

---

## Reasons, assessments and actions taken: sex and age differences in uses of Internet health information

Michele Ybarra<sup>1\*</sup> and Michael Suman<sup>2</sup>

---

### Abstract

The Internet is transforming the way in which consumers approach their health care needs. Sex and age are influential aspects of one's health as well as disease risk and are thus integral components of the emerging picture of health information seekers. Using data from *Surveying the Digital Future, Year 4*, a nationally representative, longitudinal telephone survey of Americans 12 years of age and older ( $n = 2010$ ), we examine the reasons for, assessments of and actions taken as a result of health information found online among men and women and older and younger people. Although we tend to think of the Internet as a young person's technology, the percent of adults 60 years of age and older is similar to that of adolescents using the Internet as a health care information resource, thus suggesting an untapped opportunity with online interventions for older adults. Nonetheless, as age increases so too does the report of frustration with the experience. Men are more likely to report a positive seeking experience than women. Differences in Internet use fail to explain these observed sex and age differences in the seeking experience. Across the spectrum of age, sex and Internet skill, Internet health information seek-

ing appears to enhance the patient-provider relationship.

---

### Introduction

An estimated 7 in 10 of Americans are now online [1], more than half of whom are Internet health information seekers [2, 3, 13]. As the Internet continues to grow in popularity [1], research attention has turned to how consumers are using the Internet as a health care information resource [3–8]. The majority of research has focused on the quality of health websites. Findings consistently report that quality is lacking [9–11]. Regardless of researchers' concerns about the Internet's limitations, however, data suggest that its use as a health information resource is only going to increase among consumers [12]. As such, researchers must move beyond discussions of quality, the digital divide, etc. and also examine the seeking experience [3–8]. Indeed, if we are interested in harnessing the power of the Internet as a health education tool, it is imperative that researchers examine the reasons why people turn to the Internet for their health care information needs, their assessments of this experience and the resulting actions spurred by the information found.

Physicians are the preferred first source of health information for 50% of Americans, yet only 11% report their physician as the first line of inquiry, as compared with 49% who report that the Internet is their first source [3]. The Internet is frequently used as a source of health information among consumers, although there remains a great deal to learn about the seeking experience and how it may differ across

---

<sup>1</sup>Internet Solutions for Kids, Inc., 74 Ashford, Irvine, CA 92618, USA and <sup>2</sup>Center for the Digital Future, USC Annenberg School for Communication, 300 S. Grand Avenue, Suite 3950, Los Angeles, CA 90071, USA

\*Correspondence to: M. Ybarra.

E-mail: Michele@ISolutions4Kids.org

age groups and between the sexes. Recent research suggests men and women differ in their reasons for online searching. For example, men are more likely than women to look for information about sensitive health subjects whereas women are more likely than men to indicate that the information found online was influential in helping them cope with their illness [13]. Age-specific lifestyle trends (e.g. middle-aged adults becoming caregivers for older parents as well as their children) and typical health status and disease risk changes as one grows older also likely influence the Internet health information seeking experience although there is a paucity of research in this area. Among people with the same medical condition, middle-aged people are more likely than younger people to use the Internet as a health information resource [14]. Similarly, 75% more older adults versus younger adults report searching for information about experimental treatments [12]. These findings suggest that age and sex influence the seeking experience. To what extent remains unclear.

It is likely that general Internet use, experience and expertise, which also vary by sex and age, affect the e-health seeking experience. Adolescents have more readily adopted the Internet in general, yet middle-aged adults are most likely to look for health information online [2]. Women are more likely to be health information seekers [13], but also generally have more negative attitudes toward computers and the Internet [15]. It is important to understand how these underlying differences may mediate the online health care seeking experience.

Recognizing that the Internet's influence on health care information is likely to only increase [12], more detailed information of the searching experience of people with different personal characteristics is needed. Findings will help health education researchers who use the Internet to deliver targeted programs to better understand how these characteristics may relate to different reasons, assessments and actions of online consumers. To examine these issues, we use data from *Surveying the Digital Future, Year 4*. We first report the sex and age-specific experiences of online health information seeking. Second, we

examine how Internet expertise and knowledge affect both the assessment of the experience and actions taken as a result of information found online among the different sex and age groups. We hypothesize that it will be easier for younger health information seekers to find the information they are looking for because of their greater expertise and comfort with the Internet. We also posit a generally more positive experience for men than women because of their greater comfort with the technology. We expect these variations largely to be explained by underlying differences in Internet usage characteristics.

---

## Methods

---

### Data source

Data are from *Surveying the Digital Future, Year 4*, a nationally representative telephone survey of people in the United States 12 years of age and older [1]. Data were collected in the summer and fall of 2003. The equal probability selection method (EPSEM) was used to identify the original sample in Year 1, as well as replacement respondents in subsequent years. In Year 1, 19 247 phone numbers were generated. Of the 7059 eligible households identified, 2104 completed interviews. In Year 4, all 1960 respondents from the previous year who indicated they were willing to be contacted again were called. To replace dropouts, an additional 18 500 phone numbers were randomly identified via EPSEM and called. In total, 2010 interviews were completed among the 6279 eligible households identified. Five hundred and seventy of the 2104 participants from Year 1 were in the panel in Year 4.

During the first call, the interviewer spoke with an adult to create a list of all household members 12 years of age and older from which one member was randomly identified to participate. Interviews were completed in either English or Spanish and took an average of 34 min. The final study protocol was reviewed and approved by the

Institutional Review Board at the University of California, LA, which was also responsible for overseeing compliance with human subjects research standards.

### **Study sample**

Eligibility criteria were intentionally broad to promote a wide range of participants. Respondents were required to be aged 12 years or older, speak either English or Spanish, and provide verbal consent. No additional exclusion criteria were applied. The current study sample includes all survey respondents who provided a valid answer about their Internet use in the previous year ( $n = 2007$ ).

### **Measures**

#### *Health information seekers*

Health information seekers were identified as those who reported looking for health or medical information on the Internet in the previous 12 months (yes/no).

#### *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 (yes/no), as well as for health or medical information about a health problem a loved one may have had in the previous year (yes/no). Respondents were additionally asked an open-ended question about why they chose the Internet to look for health or medical information. Results suggested six categories: (i) information was free/seeing a physician was expensive; (ii) information was quickly acquired/had a serious problem and needed answers quickly; (iii) privacy/avoiding embarrassment/sensitive issues; (iv) easy to find; (v) wide availability of information and (vi) all other responses. The sixth category was uninformative and not included in the current investigation.

#### *Assessment of experience and information accessed*

Respondents were read 11 statements (see Tables I and II for complete list) reflecting feelings or

perceptions one may have after searching for health information online (e.g. the search took a lot of effort) and were asked to rate how strongly they agreed or disagreed with the statement [Likert scale: 1 (strongly disagree)–5 (strongly agree)]. After examining cell distributions, each variable was dichotomized to ensure cell stability; those who indicated they agreed/strongly agreed with the statement were compared with all others. Two statements were overlapping ('I found too much information' and 'I found too little information'). Only the latter is reported here.

#### *Action taken based upon information found*

Additional outcomes stemming from the information found online were also sought (see Tables I and II). Specifically, 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 (yes/no).

### **Statistical methods**

Stata 7 was used for all statistical analyses [16]. First, missing and non-responsive answers (i.e. 'don't know' and 'refused') were imputed using best-set regression [16]. This affected <1% of data with one exception: 6.5% of respondents were unresponsive to queries about their household income. Second, we examined self-reported characteristics related to using health care information online, focusing on three domains: (i) reasons for using the Internet as a resource, (ii) one's assessment of the experience and (iii) actions taken as a result. Differences by sex and age were investigated using chi-square tests. Third, we examined the potential mediating effect underlying differences in Internet usage characteristics may have on explaining observed associations between the seeking experience and age and sex. Each reason, assessment and action taken that was significant at the bivariate level (i.e.  $P < 0.05$ ) was examined at the multivariate level. Logistic regression was used to adjust for the influence

**Table I.** Age differences in reasons for, assessments of and actions taken because of online health information (n = 819)

Online health information seeking experience	% (n)	12–19 years	20–39 years	40–59 years	60–97 years	Statistical comparison	P value
		(n = 37)	(n = 235)	(n = 388)	(n = 159)		
		% (n)	% (n)	% (n)	% (n)		
<b>Reason for using the Internet</b>							
Health problem that respondent has	70.0% (573)	64.9 (24)	67.7 (159)	71.4 (277)	71.1 (113)	$\chi^2 (3) = 1.5$	0.68
Health problem that loved one has	75.0% (614)	54.1 (20)	76.2 (179)	77.8 (302)	71.1 (113)	$\chi^2 (3) = 11.8$	0.01
Information is easy to find	40.2% (329)	48.7 (18)	42.1 (99)	40.2 (156)	35.2 (56)	$\chi^2 (3) = 3.1$	0.38
Wide availability of information	36.0% (295)	13.5 (5)	33.6 (79)	38.4 (149)	39.0 (62)	$\chi^2 (3) = 10.3$	0.02
Needed information quickly	31.0% (254)	32.4 (12)	37.9 (89)	29.9 (116)	23.3 (37)	$\chi^2 (3) = 9.9$	0.02
Privacy/embarrassing topic	4.2% (34)	2.7 (1)	4.3 (10)	4.6 (18)	3.1 (5)	$\chi^2 (3) = 0.8$	0.84
Information is free/health care is expensive	1.7% (14)	0.0 (0)	2.6 (6)	1.0 (4)	2.5 (4)	$\chi^2 (3) = 3.3$	0.35
<b>Assessment of experience</b>							
Satisfied with information found	73.3% (600)	81.1 (30)	71.9 (169)	73.2 (284)	73.6 (117)	$\chi^2 (3) = 1.4$	0.71
Found too much information	24.5% (201)	13.5 (5)	26.0 (61)	25.3 (98)	23.3 (37)	$\chi^2 (3) = 2.9$	0.40
Concerned about quality of information	20.8% (170)	18.9 (7)	25.5 (60)	19.3 (75)	17.6 (28)	$\chi^2 (3) = 4.8$	0.19
Wanted more information but did not know where to find it	20.8% (170)	16.2 (6)	15.3 (36)	20.4 (79)	30.8 (49)	$\chi^2 (3) = 14.5$	<0.01
Not enough time to get all information needed	20.2% (165)	8.1 (3)	20.0 (47)	20.9 (81)	21.4 (34)	$\chi^2 (3) = 3.6$	0.31
Felt frustrated during the search	14.2% (116)	10.8 (4)	12.8 (30)	13.7 (53)	18.2 (29)	$\chi^2 (3) = 3.0$	0.40
Took a lot of effort	13.7% (112)	0.0 (0)	9.8 (23)	13.7 (53)	22.6 (36)	$\chi^2 (3) = 19.7$	<0.001
Not enough energy to get all the information needed	12.2% (100)	5.4 (2)	14.0 (33)	10.3 (40)	15.7 (25)	$\chi^2 (3) = 5.5$	0.14
Information was too hard to understand	7.9% (65)	8.1 (3)	7.7 (18)	6.4 (25)	12.0 (19)	$\chi^2 (3) = 4.7$	0.19
Unaffordable cost for information	7.1% (58)	0.0 (0)	6.0 (14)	7.7 (30)	8.8 (14)	$\chi^2 (3) = 4.2$	0.24
<b>Action taken/result of information found</b>							
Felt more comfortable with information from health provider	78.1% (640)	78.4 (29)	72.3 (170)	79.4 (308)	83.7 (133)	$\chi^2 (3) = 7.8$	0.05
Contact a health care provider	55.1% (451)	48.7 (18)	58.3 (137)	54.4 (211)	53.5 (85)	$\chi^2 (3) = 1.8$	0.61
Tried to treat a health problem	33.3% (273)	32.4 (12)	40.9 (96)	31.7 (123)	26.4 (42)	$\chi^2 (3) = 9.9$	0.02
Tried to diagnose a problem	43.1% (353)	32.4 (12)	47.7 (112)	42.3 (164)	40.9 (65)	$\chi^2 (3) = 4.1$	0.25
Seek support from others	30.2% (247)	29.7 (11)	33.2 (78)	27.3 (106)	32.7 (52)	$\chi^2 (3) = 3.0$	0.39

of Internet use in health information seeking characteristics significantly associated with sex, and multinomial logistic regression was used to adjust for differences in Internet use in observed associations between the seeking experience and age. This analytical technique produces conditional odds ratios for multiple comparison groups (i.e. older adults, middle-aged adults and younger adults) versus one comparison group (i.e. adolescents).

## Results

As reported previously [2], 73% (n = 1459) of respondents in *Surveying the Digital Future, Year 4* reported they were current Internet users, 56% (n = 819) of whom acknowledged using the Internet to search for health care information in the previous year. The mean age of participants was 48

**Table II.** Sex differences in reasons for, assessments of and actions taken because of online health information ( $n = 819$ )

Online health information seeking experience	% ( $n$ )	Males	Females	Statistical comparison	$P$ value
		( $n = 290$ )	( $n = 529$ )		
		% ( $n$ )	% ( $n$ )		
<b>Reason for using the Internet</b>					
Health problem that loved one has	75.0% (614)	73.8 (214)	75.6 (400)	$\chi^2 (1) = 0.3$	0.57
Health problem that respondent has	70.0% (573)	70.7 (205)	69.6 (368)	$\chi^2 (1) = 0.1$	0.74
Information is easy to find	40.2% (329)	46.2 (134)	36.9 (195)	$\chi^2 (1) = 6.8$	<0.01
Wide availability of information	36.0% (295)	32.4 (94)	38.0 (201)	$\chi^2 (1) = 2.5$	0.11
Privacy/embarrassing topic	4.2% (34)	3.5 (10)	4.5 (24)	$\chi^2 (1) = 0.6$	0.46
Needed information quickly	31.0% (254)	27.9 (81)	32.7 (173)	$\chi^2 (1) = 2.0$	0.16
Information is free/health care is expensive	1.7% (14)	2.1 (6)	1.5 (8)	$\chi^2 (1) = 0.4$	0.56
<b>Assessment of experience</b>					
Satisfied with information found	73.3% (600)	76.9 (223)	71.3 (377)	$\chi^2 (1) = 3.0$	0.08
Found too much information	24.5% (201)	26.6 (77)	23.4 (124)	$\chi^2 (1) = 1.0$	0.32
Concerned about quality of information	20.8% (170)	22.1 (64)	20.0 (106)	$\chi^2 (1) = 0.5$	0.49
Wanted more information but did not know where to find it	20.8% (170)	19.0 (55)	21.7 (115)	$\chi^2 (1) = 0.9$	0.35
Not have the time to get all information needed	20.2% (165)	15.5 (45)	22.7 (120)	$\chi^2 (1) = 6.0$	0.01
Felt frustrated during the search	14.2% (116)	13.8 (40)	14.4 (76)	$\chi^2 (1) = 0.1$	0.82
Took a lot of effort	13.7% (112)	8.6 (25)	16.5 (87)	$\chi^2 (1) = 9.7$	<0.01
Not have the energy to get all the information needed	12.2% (100)	11.7 (34)	12.5 (66)	$\chi^2 (1) = 0.1$	0.75
Information was too hard to understand	7.9% (65)	6.9 (20)	8.5 (45)	$\chi^2 (1) = 0.7$	0.42
Unaffordable cost for information	7.1% (58)	4.8 (14)	8.3 (44)	$\chi^2 (1) = 3.5$	0.06
<b>Action taken/result of information found</b>					
Not more comfortable with information from health provider	78.1% (640)	77.6 (225)	78.5 (415)	$\chi^2 (1) = 0.1$	0.78
Contact a health care provider	55.1% (451)	54.1 (157)	55.6 (294)	$\chi^2 (1) = 0.2$	0.69
Tried to diagnose a problem	43.1% (353)	48.6 (141)	40.1 (212)	$\chi^2 (1) = 5.6$	0.02
Tried to treat a health problem	33.3% (273)	31.0 (90)	34.6 (183)	$\chi^2 (1) = 1.1$	0.30
Seek support from others	30.2% (247)	23.8 (69)	33.7 (178)	$\chi^2 (1) = 8.6$	<0.01

years ( $SD = 19$  years) and 60% ( $n = 1214$ ) were female. Median household income was between \$50 000 and \$60 000.

### Comparisons between health information seekers and all other respondents

As shown in Table III, the percentage of non-Internet users increased with age. Only 5% of adolescents were not current users, whereas 54% of older adults were not. Just over one in five (23%) adolescents were online health information seekers, as were one in four older adults (26%). Among young adults, middle-aged adults and older adults, Internet users who used the Internet as a health information resource outnumbered Internet users

who do not. Among Internet users, there was an equal split of health information seekers and non-seekers among men, but more health information seekers than non-seekers among women.

### Age differences in online health information seeking experience

As shown in Table I, the reasons for using the Internet as a health resource differed by age. The most common reason adolescents used the Internet was to search for information about a personal problem, whereas young adults and middle-aged adults were most likely to use the Internet to search for information about a condition of a loved one. Equal percentages of older adults reported each

**Table III.** *Distribution of Internet behavior by age and sex (n = 2007)*

	Online health information seeker	Internet user, non-seeker	Non-Internet user
	% (n)	% (n)	% (n)
<b>Age</b>			
Adolescents (12–19 years)	23 (37)	72 (114)	5 (8)
Young adults (20–39 years)	47 (235)	40 (201)	13 (67)
Middle age (40–59 years)	53 (388)	27 (203)	20 (148)
Older adults (60+ years)	26 (159)	20 (122)	54 (325)
<b>Sex</b>			
Men	37 (290)	38 (304)	25 (199)
Women	44 (529)	28 (336)	29 (349)

Some categories may not add to 100 because of rounding.

reason. Regardless of age, the great majority (i.e. >70%) of health information seekers reported feeling satisfied with the information they found, and they most often (i.e. >70%) felt more comfortable with information received from a health provider after their online experience.

Older people turned to the Internet because of the amount of information available, whereas younger people went online because of its relative speed. Almost 40% of middle-aged and older adults reported going online because of the wide availability of information as compared with 34% of young adults and 14% of adolescents ( $P = 0.02$ ). Younger seekers were somewhat more likely to report using the Internet because they needed information quickly: 38% of young adults and 32% of adolescents reported this as a reason as compared with 30% of middle-aged adults and 23% of older adults ( $P = 0.02$ ).

In general, assessment of the experience worsened as age increased. For example, 16% of adolescents as compared with 15% of young adults, 20% of middle-aged adults and 31% of older adults wanted more information but did not know where to find it ( $P < 0.01$ ). Similarly, no adolescents reported that trying to find information took a lot of effort, as compared with 10% of young adults, 14% of middle-aged adults and 23% of older adults ( $P < 0.001$ ).

Although greater comfort with information from a provider was the most commonly expressed result of the experience for all age categories, endorsement differed significantly across age groups. Specifically, 84% of older adults as compared with 79% of middle-aged adults, 78% of adolescents and 72% of young adults reported greater comfort ( $P = 0.05$ ). Young adults were the most likely to report trying to treat a health problem (41%) as compared with middle-aged adults (32%), adolescents (32%) and older adults (26%) ( $P = 0.02$ ).

### **Sex differences in online health care information seeking experience**

As shown in Table II, both males and females most commonly reported using the Internet because they wanted to look for information about a loved one's health problem. Overwhelmingly, the most common assessment of the experience for both sexes was satisfaction with information found. Feeling more comfortable about information received from a provider was the most common result for both men and women health information seekers.

Reasons cited for using the Internet generally did not significantly differ between men and women. One exception was 46% of men versus 37% of women said they used the Internet as a resource because they expected information to be easy to find ( $P < 0.01$ ). When asked to evaluate their experience, almost twice as many women (17%) as men (9%) said that it took a lot of effort to find information ( $P < 0.01$ ). Moreover, 23% of women as compared with 16% of men reported not having enough time to find all the information that they needed ( $P = 0.01$ ). Once the information was obtained, men were significantly more likely to report trying to diagnose a problem compared with women ( $P = 0.02$ ), whereas women were significantly more likely than men to seek support from others ( $P < 0.01$ ).

### **The influence of Internet usage characteristics on actions taken as a result of health information online**

To examine the potential influence that underlying differences in Internet usage characteristics

(i.e. tenure, intensity of use, self-rated expertise and home Internet access location) may have had on observed differences in results/actions taken by men and women and people of different age groups, logistic regression (multinomial logistic regression for age) was used to quantify the magnitude of association and adjust for potential differences in Internet usage. Each of the six significant associations with age that were calculable (i.e. 'wanted more information' had a null cell, precluding the calculation of a logistic regression equation) and five significant associations with sex persisted even after adjusting for differences in Internet usage characteristics. Indeed, no association changed in magnitude  $>0.47$ . As an illustrative example, females were 2.1 times as likely as males to report that the search took a lot of effort ( $P = 0.002$ ). After adjusting for Internet usage characteristics, females are 2.0 as likely as males to report such effort ( $P = 0.004$ ).

---

## Discussion

---

Results from *Surveying the Digital Future, Year 4* generally suggest more similarities than differences across health information seekers across ages and sexes in the reasons they choose the Internet as a resource, assessment of their experience and actions they choose to take as a result. Overall, high satisfaction ratings are reported, with seven out of 10 respondents within each age and sex category reporting they are satisfied with the information found. Similarly, more than seven in 10 respondents across age and sex categories report feeling more comfortable with information received from a health care provider as a result of information found online. Respondents are equally likely to contact a health care provider because of information found online regardless of sex or age. Findings suggest that irrespective of one's age and sex, the online seeking experience is generally positive and reinforces the patient-provider relationship.

Several important distinctions among age groups and between men and women are noted. Of the

overwhelming majority of adolescents who use the Internet (95%), there are three times as many non-seekers as health information seekers. In contrast, within all other age groups there are more health information seekers than non-seekers among Internet users. This does not mean that Internet-based interventions are not appropriate for adolescents as almost one in four young people between the ages of 12 and 19 years in the general population are estimated to have gone online to look for health care information in the last year. There are very few other sources that young people actively use to find similar information. In fact, based upon 26 single-gender focus groups with 157 English-speaking students in the United Kingdom and United States, Gray *et al.* [17] report that the Internet is the primary source of health care information among adolescents. Instead, the current findings reveal largely untapped Internet-based opportunities for older adults. Just over one in four adults over the age of 60 years in the general population is estimated to have looked for health care information online in the previous year. Two important implications arise: first, if the Internet is the primary source of health information for young people, then we as health educators must be sure that our websites are engaging, highly rated and approachable to young people. Previous reports suggest that younger people are more likely to leave a health information site because of its unprofessional design as compared with older people [13]. We must integrate professional design and interactive technologies that young people have come to expect in their websites. Second, we should examine further the potential for reaching the one in four older adults who are online looking for health information. Future research should focus on websites that older adults are likely to visit so that effective partnerships (e.g. American Association of Retired Persons) can be formed. Qualitative research also should be conducted to better understand the design and navigation expectations of older people using the web.

Older people are just as likely to report looking for information about a health condition concerning

a loved one as for information pertaining to a personal problem. Although we often think of middle-aged adults as having a large care giving burden because of responsibilities for both their parents and their own children, a similar percentage of older people and middle-aged people report searching for information about a loved one. This suggests that it is not only adult children who are using the Internet as a resource for care giving support but also older people. As the population ages, this also may mean that more and more older people will be looking for information for themselves as well as for their partners. Researchers designing health education websites may do well to include information about the targeted medical condition as well as implications for caregivers. This 'multiple-hit' approach will maximize the health educator's ability to reach their target populations as well as to efficiently disseminate information on as wide a scale as possible.

As age increases so too does the likelihood of indicating that the Internet is a helpful tool because of the great amount of available information. Younger respondents, on the other hand, are more likely than older respondents to suggest that needing information quickly is an influential reason for turning to the Internet. Accordingly, as compared with adolescents, twice as many middle-aged and older adults said they did not have enough time to find all the information they wanted. More than one in five older adults also indicate that the search took a lot of effort, as compared with none of adolescent health information seekers. These findings suggest that health education websites designed for young people should make information quickly accessible. Websites aimed at older adults on the other hand, should perhaps provide more detailed information as well as pay more attention to easy navigation and an intuitive layout. Qualitative research will be a useful tool in identifying specific components that can be integrated into website design to improve the seeking experience for each age group.

In contrast to previous reports suggesting that women are more likely than men to endorse the benefits of online searches, especially the conve-

nience and amount of information available [13], men in the current investigation are significantly more likely than women to report that the reason they use the Internet as a resource is because information is easy to find. Men and women are equally likely to endorse all other reasons for health information seeking. On the other hand, women are significantly more likely to report that the search took a lot of effort and that there was not enough time to find all the information needed. This may be reflective of sex differences in comfort with this technology in general [15]. It may also be that the time demands of women are greater than the those of men, leaving less time for Internet searches. Future research, especially qualitative methods, could be used to provide more detail on the Internet health information seeking motivations, assessments and experiences of men and women. Current findings may highlight the importance of testing female-focused intervention websites with women to ensure that the design fits the needs and navigation tendencies of the intended audience.

Previous literature suggests that younger people are more comfortable than older people using the Internet in general [18], as are men compared with women [15]. We hypothesized that underlying differences in Internet use may help explain observed differences in assessments of the seeking experience and actions taken because of the information found online. Indeed, self-rated expertise and the number of years online significantly differ by age and sex among health care information seekers in the current sample. Results suggest, however, that Internet usage characteristics consistently fail to explain demographic differences in assessments of the online seeking experience and the actions taken as a result. For all significant differences in assessment and actions taken by sex and age, findings are persistent even after adjusting for underlying differences in Internet usage characteristics (i.e. intensity of use, tenure online, whether one has access at home and one's self-rated expertise online). Observed differences in the online health care seeking experience between men and women and among different age groups in the

current report seem to have less to do with Internet use and expertise than one might think.

### Limitations

The current investigation has highlighted important differences as well as similarities between males and females and among members of different age groups in reasons for, assessments of and actions taken as result of health information found online. It is not, however, without limitations. First, the current investigation does not include medication conditions or treatment outcomes. This information would enhance the findings. Second, the measurement of health information seeking is rather crude in the current investigation. It is possible that intensity and frequency of seeking behavior would reveal additional differences across age and sex. This may be an important area of future inquiry. Lastly, the response rate is reflective of a general decline in response rates for national telephone surveys [19, 20], which face the challenges of caller ID, confusion with telemarketers and saturation of surveys among the public. Our survey is additionally challenged because of its broad inclusion criteria; targeting a more select population would have likely increased the response rate but decreased the generalizability.

### Implications and conclusion

The Internet is transforming the manner in which consumers are informed about medical and health issues, as well as the way in which they interact with their providers. Indeed, 55% of all health information seekers contacted a health care provider because of the information they found online. Regardless of age or sex, the great majority of health information seekers in the current investigation report feeling satisfied with the information they found and are equally likely to contact a health care provider with information found online, as are members of the different age groups.

The current study reveals that one in four older adults are health information seekers, suggesting further attention to online tools for older people by health education researchers may be warranted. Findings also suggest differences in the seeking

experience by sex and age. In general, assessment of the seeking experience tends to worsen as age increases. More than one in five older adults report that the search took a lot of effort as compared with none of the adolescents. Women are significantly more likely to report that the experience took a lot of effort or required more time than they had. Underlying differences in Internet use and experience fail to explain these associations. Future research should integrate qualitative methods to probe for more detailed information about the motivations for and context influencing Internet health information seeking.

Variance in the seeking experience may influence the quality of information found and presented at the health provider's office, as well as the patient's presentation of information. Health education professionals should be aware of sex and age differences in online health information seeking behavior and integrate related advice to design interventions accordingly.

---

### Acknowledgements

---

The National Cancer Institute supported this research. This manuscript is an extension of an oral presentation at the American Public Health Association's Annual Conference, 2005.

---

### Conflict of interest statement

---

None declared.

---

### References

---

1. USC Annenberg School Center for the Digital Future. *Ten Years, Ten Trends. Year 4. The Digital Future Report: Surveying the Digital Future*. 2004. Available at: <http://www.digitalcenter.org/downloads/DigitalFutureReport-Year4-2004.pdf>
2. Ybarra M, Suman M. Help seeking behavior and the Internet: a national survey. *Int J Med Inform* 2005; **75**: 29–41.
3. Hesse BW, Nelson DE, Kreps GL *et al*. Trust and sources of health information: the impact of the Internet and its implications for health care providers: findings from

- the first Health Information National Trends Survey. *Arch Intern Med* 2005; **165**: 2618–24.
4. Cotten SR, Gupta SS. Characteristics of online and offline health information seekers and factors that discriminate between them. *Soc Sci Med* 2004; **59**: 1795–806.
  5. Wagner TH, Jimison HB. Computerized health information and the demand for medical care. *Value Health* 2003; **6**: 29–39.
  6. Baker L, Wagner TS, Singer S *et al*. Use of the Internet and e-mail for health care information: results from a national survey. *J Am Med Assoc* 2003; **289**: 2400–6.
  7. Murray E, Lo B, Pollack L *et al*. The impact of health information on the internet on the physician-patient relationship: patient perceptions. *Arch Intern Med* 2003; **163**: 1727–34.
  8. Cline RJW, Haynes KM. Consumer health information seeking on the Internet: the state of the art. *Health Educ Res* 2001; **16**: 671–92.
  9. Berland GK, Elliott MN, Morales LS *et al*. Health information on the Internet: accessibility, quality, and readability in English and Spanish. *J Am Med Assoc* 2001; **285**: 2612–21.
  10. Boyer C, Selby M, Appel RD. The Health on the Net Code of Conduct for medical and health web sites. *Med-information* 1998; **9**(Pt 2): 1163–6.
  11. Eysenbach G, Powell J, Kuss O *et al*. Empirical studies assessing the quality of health information for consumers on the world wide web. *J Am Med Assoc* 2002; **287**: 2691–700.
  12. Fox S. *Health Information Online: Eight in Ten Internet Users Have Looked for Health Information Online, with Increased Interest in Diet, Fitness, Drugs, Health Insurance, Experimental Treatments, and Particular Doctors and Hospitals*. Washington, DC: Pew Internet & American Life Project, 2005.
  13. Fox S, Rainie L. *Vital Decisions: How Internet Users Decide What Information to Trust When They or Their Loved Ones are Sick*. Washington, DC: Pew Internet & American Life Project, 2002.
  14. Sabel MS, Stringfield VJ, Schwartz JL *et al*. Patterns of Internet use and impact on patients with melanoma. *J Am Acad Dermatol* 2005; **52**: 779–85.
  15. Broos A. Gender and information and communication technologies (ICT) anxiety: male self-assurance and female hesitation. *Cyberpsychol Behav* 2005; **8**: 21–31.
  16. StataCorp. *Stata Statistical Software. Release 7.0 Ed*. College Station, TX: Stata Corporation, 2000.
  17. Gray NJ, Klein JD, Noyce PR *et al*. Health information-seeking behaviour in adolescence: the place of the internet. *Soc Sci Med* 2005; **60**: 1467–78.
  18. US Department of Commerce. *A Nation Online: How Americans are Expanding Their Use of the Internet*. 2002. Available at: [http://www.ntia.doc.gov/ntiahome/dn/nationonline\\_020502.htm](http://www.ntia.doc.gov/ntiahome/dn/nationonline_020502.htm).
  19. Martin E. Presidential address: unfinished business. *Public Opin Q* 2004; **68**: 439–50.
  20. McGuckin N, Keyes MA, Liss S. *Hang-Ups: Looking at Non-Response in Telephone Surveys*. US Department of Transportation, 2004. Available at: [http://www.fhwa.dot.gov/ohim/hang\\_ups.htm](http://www.fhwa.dot.gov/ohim/hang_ups.htm).

Received on October 30, 2005; accepted on June 5, 2006