

## Impact of Internet Use on Health-Related Behaviors and the Patient-Physician Relationship: A Survey-Based Study and Review

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**Context:** Although patient use of online resources to locate health-related information is increasing, few large-scale studies investigating ramifications to patient health and the patient-physician relationship have been conducted in primary care or osteopathic medical settings.

**Objectives:** To describe online health information-seeking behaviors among patients. To evaluate the effects of this information on patient self-care and the patient-physician relationship.

**Methods:** A standardized eight-question survey regarding Internet use and healthcare was given to patients at three osteopathic primary care medical clinics. A review of the literature is also included.

**Results:** Of 154 patient responses received, 89 patients (58%) reported using the Internet to find health information. Slightly more than half of these individuals (49 [55%]) reported a change in the way they think about their health as a result of that information. In addition, most of these individuals (41 [46%]) reported making subsequent health-related behavioral changes. The largest segment of this population was aged 31 to 45 years (17 [57%]). They reported asking more questions during office visits (27 [66%]), following physician advice more closely (22 [54%]), and making self-directed dietary changes (22 [54%]). By and large, these patients informed their physicians of these changes (30 [73%]), especially as they believed physicians were willing to discuss the health information they obtained online (75 [84%]).

**Conclusion:** Although many concerns have been expressed about resulting changes in patient-physician dynamics, online information gathering has the potential to foster greater patient engagement in health maintenance and care.

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The benefits of the increase in online information-seeking behaviors among patients has been well-documented in the past 5 years.<sup>1-4</sup> In addition to benefiting from increased knowledge, competence, and engagement in health maintenance and decision-making,<sup>5</sup> patients may appreciate the opportunity to investigate difficult or embarrassing questions in a comfortable, private environment.<sup>6,7</sup> Many patients may appreciate the freedom afforded by ready access to online health resources, which can reduce the time commitment office-based physician consultations require. Independent online inquiries also allow patients greater control over the rate at which they learn new medical information, reducing the sense of “information overload” that has traditionally stymied patient-physician encounters.<sup>7</sup>

In addition, the Internet provides a vast community of patients who find themselves in similar medical situations, thereby generating a strong, highly accessible base of support for individuals with health challenges.<sup>7</sup> Such support is especially beneficial for those who are homebound as a result of debilitating illness. Furthermore, it is possible that increased patient knowledge may help reduce physician errors.

Many concerns about potential disadvantages of online patient resources have been presented, however. Such concerns—and, indeed, objections—generally can be classified into one of the following areas:

- **reduced physician influence** as the patient may no longer view the physician as the ultimate healthcare authority, perhaps even bypassing the patient-physician relationship in favor of self-treatment
- **increased time and cost burdens on physicians and the medical system** that result from patient questions and requests for inappropriate testing or treatment<sup>8-12</sup>

Search results for health information using popular Internet search engines can range from Web sites offering unregulated advice that contradicts standard medical opinion to clinical Web sites that provide complex data for medical professionals. Misunderstandings, confusion, and other problems for patients can occur at both of these extremes.<sup>9,11</sup>

Certainly, the availability of health information on the Internet is changing many patients from passive consumers of healthcare services to empowered participants in their own health maintenance, resulting in a new challenge for many

physicians.<sup>13</sup> Are physicians prepared to respond when patients bring reams of information for interpretation during a brief office visit? What about when patients demand experimental treatments they read about online?<sup>14,15</sup>

Most research suggests that many patients use the Internet for finding relatively simple information on such routine health matters as diet and exercise rather than for complex information on specific clinical conditions.<sup>4</sup> Although some researchers<sup>16-21</sup> have investigated the possible effects of Internet use on the patient-physician relationship in specialty clinic settings, with the exception of one large study,<sup>3</sup> the effect of this trend in primary care settings has received minimal attention.<sup>7,12,13,22</sup> This dearth of knowledge is unfortunate because basic healthcare information—the kind most often delivered to patients in the primary care setting—is of most interest to the majority of Internet users<sup>4</sup> and has the greatest chance of improving patient well-being by encouraging modifications to routine self-care behaviors.

In 1983, the American Osteopathic Association<sup>23</sup> issued a position paper announcing the profession's goal of advancing patient education "to promote a better understanding of personal health and wellness." Commentary<sup>24,25</sup> and editorials<sup>26,27</sup> published in *JAOA—The Journal of the American Osteopathic Association* have also emphasized the importance of patient responsibility and self-care. Yet, there has been little evidence-based research<sup>28</sup> published on this topic as it relates to the osteopathic medical setting or Internet use.

### Methods

For the present investigation, we created a standardized survey to assist us in determining the prevalence of online information-seeking behaviors by patients. Patients at three primary care osteopathic medical clinics outside Detroit, Mich, were surveyed. We sought to determine the role this information played in changing patient beliefs and behaviors—as seen primarily in the context of the patient-physician relationship.

Data were collected anonymously using an eight-question survey (*Appendix*). Questions addressed a variety of topics related to patient use of the Internet to find health information.

The survey was created by the lead author (S.A.I.) in collaboration with the research coordinator at Mount Clemens Regional Medical Center in Mich. Staff of the residency program at this institution reviewed the questions to ensure readability and appropriateness for a broad spectrum of patients in the primary care setting.

Practical considerations in the clinical setting dictated the need for a brief survey. Therefore, we were unable to address the topic in great detail. Patients were asked about their ability to find the information they sought and the results of their independent research efforts—specifically any changes in thinking or behavior and how those changes may have affected the patient-physician relationship. The survey also included

"Background Information" items intended to gather minimal demographic data. No information was collected about participant income levels or health status.

Questionnaires were offered to all patients as they arrived for previously scheduled appointments with osteopathic family physicians or osteopathic internists at three medical clinics in Clinton Township, Mich. One of these clinics was a family practice clinic while the other two were internal medicine clinics.

A total of 100 surveys were distributed to patients at each clinic for a potential data pool of 300 participants. Participants were told that completion of the survey was voluntary and that their physician would not be involved with data collection nor made aware of their participation or responses. Office staff at the clinics collected the surveys from participants before the patient's appointment. Surveys were completed during the 10-week period from January 17, 2005, to March 25, 2005.

The anonymous data were tabulated for each question according to response, gender, and age group. Differences from the expected data distribution (ie, responses equally divided among answer choices within each age group) were analyzed using  $\chi^2$  tests. Incomplete surveys were included in data tabulations in all but four instances. In these instances, replies to questions were either insufficient for assignment or contradictory answers were given.

A review of the published literature focusing on primary care and Internet use in the United States accompanies the present survey-based investigation. A search was conducted using the PubMed database of the National Library of Medicine for articles related to patient use of the Internet for health-related information and the potential effects of this independent research activity on the patient-physician relationship. Our search included English-language articles published from 1999 to mid-2005.

All methods used in the present study were approved by the Mount Clemens Regional Medical Center Institutional Review Board.

### Survey Results

A total of 154 adequately completed surveys were collected and tabulated for an overall response rate of 51%.

In accord with the work of previous researchers<sup>4,28,29</sup> who noted that women make up a slightly higher proportion of people who use the Internet to seek health information, we observed a higher survey response rate from women (98 [64%]) than men in the present investigation. However, for each question, the relative ratio of men vs women who answered each question affirmatively was not statistically different from the distribution expected with the gender ratio observed (*Table 1*) as based on  $\chi^2$  analysis. Thus, our results are not separated by gender.

The majority of respondents (60%) were aged between 31

**Table 1**  
**Survey on Patient Use of the Internet for Health Information:**  
**Subject Characteristics (N=154)**

Characteristic	Age Group, y				Unknown	Total, No. (%)
	18-30	31-45	46-60	≥61		
<b>■ Sex</b>						
<input type="checkbox"/> Man	5 (10.4)	13 (27.1)	19 (39.6)	10 (20.8)	1 (2.1)	48 (31.2)
<input type="checkbox"/> Woman	24 (24.5)	32 (32.7)	27 (27.6)	14 (14.3)	1 (1.0)	98 (63.6)
<input type="checkbox"/> No answer	0 (0)	1 (12.5)	0 (0)	0 (0)	7 (87.5)	8 (5.2)
<b>■ Reason for Office Visit</b>						
<input type="checkbox"/> For myself	23 (20.0)	32 (27.8)	40 (34.8)	19 (16.5)	1 (0.9)	115 (74.7)
<input type="checkbox"/> For someone else	3 (25.0)	7 (58.3)	1 (8.3)	1 (8.3)	0 (0)	12 (7.8)
<input type="checkbox"/> No answer	3 (11.1)	7 (25.9)	5 (18.5)	4 (14.8)	8 (29.6)	27 (17.5)

\* Overall sample size represents number of surveys completed and tabulated. Data for each survey item are presented as No. (%) of the total for that item.

and 60 years, with the remainder roughly equally distributed among the other age groups. Use of the Internet to find health information decreased with age.

Regarding the reasons for the office visits, most participants (115 [75%]) noted that they were seeing the physician for their own medical care.

Of 154 survey respondents, 89 individuals (58%) indicated that they had used the Internet to find information on medical problems or other health-related concerns (Table 2); this population is referred to as "Internet users" throughout the present article.

Among the 89 Internet users, 60 (67%) reported that they were able to find answers to their healthcare questions online, while another 26 users (29%) said they were "somewhat able" to do so. Two Internet users (2%) responded that they were unable to answer their questions using online resources. Among participants aged 31 to 45 years, 86% reported that they were able to find healthcare answers on the Internet, while 60% or less of participants in all other age groups answered this question affirmatively.

Of the Internet users, 49 individuals (55%) indicated that the information they found on the Web changed the way they thought about their health. Among the various age groups, Internet users aged 31 to 45 years were most likely to report changed thinking (19 [63%]) than users in other age groups. Internet users aged 61 years and older were far less likely to report this outcome (2 [25%]).

Of the 49 Internet users who reported changes in their thinking prompted by online information, the most common change (29 [59%]) was increased interested in their own health (Figure 1).

Although the majority of Internet users (48 [54%]) did not change their behavior as a result of the information they found in online health resources, 41 individuals (46%) did report having made such changes. Once again, Internet users

aged 31 to 45 years were most likely to report behavioral changes (17 [57%]); users aged 61 years and older were least likely to report these changes (2 [25%]).

The behavioral changes most commonly reported among Internet users were those that signify more active engagement during physician office visits, particularly asking more questions (27 [66%]). In addition, these patients reported greater adherence to physician advice (22 [54%]) and changed dietary habits (22 [54%]). Other notable behavioral changes reported were increased physician visits (15 [37%]) and increased use of herbal products or dietary supplements (11 [27%]).

Among the 41 Internet users who changed their behaviors based on online health information, 30 (73%) responded that they told their physicians about these behavioral changes, while 9 (22%) reported that they did not. The latter group expressed several reasons for not keeping their physicians informed during recent office visits. These reasons ranged from having forgotten about the changes or believing those changes insignificant to time constraints during office visits and a belief that the physician would disapprove. Among this group of Internet users, 5 subjects were aged 46 to 60 years. The remaining 4 respondents were spread throughout the other age groups.

Most Internet users (75 [84%]) indicated that they believed their physicians would be willing to discuss health information they had found online. This proportion was higher among respondents in younger age groups, with a high of 91% in the 18-to-30-years age group. Nine Internet users (10%) did not respond to this survey question.

The majority of Internet users reported that they followed physician recommendations "always" (55 [62%]) or "most" of the time (18 [20%]) before the advent of the Internet. Self-reported patient compliance rates were generally higher among older participants than younger participants. Eight participants (9%) did not answer this survey question.

## SPECIAL COMMUNICATION

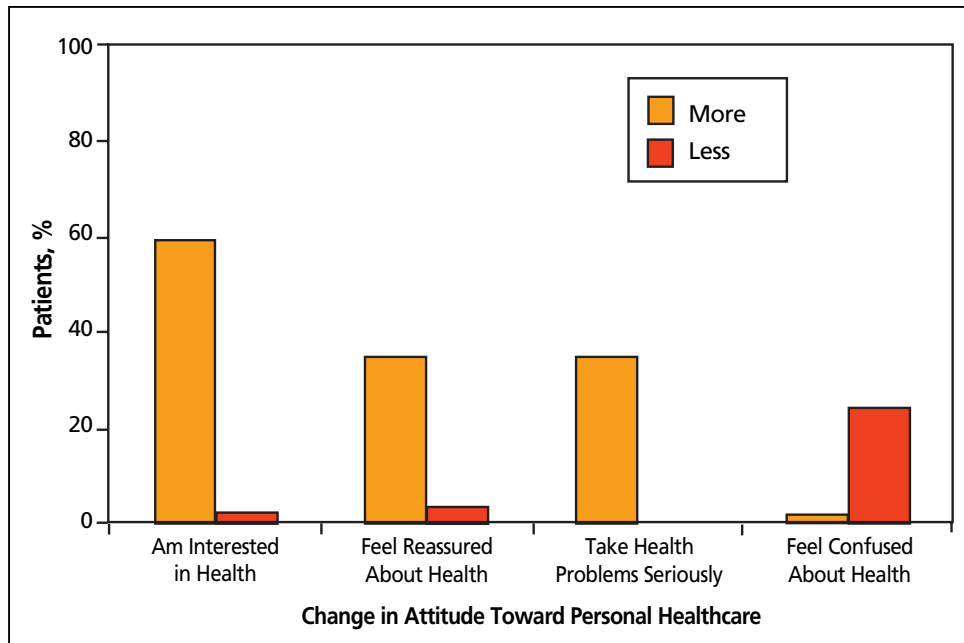
**Table 2**  
**Survey on Patient Use of the Internet for Health Information:**  
**Responses from Internet Users (n=89) vs Non-Internet Users (n=65)\***

Survey Item	Age Group, y					Total, No. (%)†
	18-30 (n=29)	31-45 (n=46)	46-60 (n=46)	≥61 (n=24)	Unknown (n=9)	
<b>INTERNET USERS, No. (%)</b>	<b>21 (23.6)</b>	<b>30 (33.7)</b>	<b>25 (28.1)</b>	<b>8 (9.0)</b>	<b>5 (5.6)</b>	<b>89 (57.8)</b>
<b>■ I am able to find answers to my health questions online</b>						
□ Yes	11 (52.4)	26 (86.7)	15 (60.0)	4 (50.0)	4 (80.0)	60 (67.4)
□ Somewhat	9 (42.9)	4 (13.3)	10 (40.0)	3 (37.5)	0 (0)	26 (29.2)
□ No	1 (4.8)	0 (0)	0 (0)	0 (0)	1 (20.0)	2 (2.2)
□ No answer	0 (0)	0 (0)	0 (0)	1 (12.5)	0 (0)	1 (1.1)
<b>■ I experienced changes in thinking about health as a result of online information</b>						
□ Yes	10 (47.6)	19 (63.3)	14 (56.0)	2 (25.0)	4 (80.0)	49 (55.1)
□ No	10 (47.6)	10 (33.3)	11 (44.0)	6 (75.0)	1 (20.0)	38 (42.7)
□ No answer	1 (4.8)	1 (3.3)	0 (0)	0 (0)	0 (0)	2 (2.2)
<b>■ I made behavioral changes as a result of online information</b>						
□ Yes	9 (42.9)	17 (56.7)	11 (44.0)	2 (25.0)	2 (40.0)	41 (46.1)
– I informed my physician about these behavioral changes						
· Yes	7 (77.8)	16 (94.1)	5 (45.5)	1 (50.0)	1 (20.0)	30 (73.2)
· No	2 (22.2)	1 (5.9)	5 (45.5)	1 (50.0)	0 (0)	9 (22.0)
· No answer	0 (0)	0 (0)	1 (9.1)	0 (0)	1 (20.0)	2 (4.9)
□ No	12 (57.1)	13 (43.3)	14 (56.0)	6 (75.0)	3 (60.0)	48 (53.9)
□ No answer	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
<b>■ I believe my physician is willing to discuss online information with me</b>						
□ Yes	19 (90.5)	27 (90.0)	21 (84.0)	6 (75.0)	2 (40.0)	75 (84.3)
□ No	0 (0)	3 (10.0)	2 (8.0)	0 (0)	0 (0)	5 (5.6)
□ No answer	2 (9.5)	0 (0)	2 (8.0)	2 (25.0)	3 (60.0)	9 (10.1)
<b>■ I followed physician's advice before I began using the Internet</b>						
□ Always	12 (57.1)	17 (56.7)	19 (76.0)	6 (75.0)	1 (20.0)	55 (61.8)
□ Most of the time	5 (23.8)	8 (26.7)	3 (12.0)	1 (12.5)	1 (20.0)	18 (20.2)
□ If advice made sense	3 (14.3)	2 (6.7)	2 (8.0)	0 (0)	0 (0)	7 (7.9)
□ Made up own mind	0 (0)	1 (3.3)	0 (0)	0 (0)	0 (0)	1 (1.1)
□ Seldom	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
□ No answer	1 (4.8)	2 (6.7)	1 (4.0)	1 (12.5)	3 (60.0)	8 (9.0)
<b>NON-INTERNET USERS, No. (%)</b>	<b>8 (12.3)</b>	<b>16 (24.6)</b>	<b>21 (32.3)</b>	<b>16 (24.6)</b>	<b>4 (6.2)</b>	<b>65 (42.2)</b>
<b>■ Reasons given for not using the Internet to locate information about health online</b>						
□ Already adequately informed	5 (62.5)	5 (31.3)	4 (19.0)	5 (31.3)	1 (25.0)	20 (30.8)
□ Use other resources	1 (12.5)	8 (50.0)	8 (38.1)	5 (31.3)	1 (25.0)	23 (35.4)
□ No Internet access	3 (37.5)	7 (43.8)	10 (47.6)	9 (56.3)	1 (25.0)	30 (46.2)
□ Uncomfortable with Internet	1 (12.5)	1 (6.3)	5 (23.8)	3 (18.8)	0 (0)	10 (15.4)
□ Do not trust Internet information	0 (0)	1 (6.3)	3 (14.3)	2 (12.5)	0 (0)	6 (9.2)

\* A total of 154 surveys were completed and tabulated. Some percentages do not total 100 because of rounding.

The 65 survey participants (42%) who had not used the Internet to seek health-related information were directed to a question at the end of the survey that inquired as to their reasons for not doing so. The most common reasons provided

were lack of Internet access (30 [46%]), the availability of other information resources (23 [35%]), and feeling adequately informed already (20 [31%]). Ten of these respondents (15%) reported feeling uncomfortable using the Internet, while 6 (9%)



**Figure 1.** Percentage of surveyed patients who indicated that they had changed their way they think about their health as a result of information they found on the Internet (n=49). The survey asked these patients whether they were more or less inclined to be interested in and reassured about their health, take their health problems seriously, and feel confused.

indicated that they did not trust the information available in that medium.

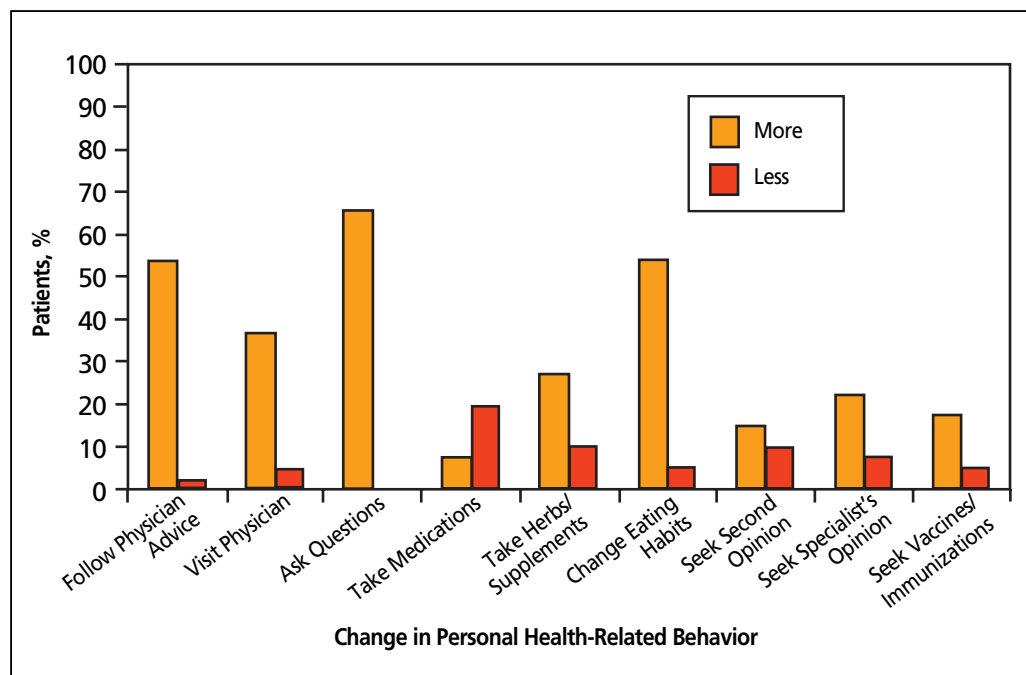
**Comment**

Fifty-one percent of the surveys distributed were completed and returned. We cannot be certain why some patients completed surveys and others did not, but it is possible that patients using the Internet were more likely to complete the survey than those not using the Internet. Therefore, our results may

be biased to reflect slightly greater use of the Internet than exists in the general patient population at primary care clinics.

More than half of our survey respondents reported that they had used the Internet to find information about their medical problems or other health-related concerns. Such users were more commonly found among younger age groups than their older counterparts.

As noted, of those survey participants not using the Internet for health-related information, lack of Internet access



**Figure 2.** Percentage of surveyed patients who indicated that they had changed their behavior as a result of health-related information they found on the Internet (n=41). The survey asked these patients whether they were more or less inclined to follow physician advice, seek medical care, ask questions during office visits, take medication and herbal products or dietary supplements, change their eating habits, seek a second medical opinion, seek a specialist's opinion, and seek vaccination or immunization.

was the most common reason provided for not using the Web, followed by discomfort using the Internet. These findings suggest that the proportion of Internet users will likely grow among the patient population as Internet access expands and as more individuals become comfortable with this relatively new technology.

### **Potential Beneficial Effects**

Using the Internet to find health information could help empower patients to become more active partners in their own health management, allowing them to better understand medical information by removing the time constraints and potential embarrassment that can occur in a clinical setting.

More than half the Internet users responding to the present survey reported that the online information they found changed the way they thought about their health, with these changes most prevalent in the 31-to-45-years age group and least prevalent in those aged 61 years and older. Many individuals reported increased interest in their health as a result of their independent Web-based research. These same individuals also reported changes in their thinking about health-related issues, including asking more questions during physician visits and increased levels of patient compliance.

The vast majority of Internet users in the present survey were able to use the Web to answer at least their initial health-related questions, with close to 100% of users reporting that they were either fully or partially successful in their searches. These results suggest that the amount of medical information available on the Internet is sufficient to satisfy most users. Younger Internet users, those aged 31 to 45 years, were most likely to report that they had found answers to their health questions. Although a bias toward younger age groups seems intuitive for such a question, it is unclear why this particular age group would feel more confident than the youngest group of Internet users (ie, those aged 18 to 30 years) in locating online health-related information.

The Internet users surveyed also reported that the online health information they found had a reassuring effect and reduced confusion with regard to their personal medical issues.

The survey did not inquire as to why online information led to changes in patient thinking (eg, whether patients were better able to control the rate of new information online compared with office visits, or whether patients felt more free to ask questions that might cause embarrassment in a face-to-face setting). Furthermore, we did not use the survey to probe the extent to which participants actually understood the information they found online. Nevertheless, the results of the present survey support the theory that health-related information on the Internet may play an important role in patient ability to function as confident partners in their own health management, possibly by answering simpler questions before

physician visits and by allowing patients to encounter new information at their own pace so they feel less overwhelmed.

### **Potential Harmful Effects**

One major concern among physicians is the possible influence of the Internet on the patient-physician relationship, specifically insofar as patients may come to view physicians as less of an authority on medical issues. However, our survey results lead us to reject this hypothesis because—among Internet users who changed their behavior based on information they obtained online—the majority of respondents believed that their physicians would be open to discussing the health-related information they located online (84%) and shared the results of their research with their physicians (73%). Of the nine Internet users who changed their behavior but did not tell their physicians, only one user cited a feeling that the physician would disapprove of the information. Most other users simply forgot about the changes they had made, thought them inconsequential, or simply had not yet met with their physicians.

Five of the nine Internet users who changed their behavior but did not tell their physicians were between the ages of 46 and 60 years. This finding—combined with the younger age distribution of those believing physicians would be willing to discuss any information they had located online—suggests that older patients are perhaps less likely to be forthcoming about their use of the Internet. Moreover, the question about physician willingness to discuss Web information resulted in the highest number of nonresponses (9 [10%]) of any question in the survey—possibly indicating more reticence among patients on this issue than is suggested solely by our results.

Two of the most commonly changed behaviors reported by Internet users—asking more questions during office visits and increased patient compliance—suggest that these patients continue to perceive and seek out physicians as authoritative health experts. It is worth noting the greater adherence to physician advice reported before the availability of the Internet, with 82% of respondents answering that they had followed physician advice always or most of the time. However, it is also true that even when patients claimed to comply with physician instructions for self-care, it does not necessarily follow that they actually did so. Nine percent of Internet users did not answer the patient-compliance question, further suggesting that actual compliance rates may be lower than reported.

A related concern commonly voiced by physicians regarding the influence of the Internet on the patient-physician relationship is that, on the basis of inaccurate, inadequate, or misleading online information, patients may begin a self-treatment regimen that is ineffective or potentially hazardous. Indeed, some patients may attempt to use online information for self-diagnosis and self-treatment when they are unable to obtain an appointment with their physicians quickly.

Internet-prompted self-diagnosis and self-treatment is a cause for concern among medical professionals because most patients have trouble evaluating and verifying the health-related information they locate online. For example, in one of the Web-related behavioral changes addressed by the present survey, Internet users reported increased use of herbal products. Many herbal products are known to be ineffective or inaccurately labeled and marketed, and many such substances can interact adversely with prescription medications.<sup>30</sup>

Internet users also reported making dietary changes as a result of online information—and, to a lesser extent, “adjust[ing] medicine doses” (8 [20%]). If these changes are in accord with physician recommendations, there would be a net benefit to patient health. However, because we did not have follow-up questions for these survey items, we are unable to determine whether these self-directed behavioral changes would be beneficial.

In addition, though we did not attempt to evaluate the ability of patients to judge information quality, we were able to determine that approximately 90% of non-Internet users who responded to our survey trust information obtained online. Although this number might have been lower if our survey had asked patients if they have “a healthy skepticism” of online information, our data still suggest that patients might not fully appreciate the difficulty inherent to the task of assessing the quality of online health information.

The final concern often expressed about the influence of the Internet on the patient-physician relationship is the extra burden of time and resources placed on physicians and the medical system as a result of an increase in patient questions. These questions include requests for diagnostic tests, procedures, and specialist consultations. The results of our survey clearly indicate that this particular concern may be well founded.

We reported that 66% of patients indicated that they had more questions for their physicians as a result of their Web-based research. It is likely that this increase adds to the increasing time constraints reported by both parties during office visits. To a lesser extent, the results of our survey also support the impression among physicians that Internet users would request more vaccinations or immunizations (9 [22%]) and specialist care (7 [17%]). Interestingly, the number of Internet users reporting increased requests for second opinions (6 [15%]) was almost balanced out by the number of such patients reporting a decrease in these requests (4 [10%]) as a result of their independent research efforts.

Overall, our survey of patient-reported behaviors suggests there may be an increased work burden placed on physicians as a result of online information-seeking behaviors among patients. However, our results do not attempt to evaluate if these patient-driven increases are appropriate or beneficial to patients given their individual health conditions and medical histories.

### Literature Review and Research Synthesis

The percentage of Internet users at osteopathic primary care clinics (58%) was higher than that reported in an allopathic setting (33%)<sup>3</sup> and higher than that hypothesized (48%) for the osteopathic setting by previous researchers.<sup>28</sup> At the time of the study, there were no other structured surveys of Internet use by patients in the primary care setting—though data does exist on Internet use by patients at cancer clinics and in other specialty settings.<sup>16-21</sup>

Previous survey-based studies<sup>4,20,28,29,31,32</sup> also reported decreased Internet use with increased age, even when computers were available to participants and when those individuals used the Internet for other purposes. As indicated previously, researchers<sup>4,28,29</sup> have found that women make up a slightly higher proportion of people who use the Internet to seek health information. In addition, levels of Internet use are reported as higher among whites than other racial and ethnic groups<sup>20,29</sup> as well as among those with higher education levels and socioeconomic status.<sup>28,32,33</sup> Socioeconomic factors were not studied in the present investigation, however.

Previous studies have cited the availability of health information on the Internet as a generally beneficial development for patients.<sup>12,14</sup> However, these studies included mainly anecdotal or indirect information on the effects of this behavior among patients. Thus, more research on this topic is clearly needed.

### Patient-Physician Relationship

One area examined in previous studies of Internet users is the role of the physician as health authority and screener of medical information.<sup>8</sup> Some critics<sup>22</sup> have charged that, as a consequence of the managed care system, the patient-physician relationship is less personal and attentive than it was in the past.

Patients in previous surveys have indicated that they investigate issues on the Internet partly to avoid troubling their physicians with every question they have—as well as to control the rate at which they encounter new information so they feel less overwhelmed.<sup>7</sup> This form of Internet use may be seen as a proactive response to a potential source of discomfort within the patient-physician relationship rather than a wholesale threat to its continuation.

When surveyed, most patients indicate that they viewed their primary care physicians as the most reliable source of health information. In fact, most patients report that they trust their primary care physicians more than any other health information source.<sup>12,34,35</sup> Thus, the patient-physician relationship may deteriorate only for those physicians who insist on acting as sole arbiters of medical information—specifically those who summarily dismiss the concerns and questions of informed and engaged patients.<sup>12,34-36</sup>

A larger concern investigated by other researchers<sup>15,36</sup> centers on patients who may ignore the expertise of physi-

cians and use information on the Internet for self-diagnosis and self-treatment. A literature review of patient behavior by Morahan-Martin<sup>35</sup> indicated that many patients do not discuss their online findings with their physicians. According to that review,<sup>35</sup> surveys asking patients directly whether they had used Internet information to self-diagnose revealed that approximately 20% of respondents had done so.

Self-diagnosis based on information on the Internet can, at its worst, steer patients toward potentially inappropriate, ineffective, and lethal treatments. In the vast majority of cases, however, self-diagnosis takes the form of requests by patients for inappropriate or currently unavailable diagnostic testing.<sup>37</sup>

Numerous authors have commented on the variable quality of health-related information that is available online as well as the questionable ability of patients to evaluate the reliability of such resources.<sup>8,9,11,12</sup> A survey of 748 physicians in the United Kingdom found that the majority of physicians believes that health information on the Web is either “usually” or “sometimes” reliable.<sup>14</sup> Yet, studies of online information quality—which have been restricted to specific health conditions—support the position that many Web sites do not provide reliable or detailed information.<sup>17,18,30,38</sup>

Indeed, many individuals lack the media literacy skills to comprehend and comparatively evaluate medical information and do not understand how or where to locate the most accurate information online.<sup>1,13,39,40</sup> Previous research suggests that most patients, even those who are college-educated, demonstrate low Internet search competence and routinely overestimate their ability to locate information online.<sup>12,15,40,41</sup> The average Internet user is commonly unaware of the source of the material that he or she encounters online and is likewise unaware of the likelihood of locating misleading and possibly dangerous health recommendations there.<sup>1,13</sup> Although Eysenbach and Kohler<sup>37</sup> found that patients do consider information source when attempting to evaluate the trustworthiness of a health-related Web site, they also found that patients generally tend to trust Web sites as long as the site design appears professional and easily navigable.

Level of confidence in Web resources may vary with demographic factors. Internet users who have attained higher levels of education and income are most likely to perceive online information as reliable.<sup>19,34</sup> Some researchers<sup>13,37</sup> have concluded that patients typically do not check, or cannot remember, the source of the information they read online.

Another problem noted in the literature is the inability of many patients to appropriately weigh medical information from anecdotal reports versus data derived from large-scale controlled clinical studies.<sup>12</sup> Thus, though some health experts have expressed concern that the availability of clinical Web sites may pose a danger to patients by prompting them to request experimental treatments,<sup>9</sup> the larger problem may actually be the multitude of data available in conjunction with poor media

literacy skills—an increasingly challenging skill for physicians to master as well.<sup>27,42</sup>

The extra burdens of time and resource costs to physicians resulting from more patients questions, inappropriate requests for treatment, and the potential for such information to encourage hypochondriac tendencies among some patients, are some of the factors in the debate surrounding the widespread availability of online health resources.<sup>12,14</sup>

Increased physician workload load as a result of patient questions—sometimes with ancillary printouts and visual aids presented for analysis and interpretation during office visits—is certainly memorable for some physicians and can undoubtedly lead to increased time pressure during patient encounters. Nevertheless, some questions generated by patients’ independent research efforts may be legitimate. Therefore, the objective of physicians should be to encourage questions that can improve patient care and compliance. In addition, it should be pointed out that physicians can greatly overestimate the amount of time they spend dispensing information to patients,<sup>12,14</sup> so the perceived imposition on physician time and resources may not be as great as some individuals believe.

There has been little research<sup>5</sup> on how best to communicate information to patients to keep them well informed on the healthcare issues that may affect them. Physicians with a strong interest in promoting public health may consider partnering with local educational institutions—many of which already produce materials to improve media literacy<sup>43</sup>—to address healthcare topics. Handouts that compare appropriate versus inappropriate patient requests and materials that describe methods for patients to evaluate health information (eg, anecdotal reports vs double-blind clinical trials) would be a good direction for such advocacy efforts. Although it will be impossible to reach every patient with such materials, it is possible to support existing public education efforts with the end-goal being more efficient healthcare delivery and reduced demands on physicians.

For example, patients often make requests for inappropriate treatment based on direct-to-consumer advertisements. Murray et al<sup>10</sup> reported that nearly half of requests for treatment resulting from this relatively new advertising vehicle were medically inappropriate. Some of these requests likely arise from a lack of media literacy. Other requests may come from particularly insistent patients or entrenched hypochondriacs. These latter requests are more troubling in the current legal and medical management environment because patients may feel that denied requests are based on a desire to cut costs rather than on sound, evidence-based medical advice.<sup>15</sup>

Indeed, some physicians may decide to honor inappropriate patient requests for testing and treatment—provided that these requests would not cause harm—simply to avoid arguing with patients or to retain patient trust.<sup>10,15</sup> This path-of-least-resistance tendency may balloon as hypochondriac and poten-



tially litigious patients move from physician to physician. The resulting waste of healthcare resources will likely be ameliorated only by establishing standards that clearly discourage such behavior.

## Conclusion

Access to online health information is widespread among patients in primary care settings, with online information-seeking behaviors slightly more prevalent among individuals aged 31 to 45 years than other age groups.

Obtaining medical information from the Internet may produce several benefits for the patient-physician relationship, including a better understanding of health information among patients, active patient engagement in health maintenance, and a proactive patient response to health challenges.

Internet use among patients clearly leads to an increase in questions from patients and increased requests for inappropriate or unavailable testing or treatment—a development that could place a burden on physicians and other medical resources.

Because the size of the survey population used in the present study was limited—and because patterns of Internet use change rapidly—a large multiregional study may further clarify patterns observed in the present investigation.

Future studies should examine the effects on the patient-physician relationship from both parties' perspectives as well as from a larger, socioeconomic point of view. An improved understanding of the true effect of this information-seeking behavior on health outcomes would help physicians further engage their patients in the collaborative relationships that are the hallmark of the osteopathic concept of providing care for the whole patient.

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**Appendix**

The standardized survey presented in this appendix was used to determine the prevalence of online information-seeking behaviors among patients. Patients at three primary care osteopathic medical clinics outside Detroit, Mich, were surveyed. Researchers sought to determine the role online information played in changing patient beliefs and behaviors—as seen primarily in the context of the patient-physician relationship.

**Mount Clemens Regional Medical Center  
Survey on Patient Use of the Internet for Health Information**

*Instructions: Please select the correct answer(s) to each question.*

**1. Have you ever used the Internet to find information on medical problems or health-related concerns?**  
 Yes   
 No

*(If you answered "Yes" to question 1, please go to question 2. If you answered "No," please go to question 8.)*

**2. If you used the Internet, were you able to find answers to your health questions?**  
 Yes   
 No   
 Somewhat

**3. Did the information you found on the Internet change the way you think about your health?**  
 Yes   
 No

If you answered "Yes" to question 3, what has changed? *(Please check all answers that apply.)*

I am more interested.	<input type="checkbox"/>	I am less interested.	<input type="checkbox"/>
I feel reassured.	<input type="checkbox"/>	I feel overwhelmed.	<input type="checkbox"/>
I take problems more seriously.	<input type="checkbox"/>	I take problems less seriously.	<input type="checkbox"/>
I feel more confused.	<input type="checkbox"/>	I feel less confused.	<input type="checkbox"/>

Other *(Please describe.)* \_\_\_\_\_

**4. Have you made any changes in your behavior because of health-related information you found on the Internet?**  
 Yes   
 No

If you answered "Yes" to question 4, what are you doing differently? *(Please check all answers that apply.)*

I follow my doctor's advice:	More closely <input type="checkbox"/>	Less closely <input type="checkbox"/>
I am seeing the doctor:	More often <input type="checkbox"/>	Less often <input type="checkbox"/>
During doctor visits, I ask questions:	More often <input type="checkbox"/>	Less often <input type="checkbox"/>
I adjusted my medicine doses:	Taking more <input type="checkbox"/>	Taking less <input type="checkbox"/>
I am taking herbs/supplements:	More often <input type="checkbox"/>	Less often <input type="checkbox"/>
I started eating differently:	Yes <input type="checkbox"/>	No <input type="checkbox"/>
I have sought a second opinion:	More often <input type="checkbox"/>	Less often <input type="checkbox"/>
I have sought a specialist's opinion:	More often <input type="checkbox"/>	Less often <input type="checkbox"/>
I have sought vaccines/immunizations:	More often <input type="checkbox"/>	Less often <input type="checkbox"/>

Other *(Please describe.)* \_\_\_\_\_

*(continued)*

**Appendix (continued)**

**Mount Clemens Regional Medical Center  
Survey on Patient Use of the Internet for Health Information (continued)**

5. If you have made any changes in your health practices, have you told your doctor?

- Yes
- No

If you answered "No" to question 5, why not? *(Please check all answers that apply.)*

- I forgot.
- I didn't think it was important.
- I didn't think he/she would approve.
- I haven't been to the doctor's office until now.
- There did not seem to be enough time to discuss it.
- Other *(Please describe.)* \_\_\_\_\_

6. Do you feel that your doctor would be willing to talk with you about your Internet findings?

- Yes
- No

7. Before the Internet became available, how closely did you tend to follow your doctor's recommendations?

*(Please check only one answer.)*

- I always followed his/her advice as closely as possible.
- I followed most of his/her advice closely. (For example, I may have forgotten some medication doses or did not have some recommended testing done.)
- I followed recommendations closely when they made sense to me.
- I preferred to make up my own mind about recommended medications, testing, or follow-up appointments.
- I have seldom followed my doctor's recommendations.
- Other *(Please describe.)* \_\_\_\_\_

8. If you have not used the Internet to search for health information, why not? *(Please check all answers that apply.)*

- I feel adequately informed already.
- I get information through other resources.
- I do not have access to the Internet.
- I am not comfortable searching the Internet.
- I do not trust the information on the Internet.
- Other *(Please describe.)* \_\_\_\_\_

Do you have any other comments?

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

*(continued)*

## Appendix (continued)

Mount Clemens Regional Medical Center Survey on Patient Use of the Internet for Health Information (continued)	
<b>Background Information</b> <i>(Please check the answer that applies.)</i>	
My sex:	
Woman	<input type="checkbox"/>
Man	<input type="checkbox"/>
My age range, in years:	
18-30	<input type="checkbox"/>
31-45	<input type="checkbox"/>
46-60	<input type="checkbox"/>
61-72	<input type="checkbox"/>
Over 72	<input type="checkbox"/>
My reason for being at the doctor today:	
For myself	<input type="checkbox"/>
For someone else	<input type="checkbox"/>
If you are here with someone else, with whom did you come?	
My child	<input type="checkbox"/>
My spouse	<input type="checkbox"/>
A client	<input type="checkbox"/>
A friend	<input type="checkbox"/>
My parent	<input type="checkbox"/>
My grandparent	<input type="checkbox"/>
My grandchild	<input type="checkbox"/>
Other	_____
<i>Thank you for taking the time to complete this survey.</i>	