Help seeking behavior and the Internet: A national survey

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Summary   Health-related websites have the potential to powerfully influence the attitudes and behavior of consumers. Access to reliable disease information online has been linked to reduced anxiety, increased feelings of self-efficacy, and decreases in utilization of ambulatory care. Studies report that Internet health information seekers are more likely to have health concerns; adult seekers are more likely to rate themselves as having poor health status and adolescent seekers are more likely to demonstrate clinical impairment or depressive symptomatology compared to non-seekers.

   Although more and more Americans are using the Internet for healthcare information, little is known about how this information affects their health behaviors. The current study extends the literature by examining characteristics associated with help seeking, either from a healthcare provider or from peers, as a direct result of health information found online. Medical care seekers appear to be using the Internet to enhance their medical care; they report using the information online to diagnose a problem and feel more comfortable about their health provider's advice given the information found on the Internet. Support seekers tend to be of slightly lower income compared to non-support seekers. They are also significantly more likely to have searched for information about a loved one's medical or health condition, signaling that many of these consumers may be caretakers.
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The amount of health information available online is astounding. Using the most common method consumers rely on to find healthcare information online [1], a keyword search on ''health'' at a popular search engine recently generated 473,000,000 results (Google.com; January, 2005). Consumers appear unfazed by this overwhelming amount of information. Recent reports suggest that about four in 10 adults [2,3] and one in four adolescents [4] have used the Internet to access health information in the previous year.

Health-related websites have a powerful influence on the attitudes and behavior of people. Access to reliable disease information online has been linked to reduced anxiety [5], increased feelings of self-efficacy, and decreases in utilization of ambulatory care [6]. Almost half (48%) of health information seekers indicate that their findings help them to take better care of themselves [7]. Two-thirds (67%) of adults also report that Internet health information has increased their understand-

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ing of health issues [2]. Adolescents view the Internet as a powerful tool for healthcare information [8], and have used it as an instrument for empowerment. More than half (53%) of youth between the ages of 15 and 17 who have looked for health information online report they have had a conversation with their caregiver about what they have learned [1]. Forty-one percent of adolescents indicate having changed their behavior because of information they found online [9], and 14% have sought healthcare services as a result [1].

Understanding who is more likely to use the Internet as a health information tool is an important aspect of understanding how the Internet is transforming medical care. Studies report that seekers are more likely to have health concerns; adult health seekers are more likely to rate themselves as having poor health status [2] and adolescent health seekers are more likely to demonstrate clinical impairment or depressive symptomatology compared to non-seekers [10]. Middle-aged adults are more likely to search for information online compared to their older and younger adult peers [11], as are females compared to males [2]. Important aspects of Internet use, such as expertise, comfort using the Internet, tenure (i.e., number of years of experience online), and location of access are less well reported and require additional attention.

Internet-related technologies have been influencing the way in which physicians practice medicine for over a decade [12], including advances in telemedicine [13], patient-provider communication [14,15], and even innovative improvements in infectious disease monitoring [16]. Some have raised alarms however, about how information on the Internet may affect the consumer's role in medicine. Specifically, some health professionals have voiced concern about whether increased access to health information will impede or delay the seeking of medical care by those who need it [17]. It has been posited that the Internet will be used as a diagnostic tool, potentially causing one to delay or forgo medical intervention [18]. Evidence suggests, however, that the Internet can actually motivate people to seek help from a health care professional [19], or at the very least, has no effect on healthcare utilization [2]. Beyond this, however, details about what people do with information found online, and specifically, who is likely to seek help as a result, is an important yet unreported aspect of the emerging e-health movement. Also, given the number of patients arriving at the physician's office armed with information found on the Internet [17], it is important to create of profile of people who are likely to utilize healthcare services because of information found online. Charac-

teristics beyond demographics, including Internet usage, perception of the Internet, and reasons for using the Internet as a resource, are all important aspects of such a profile. Using cross-sectional data from the *Surveying the Digital Future*, *Year Four*, we will investigate the characteristics of Internet users likely to contact a health professional. Because not all people searching for healthcare information necessarily require medical attention, as well as the substantial literature attesting to the positive influences of social support [20—24], we will also identify a cross-sectional profile of health information seekers likely to seek support from others because of the information found online.

1. Methods

1.1. Data source

Data are from the fourth year of *Surveying the Digital Future* (USC Annenberg School for the Digital Future (2004). Ten Years, Ten Trends: Year Four of the Digital Future Report. Available on the World Wide Web at: http://www.digitalcenter. org/pages/current_report.asp?intGlobalId=19), a national, longitudinal telephone survey of Americans living throughout the 50 states and the District of Columbia. For both the original sample drawn in 2000, and the replacement samples selected in subsequent years, a national Random Digit Dial (RDD) telephone sample using an Equal Probability Selection Method (EPSEM) was identified.

In Year 1, 19,247 phone numbers were generated by EPSEM (see Table 1), 2104 of which resulted in a completed interview. In Year 4, all 1960 individuals who participated in Year 3 interviews and stated a willingness at the end of the survey to be interviewed in Year 4 were called. An additional 18,500 EPSEM phone numbers were generated to supplement the completed Year 3—Year 4 interviews. In sum, 2010 interviews were conducted in Year 4. Of the 2104 Year 1 respondents, 570 took part in Year 4.

In the initial call, an interviewer spoke to a person in the household 18 years of age or older to obtain a roster of all household members. A computer system (''CFMC Servant'' CATI) then randomly selected one individual from among those 12 years of age and older to be interviewed. Interviews were conducted in English or Spanish and took an average of 34 minutes to complete. Data were collected between July and September 2003. The final study protocol was reviewed and approved by the IRB at the University of California, Los Angeles. The UCLA IRB was also responsible for overseeing compliance with human subjects research standards.

Table 1 Response data for surveying the digital future, Years 1 and 4

Outcome	Year 1	Year 4[*]	
		Y3 responders	EPSEM generated
	N	N	N
Completed interviews	2104	1316	694
Partial interview[a]	470	4	151
Refusal/break-off[b]	2218	45	2159
Non-contact[c]	2267	52	1858
Other[d]	340	12	3
Unknown other[e]	0	133	41
Total households contacted	7399	1562	4906
Non-eligible[f]	7646	79	9456
Unknown if household[g]	4202	319	4138
Total non-household contact	11848	398	13594
Total numbers called	19247	1960	18500

[*] In Year 4, individuals who participated in Year 3 and stated a willingness at the end of the interview to be interviewed in Year 4 were contacted for inclusion in the Y4 study. Additional EPSEM phone numbers were generated to supplement the completed interviews accomplished by recalling Year 3 participants.

[a] Individuals expressed a willingness to complete but could not be reached to complete the survey by the end of the survey period.

[b] Respondent refused after starting the interview.

[c] Phone number was confirmed as an eligible household but the selected respondent was never available.

[d] Number reached a respondent whose physical and/or mental ability prevented an interview from being completed, or the language spoken by the household was other than English or Spanish.

[e] Number reached a household, but eligibility could not be determined.

[f] Number reached a non-household.

[g] Number always resulted in a no answer, a busy, an answering machine, etc.

1.2. Study sample

All participants who were at least 12 years of age or older, English or Spanish speaking, and willing to participate were eligible. No additional exclusion criteria applied.

The current sample includes survey respondents for whom we had valid data on whether they had used the Internet in the previous year. All 2010 respondents provided Internet use information, 1459 of whom were current Internet users. Following demographic and Internet usage comparisons, the sample was further restricted to respondents who reported accessing health information online in the previous year (N = 819).

1.3. Participants

Sixty percent of respondents to *Surveying the Digital Future, Year Four* were female with an average age of 48 years (S.D. = 19). Eight-four percent of respondents were white, 6% were black, and 10% were of another race. Eight percent of respondents reported Hispanic ethnicity. Median household income was between $40,000 and $50,000.

1.4. Measures

1.4.1. Health information seekers
Health information seekers were those who reporting accessing health information online in the previous 12 months (yes/no).

1.4.2. Help-seeking
Help-seeking behavior was defined as either: (1) contacting a health care professional (yes/no), or (2) seeking support from others (yes/no) because of the health or medical information a respondent found on the Internet. These are the main outcome variables of interest in the current investigation.

1.4.3. Demographic characteristics
Age was categorized in roughly 20 year increments: (1) 12–19 years of age; (2) 20–39 years of age; (3) 40–59 years of age; (4) 60 years of age and greater (outer limit: 97 years). A category definition was chosen due to indications of non-linearity. To ensure cell stability, race was collapsed into three categories: white, black, and all other. A dichotomous indicator of Hispanic ethnicity was also included to reflect participants who identified themselves as Spanish, Hispanic, or Latino. Household income

was entered in the model as an ordinal variable in increments of $10,000 (range: 1–22). Respondent education was collected and entered into the model as an ordinal variable reflecting one of 12 possible responses: (1) none; (2) elementary; (3) junior high/middle school; (4) some high school; (5) high school graduate; (6) vocational/trade school; (7) some college, no degree; (8) associate degree; (9) bachelor's degree; (10) master's degree; (11) professional degree/M.D./L.L.D; (12) doctorate degree/Ph.D./ED.D. The interviewer assigned the respondent's gender at the survey's completion.

1.4.4. Reasons for using the Internet as a source

Internet users were asked whether they had used the Internet to search for health or medical information about a personal health problem they may have had, as well as for health or medical information about a health problem a loved one may have had. Each was treated as a dichotomous (yes/no) indicator. Respondents were additionally asked an open-ended question as to why they chose the Internet to look for health or medical information. Answers were coded into one of six possible categories: (1) information was free/seeing a physician was expensive; (2) information was quickly acquired/had a serious problem and needed answers quickly; (3) privacy/avoiding embarrassment/sensitive issues; (4) easy to find; (5) wide availability of information; (6) all other responses. The sixth category was uninformative and not included in the current investigation. Each of the five variables was treated as a dichotomous variable to reflect respondents who had voiced the reason versus all other respondents.

1.4.5. Action taken based upon information found

Additional outcomes stemming from the information found online were also sought. Participants were asked whether they felt more comfortable about advice already received from health professionals, tried to diagnose a medical problem, or tried to treat a medical problem based upon the information found online. Each of the three variables was treated as a dichotomous (yes/no) indicator.

1.4.6. Assessment of experience and information accessed

Respondents were read a series of statements reflecting feelings or perceptions one may have after accessing health information online and were asked to rate how strongly they agreed or disagreed with the statement [Likert scale: 1 (strongly disagree) – 5 (strongly agree)]. Eleven reactions were queried: (1) wanted more information but did not

know where to find it; (2) took a lot of effort to get the needed information; (3) did not have the time to get all of the necessary information; (4) did not have the energy to get the necessary information; (5) felt frustrated during the search; (6) information cost money which the person could not afford; (7) concerned about the quality of the information; (8) found too much information; (9) found too little information; (10) information was too hard to understand; (11) satisfied with the information found. After examining cell distributions, each variable was dichotomized to ensure cell stability; those who indicated they agreed/strongly agreed (4 or 5) with the statement were compared to all others (3, 2, or 1).

1.4.7. Internet use

Internet access was broadly defined to include use at home, school, work, or any other location. Respondents indicated the total number of months they had been using the Internet (ever), which was categorized as follows: (1) less than 1 year; (2) 1 to less than 3 years; (3) 3 to less than 5 years; (4) 5 to less than 7 years; (5) 7 or more years. Self-reported average daily Internet use was entered as a continuous variable (hours). The location at which a respondent most frequently logged onto the Internet was reflected by home versus all other locations. Self-rated Internet expertise was coded as poor, fair, good, or excellent. An individual's perception of the Internet's utility was assessed from responses to the statement: ''People who do not have access to the Internet are at a serious disadvantage''. The five-point Likert scale was dichotomized to reflect those who agreed or strongly agreed versus all others.

1.4.8. Psychosocial indicators

Psychosocial indicators compose a potentially important aspect of the profile of health care information seekers because mental health challenges may affect the reasons one uses the Internet, or the way he or she experiences the Internet. Three aspects of psychosocial well being were included in the current analysis: unhappiness (''My life could be happier than it is now''); loneliness (''I often feel lonely''); social support (''I belong to a network for friends''). Respondents rated their level of agreement with each statement on a five-point [Likert scale: 1 (strongly disagree) – 5 (strongly agree)]. Each was dichotomized to reflect those who agree or strongly agree versus all others.

1.5. Statistical methods

The data were compared to U.S. Census data to ensure that the sample was representative in terms

of geographic distribution, race, age, gender, family composition, education, and household income. To correct for minor discrepancies between the sample data and Census data, the sample data was weighted.

Stata 7 was used for all statistical analyses [25]. First, missing and non-responsive answers (i.e., ''do not know'' and ''refused'') were imputed using best-set regression [25]. In most instances, this affected less than 1% of data, income being the exception; 13.5% of all respondents were unresponsive to queries about their household income (11.3% of health information seekers).

Next, sample distributions were examined across individual and Internet usage characteristics to identify characteristics significantly related to aspects of health information seeking behavior. Specifically, characteristics were examined based upon: (1) report of using the Internet as a health information resource, (2) contacting a health professional because of information accessed online, and (3) seeking help from others based upon Internet health information. The statistical test employed was determined by the types of variables assessed: χ^2-tests were used to test categorical variables, t-tests were used to test mean differences of continuous variables, ANOVA tests were used to test mean differences across several groups, and continuity corrected Pearson's χ^2-tests were used to identify median differences for ordinal variables.

Cross-sectional profiles were then identified for each of three outcomes of interest: (1) among Internet users, people who used the Internet to access health information; (2) among Internet health information seekers, people who contacted a physician as a result of information accessed; (3) among Internet health information seekers, people who sought help from others as a result of information accessed. Variables assessed for the first model included demographic characteristics, psychosocial indicators, and Internet usage characteristics. Variables assessed for the second and third models additionally included reasons for using the Internet for health information, assessment of the seeking experience, and actions taken based upon the information received. The steps in building the parsimonious logistic regression model were the same for each outcome of interest. All characteristics significantly related to the outcome at the bivariate level were included in one ''saturated'' logistic regression model. Because of the necessary exploratory nature of the analyses, statistical significance was conservatively set at $p < .01$. Intercollinearity of variables in the saturated model was tested by estimating a ''dummy'' linear regression model and generating Variance Inflation Scores (VIFs) (scores less than 5 are desirable for categorical variables). Next, forward stepwise maximum likelihood estimation was used to identify significant variables ($p < .01$) and drop non-significant variables. The resulting model was parsimonious in that it included only those variables necessary in helping to explain the odds of reporting the outcome. Results were confirmed using backward stepwise estimation. Goodness of fit (GOF) tests were used to estimate the final model fit to the data ($p > .05$ indicates a better fit). Variables that were retained in one stepwise model but not the other were included in the final model if their inclusion increased the GOF.

2. Results

2.1. Descriptive results

Seven out of 10 (73%, $N = 1459$) respondents in *Surveying the Digital Future*, *Year Four* reported using the Internet in the previous year, 56% ($N = 819$) of whom reported using the Internet as a resource for health information. Demographic characteristics varied by self-reported use of the Internet. In general, Internet users tended to report a higher family income and education level, and this was especially true for health information seekers. For example, 52% of health information seekers reported an income of $ 60,000 or greater compared to 39% of Internet users who did not access health information, and 11% of non-Internet users ($p < .001$). Non-Internet users tended to be older than Internet users; the average non-user was 61 years of age (S.D. = 18) as compared to 41 years of age (S.D. = 19) for non-health information seeking Internet users and 46 years of age (S.D. = 15) for health information seekers ($p < .001$). Not surprisingly, Internet users were significantly more likely to perceive lack of Internet access as a disadvantage compared to non-Internet users ($p < .001$).

2.2. Characteristics of health information seekers

The average Internet health information seeker was 46 years of age, female, white, and comfortable using the Internet (see Table 2). They reported significantly longer Internet tenure than non-seekers (72 months versus 54 months, respectively; $p < .001$) and higher levels of skill at using the Internet than non-seekers (73% versus 59% had good or excellent skills, respectively; $p < .001$). Sixty-

Table 2 Characteristics of Internet health information seekers ($N = 819$)

Personal characteristics and self-reported experiences	% (N)	Statistical comparison[a]
Demographic characteristics		
Age		$\chi^2 = 84.0\ (3)^{***}$
12—19 y.o.	4.5 (37)	
20—39 y.o.	28.7 (235)	
40—59 y.o.	47.4 (388)	
60—97 y.o.	19.4 (159)	
Race		$\chi^2 = 23.2\ (2)^{***}$
Black	3.9 (32)	
White	88.6 (726)	
Other	7.5 (61)	
Hispanic	5.6 (46)	$\chi^2 = 4.0\ (1)^{*}$
Female	64.6 (529)	$\chi^2 = 21.8\ (1)^{***}$
Income ($) (median)	60000—70000	$\chi^2 = 24.8\ (1)^{***}$
Education (median)	AA degree	$\chi^2 = 56.9\ (1)^{***}$
Psychosocial indicators		
Social support network	68.1% (993)	$\chi^2 = 47.4\ (1)^{***}$
Unhappy	32.9% (1346)	$\chi^2 = 31.9\ (1)^{***}$
Lonely	7.8% (113)	$\chi^2 = 99.3\ (1)^{***}$
Internet usage characteristics		
Internet access is advantageous	55.9 (458)	$\chi^2 = 12.6\ (1)^{***}$
Intensity of use (h/day) (range: 0—18.6) [M (S.D.)]	1.4 (1.6)	$t = -1.8\ (1457)$
Access the Internet most frequently from home	89.9 (736)	$\chi^2 = 16.2\ (1)^{***}$
Internet expertise		$\chi^2 = 43.0\ (3)^{***}$
Poor	4.2 (34)	
Fair	23.0 (188)	
Good	43.0 (352)	
Excellent	29.9 (245)	
Tenure		$\chi^2 = 80.3\ (4)^{***}$
<1 year	1.6 (13)	
1—3 years	10.9 (89)	
3—5 years	23.2 (190)	
5—7 years	25.9 (212)	
>7 years	38.5 (315)	

[*] p-value < .05; [**] p-value < .01; [***] p-value < .001.
[a] Comparisons made between health information seekers ($N = 819$) and non-health information seekers ($N = 1188$) among Internet users ($N = 1459$).

eight percent of seekers reported belonging to a social network of friends.

Search engines were the most frequently cited source of health websites, with 85% of health information seekers indicating they had used this method to find information online. Most people (71%) reported the Internet as just one of many sources of health information (e.g., magazines). Three-quarters (75%) of health information seekers reported using the Internet to access information about a loved one's health or medical condition, whereas 70% reported looking for information about a personal health or medical problem (see Table 3). Most (89%) felt confident after their experience that they could get health information from the Internet if they needed to in the future.

2.3. Cross-sectional profile of health information seeking among Internet users

In order to identify the most influential characteristics related to seeking health information online, a parsimonious logistic regression model of health information seeking was identified based upon all characteristics significantly related to the outcome at the bivariate level ($p < .01$). Acceptable inter-collinearity (mean VIF: 1.2, range: 1.0—1.4) and model fit (Hosmer—Lemeshow's $\chi^2 = 4.9$ (8); p-value = .77) were observed. Variables included in the final model were adjusted for all other variables in the model (see Table 4).

Among otherwise similar Internet users, females were 90% more likely than males to report using

Table 3 Experiences of using the Internet as a resource among health information seekers (N = 819)

Experience	% (N)
Reason for using the Internet	
Health problem that loved one has	75.0 (614)
Health problem that respondent has	70.0 (573)
Information is easy to find	40.2 (329)
Wide availability of information	36.0 (295)
Needed information quickly	31.0 (254)
Privacy/embarrassing topic	4.2 (34)
Information is free/healthcare is expensive	1.7 (14)
Assessment of online experience	
Satisfied with information found	73.3 (600)
Found too much information	24.5 (201)
Wanted more information but did not know where to find it	20.8 (170)
Concerned about quality of information	20.8 (170)
Not enough time to get all information needed	20.2 (165)
Felt frustrated during the search	14.2 (116)
Took a lot of effort	13.7 (112)
Not enough energy to get all of the information needed	12.2 (100)
Found too little information	9.4 (77)
Information was too hard to understand	7.9 (65)
Unaffordable cost for information	7.1 (58)
Action taken based upon information found online	
Felt more comfortable with information from health provider	78.1 (640)
Contact a healthcare provider	55.1 (451)
Tried to diagnose a problem	43.1 (353)
Tried to treat a health problem	33.3 (273)
Seek support from others	30.2 (247)

the Internet to access health information ($p < .001$). The odds of reporting health information seeking online rose 10% with each increase in education level (e.g., from elementary school to junior high school) after adjusting for all other significant characteristics ($p < .001$). All other things being equal, people between the ages of 20 and 39 were 2.5 times as likely ($p < .001$), while people between the ages of 40 and 59 were 4.4 times as likely ($p < .001$), and people over 60 years of age were 3.4 times as likely ($p < .001$) as respondents 19 years of age or less to report using the Internet for health information. Black people were 60% less likely than otherwise similar white people to be health information seekers ($p = .001$). A similar trend was observed for people of other races compared to white respondents after adjusting for all other characteristics ($p = .053$). As one's Internet expertise increased so too did the likelihood of using the Internet to access health information. After adjusting for all other significant characteristics, users rating their skills as ''excellent'' were four times as likely ($p < .001$), and ''good'' users were 2.5 times as likely ($p < .001$) as ''poor'' users to report e-health seeking. No significant differences were observed between self-described ''fair'' and ''poor'' users ($p > .05$).

2.4. Seeking help because of information received online

Among the 55% (N = 451) of health information seekers who contacted a health professional and the 30% (N = 247) who sought support from others, 21% (N = 173) engaged in both help-seeking behaviors. Help seekers compared to non-help seekers were more likely to report looking for information about a health or medical condition a loved one or they themselves may have had. Beyond these similarities, however, each help-seeking behavior was associated with a unique set of personal characteristics. Findings are described below and displayed in Table 4.

2.5. Cross-sectional profile of people likely to contact a health provider

A parsimonious logistic regression model was identified to illuminate characteristics most strongly related to contacting a physician because of the health information found online (see Table 4). This cross-sectional profile included all characteristics that were significantly related to the outcome while adjusting for all other influential characteristics. Acceptable inter-collinearity was reported

Table 4 Cross-sectional profiles of health information seeking and subsequent outcomes

Personal characteristics	Health information seeking (N = 1459)		Contacted a physician (N = 819)		Sought support from others (N = 819)	
	COR (95% CI)	p-value	COR (95% CI)	p-value	COR (95% CI)	p-value
Demographic characteristics						
Age						
12—19 y.o.	1.00 (reference)					
20—39 y.o.	2.5 (1.5, 3.9)	<.001				
40—59 y.o.	4.4 (2.7, 7.0)	<.001				
60—97 y.o.	3.4 (2.0, 5.7)	<.001				
Race						
White	1.00 (reference)					
Black	0.4 (0.3, 0.7)	.001				
Other	0.7 (0.5, 1.0)	.053				
Female	1.9 (1.5, 2.3)	<.001				
Income					0.9 (0.9, 1.0)	.001
Education	1.1 (1.1, 1.2)	<.001				
Internet usage characteristics						
Intensity of use (h/day)			1.1 (1.0, 1.3)	.016		
Internet expertise						
Poor	1.00 (reference)					
Fair	1.4 (0.9, 2.3)	.173				
Good	2.5 (1.5, 4.0)	<.001				
Excellent	4.2 (2.5, 7.0)	<.001				
Reason for using the Internet						
Health problem that loved one has			2.1 (1.5, 3.1)	<.001	2.5 (1.7, 3.9)	<.001
Health problem that respondent has			1.6 (1.1, 2.3)	.006		
Information was free/healthcare was expensive			0.1 (0.0, 0.5)	.003		
Assessment of experience						
Information was too hard to understand					2.6 (1.5, 4.5)	<.001
Action taken based upon information found						
Felt more comfortable with information from health provider			2.3 (1.5, 3.3)	<.001		
Contacted a healthcare provider					2.2 (1.6, 3.1)	<.001
Tried to diagnose a problem			2.5 (1.8, 3.4)	<.001		
Sought support from others			2.0 (1.4, 2.8)	<.001		

(mean VIF: 1.1, range: 1.0—1.2) and appropriate model fit was observed (Person's $\chi^2 = 401.9$ (428); p-value = .81).

Among health information seekers, people who were searching because of a specific health or medical condition were significantly more likely to contact a health provider following their search. Specifically, respondents who reported using the Internet to look for information about a loved one's medical or health problem were twice as likely as otherwise similar respondents who reported not searching for information about a loved one's condition (p < .001). Similarly, respondents who reported searching for information about a personal health or medical problem were 60% more likely to contact a health professional compared to other information seekers who had not searched for information about a personal health problem, after adjusting for all other significant characteristics (p < .01). On the other hand, all other things being equal, people who reported that they used the Internet because the information was free,

or that seeing a health professional was expensive, were 90% less likely to contact a healthcare professional because of information found online ($p < .01$).

Health information seekers who reportedly tried to diagnose a problem based upon the information received were 2.5 times as likely to contact a healthcare professional than seekers who did not try to diagnosis a problem, after adjusting for all other significant characteristics ($p < .001$). Similarly, people who felt comfortable about advice already received from a healthcare provider were 2.3 times as likely to also report contacting a health professional after going online compared to otherwise similar seekers who did not report feeling comfortable about healthcare advice already received ($p < .001$). Results further suggested that some respondents tended to reach out in many directions. Among otherwise similar health information seekers, individuals who reported seeking help from others after finding information online were twice as likely as non-support seekers to also report contacting a physician.

All other things being equal, each additional hour on the Internet was associated with a 10% increase in the odds of contacting a healthcare provider among otherwise similar healthcare information seekers. No other Internet or demographic characteristics significantly discriminated between people who reported contacting a healthcare professional with those who reported not contacting a healthcare professional after adjusting for all other influential characteristics.

2.6. Cross-sectional profile of people seeking support from others

In order to understand the characteristics of people likely to seek support from others because of health information found online, a parsimonious logistic regression model was identified based upon characteristics that were significantly related ($p < .01$) to reporting support seeking among Internet health information seekers at the bivariate level. Acceptable inter-collinearity (mean VIF = 1.1, range: 1.0−1.1) and model fit (Hosmer−Lemeshow's $\chi^2 = 5.3$ (8); p-value = .72) were observed.

Among otherwise similar Internet health information seekers, respondents who reported searching for information about a loved one's health or medical condition were 2.5 times as likely to also report seeking help from others ($p < .001$). With each $10,000 increase in income, the likelihood of seeking support from others decreased by 10% after adjusting for all other influential character-

istics ($p = .001$). All other things begin equal, those who contacted a medical professional because of information received were also 2.2 times as likely to report seeking help from others compared to otherwise similar health information seekers who did not report contacting a health professional as a result ($p < .001$). Interestingly, those who reportedly found the health information accessed online too hard to understand were 2.6 times as likely to report seeking support from others compared to those who did not have trouble understanding the information received, after adjusting for all other significant characteristics ($p < .001$).

3. Discussion

As the Internet becomes more and more integrated into the lives of health consumers, the crossroads between health information online and healthcare utilization patterns are becoming evermore apparent. The current investigation examines the personal characteristics of people who are moved to seek help because of health information they find online. Findings mirror those reported previously. For example, similar to previous reports based upon nationally representative samples [2,3], 56% of Internet users report accessing the Internet for healthcare information in the previous year. Search engines continue to be the most popular method of identifying health information web sites [1], perhaps indicating that consumers still do not know about the many dependable, comprehensive health web sites available (e.g., www.cdc.gov). Seventy percent of health information seekers report having used the Internet to search for information about a potential health or medical problem they had, mirroring previous findings that health information seekers were more likely to indicate somatic and mental health problems [2,10].

3.1. Demographic differences of health information seekers

As expected, females are significantly more likely than males to use the Internet as a resource for health information [2,7,11]. Among information seekers, however, no significant gender differences are observed for those who do and do not report searching for information about a health or medical problem a loved one may have, or do or do not search for information about a personal health or medical problem. People use the Internet as a resource for a variety of topics; this finding may indicate that females more than males look for

non-specific health information just as others may search for general travel information. When looking for information about a specific condition that respondents or their loved ones may have, however, males are just as likely as females to use the Internet. Looking for general health information thus may entail a different type of Internet searching than efforts to locate information about specific medical conditions.

Findings of the current investigation highlight important age differences in health information seekers. Middle-aged adults, those between 40 and 59 years of age, are the most highly represented age group among health information seekers [11], whereas teenagers are the smallest group of seekers. This may reflect growing concern and self-awareness about health conditions and increasing caregiving responsibility for elder parents as one grows older. It may also help explain a shift in reasons to use the Internet as a resource. Very few (4%) reported using the Internet because it was private or they were embarrassed about their topic. Instead, convenience was the most frequently cited reason; 40% said they used the Internet to find health information because it was easy to find, and 31% needed information quickly and thought the Internet was the fastest method. With competing responsibilities, including a job, a family, and elder parents, it appears that some middle-aged adults are using the Internet as a first line of inquiry.

3.2. Replacing or enhancing care

Providers and researchers have raised the question about whether access to health information online will enhance, replace, or impede one's medical care [17,18]. The current study finds that two in five people who use the Internet as a health information resource tried to diagnose a health problem and one in three tried to treat a health problem with the information they found online. This does not necessarily indicate, however, that consumers are replacing health care providers with Internet information. Rather, it appears that many are arming themselves with information from multiple sources including both health care providers and the Internet. Indeed, 78% of people who used the Internet for health information reported feeling better about information they had received from their healthcare provider because of what they found online. Although some may be concerned that information on the Internet holds weight with consumers when compared to information from health care providers, this may not necessarily signal a negative development. With the vast amount of medical knowledge that is changing at a rapid pace, some

physicians find it challenging to read all of the current literature [17]. Patients who are active participants in their care can align with their physicians and bring knowledge and questions to the table that may hasten the diagnosis and treatment process. This active consumerism further highlights the importance of the physician's role in educating the patient about reliable healthcare websites, as well as how to interpret and integrate information found online with traditional health care utilization.

3.3. Seeking medical care

Fifty-five percent of Internet health information seekers contacted a health professional because of the information they received online. The profile of people more likely to seek professional consultation suggests they are using the Internet as a resource for information about a specific medical or health condition that they or a loved one is facing. Medical care seekers appear to be using the Internet to enhance their medical care; they report using the information online to diagnose a problem and feel more comfortable about their health provider's advice given the information found on the Internet. They likely are experienced consumers with many resources; they do not report expense of medical professionals as a concern, they use the Internet more intensively on a daily basis, and they report seeking support from others. It should be noted that these results are based upon respondents from the United States, which has a healthcare system based largely on insurance reimbursements. It is possible that healthcare consumers in other countries with different access and reimbursement structures will report different reasons for using the Internet as a health information resource as well as subsequent help seeking behavior. Understanding how differences in payment systems affect the Internet's role in consumer health is a potentially important area for future inquiry.

3.4. Seeking social support

Social support is a necessary component of somatic and mental health and is related to better outcomes among people with medical conditions [20,26] and this is especially true for low-income [21] and depressed populations [22,27]. The current investigation suggests that 30% of people who report using the Internet as a health information resource seek support from others because of the information they read online. Support seekers tend to be of slightly lower income compared to non-support seekers. They are also significantly more likely to have searched for information about a loved one's

medical or health condition, signaling that many of these consumers may be caretakers. Social support has a positive influence on caretakers who can often feel isolated and emotionally strained [23,24]. It is possible that consumers are acting on advice they found online that encouraged them to seek out social support, providing further suggestion that Internet health information is used to enhance and not replace one's health care professionals. These consumers are also significantly more likely to report that the information found online was too hard to understand. Perhaps they are seeking support from others to better understand the information they have found online. Moreover, they are significantly more likely to contact a medical professional. Support seekers then may be proactive about their health education and are using the Internet as one tool in an arsenal of multiple resources. Taken together, this profile of support seekers suggests that they are proactive in securing support and help from others even though they may have fewer economic and psychological resources. The Internet is used as an information resource that arms them with knowledge and informs their decision to seek social support.

3.5. Psychosocial indicators

Despite initial concern that Internet use may lead to poor social and mental health functioning [28], current findings add to the now-growing literature that suggests Internet use is not a damaging influence for most people [29,30]. In fact, non-Internet users are significantly more likely than Internet users to report feeling unhappy, 47% versus 33% ($p < .001$). Similarly, 24% of non-Internet users versus 8% of Internet users report feeling lonely ($p < .001$). On the other hand, only 51% of non-Internet users versus 68% of Internet users report having a social support network ($p < .001$). It is possible that the Internet has reached a saturation level in our society where it is now more normative to have Internet access than not.

4. Limitations

The current study provides important new information about Internet health information seeking, including characteristics related to medical and support seeking behavior among Americans who use the Internet. It is not, however, without limitations. The main focus of the study was not health information seeking but rather a more global look at Internet usage. As such, the measures of support seeking following Internet health information seeking are somewhat crude. Further, the data lack sufficient

detail to examine one's underlying motivation for taking a specific action. For example, we cannot know whether a respondent contacted a clinician with the intent to initiate care, to challenge current care, or for some other reason. The potential consequences arising from each of these scenarios is different and each may be highly influential in clinical care implications. Future research should focus more specifically on this topic, integrating findings from the current investigation. Additionally, although missing data were largely not an issue, income information was imputed for over 10% of the sample. Caution should be used in interpreting related results. In general, the overall response rate is reflective of a general decline in response rates for national telephone surveys [31−33]. The ever more pervasive use of surveys, along with constant harassment by telemarketers, have made the general public more wary and less inclined to participate in telephone survey research. Technological advances (e.g., answering machines, caller ID) have made it more difficult to even reach potential respondents. When they can be contacted, these potential subjects are often reluctant to participate. It should be kept in mind that our sample was more inclusive than most, including all people who were over the age of 12 and spoke either English or Spanish. Receiving cooperation to participate in such a national random sample is generally more challenging than with more select populations. Moreover, an Equal Probability Selection Method (EPSEM) was used. Although this sampling methodology gives every telephone number in every locality an equal chance of being selected, it also means that there will be more non-household numbers and more unresolved numbers in general than in other RDD random samples. An additional challenge was the survey's length, which at an average of 34 min influenced the likelihood of a potential respondent who was time-sensitive, to participate.

5. Implications

The Internet is transforming health care, as it is many other aspects of our lives. Findings from *Surveying the Digital Future*, *Year Four* suggest that people are using the Internet as a complimentary and positive resource for health information. Many respondents indicate that this information has spurred them to contact a healthcare provider or to seek social support from others. As health information seekers are often looking for specific medical problems that they themselves or a loved one are facing, it is encouraging to learn that professional support is a frequent outcome. Instead

of impeding care, results suggest that the Internet may be enhancing care. Providers may do well to align themselves with their patients in online health information seeking by, for example, arming themselves with reliable Internet resources to which they can refer their patients. Based upon these findings, future studies should focus on medical outcomes to better understand how the Internet is influencing disease-specific outcomes and healthcare utilization patterns.

Acknowledgement

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