in clinical reasoning, their knowledge becomes more encapsulated and synthesized into illness scripts, which are readily recalled instances of diseases, conditions or symptoms. According to Bowen (Bowen, 2006) "these representations trigger clinical memory, permitting the related knowledge to become accessible for reasoning"(p. 2219). Since illness scripts are constructed based on clinical experience and exposure to cases, it is logical to expect that more experienced veterinarians will have a larger bank of illness scripts to draw on, and thus, find it easier to work with the abstract

representation of a case provided during a telephone conversation.

Despite the potential benefits of ICTs, another common fear of health care providers is that they have the potential to blur professional boundaries. It has been suggested that this is a major obstacle for more general adoption of ICTs by physicians (Lee et al., 2015; Moubarak et al., 2011). In the current study, views on ICTs were predominantly positive. Most participants felt ICTs can be used to strengthen the veterinary-client-patient-relationship and be a valuable tool in small animal practice and consulting. Participants also agreed with the recent emphasis on preventive health care in dogs and cats, and supported their future use. Perhaps tellingly, however, only 20% of respondents felt that clients would be willing to pay for such electronic consultations. Fears about time and payment are likely to play a role in how quickly these new types of consultations are instituted.

Lastly, this survey also asked participants to report their views on wearable monitors for dogs. Results from this study found mixed views on the topic. When asked their views on using a remote sensing device on a neck collar to monitor a patient's activity level, vital signs, and

location and transmit this data to both client and veterinarian, younger veterinarians had a more negative view of these devices than older veterinarians. Younger veterinarians felt these devices could unnecessarily worry clients between veterinary visits and had the potential to create more work for veterinarians and staff. It is possible that this difference based on age is due to familiarity with wearable health monitors for humans, given that adults aged 35-54 make up the largest market for fitness trackers (Hughes, 2015).

Yet, most participants saw the potential benefit of these devices, agreeing they could be beneficial in delivering quality patient care, and strengthening the veterinary-client-patient-relationship. This debate over the pros and cons of wearable monitors is mirrored in human medicine. A recent article summarized some of the perceived benefits as well as potential risks. Some argue for the use of these devices, suggesting that they have the ability to reduce morbidity and mortality by encouraging healthy behavior, helping people to correlate personal decisions with health outcomes, and helping doctors to hold patients accountable for their behavior. Others, however, worry they are creating a

population of 'worried well', those who over diagnose themselves, creating unnecessary anxiety (Husain & Spence, 2015). It would appear that only time and additional research will help the field assess whether these are overall a positive or negative. What cannot be argued however, is that this field is exploding. It is estimated that the market for animal wearables is expected to reach 2.6 billion by 2025, and while there are currently about 300 animal wearable manufacturers worldwide, this is expected to increase to 500 by 2025 (Meinhold, 2014).

## 5.1 Conclusion

It seems clear that in both human and veterinary medicine, consumers are taking a more active role in health care. They are coming to appointments armed with more information collected online and data from wearable technology, and expecting their health care providers and veterinarians to provide more accessibility and communication options (Baptist et al., 2011; Lee et al., 2015; Pai, 2014).

To meet the needs of veterinary clients, similar to human medicine, policies and reimbursement models will need to be modified (Crotty et al., 2014). It is suggested

that, in the near future, it will no longer be an acceptable working model for veterinarians to provide free phone or electronic consultations. Additionally, veterinary clinics should proactively institute business policies regarding email and social media related to client communication to help veterinarians feel confident about current regulations and acceptable practices. As noted by Lee et al. (2015), it would be more beneficial to educate health care providers on the proper use of social media and email contact with clients rather than prohibit their use.

It is imperative that the field move towards offering what veterinary clients want. Just like in human medicine, clients want to be able to access veterinary health care outside the office (Malley, Samuel, Bond, & Carrier, 2012). Working on creating technology to ensure the confidentiality and safety of such communication within veterinary medicine should be a top priority. While communication training is now recognized as crucial in veterinary education (McArthur & Fitzgerald, 2013), it is critical that veterinary schools address the nuances of communication including how to use ICTs appropriately to best prepare students for

success upon graduation. It is the view of the authors that ICTs can be used to strengthen the veterinarian-client relationship, and as a result, improve animal care.

## 6. Conflict of Interests

The authors declare that there is no conflict of interests regarding the publication of this paper.

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